APPENDIX H

Response to Environmental Assessment Atlantic Mining NS Incorporated Touquoy Gold Project Site Modifications Historic Tailings

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November 23, 2021

Project #
60664547

Dear Ms. Nicholson,

Subject: Response to Environmental Assessment – Atlantic Mining NS Incorporated Touquoy Gold Project Site Modifications – Historic Tailings

As part of the letter issued to Atlantic Mining NS Incorporated (AMNS) on September 8, 2021 regarding the Environmental Assessment – Atlantic Mining NS Incorporated Touquoy Gold Project Site Modifications, additional information was requested by the Minister of Environment and Climate Change in Consultation with Nova Scotia Environment and Climate Change (ECC). One item from the request requiring additional information is:

"*Historic Tailings: Provide a description and map of historic mine tailings within or near the proposed project footprint. Provide a plan to manage the historic tailings."*

In response to this request, please find attached to this memo, **Figure 1 – Historic Tailings Locations (Attachment 1).** All historic tailings within or near the proposed project footprint that are disturbed as part of the site modifications will be managed in accordance with the approved Historic Tailings Management Plan (HTMP) (Stantec, 2018) (**Attachment 2)** with some updates to accommodate current site conditions and changes since the original HTMP was developed in July 2018. The updates are further discussed in this memo.

Historic Tailings Management Plan – 2021 Updates

Given the project site changes since the HTMP was approved, AECOM Canada Ltd. (AECOM) was retained by Atlantic Mining NS (AMNS) to review and suggest modifications to the HTMP to be reflective of current site conditions. The major updates to the HTMP are as follows:

1. The remaining areas of historic tailings has decreased due to remediation that occurred during pit development in 2018 and 2019. Further management may be required in limited areas near the proposed project footprint, (specifically the proposed open pit spill way which will be constructed as part of site closure activities).
2. The disposal location for historic tailings will be changed, as the clay cells built within the tailings management facility (TMF), are now full and capped.

Remaining Areas of Historic Tailings

The proposed open pit spill way (approximate location) intersects with historic tailings from the G&K Stamp Mill Area as shown on **Figure 1.** Based on preliminary conceptual design information for the spillway, the area of intersection between the spillway and historic tailings is estimated to be 640 square meters. From initial assessment the tailings in this area range from 0 to 1 m thick. It is anticipated there is approximately 640 m^3 of historic tailings which may require management under the HTMP, unless the proposed spillway location is adjusted. Concentrations of arsenic within the historic tailings to be managed would range from 1900 mg/kg to

9400 mg/kg and concentrations of mercury range from non-detect to 0.9 mg/kg. All historic tailings will be managed in accordance with the Historic Tailings Management Plan, part from the updated disposal location.

Disposal Options Update

As part of the HTMP, several remedial options for the historic tailings were reviewed. In 2019 the HTMP selected Cell Encapsulation within the Tailings Management Facility as the chosen remedial option. To date, all historic tailings managed under the HTMP have been encapsulated within the TMF. However, this remedial option is no longer the best option for future disposal of historic tailings (if required), as the TMF is nearing capacity. Therefore, all remedial options have been re-evaluated using the criteria outline in the HTMP and flow chart shown in the HTMP and attached (**Figure 2 – Attachment 1)**) to this memo for reference.

Based on the criteria as outlined in the HTMP, one possible remedial option would be off-site disposal.

"Off-site disposal is an option for tailings material for which no other suitable remedial measure could be found, which could be the case for high levels of mercury if found in historic tailings". (HTMP, 2018).

Disposal of the historic tailings within the current pit limits is being considered as a potential remedial option. Further geochemical investigation would be required to confirm it this is an acceptable remedial option. AMNS would seek input and approval from NS ECC if this option is considered in more detail.

Relocation or adjustment of the spillway location is another option being evaluated by AMNS. It is AECOM's understanding that detailed design of the spillway has not yet been completed as the project is still in the preliminary conceptual design phase. Therefore, the final location of the spillway could potentially be adjusted to avoid the disturbance of historic tailings. This option should be further considered as part of continued site reclamation planning,

Additionally, AMNS will continue to evaluate remedial options for the historic tailings. Should other viable options be considered suitable, AMNS would present the alternative remedial options to NS ECC for review.
Sincerely,

AECOM Canada Ltd.

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Attachments:
Attachment 1 – Figure 1 – Historic Tailings Locations
Figure 2 – Flow Chart
Attachment 2 – Historic Tailings Management Plan

References:
Stantec, 2018. Historic Tailings Management Plan, Dated July 26, 2018.

Statement of Qualifications and Limitations

The attached Report (the "Report") has been prepared by AECOM Canada Ltd. ("AECOM") for the benefit of the Client ("Client") in accordance with the agreement between AECOM and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations and conclusions contained in the Report (collectively, the "Information"):

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- represents AECOM's professional judgement in light of the Limitations and industry standards for the preparation of similar reports;
- may be based on information provided to AECOM which has not been independently verified;
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued;
- must be read as a whole and sections thereof should not be read out of such context;
- was prepared for the specific purposes described in the Report and the Agreement; and
- in the case of subsurface, environmental or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time.

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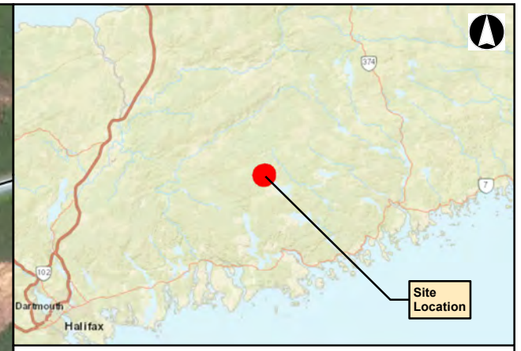
This Statement of Qualifications and Limitations is attached to and forms part of the Report and any use of the Report is subject to the terms hereof.

AECOM: 2015-04-13

Attachment 1

Figures



Legend

- Approximate Extent of Historical Tailings Remediated in 2018 and 2019
- Approximate Extent of Historical Tailings Remaining Within IA Limit
- Approximate Extent of Tailings Areas Outside of Proposed IA Limits
- IA limits – Outside Berm
- Proposed Open Pit Spillway, Final Location to be Confirmed Upon Detailed Design
- Proposed EA Project Footprint (Clay Borrow Expansion)
- Roads

Note:
Drone image - January 3, 2020

0 30 60 120 180 240
Metres

TOUQUOY GOLD PROJECT

Historic Tailings Locations

Oct 22, 2021	1:3,750 * when printed 11"x17"	Datum: NAD 1983 CSRS UTM Zone 20N Source: Image: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong),
P# 60664547		

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Figure 1

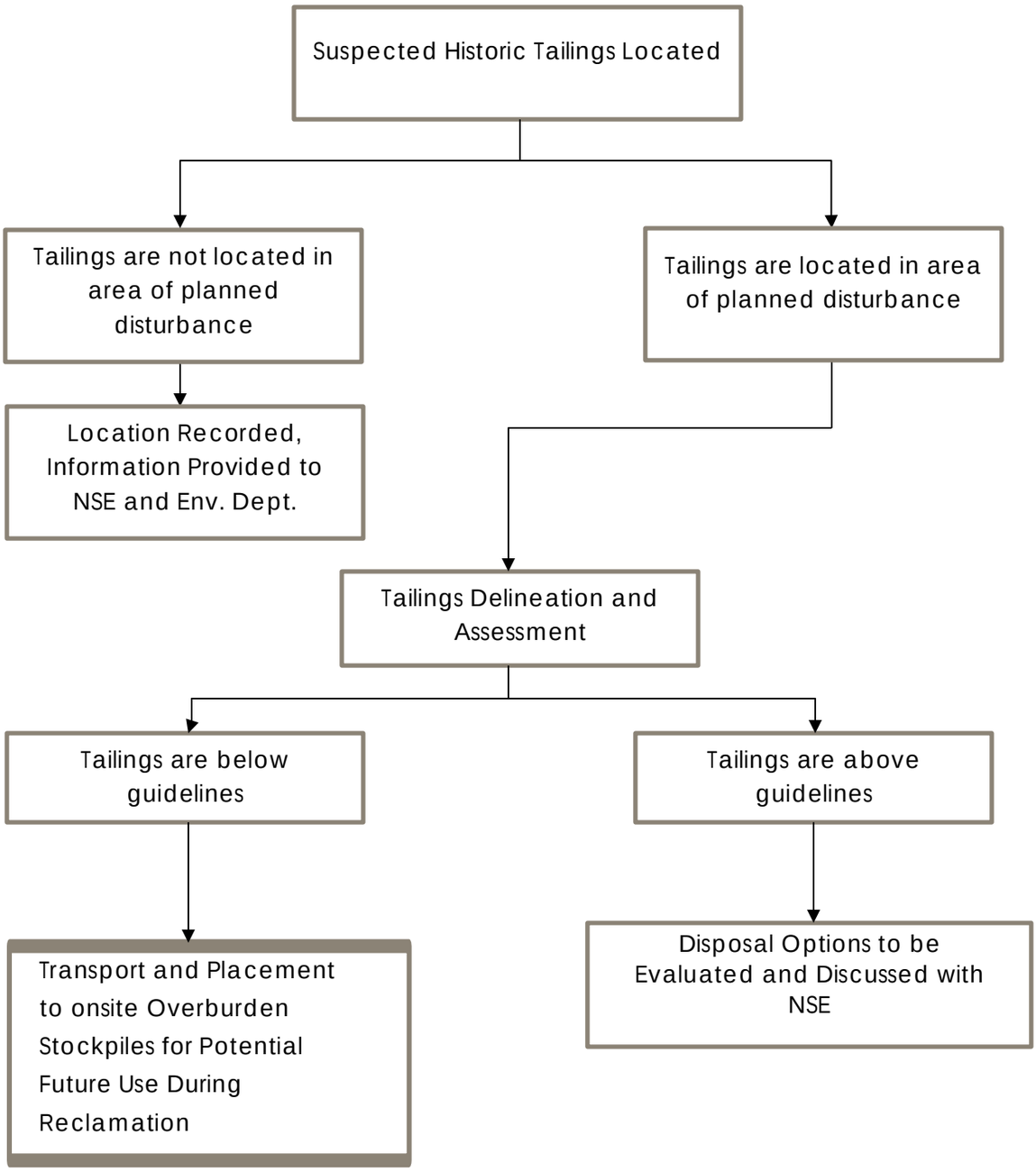

Figure 2 – Historic Tailings Remedial Flow Chart

AECOM

Attachment 1

Historic Tailings Management Plan

Final Historic Tailings Management Plan

Prepared for:
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File No: 121619250

July 26, 2018

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LIST OF APPENDICES

1.0 INTRODUCTION

At the request of Atlantic Gold Corporation, this Historic Tailings Management Plan has been developed in accordance with Condition 18 of Industrial Approval (hereafter referred to as the "Approval") number 2012-084244-03.

1.1 PROJECT OVERVIEW

The Touquoy Gold Project (hereafter referred to as the "Site") is located in Moose River, NS and is an open pit gold mine that is operating in an area of historic gold mining (Figure 1, Appendix A). As a result, historic tailings are known to exist on site due to the existence of stamp mills that were used for processing gold containing ore.

The Approval contains a number of conditions related to the assessment, delineation and remediation of historic tailings that are located in areas that are planned for disturbance during the construction, operation or reclamation of the project and its associated facilities.

1.2 GOALS AND PURPOSE OF THE PLAN

The purpose of this plan is to provide a methodology for managing historic tailings at the Touqouy Site through the life of operations and throughout reclamation. To achieve this purpose, this management plan has been developed with the following goals:

1. Define procedures for the identification, and if required, delineation and assessment of historic tailings prior to development on Site.
2. Provide a methodology for the selection of historic tailings management and disposal technologies as required.
3. Define responsibilities for the notification and reporting for issues related to historic tailings management.
4. Provide a summary of the current understanding of historic tailings within the site footprint
5. Provide a summary of proposed management and mitigation for known areas of historic tailings that will be disturbed by planned Site activities.

These goals lay out the basis for achieving the purpose of this plan in a safe, cost effective manner.

2.0 IDENTIFICATION OF HISTORIC TAILINGS

Due to the nature of historical mining within the Site area, the extent of historically tailings has been poorly defined prior to the development of the Touqouy site by the Atlantic Gold Corporation. This is a result of the age of the deposition of these historic tailings (approximately 100 years old) and is inherent

to the nature of tailings deposition by stamp mills themselves, which was very dependent on now unknown piping routes and local topography. This section outlines the current understanding of historic tailings distribution at Site, and provides a methodology for the future identification of areas suspected to contain tailings prior to development.

2.1 HISTORIC TAILINGS DISTRIBUTION ON SITE

2.1.1 Known Historical Tailings and Investigations

Several historical reports and studies have been conducted in the area surrounding the site. This section gives a summary of known studies and investigations that quantify the presence of historic tailings and stamp mills, and where possible delineate the extents of known tailings.

In 2007, Atlantic Gold submitted a Historic Tailings Management Plan to Nova Scotia Environment (NSE) for the Moose River Gold Mine Project (Inspec-Sol, 2007). The Historic Tailings Management Plan identified six historic mining stamp mills that operated between 1882 and 1925 in the area of the mine's proposed open pit. Two of these historic stamp mills (Moose River Gold Mines Stamp Mill and G&K Mining Stamp Mill) were found to be located within the Touquoy Gold Project property limit near the proposed open pit. Figure 1, Appendix A shows the approximate locations of four of the historic stamp mills. The fifth mill is located away from the current area of work, and the sixth stamp mill (Reynolds Mill) location could not be determined. It is expected that there is historic tailings located near each of these six historic stamp mills.

In 2016, Atlantic Gold completed a sampling program to delineate historic tailings areas at the Moose River Gold Mine and G&K Gold Co. sites (Atlantic Gold, 2016) to address comments from NSE made in response to its Industrial Approval Application (NSE, 2013). As part of this delineation program, 126 soil samples were submitted for laboratory analysis of metals (including mercury). This study found historical tailings present with elevated levels of arsenic and mercury, and completed a preliminary delineation of the historical tailings. This report is provided within Appendix B of this Plan.

To build upon this work and delineate the historic tailings at the Moose River Gold Mine and G&K Gold Co. sites, Atlantic Gold commissioned a Phase 1 Environmental Site Assessment (ESA) to identify environmental considerations (Stantec, 2017), which was followed by Phase 2 ESA with additional study (Stantec, 2017 and Stantec, 2018). These documents are provided in Appendix B of this Plan. A summary of the findings of these studies is as follows:

- The area of was actively mined for gold and Tungsten from 1866 to the late 1930s. Minor waste reprocessing/surface mining may have occurred between the 1930s and early 1980s.
- The tailings material found was well sorted, and ranged from a light grey to a reddish brown. Typically, deposited tailings material was stratified, and few clasts/cobbles were present.
- Areas containing elevated gold concentrations tend to have elevated concentrations of arsenic due to the presence of arsenopyrite that is common in the geology of the area. Therefore, elevated arsenic concentrations are expected to be present across the Site. The activities associated with the historic stamp mills could also increase arsenic concentrations in the soil at these areas. Elevated arsenic

concentrations were identified in soil up to 50 m away from the estimated extent of the tailings pile at the Former G&K Mining Stamp Mill, indicating that arsenic is likely naturally elevated in that area.

- Selected soil samples were collected that contained elevated arsenic as compared to the local background. Concentrations of other metals parameters (including mercury) were not detected above the Nova Scotia Tier 1 EQS for an industrial site in the soil samples tested as part of this program. The Nova Scotia Tier 1 EQS standards were selected as the site is an industrial area located on provincial land in Nova Scotia. However, elevated concentrations of mercury (in comparison with the background sample results) are present. Mercury was commonly used in the amalgamation process of stamp mills.

- The concentrations of aluminum, arsenic, cadmium, and iron detected at the surface water sample collected from Moose River are within the range or slightly elevated in comparison with background surface water data.

- The historic tailings were assessed to cover an area of ~16,200 m^2 at the Moose River Stamp Mill location, and an area of ~19,800 m^2 at the G&K Stamp mines location. To calculate the estimated volume of historic tailings at each location, a conservative estimate of tailings depth was used (the maximum depth that tailings were observed, 1.2 m) and a 25% safety factor was applied. Using these assumptions, the volume of tailings at the Moose River Mill location is estimated to be ~24,200 m3, and a volume of tailings of 29,700 m3 was estimated to be at the G&K stamp mill location.

Further confirmatory delineation and groundwater assessment of these locations is planned as part of the remediation strategy.

2.1.2 Determination of Suspected Tailings Areas

As discussed above and partially shown in Appendix A, Figure 1, there are six stamp mills known to be in the Touqouy Project vicinity. In areas prior known to contain historic stamp mills, a Phase I ESA should be performed to CSA standards to gain an understanding of the activities in the area of each site prior to field assessment and delineation. Based on the results of the Phase I ESA and the judgement of the environmental professional, a Phase II ESA may be required. Section 2.2 below provides guidance on the identification and delineation for areas suspected to contain historic tailings to assist with undertaking Phase II ESAs.

2.2 METHODOLOGY FOR DELINEATION AND CHARACTERIZATION OF HISTORICAL TAILINGS

As recommended above in Section 2.1.2, tailings identification has specific considerations that should be accounted for when delineating and assessing historic tailings. The following is a general methodology for identifying historical tailings including visual and material sampling and chemical analysis techniques. It should be noted that historical tailings delineation can be highly site specific, and as such professional judgement is a key component of any impact delineation exercise.

A review of available guidance from NSE and academic sources was undertaken at the request of NSE and Atlantic Gold. NSE guidance regarding the identification of tailings, excerpted from the NSE document is provided below.

- Tailings are a sand-like material, generally with no rocks mixed in.
- The colour of them can vary between light brown and dark grey.
- Tailings often look like a 'fine sand beach' but inland without the water

The bullets above are consistent with observations of historical tailings in the Cochrane Hill Gold District (Mosher, 2004), the Montague and Goldenville Gold Districts (Parsons et al., 2015).

Visual delineation methods, while useful, need to be combined with sampling and chemical analysis. Within Nova Scotia, gold deposits tend to occur in areas with high incidences of arsenopyrite. Historical milling operations have used mercury in processing, as it was a common technology applied at this time. An understanding of background concentrations of arsenic and mercury is required, as naturally occurring levels due to the local rock formation can exceed applicable environmental quality guidelines.

A literature review has indicated that little formal guidance is available publicly from government sources regarding typical concentrations of arsenic and mercury backgrounds in gold bearing regions of Nova Scotia. Studies have been completed by independent organizations regarding arsenic levels within the Halifax regions, and academic organizations have completed studies at specific sites, but guidance is not available for all regions. Available literature has been reviewed to gain an understanding of arsenic and mercury background concentrations, and delineation methodologies applied.

Site specific approaches need to be applied when undertaking tailings and tailings impacts investigations. A combination of physical visual identification (where possible) and chemical analysis methods are used for delineating the tailings and their associated impacts.

Physical identification is the primary method to initially ascertain whether an area contains historical tailings. Due to the primary method of processing used historically (stamp mills), there are physical characteristics common to tailings deposited in the late 19th/early 20th century. Physical samples should be collected in materials from areas where tailings historic deposits are suspected, and compared to the following general physical criteria:

- Fine grained, well sorted material, generally less than 1mm in size. Few or no large cobbles (or clasts) present.
- Highly bedded deposition, with visually identified depositional layers. Some areas may not display this layering depending on how the stamp mill and tailings deposition occurred.
- Colour ranging from light grey, through to a brownish red. The characteristics of the local ore body should be considered in this evaluation.

Background samples should be collected near the area of suspected tailings deposition. However, there are several considerations that should be observed when selecting a background location, including:

- Selecting a location that overlays the same host rock as the area of potential tailings deposition.
- Background samples should be collected in undisturbed areas that have not been recently worked or show signs of historical activities.
- Collection of samples at a similar depth to the tailings impact delineation samples, to account for historical weathering and the potential for arsenic transport.

When background samples have been taken and analyzed for chemical characteristics, an appropriate value for background parameters of interest should be selected. Chemical analysis results should be

compared to the selected background chemical values as per standard Phase II methodology (CSA Group, 2013).

2.3 REPORTING

2.3.1 Internal

The results of any study or reporting, whether externally commissioned or internally completed shall be provided to the Site Environmental Department. Information regarding the known location, chemical makeup and extent of tailings on Site shall be integrated into this plan as part of this Plans ongoing adaptive management and updating process.

2.3.2 External

Prior to the implementation of this plan, the plan is required to be submitted to NSE for review and approval thirty (30) days prior to implementation. This plan shall be submitted to NSE as required by the Department.

The results of all externally commissioned studies relating to the assessment and delineation of historic tailings shall be provided to NSE.

3.0 SELECTION OF REMEDIAL OPTIONS FOR HISTORICAL TAILINGS

Phase I ESA studies completed to date have shown that historic tailings have been deposited by a variety of mining endeavors, that spans greater than 40 years. The chemistry of historic tailings can be variable, due to the primitive nature of the processing at the time and the effects of natural attenuation. The following section outlines the available remedial options for historic tailings at site. It should be noted that any placement of historic tailings material outside of the tailings management facility (TMF) requires the explicit permission of NSE, as per the requirements in the Approval (Condition 19 d.).

3.1 AVAILABLE REMEDIAL OPTIONS

3.1.1 Tailings Management Facility Material Placement

The TMF at the Touqouy site is the receiving and storage facility for tailings generated during the ongoing processing of gold. Placement of material within this facility with the regular tailings stream may be an appropriate remedial option depending on the chemistry of the historic tailing.

For tailings material to be placed within the TMF, it has to meet the following two criteria:

1. The historic tailings are chemically similar to the design tailings criteria for the TMF

2. A geochemical study has shown that no adverse chemical reactions will occur between the historic tailings and the geochemical conditions within the TMF.

If historic tailings material has been shown to be geochemically stable within the TMF, and is physically and chemically consistent with the design criteria for the TMF, placement within the facility with the currently generated tailings stream is an option.

3.1.2 Cell Encapsulation within the Tailings Management Facility

If historic tailings material are not appropriate for direct disposal within the TMF, cell encapsulation within the facility may be an option. Cell encapsulation involves the design and construction of a capped cell, either impermeable or semi-impermeable, within the footprint of the existing TMF at Site. The design goal of the cell is to increase the level of containment provided by the TMF, and limit the infiltration of water into the tailings, and out into the environment.

3.1.3 Transport and Placement

If the historic tailings material does not exceed the Nova Scotia Tier 1 Environmental Quality Standards (EQS) for Contaminated Sites at an Industrial site (Nova Scotia Environment, 2013), the removal of historic tailings from their existing location to another suitable area on site is an option. There are several locations at Site, such as waste rock pile where material could be deposited if it meets the applicable criteria. If the tailings material is below applicable land use guidelines, the tailings material could be used as site overburden.

3.1.4 Re-Process

The re-processing of historic tailings may be an option, depending on the variability of the tailings and the capacity and capability of the mill. During the reprocessing of old tailings material, the metal(s) of interest are extracted using modern mill technology, and the residual material processed and deposited within the TMF (if chemically suitable).

While this option can be attractive due to the possibility of enhanced revenue generation in practice the re-processing of tailings can be difficult. Mill processes are tuned to the expected chemistry of the material being processed. Tailings of the age expected to be found on Site commonly contain organic materials and other substances that can be detrimental to an efficient re-processing of tailings.

3.1.5 Off-Site Disposal

Off-site disposal is option for tailings material for which no other suitable remedial measure could be found, which could be the case for high levels of mercury if found in historic tailings. There are currently no facilities located in New Brunswick or Nova Scotia that can receive solid materials that contain high levels of mercury. The nearest facilities are located at Quebec, and have limits on the levels of arsenic and mercury for material acceptance.

3.2 REMEDIAL OPTION SELECTION

The following section outlines some of the considerations when selecting a preferred remedial option for historic tailings. The guiding principles for the selection of a remedial option for historic tailings are:

1. The risk of adverse environmental impacts is minimized, and improved from existing conditions.
2. The risk to human health is minimized, and improved from existing conditions.
3. The remedial option is technically feasible and cost efficient.
4. The remedial solution is permanent to the practicable extent possible, and minimizes future liability to Atlantic Gold.
5. Any historic tailings disturbed by Atlantic Gold operations must be remediated, as per the Approval.

The flow chart below outlines the decision-making processes for the selection of remedial options based on the above principles is located in Appendix A, Figure 2.

4.0 PROCEDURES FOR THE REMEDIATION OF HISTORICAL TAILINGS

4.1 TAILINGS EXCAVATION

Tailings within the project disturbance footprint will be excavated to delineated extents or to bedrock via excavator, with a trained environmental professional directing the removal of material. The material identification methodology described in Section 2.2 will be used to identify tailings during excavation, with special emphasis placed on ensuring the vertical extent of the tailings are captured. Recent excavation of a portion of the tailings has found trenching to be a more effective method of visually identifying the tailings extent.

Tailings will be placed directly in trucks for transport. The volume of material transported by trucks should be recorded, and pictures should be taken both during excavation and material placement for record keeping purposes.

Soil samples will be collected along the final horizontal and vertical extents of the excavation for confirmatory sampling (where the excavation has not been extended to bedrock). Confirmatory sampling methodology and frequency will meet the requirements of the Nova Scotia Contaminated Site Regulations (NSE, 2013). Where arsenic contaminated soil is excavated in conjunction with historic tailings, confirmatory sampling will be completed by a trained environmental professional to confirm the segregation of tailings from contaminated soil. Arsebuc contaminated soil remediation is discussed further in Section 5.1.

The vertical (if not extended down to bedrock) and horizontal extents of the excavation should be surveyed once excavation activities are complete.

4.2 WATER MANAGEMENT

Due to the nature of historic tailings deposition, tailings material is typically found close to the existing ground surface, and as a result has the potential to be saturated with water. Therefore, this water must be controlled as it has the potential for the transport of contaminants.

Currently at Site, the Touquoy Pit (hereafter referred to as the “Pit) acts as the governing controlling groundwater flow feature due to pumping occurring within the pit. It is expected that groundwater and surface water will flow towards this governing feature and be captured and managed within the TMF as part of normal mine operations.

If required, surface areas should be contoured to promote rapid surface drainage towards the pit, with ditches or pumping used as required. If future historic tailings are remediated outside of the surface water/groundwater capture zone of the pit, surface water management, and if required, remedial activities should be planned on a site by site basis.

4.3 TAILINGS TRANSPORT AND PLACEMENT

Tailings will be deposited directly into available trucks via excavator for transport to the selected area for remediation. If the material is dry and dust generation is a concern during transport, the material in the trucks will be covered.

If the material is excessively wet, the truck boxes will be sealed during transport. Existing access roads will be used to the extent possible, new temporary roads may be constructed to facilitate remediation if required.

Prior to material being transported off site, the material should be assessed to see if it falls under the Transportation of Dangerous Goods Regulation. If the material does meet the requirements under the regulation, appropriate permits shall be obtained prior to transportation.

4.4 MONITORING AND REMEDIAL VERIFICATION

All confirmatory samples should be sent to an accredited laboratory and tested for, at minimum, metals in soil. These samples should be compared to the Nova Scotia Contaminated Site Regulations (NSE, 2013) for an Industrial site, and any site specific (i.e. background) criteria developed. If the confirmatory samples exceed the relevant soil quality guidelines, additional assessment should be completed to ensure the remedial objectives are met.

Groundwater wells will be installed in the area of the historic tailings and sampled prior to removal of the bulk of the historic tailings material. Groundwater wells will be monitored in order to assess whether source removal and/or dewatering of the open pit mine have an impact on groundwater quality. Monitoring wells should be monitored at least quarterly for two years after remediation activities to assess changes in groundwater conditions over time, at which point the results should be assessed by an environmental professional and further monitoring planned if required. Baseline groundwater sampling

should be compiled from existing site monitoring wells, and from at least one round of sampling of the new well installations to assist with assessment.

4.5 REPORTING

4.5.1 Internal

The following information should be reported internally, and where appropriate, integrated into this Plan, as well as provided to the Site Environmental Department for record keeping and planning purposes:

- All confirmatory sampling results and laboratory certificates.
- The surveyed delineated extents of the historic tailings excavation.
- Any pictures of the excavation, placement or transport of the material.
- Groundwater sampling results and water levels, both preliminary and ongoing results.
- Volumes of removed material, and placement location if an on-site remedial option is chosen.
- Any contractor disposal certificates if an off-site remediation method is chosen.
- Any reprocessed tailings quality results, if re-processing is selected as a remedial option.

4.5.2 External

The following information, whether provided as part of an updated Historic Tailings Management Plan, or submitted under a separate cover, should be submitted to NSE:

- All confirmatory sampling results and laboratory certificates.
- The surveyed delineated extents of the excavation.
- Groundwater sampling results and water levels, both preliminary and ongoing results.
- Volumes of removed material, and placement location if an on-site remedial option is chosen.
- Any contractor disposal certificates if an off-site remediation method is chosen.
- Any reprocessed tailings quality results, if re-processing is selected as a remedial option.
- Design of the containment cell, if selected as a remedial option

5.0 PLANNED REMEDIAL ACTIVITIES

5.1 PLANNED REMEDIATION AND ASSUMPTIONS

As discussed within Section 2.1.1 of this Plan, assessment and delineation activities have been undertaken at the former locations of the Moose River and G&K Stamp Mills in the area of the planned open pit disturbance. The results of these studies (including tailings extents and presence of arsenic contaminated soil outside of the tailings extents) are contained within Appendix B of this Plan. The arsenic contaminated soil identified in this area is likely caused by proximity to the ore body as well as historic mine activities (historic waste rock piles present throughout the area). Management of arsenic contaminated soils and historic waste rock is considered separate from the historic tailings management and will be detailed in a separate Contaminated Soil Management Plan document. In the interim, all soil within the area of historic mine activities will be treated as contaminated soil until proven otherwise. This soil will be contained within a temporary cell in the TMF until the CSMP is approved (as detailed in

AMNS's "Request for Partial Excavation and Temporary Relocation of Historic Tailings" memo to NSE dated May 31, 2018).

Remedial activities are planned for these locations in 2018, within the planned disturbance areas of the Pit, as is required by the Approval. The outline of each delineated area is located in Figure 1, Appendix A. To estimate the total quantity of historic tailings that will require remediation, the following assumptions were made:

- Areas that are disturbed by the current Pit footprint and mine activities will be progressively remediated as site development continues.
- To be conservative, given the variability of tailings depth, volume estimates were calculated based upon the maximum depth of tailings observed during assessment (1.2 m). The average depth of historic tailings is expected to be closer to 0.7 m based on the assessment completed.
- For the calculation of expected remedial volume, a safety factor of 25% was added to increase the conservatism of the volume calculation.

The pit development, and therefore the area of disturbance will occur in two stages, a preliminary stage of development while a quarry is developed in the TMF, and then the final pit outline after the quarry is exhausted. This is shown in Figure 1, Appendix A, where the extent of initial pit development and remediation is denoted as "Phase 1" and the final extent of pit development and remediation is denoted as "Phase 2". Due to a quarry located within the TMF, space is currently limited for the development of an enclosed cell.

NSE has raised concerns regarding the proximity of any proposed encapsulated cell to the blasting that will be occurring in the quarry; to address this issue, Atlantic Gold will remediate the historic tailings and historic mine impacted soils that will be disturbed during the 2018 construction season. In 2019, when the quarry no longer constrains cell dimensions, Atlantic Gold will remediate the remainder of the historic tailings and historic mine impacted soils that intersect with the Pit outline. The selection of cell encapsulation as a remedial method is discussed further in the following section.

Using the above assumptions, the preliminary volume of historic tailings that is required to be remediated in 2018 is approximately ~15,100 m^3, while the total amount of historic tailings that is required to be remediated is 53,900 m^3.

5.2 REMEDIAL OPTION SELECTION

The procedures described in Section 3.0 of this document were applied to select the preferred remedial option. The Phase I ESA and Phase II ESA documents located in in Appendix B outline the full assessment and delineation of tailings. The historic tailings chemistry at the G&K and Moose River sites where found to have elevated arsenic levels exceeding Tier 1 Nova Scotia Guidelines for an Industrial Site, and elevated mercury which did not exceed Tier 1 Nova Scotia Guidelines for an Industrial Site.

Given the delineation and chemistry of the historic tailings Transport and Placement was not considered an appropriate method, given the elevated arsenic levels within the historic tailings. Re-Processing of tailings is an option, but given the expense and difficulty with processing variable tailings of this age, it was decided that at this time it was not an economical option.

Deposition within the TMF, either deposited with the incoming modern tailings stream or encapsulated within a cell was evaluated as a remedial option. To evaluate the interactions between historical tailings and the modern tailings being deposited within the TMF, a high level geochemical study was completed to evaluate chemical interactions between the historic tailings and the modern tailings produced and deposited within the TMF (Lorax, 2018). This report is found within Appendix B.

While this report used very conservative assumptions regarding the interactions between historical tailings and modern tailings, it did show the possibility of a negative impact on water quality as a result of chemical interactions mobilization mercury in the historic tailings from a solid phase to an aqueous phase.

As a result, using the procedure outlined in Section 3.2, the available remediation options are cell encapsulation within the TMF, re-processing, and off-site disposal. Using the flow chart shown in Figure 2, Appendix A, cell encapsulation within the TMF was selected as the appropriate remediation method, given the available information. A preliminary design is displayed within Figure 3, Appendix A.

Groundwater seepage modelling through the historic tailings is currently being undertaken to better understand how porewater will seep into and through the historic tailings. When these results are available, the geochemical study will be further refined using these modelled seepage values. When the updated geochemical study is available, the results will be used to refine the remedial strategy for the historic tailings. This refinement may involve the modification of the remedial method or cell encapsulation design, depending on the results of the geochemical study and modelling.

5.3 ADDITIONAL MONITORING AND DELINEATION ACTIVITIES

Additional delineation and assessment work is being completed to increase the understanding of both the extents of the historical tailings, and the natural arsenic background in the region:

- Additional background sampling has been completed in response to NSE's request to confirm background concentrations for comparison with arsenic and mercury impacts within the area of open pit mining disturbance (Stantec, 2018b). This work recommended that future assessment and remedial activities consider the following background concentrations:
  - arsenic: 300 mg/kg
  - mercury: 0.26 mg/kg

.

- To enhance the horizonal extent of the historic tailings delineation, trenching will be completed for visual assessment across the estimated extent of tailings under the direction of a qualified environmental professional. It is Stantec's experience that this is the most effective method of visually delineating historic tailings extents.

- As discussed in Section 4.1, confirmatory sampling will be undertaken by a trained environmental professional to confirm tailings removal.

- Prior to the removal of the bulk of the historic tailings, 8 shallow monitoring wells will be placed outside the pit limits at each historic tailings location to enhance groundwater assessment in this area (refer to Figure,1, Appendix A). These new wells will be used in conjunction with the existing site monitoring wells to assess the groundwater quality in the area of historic tailings deposition before and after tailings removal. These wells will also be used to confirm whether pit dewatering is affecting

the groundwater in the area of the historic tailings. The monitoring well logs will be presented to NSE in a brief memo.

6.0 CLOSURE

This Historic Tailings Management Plan describes how historic tailings material will be managed, assessed, delineated, and remediated at the Touqouy Site located in Moose River, Nova Scotia. This Plan has been prepared in accordance Industrial Approval 2012-084244-03 (NSE, 2017).

This plan documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential liabilities associated with the identified property.

This plan provides an evaluation of selected environmental conditions associated with the identified portion of the property that was assessed at the time the work was conducted and is based on information obtained by and/or provided to Stantec at that time. There are no assurances regarding the accuracy and completeness of this information. All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

The opinions in this report can only be relied upon as they relate to the condition of the portion of the identified property that was assessed at the time the work was conducted. Activities at the property subsequent to Stantec's assessment may have significantly altered the property's condition. Stantec cannot comment on other areas of the property that were not assessed.

Conclusions made within this plan consist of Stantec's professional opinion as of the time of the writing of this plan, and are based solely on the scope of work described in the report, the limited data available and the results of the work. They are not a certification of the property's environmental condition. This report should not be construed as legal advice.

This plan has been prepared for the exclusive use of the client identified herein and any use by any third party is prohibited. Stantec assumes no responsibility for losses, damages, liabilities or claims, howsoever arising, from third party use of this report.

The conclusions are based on the site conditions encountered by Stantec at the time the work was performed at the specific testing and/or sampling locations, and conditions may vary among sampling locations. Factors such as areas of potential concern identified in previous studies, site conditions (e.g., utilities) and cost may have constrained the sampling locations used in this assessment. In addition, analysis has been carried out for only a limited number of chemical parameters, and it should not be inferred that other chemical species are not present. Due to the nature of the investigation and the limited data available, Stantec does not warrant against undiscovered environmental liabilities nor that the sampling results are indicative of the condition of the entire site.

July 26, 2018

Should additional information become available which differs significantly from our understanding of conditions presented in this plan, Stantec specifically disclaims any responsibility to update the conclusions in this report.

Submitted by,

Stantec Consulting Ltd.

Michael Charles, P.Eng.
Senior Principal
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Fax: (902) 468-9009
michael.charles@stantec.com

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7.0 REFERENCES

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APPENDIX A

Figures and Drawing

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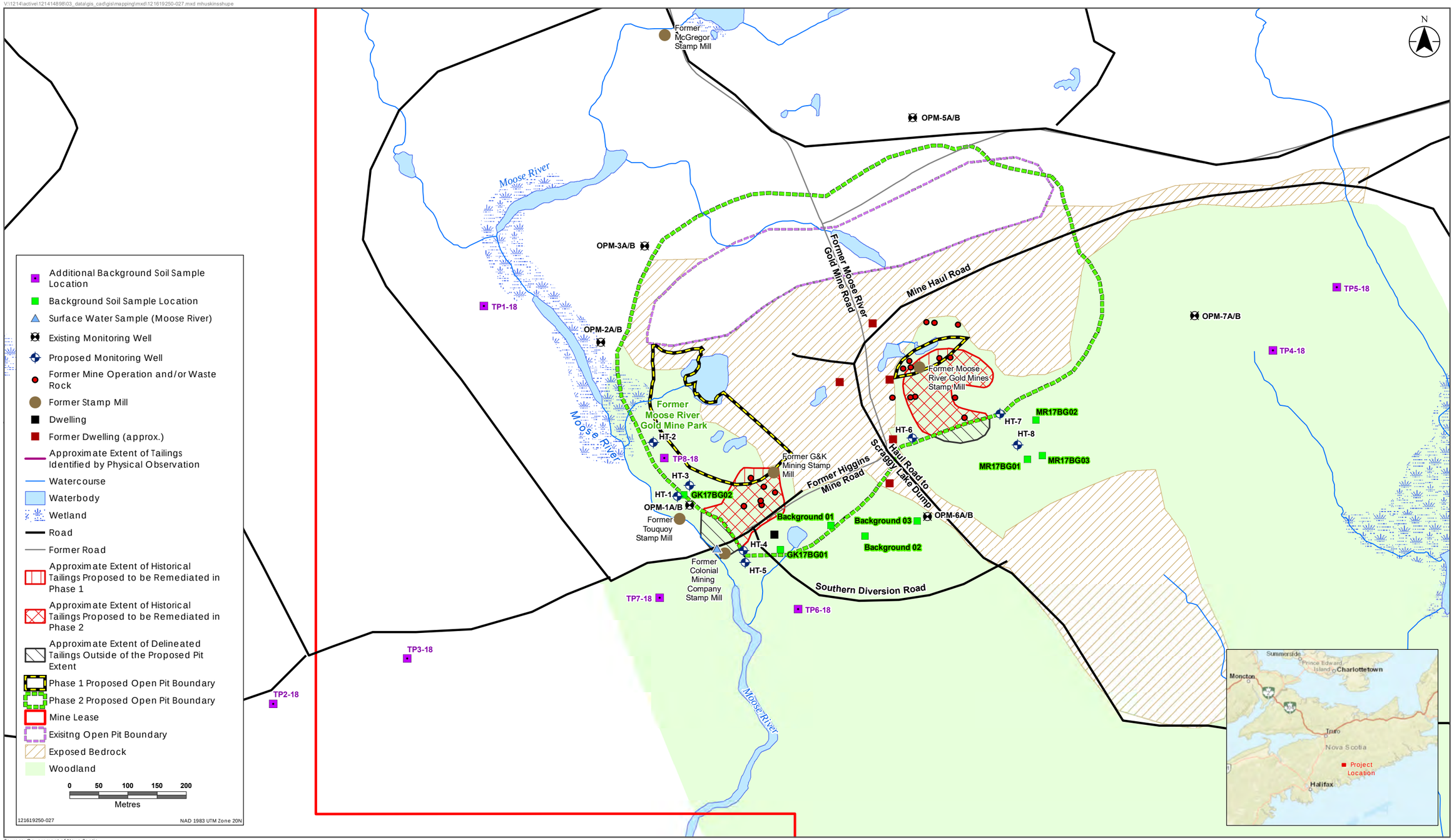


Sources: Government of Nova Scotia

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Stantec

ATLANTIC GOLD

Arsenic Background Sample Locations and Proposed Monitoring Well Locations
G&K Mining and Moose River Gold Mines
Historic Tailings Areas, Moose River Gold Mine, Nova Scotia

Figure 1

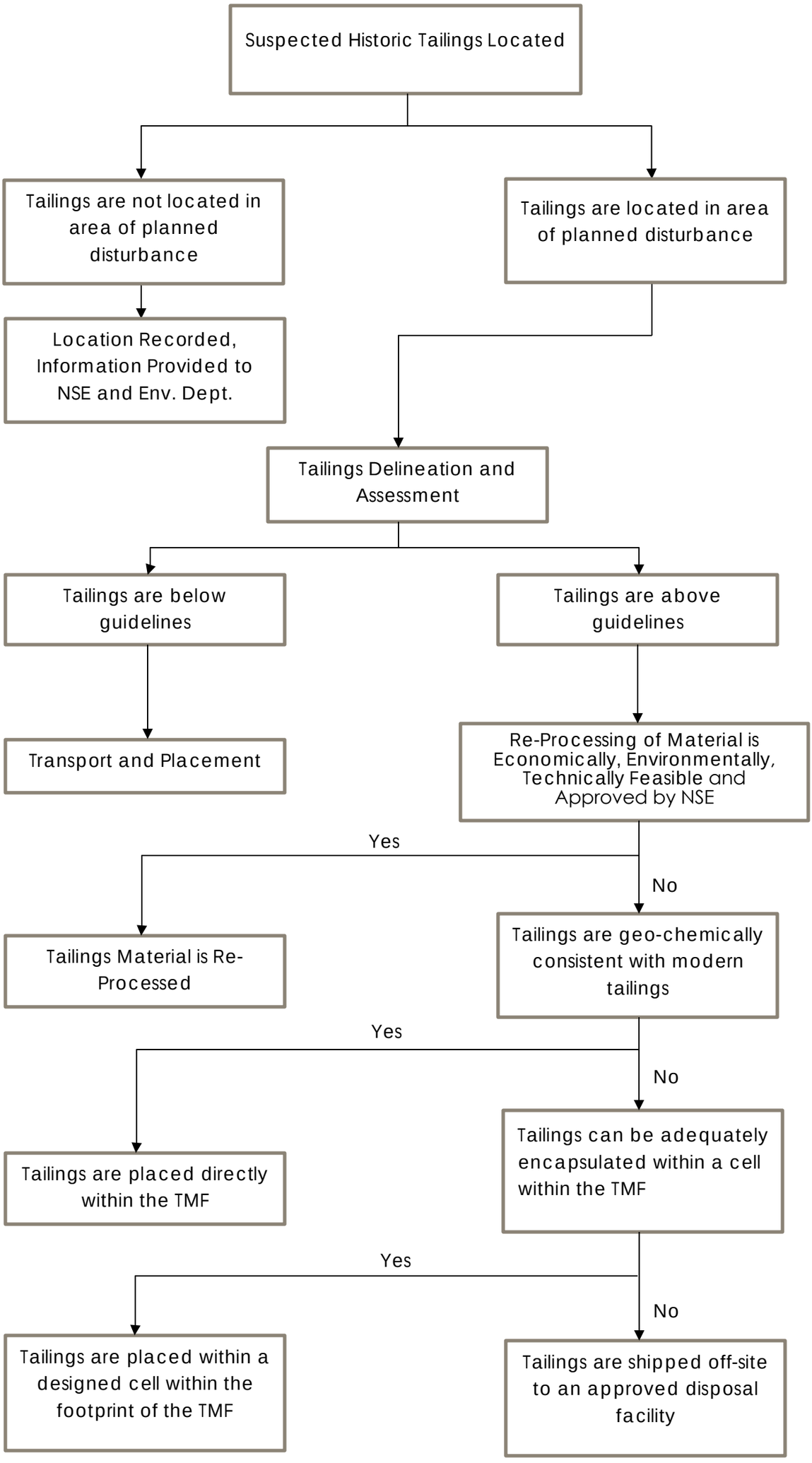
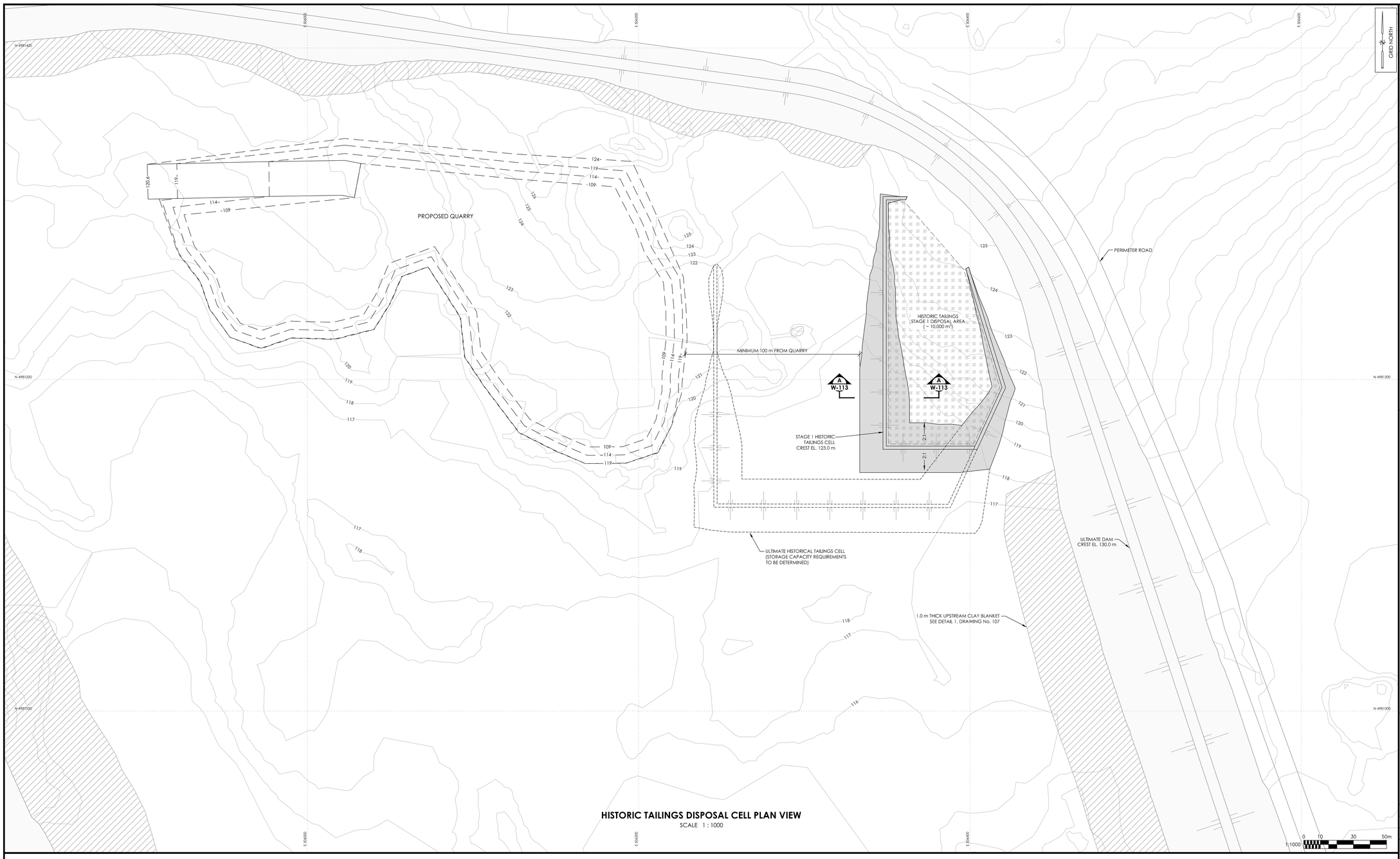
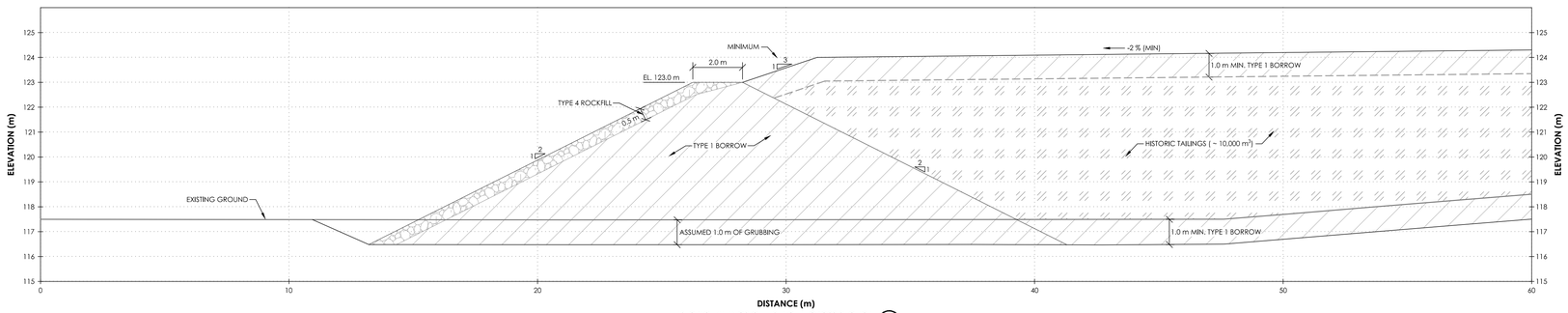


Figure 2 – Historic Tailings Remedial Option Selection



HISTORIC TAILINGS DISPOSAL CELL PLAN VIEW
SCALE 1 : 1000



HISTORIC TAILINGS CELL STAGE 1 CROSS SECTION A W-113
SCALE 1 : 100

Stantec
845 Prospect Street
Fredericton, New Brunswick, Canada, E3B 2T7
Tel. 506.452.7000
www.stantec.com

Legend

- EXISTING CONTOURS
- PROPOSED QUARRY
- 1.0 m THICK UPSTREAM CLAY BLANKET (APPROX.)

Notes

1. EXISTING TOPOGRAPHY SHOWN IS BASED ON LIDAR DATA PROVIDED BY CONESTOGA-ROVERS & ASSOCIATES (2010). CONTOURS HAVE BEEN SMOOTHED USING MUCK3D (2 m GRID SPACING). ACTUAL FIELD CONDITIONS MAY VARY.

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

STAMP | STAMP

No.	DETAILS	BY	APPD.	DATE
4	UPDATED HISTORIC TAILINGS DAM	JG	PD	2018-03-09
3	REPLACED UPPER FILTER LAYERS WITH RIP RAP, EXTEND TO CREST; FROST PROTECTION; CLAY BLANKET DETAIL AT DRUMLIN; DECANT TOWER; GEOTEXTILE IN SEEPAGE COLLECTION DITCH	JG	JG	2017-06-06
2	REPLACED GROUT CURTAIN WITH 1.0 m THICK UPSTREAM CLAY BLANKET	TY	JG	2016-10-13
1	ISSUED FOR NOVA SCOTIA ENVIRONMENT REVIEW NOT FOR CONSTRUCTION	JB	JB	2016-04-15
0	ISSUED FOR REVIEW NOT FOR CONSTRUCTION	JB	JB	2016-04-04

REVISIONS

CLIENT: **ATLANTIC GOLD CORPORATION**

PROJECT: **TOUQUOY GOLD PROJECT TAILINGS MANAGEMENT FACILITY**

PROJECT LOCATION: **HALIFAX COUNTY, NOVA SCOTIA**

JOB No.:	SCALE:	DATE:
121619250	AS SHOWN	2018-03-09
DRAWN BY:	DESIGNED BY:	APPROVED BY:
JDL	JG	AJV

DRAWING TITLE: **HISTORIC TAILINGS DISPOSAL CELL STAGE 1**

DRAWING No.: **19250W-113**
REVISION No.: **4**

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APPENDIX B

Reports

APPENDIX B1

Atlantic Gold Delineation of Historic Gold Mine Tailings, Touquoy Gold Project, Moose River, NS

ATLANTICGOLD

Delineation of Historic Gold Mine Tailings

Touquoy Gold Project

Moose River, Nova Scotia

Prepared By:
Drew Pelley P.Geo
Mike Simpson

CONTENTS

LIST OF FIGURES

1.0 INTRODUCTION

This report details the results of a sampling programme aimed at full physical and chemical delineation of historic mine tailings which may be impacted by mine development in the Moose River area. Initial tailings mapping and sampling were completed and the results were outlined in the Historic Tailings Management Plan (November 1, 2007), however, in a letter dated June 14, 2013 NSE outlined several issues within the plan which required further study. In particular, it was suggested that materials described as grey clays underlying tailings could potentially represent distal unoxidized tailings. This programme was designed to systematically map the distribution of tailings, clays and glacial till and to gather assay data for each of these phases.

2.0 STAMP MILL LOCATIONS

Six historic mining stamp mills are known to have operated in the Moose River area between 1882 and 1925. The location of five stamp mills was presented in the Historic Tailings Management Plan. Only the G&K Gold Co and Moose River Gold Mines sites are likely to be impacted by development of the project and as a result, only tailings associated with these sites have been evaluated in this programme.

2.1 G&K Gold Co. Stamp Mill

The G&K Gold Co. Stamp Mill was located approximately 60m north of Higgins Mines Road and 60m east of Moose River Gold Mines Provincial Park and is just beyond the south western margin of the proposed open pit (Fig. 1). The tailings associated with this mill were deposited in the low lying area southwest of the mill. Much of this area has been disturbed recently as a result of construction of the park and by the infilling of historic shafts.

2.2 Moose River Gold Mines Stamp Mill

The Moose River Gold Mines Stamp Mill is located approximately 90m east of Moose River Road and overlaps with the south eastern portion of the proposed open pit (Fig. 1). Tailings associated with this stamp mill were discharged southward and eastward into nearby low-lying areas.

3.0 METHODOLOGY

In 2007, the distribution of tailings at the two sites had been roughly determined, however not enough samples were collected to calculate the total volume of tailings. Further work was required in order to systematically delineate the aerial extents and depth of the tailings plumes. To this end, 20m x 20m grids were proposed over the G&K and MRGM areas, extending well beyond the expected boundary of the tailings in order to ensure that the margins were completely defined. The proposed grids were then uploaded onto handheld GPS receivers for use in the field. Field staff then visited each location defined

Figure 1: Map of Moose River area showing historic stamp mill locations.

by the grid and dug a hole using either shovels or a gas powered two man auger equipped with a blade 8" in diameter (Figure 2). An attempt was made to dig each hole as deep as necessary to reach undisturbed glacial till, however in many cases this was not possible due to rocky ground conditions or the auger reaching its maximum depth of ~1.2m. Once each hole was dug, the depth of the hole was recorded and the material encountered was described. In cases where more than one type of material was encountered (i.e. tailings and glacial till), each phase was described separately and depth of each interface was recorded. Samples were also collected at each location and of each phase individually, where possible. Samples consisted of approximately 100 to 300g of material collected in kraft paper bags. The samples were identified with unique alphanumeric sample numbers and later individually sealed in Ziploc bags for shipping.

Figure 2: Photograph of gas powered auger used for tailings mapping

A total of 126 samples were submitted to ALS Laboratories facility (Sudbury) for analysis. The samples were dried and screened to -180µm then analyzed using ICP-AES which analyzes for trace levels of 35 elements. A small sub-sample was analyzed separately using cold vapour AAS which specifically tests mercury concentrations.

4.0 RESULTS

4.1 Results for G&K Gold Co. Area

Figure 3 shows the thickness of tailings encountered at each sample location in the G&K area and the type of material encountered directly below any overlying organics and/or soil material. The interpreted boundary of the tailings plume is also shown on Figure 3. Analytical results for Mercury (ppm) and Arsenic (ppm) are shown on Figures 4 and 5 respectively.

The assay results for the 49 samples from this area show a marked increase in the mercury concentrations in tailings relative to the surrounding and underlying glacial till. The average mercury concentration for tailings is 6.50ppm with an average of 1.51ppm in glacial till. Arsenic values were relatively consistent with averages of 2669.0ppm and 2110.4ppm in tailings and till respectively.

The estimated total volume of tailings in the G&K Area was estimated by multiplying the average thickness of tailings encountered by the area of the plume. The area of the inferred plume is 3294m^2 and the average thickness of tailings was 0.59m giving an estimated volume of 1943m^3.

4.2 Results for Moose River Gold Mines Area

Tailings thicknesses and material classification at each sample location in the Moose River Gold Mines area are shown on Figure 6. Assay results for Mercury and Arsenic are shown on Figures 7 and 8 respectively.

77 Samples were collected and analyzed from this area. The results show an increase in mercury concentrations in tailings with an average of 7.25ppm compared to 3.6ppm in till. It should be noted that one sample of glacial till contained 79.7ppm of mercury. This sample was collected just a few meters south of the MRGM stamp mill, below 75cm of tailings. It is reasonable to suggest that this sample was contaminated by overlying tailings. Omitting this sample brings the average concentration of mercury in till down to 1.37ppm. The average arsenic concentrations were elevated in tailings relative to the till at 1003.3ppm and 539.7ppm respectively.

The tailings plume in this area covers 12260m^2 and averages 0.48m thick resulting in an estimated volume of 5885m^3.

5.0 DISCUSSION

The tailings plumes interpreted from the data presented in this report represents a vast improvement in the level of knowledge in this area. The results of mapping indicate that tailings from material crushed at the G&K Stamp Mill were discharged westward into low lying areas, migrating to the south-west

Figure 3: G&K Mining Area Soil Sample Locations w/ tailings thicknesses (m)

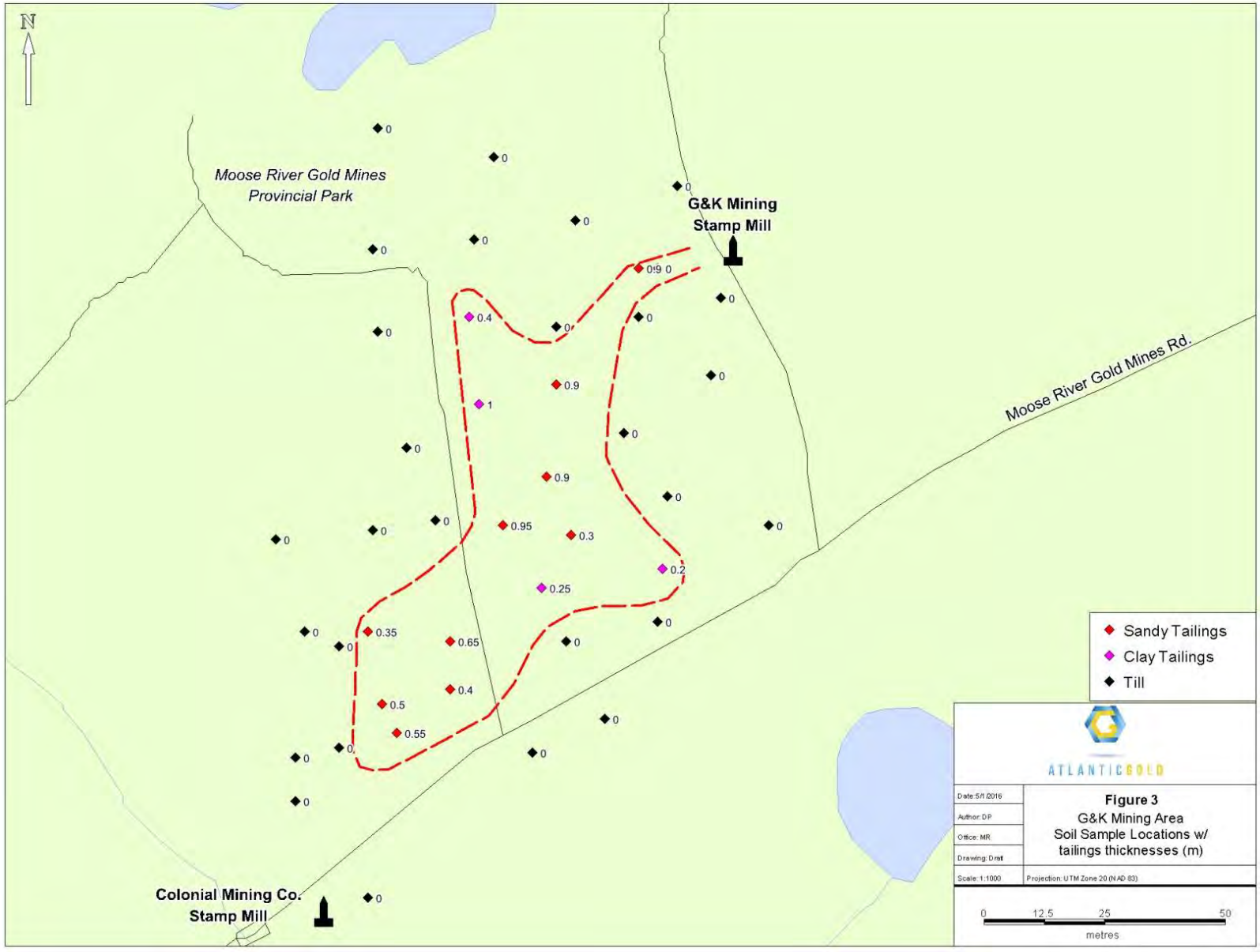


Figure 4: G&K Mining Area Soil Sample Locations w/ posted Hg (ppm) assay values

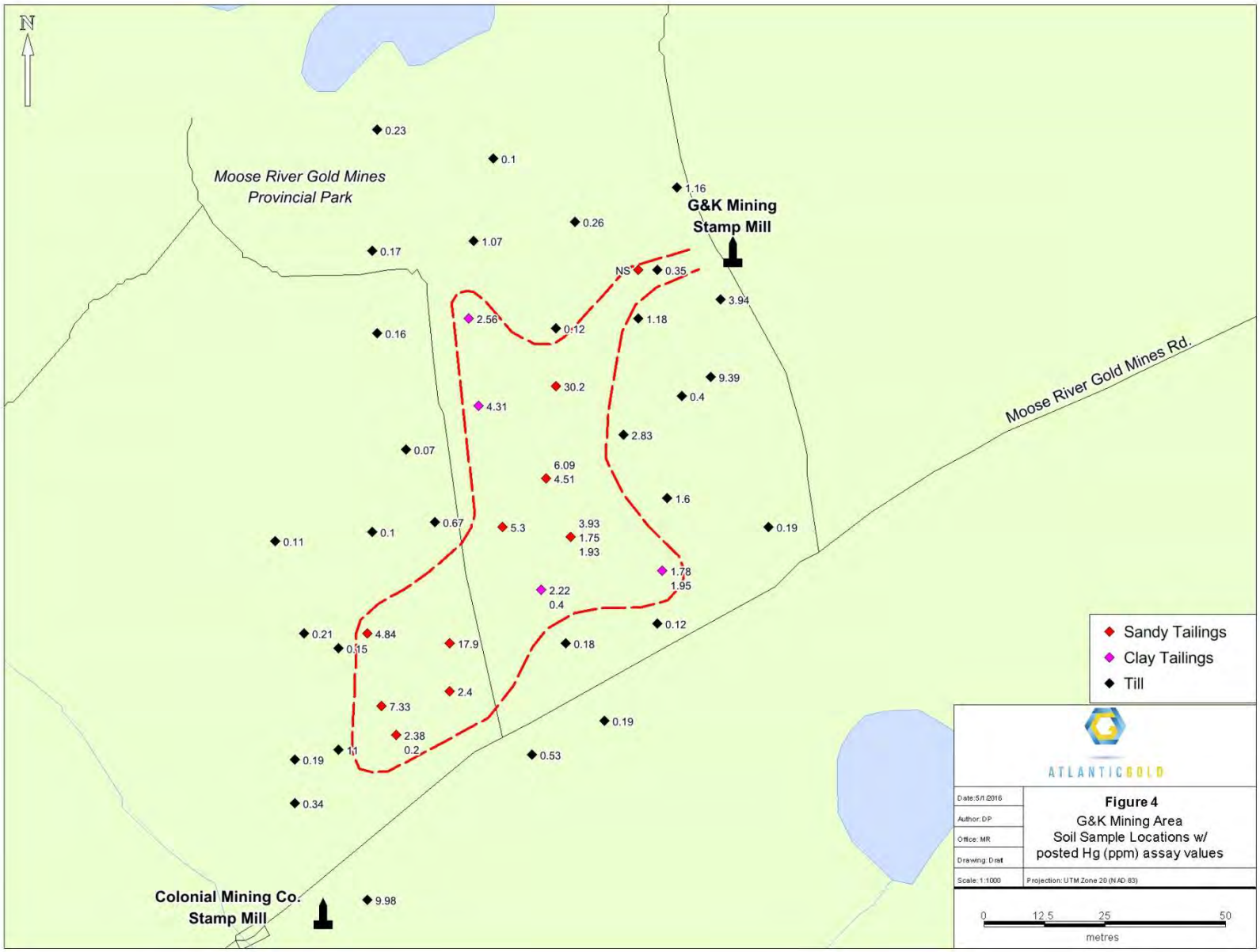


Figure 5: G&K Mining Area Soil Sample Locations w/ posted As (ppm) assay values

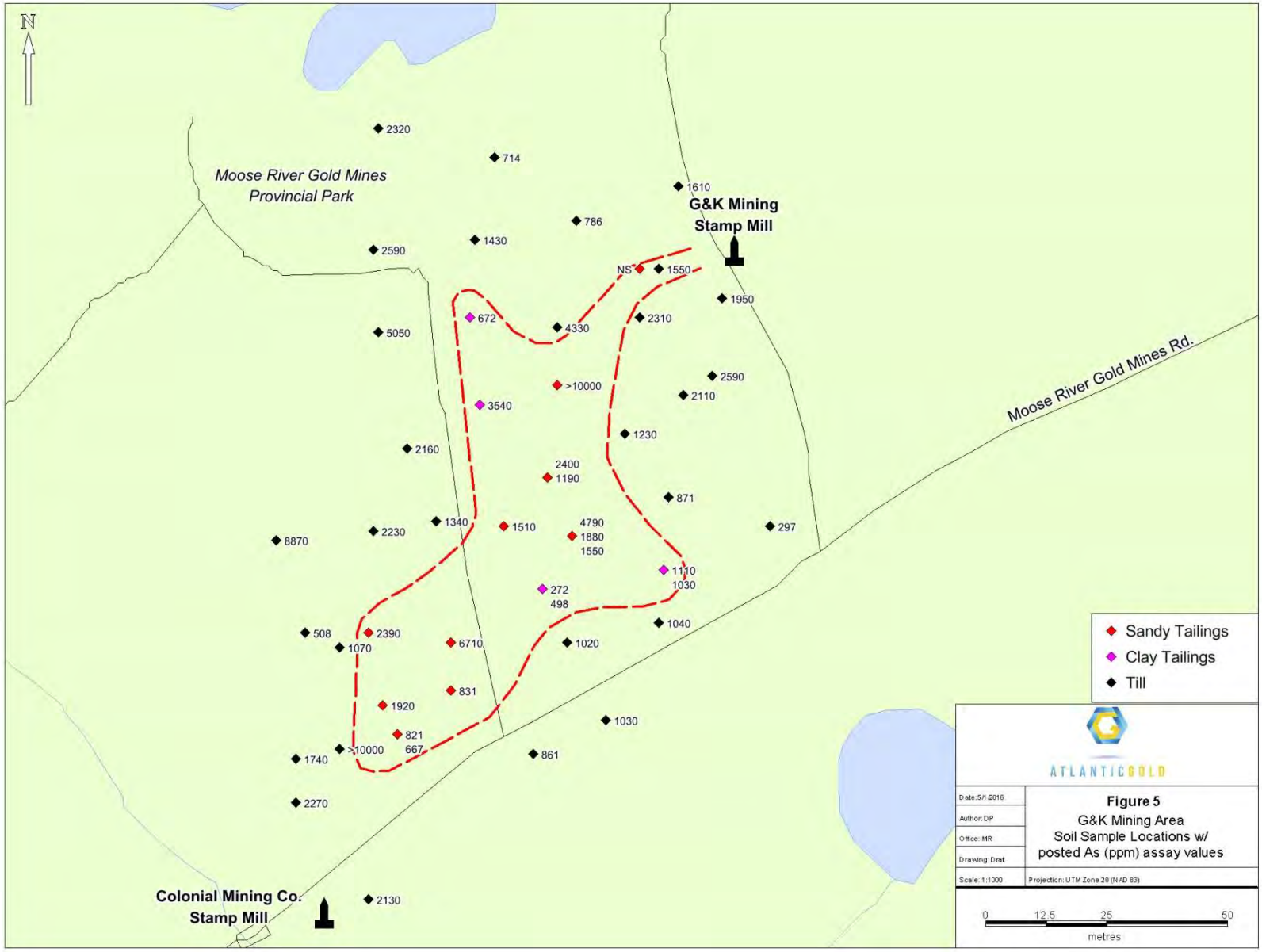


Figure 6: Moose River Gold Mines Soil Sample Locations w/ tailings thicknesses (m)

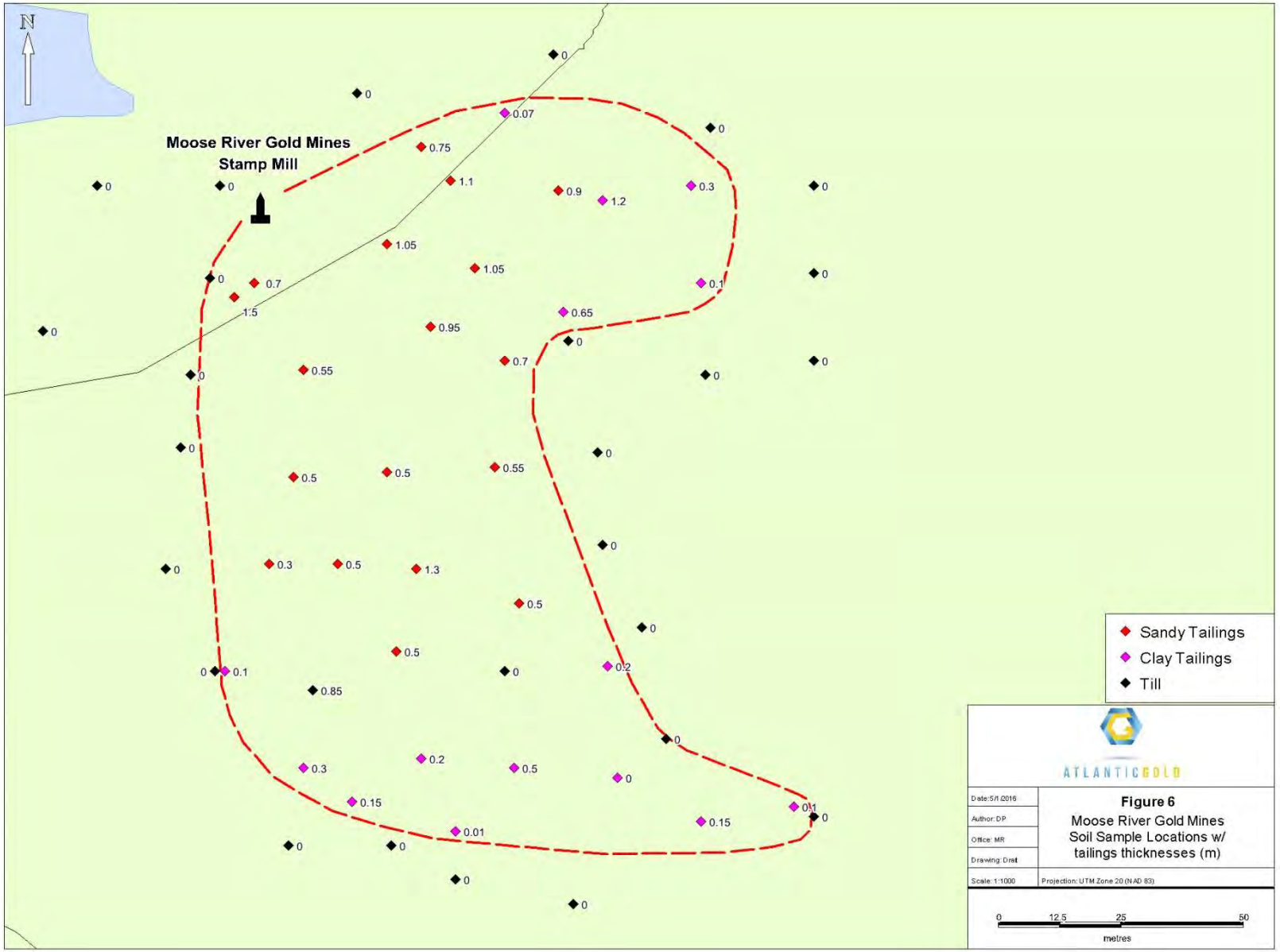


Figure 7: Moose River Gold Mines Soil Sample Locations w/ posted Hg (ppm) assay values

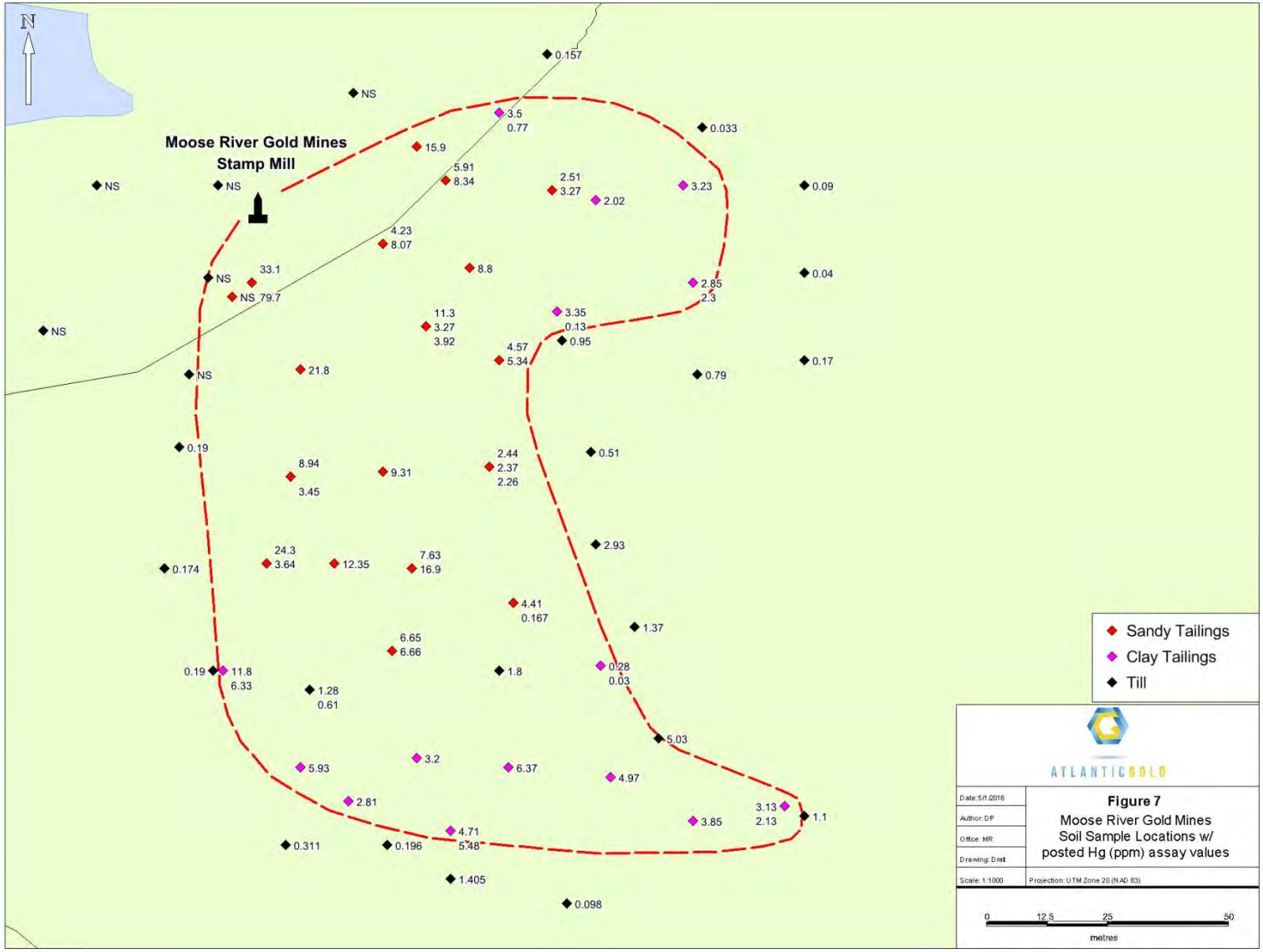
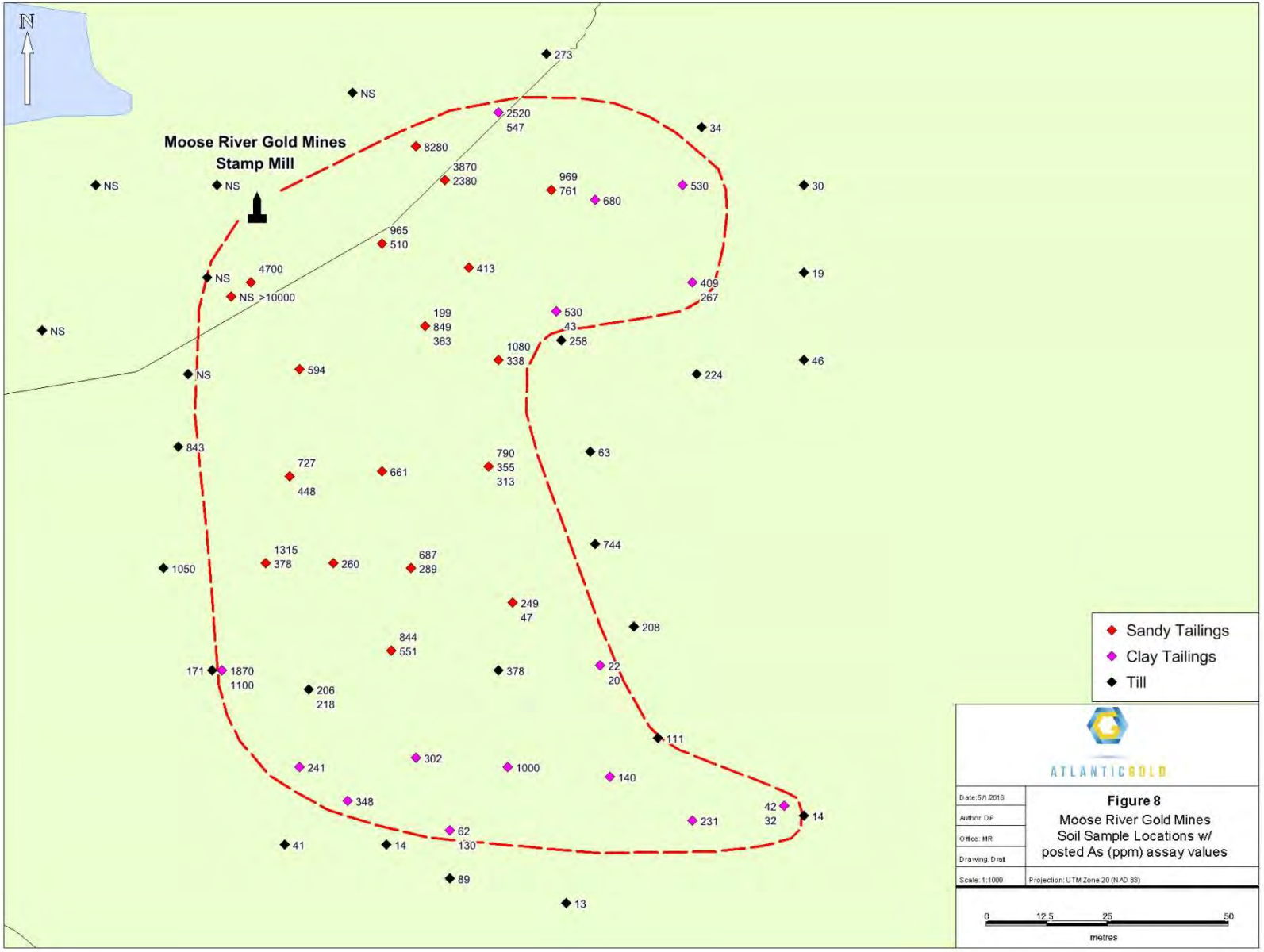


Figure 8: Moose River Gold Mines Soil Sample Locations w/ posted As (ppm) assay values



towards Moose River. No tailings were encountered south of Moose River Gold Mines Rd (Figure 3). In the Moose River Gold Mines area, tailings were discharged southward and eastward.

Early in the mapping process, it became evident that the grey clays described in the Historic Tailings Management Plan represented fine-grained unoxidized tailings. It is unlikely that sediments of this nature (very well sorted) would naturally occur in this environment. Also, It was noted that in several locations, grey clays were thinly intercalated with coarser red-brown sandy tailings (Figure 9) offering further confirmation that grey clays represent historic mine tailings.

Figure 9: Photo of sample location in the Moose River Gold Mines area showing intercalated clay and sandy tailings.

Mercury levels in the tailings appear elevated relative to the surrounding material; however some high values were obtained from glacial till outside of the tailings plume. It should be considered that when these operations were in production, zero consideration was given to contamination related to mercury. Furthermore, there were no procedures in place for storage and handling of toxic materials. As a result, it is easy to imagine that mercury, which was used in great quantities for gold separation, could be found throughout the area. Arsenic levels in the tailings and till were comparable. This is likely due to the presence of naturally occurring arsenopyrite which is abundant in the rocks underlying the Moose River area.

APPENDIX B2

Final – Phase 1 Environmental Site Assessment Historical Tailings Deposits at the Atlantic Gold Touquoy Gold Project, Moose River, NS

FINAL -
Phase I Environmental Site Assessment Historical Tailings Deposits at the Atlantic Gold Touquoy Gold Project

Moose River Gold Mines, NS

Prepared for:
Atlantic Gold Corporation

Prepared by:
Stantec Consulting Ltd.
102-40 Highfield Park Drive
Dartmouth, NS B3A 0A3

Job No.: 121414898

October 06, 2017

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Appendices

Executive Summary

Executive Summary

Site Description and Current Operations

Stantec Consulting Ltd. (Stantec) conducted a Phase I Environmental Site Assessment (Phase I ESA) of the two historical tailings areas located at the Atlantic Gold Touquoy Gold Project property located in Moose River Gold Mines, Nova Scotia, herein referred to as the "Site". The Phase I ESA was conducted for Atlantic Gold in support of meeting one of the conditions of the Industrial Approval issued as part of the mine development. The purpose of the Phase I ESA was to assess if evidence of potential or actual environmental contamination exists in connection with the Site, as a result of current or past activities on the Site or neighbouring properties.

The Site consists of two areas, referred to as the G&K Mine Tailings and the Moose River Gold Mine Tailings. The G&K Mine Tailings are located east of Moose River and north of the former Higgins Mine Road, and the Moose River Gold Mine Tailings are located to the east of the former intersection of the Moose River Gold Mine Road and the former Higgins Mine Road. The Site areas are currently woodland /overgrown, and are within the area to be occupied by the future extent of the Toquoy Gold Project open pit mine.

Records Review

Based on the historical information gathered during the Phase I ESA, the Site areas and the surrounding greater area weres developed in 1865 when gold was discovered in Nova Scotia. Between 1865 and 1939 there were various surface excavations, mine shafts of various depths, and numerous stamp mills or crushers utilized for the extraction of gold from the quartzite ore. The near by Moose River was modified with diversions, dams, and flumes to provide wash water and power for the gold mining operations. In addition to the water power, maps from the 1890s refer to engine houses, power houses and steam powered stamp mills. By the 1900s there was a small town to the north along Moose River Gold Mine Road and Mooseland Road which included a school, shops and various houses. In the 1930s there was a publicized mine disaster where several people were trapped in a mine shaft and two of them were later rescued shortly after this commercial gold mining in the area ceased. The historical practice of gold mining in the 1800s/early 1900s used crushers to render the ore into sand size particles. The sand size particles were then washed with water and mercury to recover the fine gold particles. The resulting tailings mixture was allowed to flow from the stamp mills into adjoining low lying areas in an uncontrolled manner with alternating amounts of water to push the tailings further from the stamp mill as needed. The base rock from which the gold was extracted was sandstone and slate of the Meguma Group Goldenville Formation; this formation is also know to be high in natural concentrations of arsenopyrite (FeAsS) which is found associated with gold deposits in Nova Scotia. The tailings areas contain both mercury and arsenic. Mapping provided by the Nova scotia Department of Natural Resources illustrate numerous excavations, shafts and mining operations on the Site and surrounding areas.

Between the 1940s and the 1980s, the area of the Site was allowed to become overgrown with trees and the surrounding areas was developed as a Provincial Park remembering the mine disaster, woodland, residential houses, and fields. In the late 1980s there was renewed interest in the presence of gold in the area of the Site and the surrounding area to the north. This included various prospecting activities including drilling boreholes to assess the mineral content and the excavation of a large test sample of ~ 57,000 tonnes of rock directly to the north of the G&K Mine (this later infilled with water).

In the 2000s there were various environmental, geotechnical and other assessments completed to support the development of the open pit mine in the area. Of particular interest to the Phase I ESA was a report prepared by Atlantic Gold regarding the extent of historical gold mine tailings from two stamp mills which fall with in the proposed open pit mine boundaries. These historical tailings were identified as requiring management as part of the development of the open pit mine site. The previous work focused upon the areas of two stamp mills within the extent of the future open pit mine. Analytical results of the tailings assessment revealed the anticipated elevated concentrations of arsenic and mercury. Based on a review of this document, it appears that the tailings may not be fully delineated at this time. The further delineation of these tailings areas is being completed concurrently with this Phase I ESA report, and will be reported under separate cover.

Executive Summary (continued)

Site Visit/Interviews

During the site visit completed on September 26, 2017, the foundations of the stamp mills were located along with Department of Natural Resources signs warning of the presence of historical mine operations. At each of the former mine sites there were also piles of waste rock and in a few locations areas of surface debris (rusted metal cans, debris, etc.). It appears that several of the mine shafts became dumping areas, as evidenced by car bumpers, wheel rims and other miscellaneous debris noted along the western edge of the Moose River Gold Mine area. There were no particular concerns noted with the materials present. During the site visit, Drew Pelley noted areas of suspected mine tailings outside the areas previously delineated, which are being assessed as part of a concurrent Phase II ESA (reported under separate cover).

Conclusions

The Phase I ESA has revealed no evidence of environmental contamination associated with the Site.

It is our understanding that the identified historical tailings areas which are within the proposed extent of the open pit mine development are to be managed as part of mine operation. Further delineation of the historical tailings areas is currently underway to determine the extent of the materials to be managed as part of the development of the mine under the conditions of the Industrial Approval.

The statements made in this Executive Summary are subject to the same limitations included in the Closure (Section 7.0) and are to be read in conjunction with the remainder of this report.

Phase I Environmental Site Assessment

1.0 General Information

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Project Information:
Phase I Environmental Site Assessment - Historical Tailings Deposits at the Atlantic Gold Touquoy Gold Project
121414898

Site Information:
Toquoy Gold Project
Moose River Gold Mine Road
Moose River Gold Mines, NS B0N

Consultant Information:
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Site Visit Date: 09/26/2017
Report Date: 10/06/2017
Site Assessor: Patrick Turner, B.Sc., P.Eng.
Report Preparer: Patrick Turner, B.Sc., P.Eng.
Senior Reviewer: Don Carey, M.Sc., P.Eng.

Site Assessor:

Patrick Turner, B.Sc., P.Eng.
Associate, Environmental Services

Report Preparer:

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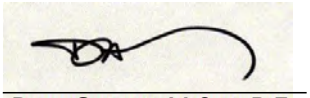


Don Carey, M.Sc., P.Eng.
Senior Technical Reviewer

The environmental site assessment and preparation of this report were completed in general accordance with the objectives, requirements or standards of the CSA Phase I Environmental Site Assessment Standard Z768-01 (R2016).

2.0 Introduction

2.1 Objectives

Stantec Consulting Ltd. (Stantec) conducted a Phase I Environmental Site Assessment (Phase I ESA) of the two historical tailings areas located at the Atlantic Gold Touquoy Gold Project property located in Moose River Gold Mines, Nova Scotia, herein referred to as the "Site". The Phase I ESA was conducted for Atlantic Gold in support of meeting one of the conditions of the Industrial Approval issued as part of the mine development. The purpose of the Phase I ESA was to assess if evidence of potential or actual environmental contamination exists in connection with the Site, as a result of current or past activities on the Site or neighbouring properties.

A site plan is included in Appendix A and selected photographs of the Site are included in Appendix B.

2.2 Scope of Work

The Phase I ESA carried out by Stantec on this property was conducted in general accordance with Stantec's Proposal Number 1214991010 dated September 19, 2017 and the Canadian Standards Association's (CSA) Phase I Environmental Site Assessment Standard Z768-01 (R2016) and consisted of the following:

- records review including, but not limited to, publicly available city directories, aerial photographs, fire insurance plans, geological and topographic maps
- provincial government regulatory search
- review of available environmental databases and records
- review of previous environmental reports and existing title searches, if made available
- interviews with persons having knowledge of the Site
- a site visit
- evaluation of information and preparation of the report provided herein

A Phase I ESA does not include sampling or testing of air, soil, groundwater, surface water or building materials. For this Phase I ESA, no enhancements to the CSA standard were made.

This assessment did not include a review or audit of operational environmental compliance issues, or of any environmental management systems, which may exist for the Site.

The assessment of the Site for the potential presence of hazardous building materials was based on the age of the building(s) and components, and a non-intrusive visual review of the Site. No sampling of materials was conducted. A Phase I ESA does not constitute a Hazardous Materials Survey or Designated Substances Survey.

The assessment of the Site for microbial contamination and moisture damage was made during the walk through of the building(s). This assessment was visual only and not every area was assessed. No sampling or intrusive investigation was conducted.

The professional qualifications of the project team are provided in Appendix C.

The site visit was conducted by Patrick Turner, P.Eng., of Stantec, on September 26, 2017. The Site and readily visible and publicly accessible portions of adjoining and neighbouring properties were observed for the presence of potential sources of environmental contamination. Stantec was accompanied by Drew Pelley, Mine Geologist of Atlantic Gold during the site visit. Drew has been associated with the Site since 2015.

Interviews were carried out with Drew to obtain or confirm information on the historical operations and activities on the Site. Drew had limited information about the site prior to the development of the current open pit mine. Pertinent information gathered from these interviews is presented within the appropriate sections of this report.

2.0 Introduction (continued)

2.2 Scope of Work (continued)

Portions of the Site and adjoining properties are overgrown with scrub vegetation which hindered the view of the ground surface during the site visit.

2.3 Regulatory Framework

In Nova Scotia, the Contaminated Site Regulations and associated Ministerial Protocols (effective on and after July 6, 2013), prescribe the regulatory process and time frames to notify the Department, assess the site, remediate the impacts and obtain "Closure" for a contaminated site. The first step in the full property remediation process is completing a Phase I ESA as prescribed in the applicable Ministerial Protocol. A Phase I ESA may identify potential environmental concerns on the property which may lead to additional assessment and remediation.

During a Phase I ESA samples are not collected, however, if there are previous soil or groundwater sample results available, the results are compared to applicable federal and provincial regulations and guidelines.

A Phase I ESA involves a review of any site buildings for the potential presence of hazardous materials related to building components and materials. Specific federal or provincial regulations, guidelines or codes of practice exist for these individual hazardous materials. Where required, this documentation was utilized to determine appropriate conclusions and formulate appropriate recommendations.

3.0 Records Review

3.1 Information Sources

The applicable search distance for the records review included the Site, properties immediately adjoining the Site and other neighbouring properties where activities considered to be potential sources of environmental contamination were apparent. Information sources obtained and reviewed as part of the records review are listed below.

SOURCE	INFORMATION/CONTACT
Aerial Photographs	1931, 1948, 1954 - National Airphoto Library 2002, 1992, 1982, 1974, 1964 - Stantec Aerial Photography collection June 2016, February 2015, June 2012 - GoogleEarth Pro Imagery accessed October 2017 Landsat 8 image captured on August 21, 2017 downloaded October 2017
Fire Insurance Plans	None available
City Directories	Nova available
Previous Environmental Reports	"Environmental Assessment Registration Document For The Touquoy Gold Project Moose River Gold Mines, Nova Scotia" Prepared For DDV Gold Limited by Conestoga-Rovers & Associates (CRA), report dated March 2007 REF. NO. 820933 (3)
Company Records	Site Map - Route from old office to new Administration Building. Prepared by Atlantic Gold, dated 2017-04-04. "Delineation of Historic Gold Mine Tailings, Touquoy Gold Project, Moose River, Nova Scotia" prepared by Atlantic Gold, dated February 2016.
Geological and Geotechnical Reports	Surficial Geology Map of the Province of Nova Scotia, Nova Scotia Department of Natural Resources, Map 92-3, 1992. Geological Map of the Province of Nova Scotia, Nova Scotia Department of Natural Resources, Map ME2000-1, 2000. Map Showing Potential Radon in Indoor Air in Nova Scotia, Province of Nova Scotia, Department of Natural Resources. Accessed interactive map in September 2017.
Regulatory Infractions	None reported - information from Nova Scotia Environment (NSE) is presented in Section 3.3

3.0 Records Review (continued)

3.1 Information Sources (continued)

SOURCE	INFORMATION/CONTACT
Reportable Spill Occurrences	None reported - information from NSE is presented in Section 3.3
Contaminated Sites	None reported - information from NSE is presented in Section 3.3
Hazardous Waste Generator Registration	None reported - information from NSE is presented in Section 3.3
Underground & Aboveground Storage Tanks	None reported - information from NSE is presented in Section 3.3
Other Available Information	Plan of Survey of Parcels WD-1, WD-2 and WD-3 being a subdivision and Consolidation of Lands Conveyed to DDV Gold Limited, Northern Timber Nova Scotia Corporation and S. Prest Land Holdings Limited. Plan prepared by WSP Canada Inc. July 2016, Ref No. 111-56443. Plan Showing Survey of Properties at Moose River Gold Mines, Halifax County, Nova Scotia. Plan prepared by EC Ken Land Surveying Ltd. dated Feb 15, 1989 Plan No. D6-18. Moose River Gold District, Halifax Co. NS, Plan No. 646 Geological Survey of Canada 1898, Prepared by ER Faribault. Scale 250 feet to 1 inch. Historical Gold Mining, Moose River Area, Part of NTS Sheets 11E/02 and 11D/15, Halifax County, Nova Scotia. Sheet No. ME2009-1 (Sheet 49 of 64), Scale 1:9500, Nova Scotia Department of Natural Resources Mineral Resources Branch, Dated 2009. Nova Scotia Department of Environment and Labour Ministerial Approval for the Touquoy Gold Project, letter dated February 1, 2008, File No. 10700-40. Geological Survey of Canada Memoir 385 "Gold Fields of Nova Scotia" (first published in 1929 as Memoir 156) Energy, Mines and Resources Canada 1976, Catalogue No. M46-385. Topographic Map "Moose River Gold Mines", Sheet No. 10 449500 62900, scale 1:10000, Prepared by Service Nova Scotia and Municipal Relations from aerial photography flow May 2006, Produced August 2009, Edition 1.1.

3.0 Records Review (continued)

3.1 Information Sources (continued)

SOURCE	INFORMATION/CONTACT
Water Well Records	Map Showing Water Wells in Nova Scotia, Province of Nova Scotia, Department of Natural Resources. Accessed interactive map in September 2017.

3.2 Previous Reports

Stantec obtained a copy of the CRA Environmental Assessment Registration for Touquoy Gold Project from the Nova Scotia Environment website as public information. This report, prepared in 2007, while not a Phase I Environmental Site Assessment did contain useful information about the history of the site and land use in 2006/2007. This report was prepared for DDV Gold Limited in support of obtaining approval from the Province of Nova Scotia for the development of an open pit gold mine in the area. This report assessed the potential environmental effects of the development of the open pit gold mine on biophysical and socio-economic Valued Environmental Components (VECs). The assessment was based on inputs from members of the public, the Mi'kmaq community, government regulators and the professional judgement of CRA and its subconsultants. The following VECs were identified and assessed by CRA:

Air Quality;
Noise;
Surface Water Resources;
Geology and Hydrogeology;
Terrestrial Resources;
Wetlands;
Archaeological and Cultural Resources; and
Population and Economy.

Based on this report there were potential environmental concerns associated with the historical mining practices in the 1800s/early 1900s, and limited soil sampling identified the presence of mercury and arsenic below the then applicable CCME guidelines. Information related to wetland, geology, bedrock, acid generation potential, surface water and hydrogeology are presented in the appropriate sections of this report.

Stantec was provided with a copy of Atlantic Gold's report "Delineation of Historic Gold Mine Tailings, Touquoy Gold Project, Moose River (Gold Mines), Nova Scotia" dated February 2016. This report was prepared in response to questions from NSE in 2013 regarding a previous delineation report from 2007 (not provided). The report summarizes the assessment of the G&K Tailings Area and the Moose River Gold Mines Tailings Area. Mercury and arsenic were identified at both locations. Mercury concentrations in the tailings were generally higher than the concentrations in the till and were less than the current Nova Scotia Tier I Environmental Quality Standards (EQS) for an industrial site with non-potable groundwater. There were spot concentrations which exceeded residential/parkland criteria. Arsenic concentrations were greater than the NS Tier I EQS in both the tailings and the till, which is not unexpected due to the naturally occurring presence of this mineral in the Goldenville Formation. Based on the approximate sketch of the anticipated tailings area and the distribution of the survey samples, there appears to be potential data gaps. We understand these potential data gaps are being addressed through a Phase II ESA being conducted concurrently with this Phase I ESA, and reported under separate cover.

3.0 Records Review (continued)

3.3 Regulatory Information

We have received Nova Scotia Environment 's Environmental Registry response to our inquiry for the subject site and adjoining properties. It must be noted that our request to Nova Scotia Environment was limited due to the lack of civic addresses on the property records, and absence of dwellings with civic numbers (NSE files are based on civic addresses) due to the development of the open pit gold mine. We specifically did not request information about the development of the gold mine as the ministerial approval for the project was obtained from the NSE website, and a copy of the Industrial Approval was provided to Stantec by Atlantic Gold. The information obtained is summarized below and where applicable attached in Appendix D.

Regulatory Infractions Search: Nova Scotia Environment (NSE) has no record of infractions for the subject or adjoining properties.

Environmental Investigations: Information pertaining to site assessments, risk assessments, remedial work or other environmental investigations registered with NSE for the subject or adjoining properties are available only through "Freedom of Information" requests which require a ninety day turn-around time. NSE indicated that no records requiring a "Freedom of Information" (FOIPOP) request were on file for the Site or the adjoining properties. We specifically did not request information about the development of the gold mine as the ministerial approval for the project was obtained from the NSE website.

Tank Registrations: Information from the NSE Petroleum Storage Tank Registry indicated that no tanks were registered to the Site.

Other Information:
There is an Industrial Approval from Nova Scotia Environment for the development of the Touquoy Gold Project. One of the conditions of this approval is the assessment and delineation of historical gold mine tailings areas which will fall within the boundaries of the proposed extent of the open pit mining operation. Once delineated these historical tailings areas are to be removed and managed in the new tailings management facility to the east of the pit.

A septic tank approval was provided for a cottage property at 1648 Mooseland Road. This is not considered an environmental concern to the Site as it is located in Jacket Lake, over 20 km to the southeast of the Site.

3.4 Physical Setting

3.4.1 Surficial Geology

Based on an available surficial geology map, the native surficial soils of the Site consist of glacial till. The characteristic permeability of these soils is moderate. A site-specific determination would be required in order to obtain detailed soil profile and permeability information. Previous subsurface investigations conducted on the Site indicate the subsurface soil profile at the Site to consist of clay glacial till between 2 and 3 meters thick. Bedrock was encountered between 2 and 3 meters below grade.

3.4.2 Surface Water Drainage

The surfaces of the Site consist of a combination of open field and woodland. Stormwater is anticipated to drain by infiltration and/or overland flow. Adjoining areas have been stripped of overburden to expose the bedrock surface and several large (5 - 7 meter deep) excavations have been made to allow for draining of various former ponds and dewatering of the main open pit mine to the north.

3.0 Records Review (continued)

3.4 Physical Setting (continued)

3.4.3 Topography and Regional Drainage

The site areas are woodland which have re-grown after historical gold mining in the 1800s/early 1900s, which included construction of various dams along local water ways, surface mining, water washing, and excavation of numerous mine shafts/pits.

Based on the EA report, an available topographic map and the observed site topography, regional undisturbed surface drainage (anticipated shallow groundwater flow direction) appears to be to the southwest toward the Moose River.

It should be noted that the direction of the shallow groundwater flow in limited areas can also be influenced by the presence of underground utility corridors and is not necessarily a reflection of regional or local groundwater flow or a replica of the Site or area topography. As part of the larger open pit mine development there are various excavations and dewatering activities affecting local surface and subsurface groundwater flow in the area of the Site.

3.4.4 Bedrock Geology

Based on an available bedrock geology map, bedrock in the area of the Site consists of slate and quartzite of the Goldenville Formation. Based on observations where the overburden has been stripped as part of the open pit mine preparation, overburden was approximately 2 to 3 meters thick. Testing of the waste rock as part of the EA prepared by CRA indicated that the waste rock has a low acid generation potential.

4.0 Site Description

4.1 Property Information

The Site consists of two areas. The western area is referred to as the G&K Mine Tailings area, and is generally located immediately north of the former Higgins Mine Road and east of Moose River. The G&K mine tailings area falls mainly on PID No. 40338972 with the southern tip extending on to the former right of way of Higgins Mine Road. The eastern area is referred to as the Moose River Gold Mine Tailings area and is situated to the east of the intersection of the former Moose River Gold Mine Road and the Higgns Mine Road. The Moose River Gold Mine Tailings occupy portions of PIDs No. 00642892, 00643247, and 00643254. The areas are not currently serviced being in a rural portion of the province and within the boundaries of the future open pit mine boundaries. Ownership of the land is a combination of Atlantic Gold and the Province of Nova Scotia with surface mining rights held by Atlantic Gold. The location of the two tailings areas is based on the information obtained from the Atlantic Gold report from 2016.

4.2 On-Site Buildings and Structures

There are no current buildings on the Site. Foundations for the former stamp mills were located along with several DNR signs indicating the presence of underground mine workings.

4.3 Historical Land Use

Historical land use for the Site was determined through historical records listed in Section 3.0. A summary of the historical information is presented below.

Period/Date:	Land Use:
pre-1865	The area was undeveloped woodland
1866 to late 1930s	The area was actively mined for gold and tungsten. Based on the reviewed information sources, there were numerous stamp mills operating on Site and in the surrounding area. The stamp mills or crushers were either water or steam powered. In the records reviewed there was mention of various engine house and power generation systems to supply the various shafts, mining equipment and stamp mills. After a mine disaster in the mid 1930s, the active pursuit of gold in the area ceased. As part of the mining operations, a small village was founded with a school house, post office and various houses.
Between the late 1930s and early 1980s	the area of the Site appears to have some surface disturbance as noted by cleared areas near both the G&K Mine and the Moose River Mine. This suggests processing of the waste rock or minor surface mining operations in the area.
Early 1980s to present	Based on the reviewed records, there was a renewed interest in the gold potential of the Moose River Gold Mine area. This included exploratory drill holes, resurveying the area, and in the late 1980s to the north, the excavation of a large test sample to confirm the quantity of gold in base rock. In the 2000s further environmental assessment work was completed leading to the initial surveys of the tailings areas to assess them for mercury and arsenic. By 2008 the Department of Environment had approved the plans for the open pit mine. In 2016, clearing of the former homes and surrounding trees had started. By mid 2017 the Moose River Gold Mine Road and Mooseland Road had been realigned; the former alignments were mostly removed during the removal of overburden material. The areas of the tailings was left undisturbed woodland as this material would require eventual management in the tailings area being developed to the east.

5.0 Site Visit Findings

5.1 Current Site Operations

The Site is currently occupied by historical tailings covered by trees, shrubs and other vegetation. The areas immediately adjacent to the waste tailings areas to the north, and between the two areas, has been cleared of overburden to the weathered bedrock as part of the open pit mine development.

5.2 Waste Generation and Storage

5.2.1 Solid and Liquid Wastes

No hazardous waste generation or storage was identified to be conducted on the Site. There were areas of waste rock from the historical mining activies noted during the site visit along with occasional surface metal debris. It appears that some old mine excavations were used for the disposal of waste materials as noted in Section 5.5.1.

5.2.2 Drains, Sumps, Septic Systems and Oil Water Separators

No floor drains, sumps, septic systems, interceptors, or separators were identified on the Site. It is known that prior to the mine development there were homes between the two waste tailings areas along the Former Moose River Gold Mine Road. The septic systems were likely removed along with the overburden material.

5.2.3 Air Discharges and Odours

No sources of air emissions that are suspected to result in residual contamination to the property were identified on the Site. Further, no strong, pungent, or unusual odours were identified during the site visit.

5.3 Fuel and Chemical Storage

5.3.1 Underground Storage Tanks (USTs)

No chemical or fuel storage USTs were identified on the Site. Further, no vent or fill pipes indicating the potential presence of an abandoned or decommissioned UST were observed.

5.3.2 Aboveground Storage Tanks (ASTs)

No chemical or fuel storage ASTs were identified on the Site.

5.3.3 Other Storage Containers

No chemical storage was observed on the Site.

5.4 Building Systems/Equipment

5.4.1 Heating and Cooling Systems

No heating or cooling systems are on the Site, as the Site is undeveloped.

5.4.2 Hydraulic Equipment

No hydraulic equipment is on the Site, as the Site is undeveloped.

5.0 Site Visit Findings (continued)

5.5 Exterior Site Observations

5.5.1 Surface Features

No stained surficial materials were observed on the Site. It was noted that in locations there are exposed historical tailings present at the surface and there is no vegetation in these areas; similarly there are areas of waste rock piled at the surface and no vegetation is growing in these areas. During the site visit, numerous DNR warning signs were noted indicating the presence of historical mine workings several of which were present as noticeable pits with debris present in the openings. To the north of both stamp mill locations were various water bodies/ponds; these have either been excavated or dewatered as part of the open pit mine development. Excavations between the two areas are being used for water discharge from the pumps from the open pit mine to the north of the Site.

5.5.2 Fill Materials

There are areas of exposed historical mine tailings at both areas that make up the Site. Based on information obtained during the site visit, the average depth was around 30 cm with deeper areas extending 1 to 1.5 meters. Based on the history of the area, the surficial soils have been reworked numerous times between 1866 and 1930 with tailings, waste rock and other materials placed on native till layers.

5.5.3 Wells

No abandoned or existing wells (water, oil, gas or disposal) were identified on the Site. It is suspected that the former residential homes had wells, but based on the information obtained from the Nova Scotia water well records there were no drilled drinking water wells in the area of the Site. There were records for a number of drilled exploration holes as part of the assessment of the area for development of a mine both on the Site and in the surrounding area in a grid pattern. It is unknown how these drilled holes, which extended several hundred feet in some cases, were backfilled. If potable wells or exploration wells are encountered during tailings management operations (e.g. removal of the historical tailings to the new tailings management areas), they should be properly decommissioned, in accordance with provincial regulations.

5.6 Hazardous Building Materials

5.6.1 Asbestos-Containing Materials (ACMs)

The common use of friable (crumbles easily by hand pressure) asbestos-containing materials (ACMs) in construction generally ceased voluntarily in the mid 1970s but was only banned through legislation in the mid-late 1980s. Asbestos was used in thousands of building products and the common uses of friable ACMs included boiler and pipe insulation, and spray-on fireproofing. Asbestos was also used in many manufactured products such as floor tiles, ceiling tiles, transite cement products and various other construction materials. Some cement drain piping currently used in the construction of buildings still contains asbestos (non-friable). Vermiculite used as insulation may be contaminated with asbestos fibres.

As the Site is undeveloped, no suspected ACMs were identified on the Site during the site visit.

5.6.2 Polychlorinated Biphenyls (PCBs)

From the 1930s to the 1970s, PCBs were widely used as coolants and lubricants for electrical equipment, including transformers and capacitors, and in a number of industrial materials, including sealing and caulking compounds, inks and paint additives. The use of PCBs was prohibited in heat transfer and electrical equipment installed after September 1, 1977, and in transformers and

5.0 Site Visit Findings (continued)

5.6 Hazardous Building Materials (continued)

5.6.2 Polychlorinated Biphenyls (PCBs) (continued)

capacitors installed after July 1, 1980. Regulations now require that PCB containing equipment be taken out of service prior to regulated deadlines.

No oil-filled transformers or lamps ballasts were observed on the Site.

5.6.3 Lead-Based Materials

In 1976, the lead content in interior paint was limited to 0.5% by weight under the federal Hazardous Products Act. Lead based water supply pipes were used greater than 50 years ago. Between 1930 and 1986, most buildings used copper pipe with lead-solder joints. Other lead-based products include wall shielding (x-ray rooms).

As the Site is undeveloped, no lead-based materials were identified on the Site.

5.6.4 Urea Formaldehyde Foam Insulation (UFFI)

Urea Formaldehyde Foam Insulation (UFFI) was used as an insulation product for existing houses between the mid-1970s and its ban in Canada in 1980. It was not commonly used for commercial or industrial buildings.

As the Site is undeveloped, no UFFI was identified on the Site.

5.6.5 Ozone-Depleting Substances (ODSs)

Refrigeration and air conditioning equipment in place before 1998 may contain refrigerants containing Ozone-depleting Substances. Non-ODS refrigerants have been developed and are available to replace these materials in newer equipment.

As the Site is undeveloped, no equipment containing ozone-depleting substances (ODSs) was identified on the Site.

5.7 Special Attention Items

5.7.1 Radon Gas

Radon is a radioactive gas associated with uranium rich black shale and/or granite bedrock. Radon emits alpha particles and produces several solid radioactive products called radon daughters. Harmful levels of radon and radon daughters can accumulate in confined air spaces, such as basements and crawl spaces.

Based on a the online map supplied by the Nova Scotia Department of Natural Resources, the Site is in a area of low radon potential.

5.7.2 Microbial Contamination (Mould) and Indoor Air Quality

The growth of mould in indoor environments is typically due to a moisture problem related to building envelope or mechanical systems deficiencies or design, and can produce adverse health effects. There is no practical way to eliminate all mould and mould spores in the indoor environment. The way to control mould is to control moisture.

No visual evidence of suspected indoor mould growth was observed on the Site, at the time of the site visit, as no buildings or structures exist.

5.7.3 Electromagnetic Frequencies (EMFs)

Electrical currents induce electromagnetic fields. No scientific data supports definitive answers to questions about the existence or non-existence of health risks related to electromagnetic fields.

No high-voltage transmission lines or electrical substations, which could generate significant electromagnetic fields, were identified on or adjacent to the Site.

5.7.4 Noise and Vibration

The effects of noise and vibration on human health vary according to the susceptibility of the individual exposed, the nature of the noise/vibration and whether exposure occurs in the working environment or in the home.

The Site activities involve blasting and open pit mining activities which generate significant noise/vibration, however given the industrial nature of the surrounding area this is not considered to be a concern to the Site.

5.8 Neighbouring Property Information

The current activities on neighbouring properties observed at the time of the site visit and a summary of historical information gathered through the records review are presented in the following sections.

The greater area of the proposed open pit mine encompasses the former Moose River Gold Mine village and historical mining operations. Located to the west, north and east of the Site were numerous open pits, mine shafts, stamp mills and engine houses for the processing of rock for the extraction of gold between 1866 and the late 1930s. Between the late 1930s and the 1970s, the area appears to be rural residential with some evidence of small scale mining operations (small clearings, road cuts, etc.) in the areas of the previous gold mining. Likely these operations were reprocessing waste rock for gold not recovered initially. North of the G&K Stamp Mill was a large excavation in 1989 as part of the feasibility assessments for what would become the current open pit mine operation. In 2003 there were various homes along Higgins Mine Road to the south of the Site and along Moose River Gold Mine Road to the intersection of Higgins Mine Road. Limited property information exists about these buildings but historical mapping indicates that there was previously a post office in the early 1900s in the area of the intersection of the two roads and an inn; based on the property records, dates were not provided for its operation. Based on the EA, the population of the area in the early 1900s may have been as high as 5000 people; however by the 2000s the population was less than 30 and there were numerous vacant dwellings in the area. There were no concerns with the former dwellings many of which have been removed along with the roadways as part of the overall development of the open pit mine. Haul roads running north/south from the pit to the Scraggy Lake Dump follow a similar alignment as the former Moose River Gold Mine Road. The area north of Higgins Mine Road and south of the new alignment of Mooseland Road has been stripped of overburden material to expose weathered bedrock, and the open pit mine has been excavated since mid 2016. To the northwest of the G&K Mine was a Provincial Park commemorating the rescue of trapped miners in 1936. Based on the aerial photographs, the park appears to date from the 1980s until it was closed as part of the open pit mine development. At the time of the site visit a single vacant dwelling was noted at the intersection of the Southern Diversion Road and the former Higgins Mine Road south of the G&K Mine site.

The historical mining operations in the area of the Site represent a potential concern due to the use of mercury in recovery of gold in mining practices from the late 1800s/early 1900s. The source of power for the steam engines used is also unknown, although given the lack of a rail connection it is likely that these were wood fired rather than coal fired owing to the difficulties of transporting coal to the mine sites. The native rock in the area has a high concentration of arsenic which could be considered an

environmental concern. Given that these waste materials are to be relocated to the new tailings area, they are considered to be a low risk to the overall operation of the open pit mine site.

5.9 Client-Specific Items

No specific client requests were made with respect to this Phase I ESA.

6.0 Conclusions

The Phase I ESA has revealed no evidence of environmental contamination associated with the Site.

It is our understanding that the identified historical tailings areas which are within the proposed extent of the open pit mine development are to be managed as part of mine operation. Further delineation of the historical tailings areas is currently underway to determine the extent of the materials to be managed as part of the development of the mine under the conditions of the Industrial Approval.

7.0 Closure

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential liabilities associated with the identified property.

This report provides an evaluation of selected environmental conditions associated with the identified portion of the property that was assessed at the time the work was conducted and is based on information obtained by and/or provided to Stantec at that time. There are no assurances regarding the accuracy and completeness of this information. All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

The opinions in this report can only be relied upon as they relate to the condition of the portion of the identified property that was assessed at the time the work was conducted. Activities at the property subsequent to Stantec's assessment may have significantly altered the property's condition. Stantec cannot comment on other areas of the property that were not assessed.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report, and are based solely on the scope of work described in the report, the limited data available and the results of the work. They are not a certification of the property's environmental condition. This report should not be construed as legal advice.

This report has been prepared for the exclusive use of the client identified herein and any use by any third party is prohibited. Stantec assumes no responsibility for losses, damages, liabilities or claims, howsoever arising, from third party use of this report.

This report is limited by the following:

- *Portions of the Site are covered by thick vegetation which prevented a through assessment of the ground surface in those areas of the Site.*

The locations of any utilities, buildings and structures, and property boundaries illustrated in or described within this report, if any, including pole lines, conduits, water mains, sewers and other surface or sub-surface utilities and structures are not guaranteed. Before starting work, the exact location of all such utilities and structures should be confirmed and Stantec assumes no liability for damage to them.

The conclusions are based on the site conditions encountered by Stantec at the time the work was performed at the specific testing and/or sampling locations, and conditions may vary among sampling locations. Factors such as areas of potential concern identified in previous studies, site conditions (e.g., utilities) and cost may have constrained the sampling locations used in this assessment. In addition, analysis has been carried out for only a limited number of chemical parameters, and it should not be inferred that other chemical species are not present. Due to the nature of the investigation and the limited data available, Stantec does not warrant against undiscovered environmental liabilities nor that the sampling results are indicative of the condition of the entire site. As the purpose of this report is to identify site conditions which may pose an environmental risk; the identification of non-environmental risks to structures or people on the site is beyond the scope of this assessment.

Should additional information become available which differs significantly from our understanding of conditions presented in this report, Stantec specifically disclaims any responsibility to update the conclusions in this report.

This report was prepared by Patrick Turner, P.Eng. and reviewed by Don Carey, M.Sc., P.Eng.

Appendix A

Site Plans

V:\1214\active\121414898\03_data\gis_cad\gis\mapping\mxd\ST_NS_121414898-006.mxd hward

Former Mine Operation and/or Waste Rock
Former Stamp Mill
Dwelling
Former Dwelling (approx.)
Phase I ESA Site Boundary: Approximate extent of tailings pile (from Draft Atlantic Gold Delineation of Historic Gold Mine Tailings Report, Feb 2016)
Watercourse
Road
Former Road
Proposed Open Pit Boundary
Exisitng Open Pit Boundary
Exposed Bedrock
Woodland

0 25 50 75
Metres

ST_NS_121414898-006 NAD 1983 UTM Zone 20N

N

Former Moose River Gold Mine Road
Mine Haul Road
Former Moose River Gold Mines Stamp Mill
"New Pond"
Water Discharge Area
Haul Road to Scraggy Lake Dump
Moose River
Former Moose River Gold Mine Park
Former G&K Mining Stamp Mill
Former Higgins Mine Road
Former Touquoy Stamp Mill
Former Colonial Mining Company Stamp Mill
Southern Diversion Road

Summerside
Prince Edward Island
Charlottetown
Moncton
Truro
Nova Scotia
Project Location
Halifax

Sources: Government of Nova Scotia

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Stantec

ATLANTIC GOLD

Phase 1 Environmental Site Assessment
Historical Tailing Area
Mosse River Gold Mine, Nova Scotia

Figure 1

Appendix B

Photographs

Foundation Remains of the Moose River Gold Mine Stamp Mill (Crusher)

Historical Mine Shaft - Western Edge of Moose River Gold Mine Tailings Area

Typical View of Moose River Gold Mines Tailings Area

Typical Waste Rock Pile - Moose River Gold Mines Tailings Area

Typical DNR Warning Sign Near Historical Operations

Typical Steel Post Marking Drilled Exploration Hole

Debris Located to the Northwest of the Moose River Gold Mine Tailings Area in Former Pond

Open Former Mine Excavation with Debris Dumped Inside - West of Moose River Area

Foundation of the G&K Stamp Mill (Crusher)

Former Pond to the North of the G&K Stamp Mill (Crusher)

Exposed Mine Tailings - G&K Tailings Area

Foundation of a Stamp Mill Located to the South of the G&K Tailings Area Next to the Moose River

View of the Former Higgins Mines Road Looking East

Abandoned Residential Dwelling to the South of the G&K Tailings Area

View of the Former Provincial Park to the North of the G&K Tailings Area

Typical Waste Rock Pile Near the G&K Tailings Area

Moose River to the West of the G&K Tailings Area

Typical Transition Between Areas That Have had Overburden Removed and Tailings Areas

Excavation for Water Discharge to the East of the G&K Tailings Area

Haul Road Between the Site Areas Looking to the South Approximate Alignment of the Former Moose River Gold Mines Road

Excavation to the Southwest of the Moose River Tailings Area for Collection of Water

Surficial Building Debris Located to the Southwest of the Moose River Gold Mine Tailings Area

View of the Open Pit Mine to the North of the Site Looking Westerly from the Northern Access Road

Appendix C

Assessor Qualifications

Patrick Turner, B.Sc., P.Eng.
Associate Environmental Services

Profile

Patrick Turner, B.Sc., P.Eng., has been with Stantec since 2000. Mr. Turner has conducted over 500 Phase I, II and III Environmental Site Assessments (ESAs) in Nova Scotia, New Brunswick, Newfoundland, Ontario and Quebec. These environmental assessments and remediation projects dealt with metal, hydrocarbon, polycyclic aromatic hydrocarbon, polychlorinated biphenyl and chlorinated solvent impacts in soil and/or groundwater. Properties assessed have ranged from single family dwellings to industrial oil refineries.

EDUCATION

B.Sc. – Dalhousie University – Math, 1997

Bachelor of Engineering (Civil) –
Technical University of Nova Scotia 1998

COMPENTENCY

Site Visit

Report Writer

Technical Report Review

PHASE I ENVIRONMENTAL SITE ASSESSMENT
ASSESSOR QUALIFICATIONS – Don Carey

Donald A. Carey, M.Sc., P.Eng.

Principal

Profile

Don Carey, M.Sc., P.Eng., is a Principal and Senior Hydrogeologist in the Dartmouth office of Stantec. He is also the National Technical Leader for Site Investigation & Remediation for Stantec's Canadian operations, responsible for the development of standard operating procedures and quality for Phase I ESAs. Mr. Carey has more than 30 years' experience at Stantec in environmental site assessments, including senior technical review on more than 1,000 Phase I ESAs, for a wide variety of projects, from small residential properties, to large, complex industrial facilities.

Education M.Sc. – University of Waterloo – Hydrogeology, 1985
B.A.Sc. – University of Toronto – Geotechnical Enginering, 1977

Associations **Engineers of Nova Scotia**

Competencies Senior Review

Appendix D

Supporting Documentation

NOVA SCOTIA
Environment

Information Access and Privacy

PO Box 442
Halifax, Nova Scotia
B3J 2P8

ph: (902) 424-2549
fax: (902) 424-6925

October 5, 2017 Our file # ENV-2017-2188/2189

Email: patrick.turner@stantec.com

Patrick Turner
Stantec
102-40 Highfield Park Drive
Dartmouth NS B3A 0A3

Dear Mr. Turner:

RE: Lot 2 Mooseland Rd. (PID 00642892) and 140 Moose River Gold Mines Rd (PID 0051469), Moose River

I refer to your enquiry of the Environmental Registry received September 25, 2017. We acknowledge receipt of payment for 2 properties.

Enclosed is the information that was located through the Environmental Registry with regards to Lot 2 Mooseland Rd. River Gold Mines

No information was located through the Environmental Registry with regards to the remaining above referenced property.

Nova Scotia Environment makes no representations or warranties on the accuracy or completeness of the information provided.

Sincerely,

Tina Skeir
Information Access Officer

NOVA SCOTIA

APPROVAL # 2002-026746

Department of Environment and Labour

COMPLETION OF WORK FORM FOR ON-SITE SEWAGE DISPOSAL SYSTEM INSTALLERS

Name of Applicant _____ Qualified Person VICTOR HARTLING

Location of Property 1648 MOOSELAND RD Lot Number 2

Municipality H.R.M. PID 053972 455 NO.

The following applies to a Septic Tank(s) or a Holding Tank(s)			
Yes	No	N/A	
☑	☐	☐	The tank has been installed in accordance with manufactures recommended procedures
☑	☐	☐	The tank has been sized as per the approval
The following items have been installed in accordance with the approval:			
☑	☐	☐	Pipe
☑	☐	☐	Geotextile
☑	☐	☐	Crushed Rock
☑	☐	☐	Imported Fill
☑	☐	☐	Filter Sand
☐	☐	☑	Interceptor/Swale
☐	☐	☑	Pump Chamber/Siphon Chamber
☐	☐	☑	Pump
☐	☐	☑	Alarm
☑	☐	☐	Topsoil and Seed or Sod, if no, installer to notify owner of requirement

I have installed this system in accordance with the approval, the On-site Sewage Disposal System Regulations and the Guidelines Victor Hartling VICTOR HARTLING

Installer's Signature Print Name

License # 72 Date MAY 18/02

NSDEL dated January 21, 2002

NOVA SCOTIA
Department of Environment and Labour

Suite 224, Sunnyside Mall
1595 Bedford Highway
Bedford NS B4A 3Y4

Tel: (902) 424-7773
Fax: (902) 424-0597

May 7, 2002

Our File Number: 96000-30-/BED-026746

Dear

RE: **Approval to Construct and Install - On-site Sewage Disposal System**
Approval No. 2002-026746, PID # 053972

Attached is your approval pursuant to the *Environment Act* authorizing the installation of an on-site sewage disposal system at Lands of Charles Bissett, 1648 Mooseland Rd, Mooseland, Halifax Regional Municipality, Nova Scotia.

This Approval or a copy is to be kept on site at all times during installation of the system. The terms and conditions are attached to the Approval. It is your responsibility to ensure that all personnel involved in the project are aware of and follow these terms and conditions. Failure to comply with the terms and conditions is an offence.

It is your duty to advise the Qualified Person, Victor Hartling, and the Department of any new and relevant information respecting any adverse effect that results or may result from the approved activity which comes to your attention after the issuance of the Approval. Notification to the Department is required under Section 60 of the *Environment Act*.

No alteration or modification is permitted to the on-site sewage disposal system referenced in this Approval without applying for, and receiving, an amendment to this Approval.

The on-site sewage disposal system shall be installed by a licensed installer and a copy of this Approval must be given to the installer. The Qualified Person, Victor Hartling, is responsible to submit a certificate of installation to the department within 14 days of installation of the system which states that the system has been installed in conformance with the Approval.

Despite the issuance of this Approval, the Approval Holder is still responsible for obtaining any other authorization which may be required to carry out the activity, including those which may be necessary under provincial, federal or municipal law.

Please call if you have any questions about the conditions of this Approval. You may reach me at (902) 885-2462.

Yours truly,

Bridget A Boutilier

Bridget A Boutilier, CPHI(c)
Inspector Specialist

cc: Victor Hartling

Eimas #: 2002-026746

NOVA SCOTIA
Department of Environment and Labour

APPROVAL

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

APPROVAL HOLDER: John Babin

APPROVAL NO: 2002-026746

EFFECTIVE DATE: May 7, 2002

EXPIRY DATE: May 7, 2005

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

Construction and installation of an on-site sewage disposal system to service a three bedroom single family residential dwelling at Lands of Charles Bissett, 1648 Mooseland Rd, Mooseland, Halifax Regional Municipality, Nova Scotia, the "Site".

Administrator Budget Boutilier
Date Signed May 7/02

TERMS AND CONDITIONS OF APPROVAL

Nova Scotia Department of Environment and Labour

Project: **John Babin**
PID #053972
Lands of Charles Bissett
1648 Mooseland Rd
Mooseland, Halifax Regional Municipality

Approval Number: **2002-026746**

File Number: **96000-30-/BED-026746**

Reference Documents:

- Application dated May 3, 2002 and attachments prepared by Victor Hartling.

1. General Terms and Conditions

a) The Approval Holder shall conduct the installation of an on-site sewage disposal system in accordance with provisions of the:

i) *Environment Act*, S.N.S. 1994-95 c.1;
ii) Regulations pursuant to the above Act
iii) *On-Site Sewage Disposal Systems Regulations.*
iv) Nova Scotia Department of Environment and Labour "On-Site Sewage Disposal Systems Technical Guidelines", latest edition

b) The on-site sewage disposal system shall be installed as per the drawings and specifications listed in the reference documents above and as attached and forming part of this Approval. If there is a discrepancy between the reference documents and these terms and conditions, the terms and conditions of this Approval shall apply.

c) No authority is granted by this Approval to enable the Approval Holder to construct or install the on-site sewage disposal system on lands which have not been approved for the designated activity by the landowner. It is the responsibility of the Approval Holder to ensure that such contravention does not occur.

d) The on-site sewage disposal system shall be installed in the area where the acceptable test pit(s) was located. This Approval is specific to the Site indicated on the drawings/sketch supplied by the qualified person and attached to this Approval. The relocation of the on-site sewage disposal system to another site or location on the lot will require approval from the Department prior to installation.

e) The Approval Holder shall ensure that the Site is developed in such a manner as to minimize the disturbance in the areas that are required for installation of the on-site sewage disposal system.

f) The Minister or Administrator may modify, amend or add conditions to this Approval at any time pursuant to Section 58 of the Act.

g) (i) If the Minister or Administrator determines that there has been non-compliance with any or all of the terms and conditions contained in this Approval, the Minister or Administrator may cancel or suspend the Approval pursuant to subsections 58(2)(b) and 58(4) of the Act, until such time as the Minister or Administrator is satisfied that all terms and conditions have been met.

(ii) Despite a cancellation or suspension of this Approval, the Approval Holder remains subject to the penalty provisions of the Act and regulations.

h) This Approval is not transferable without the consent of the Minister or Administrator.

i) The Approval Holder shall notify the Nova Scotia Department of Environment and Labour prior to any changes not approved under authorization of this Approval. No alteration, or modification is permitted to the on-site sewage disposal system referenced in this Approval without applying for, and receiving, an amendment to this Approval.

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

k) The Approval Holder shall ensure that this Approval or a copy is kept on Site at all times during installation of the system and that personnel directly involved in the project are made fully aware of the terms and conditions which pertain to this Approval.

2. Specific Requirements:

a) **Minimum System Clearance:**

Lot Boundary	***3.0 m***	Downslope Boundary	***9.0 m***
Dug Well	***30.5 m***	Foundation Footing Drain (from tank)	***1.5 m***
Drilled Well	***15.2 m***	Foundation Footing Drain (from field)	***6.0 m***
Water Course	***30.5 m***	Intermittent Drainage Ditch	***15.2 m***
Right-of-way	***6.0 m***		

b) **Certificate of Installation:** An inspection of the on-site sewage disposal system is required in accordance with Section 25 of the *On-Site Sewage Disposal Systems Regulations* before the system is covered with earth. The Qualified Person is responsible to submit a certificate of installation to the Department within 14 days of completion of the system, which states that the system has been installed in conformance with the Approval. Completion of the system includes top soil and seeding or sodding.

c) **Department Audit:** The Department may audit the installation and/or final inspection. To facilitate inspection and scheduling, the Approval Holder, Qualified Person or Installer shall notify the Nova Scotia Department of Environment and Labour three days before the system installation commences. Please call Bridget A Boutilier, at 885-2462, between the hours of 8:30 a.m. and 4:30 p.m. to arrange for inspection. Failure to notify may result in a requirement for the system to be uncovered in order to conduct the audit.

d) **Installation**: The on-site sewage disposal system shall be installed by a licensed installer.

e) **Topsoil and Seeding/Sodding:** A minimum of 100 mm of topsoil cover is required over the disposal field including the imported sand fill buffer. After topsoil is placed, the disposal field must be seeded or sodded.

The Approval Holder is responsible for all aspects of the Approval including the placement of the topsoil and seeding/sodding.

After final inspection of the septic system has been granted, the Qualified Person is to return to the lot and confirm that the placement of the topsoil and seeding/sodding have been completed prior to issuing the final inspection report to the Approval Holder, building inspector and the Nova Scotia Department of Environment and Labour.

f) **Water Treatment Devices:** Backwash water from water treatment devices must not be discharged to the on-site sewage disposal system.

g) **Pump/Syphon Testing:** It is the responsibility of the installer and/or Qualified Person, prior to issuing a certificate of installation, to test the pump or syphon to ensure it is operating properly and is providing equal distribution to the disposal field.

NOVA SCOTIA
Department of the Environment

APPLICATION FOR APPROVAL

7103 $ 50.00

2002-026746

PLEASE PRINT OR TYPE. Complete Sections 1, 2, 3, 4 and 7 for ALL Applications. Complete areas of Sections 5 and 6 that are applicable to the specific activities of this application only.

Type of Application:

New Application ☑ Renewal ☐ Amendment ☐ Transfer ☐

If applicable, provide the previous Approval #

DUE CENTRAL REGION
Bridget
MAY 2002
RECEIVED

SECTION 1 - OWNER

If there is more than one owner, please indicate who will be the primary applicant for this project and attach a complete list of owners.

Company/Organization/Municipality

Business Number (BN) if applicable

Mr. ☑ Ms. ☐ Mrs. ☐ Other: Professional Designation

Middle Initial D Family Name

Phone | Home

Business ( ) Ext. | Other ( ) Ext.

Fax ( ) E-mail

Civic/Street Address

Mailing Address (if different than civic)

County HRM

City/Town

Province NOVA SCOTIA Postal Code Country CANADA

SECTION 2 - APPLICATION CONTACT

Is the Application Contact the same as Section 1 - Owner? Yes ☑ No ☐ If yes, please skip to Section 3.

Company/Organization/Municipality

Business Number (BN) if applicable

Mr. ☐ Ms. ☐ Mrs. ☐ Other: Professional Designation

First Name Middle Initial Family Name

Phone | Home ( ) Business ( ) Ext. | Other ( ) Ext.

Fax ( ) E-mail

Civic/Street Address

Mailing Address (if different than Civic)

County

Province City/Town

Postal Code Country

SECTION 3 - SITE/LOCATION OF PROPOSED ACTIVITIES

Property identification numbers (PID) are available at the Nova Scotia Department of Housing & Municipal Affairs. 1:50,000 Topo Maps (identifying Eastings and Northings) are available at Nova Scotia Department of the Environment Regional Offices.

Subdivision Name	
Lot # 2	
Site Name	
Civic/Street Address 1648 MOOSELAND RD.	
County HRM	Community MOOSELAND
Property Identification # (PID) 053972	1:50,000 Topo Map #
Grid Reference Easting (E)	Northing (N)

SECTION 4 - ACTIVITY

Proposed Activity - Please check (✓) all that apply.

Activity		Complete Sections
On-site Sewage Disposal System	☑	4, 5A, 6, 7
Subdivision Proposal Report	☐	4, 5B, 6, 7
Lot Assessment Report	☐	4, 5B, 6, 7

Will this Activity employ a new technology? Yes ☐ No ☑

If yes, please specify.

Proposed Project Dates, if applicable (yyyy/mm/dd)

Start Construction Date ASAP Start Operations ASAP End/Closure Date ASAP

SECTION 5 - ACTIVITY DETAILS

Complete Section 5 to the best of your knowledge. Please provide measurements in the metric units indicated.

5A - Complete for all *Individual* Lot On-site Sewage only

Sewage Disposal System: New ☑ OR Replacement ☐

Size of Lot: Length (metres) 217.20 Width (metres) 65.50 Area (metres²) 14,226.60

Water Supply: Existing ☐ or Proposed ☑

Type: Dug Well ☑ Drilled Well ☐ Other ☐

If other, please specify:

Type of building: New ☐ Existing ☑

Dwelling Type: Single Detached ☑ OR Other ☐ If other, please specify

Number of Bedrooms: 3 Design Capacity (litres/day) 1000 Whirlpool Baths/Hot Tubs: Yes ☐ No ☑

Name of Qualified Person (if applicable) VICTOR HARTLING Certificate/APENS # 72

Category of Lot: 1 ☑ 2 ☐ 3 ☐ 4 ☐

Municipal Planning Approval: Yes ☐ No ☐ Date of Approval (yyyy/mm/dd) UNKNOWN

Assessment Report completed by: OP1 ☐ OP2 ☑ Other ☐

If other, please specify:

5B - Request for Written Report for a Subdivision Proposal or Lot Assessment (Report only - no Approval Issued)		
Is this a Development Officer request for a written report?	Yes ☐	No ☐
Proposed Number of Lots:	Proposed Lot Numbers (attach list if necessary):	

SECTION 6 - SUPPORTING DOCUMENTATION TO ATTACH

All supporting documentation is to be submitted in accordance with the "Approvals Procedures Regulations." If applicable, the following documents must be submitted with this Application; however, additional information may be requested.

Note: A legend must be supplied for all mapping describing symbols used, scale and north orientation.

Attach for *All* applications
✓ Copy of the property deed, lease or letter proving the applicant's legal right to conduct the activity on the site
✓ Sketch of lot(s), including (but not limited to): • Location of proposed buildings, wells, septic systems, roads and driveways • Distances (metres) to wells and septic systems, watercourses, wetlands, etc., within 60 metres of property lines.
✓ Copy of subdivision, surveyor's or plot plan
✓ If applicable, Qualified Person's Assessment Report and Qualified Person's System Selection (system type, size, location, etc.)

If information submitted is incomplete, or if supporting documentation is of poor quality (plans, maps, etc.), the application may be delayed, returned or rejected.

SECTION 7 - DECLARATION

Correspondence is to be returned to: Owner ☑ OR Application Contact ☐

Information in this application package which the applicant considers to be confidential business information should be clearly identified. Are you making this request? Yes ☐ No ☑

If yes, please indicate which information in the Supporting Documentation is considered confidential.

Owner's Signature John D Babin Date (yyyy/mm/dd) 02/05/03

Name (Please print or type) John D Babin

OR Owner's Authorization (Letter of Authorization attached)

If you are acting on behalf of the owner, you must:

1. Attach a letter of authorization from the *Owner* identified on Page 1, Section 1, of this application.
2. Identify yourself as the *Application Contact* on Page 1, Section 2, of this application.
3. Sign the declaration below.

I certify that I am acting with the owner's full consent.

Signature _____ Date (yyyy/mm/dd) _____

Name (Please print or type) _____

SUBMISSION STANDARDS FOR APPLICATIONS FORM

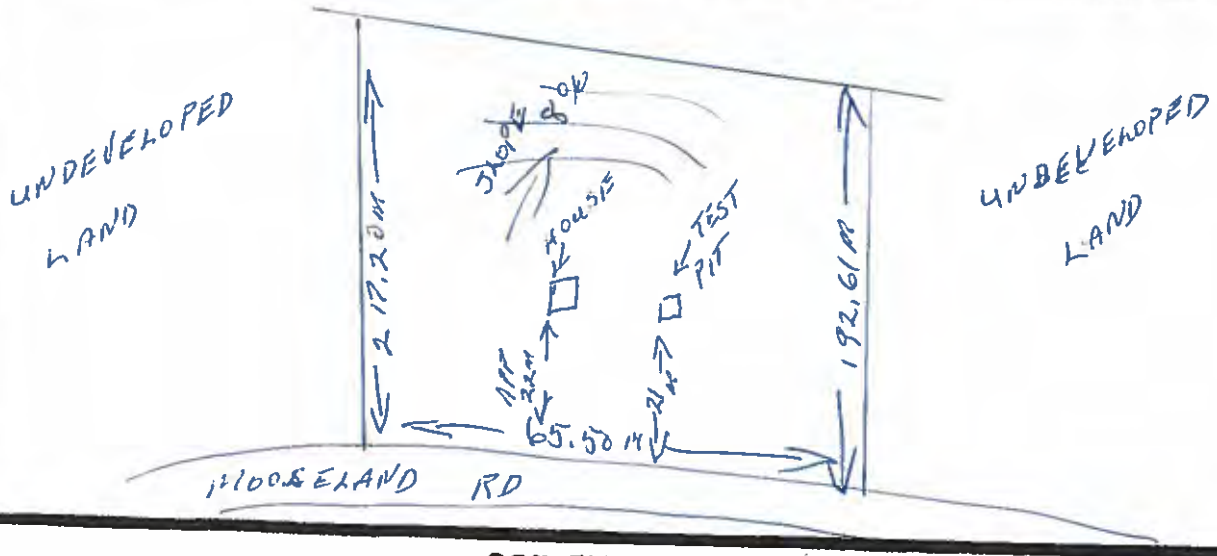
All applications must comply with the Act, Regulations, Guidelines and any policies within the Department. A completed copy of this form should accompany each application.

APPLICANTS NAME: _____ **APPLICATION #:** _____

SUBDIVISION NAME: LANDS **LOT NUMBER:** 02

SITE EVALUATION OF LOT

*Sketch of lot, location of soil evaluation tests, direction of slope, watercourse and other features that may influence the selection or design of the system.



SOIL EVALUATION TESTS

TEST PIT PROFILE (M)

TOTAL DEPTH:	2 M
BEDROCK AT:	NO M
WATER TABLE:	NO M
SLOPE:	8 %
ROOTS TO:	400 M M
MOTTLING AT:	NO M

Permeability of soil in-situ:	
Flow rate:	
Test method:	

SOIL STRATUM	SOIL TYPE SILTY SAND	DEPTH OF SOIL (mm)	DENSITY	MOISTURE
ORGANIC	organic mat	150	LOOSE	SLIGHTLY DAMP
1ST layer	TOPSOIL	150 – 400	LOOSE	SLIGHTLY DAMP
2ND layer	SILTY SAND	400 MM – 2 M	FAIRLY LOOSE	SLIGHTLY DAMP
3rd layer				

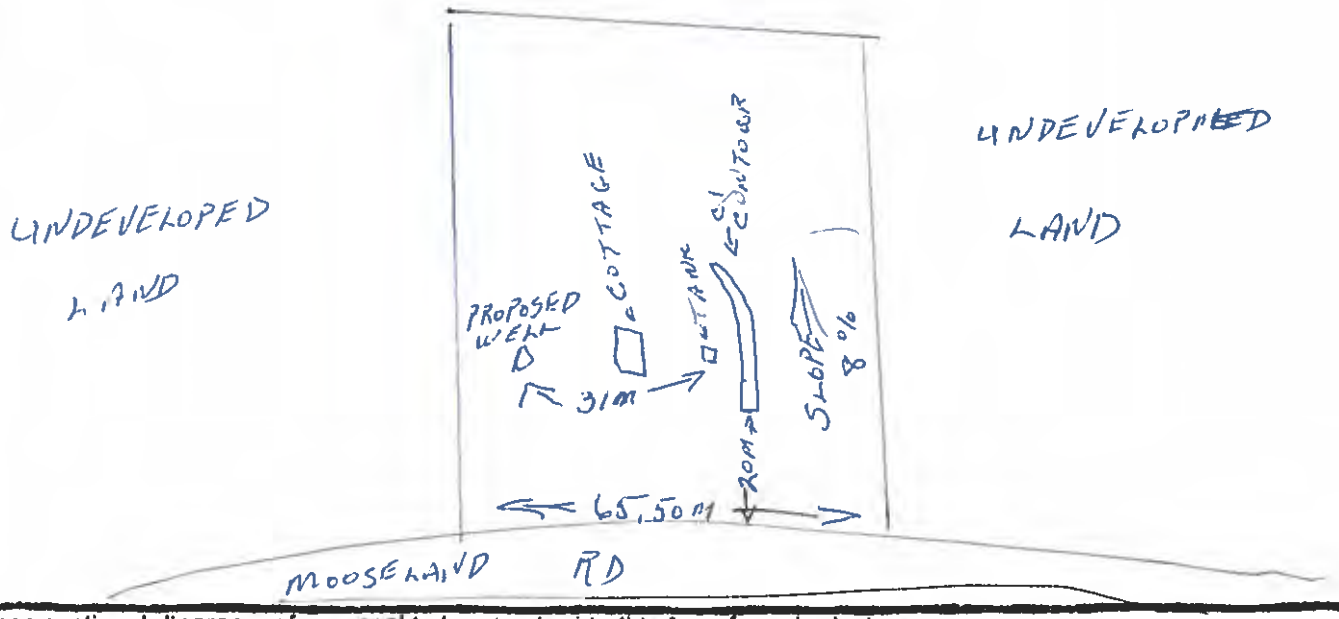
APPLICANTS NAME:_____ APPLICATION #:_____

SYSTEM SELECTION CRITERIA			
Daily flow	Soil Type	Soil permeability	Depth of permeable soil
Litres/day: 1000	SILTY SAND	m/s: 8E-6 M/S	mm: 2000

SYSTEM SELECTION FROM TECHNICAL GUIDELINES			
Type of Disposal Field:	C1	Imported sand fill required	☑ YES ☐ NO
Dimensions:	25M L x 12M W	Permeability Rate	6X10-6 m/sec
Cut at Toe of Trench:	600 mm	Width of Buffer -downslope -upslope	NO M M
Interceptor Trench	☐ YES ☑ NO depth:____	Depth of Buffer	____ mm
Pump or Siphon Capacity	____ Litres	Septic Tank Capacity	3300 Litres

DRAWING OF PROPOSAL

* Sketch of On-site Sewage Disposal System Selection/Design



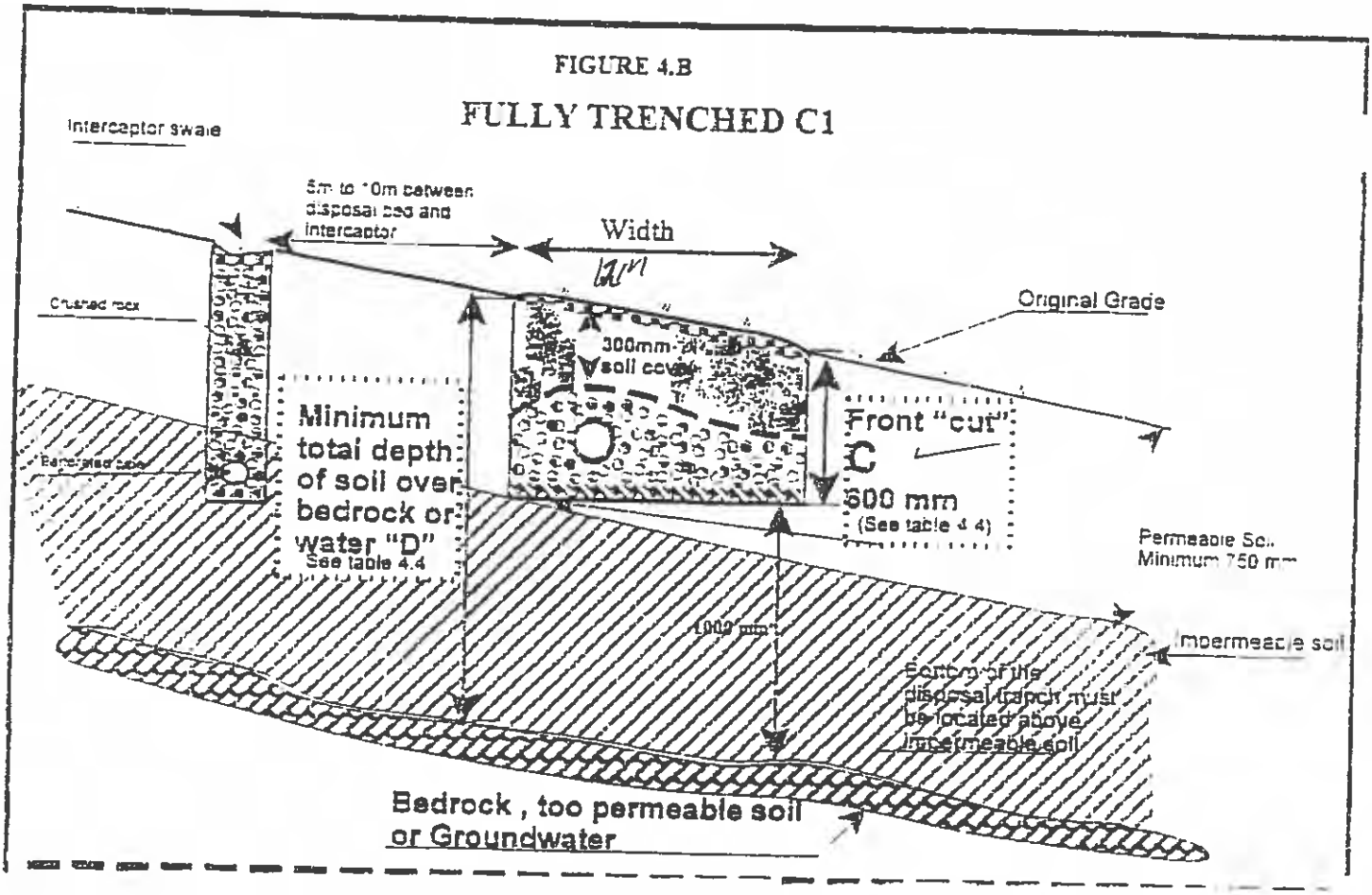
* Cross sectional diagrams of proposal to be attached to this form for submission.

DATE:_____ QUALIFIED PERSON:_____ (SIGNATURE)

CERTIFICATE OF QUALIFICATION #:_____ _____ (PRINT NAME)

FIGURE 4.B

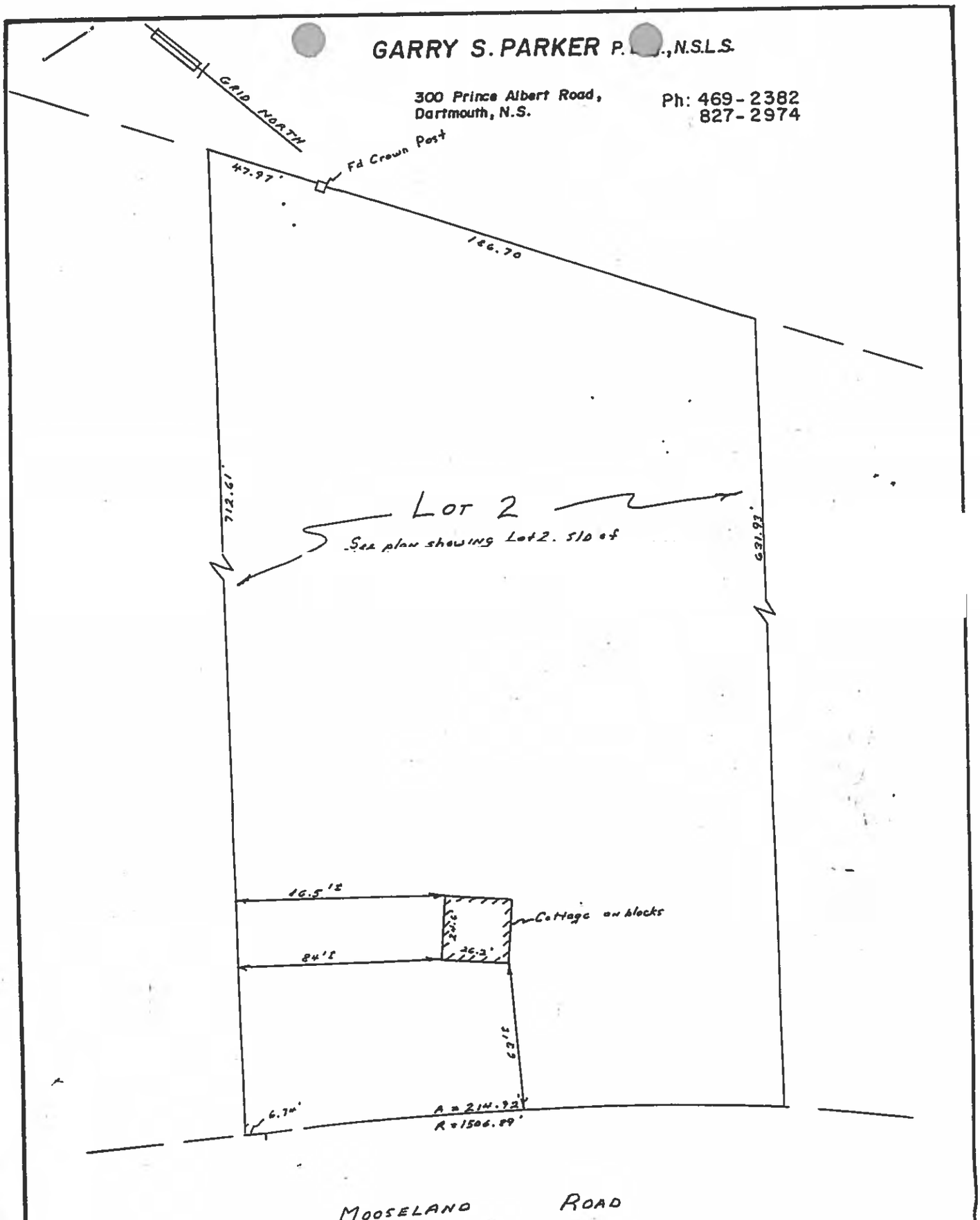
FULLY TRENCHED C1



GARRY S. PARKER P.[illegible], N.S.L.S.

300 Prince Albert Road,
Dartmouth, N.S.

Ph: 469-2382
827-2974



I certify to— that I have found the cottage located on Lot 2, S/D of lands of — at Mooseland Road Halifax County, Nova Scotia to be located as shown on the above plan.

THE ASSOCIATION OF NOVA SCOTIA LAND SURVEYORS
FOUNDED 1951
GARRY S. PARKER
455
MEMBER

SCALE: 1 in. = 50 ft.

Date: Sept 9/87 Drg No. 87148

Nova Scotia Land Surveyor

Department of
Environment & Labour

PO Box 697
Halifax, Nova Scotia
B3J 2T8

Our File Number:
10700-40

Office of the Minister

Original dated February 1, 2008

Mr. Wally Bucknell
Executive Director
DDV Gold Ltd.
6749 Moose River Road
RR2
Middle Musquodoboit
NS B0N 1X0

Dear Mr. Bucknell:

Re: Environmental Assessment - Touquoy Gold Project

The environmental assessment of the Touquoy Gold Project has been completed.

This is to advise that I have approved the above project in accordance with Section 18 (a) of the *Environmental Assessment Regulations*, pursuant to Part IV of the *Environment Act*. The project has been considered with respect to potential adverse effects and environmental effects, including effects on socio-economic conditions. I am satisfied following a review of the information provided by DDV Gold Limited, and through the government and public consultation as part of the environmental assessment, that any adverse effects or significant environmental effects of the undertaking can be adequately mitigated through compliance with the attached terms and conditions.

This letter in conjunction with the attached terms and conditions constitutes my approval. This approval is subject to any other approvals required by statute or regulation, including approval pursuant to Part V of the *Environment Act*.

If you have any questions regarding the approval of this project, please contact the Manager, Environmental Assessment Branch, Ms. Lorrie Roberts at (902) 424-6344.

Sincerely,

Original Signed By

Mark Parent
Minister

Encl.

NOVA SCOTIA

30 Damascus Road, Suite 115
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Canada B4A 0C1

902-424-7773 P
902-424-0597 F
www.novascotia.ca

APPROVAL

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

APPROVAL HOLDER: ATLANTIC MINING NS CORP.

SITE PID: 00437368, 00437699, 00437707, 00485193, 00485219, 00486134, 00514695, 00568006, 00642777, 00642819, 00642892, 00642926, 00642934, 00642942, 00642959, 00642967, 00642975, 00642983, 00642991, 00643007, 00643015, 00643023, 00643031, 00643049, 00643056, 00643064, 00643080, 00643098, 00643106, 00643114, 00643122, 00643130, 00643148, 00643155, 00643163, 00643171, 00643189, 00643197, 00643205, 00643213, 00643221, 00643239, 00643247, 00643254, 40307092, 40319543, 40338972, 40350050, 40350068, 40350076, 40449589, 40449597, 40500647, 40503468, 40524217, 40524225, 40524233, 40524241, 40535254, 40627218, 40627226, 40657363, 40747818, 41274606, 41280892, 41317108, 41334640, 41340621, 41342163, 41346073

APPROVAL NO: 2012-084244-03

EXPIRY DATE: March 28, 2024

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

Administrator: Kevin G Garroway

Effective Date: July 13, 2017

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

TERMS AND CONDITIONS OF APPROVAL

Nova Scotia Environment

Approval Holder: ATLANTIC MINING NS CORP.

Project: Touquoy Gold Project

Site:

PID	Civic #	Street Name	Street Type	Community	County
00437368				Mooseland	Halifax
00437699				Long Lake	Halifax
00437707				Mooseland	Halifax
00485193				Moose River Gold Mines	Halifax
00485219				Moose River Gold Mines	Halifax
00486134				Mooseland	Halifax
00514695	140	Moose River Gold Mines	Rd.	Moose River Gold Mines	Halifax
00568006				Moose River Gold Mines	Halifax
00642777				Moose River Gold Mines	Halifax
00642819				Mooseland	Halifax
00642892				Moose River Gold Mines	Halifax
00642926	6752	Moose River	Rd.	Moose River Gold Mines	Halifax
00642934				Moose River Gold Mines	Halifax
00642942				Moose River Gold Mines	Halifax
00642959	6720	Moose River	Rd.	Moose River Gold Mines	Halifax
00642967	6708	Moose River	Rd.	Moose River Gold Mines	Halifax
00642975	6700	Moose River	Rd.	Moose River Gold Mines	Halifax
00642983				Moose River Gold Mines	Halifax
00642991	6686	Moose River	Rd.	Moose River Gold Mines	Halifax

00643007	6656	Mooseland	Rd.	Moose River Gold Mines	Halifax
00643015	6749	Moose River	Rd.	Moose River Gold Mines	Halifax
00643023	6743	Moose River	Rd.	Moose River Gold Mines	Halifax
00643031				Moose River Gold Mines	Halifax
00643049				Moose River Gold Mines	Halifax
00643056	10	Moose River Gold Mines	Rd.	Moose River Gold Mines	Halifax
00643064	4	Moose River Gold Mines	Rd.	Moose River Gold Mines	Halifax
00643080	20	Moose River Gold Mines	Rd.	Moose River Gold Mines	Halifax
00643098	24	Moose River Gold Mines	Rd.	Moose River Gold Mines	Halifax
00643106	32	Moose River Gold Mines	Rd.	Moose River Gold Mines	Halifax
00643114				Moose River Gold Mines	Halifax
00643122	40	Moose River Gold Mines	Rd.	Moose River Gold Mines	Halifax
00643130	68	Moose River Gold Mines	Rd.	Moose River Gold Mines	Halifax
00643148				Moose River Gold Mines	Halifax
00643155				Moose River Gold Mines	Halifax
00643163	101	Moose River Gold Mines	Rd.	Moose River Gold Mines	Halifax
00643171				Moose River Gold Mines	Halifax
00643189	85	Moose River Gold Mines	Rd.	Moose River Gold Mines	Halifax
00643197				Moose River Gold Mines	Halifax
00643205	33	Moose River Gold Mines	Rd.	Moose River Gold Mines	Halifax
00643213	61	Moose River Gold Mines	Rd.	Moose River Gold Mines	Halifax
00643221	25	Moose River Gold	Rd.	Moose River Gold	Halifax

		Mines		Mines	
00643239				Moose River Gold Mines	Halifax
00643247	83	Moose River Gold Mines	Rd.	Moose River Gold Mines	Halifax
00643254				Moose River Gold Mines	Halifax
40307092				Mooseland	Halifax
40319543				Moose River Gold Mines	Halifax
40338972				Moose River Gold Mines	Halifax
40350050	6719	Moose River	Rd.	Moose River Gold Mines	Halifax
40350068	6705	Moose River	Rd.	Moose River Gold Mines	Halifax
40350076				Moose River Gold Mines	Halifax
40449589				Moose River Gold Mines	Halifax
40449597				Moose River Gold Mines	Halifax
40500647				Moose River Gold Mines	Halifax
40503468	43	Moose River Gold Mines	Rd.	Moose River Gold Mines	Halifax
40524217				Moose River Gold Mines	Halifax
40524225				Moose River Gold Mines	Halifax
40524233				Moose River Gold Mines	Halifax
40524241				Moose River Gold Mines	Halifax
40535254	56	Moose River Gold Mines	Rd.	Moose River Gold Mines	Halifax
40627218	6569	Mooseland	Rd.	Moose River Gold Mines	Halifax
40627226				Moose River Gold Mines	Halifax
40657363				Moose River Gold Mines	Halifax

40747818	6460	Mooseland	Rd.	Mooseland	Halifax
41274606				Moose River Gold Mines	Halifax
41280892				Moose River Gold Mines	Halifax
41317108				Moose River Gold Mines	Halifax
41334640				Moose River Gold Mines	Halifax
41340621				Moose River Gold Mines	Halifax
41342163	131	Moose River Gold Mines	Rd.	Moose River Gold Mines	Halifax
41346073				Moose River Gold Mines	Halifax

Approval No: 2012-084244-03

File No: 92100-30-BED-2012-084244

Reference Documents

- Application submitted July 13, 2017 and attachments.

1. Definitions

a. “Act” means Environment Act, Chapter 1, s.1 of the Acts of 1994-95, and includes, unless the context otherwise requires, all regulations made pursuant to the Act.

b. "Active Area" means the area required to construct, operate and reclaim the Facility and includes the open pit (surface) mine, mineral processing facility and associated works.

c. "Administrator" means a person appointed by the Minister to be responsible for processing applications respecting activities designated under the Activities Designation Regulations, and includes an acting administrator.

d. “Approval” means an approval issued pursuant to this Act with respect to an activity.

e. “Associated Works” means any building, machinery, equipment, device, tank,

system, stockpile, or other related infrastructure.

f. "Department" means the Central Region, Bedford Office, of Nova Scotia Environment located at the following address:

Nova Scotia Environment
Inspection, Compliance, and Enforcement Division
Central Region, Bedford Office,
Suite 115, 30 Damascus Road,
Bedford, Nova Scotia, B4A 0C1.

Phone:(902) 424-7773
Fax:(902) 424-0597

g. "Disturbed Area" means any area on the Site that has been stripped of vegetation and is susceptible to erosion.

h. “Dormancy” means periods of cessation of mining and mineral processing.

i. “Engineer of Record” means the professional engineer that has overarching responsibility for assuring that a tailings storage facility or dam is designed, built, operated and/or closed/decommissioned with appropriate concerns for safety, water management and environmental impact and meets the applicable regulations, statutes, guidelines, codes and standards.

j. “Extension” means an increase in size, volume or other physical dimensions of an activity such that the increase may cause an adverse effect if not properly mitigated.

k. “Facility” means the open pit (surface) gold mine, mineral processing facility and associated works required for the production of gold.

l. “Historic Tailings” means mine tailings deposited by operations that predate the Facility and are identified and documented, as such, by an independent experienced consultant.

m. "Minister" means the Minister of Environment, and may include any person appointed as a designate of the Minister.

n. “Modification” means a change to an activity that may cause an adverse effect if not properly mitigated and includes, but is not limited to, the expansion of the same process, addition of product lines and replacement of equipment with different technology other than that presently in use.

o. “NSE” means Nova Scotia Environment.

p. “Operation” means

i) For the purpose of the open pit mine (OPM wells), operation will only be considered as commenced when historic tailings are disturbed or material is extracted for the purpose of placement in the waste rock stockpile or as ore in the processing plant.

ii) For the purpose of the processing plant (PLM wells), operation will only be considered as commenced when ore is placed in the processing plant.

iii) For the purpose of the tailings management facility (TMF), including the proposed containment cell for historic tailings (TMW wells and 2 domestic wells), operation will only be considered as commenced when tailings or sludge are placed in the TMF or containment cell.

iv) For the purpose of the waste rock storage area (WRW wells), operation will only be considered as commenced when material is placed in the waste rock stockpile area.

q. “Production” means the development, mining, processing, concentration and smelting to produce elemental gold from gold ore.

r. “Province” means the responsible regulatory Department(s) within the government of Nova Scotia.

s. "Reclamation or Rehabilitation" means restorative work performed or to be performed in accordance with the approved reclamation plan and/or as directed by the Department.

t. “Site” means the lands where an activity or proposed activity will take place and includes the area within the property boundaries of the lots identified with PID#' s listed in this approval.

u. “Standard” means a standard, policy, code, guideline, protocol or other rule in relation to a designated activity that, by reason of its establishment or adoption by regulation or as a condition of an approval or certificate of qualification, becomes a mandatory requirement for participation in that designated activity.

v. "Structure" includes, but is not limited to, a private home, a cottage, an apartment building, a school, a church, a commercial building or a treatment facility associated with the treatment of municipal sewage, industrial or landfill effluent, an industrial building, infrastructure or construction, a hospital, and a nursing home, etc.

w. “Tailings Management Facility (TMF)” means all infrastructure required to be constructed and operated for the purpose of management of mine tailings, historic tailings and associated wastewater over the life cycle of the Facility.

x. “Watercourse” means

(i)the bed, banks and shore of every river, stream, lake, creek, pond, spring, lagoon or other natural body of water, and the water therein, within the jurisdiction of the Province, whether it contains water or not, and

(ii)all groundwater;

y. "Wetland" means lands commonly referred to as marshes, swamps, fens, bogs, and shallow water areas that are saturated with water long enough to promote wetland aquatic processes and which are indicated by poorly drained soil, vegetation and various kinds of activities which are adapted to a wet environment.

2. Scope

a. This Approval (the "Approval") relates to the Approval Holder and their application for Industrial Approval Amendment dated November 25, 2016 and supporting reference documents, as listed in Appendix I attached, to construct, operate and reclaim the Facility, situated at or near 6749 Moose River Rd., Moose River Gold Mines, Halifax Regional Municipality (the "Site").

b. The scope of the Approval shall be limited to surface mining by open pit methods for the extraction of gold ore and the mineral processing of gold ore for the production of elemental gold.

c. The scope of Approval includes recommendations in the Supporting Reference Documents of the Application which apply to the construction, operation and reclamation of the TMF with the following features:

i) an upstream clay till blanket for the purpose of seepage control.

ii) an upstream clay till core in the dam for the purpose of seepage control.

d. The Approval Holder shall not process historic tailings for the purpose of gold recovery without the approval of the Department.

e. The Approval Holder shall not remove tailings, waste rock, slag or historic tailings from the Site without prior approval of the Department.

f. The Facility shall not exceed the active area as outlined in the application and supporting reference documents.

g. This Approval provides for the operation of the Facility at the existing Site only. Any change in location requires further Approval from the Department.

h. The Approval Holder shall maintain a minimum separation distance of 30 metres between the Facility and outer property boundaries of the Site unless otherwise varied by the Department.

i. The Certificate of Variance signed March 21, 2016 regarding Reclamation and Reclamation Security shall be considered replaced by Condition 24 of the Approval.

3. General

a. The Approval Holder shall construct, operate and reclaim its' Facility in accordance with the following provisions:

i) Environment Act S.N.S. 1994-1995, c.1, s.1 as amended from time to time;

ii) Regulations, pursuant to the above Act, as amended from time to time;

iii) Nova Scotia Standards for Construction and Installation for Petroleum Storage Tank Systems, 1997 Edition as amended from time to time,

iv) The Nova Scotia Environment Contingency Planning Guidelines, May 10, 2016 as amended from time to time, and

v) Any standard adopted by the Department, as amended from time to time.

b. No authority is granted by this Approval to enable the Approval Holder to construct or operate the Facility on lands which are not in the control or ownership of the Approval Holder. It is the responsibility of the Approval Holder to ensure that such a contravention does not occur.

c. If there is a discrepancy in the reference documents or between the reference documents and the terms and conditions of this Approval, the terms and conditions of this Approval and the most recent Application reference submission of clarification from the Approval Holder shall apply.

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

e. The Minister may modify, amend or add conditions to this Approval at anytime pursuant to Section 58 of the Act.

f. This Approval is not transferable without the consent of the Minister.

g. i) if the Minister determines that there has been non-compliance with any or all of the terms and conditions contained in this Approval, the Minister may cancel or suspend the Approval pursuant to subsections 58A(1) and 58A(2) of the Act, until such time as the Minister is satisfied that all terms and conditions have been met.

ii) If the Minister cancels or suspends this Approval, the Approval Holder remains subject to the penalty provisions of the Act and regulations.

h. The Approval Holder shall notify the Department prior to any proposed extensions or modifications of the Facility, including, but not limited to, process changes or waste disposal practices which are not granted under this Approval. An amendment to this Approval may be required before implementing any change.

i. Extensions or modifications to the Facility may be subject to the Environmental Assessment Regulations. Written approval from the Minister may be required before implementing any change.

j. Pursuant to Section 60 of the Act, the Approval Holder shall submit to the Minister any new and relevant information respecting any adverse effect that actually results, or may potentially result, from any activity to which the Approval relates and that comes to the attention of the Approval Holder after the issuance of the Approval.

k. The Approval Holder shall immediately notify the Department of any incidents of non-compliance with this Approval.

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

m. Unless specified otherwise in this Approval, all samples required to be collected by this Approval shall be collected, preserved and analysed, by qualified personnel, in accordance with recognized industry standards and procedures.

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

o. The Approval Holder shall ensure that this Approval, or a copy, is kept on the Site at all times and that personnel directly involved in the Facility operation are made fully aware of the terms and conditions which pertain to this Approval.

p. Upon any changes to the Registry of Joint Stock Companies information, the Approval Holder shall provide a copy of the complete information to the Department within 15 days.

4. Particulate Emissions (Dust)

a. Particulate emissions shall not contribute to an ambient concentration of total suspended particulate matter that exceed the following limits (in micrograms per cubic metre of air) at or beyond the Site property boundaries:

Annual Geometric Mean 70 µg/m3

Daily Average (24 hr.) 120 µg/m3

b. The use of used oil as a dust suppressant is strictly prohibited. The generation of dust from the Site shall be suppressed as required.

c. i) The Approval Holder shall establish six ambient air monitoring stations for the total suspended particulate. Stations are situated as identified in drawing Dwg. 1, located in Appendix A attached, entitled “Particulate Emission Monitoring Locations, Nova Scotia Industrial Approval, Touquoy Mine Tailings Management Facility, Halifax County, Nova Scotia, Atlantic Mining NS Corp., prepared by Stantec, February 15, 2017".

ii) These stations shall be monitored annually though out construction, operation and reclamation, during July - August, including periods of Facility dormancy.

iii) Suspended particulate matter shall be measured by the EPA standard; EPA/625/R-96/010a; Sampling of Ambient Air for Total Suspended Particulate Matter (SPM) and PM10 Using High Volume (HV) Sampler.

iv) Revised and/or additional dust monitoring and reporting shall be conducted at the request of the Department.

v) Results of particulate emission monitoring shall be submitted with the annual report, required in Condition 12, unless otherwise requested by the Department.

d. i) The Approval Holder shall implement their plan to control fugitive dust emissions from the Facility during all periods of Facility development, operation and reclamation including periods of post reclamation and dormancy.

ii) The plan for dust control shall be implemented to the satisfaction of the Department.

5. Sound Levels

a. Sound levels measured at stations situated at or beyond the Site property boundaries shall not exceed the following equivalent sound levels (Leq):

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

b. Monitoring of sound levels shall be conducted at the request of the Department. The location of the monitoring station(s) for sound will be established by a qualified person retained by the Approval Holder and submitted to the Department for approval and may include point(s) to and beyond the property boundary of the Site.

c. Where it is the opinion of the Department that the Approval Holder has exceeded limits established in Condition 5(a), the Approval Holder will be required to implement a corrective action plan which may include additional noise monitoring. The Approval Holder shall implement immediate corrective actions to mitigate noise if so directed by the Department.

d. Noise monitoring shall be conducted in accordance with the Department's Guideline for Environmental Noise Measurement and Assessment or future revisions to this Guideline. Noise measurements shall be integrated on the A weighted scale based on a minimum of two hours of continuous sampling during each of the periods of the day as identified in Condition 5(a).

e. Revised and/or additional noise monitoring and reporting shall be conducted at the request of the Department. The location of the revised and/or additional noise monitoring station(s) will be established by the Department in consultation with the CLC and may include point(s) beyond the property boundary of the Site.

6. Air Emissions

a. The Approval Holder shall ensure that emissions from the facility do not contribute to an exceedence of the maximum permissible ground level concentrations specified in Schedule "A" of the Air Quality Regulations.

b. The Approval Holder shall operate the Facility so that air emissions do not result in an exceedence of the ground level concentrations at or beyond the Site boundary listed in Table 1, Appendix B.

c. Stack Emissions for Particulate Collection Systems, Electrowinning, Carbon Regenerator and Gold Furnace

i) The Approval Holder shall meet the air emissions criteria specified in Table 2, Appendix B.

d. The Approval Holder shall be required to comply with additional ambient air or stack limits established by the Department.

e. Stack testing shall be conducted and results submitted as directed by the Department to confirm compliance with the limits in Condition 6.

f. Air Emission Source Program

i) The Approval Holder shall prepare a program to conduct source monitoring to verify the dispersion modeling estimates for the parameters of mercury, total suspended particulate, hydrogen cyanide, ammonia, and metals, including arsenic and lead.

ii)The program shall be submitted 30 days prior to commencement of operation

and implemented in a time frame acceptable to the Department.

iii) The implementation of the program shall be conducted and subsequent analysis shall be performed by a consultant with experience in source testing and ambient air testing and modelling.

iv) Detailed pre-test methods including the test procedures, name of the company performing the work and their previous experience must be submitted to the Department not less than eight weeks prior to the testing, if such testing is required or planned.

v) The results of the program as described in Condition 6(f) of this Approval shall be based upon the operating condition scenario for which the highest concentration of contaminant at ground level would result.

vi) The results of the program shall be submitted to the Department for review and approval.

vii) If results from the program described in Condition 6(f) of this approval demonstrate that the Approval Holder is or may be contributing to an exceedance of the maximum permissible ground level concentrations specified in Table 1, limits in Table 2, Appendix B or Schedule “A” of the Air Quality Regulations, the Approval Holder may be required to conduct additional ambient monitoring or field measurement. The Approval Holder may also be required to prepare and submit, to the Department, an emission reduction plan to prevent non-compliance.

viii) If required, the Approval Holder shall implement the emission reduction plan in a time frame acceptable to the Department to achieve compliance.

g. Air Emission Control Operation and Maintenance

i) Air emissions from the particulate collection systems, electrowinning circuit, gold furnace and carbon regeneration kiln shall be directed to the emission control systems when these units are in operation.

ii) The Approval Holder shall prepare and submit, to the Department, an operation and maintenance manual for the control of air emissions from all emission control equipment including scrubbers, baghouses, demisters, dust collectors, etc.
iii) The manual shall be prepared and submitted prior to commencement of operation of the process units.

iv) The Approval Holder shall maintain records of the inspections on the emission control systems for a period of not less than two years and make them available

to the Department upon request.

vi) The Approval Holder shall conduct annual inspections of each emission control system to ensure it is in proper operating condition. This shall include, but not be limited to, an examination of the instrumentation, seals and connections on ductwork and the condition of all vent lines. The Approval Holder shall maintain a record of these inspections on the Site for a period of not less than two years and make them available to the Department upon request.

7. Surface Water

a. The Site shall be developed and maintained to prevent siltation of the surface water which is discharged from the Site into the nearest watercourse. Additional controls shall be implemented if site runoff exceeds the discharge limits contained in Condition 15.

b. No authority is granted by this Approval to enable the Approval Holder to discharge surface water onto adjoining lands without the authorization of the affected landowner(s). It is the responsibility of the Approval Holder to ensure authorizations are current and valid.

c. The Approval Holder shall establish and maintain sixteen (16) surface water monitoring stations as identified in attached drawing Dwg. 2 (Appendix C attached), entitled “Surface Water Monitoring Locations, Nova Scotia Industrial Approval Touquoy Mine Tailings Management Facility, Halifax County, Nova Scotia, Atlantic Mining NS Corp., prepared by Stantec, February 15, 2017". The stations are described as follows:

SW-1 Moose River - Upstream of Facility and Upstream of Moose River Road culvert.

SW-2 Moose River - Downstream of Facility and Upstream of Bridge.

SW-3 Unnamed Tributary (Watercourse #4) to Moose River Downstream of Facility.

SW-11 Moose River - Upstream at Facility Boundary

SW-12 Outlet from Square Lake

SW-13 Outlet from Scraggy Lake at Dam

SW-14 Final (MMER) Facility Liquid Effluent - Outlet from the Polishing Pond.

SW-15 End of unnamed Tributary to Scraggy Lake south of the Polishing Pond

SW-16 Seepage Collection Point East of Tailings

SW-17 Seepage Collection Point West of Tailings

SW-18 Fish River North of Pughole and Upstream of Bridge

SW-19 Unnamed Tributary to Moose River Upstream of Facility.
SW-20 East of the TMF on an unnamed Tributary to Scraggy Lake

SW-21 Scraggy Lake near the final effluent outfall into the lake

SW-22 Seepage Collection Point North of Tailings

SW-23 Upstream of the Mineral Processing plant on Watercourse #4, an unnamed Tributary to Moose River.

d. i) The Approval Holder shall conduct surface water quality monitoring during the various stages of the Facility construction, operation and reclamation in accordance with Table 3, Appendix D, for the parameters specified in Appendix G, subject to condition 7(e).

ii) The Approval Holder shall conduct monitoring at environmentally significant areas for total suspended solids as specified in the Application and identified on Drawing No. 7.2 Stantec dated November 25, 2016 and implement mitigative measures as specified in the Atlantic Gold, Touquoy Mine Project, Environmental Effects Monitoring Plan (EEM) for various phases of the Facility.

e. i) The Approval Holder shall conduct monthly surface water quality monitoring at all monitoring stations designated by the MMER.

ii) Monitoring shall be conducted during construction and for one year following commencement of all operations for parameters specified in the MMER.

iii) Thereafter, the frequency of monitoring shall be, at minimum, as specified in Table 3, Appendix D.

f. i) The Approval Holder shall develop a stage - discharge curve for the flow in Moose River surface water monitoring stations SW-11 and SW-2 for the period of June 1 to September 30, to establish the relationship between the water level on the staff gauge and the rate of flow.

ii) Accepted stream gauging standards such as ISO 748 shall be used in developing the stage discharge curve for both monitoring stations.

iii) A minimum of four measurements shall be made of depth and flow in Moose

River at both locations in 2017. At least one measurement shall be made in the period between August 15 and September 3 during a low stage in Moose River.

iv) Flow measurement equipment which is sufficiently sensitive to measure flows in the range of 0.002 cubic metres per second shall be used to determine flows. The capability of flow measurement instrumentation shall be documented in all required reporting for establishment of the stage discharge curve.

v) The staff gauge at both locations shall be recalibrated annually by a person qualified and experienced in low flow hydrology.

vi) In relation to the stage discharge curve, the Approval Holder shall submit a report to NSE by October 31, 2017. The report shall be prepared by a person trained and experienced in low flow hydrology and shall include the following information, as a minimum:

• The stage-discharge curve for both locations, plotted at a scale which clearly shows the low flow end of the curve,

• A best-fit equation describing the low flow stage-discharge relationship,

• A description of the development of the stage discharge curve,

• A description of the location chosen for the monitoring stations.

vii) The Approval Holder shall provide additional information regarding the stage discharge curve and staff gauge at the request of NSE.

g. i) The Approval Holder shall install and maintain two permanent staff gauges for recording surface water flow measurements in Moose River, upstream and downstream of the open pit mine, at an appropriate location near SW11 and SW2.

ii) Water measurements shall be recorded at least daily, to estimate flow through an established stage-discharge curve relationship, beginning no later than July 15, 2017 through September 30, 2017 and from June 1st through September 30th every year after.

iii) Surface water flow data may be measured and recorded using a combination of staff gauge readings and automated data loggers.

iv) If measurements are recorded using data loggers, on at least a bi-weekly basis, the data shall be downloaded, reviewed, and compared to the staff gauge to ensure accuracy of the data loggers. During this data review, the Approval Holder shall compare upstream and downstream flow rates in order to identify

potential impacts on Moose River.

v) The Approval Holder shall notify NSE immediately if significant deviation from baseline or upstream flow is observed in Moose River.

vi) Data loggers shall be calibrated on at least an annual basis.

vii) The permanent monitoring stations shall be established no later than July 14, 2017.

viii) Site selection for placement of the permanent monitoring stations shall be completed by or under the direct supervision of a qualified person trained and experienced in low flow hydrology.

ix) The staff gauge shall be located such that it will be submerged if there is any flow in the watercourse.

h. The Department reserves the right to require modifications including, but not limited to, monitoring locations, monitoring frequency and contaminants of concern for surface water. The Approval Holder shall conduct additional monitoring at the direction of the Department.

i. Revisions to the surface water monitoring program proposed by the Approval Holder shall require prior written approval of the Department.

j. The Approval Holder shall be required to change environmental control measures if surface water monitoring indicates adverse environmental effects are or may be occurring and are attributable to activities at the Facility.

k. The Approval Holder shall be required to implement contingency measures to maintain flow in the Moose River or its tributaries if so directed by the Department.

l. The Approval Holder shall implement the approved Copper Sulphate Management Plan and review it on an annual basis for improvements or revisions. The Plan revisions shall meet the approval of the Department.

m. The Approval Holder shall retain a 30 metre undeveloped buffer on all adjacent watercourses and wetlands unless specific approval has been given to alter the watercourse/wetland. The Approval Holder shall obtain written authorization from the Department to encroach within these limits.

n. No later than ninety (90) days prior to commencing construction, the Approval Holder shall submit an application for water withdrawal for all sources from which water is proposed to be withdrawn for the processing facility water supply (startup and makeup once recycling commences). The application shall specify the full

anticipated daily maximum and average withdrawal volume and expected duration for startup and makeup water requirements for each water body that is proposed as water withdrawal source. The application shall meet all submission requirements of the NSE “Guide to Surface Water Withdrawal Approvals 2016" or future revisions.

o. The Approval Holder shall obtain a water approval prior to alteration of the mini-pit and notify the Department at least thirty (30) days prior to the planned removal of fish from the mini-pit.

p. i) The Approval Holder shall submit, to the Department, a report on surface water quality, to be included with the annual report, no later than April 30 of each year, based on the data from the previous calendar year.

ii) The Approval Holder shall provide additional reporting or modify annual reporting content and/or format if so directed by the Department.

8. Groundwater

a. i) Prior to commencement of construction of the Facility, subject to condition 8(a)(ii), the Approval Holder shall establish and maintain thirty two (32) groundwater monitoring stations at the locations as identified in the following drawing; “Groundwater Monitoring Locations, Nova Scotia Industrial Approval Touquoy Mine Tailings Management Facility, Halifax County, Nova Scotia, Atlantic Mining NS Corp., prepared by Stantec., February 15, 2017" (Appendix E attached), the two additional domestic water wells situated at the museum and office shall be included in the program.

ii) Monitoring wells shall be installed no less than 275 days prior to commencement of operation.

iii) Monitoring well drilling and installation shall be overseen by a qualified hydrogeologist experienced in monitoring well installation and licensed to practice in Nova Scotia by the Association of Professional Geologists of Nova Scotia (APGNS) or the Association of Professional Engineers of Nova Scotia (APENS).

iv) Monitoring well pairs shall consist of at least one monitoring well installed to intercept the water table and one monitoring well installed in shallow fractured bedrock.

v) The elevation of the top of well casing shall be surveyed relative to an appropriate fixed reference point at the Site which is also referenced to mine water levels.

vi) Within 30 days of completion of monitoring well installation, a borehole log showing well construction shall be provided to the Department.

b. i) The Approval Holder shall complete groundwater quality monitoring for the stations, referenced in condition 8(a)(i), during the various stages of Facility development including pre-construction, construction, operation, reclamation and post-reclamation in accordance with Table 4, Appendix F, for the parameters specified in Appendix G.

ii) All groundwater monitoring stations shall be monitored for static water level on at least a monthly basis, unless otherwise directed by NSE or specified within the terms and conditions of Approval.

iii) (a) Data loggers shall be maintained in groundwater monitoring stations OPM 1A/B, OPM 2A/B, OPM 3A/B, TMW-9A/B, OPM 5A/B, OPM 6A/B, and OPM 7A/B with readings recorded on an hourly basis, as a minimum.

(b) The data logger results shall be downloaded and reviewed by a trained independent consultant on a monthly basis, as a minimum, in order to identify impacts on the water levels associated with the open pit mine.

(c) The data loggers shall be calibrated on at least an annual basis.

iv) Water level measurements and water quality samples shall be collected by qualified personnel in a consistent manner in accordance with accepted best practises for groundwater monitoring.

c. i) The Approval Holder shall submit an updated Groundwater Contingency Plan for approval on or before April 30, 2017. The revised plan shall include the establishment of actual Action Levels for key groundwater and surface water parameters which trigger the activation of the Contingency Plan. The plan shall include a comparison of the Action Level with appropriate Nova Scotia, Environmental Quality Standards (EQS) and CCME Water Quality Guidelines for the Protection of Aquatic Life (Freshwater).

ii) The Approval Holder shall clearly establish and identify the baseline monitoring results and Action Levels for groundwater and surface water monitoring stations. These results shall be used for the purpose of comparison with ongoing monitoring results and be included with the annual report starting April 30, 2017.

iii) The Approval Holder shall implement the approved Groundwater Contingency Plan at the direction of the Department.

iv) The Approval Holder shall ensure that any replacement water supplied for potable water use, to address the plan, shall meet the quantity and quality requirements of Health Canada drinking water, health and aesthetics objectives and be supplied in accordance with provincial regulations and guidelines.

d. i) The Approval Holder shall submit, to the Department, a report on groundwater monitoring, with the annual report, no later than April 30 of each year based on the data from the previous calendar year.

ii) Results of groundwater monitoring shall be submitted to the Department upon request.

e. i) The Approval Holder shall undertake a review of the monitoring well logs for the groundwater monitoring wells surrounding the TMF, in comparison to anticipated seepage depths, groundwater elevation, and hydraulic conductivity of the bedrock to ensure that monitoring well screens are appropriately placed to capture seepage from the TMF. The review shall be undertaken by a Professional Hydrogeologist licensed to practice in Nova Scotia by APENS or APGNS,

ii) Results and recommendations associated with condition 8(e)(i)shall be submitted to the Department on or before April 30, 2017.

f. The Approval Holder shall install additional monitoring wells at the request, and in a time frame, acceptable to NSE.

g. The Approval Holder shall be required to prepare and implement a plan to mitigate unacceptable seepage from the TMF and/or groundwater impacts at the direction of the Department.

h. Revisions to the groundwater monitoring program, proposed by the Approval Holder, shall require written approval of the Department.

9. Spills or Releases

a. Spills or releases shall be reported in accordance with the Act and the Environmental Emergency Regulations.

b. Spills or releases shall be cleaned up in accordance with the Act and the Contaminated Sites Regulations.

10. Construction

a. Erosion and sedimentation control devices shall be installed prior to construction at the Site and shall remain in place and be maintained until disturbed areas are stabilized.

b. A surface water monitoring and management plan shall be prepared that is specific to each stage of construction consistent with the “Erosion and Sediment Control Plan for the Development of the Touquoy Gold Project, Moose River Gold Mines, NS, prepared by Stantec, dated March 2010 of Appendix C of the original Application for Industrial Approval. A copy of this plan shall be forwarded to the Department prior to the commencement of each phase of construction.

c. The Approval Holder shall retain the services of an independent professional engineer to inspect, design, report and/or advise on the status of soil erosion and sedimentation controls during construction and, if so directed, during other phases of operation and reclamation.

d. All proposed TMF dams shall be constructed with a low permeability core, consisting of compacted clay till having a hydraulic conductivity no greater than 1x10-6 cm/sec.

e. The TMF shall be constructed in accordance with the Stantec Technical Specifications October 7, 2016 and Stantec Quality Management Plan dated November 25, 2016 or as revised and reported to the Department. The construction shall include a seepage control blanket with tailings beach along the upstream main tailings pond dam separating the polishing pond.

f. i)No less than thirty (30) days prior to construction of each component identified below, the Approval Holder shall provide copies of the final construction design engineering drawings stamped by a professional engineer licensed to practise in the Province of Nova Scotia:

- Soil Erosion and Sedimentation Plan (continuous during 5 construction phases, including the final construction and post reclamation stages)

- Secondary Containment for Dangerous Goods Handling,

- Containment Cell(s) for Historic Tailings,

- Effluent Treatment Plant,

- Mill Wastewater Treatment for Arsenic Reduction

- Inco SO2/air process for Cyanide Destruction,

- Air Emission Control Systems for particulate collection and on the Gold Furnace, Carbon Regeneration Kiln and Electrowinning Circuit,

ii) The Approval Holder shall be required to revise the construction design drawings if so directed by the Department.

iii) The Approval Holder shall obtain written certification by a professional engineer that all construction or installation has been conducted in accordance with the terms and conditions of this Approval and has met the minimum requirements of all drawings and specifications for the components listed in 10(f)(i).

iv) A copy of this certification must be provided to the Department six (6) weeks prior to the operation or use of the component or 6 weeks following completion of installation, whichever comes first.

v) The certification must confirm that all as-built drawings and any other relevant documentation have been provided to the Approval Holder by the engineer.

g. Erosion control materials shall be comprised of clean, non-erodible, non-ore bearing, non-watercourse derived and non-toxic materials. Any rock used for construction which lies outside the TMF drainage catchment shall be tested for acid rock drainage and metal leaching potential. Records of such testing shall be held for inspection by the Department for the life of the project.

h. All work operations shall be conducted in a manner to protect the watercourses/wetlands and groundwater from siltation and disturbance to the adjacent and downstream areas. Silted water is not to be released directly into a watercourse/wetland.

i. i) Separate watercourse/wetland alteration Approval(s) shall be obtained by the Approval Holder from the Department prior to causing alteration or disturbance of the watercourse/wetland.

ii) No less than ninety (90) days prior to wetland alteration the Approval Holder shall submit for review and approval a Wetland Protection Plan which has been developed in consultation with Nova Scotia Department of Natural Resources Wildlife Division.

iii) As part of the application, under the Environment Act, for approval to alter a wetland, the industrial Approval Holder shall submit, a wetland compensation plan for wetlands situated within the footprint of the TMF and the engineered wetlands treatment system.

iv) The compensation plans shall be submitted for review and approval at least ninety (90) days prior to the wetland alteration. The time frame for implementation of the approved plans shall be acceptable to the Department and Nova Scotia Department of Natural Resources.

j. Any overland flow which has the potential to enter the construction area is to be diverted away from the construction site, into vegetated areas a minimum of 30 metres from any watercourse and/or wetland, where it will not enter a watercourse/wetland.

k. All excavated material shall be placed in a location where it will not adversely impact a watercourse/wetland.

l. The Approval Holder shall ensure that topsoil / organic material resulting from

construction remains segregated and stabilized for reclamation use at the Facility and Site reclamation.

11. Blasting

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

ii) At the request of the Department, the Approval Holder shall submit a copy of the blast design;

iii) At the direction of the Department, the Approval Holder shall modify or cease blasting.

b. The Approval Holder shall call the nearest weather office to assess the climatic conditions prior to conducting any blasting. No blasting will be permitted if a thermal inversion is anticipated at the time of the proposed blast.

c. No blasting shall occur on Sunday or on a statutory holiday prescribed by the Province.

d. The Approval Holder shall ensure that all blasts are monitored for air concussion and ground vibration. The limits established in Table 5, Appendix H shall not be exceeded at structures located off Site.

e. The monitoring stations for blasting shall be as indicated in Table 5, Appendix H.

f. Additional monitoring stations for blasting may be specified as required by the Department. Any changes to the location of the stations shall be approved in writing by the Department.

g. i) A summary of results of monitoring shall be submitted to the Department, with the annual report, on or before April 30. Reporting frequencies shall be revised at the direction of the Department.
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ii) Blast monitoring results shall also be made available to the Department within 48 hours of a specific request.

iii) Non-compliant results shall be reported within 24 hours of the blast.

h. The Approval Holder shall conduct pre-blast surveys for all structures situated beyond the Site boundary and within 800 metres of a proposed blast location at the Facility, which have not had pre-blast surveys conducted. The survey shall be conducted in accordance with the Department's 'Procedure For Conducting a Pre-Blast Survey" and the results of this survey sent to the Department prior to any blasting. The pre-blast survey shall include potable water quality analysis for

all identified structures.

12. Reporting

a. Any non-compliance with this Approval shall be reported immediately to the Department's Regional Office.

b. The Approval Holder shall provide records, inspection results and/or reports required by terms and conditions of the Approval upon the request of the Department. These shall include, but not be limited, to those associated with the following:

• Operating parameters for waste management and treatment systems,

• Implementation of the OMS Manual requirements, including TMF operating parameters,

• Groundwater, surface water, liquid effluent, blasting, air emissions, noise, particulate emission, acid rock generation, seepage or flow rates,

• Implementation of the Technical Specifications requirements,

• Implementation of the Quality Management Plan requirements,

• Resulting from the duties of the Engineer of Record.

c. An Annual Report shall be submitted to the Department by April 30 of each year. Two copies of the report, plus an electronic copy, shall be provided and include the following information associated with the previous calendar year:

i) The Annual Report shall contain all required and requested monitoring results and/or reports. It shall contain an executive summary with a general description on the status of operations and environmental compliance, highlighting notable events. Any instance of non-compliance shall be identified and cross referenced in the executive summary.

ii) The Approval Holder shall maintain records for the surface water and groundwater monitoring program, including surface water flow data, data logger and staff gauge readings, monitoring well elevations, and groundwater and surface water quality, for the duration of the Approval. Records shall be made available to NSE immediately upon request.

d. The Annual report shall detail the results of the groundwater and surface water monitoring program. This section of the report shall be prepared, by or under the direction of, an independent qualified professional licensed to practice in Nova

Scotia by APGNS or APENS and shall include, but is not limited to, the following details related to surface water and groundwater:

Surface Water

• a review of field methodologies, including sampling techniques;
• a description of the surface water monitoring network;
• a review of the current surface water monitoring program and recommendations for modifications, as applicable;
• current and historical surface water quality data in chronological tabular format; in comparison to relevant criteria and Contingency Plan Action Levels, with exceedances highlighted;
• current and historic surface water flow data in chronological tabular format, including both electronic and staff gauge data;
• a detailed interpretation of the surface water quality data including an analysis of spatial and temporal trends, graphical representation of relevant parameters;
• a detailed interpretation of the surface water flow data including an analysis of spatial and temporal trends, a comparison of upstream and dowstream flow rates, a graphical representation of trends in flow over the monitoring period at both downstream and upstream locations, and a comparison of electronic and staff gauge measurements;
• updated stage discharge curve for both monitoring locations;
• the identification of any adverse impacts to surface water resources (quality and quantity), including watercourses, wetlands, and aquatic life, as a result of site activities and associated recommendations, as applicable;
• a comparison of the actual surface water quality results for Scraggy Lake and Watercourse #4 with those predicted in the Application.
• a comparison of actual seepage volumes into the seepage collection ditches with those estimated in the Application.
• laboratory certificates of analysis.

Groundwater

• a review of field methodologies, including sampling techniques;
• a description of the groundwater monitoring network;
• a review of the current groundwater monitoring program and recommendations for modifications, as applicable;
• current and historic static water level data in chronological tabular format;
• current and historical groundwater quality data in tabular format, in comparison to relevant criteria and Contingecy Plan Action Levels, with exceedances highlighted;
• a detailed interpretation of the groundwater quality data including an analysis of spatial and temporal trends, including graphical representation of relevant parameters, in relation to background and baseline data and relevant criteria;
• current and historical groundwater elevation data in chronological tabular

format;
• a detailed interpretation of the groundwater elevation data including graphical representation and an analysis of trends; and
• the identification of any adverse impacts to groundwater (quality or quantity), third party properties, or human health, as a result of site activities and associated recommendations, as applicable.
• laboratory certificates of analysis;

13. Complaint Response

a. The Approval Holder shall develop and maintain standard procedures to address complaints associated with the Facility which would include, but not be limited to;

i) Immediately investigate the cause of the complaint and undertake immediate and appropriate action, if necessary, to correct the problem.

ii) The Approval Holder shall record all complaints and document the date, time, name, address and telephone number of the individual lodging the complaint. The record shall also state any cause and the agreement or action taken to correct a problem.

iii) The Approval Holder shall record all arbitration referrals, the proceedings of any referrals and the decisions rendered.

iv) Records referenced in Condition 13(a)(i,ii,iii) shall be forwarded to the Department on an annual basis with the annual report, required in Condition 12, as requested by the Department.

b. The Approval Holder shall be required to establish and maintain a Community Liaison Committee (CLC) to facilitate communication between the Approval Holder and the local community. Terms of reference shall include, but not be limited to, environmental monitoring, dispute/complaint resolution, wetlands compensation plans, mine development, operations and reclamation plans.

14. Environmental Assessment Approval

a. The Approval Holder shall comply with the terms and conditions of the Environmental Assessment Approval dated February 2008 for the open pit (surface) gold mine and mineral processing facility (Touquoy Gold Project) situated at or near 6749 Moose River Rd, Moose River Gold Mines, Halifax Regional Municipality (the "Site").

b. i) Within one year of the date of Approval Amendment, the Approval Holder shall complete a plan, acceptable to NSE, for procuring conservation land. The lands shall posses valued protected area attributes in the vicinity of the Site for statutory protection by the Province, consistent with Condition 2.1 of the

Environmental Assessment Approval. If an acceptable plan has not been completed within this time, the Approval Holder shall post a financial security in the value of $500,000 with the Province. The security shall be returned to the Approval Holder once an acceptable plan has been implemented.

ii) The form of security and any revision to the security or plans shall meet the approval of the Province.

c. The Approval Holder shall submit a semi-annual update (April 30 and October 30) on the status of compliance with conditions of Environmental Assessment Approval for the first two years following Approval Amendment and, thereafter, at the request of the Department.

15. Liquid Effluent

a. i) The Approval Holder shall direct all wastewater and surface runoff, associated with the Facility, to the TMF for treatment. The exception to the above shall include two overburden stockpiles situated between the TMF and the open pit south and west of the polishing pond and any other areas granted approval for exemption by the Minister. Bypass discharge of the runoff from waste rock stockpile perimeter ditches shall only occur with the written permission of the Department.

ii) Cyanide laden wastewater from mineral processing shall be pre-treated using the Inco SO2/air process for cyanide destruction prior to discharge into the TMF to achieve a minimum weekly average, weak acid dissociable (WAD) concentration of less than 1.0 mg/l, unless otherwise revised by NSE.

iii) The Approval holder shall implement and maintain automated cyanide controls for cyanide addition and tailings detoxification in accordance with the details in the Application and reference documents, specifically the Atlantic Gold letter to the Department dated February 13, 2017.

iv) TMF wastewater shall be treated in the effluent treatment plant and geotube filter system for arsenic removal prior to discharge. The geotube system shall be operated and maintained in accordance with the manufacturers specifications.

v) The Approval Holder shall ensure adequate structures, such as rockfill walls, are in place to physically retain filled geotubes on the drumlin during and after operation.

vi) Alternate/Additional wastewater treatment systems shall require the written approval of the Minister.

b. i) Facility wastewater shall be directed through the main tailings pond, polishing pond and the engineered wetland treatment system for treatment prior to final

effluent discharge to Scraggy Lake. Discharge through the emergency spillway(s) is only permitted when the water level in the tailings and/or polishing pond is above the respective pond's operating level. The Approval Holder shall not discharge tailings or process water into either pond when an emergency spillway is in use to discharge.

ii) Alternate discharge locations shall otherwise require written authorization by the Minister.

c. i) The Approval Holder shall provide the Department with a copy of all liquid effluent reports, environmental effects monitoring reports and emergency reporting as required for submission to the federal government in accordance with the Metal Mining Effluent Regulations (MMER) pursuant to Fisheries Act. Reports shall be provided to the Department at the same frequency as required by the federal government.

ii) If so directed by the Department, the Approval Holder shall comply with limits established in the MMER and any other separate liquid effluent discharge limits the Department may chose to establish outside the scope of the MMER.

d. The Site shall be developed and maintained to prevent surface water contaminants from being discharged into a watercourse, wetland, water resource, or beyond the property boundary, in excess of the following criteria:

i) Total Suspended Solids

Clear Flows (Normal Background Conditions):

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

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

High Flow (Spring Freshets and Storm Events):

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

2) Shall not increase more than 10% over background levels when background is > 250 mg/l

ii) pH

1) Maximum 5 to 9 in grab sample

2) Maximum 6 to 9.5 as a Monthly Arithmetic Mean

iii) Petroleum Hydrocarbons

1) Nova Scotia Environment Tier 1 Environmental Quality Standards for Surface Water - Petroleum Hydrocarbons (PHC) Parameters.

Note: Results for the following stations shall be used to determine Background concentrations: SW-1, SW-11 and SW-12, SW-23 Downstream concentrations: SW-2, SW-3, SW-15, SW-19, SW-20 and SW-21. Reference Dwg. 2, entitled " Surface Water Monitoring Locations, Nova Scotia Industrial Approval Touquoy Mine Tailings Management Facility, Halifax County, Nova Scotia, Atlantic Mining NS Corp., prepared by Stantec, February 15, 2017".

e. The Approval Holder shall be required to undertake any mitigative action specified by the Department to comply with limits established in the MMER or by the Department in accordance with Condition 15.

16. Engineer of Record

a. The Approval Holder shall commit to retain the service of an Engineer of Record (EOR) to complete duties over the life cycle of the Facility as defined in the CDA Application of Dam Safety Guidelines to Mining Dams.

b. The Approval Holder shall clearly identify the EOR and any future changes to the EOR. The Approval Holder shall ensure that a proper succession plan is in place to maintain continuity of responsibility and that all records, files and knowledge are transferred to the new EOR.

c. i) The EOR shall be involved with all aspects of the life cycle of mining dams on the Site. This shall include the phases of construction, operation, care and maintenance, reclamation and closure of the mining dams on the site.

ii) The scope of the EOR responsibilities shall include dam safety inspections (DSI) and dam safety reviews (DSR), as well as environmental impacts to ensure the design and on-going construction and operation meets the terms and conditions of Approval.

iii) The Approval Holder shall ensure that the EOR provides certification that the tailings dams and TMF have been designed and constructed for it's intended purpose, in accordance with the design and specifications provided in the Application and supporting reference documents. This certification shall be submitted prior to a) initial tailings deposition and b) following each and every

raise to the tailings dams and spillways

d. The Approval Holder shall conduct semi-annual dam safety inspections (DSI).

e. The Approval Holder shall conduct at least two dam safety reviews (DSR) of the tailings and polishing pond dams during the life of the project. One of the DSR's shall be conducted after final reclamation and prior to abandonment. The dam safety reviews shall be in accordance with the Canadian Dam Association Dam Safety Review, Technical Bulletin 2016 as amended from time to time.

f. A copy of the results, conclusions and recommendations of the DSI and DSR reports shall be provided to the Department with the annual report required in Condition 12.

17. Tailings Management

a. The Approval Holder shall adhere to the Atlantic Gold, Best Applicable Practises for Tailings Management document dated November 25, 2016, as a minimum, and if updated shall be approved by the Department. An integral part of the adherence involves the Canadian Dam Associations, Dam Safety Guidelines 2016 and the Mining Association of Canada document entitled, "Developing of an Operations, Maintenance and Surveillance Manual for Tailings and Water Management Facilities"

b. i) The TMF and associated works shall be designed, constructed, operated and maintained in accordance with the report on "Operation Maintenance and Surveillance Manual, Tailings Management Facility, prepared by Stantec dated April 5, 2016" and subsequent updates.

ii) The OMS Manual shall be updated with changes to personnel, operations, infrastructure, and/or design as required. Any revisions to the OMS Manual shall be submitted to the Department within 30 days after completing the revision and a copy also made available to staff of the Department upon request.

iii) An updated Operation, Maintenance and Surveillance (OMS) Manual shall be submitted to the Department on or before April 30, 2017.

c. i) TMF pipelines, spillways, decants and seepage collection ditches shall be inspected and the inspections recorded on a daily basis and necessary action taken to prevent spillage of untreated tailings and/or wastewater beyond the TMF.

ii) A secondary tailings discharge point shall be established in the TMF in the event of breakage and/or blockage during discharge of the tailings line which is in use.

iii) The Approval Holder shall submit a design for secondary containment, leak

detection and a leak response plan for the tailings pipeline. The design shall be submitted to the Department on or before March 31, 2017.

d. The tailings and polishing pond water levels shall be maintained within the operating design levels, and design freeboard must be maintained at all times. The Approval Holder shall notify the Department when tailings and polishing pond water levels are less than a measured freeboard of 1 metre on these dams. A record shall be kept of all days when freeboard is less than 1 metre.

e. The Approval Holder shall only dispose of tailings associated with the Facility in the designated TMF. This includes historic tailings and treatment sludge unless otherwise revised through compliance with terms and conditions of the Approval.

f. i) The Approval Holder shall record the monthly volume of tailings, historic tailings and treatment sludge deposited in the TMF, and report the results to the Department on an annual basis with the annual report required in Condition 12. Reporting frequencies shall be revised at the direction of the Department.

ii) The Approval Holder shall record the effluent discharge, mine water, tailings water recycle, freshwater makeup, process water and potable water volumes utilized on a daily basis. A summary record shall be kept of the monthly total and average daily volumes and provided in the annual report required in Condition 12.

iii) Fresh makeup water and potable water withdrawal records shall be submitted to the Department with reporting as required by water withdrawal approvals.

iv) Records shall be made available to the Department upon request.

g. i) The Approval Holder shall ensure that the capacity of the TMF is maintained to retain the projected accumulation of mine tailings and runoff. The Approval Holder shall have a the Engineer of Record conduct a semi-annual review of the capacity of the TMF.

ii) The review shall evaluate the capability of the TMF to retain the projected accumulation of mine tailings and runoff and confirm that the current stage of TMF development complies with the current Canadian Dam Association (CDA) design standards.

iii) A copy of the results of the review shall be forwarded to the Department with the annual report, required in Condition 12, unless otherwise directed by the Department. If the results indicate that the CDA standard is not being met, then the Approval Holder shall notify the Department and propose immediate actions to comply the above standard.

iv) The Approval Holder shall be required to complete revised engineering design

and specifications prior to altering the TMF dams or discharge spillways. Any designs shall be submitted to the Department for approval prior to commencement of work.

v) All work identified in 17(g)(iv) shall be supervised and confirmed, in writing, by the Engineer of Record (EOR) prior to use.

h. The Approval Holder shall be required to complete the staged construction of tailings dam raises and the associated emergency spillway installations, on an annual basis, in accordance with the Application, including the technical specifications and drawings, unless otherwise directed in writing by the Department. This shall include the staged construction from commissioning to ultimate stage of construction.

i. The Approval Holder shall be required to implement tailings, waste rock, overburden, topsoil and/or byproduct management plans, including TMF waste water treatment plans, based on the results of monitoring programs identified in this approval.

j. i) Seepage collected in the perimeter seepage collection ditches along the north, east and west dams shall be collected and directed back to the TMF, unless otherwise approved by NSE.

ii) The seepage collection system shall be excavated to bedrock or constructed in materials that have a permeability no greater than 1x10-6 cm/sec, unless otherwise approved by NSE.

iii) The Approval Holder shall measure the flow of seepage into the collection ditches and provide this information with the annual report required in Condition 12.

iv) The Approval Holder shall submit and implement a mitigative strategy to investigate and/or mitigate potential seepage from the TMF at the direction of the Department.

k. The Approval Holder shall be required to install floating baffle curtains in the main tailings and/or polishing pond to increase the retention period if so directed by the Department.

l. The slopes of all dams shall be protected against erosion, as required, with placement of riprap and/or appropriate vegetation.

18. Historical Tailings Management

a. i) Prior to disturbance of areas of the Site which are known to contain, and/or suspected to have Historic Tailings, the Approval Holder shall be required to fully delineate the location of the Historic Tailings in the Areas of Potential

Environmental Concern (APEC).

ii) Areas of Potential Environmental Concern (APEC) for the delineation shall include all areas of the Site which are known or suspected to have deposits of historic gold mine tailings, as identified in the Historic Mine Tailings Management Plan, and which are planned for disturbance during the construction, operation or reclamation of the Facility.

b. For the purpose of Historic Tailings delineation, the Approval Holder shall retain a Site Professional (as defined by the Contaminated Sites Regulations), to delineate all soil and groundwater impacts associated with the tailings using current CAN/CSA Phase I/II Environmental Site Assessment Standards. The results of the delineation activities shall be submitted to the Department in the form of a CAN/CSA Phase I/II ESA Report by September 30, 2017.

c. i) The Historic Mine Tailings Management Plan shall be revised to include the results of a technical study of the potential mobility of mercury into the receiving environment. The testing and results of the technical study shall be completed by a professional geochemist as described in correspondence from Lorax Environmental dated the January 25, 2017.

ii) Upon completion of delineation activities, the “Historic Mine Tailings Management Plan” shall also be revised to reflect the 2017 delineation activities and any changes to the proposed plans for the management of historical tailings. The Historic Mine Tailings Management Plan shall describe remediation plans for all historic tailings delineated as per item 18 a(ii).

d. i) The revised Historic Mine Tailings Management Plan shall be submitted to the Department for review and approval thirty (30) days prior to implementation. The revisions shall include designs and specifications, where required, by a professional engineer. Final disposal of the historic tailings shall be in the TMF unless otherwise approved by the Department.

ii) The Approval Holder shall retain a Site Professional to provide details of any proposed risk assessment approaches to address historic tailings on Site.

19. Acid Rock Drainage Contingency

a. Drainage water pumped from the open pit (surface) mine and draining from the waste rock stockpiles shall be monitored weekly for pH. Records of this monitoring shall be maintained on the Site for inspection by the Department.

b. i) The Approval Holder shall collect and analyze samples of fresh waste rock and tailings for at least every 100,000 tonnes of ore mined. Samples shall be analyzed for acid base accounting, total sulphur and percent sulphide.

ii) The B.C. Confirmation Test or alternate acceptable acid rock drainage kinetic testing shall be conducted on all samples which have an acid consuming to acid generating ratio of 3:1 or less.

c. Should the results of testing indicate potentially acid generating conditions the Approval Holder shall notify the Department immediately and may be required to conduct additional monitoring/testing or implement a plan to monitor and mitigate potential acid mine drainage, if so directed by Department.

d. A summary of the results of acid rock drainage testing shall be provided with the annual report required in Condition 12.

20. Dangerous Goods/Waste Dangerous Goods/Reagent Handling

a. All floors in the storage and handling and mix tank areas shall be constructed of smooth impervious material with secondary containment or sloped to an impermeable enclosed drainage collection sump capable of holding a spill.

b. Individual dangerous/waste dangerous goods or groups of compatible dangerous/waste dangerous goods shall have secondary containment to meet the specifications of Condition 20(g). Secondary containment shall be constructed such that potential spills of dangerous/waste dangerous goods do not come in contact with or pass under or near incompatible materials.

c. An employee trained in the handling of dangerous/waste dangerous goods shall be present during all dangerous/waste dangerous goods handling operations.

d. The storage, handling and mix tank areas of the Facility shall have no open floor drains.

e. All storage racks, vehicles, ventilation ducts, containers and mix/storage tanks associated with flammable dangerous/waste dangerous goods shall be electrically grounded to prevent build up of static electric charges.

f. All dangerous/waste dangerous goods that are accepted by the Facility shall be stored in drums, containers or tanks composed of materials which are compatible with the goods stored therein as specified by the manufacturer.

g. All containers or tanks shall be completely surrounded by secondary containment sized to contain 110% of the volume of the largest tank or container in the specifically contained area or 100% of the volume of the largest tank or container plus 10% of the aggregate capacity of all other containers or tanks in the contained area, whichever is greater.

h. All containers shall be stored upright and kept off the floor. All products and dangerous/waste dangerous goods shall be stored in accordance with manufacturers specifications.

i. Sufficient aisle space shall be provided between dangerous/waste dangerous goods to allow the unobstructed movement of persons, transfer equipment, fire protection equipment, spill control equipment, and decontamination equipment to any part of the Facility.

j. The Approval Holder shall ensure that all storage areas, containers and tanks, for dangerous/waste dangerous goods are labelled to clearly identify their contents.

k. The Approval Holder shall maintain written acceptable standard operating procedures for the handling of dangerous goods. Such procedures shall be readily available to all employees and the Department.

l. The Approval Holder shall be required to design and upgrade the storage of dangerous/waste dangerous goods to meet the approval of the Department if so directed.

m. Storage of used oil shall be in accordance with Guidelines for the Storage of Used Oil, August 26, 2003 as amended from time to time.

n. i) The Approval Holder shall identify the proposed storage and disposal location for air emission control system wastes prior to commencement of operation.

ii) The Approval Holder shall be required to evaluate the characteristics of air emission control system wastes at the direction of the Department.

iii) The disposal of air emission control system wastes shall be acceptable to the Department.

o. Any proposal to dispose of solid waste in an approved municipal landfill shall meet the criteria established in the Nova Scotia Department of the Environment "Guidelines for Disposal of Contaminated Solids in Landfills (May 10, 2016) as amended from time to time.

21. Inventory

a. The Approval Holder shall maintain an up-to-date inventory of dangerous goods and waste dangerous goods which are stored at the Facility. The inventory shall include the informational requirements of Section 11(2) of the Dangerous Goods Management Regulations.

b. The inventory shall be made available to the Department for inspection upon request.

22. Insurance

a. The Approval Holder shall maintain environmental impairment liability insurance in the minimum amount of ten million dollars ($10,000,000). The insurance shall name Nova Scotia Environment as insured.

b. The Approval Holder shall review the adequacy of insurance coverage on an annual basis and provide a status report to the Department with the annual report due April 30.

c. The Approval Holder shall be required to review and/or amend the value of insurance coverage at the direction of the Department.

23. Contingency/Emergency Response Plan

a. The Approval Holder shall maintain approved contingency/emergency response plans for the Facility. The contingency/emergency response plans shall be updated annually in accordance with the Department's Contingency Planning Guidelines dated May 10, 2016, as amended from time to time. The plans shall be made available to the Department upon request and include, but not be limited to:

i) general procedures for routine (equipment break-down, upset conditions, maintenance, etc.) or major emergencies within the Facility,

ii) plans for dealing with emergency issues including, but not limited to, fires, explosions, spills and releases including those associated with sodium cyanide and hydrogen cyanide release,

iii) malfunctions, risk of failure and actual failure of tailings/wastewater management systems,

iv) actions to be taken in the event of known or suspected impacts to surface water and groundwater quality and/or quantity, and

v) contingency plans for replacement or mitigation, if necessary, of all water wells situated within 800 metres of the open pit during all stages of the Facility development.

b. The Approval Holder shall ensure that the contingency/emergency response plans for the Facility are reviewed and updated on a yearly basis. The Approval Holder shall document what modifications were made to the plans and how the plans were communicated to their staff.

c. Copies of the contingency/emergency response plans are to be maintained on Site at all times and made available for inspection by staff of the Department upon request.

d. The contingency plan shall contain a Site layout drawing identifying the location of all Facility features and dangerous/waste dangerous goods. A copy of the Contingency plans shall be made available to the local fire Department(s) and police.

e. The Approval Holder shall ensure that all personnel are trained to address environmental emergencies in a manner consistent with the Facility's approved contingency plan and that the necessary materials and equipment are available at all times for such purpose.

f. The Approval Holder shall be required to implement the design, construction and implementation of the contingency plan in a time frame specified by the Department.

24. Reclamation & Financial Security

a. i) The Approval Holder shall submit and maintain a financial reclamation security with the Province in an amount and form acceptable to the Department. The security shall also be provided and maintained in a time frame acceptable to the Province.

ii) The Approval Holder shall ensure that any security posted for rehabilitation/reclamation be kept valid for the term of the Approval.

iii) Additional financial security may be required by the Department to address potentially acid generating wastes, wastewater treatment requirements and/or other environmental issues that come to the attention of the Department or Province.

iv) Cost estimates for reclamation shall reflect the greatest level of reclamation required at any point prior to the completion of reclamation.

v) Reclamation security in the value of no less than $10.4 million (M) shall be posted with the Province of Nova Scotia. The security shall be posted on or before the specified dates in accordance with the installment schedule specified below:

Prior to Construction (confirmed) $3.6 M - April 15, 2016
Prior to Ore processing $2.10 M - Dec.31, 2017
1 years after Start Ore Processing $2.6 M – Dec. 31, 2018
2 years after Start Ore Processing $2.1 M - Dec. 31, 2019

vi) The Approval Holder shall not commence construction and/or ore processing until written confirmation is received from the Province that satisfactory reclamation security has been posted.

vii) The Approval Holder shall provide two sets of legal survey drawings to the Department which depict the disturbance of the open pit, plant area, tailings treatment and containment areas, the tailings and stockpiles of waste, overburden and topsoil.

One set of drawings shall depict the current Site disturbance and the second set shall depict the anticipated Site disturbance for the upcoming 12 months of project development.

The drawing sets shall be prepared by a surveyor licensed to practise in the Province of Nova Scotia and submitted on or before the following dates: January 30, 2018, January 30, 2019 and January 30, 2020.

b. i) The Approval Holder shall submit an updated mine and reclamation plan on or before April 30, 2017, and every three years thereafter, unless a final plan is submitted in accordance with condition 24 b)iii). The revisions shall include an evaluation of the reclamation progress and recommendations from an experienced independent consultant. The revised reclamation plan shall examine the location options for long term physical and chemical stability of the wastewater effluent treatment plant sludge.

ii) The updated plan shall indicate the current status of the Facility development and Site reclamation. It shall also indicate the mine plan and progressive reclamation plans for the remaining mine life and include an estimate of the remaining reclamation cost.

iii) The Approval Holder shall submit a final mine and reclamation plan to the Department for approval six months prior to the planned end of production, or within six months after the continuous unplanned suspension of production, unless granted an extension in writing by the Department. The plan shall address reclamation of the TMF, waste piles, mine, processing plant, ancillary equipment and associated works.

iv) The Approval Holder shall submit a final Post Mining Environmental Management Plan within six months prior to the planned end of production or six months prior to the commencement of final reclamation, unless granted an extension in writing by the Department. The plan shall address ongoing monitoring, maintenance and response measures.

v) The Approval Holder shall conduct geochemical studies on the tailings, under the direction of a qualified geochemist, to examine the potential solubility and mobility of arsenic under different reclamation scenarios. The results shall be used to develop a reclamation plan which limits arsenic mobility. The results shall be submitted with the updated and final reclamation plan and implemented in manner acceptable to the Department. The reclamation plan shall be developed in consultation with a qualified geochemist.

c. Post reclamation monitoring and reporting shall extend for a period of no less than three (3) years following completion of reclamation unless otherwise

directed by the Department

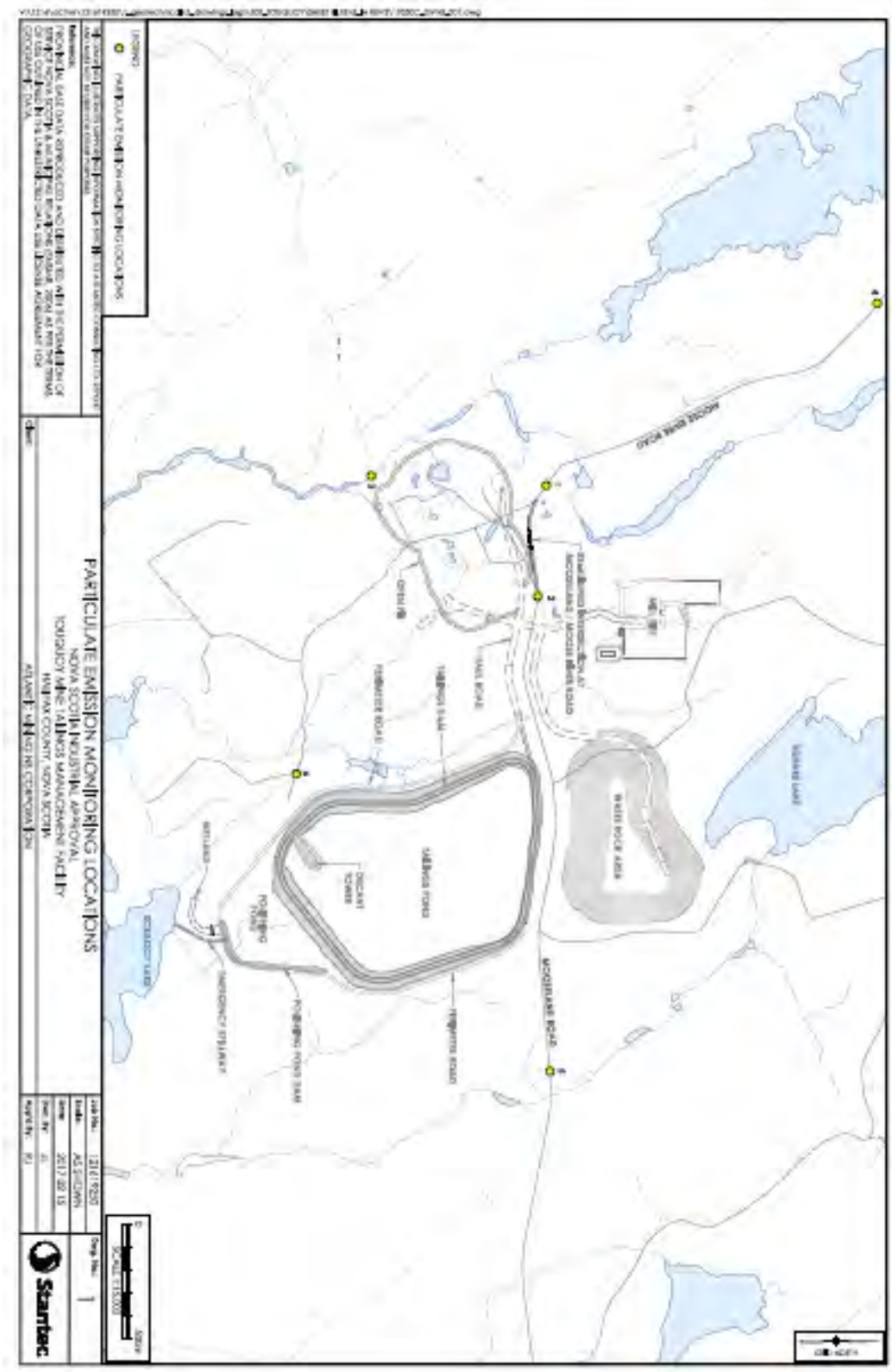
d. If so directed, the Approval Holder shall be required to reclaim all or any portion of the Facility and Site to the satisfaction of the Department.

e. The final Site reclamation shall meet the approval of the Province after which the Approval Holder shall be released from their financial security obligations.

25. Community Liaison Committee

a. The Approval Holder shall be required to establish and maintain a Community Liaison Committee (CLC) to facilitate communication between the Approval Holder and the local community. Terms of reference shall include, but not be limited to, environmental monitoring, dispute/complaint resolution, wetlands compensation plans, mine development, operations and reclamation plans.

APPENDIX A


PARTICULATE EMISSION MONITORING LOCATIONS
NOVA SCOTIA INDUSTRIAL APPROVAL
TOMPKINS WASTE MANAGEMENT FACILITY
HALIFAX COUNTY, NOVA SCOTIA
Stantec
MOSHERS ISLAND ROAD
HIGHWAY 107
SCALE 1:5000

APPENDIX B

Table 1. Air Emission Concentration Limits at Ground Level or Site Boundary.

Air Contaminant	CAS Number	Maximum Ground Level Concentration - [Half Hour Standard Concentration ($\mu g/m^3$)*]	Maximum Ground Level Concentration - [24 Hour Standard Concentration ($\mu g/m^3$)*]
Arsenic and Compounds	7440-38-2	1	0.3
Mercury-alkyl compounds	7439-97-6	1.5	0.5
Mercury	7439-97-6	5	2

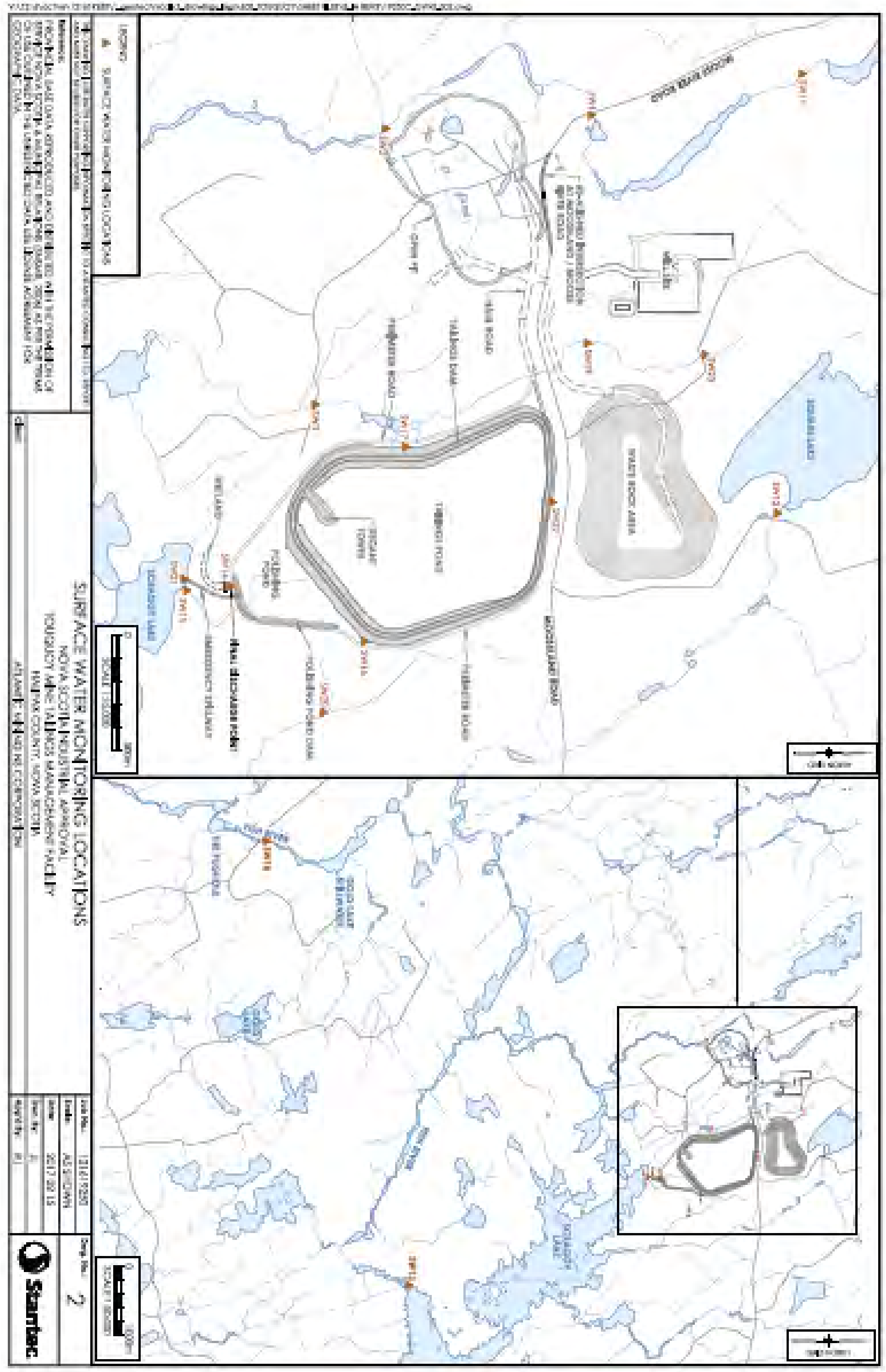
* Summary of Standards and Guidelines to support Ontario Regulation Reg. 419/05, Air Pollution-Local Air Quality, Standards Development Branch, Ontario Ministry of the Environment, April 2012

Table 2. Stack Emissions Limits.

Source	Parameter	Stack Emission Limit	Method*
Furnace Stack	Total Particulate Matter	20 mg/Rm3	EPS-1/RM/8 (as amended)
	Opacity	Maximum 10%	EPS-1-AP-75-2 (as amended)

* Correction for oxygen not required unless a combustion source is used.
Modification of Sampling Methods shall require prior approval of the Department.

APPENDIX C



APPENDIX D

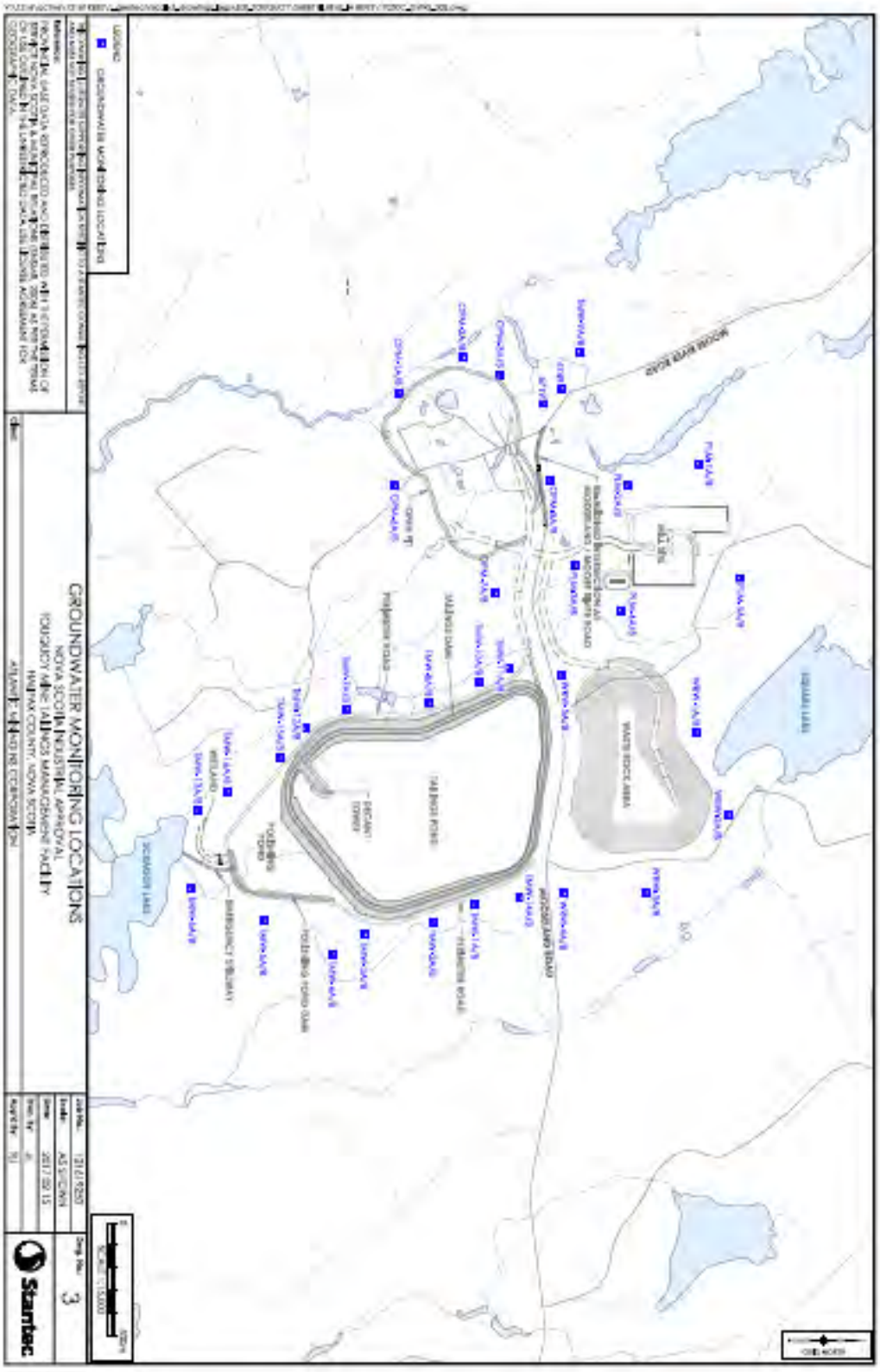
Table 3. Surface Water Monitoring Parameters and Frequency.

Monitoring Point	Parameter	Frequency
SW-1 SW-2 SW-3 SW-11 SW-12 SW-13 SW-14 SW-15 SW-16 SW-17 SW-18 SW-19 SW-20 SW-21 SW-22 SW-23	i) Water Quality Appendix G Parameters ii) Surface water flow rate at the permanent surface water monitoring stations near SW11 and SW2*	i) Monthly ii) Surface water flow rate - Daily **

* Note: Surface water measurements to estimate flow based on established stage-discharge curve at the permanent surface water monitoring stations near SW-11 and SW-2.

** Note: Daily surface water measurement to estimate flow based on established stage-discharge curve for the period of June to September.

APPENDIX E


GROUNDWATER MONITORING LOCATIONS
NOVA SCOTIA INDUSTRIAL APPROVAL
WATER AND WASTEWATER MANAGEMENT FACILITY
HALIFAX COUNTY, NOVA SCOTIA
Stantec

APPENDIX F

Table 4. Groundwater Monitoring Parameters and Frequency.

Monitoring Point	Parameter	Frequency
Plant PLM-1A/B PLM-2A/B PLM-3A/B PLM-4A/B PLM-5A/B **Open Pit Mine** OPM-1A/B OPM- 2A/B OPM-3A/B OPM-5A/B OPM-6A/B OPM-7A/B **Waste Rock Area** WRW-1A/B WRW-2A/B WRW-3A/B WRW-4A/B WRW-5A/B **TMF** 2 Domestic Wells TMW-1A/B TMW-2A/B TMW-3A/B TMW-4A/B TMW-5A/B TMW-6A/B TMW-7A/B TMW-8A/B TMW-9A/B TMW-10A/B TMW-11A/B TMW-12A/B TMW-13A/B TMW-14A/B TMW-15A/B	i) and ii) Water Quality Parameters in Appendix G iii)Static Water Level iv) Data Logging of Groundwater Levels in wells associated with the open pit mine.	i) a minimum of four quarterly baseline water quality analyses prior to the start of operation of the processing plant (PLM), open pit/mine (OPM), waste rock storage area (WRW) and TMF, including the containment cell area and 2 domestic wells(TMW). ii) Quarterly, unless otherwise stated in the conditions of Approval iii) Static Water Levels Monthly, unless otherwise required, by conditions of Approval iv) Data logging of wells, associated with the open pit mine, on an hourly basis as a minimum.

TMW-16A/B		

APPENDIX G

GROUNDWATER and SURFACE WATER QUALITY PARAMETERS

Note : ** Groundwater only * Surface water only

Total Alkalinity
Dissolved chloride
Colour
Hardness
Nitrate & nitrite
Nitrite, Nitrogen
Ammonia (Ammonia nitrogen)
Total organic carbon
Total Phophorus
pH
Reactive silica
Dissolved sulphate
Turbidity
Conductivity
Aluminum
Antimony
Arsenic
Copper
Iron
Lead
Manganese
Molybdenum
Nickel
Selenium
Silver
Strontium
Thallium
Tin
Titanium
Uranium
Vanadium
Zinc
Total Suspended Solids
Sodium

Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Chromium
Cobalt
Cyanate
Potassium
Magnesium
Fluoride
Ion Balance
Mercury
Sulphate
Total Dissolved Solids**
Total Petroleum

Chemical Oxygen Demand
Total Cyanide
Weak Acid Dissociable Cyanide
Free Cyanide (CN_F)
Thiocyanates (SCN)
Radium 226* (monitored and reported only at MMER stations)
Salinity*
Hydrocarbons TPH & BTEX **
Field Parameters: Temperature, pH, Electrical Conductivity, Dissolved Oxygen*
Static Water Level (groundwater only)**
Additional Parameters as specified or requested by the Department.

APPENDIX H

Table 5. Blasting Limits.

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

APPENDIX I

Amendment Application Documents:

- Industrial Approval Amendment Application. Submitted by Atlantic Mining NS Corp. Signed by Chris Batalha, AMNS Director on November 22, 2016. Application included the following attachments:

  - Industrial Approval Amendment. Report. Touquoy Gold Mine -Tailings Management Facility. Prepared by Stantec Consulting Ltd (Stantec). Fredericton, NB. Dated: November 25, 2016.

  - Touquoy Mine, Tailings Management Facility Dam Design – Slope Stability Assessment. Prepared by Stantec Consulting Ltd. (Stantec). Fredericton, NB. Dated: February 29, 2016.

  - Technical Specifications. Prepared by Stantec Consulting Ltd. (Stantec). Dated: October 7, 2016.

  - Touquoy Mine, Tailings Management Facility – Embankment Core Construction Alternatives. Memo. Prepared by Stantec Consulting Ltd. (Stantec). Fredericton, NB. Dated: December 22, 2015.

  - Touquoy Mine TMF – Upstream Clay Blanket – Seepage Analysis. Internal Memo. Prepared by Stantec Consulting Ltd. (Stantec). Fredericton, NB. Dated: October 13, 2016.

  - Touquoy Mine, Tailings Management Facility – Hydraulic Design Rev. 1.0. Prepared by Stantec Consulting Ltd. (Stantec). Fredericton, NB. Dated: November 25, 2016

  - Touquoy Mine Tailings Management Facility - Geotechnical/Hydrogeological Field Investigation. Factual Report. Prepared by Stantec Consulting Ltd. (Stantec). Fredericton, NB. Dated: February 29, 2016.

  - Touquoy Waste Rock Storage Facility – Geotechnical Investigation. Prepared by Stantec Consulting Ltd. (Stantec). Fredericton, NB. Dated: March 2, 2016.

  - Touquoy Mine Tailings Management Facility Dam Design - Seepage Assessment. Prepared by Stantec Consulting Ltd. (Stantec). Fredericton, NB. Dated: August 26, 2016.

  - Touquoy Mine Tailings Management Facility – Potential Clay Borrow Source Investigation. Prepared by Stantec Consulting Ltd. (Stantec). Fredericton, NB. Dated: March 9, 2016.

  - Assessment of Water Quality Downstream of Tailings Management Facility, Touquoy Gold Project. Prepared by Stantec Consulting Ltd. (Stantec). Fredericton, NB. Dated: November 25, 2016

  - 15 Stamped Engineered Drawings dated October 13, 2016 (2 complete sets).
    - 19250W-101- General TMF Plan. Rev. 3
    - 19250W-102- Longitudinal Profile through Centerline of Tailings Dam. Rev. 2
    - 19250W-103- Seepage Collection System Plan View and Details. Rev. 2
    - 19250W-104- Seepage Collection System Longitudinal Profiles. Rev. 2
    - 19250W-105- Tailings Dam Ultimate Stage Sections. Rev. 2
    - 19250W-106-Tailings Dam Foundation Details. Rev. 2
    - 19250W-107- Tailings Dam Details. Rev. 2
    - 19250W-108-Tailings Dam Spillway Profiles, Sections and Details. Rev. 2
    - 19250W-109- Polishing Pond Dam Plan, Profile and Details. Rev. 2
    - 19250W-110- Polishing Pond Emergency Spillway Profile and Details. Rev. 2
    - 19250W-111- Decant Tower 1 for Stages Commissioning, 1&2. Rev. 2
    - 19250W-112- Decant Tower 2 for Stages 4 & Ultimate. Rev. 2
    - 19250W-113- Historic Tailings Disposal Cell. Rev. 2
    - 19250W-114- Constructed Wetland. Rev. 2
    - 19250W-115- Geotube Cells Plan View & Sections. Rev. 2

- Application for TMF Industrial Approval Amendment - #2012-084244. Touquoy Gold Mine and Mill, Moose River Gold Mines, HRM. Letter Report prepared by J. Gilchrist, Stantec Consulting Ltd., February 10, 2017. Letter Report includes the following attachments:

    - Response to NSE 's Comments on Application for Industrial Approval Amendment - #2012-084244. Letter prepared by Stantec Consulting Limited. Dated: January 31, 2017.
        - Attachment A – Touquoy Gold Mine - Response to Comments on Industrial Approval
        - Amendment (FINAL), Lorax Environmental, January 25, 2017.
        - Attachment B - Instrumentation Layout Drawing (#1) Dated: November 29, 2016; Longitudinal Profile Through Centerline of Tailings Dam Showing Instrumentation Locations Drawing (#2). Dated: November 29, 2016 and Instrumentation Typical Section Drawing (#3). Dated December 9, 2016.
    - Discussion of Predicted Levels in Polishing Pond, Touquoy Gold Mine and Mill. Letter prepared by Stantec Consulting Limited. Dated February 7, 2017.
    - Responses to DNR Comments on Application for Industrial Approval Amendment - #2012-084244. Letter prepared by Stantec Consulting Limited. Dated: February 10, 2017.
    - Industrial Approval Amendment. Report. Touquoy Gold Mine -Tailings Management Facility. Prepared by Stantec Consulting Ltd (Stantec). Fredericton, NB. Dated: November 25, 2016. (Signed copy of the body of the report).
    - Water Management Plan. Version 1.0. Touquoy Gold Mine Facility. Prepared by Stantec Consulting Ltd (Stantec). Fredericton, NB. Dated: February 9, 2017.

- Reliance Letter – Stantec Reports prepared for Atlantic Mining NS Corp Touquoy Gold Mine and Mill, Moose River Gold Mines, HRM. Letter prepared by Paul Deering, Stantec Consulting Limited. Dated February 10, 2017.

- Application for IA Amendment - #2012-084244. Touquoy Gold Mine and Mill, Moose River Gold Mines, HRM. Letter prepared by Janis Rod, Atlantic Mining NS Corp. in response to B. Matlock letter Feb 8, 2017. Letter dated February 13, 2017.; and

- AMNS – IA Amendment Application. Email prepared by Janis Rod, Atlantic Mining NS Corp. in response to R. Bower comments on Jan 31, 2017. E-mail dated: February 13, 2017.

Original Application Documents:

- Application dated November 26, 2012 and attachments.

- Industrial Approval Application and Supporting Documentation, Touquoy Gold Project, Moose River Gold Mines, NS, prepared for DDV Gold Limited by Conestoga Rovers and Associates, November 2012 Ref. No. 820933.

- Industrial Approval Application and Supporting Documentation (Appendices), Touquoy Gold Project, Moose River Gold Mines, NS, prepared for DDV Gold Limited by Conestoga-Rovers and Associates, November 2012 Ref. No. 820933(10).

- Preliminary Reclamation Plan, Touquoy Gold Project, Moose River Gold Mines NS, prepared by DDV Gold Limited, May 2011 Version 3

- Industrial Approval Application Supporting Documentation (Appendix C, Soil Erosion and Sedimentation Plan) Touquoy Gold Project, Moose River Gold Mines, NS, prepared for DDV Gold Limited by Conestoga-Rovers and Associates, November 2012 Ref. No. 820933(10).

- Correspondence (e-mail with attachments) from DDV Gold Ltd. dated January 23, 2013 regarding Vesting Order (issued by Minister of Natural Resources dated June12, 2012) and Compensation for PID 40627218 and 40627226.

- Correspondence (e-mail with attachments) from DDV Gold Ltd. dated January 23, 2013 regarding Vesting Order (issued by the Minister of Natural Resources dated June12, 2012) and Compensation for PID40524241 and 00643171.

- Letter from Nova Scotia Environment dated June 14, 2013 to Conestoga-Rovers & Associates regarding the application for Industrial Approval.

- Response to letter of June 14, 2013 Application for Approval, Reference No. 820933-E, Additional Supporting Documentation, Moose River Gold Mines, NS, prepared for DDV Gold Limited by Conestoga-Rovers and Associates, September 12,2013.

- Environmental Assessment Registration Document for the Touquoy Gold Project, Moose River Gold Mines, prepared for DDV Gold Limited by Conestoga-Rovers & Associates dated March 2007 Ref. No. 820933(3)

- Environmental Assessment Focus Report for the Touquoy Gold Project, Moose River Gold Mines, prepared for DDV Gold Limited by Conestoga-Rovers & Associates dated November 2007 Ref. No. 820933(8)

- Environmental Assessment Approval, signed by the Minister of Environment, Approval Date February 2008, Touquoy Gold Project.

APPENDIX J

Fixed Submission Deadline Summary (for Reference Only)

i) Semi-annual EA update in accordance with condition 14(c),
ii) Land Procurement February 24, 2018 in accordance with condition 14(b),
iii) Results of ambient particulate monitoring in accordance with condition 4(c)(v),
iv) Stage Discharge Curve Report submitted October 31, 2017th condition 7(f)(vi)
v) Surface water monitoring annual report in accordance with condition 7(p),
vi) Results of DSI dam safety inspections and DSR dam safety reviews in accordance with condition 16(f),
vii) Updated OMS Manual April 30, 2017 in accordance with condition 17(b)(iii),
viii) Tailings Pipeline design March 31, 2017 in accordance with condition 17(c)(iii),
ix) Tailings deposition volumes, water use and effluent discharge volumes in accordance with condition 17(f),
x) Reports prepared by the Engineer of Record on the status of the capacity of the TMF in accordance with condition 17(g) related to the tailings deposition,
xi) Seepage rate report in accordance with condition 17(j),
xii) Historic Tailings delineation September 30, 2017 in accordance with condition 18(b),
xiii) Revised Historic Tailings Management Plan in accordance with condition 18(d)
xiv) Results of acid rock drainage testing in accordance with condition 19(d),
xv) Groundwater Contingency Plan submitted April 30, 2017 in accordance with condition 8(c),
xvi) Groundwater monitoring with annual report in accordance with condition 8(d),
xvii) Review report of groundwater monitoring wells, submitted April 30,2017, in accordance with condition 8(e),
xviii) A summary of Blast monitoring in accordance with condition 11(g),
xix) A statement on the status of compliance with Insurance in accordance with condition 22(b),
xx) A list of complaints and the company response to each complaint; in accordance with condition 13,
xxi) Reclamation security confirmation in accordance with condition 24(a)(vi),
xxi) Survey Drawings to be submitted January 30,2018, January 30, 2019, January 30, 2020, in accordance with condition 24(a)(vii),
xxii) Updated reclamation plans confirmation April 30, 2017, April 30, 2020 in accordance with condition 24(b)(i).
xxiii) Install and maintain two permanent staff gauges for recording surface water flow measurements in Moose River, upstream and downstream of the open pit mine, at an appropriate location near SW11 and SW2. The permanent monitoring stations shall be established on or before October 31, 2017, in accordance with condition 7(g).
xxiv) Annual Report due April 30 of each year, in accordance with condition 12(c).

APPENDIX B3

Draft Report: Limited Phase II Environmental Site Assessment - Atlantic Gold Touquoy Gold Project, Moose River, NS

Draft Report: Limited Phase II Environmental Site Assessment

Atlantic Gold Corporation
Touquoy Gold Project
Moose River, Nova Scotia

Prepared for:
Atlantic Gold Corporation
Suite 3083, Three Bentall Centre
595 Burrard Street
Vancouver, BC V7X 1L3

Prepared by:
Stantec Consulting Ltd.
40 Highfield Park Drive, Suite 102
Dartmouth, NS B3A 0A3

File No.: 121414898

September 29, 2017

Executive Summary

At the request of Atlantic Gold Corporation (Atlantic Gold), Stantec Consulting Ltd. (Stantec) conducted a Limited Phase II Environmental Site Assessment (ESA) between September 19 and 22, 2017 at the Touquoy Gold Project (the 'Site') in Moose River, Halifax County, NS. The purpose of the Limited Phase II ESA was to assess soil and groundwater conditions at the Site with respect to the former Moose River Gold Mines Stamp Mill, the former G&K Mining Stamp Mill, and associated tailings.

The scope of this Limited Phase II ESA consisted of the following:

- Auguring up to thirty-five boreholes using a gas-powered hand auger to assess the extent of soil impacts around the two historic tailings piles.
- Collecting a surface water sample within the former G&K Mining Stamp Mill area to assess for the presence of metals impacts in the area of the historic tailings.
- Preparing this report presenting all observations and measurements made during the assessment, providing conclusions and recommendations.

Based on the information gathered and on observations made during this assessment, Stantec provides the following conclusions:

- Possible tailings were observed at eight of the thirty-three boreholes. Four of these boreholes were located outside of the previously estimated extent of tailings piles.
- Soil samples containing elevated concentrations of arsenic were collected from 21 of the 30 boreholes advanced in the areas of the two former stamp mills.
- Areas containing elevated gold concentrations tend to have elevated concentrations of arsenic due to the presence of arsenopyrite that is common in the geology of the area. Therefore, elevated arsenic concentrations are expected to be present across the Site. The activities associated with the historic stamp mills could also increase arsenic concentrations in the soil at these areas. Elevated arsenic concentrations were identified in soil up to 50 m from the estimated extent of the tailings pile at the Former G&K Mining Stamp Mill, indicating that arsenic is likely naturally elevated in that area.
- Concentrations of other metals parameters (including mercury) were not detected above the Tier 1 EQS in the soil samples tested as part of this program. However, elevated concentrations (in comparison with the background sample results) are present. Mercury was commonly used in the amalgamation process of stamp mills. Sources of mercury may be naturally occurring or associated with the historic stamp mills. Elevated concentrations of other metals parameters such as cadmium, copper, lead, and zinc are common in Nova Scotia soil due to surface and underlying geology which contains traces of these metals.
- The concentrations of aluminum, arsenic, cadmium, and iron detected at the surface water sample collected from Moose River are within the range or slightly elevated in comparison

with background surface water data; however, these concentrations are considered to be naturally occurring.

- Groundwater assessment was not able to be completed as part of this project because of equipment meeting refusal and an absence of shallow groundwater.

As groundwater assessment was not able to be completed as part of this project, additional work is required to complete assessment of groundwater and meet the requirements of the Industrial Approval. At this time, additional assessment of soil should be completed to further define the extent of elevated metals concentrations that require management as part of the Historic Tailings Management Plan. Based on the findings of this additional investigation, updates to the Historic Tailings Management Plan may be required.

The statements made in this Executive Summary text are subject to the limitations included in Section 6.0, and are to be read in conjunction with the remainder of this report.

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1.0 INTRODUCTION

1.1 GENERAL

At the request of Atlantic Gold Corporation (Atlantic Gold), Stantec Consulting Ltd. (Stantec) conducted a Limited Phase II Environmental Site Assessment (ESA) between September 19 and 22, 2017 at the Touquoy Gold Project (the 'Site') in Moose River, Halifax County, NS (refer to Figure 1, Appendix A). The purpose of the Limited Phase II ESA was to assess soil and groundwater conditions at the Site with respect to the former Moose River Gold Mines Stamp Mill, the former G&K Mining Stamp Mill, and associated tailings.

1.2 BACKGROUND

In 2007, Atlantic Gold submitted a Historic Tailings Management Plan for the Moose River Gold Mine Project (Inspec-Sol, 2007). The Historic Tailings Management Plan identified six historic mining stamp mills that operated between 1882 and 1925 in the area of the mine's proposed open pit. Two of these historic stamp mills (Moose River Gold Mines Stamp Mill and G&K Mining Stamp Mill) were found to be located within the Touquoy Gold Project property limit near the proposed open pit. Figure 1, Appendix A shows the approximate locations of five of the historic stamp mills. The sixth stamp mill (Reynolds Mill) location could not be determined.

According to an assessment of the historic mine tailings carried out by D.D.V Gold, approximately 5,000 tonnes of tailings from the Moose River Gold Mine and G&K Gold Co. Stamp Mills are located in the area of the proposed open pit (Inspec-Sol, 2007). Samples of these tailings were collected for metals analysis but no samples were collected from the underlying soil or groundwater. The recommended disposal option for these tailings was excavation and on-site containment. A risk assessment was recommended for management of historic tailings located outside the open pit boundaries.

In 2016, Atlantic Gold completed a delineation sampling program at the two historic mine tailings areas (Atlantic Gold, 2016) to address comments from Nova Scotia Environment (NSE) made in response to its Industrial Approval Application (NSE, 2013). As part of this delineation program, 126 soil samples were submitted for laboratory analysis of metals (including mercury). Based on the program results, the estimated total volume of tailings identified was 1,900 m^3 at the former G&K Mining Stamp Mill and 5,900 m^3 at the former Moose River Gold Mines Stamp Mill. The interpreted boundaries of the tailings plumes identified as part of this work are shown on Figures 2 and 3, Appendix A.

On July 13, 2017, Atlantic Gold was issued an Industrial Approval (IA) Amendment (IA No. 2012-084244-03), which contained further requirements in relation to historic tailings management (Condition 18b). These requirements included delineation of all soil and groundwater impacts associated with the tailings by a Site Professional using the current CAN/CSA Phase I/II ESA Standards. The condition included submission of the results of the delineation in a Phase I/II ESA

report by September 30, 2017. Stantec's 2017 Limited Phase II ESA was completed to partially meet this requirement by the September 30, 2017 deadline. A separate Phase I ESA is currently underway and will be submitted to NSE on a later date under separate cover.

As part of the Phase I ESA, Stantec reviewed available topographic mapping, mine working reports and maps, aerial photographs, previous reports of the delineation of the tailings areas and the Environmental Assessment (EA) completed by CRA (2007). The following summarizes findings from these sources:

- According to the 1865 AF Church Map, Moose River Gold Mines was not active, but gold was actively being mine at Caribou Mines to the north and Mooselands Mines to the southeast. Based on historical mining reports and the CRA EA, mining in the area started in 1866 and included several water-powered stamp mills with various pits and shafts excavated in the area.
- Based on the publication Gold Fields of Nova Scotia published in 1929, between 1866 and the 1920s there were various steam and water-powered stamp mills operating in the area of Moose River Gold Mines. These were provided ore from a combination of surface operations and shafts excavated for the extraction of gold. Based on the CRA EA, an estimated 80,000 tonnes of ore was processed. Mines frequently started and stopped operation and changed name accordingly, but in general there was a 60 to 70 year period of gold extraction in the area until gold mining in the area ceased in the 1930s. Historical mining practices used mercury to aid in the separation and recovery of gold from the resulting crushed rock produced by the stamp mills. Waste rock from the mining operation is naturally high in some metals such as arsenic and have a potential acid runoff potential. The source of power for steam mills, air compressors and other heavy equipment reportedly used is unknownBased on the observations made during the site visit for the Phase I ESA, there were areas of surface dumping noted on-site and in the surrounding area.As noted in the tailings delineation report (Atlantic Gold, 2016), there is elevated mercury and arsenic present in the historical tailings materials.

1.3 SITE DESCRIPTION

The Touquoy Gold Project Site comprises approximately 176 hectares (ha) and is located in the Moose River area in Halifax County, Nova Scotia. This Phase II ESA is limited to those areas of the Site where the Moose River Gold Mines Stamp Mill and G&K Mining Stamp Mill were formerly located (Figure 1, Appendix A). These areas of the Site are described by Service Nova Scotia and Municipal Relations' Property Online as multiple separate PID numbers, which are indicated on Figures 2 and 3, Appendix A. The property owners are listed as either Atlantic Mining NS Corp. or the NS Department of Natural Resources, Her Majesty the Queen in Right of the Province of Nova Scotia. The area is mostly undeveloped and forested with the exception of several smaller former residential properties. Access to the Site is restricted and the current land is industrial in nature; Stantec is not aware of any plans to change this land use in the foreseeable future. Surrounding land use is also mostly undeveloped/forested.

Although the area surrounding the Site obtains potable water from private domestic wells, the Site is considered non-potable. According to the 2016 Annual Surface Water and Groundwater Baseline Monitoring Report (Stantec, 2017), three domestic wells on the Site, which were associated with residential homes acquired for development of the Site as a mine, are monitored. . These domestic wells have been decommissioned as potable drinking water supplies and one re-purposed to provide non-potable water for the mine office (e.g., toilets). Signage is posted at taps in the office indicating that the water is non-potable and this condition has been included in the safety orientation for all staff.

1.4 POTENTIAL SOURCES OF ENVIRONMENTAL IMPACTS

Two former stamp mills within the boundary of the mine's proposed open pit were identified in the previous environmental reports as areas of potential environmental concern. The other four former stamp mills identified in the previous reports are not included as part of this assessment. According to the IA, prior to disturbance of areas of the Site which are known to contain, and/or suspect to have historic tailings, the location of the tailings is to be fully delineated. The IA does not include requirements for delineation of tailings located in areas of the Site that are not being disturbed.

1.5 REGULATORY FRAMEWORK

1.5.1 Soil

1.5.1.1 Provincial

Nova Scotia Environment (NSE) released its *Contaminated Sites Regulations* on July 6, 2013 which provide the requirements for notification of contaminated sites, as well as the basis for determining the appropriate numerical remediation levels, or ongoing site exposure management measures, applicable to a contaminated site.

The overall regulatory goals for remediation are to manage contamination to reduce related risks to acceptable levels for humans and the environment (i.e. ecology). These goals may be met by a variety of means acceptable to NSE, from cleanup at the conservative generic (Tier 1) level, to cleanup based on site-specific conditions (Tier 2), to long-term exposure management of site contamination through engineered, physical or administrative controls.

Tier 1 Environmental Quality Standards (EQS) are substance generic environmental quality standards that may be used for remediation levels. These standards represent a standardized level of risk for contributing pathways, based on land use and other factors. Use of the Tier 1 EQS for remediation is a conservative and typical application of cleanup standards. The Tier 1 EQS incorporate human health and ecological effects where applicable.

Tier 2 Pathway Specific Standards (PSS) were developed assessing all contributions to substance risk in all applicable exposure pathways, based on land use and other factors. Applicable standards have been developed for each specific pathway such as vapour migration from

groundwater to indoor air, ingestion of potable water, soil contact/ingestion, inhalation of indoor air and leaching of soil contaminants to potable groundwater.

Soil analytical results have been compared to the Tier 1 EQS for an industrial site with non-potable groundwater use and coarse-grained soil.

1.5.1.2 Background

Background soil data has also been collected for the purpose of comparison with the soil analytical results from the historic tailings areas. Three soil samples (Background 01 to Background 03) were collected along the southern boundary of the proposed open pit in areas that were expected to represent background conditions. Concentrations of metals parameters detected in the background samples are presented in the soil analytical tables for comparison with the assessment soil results.

1.5.2 Surface Water

According to the 2016 Annual Surface Water and Groundwater Baseline Monitoring Report (Stantec, 2017), surface water analytical results must conform to the Metal Mining Effluent Regulations (MMER) and any other separate liquid effluent discharge limit NSE may choose to establish. For the purpose of this report, surface water results have also been compared against provincial standards to indicate elevated parameters (NSE Tier 1 EQS for surface water).

MMER guidelines (DFO, 2016) provide values for a composite sample, a grab sample, and the monthly average. All three values are provided in the analytical tables.

1.6 OBJECTIVES

The objective of the Limited Phase II ESA was to assess soil and groundwater quality in the areas of potential environmental concern as identified in Section 1.4, in general accordance with the *Contaminated Sites Regulations*.

1.6.1 Proposed Scope of Work

The proposed scope of this Limited Phase II ESA consisted of the following:

- Auguring up to thirty-five boreholes using a gas-powered hand auger to assess the extent of soil impacts around the two historic tailings piles, including collection and laboratory analysis of representative soil samples.
- Installing ten drive point piezometers to assess groundwater quality in the area of the historic tailings piles.
- Preparing this report presenting all observations and measurements made during the assessment, providing conclusions and recommendations.

1.6.2 Changes to Scope of Work

The following changes were made to the proposed scope of work:

- During completion of the boreholes, it was determined that installation of the drive point piezometers would not be feasible due to the conditions encountered (auger refusal on cobbles and no shallow groundwater encountered). An alternative method for monitoring well advancement (such as a track-mounted drill rig) is recommended to assess groundwater quality at these areas of the Site.
- In the absence of groundwater sampling, a surface water sample was collected within the former G&K Mining Stamp Mill area from Moose River to assess for the presence of metals impacts in the area of the historic tailings.

2.0 FIELD INVESTIGATION

2.1 HEALTH AND SAFETY

The employees of Stantec who participated in this project familiarized themselves with the relevant Stantec Safe Work Practices (SWPs) prior to commencement of the fieldwork. In addition, Stantec's pre-job HSE Risk Management Strategy form, which identifies potential health and safety risks, was completed and signed by the participants in the fieldwork. The goal of this document is to identify potential dangers to prevent accidents and injuries from occurring. In addition, a Toolbox Site Safety meeting was held with site personnel, including sub-contractors, and the minutes of the meeting were signed by participants and a copy retained on-site during field work, and subsequently in the project file. No health and safety incidents occurred while Stantec was present on the Site.

2.2 RATIONALE

Thirty sampling locations (not including background) were chosen to address the potential environmental concerns identified in Section 1.4 (the two historic stamp mills located within the proposed open pit boundary). The rationale for each sampling location is as follows:

- MR-17 BH01 and MR-17 BH02 - Located in the area of the historic tailings pile at the Former Moose River Gold Mines Stamp Mill.
- MR-17 BH03 to MR-17 BH15 - Located outside the perimeter of the historic tailings pile at the Former Moose River Gold Mines Stamp Mill.
- GK-17 BH01 to GK-17 BH05 and GK-17 BH08 to GK-17 BH15 – Located outside the perimeter of the historic tailings pile at the Former G&K Mining Stamp Mill.
- GK-17 BH06 and GK-17 BH07 – Located in the area of the historic tailings pile at the Former G&K Mining Stamp Mill.

Borehole locations are shown on Figure 2 and 3, Appendix A.

2.3 METHODOLOGY

Field assessment methodology is summarized in Appendix B.

2.4 LABORATORY ANALYSES

Based on field observations (visual evidence of presence/absence of tailings), 41 soil samples (including 3 background samples and 2 field duplicate samples) and 1 surface water sample were submitted to Maxxam Analytics, Bedford, NS, SCC-Accredited Laboratory No. 161, for analysis of metals (including mercury) parameters.

3.0 RESULTS

3.1 SOIL

3.1.1 Stratigraphy

Soil stratigraphy encountered at the majority of the borehole locations consisted of silty sand and gravel/cobbles to the maximum depth of investigation. The maximum depth of investigation ranged from 0.18 meters below grade (mbg) to 1.2 mbg and was typically limited by auger refusal on cobbles. Inferred bedrock was noted at two of the boreholes at the Former G&K Mining Stamp Mill (at 0.38 and 0.5 mbg).

Silt and possible tailings were observed at eight of the thirty-three boreholes. Four of these boreholes (MR17 BH 13, MR17 BH 15, GK17 BH05, and GK17 BH 09) were located outside of the approximate extent of tailings piles from the Atlantic Gold Delineation report (Atlantic Gold, 2016).

Descriptions of stratigraphy observed are provided in Table C-1, Appendix C.

3.1.2 Free Phase Petroleum Hydrocarbons

Indications of free phase petroleum hydrocarbons in soil were not observed during the field program.

3.1.3 Soil Analytical Results

Soil metals analytical results are provided in Table D-1, Appendix D. These results are summarized below:

- All metals parameters with the exception of arsenic were either not detected or were detected at concentrations that did not exceed the Tier 1 EQS.
- Arsenic concentrations in two of the three background soil samples were found to exceed the Tier 1 EQS of 31 mg/kg. Arsenic concentrations detected in the background samples ranged from 23 mg/kg to 280 mg/kg.

- Arsenic concentrations in one or more soil samples from 29 of the 30 boreholes were found to exceed the Tier 1 EQS. Arsenic concentrations at the Former Moose River Gold Mines Stamp Mill ranged from 15 mg/kg to 4,300 mg/kg. Arsenic concentrations at the Former G&K Mining Stamp Mill ranged from 94 mg/kg to 18,000 mg/kg.
- In comparison with the background sample results, the following boreholes were found to contain soil with elevated concentrations of arsenic:
  - Former Moose River Gold Mines Stamp Mill: 7 of the 15 boreholes (MR17 BH 01, BH02, BH03, BH04, BH08, BH09 and BH15).
  - Former G&K Mining Stamp Mill: 14 of the 15 boreholes (all but GK17 BH04).
- Although other metals parameters (including mercury) were not detected above the Tier 1 EQS, elevated concentrations (in comparison with the background sample results) are present.

The Laboratory Certificate of Analysis is provided in Appendix D.

3.2 GROUNDWATER

As discussed in Section 1.6.2, groundwater assessment was not completed as part of this project.

3.3 SURFACE WATER

Surface water metals analytical results for the one sample collected from Moose River are provided in Table D-2, Appendix D. These results are summarized below:

- Aluminum, arsenic, cadmium, and iron were detected at concentrations in excess of the Tier 1 EQS.
- All other metals parameters were either not detected or were detected at concentrations that did not exceed the Tier 1 EQS.
- All metals concentrations were well below the MMER.

According to the 2016 Annual Surface Water and Groundwater Baseline Monitoring Report (Stantec, 2017), aluminum, arsenic, cadmium, and iron commonly exceed the Tier 1 EQS at background surface water sampling locations. The report identifies three surface water monitoring locations as "background" as they are located up-gradient from the Touquoy Gold Project and are not expected to be affected by the project activities. The mean concentrations identified at these background locations are provided in Table D-2, Appendix D, for comparison with the results from the sample collected from Moose River.The results of the above comparison find that the concentrations of aluminum, arsenic, cadmium, and iron detected at the surface water sample collected from Moose River are within the range or slightly elevated in comparison with background surface water data presented in the 2016 Annual Monitoring Report.

The Laboratory Certificate of Analysis is provided in Appendix D.

4.0 CONCLUSIONS

Based on the information gathered and on observations made during this assessment, Stantec provides the following conclusions related to potential environmental contamination associated with the two historic stamp mills located within the proposed open pit area:

- Possible tailings were observed at eight of the thirty-three boreholes. Four of these boreholes were located outside of the previously estimated extent of tailings piles.
- Soil samples containing elevated concentrations of arsenic (compared to the Tier 1 EQS and background sample concentration) were collected from:
  - 7 of the 15 boreholes advanced in the area of the Former Moose River Gold Mines Stamp Mill.
  - 14 of the 15 boreholes advanced in the area of the Former G&K Mining Stamp Mill.
- Areas containing elevated gold concentrations tend to have elevated concentrations of arsenic due to the presence of arsenopyrite that is common in the geology of the area. Therefore, elevated arsenic concentrations are expected to be present across the Site. The activities associated with the historic stamp mills could also increase arsenic concentrations in the soil at these areas. Elevated arsenic concentrations were identified in soil up to 50 m away from the estimated extent of the tailings pile at the Former G&K Mining Stamp Mill, indicating that arsenic is likely naturally elevated in that area.
- Concentrations of other metals parameters (including mercury) were not detected above the Tier 1 EQS in the soil samples tested as part of this program. However, elevated concentrations (in comparison with the background sample results) are present. Mercury was commonly used in the amalgamation process of stamp mills. Sources of mercury may be naturally occurring or associated with the historic stamp mills. Elevated concentrations of other metals parameters such as cadmium, copper, lead, and zinc are common in Nova Scotia soil due to surface and underlying geology which contains traces of these metals.
- The concentrations of aluminum, arsenic, cadmium, and iron detected at the surface water sample collected from Moose River are within the range or slightly elevated in comparison with background surface water data. The arsenic concentration is likely due to the presence of arsenopyrite and is therefore considered to be naturally occurring. The aluminum and iron concentrations are typical of surface water in Nova Scotia and are likely naturally occurring. The cadmium concentration is within the range of background data and is likely naturally occurring.
- Groundwater assessment was not able to be completed as part of this project because of equipment meeting refusal, and an absence of shallow groundwater.

5.0 RECOMMENDATIONS

As groundwater assessment was not able to be completed as part of this project, additional work is required to complete assessment of groundwater and meet the requirements of the IA. At this time, additional assessment of soil should be completed to further define the extent of

elevated metals concentrations that require management as part of the Historic Tailings Management Plan. Based on the findings of this additional investigation, updates to the Historic Tailings Management Plan may be required.

6.0 CLOSURE

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential liabilities associated with the identified property.

This report provides an evaluation of selected environmental conditions associated with the identified portion of the property that was assessed at the time the work was conducted and is based on information obtained by and/or provided to Stantec at that time. There are no assurances regarding the accuracy and completeness of this information. All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

The opinions in this report can only be relied upon as they relate to the condition of the portion of the identified property that was assessed at the time the work was conducted. Activities at the property subsequent to Stantec's assessment may have significantly altered the property's condition. Stantec cannot comment on other areas of the property that were not assessed.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report, and are based solely on the scope of work described in the report, the limited data available and the results of the work. They are not a certification of the property's environmental condition. This report should not be construed as legal advice.

This report has been prepared for the exclusive use of the client identified herein and any use by any third party is prohibited. Stantec assumes no responsibility for losses, damages, liabilities or claims, howsoever arising, from third party use of this report.

This report is limited by the following:

- Site access issues in the area of investigation did not allow for the use of a drill rig for borehole advancement, limiting the depth of investigation and ability to sample groundwater

The locations of any utilities, buildings and structures, and property boundaries illustrated in or described within this report, if any, including pole lines, conduits, water mains, sewers and other surface or sub-surface utilities and structures are not guaranteed. Before starting work, the exact

location of all such utilities and structures should be confirmed and Stantec assumes no liability for damage to them.

The conclusions are based on the site conditions encountered by Stantec at the time the work was performed at the specific testing and/or sampling locations, and conditions may vary among sampling locations. Factors such as areas of potential concern identified in previous studies, site conditions (e.g., utilities) and cost may have constrained the sampling locations used in this assessment. In addition, analysis has been carried out for only a limited number of chemical parameters, and it should not be inferred that other chemical species are not present. Due to the nature of the investigation and the limited data available, Stantec does not warrant against undiscovered environmental liabilities nor that the sampling results are indicative of the condition of the entire site. As the purpose of this report is to identify site conditions which may pose an environmental risk; the identification of non-environmental risks to structures or people on the site is beyond the scope of this assessment.

Should additional information become available which differs significantly from our understanding of conditions presented in this report, Stantec specifically disclaims any responsibility to update the conclusions in this report.

This report was prepared by Melissa Nicholson, P.Eng., and reviewed by Evelyn Bostwick, M.Eng., P.Eng.

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Appendix A
Figures

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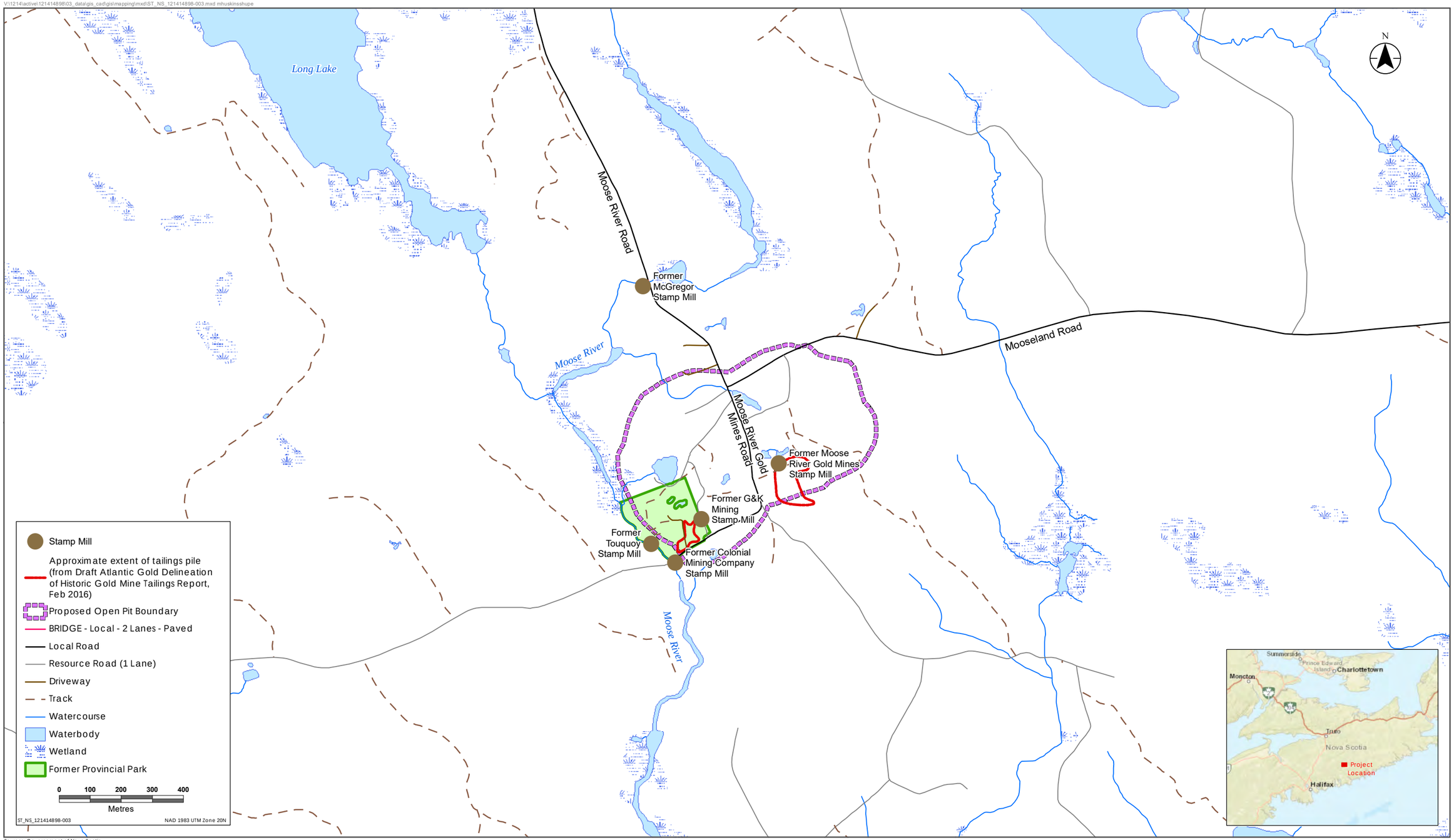

Sources: Government of Nova Scotia

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Project Location

Stantec

ATLANTIC GOLD

Figure 1

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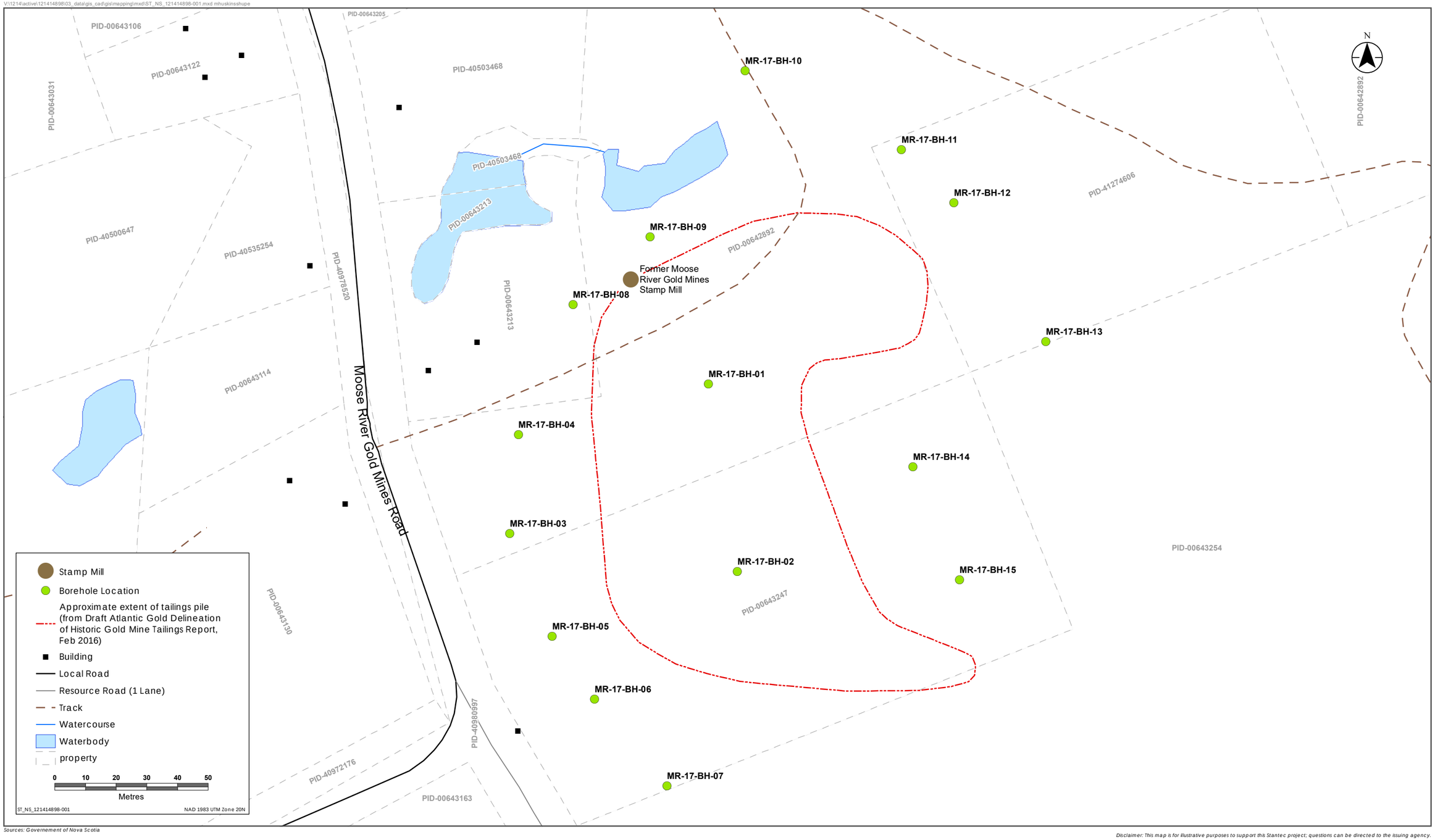

Sources: Government of Nova Scotia

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Sample Location Plan - Former Moose River Gold Mines Stamp Mill, Touquoy Gold Project

Stantec

ATLANTIC GOLD

Figure 2

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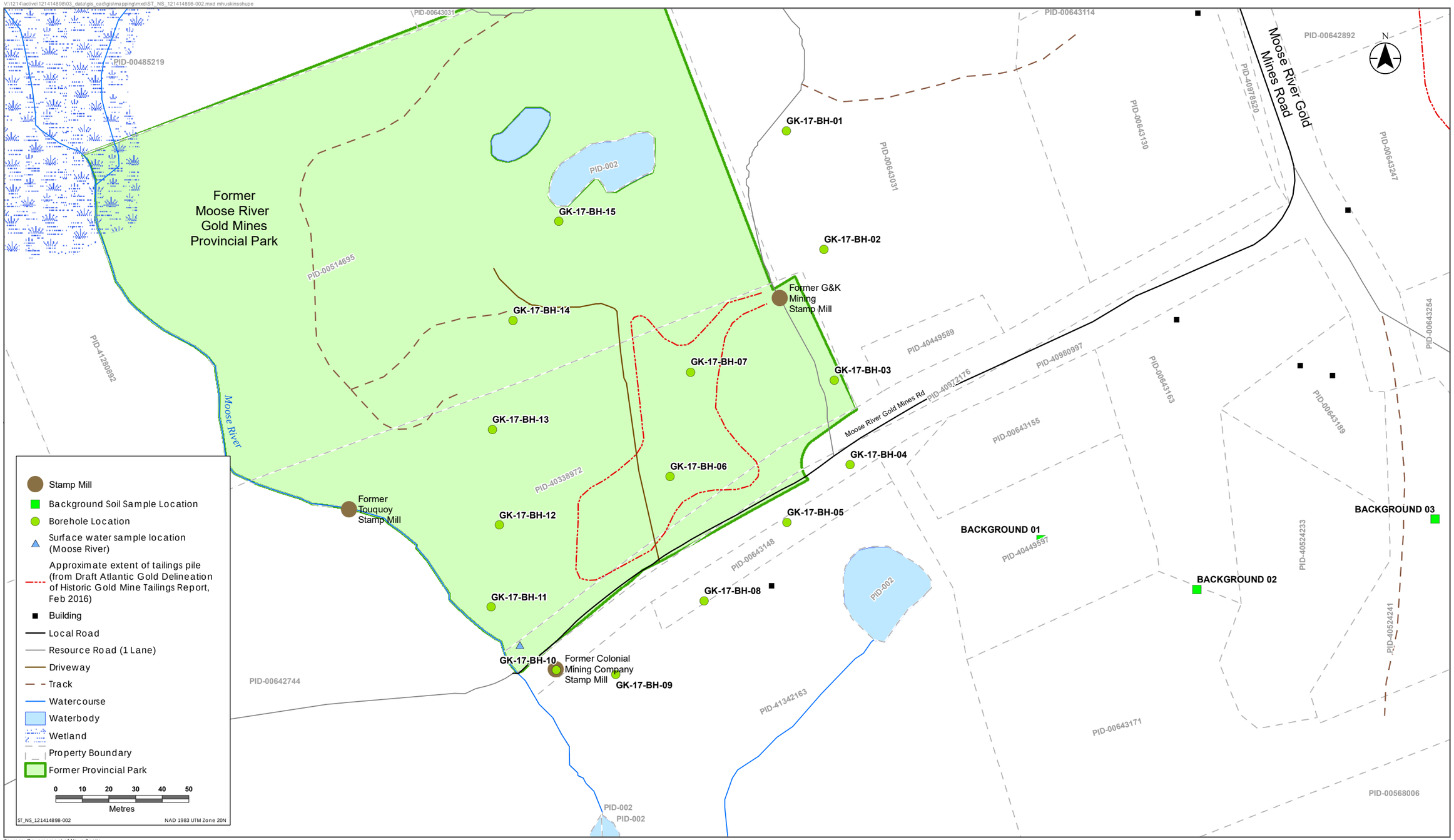

Sources: Government of Nova Scotia

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Sample Location Plan – Former G&K Mining Stamp Mill, Touquoy Gold Project

Stantec

ATLANTIC GOLD

Figure 3

Appendix B
Field Methodology

PHASE II ESA METHODOLOGY

B1.0 SITE RECONNAISSANCE

A site reconnaissance was conducted by Stantec on September 19, 2017 to identify the former stamp mill locations, tailings piles, and proposed borehole locations.

B2.0 FIELD INVESTIGATION

B2.1 Drilling

Boreholes were advanced to a maximum depth of 1.2 m below ground surface using a Stihl gas powered two man operated hand auger, equipped with standard augers. Samples were collected for logging the characteristics of the materials and for analytical testing.

B2.2 Borehole Logging

Materials retrieved from the drilling operation were logged by Stantec personnel. The texture and composition of materials and the visual presence of historical mine tailings or other indications of potential impacts were recorded.

B2.3 Soil Sampling

Soil samples were collected directly from the standard augers at indications of tailings or changes in stratigraphy.

Samples were placed in laboratory supplied containers for potential laboratory analyses.

B2.4 Survey

The location of each borehole was recorded using a hand-held GPS with sub-meter accuracy. This data was used to place the borehole locations on the site plans.

B3.0 QUALITY ASSURANCE/QUALITY CONTROL

All samples were collected following strict Stantec sampling procedures. Samples were uniquely labelled and control was maintained through use of chain of custody forms. All samples were collected in laboratory supplied containers and preserved in insulated coolers. Appropriate sampling QA/QC procedures were adhered to at all times.

Appendix C
Borehole Soil Descriptions

TABLE C-1 **BOREHOLE SOIL DESCRIPTIONS**
Atlantic Gold Corporation
Touquoy Gold Project, Moose River, Nova Scotia
Stantec Consulting Ltd. Project No. 121414898

Location ID	Borehole Depth (mbg)	Soil Description
Background 01	0-0.44	Brown silty SAND and gravel Auger refusal on cobbles No tailings encountered
Background 02	0-0.28	Brown silty SAND and gravel Auger refusal on cobbles No tailings encountered
Background 03	0-0.42	Brown silty SAND and gravel Auger refusal on cobbles No tailings encountered
MR-17BH01	0-0.82	Grey brown silty TAILINGS Auger refusal on cobbles
MR-17BH02	0-0.38	Grey silty TAILINGS
	0.38-0.62	Brown silty SAND and gravel Auger refusal on cobbles No tailings encountered
MR-17BH03	0-0.60	Brown silty SAND and gravel with cobbles No tailings encountered
MR17-BH04	0-0.47	Brown silty SAND and gravel with cobbles Auger refusal on cobbles No tailings encountered
MR-17BH05	0-0.55	Brown silty SAND with gravel and cobbles
MR-17BH06	0-0.73	Brown silty sand with cobbles No tailings encountered
MR-17BH07	0-0.68	Brown silty sand with cobbles Auger refusal on cobbles No tailings encountered
MR-17BH08	0-0.46	Brown silty SAND, gravel and cobbles No tailings encountered
MR-17BH09	0-0.43	Brown silty SAND and gravel Auger refusal on cobbles No tailings encountered
MR-17BH10	0-0.47	Brown silty SAND, gravel and cobbles No tailings encountered
MR-17BH11	0-0.60	Brown silty sand with cobbles No tailings encountered
MR-17BH12	0-0.48	Brown silty SAND with cobbles No tailings encountered
MR-17BH13	0-0.41	Grey SILT and TAILINGS
	0.42-0.84	Silty SAND with gravel and cobbles
MR-17BH14	0-0.39	Brown silty SAND Auger refusal on cobbles No tailings encountered
MR-17BH15	0-0.30	Grey SILT Auger refusal on cobbles TAILINGS encountered

TABLE C-1 **BOREHOLE SOIL DESCRIPTIONS**
Atlantic Gold Corporation
Touquoy Gold Project, Moose River, Nova Scotia
Stantec Consulting Ltd. Project No. 121414898

Location ID	Borehole Depth (mbg)	Soil Description
GK-17BH01	0-0.50	Grubbed area Brown silty SAND with gravel Auger refusal on inferred bedrock No tailings encountered
GK-17BH02	1.2	Edge of cut Brown silty SAND with gravel No tailings encountered
GK-17BH03	0-0.30	Brown silty SANd with shale fragments Auger refusal on cobbles No tailings encountered
GK-17BH04	0-0.35	Brown silty sand with cobbles Auger refusal on cobbles No tailings encountered
GK-17BH05	0.18-0.21	Grey possible TAILINGS with cobbles
	0.21-0.40	Brown silty SAND with gravel Auger refusal on cobbles
GK-17BH06	0-0.57	Grey silt TAILINGS Refusal on rock
GK-17BH07	0-0.32	Brown silty SAND
	0.32-0.75	Grey silt TAILINGS Auger refusal on cobbles
GK-17BH08	0-0.52	Brown silty sand with cobbles Auger refusal on cobbles No tailings encountered
GK-17BH09	0-0.45	Brown silty SAND with gravel and cobbles
	0.45-0.55	Grey SILT Possible TAILINGS
	0.72	Brown silty SAND with cobbles Auger refusal on cobbles
GK-17BH10	0.38	Brown silty SAND with gravel, cobbles & tree roots Auger refusal on cobbles No tailings encountered
GK-17BH11	0.37	Dark brown silty SAND and gravel Auger refusal on cobbles No tailings encountered
GK-17BH12	0-0.35	Grey silt with gravel Tailings encountered
	0.35-0.60	Brown silty SAND and gravel Refusal on cobbles
GK-17BH13	0-0.38	Brown silty SAND with gravel Auger refusal on inferred bedrock No tailings encountered
GK-17BH14	0-0.62	Brown silty SAND with gravel Auger Refusal on cobbles No tailings encountered
GK-17BH15	0-0.36	Brown silty SAND with gravel Auger Refusal on cobbles No tailings encountered

Appendix D
Soil and Surface Water Analytical Summary Tables & Laboratory Certificate of Analysis

TABLE D-1 SOIL INORGANIC CHEMISTRY
Atlantic Gold Corporation
Touquoy Gold Project, Moose River, Nova Scotia
Stantec Consulting Ltd. Project No. 121414898

Parameters	Tier 1 EQS Industrial (mg/kg)	Background Sample Results (depth in mbg)			Sample ID															
					Former Moose River Gold Mines Stamp Mill															
		BACKGROUND 01 (0 - 0.44)	BACKGROUND 02 (0 - 0.28)	BACKGROUND 03 (0 - 0.42)	MR17 BH 01	MR17 BH 02A	MR17 BH 02B	MR17 BH 03		MR17 BH 04	MR17 BH 05	MR17 BH 06	MR17 BH 07	MR17 BH 08	MR17 BH 09	MR17 BH 10	MR17 BH 11	MR17 BH 12	MR17 BH 13A	MR17 BH 13B
Date Sampled:		22-Sep-17	22-Sep-17	22-Sep-17	21-Sep-17	21-Sep-17	21-Sep-17	21-Sep-17	Lab-Dup	21-Sep-17	21-Sep-17	22-Sep-17	22-Sep-17	22-Sep-17	22-Sep-17	22-Sep-17	22-Sep-17	22-Sep-17	22-Sep-17	22-Sep-17
Aluminum	198,000	18,000	18,000	16,000	10,000	16,000	11,000	11,000	11,000	25,000	16,000	13,000	12,000	19,000	20,000	13,000	13,000	9,800	11,000	15,000
Antimony	63	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	5.0	<2.0	<2.0	<2.0	2.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Arsenic	31	**280**	**110**	23	**670**	**1,000**	**300**	**480**	**540**	**4,300**	**36**	**52**	25	**1,100**	**1,000**	**260**	**40**	29	**38**	15
Barium	140,000	15	13	28	6.0	15	33	100	100	11	44	24	36	33	33	34	13	13	25	53
Beryllium	320	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Bismuth	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Boron	24,000	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Cadmium	192	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Chromium	2,300	20	18	18	11	16	11	14	14	24	20	15	15	18	22	16	17	13	14	20
Cobalt	250	6.8	3.1	11	8.9	12	6.3	9.5	9.4	11	12	11	10	17	33	14	8.2	7.0	6.3	19
Copper	16,000	19	11	21	47	54	14	20	20	15	18	27	19	33	27	24	15	16	4.2	24
Iron	144,000	31,000	27,000	26,000	24,000	36,000	23,000	22,000	23,000	38,000	27,000	25,000	24,000	34,000	43,000	28,000	27,000	20,000	25,000	31,000
Lead	740	22	12	18	28	41	16	310	290	9.1	20	17	14	30	25	18	11	8.3	13	19
Lithium	-	29	21	26	18	27	22	21	21	23	30	23	23	24	34	30	26	21	24	29
Manganese	-	390	180	770	490	770	380	790	790	420	800	780	820	1,100	2,400	860	530	400	440	1,600
Mercury	99	0.13	0.14	0.11	8.1	6.3	1.4	0.38	0.32	0.24	<0.10	<0.10	<0.10	1.2	0.38	0.30	<0.10	<0.10	<0.10	<0.10
Molybdenum	1,200	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Nickel	2,200	17	8.5	20	18	26	10	16	15	17	19	19	18	27	27	24	18	17	12	27
Rubidium	-	5.9	5.0	7.3	<2.0	<2.0	6.8	10	10	3.6	9.4	5.5	6.3	5.8	6.9	6.2	4.6	3.1	7.7	8.9
Selenium	1,135	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver	490	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Strontium	122,000	<5.0	<5.0	6.0	<5.0	7.8	11	10	11	8.0	6.7	5.5	6.1	15	6.1	6.3	5.8	<5.0	<5.0	5.6
Thallium	1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin	122,000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.7	3.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Uranium	300	0.56	0.61	0.87	0.37	0.47	0.54	0.67	0.70	0.83	0.83	0.90	0.78	1.1	1.2	1.4	0.80	0.89	0.56	0.99
Vanadium	160	18	19	17	7.5	11	15	16	15	20	22	16	17	19	17	15	16	12	20	21
Zinc	47,000	46	30	57	49	69	32	550	390	48	55	47	51	57	78	53	45	37	38	59
				Sample Depth (mbg):	0 - 0.82	0 - 0.38	0.38 - 0.62	0 - 0.60		0 - 0.47	0 - 0.55	0 - 0.73	0 - 0.68	0 - 0.46	0 - 0.43	0 - 0.47	0 - 0.60	0 - 0.48	0 - 0.41	0.42 - 0.84
				Tailings Observed (Yes or No):	**Yes**	**Yes**	No	No		No	No	No	No	No	No	No	No	No	**Yes**	No

Notes:

1. ' -' = no standard available
2. Lab-Dup = laboratory QA/QC duplicate; DUP# = field QA/QC duplicate
3. Tier 1 EQS = Tier 1 Environmental Quality Standards for Soil. From Nova Scotia's *Contaminated Sites Regulations* (July 6, 2013) Notification of Contamination Protocol; Table 1A/1B.
4. <# = parameter concentration below laboratory's reportable detection limit
5. mbg = meters below grade
6. * = sample collected at edge of cut
7. **Bold & Underlined** = parameter concentration exceeds the Tier 1 EQS = Concentration exceeds Tier 1 EQS and is elevated above background

TABLE D-1 SOIL INORGANIC CHEMISTRY
Atlantic Gold Corporation
Touquoy Gold Project, Moose River, Nova Scotia
Stantec Consulting Ltd. Project No. 121414898

Parameters	Tier 1 EQS Industrial (mg/kg)	Background Sample Results			Sample ID: Former Moose River Gold Mines Stamp Mill			Sample ID: Former G&K Mining Stamp Mill												
		BACKGROUND 01 (0 - 0.44)	BACKGROUND 02 (0 - 0.28)	BACKGROUND 03 (0 - 0.42)	MR17 BH 14		MR17 BH 15	GK17 BH 01		GK17 BH 02	GK17 BH 03	GK17 BH 04	GK17 BH05A		GK17 BH 05B	GK17 BH 06		GK17 BH 07A	GK17 BH 07B	GK17 BH 08	GK17 BH 09A
Date Sampled:		22-Sep-17	22-Sep-17	22-Sep-17	22-Sep-17	DUP3	22-Sep-17	20-Sep-17	Lab-Dup	20-Sep-17	20-Sep-17	20-Sep-17	20-Sep-17	Lab-Dup	20-Sep-17	21-Sep-17	DUP1	21-Sep-17	21-Sep-17	21-Sep-17	21-Sep-17
Aluminum	198,000	18,000	18,000	16,000	13,000	13,000	16,000	16,000	17,000	15,000	17,000	12,000	7,900	8,400	29,000	21,000	20,000	10,000	14,000	27,000	6,900
Antimony	63	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	3.0	3.2	<2.0	<2.0
Arsenic	31	**280**	**110**	23	19	**37**	**450**	**1,400**	**1,600**	**4,500**	**1,100**	**94**	**170**	**190**	**340**	**700**	**610**	**18,000**	**14,000**	**640**	**210**
Barium	140,000	15	13	28	56	55	16	11	11	26	20	28	20	18	15	16	15	<5.0	5.4	14	23
Beryllium	320	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Bismuth	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.4	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.4	<2.0	<2.0	<2.0
Boron	24,000	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Cadmium	192	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.50	<0.30	<0.30
Chromium	2,300	20	18	18	17	15	18	18	18	18	19	13	6.2	6.8	29	23	22	13	29	27	6.2
Cobalt	250	6.8	3.1	11	9.8	8.7	12	25	25	23	30	6.7	3.6	3.2	11	12	10	12	75	24	3.0
Copper	16,000	19	11	21	11	7.9	56	51	52	26	47	12	9.0	12	29	38	32	38	590	45	7.9
Iron	144,000	31,000	27,000	26,000	30,000	29,000	34,000	39,000	40,000	36,000	43,000	21,000	14,000	14,000	45,000	40,000	39,000	57,000	41,000	44,000	14,000
Lead	740	22	12	18	12	14	49	25	25	22	82	16	5.7	5.6	17	22	18	41	160	31	10
Lithium	-	29	21	26	35	33	28	26	25	23	27	16	6.9	7.1	41	33	33	17	20	41	5.8
Manganese	-	390	180	770	560	460	820	910	910	1,000	1,000	560	220	190	560	340	340	320	200	670	270
Mercury	99	0.13	0.14	0.11	<0.10	0.14	8.8	<0.10	<0.10	<0.10	0.12	<0.10	<0.10	<0.10	0.20	4.8	3.4	6.6	11	0.13	<0.10
Molybdenum	1,200	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Nickel	2,200	17	8.5	20	22	23	20	38	39	23	48	12	9.3	10	30	26	23	41	110	37	7.3
Rubidium	-	5.9	5.0	7.3	6.8	7.2	2.1	2.9	2.6	3.1	2.7	5.3	3.0	2.8	5.3	3.1	2.6	<2.0	<2.0	4.4	2.7
Selenium	1,135	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver	490	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Strontium	122,000	<5.0	<5.0	6.0	10	9.7	6.0	<5.0	<5.0	5.9	7.1	<5.0	<5.0	<5.0	<5.0	6.9	6.7	<5.0	<5.0	<5.0	<5.0
Thallium	1.0	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.12	<0.10	<0.10
Tin	122,000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Uranium	300	0.56	0.61	0.87	1.2	1.1	0.50	0.60	0.64	0.97	0.73	0.56	0.34	0.36	0.73	0.46	0.44	0.37	0.94	0.71	0.33
Vanadium	160	18	19	17	17	18	12	13	12	12	12	18	11	11	19	14	14	9.4	9.1	19	14
Zinc	47,000	46	30	57	44	39	72	76	74	57	87	31	17	18	72	99	99	63	71	94	18
Sample Depth (mbg):					0 - 0.39		0 - 0.30	0.50		1.2*	0.30	0.35	0.18 - 0.21		0.21 - 0.40	0 - 0.57		0 - 0.32	0.32 - 0.75	0.52	0.45 - 0.55
Tailings Observed (Yes or No):					No		**Yes**	No		No	No	No	**Possible**		No	**Yes**		No	**Yes**	No	**Possible**

Notes:

1. ' -' = no standard available
2. Lab-Dup = laboratory QA/QC duplicate; DUP# = field QA/QC duplicate
3. Tier 1 EQS = Tier 1 Environmental Quality Standards for Soil. From Nova Scotia's *Contaminated Sites Regulations* (July 6, 2013) Notification of Contamination Protocol; Table 1A/1B.
4. <# = parameter concentration below laboratory's reportable detection limit
5. mbg = meters below grade
6. * = sample collected at edge of cut
7. **Bold & Underlined** = parameter concentration exceeds the Tier 1 EQS = Concentration exceeds Tier 1 EQS and is elevated above background

TABLE D-1 SOIL INORGANIC CHEMISTRY
Atlantic Gold Corporation
Touquoy Gold Project, Moose River, Nova Scotia
Stantec Consulting Ltd. Project No. 121414898

Parameters	Tier 1 EQS Industrial (mg/kg)	Background Sample Results			Sample ID							
					Former G&K Mining Stamp Mill							
		BACKGROUND 01 (0 - 0.44)	BACKGROUND 02 (0 - 0.28)	BACKGROUND 03 (0 - 0.42)	GK17 BH 09B	GK17 BH 10	GK17 BH 11	GK17 BH 12A	GK17 BH 12B	GK17 BH 13	GK17 BH 14	GK17 BH 15
Date Sampled:		22-Sep-17	22-Sep-17	22-Sep-17	21-Sep-17	21-Sep-17	21-Sep-17	21-Sep-17	21-Sep-17	21-Sep-17	21-Sep-17	21-Sep-17
Aluminum	198,000	18,000	18,000	16,000	20,000	17,000	14,000	19,000	16,000	17,000	14,000	13,000
Antimony	63	<2.0	<2.0	<2.0	<2.0	<2.0	2.9	<2.0	<2.0	<2.0	<2.0	<2.0
Arsenic	31	**280**	**110**	23	**470**	**1,200**	**6,900**	**2,200**	**1,400**	**6,600**	**11,000**	**6,500**
Barium	140,000	15	13	28	18	37	43	29	19	28	57	34
Beryllium	320	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Bismuth	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.9	<2.0
Boron	24,000	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Cadmium	192	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.52	0.31
Chromium	2,300	20	18	18	18	18	15	21	20	18	16	15
Cobalt	250	6.8	3.1	11	3.8	16	18	29	10	21	29	17
Copper	16,000	19	11	21	12	34	24	53	13	46	46	33
Iron	144,000	31,000	27,000	26,000	38,000	37,000	42,000	44,000	33,000	45,000	52,000	33,000
Lead	740	22	12	18	21	27	52	110	16	29	56	33
Lithium	-	29	21	26	23	26	23	36	31	27	22	23
Manganese	-	390	180	770	280	870	1,800	1,900	540	810	1,400	1,200
Mercury	99	0.13	0.14	0.11	0.19	4.5	6.0	0.11	<0.10	0.14	<0.10	0.19
Molybdenum	1,200	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Nickel	2,200	17	8.5	20	8.8	28	15	41	18	29	33	26
Rubidium	-	5.9	5.0	7.3	6.0	4.3	<2.0	2.5	4.2	2.9	2.9	3.4
Selenium	1,135	<1.0	<1.0	<1.0	1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver	490	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Strontium	122,000	<5.0	<5.0	6.0	<5.0	5.3	<5.0	7.7	5.0	7.3	11	12
Thallium	1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	<0.10
Tin	122,000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Uranium	300	0.56	0.61	0.87	0.53	0.71	0.90	0.89	0.42	0.65	0.73	0.59
Vanadium	160	18	19	17	22	18	12	15	14	13	10	12
Zinc	47,000	46	30	57	36	67	57	84	68	71	72	69
Sample Depth (mbg):					0.72	0.38	0.37	0.35 - 0.60	0 - 0.35	0 - 0.38	0 - 0.62	0 - 0.36
Tailings Observed (Yes or No):					No	No	No	No	**Yes**	No	No	No

Notes:

1. ' -' = no standard available
2. Lab-Dup = laboratory QA/QC duplicate; DUP# = field QA/QC duplicate
3. Tier 1 EQS = Tier 1 Environmental Quality Standards for Soil. From Nova Scotia's *Contaminated Sites Regulations* (July 6, 2013) Notification of Contamination Protocol; Table 1A/1B.
4. <# = parameter concentration below laboratory's reportable detection limit
5. mbg = meters below grade
6. * = sample collected at edge of cut
7. **Bold & Underlined** = parameter concentration exceeds the Tier 1 EQS = Concentration exceeds Tier 1 EQS and is elevated above background

TABLE D-2 SURFACE WATER INORGANIC CHEMISTRY
Atlantic Gold Corporation
Touquoy Gold Project, Moose River, Nova Scotia
Stantec Consulting Ltd. Project No. 121414898

Parameter	MMER	Tier 1 EQS Fresh Water (µg/L)	Mean Concentrations from Background Monitoring Locations	Sample ID
				MOOSE RIVER
			Date Sampled:	22-Sep-17
Aluminum	-	5	127.2 - 183.7	**250**
Antimony	-	20	n/a	<1.0
Arsenic	500/750/1000	5.0	<1 - 12.26	**17**
Barium	-	1000	n/a	5.8
Beryllium	-	5.3	n/a	<1.0
Bismuth	-	-	n/a	<2.0
Boron	-	1,200	n/a	<50
Cadmium	-	0.01	0.01 - 0.02	**0.014**
Calcium	-	-	n/a	1600
Chromium	-	-	n/a	<1.0
Cobalt	-	10	n/a	<0.40
Copper	300/450/600	2	n/a	<2.0
Iron	-	300	238 - 564	**960**
Lead	200/300/400	1	n/a	<0.50
Magnesium	-	-	n/a	570
Manganese	-	820	n/a	70
Mercury	-	0.026	n/a	<0.013
Molybdenum	-	73	n/a	<2.0
Nickel	500/750/1000	25	n/a	<2.0
Phosphorus	-	-	n/a	<100
Porassium	-	-	n/a	210
Selenium	-	1.0	n/a	<1.0
Silver	-	0.1	n/a	<0.10
Sodium	-	-	n/a	2,800
Strontium	-	21,000	n/a	9.8
Thallium	-	0.8	n/a	<0.10
Tin	-	-	n/a	<2.0
Titanium	-	-	n/a	2.1
Uranium	-	300	n/a	<0.10
Vanadium	-	6	n/a	<2.0
Zinc	500/750/1000	30	n/a	<5.0

Notes:

1. " -' = no standard available
2. MMER = Metal Mining Effluent Regulations, Schedule 4 - Authorized Limits of Deleterious Substances, maximum monthly mean concentration/maximum composite sample concentration/maximum grab sample concentration
3. Tier 1 EQS = Tier 1 Environmental Quality Standards For Surface Water. From Nova Scotia's Contaminated Sites Regulations (July 2013) Notification of Contamination Protocol, Table 3; Fresh Water
4. Mean Concentrations from Background Monitoring Locations = from 2016 Annual Report – Surface Water & Groundwater Baseline Monitoring, Atlantic Gold Nova Scotia Mining Corporation – Touquoy Gold Project, prepared for Atlantic Gold Corporation by Stantec Consulting Ltd., April 30, 2017.
   Range of mean concentrations taken from three background locations.
5. <# = parameter concentration below laboratory's reportable detection limit
6. **Bold & Underlined** = parameter concentration exceeds the referenced Tier 1 EQS

Your Project #: 121414898

Attention:Morgan Schauerte

Stantec Consulting Ltd
40 Highfield Park Drive
Suite 102
Dartmouth, NS
B3A 0A3

Your C.O.C. #: D15196, D15197, D15411, D15412, D15413

Report Date: 2017/09/28
Report #: R4742516
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7K9396
Received: 2017/09/25, 11:03

Sample Matrix: Soil
Samples Received: 41

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Metals Solids Acid Extr. ICPMS	4	2017/09/26	2017/09/26	ATL SOP 00058	EPA 6020A R1 m
Metals Solids Acid Extr. ICPMS	37	2017/09/26	2017/09/27	ATL SOP 00058	EPA 6020A R1 m

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Mercury - Total (CVAA,LL)	1	2017/09/26	2017/09/26	ATL SOP 00026	EPA 245.1 R3 m
Metals Water Total MS	1	2017/09/26	2017/09/26	ATL SOP 00058	EPA 6020A R1 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Your Project #: 121414898

Attention:Morgan Schauerte

Stantec Consulting Ltd
40 Highfield Park Drive
Suite 102
Dartmouth, NS
B3A 0A3

Your C.O.C. #: D15196, D15197, D15411, D15412, D15413

Report Date: 2017/09/28
Report #: R4742516
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7K9396
Received: 2017/09/25, 11:03

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Marie Muise, Key Account Specialist
Email: MMuise@maxxam.ca
Phone# (902)420-0203 Ext:253

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7K9396
Report Date: 2017/09/28

Stantec Consulting Ltd
Client Project #: 121414898

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEO614	FEO615	FEO616	FEO616	FEO617		FEO618		
Sampling Date		2017/09/21	2017/09/21	2017/09/21	2017/09/21	2017/09/21		2017/09/21		
COC Number		D15196	D15196	D15196	D15196	D15196		D15196		
	UNITS	**MR17 BH 01**	**MR17 BH 02A**	**MR17 BH 03**	**MR17 BH 03 Lab-Dup**	**MR17 BH 04**	**RDL**	**MR17 BH 05**	**RDL**	**QC Batch**
Metals										
Acid Extractable Aluminum (Al)	mg/kg	10000	16000	11000	11000	25000	10	16000	10	5182130
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	<2.0	5.0	2.0	<2.0	2.0	5182130
Acid Extractable Arsenic (As)	mg/kg	670	1000	480	540	4300	20	36	2.0	5182130
Acid Extractable Barium (Ba)	mg/kg	6.0	15	100	100	11	5.0	44	5.0	5182130
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	<2.0	2.0	5182130
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	<2.0	2.0	5182130
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	<50	50	<50	50	5182130
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	<0.30	<0.30	<0.30	0.30	<0.30	0.30	5182130
Acid Extractable Chromium (Cr)	mg/kg	11	16	14	14	24	2.0	20	2.0	5182130
Acid Extractable Cobalt (Co)	mg/kg	8.9	12	9.5	9.4	11	1.0	12	1.0	5182130
Acid Extractable Copper (Cu)	mg/kg	47	54	20	20	15	2.0	18	2.0	5182130
Acid Extractable Iron (Fe)	mg/kg	24000	36000	22000	23000	38000	50	27000	50	5182130
Acid Extractable Lead (Pb)	mg/kg	28	41	310	290	9.1	0.50	20	0.50	5182130
Acid Extractable Lithium (Li)	mg/kg	18	27	21	21	23	2.0	30	2.0	5182130
Acid Extractable Manganese (Mn)	mg/kg	490	770	790	790	420	2.0	800	2.0	5182130
Acid Extractable Mercury (Hg)	mg/kg	8.1	6.3	0.38	0.32	0.24	0.10	<0.10	0.10	5182130
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	<2.0	2.0	5182130
Acid Extractable Nickel (Ni)	mg/kg	18	26	16	15	17	2.0	19	2.0	5182130
Acid Extractable Rubidium (Rb)	mg/kg	<2.0	<2.0	10	10	3.6	2.0	9.4	2.0	5182130
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	<1.0	<1.0	1.2	1.0	<1.0	1.0	5182130
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	<0.50	0.50	5182130
Acid Extractable Strontium (Sr)	mg/kg	<5.0	7.8	10	11	8.0	5.0	6.7	5.0	5182130
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	5182130
Acid Extractable Tin (Sn)	mg/kg	<2.0	<2.0	2.7	3.1	<2.0	2.0	<2.0	2.0	5182130
Acid Extractable Uranium (U)	mg/kg	0.37	0.47	0.67	0.70	0.83	0.10	0.83	0.10	5182130
Acid Extractable Vanadium (V)	mg/kg	7.5	11	16	15	20	2.0	22	2.0	5182130
Acid Extractable Zinc (Zn)	mg/kg	49	69	550	390	48	5.0	55	5.0	5182130

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEO619	FEO620		FEO621	FEO622		FEO623		
Sampling Date		2017/09/22	2017/09/22		2017/09/22	2017/09/22		2017/09/22		
COC Number		D15196	D15196		D15196	D15196		D15196		
	UNITS	**MR17 BH 06**	**MR17 BH 07**	**RDL**	**MR17 BH 08**	**MR17 BH 09**	**RDL**	**MR17 BH 10**	**RDL**	**QC Batch**
Metals										
Acid Extractable Aluminum (Al)	mg/kg	13000	12000	10	19000	20000	10	13000	10	5182307
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	2.0	2.1	<2.0	2.0	<2.0	2.0	5182307
Acid Extractable Arsenic (As)	mg/kg	52	25	2.0	1100	1000	20	260	2.0	5182307
Acid Extractable Barium (Ba)	mg/kg	24	36	5.0	33	33	5.0	34	5.0	5182307
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	2.0	<2.0	<2.0	2.0	<2.0	2.0	5182307
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	2.0	<2.0	<2.0	2.0	<2.0	2.0	5182307
Acid Extractable Boron (B)	mg/kg	<50	<50	50	<50	<50	50	<50	50	5182307
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	0.30	<0.30	<0.30	0.30	<0.30	0.30	5182307
Acid Extractable Chromium (Cr)	mg/kg	15	15	2.0	18	22	2.0	16	2.0	5182307
Acid Extractable Cobalt (Co)	mg/kg	11	10	1.0	17	33	1.0	14	1.0	5182307
Acid Extractable Copper (Cu)	mg/kg	27	19	2.0	33	27	2.0	24	2.0	5182307
Acid Extractable Iron (Fe)	mg/kg	25000	24000	50	34000	43000	50	28000	50	5182307
Acid Extractable Lead (Pb)	mg/kg	17	14	0.50	30	25	0.50	18	0.50	5182307
Acid Extractable Lithium (Li)	mg/kg	23	23	2.0	24	34	2.0	30	2.0	5182307
Acid Extractable Manganese (Mn)	mg/kg	780	820	2.0	1100	2400	2.0	860	2.0	5182307
Acid Extractable Mercury (Hg)	mg/kg	<0.10	<0.10	0.10	1.2	0.38	0.10	0.30	0.10	5182307
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	2.0	<2.0	<2.0	2.0	<2.0	2.0	5182307
Acid Extractable Nickel (Ni)	mg/kg	19	18	2.0	27	27	2.0	24	2.0	5182307
Acid Extractable Rubidium (Rb)	mg/kg	5.5	6.3	2.0	5.8	6.9	2.0	6.2	2.0	5182307
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	1.0	<1.0	<1.0	1.0	<1.0	1.0	5182307
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	0.50	<0.50	<0.50	0.50	<0.50	0.50	5182307
Acid Extractable Strontium (Sr)	mg/kg	5.5	6.1	5.0	15	6.1	5.0	6.3	5.0	5182307
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	0.10	<0.10	<0.10	0.10	<0.10	0.10	5182307
Acid Extractable Tin (Sn)	mg/kg	<2.0	<2.0	2.0	<2.0	<2.0	2.0	<2.0	2.0	5182307
Acid Extractable Uranium (U)	mg/kg	0.90	0.78	0.10	1.1	1.2	0.10	1.4	0.10	5182307
Acid Extractable Vanadium (V)	mg/kg	16	17	2.0	19	17	2.0	15	2.0	5182307
Acid Extractable Zinc (Zn)	mg/kg	47	51	5.0	57	78	5.0	53	5.0	5182307

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7K9396
Report Date: 2017/09/28

Stantec Consulting Ltd
Client Project #: 121414898

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEO631	FEO632	FEO633	FEO634	FEO635	FEO636		
Sampling Date		2017/09/22	2017/09/22	2017/09/22	2017/09/22	2017/09/22	2017/09/21		
COC Number		D15197	D15197	D15197	D15197	D15197	D15197		
	UNITS	**MR17 BH 11**	**MR17 BH 12**	**MR17 BH 13A**	**MR17 BH 14**	**MR17 BH 15**	**MR17 BH 02B**	**RDL**	**QC Batch**
Metals									
Acid Extractable Aluminum (Al)	mg/kg	13000	9800	11000	13000	16000	11000	10	5182307
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	5182307
Acid Extractable Arsenic (As)	mg/kg	40	29	38	19	450	300	2.0	5182307
Acid Extractable Barium (Ba)	mg/kg	13	13	25	56	16	33	5.0	5182307
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	5182307
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	5182307
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	<50	<50	50	5182307
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.30	5182307
Acid Extractable Chromium (Cr)	mg/kg	17	13	14	17	18	11	2.0	5182307
Acid Extractable Cobalt (Co)	mg/kg	8.2	7.0	6.3	9.8	12	6.3	1.0	5182307
Acid Extractable Copper (Cu)	mg/kg	15	16	4.2	11	56	14	2.0	5182307
Acid Extractable Iron (Fe)	mg/kg	27000	20000	25000	30000	34000	23000	50	5182307
Acid Extractable Lead (Pb)	mg/kg	11	8.3	13	12	49	16	0.50	5182307
Acid Extractable Lithium (Li)	mg/kg	26	21	24	35	28	22	2.0	5182307
Acid Extractable Manganese (Mn)	mg/kg	530	400	440	560	820	380	2.0	5182307
Acid Extractable Mercury (Hg)	mg/kg	<0.10	<0.10	<0.10	<0.10	8.8	1.4	0.10	5182307
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	5182307
Acid Extractable Nickel (Ni)	mg/kg	18	17	12	22	20	10	2.0	5182307
Acid Extractable Rubidium (Rb)	mg/kg	4.6	3.1	7.7	6.8	2.1	6.8	2.0	5182307
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	5182307
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5182307
Acid Extractable Strontium (Sr)	mg/kg	5.8	<5.0	<5.0	10	6.0	11	5.0	5182307
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	5182307
Acid Extractable Tin (Sn)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	5182307
Acid Extractable Uranium (U)	mg/kg	0.80	0.89	0.56	1.2	0.50	0.54	0.10	5182307
Acid Extractable Vanadium (V)	mg/kg	16	12	20	17	12	15	2.0	5182307
Acid Extractable Zinc (Zn)	mg/kg	45	37	38	44	72	32	5.0	5182307

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7K9396
Report Date: 2017/09/28

Stantec Consulting Ltd
Client Project #: 121414898

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEO637		FEO644	FEO644	FEO645	FEO646		
Sampling Date		2017/09/22		2017/09/20	2017/09/20	2017/09/20	2017/09/20		
COC Number		D15197		D15411	D15411	D15411	D15411		
	UNITS	**MR17 BH 13B**	**RDL**	**GK17 BH 01**	**GK17 BH 01 Lab-Dup**	**GK17 BH 2**	**GK17 BH 03**	**RDL**	**QC Batch**
Metals									
Acid Extractable Aluminum (Al)	mg/kg	15000	10	16000	17000	15000	17000	10	5182307
Acid Extractable Antimony (Sb)	mg/kg	<2.0	2.0	<2.0	<2.0	<2.0	<2.0	2.0	5182307
Acid Extractable Arsenic (As)	mg/kg	15	2.0	1400	1600	4500	1100	20	5182307
Acid Extractable Barium (Ba)	mg/kg	53	5.0	11	11	26	20	5.0	5182307
Acid Extractable Beryllium (Be)	mg/kg	<2.0	2.0	<2.0	<2.0	<2.0	<2.0	2.0	5182307
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	2.0	<2.0	<2.0	<2.0	2.4	2.0	5182307
Acid Extractable Boron (B)	mg/kg	<50	50	<50	<50	<50	<50	50	5182307
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	0.30	<0.30	<0.30	<0.30	<0.30	0.30	5182307
Acid Extractable Chromium (Cr)	mg/kg	20	2.0	18	18	18	19	2.0	5182307
Acid Extractable Cobalt (Co)	mg/kg	19	1.0	25	25	23	30	1.0	5182307
Acid Extractable Copper (Cu)	mg/kg	24	2.0	51	52	26	47	2.0	5182307
Acid Extractable Iron (Fe)	mg/kg	31000	50	39000	40000	36000	43000	50	5182307
Acid Extractable Lead (Pb)	mg/kg	19	0.50	25	25	22	82	0.50	5182307
Acid Extractable Lithium (Li)	mg/kg	29	2.0	26	25	23	27	2.0	5182307
Acid Extractable Manganese (Mn)	mg/kg	1600	2.0	910	910	1000	1000	2.0	5182307
Acid Extractable Mercury (Hg)	mg/kg	<0.10	0.10	<0.10	<0.10	<0.10	0.12	0.10	5182307
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	2.0	<2.0	<2.0	<2.0	<2.0	2.0	5182307
Acid Extractable Nickel (Ni)	mg/kg	27	2.0	38	39	23	48	2.0	5182307
Acid Extractable Rubidium (Rb)	mg/kg	8.9	2.0	2.9	2.6	3.1	2.7	2.0	5182307
Acid Extractable Selenium (Se)	mg/kg	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	1.0	5182307
Acid Extractable Silver (Ag)	mg/kg	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	0.50	5182307
Acid Extractable Strontium (Sr)	mg/kg	5.6	5.0	<5.0	<5.0	5.9	7.1	5.0	5182307
Acid Extractable Thallium (Tl)	mg/kg	<0.10	0.10	<0.10	<0.10	<0.10	<0.10	0.10	5182307
Acid Extractable Tin (Sn)	mg/kg	<2.0	2.0	<2.0	<2.0	<2.0	<2.0	2.0	5182307
Acid Extractable Uranium (U)	mg/kg	0.99	0.10	0.60	0.64	0.97	0.73	0.10	5182307
Acid Extractable Vanadium (V)	mg/kg	21	2.0	13	12	12	12	2.0	5182307
Acid Extractable Zinc (Zn)	mg/kg	59	5.0	76	74	57	87	5.0	5182307

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B7K9396
Report Date: 2017/09/28

Stantec Consulting Ltd
Client Project #: 121414898

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEO647		FEO648	FEO648			FEO649		
Sampling Date		2017/09/20		2017/09/20	2017/09/20			2017/09/21		
COC Number		D15411		D15411	D15411			D15411		
	UNITS	**GK17 BH 04**	**QC Batch**	**GK17 BH 05A**	**GK17 BH 05A Lab-Dup**	**RDL**	**QC Batch**	**GK17 BH 06**	**RDL**	**QC Batch**
Metals										
Acid Extractable Aluminum (Al)	mg/kg	12000	5182307	7900	8400	10	5182323	21000	10	5182307
Acid Extractable Antimony (Sb)	mg/kg	<2.0	5182307	<2.0	<2.0	2.0	5182323	<2.0	2.0	5182307
Acid Extractable Arsenic (As)	mg/kg	94	5182307	170	190	2.0	5182323	700	20	5182307
Acid Extractable Barium (Ba)	mg/kg	28	5182307	20	18	5.0	5182323	16	5.0	5182307
Acid Extractable Beryllium (Be)	mg/kg	<2.0	5182307	<2.0	<2.0	2.0	5182323	<2.0	2.0	5182307
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	5182307	<2.0	<2.0	2.0	5182323	<2.0	2.0	5182307
Acid Extractable Boron (B)	mg/kg	<50	5182307	<50	<50	50	5182323	<50	50	5182307
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	5182307	<0.30	<0.30	0.30	5182323	<0.30	0.30	5182307
Acid Extractable Chromium (Cr)	mg/kg	13	5182307	6.2	6.8	2.0	5182323	23	2.0	5182307
Acid Extractable Cobalt (Co)	mg/kg	6.7	5182307	3.6	3.2	1.0	5182323	12	1.0	5182307
Acid Extractable Copper (Cu)	mg/kg	12	5182307	9.0	12	2.0	5182323	38	2.0	5182307
Acid Extractable Iron (Fe)	mg/kg	21000	5182307	14000	14000	50	5182323	40000	50	5182307
Acid Extractable Lead (Pb)	mg/kg	16	5182307	5.7	5.6	0.50	5182323	22	0.50	5182307
Acid Extractable Lithium (Li)	mg/kg	16	5182307	6.9	7.1	2.0	5182323	33	2.0	5182307
Acid Extractable Manganese (Mn)	mg/kg	560	5182307	220	190	2.0	5182323	340	2.0	5182307
Acid Extractable Mercury (Hg)	mg/kg	<0.10	5182307	<0.10	<0.10	0.10	5182323	4.8	0.10	5182307
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	5182307	<2.0	<2.0	2.0	5182323	<2.0	2.0	5182307
Acid Extractable Nickel (Ni)	mg/kg	12	5182307	9.3	10	2.0	5182323	26	2.0	5182307
Acid Extractable Rubidium (Rb)	mg/kg	5.3	5182307	3.0	2.8	2.0	5182323	3.1	2.0	5182307
Acid Extractable Selenium (Se)	mg/kg	<1.0	5182307	<1.0	<1.0	1.0	5182323	<1.0	1.0	5182307
Acid Extractable Silver (Ag)	mg/kg	<0.50	5182307	<0.50	<0.50	0.50	5182323	<0.50	0.50	5182307
Acid Extractable Strontium (Sr)	mg/kg	<5.0	5182307	<5.0	<5.0	5.0	5182323	6.9	5.0	5182307
Acid Extractable Thallium (Tl)	mg/kg	<0.10	5182307	<0.10	<0.10	0.10	5182323	<0.10	0.10	5182307
Acid Extractable Tin (Sn)	mg/kg	<2.0	5182307	<2.0	<2.0	2.0	5182323	<2.0	2.0	5182307
Acid Extractable Uranium (U)	mg/kg	0.56	5182307	0.34	0.36	0.10	5182323	0.46	0.10	5182307
Acid Extractable Vanadium (V)	mg/kg	18	5182307	11	11	2.0	5182323	14	2.0	5182307
Acid Extractable Zinc (Zn)	mg/kg	31	5182307	17	18	5.0	5182323	99	5.0	5182307

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B7K9396
Report Date: 2017/09/28

Stantec Consulting Ltd
Client Project #: 121414898

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEO650			FEO651		FEO652		FEO653		
Sampling Date		2017/09/21			2017/09/21		2017/09/21		2017/09/21		
COC Number		D15411			D15411		D15411		D15411		
	UNITS	**GK17 BH 07A**	**RDL**	**QC Batch**	**GK17 BH 08**	**RDL**	**GK17 BH 09A**	**RDL**	**GK17 BH 10**	**RDL**	**QC Batch**
Metals											
Acid Extractable Aluminum (Al)	mg/kg	10000	10	5182307	27000	10	6900	10	17000	10	5182130
Acid Extractable Antimony (Sb)	mg/kg	3.0	2.0	5182307	<2.0	2.0	<2.0	2.0	<2.0	2.0	5182130
Acid Extractable Arsenic (As)	mg/kg	18000	200	5182307	640	20	210	2.0	1200	20	5182130
Acid Extractable Barium (Ba)	mg/kg	<5.0	5.0	5182307	14	5.0	23	5.0	37	5.0	5182130
Acid Extractable Beryllium (Be)	mg/kg	<2.0	2.0	5182307	<2.0	2.0	<2.0	2.0	<2.0	2.0	5182130
Acid Extractable Bismuth (Bi)	mg/kg	2.4	2.0	5182307	<2.0	2.0	<2.0	2.0	<2.0	2.0	5182130
Acid Extractable Boron (B)	mg/kg	<50	50	5182307	<50	50	<50	50	<50	50	5182130
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	0.30	5182307	<0.30	0.30	<0.30	0.30	<0.30	0.30	5182130
Acid Extractable Chromium (Cr)	mg/kg	13	2.0	5182307	27	2.0	6.2	2.0	18	2.0	5182130
Acid Extractable Cobalt (Co)	mg/kg	12	1.0	5182307	24	1.0	3.0	1.0	16	1.0	5182130
Acid Extractable Copper (Cu)	mg/kg	38	2.0	5182307	45	2.0	7.9	2.0	34	2.0	5182130
Acid Extractable Iron (Fe)	mg/kg	57000	50	5182307	44000	50	14000	50	37000	50	5182130
Acid Extractable Lead (Pb)	mg/kg	41	0.50	5182307	31	0.50	10	0.50	27	0.50	5182130
Acid Extractable Lithium (Li)	mg/kg	17	2.0	5182307	41	2.0	5.8	2.0	26	2.0	5182130
Acid Extractable Manganese (Mn)	mg/kg	320	2.0	5182307	670	2.0	270	2.0	870	2.0	5182130
Acid Extractable Mercury (Hg)	mg/kg	6.6	0.10	5182307	0.13	0.10	<0.10	0.10	4.5	0.10	5182130
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	2.0	5182307	<2.0	2.0	<2.0	2.0	<2.0	2.0	5182130
Acid Extractable Nickel (Ni)	mg/kg	41	2.0	5182307	37	2.0	7.3	2.0	28	2.0	5182130
Acid Extractable Rubidium (Rb)	mg/kg	<2.0	2.0	5182307	4.4	2.0	2.7	2.0	4.3	2.0	5182130
Acid Extractable Selenium (Se)	mg/kg	<1.0	1.0	5182307	<1.0	1.0	<1.0	1.0	<1.0	1.0	5182130
Acid Extractable Silver (Ag)	mg/kg	<0.50	0.50	5182307	<0.50	0.50	<0.50	0.50	<0.50	0.50	5182130
Acid Extractable Strontium (Sr)	mg/kg	<5.0	5.0	5182307	<5.0	5.0	<5.0	5.0	5.3	5.0	5182130
Acid Extractable Thallium (Tl)	mg/kg	<0.10	0.10	5182307	<0.10	0.10	<0.10	0.10	<0.10	0.10	5182130
Acid Extractable Tin (Sn)	mg/kg	<2.0	2.0	5182307	<2.0	2.0	<2.0	2.0	<2.0	2.0	5182130
Acid Extractable Uranium (U)	mg/kg	0.37	0.10	5182307	0.71	0.10	0.33	0.10	0.71	0.10	5182130
Acid Extractable Vanadium (V)	mg/kg	9.4	2.0	5182307	19	2.0	14	2.0	18	2.0	5182130
Acid Extractable Zinc (Zn)	mg/kg	63	5.0	5182307	94	5.0	18	5.0	67	5.0	5182130

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7K9396
Report Date: 2017/09/28

Stantec Consulting Ltd
Client Project #: 121414898

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEO667		FEO668		FEO669	FEO670	FEO671		
Sampling Date		2017/09/21		2017/09/21		2017/09/21	2017/09/21	2017/09/21		
COC Number		D15412		D15412		D15412	D15412	D15412		
	UNITS	**GK17 BH 11**	**RDL**	**GK17 BH 12A**	**RDL**	**GK17 BH 13**	**GK17 BH 14**	**GK17 BH 15**	**RDL**	**QC Batch**
Metals										
Acid Extractable Aluminum (Al)	mg/kg	14000	10	19000	10	17000	14000	13000	10	5182130
Acid Extractable Antimony (Sb)	mg/kg	2.9	2.0	<2.0	2.0	<2.0	<2.0	<2.0	2.0	5182130
Acid Extractable Arsenic (As)	mg/kg	6900	200	2200	20	6600	11000	6500	200	5182130
Acid Extractable Barium (Ba)	mg/kg	43	5.0	29	5.0	28	57	34	5.0	5182130
Acid Extractable Beryllium (Be)	mg/kg	<2.0	2.0	<2.0	2.0	<2.0	<2.0	<2.0	2.0	5182130
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	2.0	<2.0	2.0	<2.0	2.9	<2.0	2.0	5182130
Acid Extractable Boron (B)	mg/kg	<50	50	<50	50	<50	<50	<50	50	5182130
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	0.30	<0.30	0.30	<0.30	0.52	0.31	0.30	5182130
Acid Extractable Chromium (Cr)	mg/kg	15	2.0	21	2.0	18	16	15	2.0	5182130
Acid Extractable Cobalt (Co)	mg/kg	18	1.0	29	1.0	21	29	17	1.0	5182130
Acid Extractable Copper (Cu)	mg/kg	24	2.0	53	2.0	46	46	33	2.0	5182130
Acid Extractable Iron (Fe)	mg/kg	42000	50	44000	50	45000	52000	33000	50	5182130
Acid Extractable Lead (Pb)	mg/kg	52	0.50	110	0.50	29	56	33	0.50	5182130
Acid Extractable Lithium (Li)	mg/kg	23	2.0	36	2.0	27	22	23	2.0	5182130
Acid Extractable Manganese (Mn)	mg/kg	1800	2.0	1900	2.0	810	1400	1200	2.0	5182130
Acid Extractable Mercury (Hg)	mg/kg	6.0	0.10	0.11	0.10	0.14	<0.10	0.19	0.10	5182130
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	2.0	<2.0	2.0	<2.0	<2.0	<2.0	2.0	5182130
Acid Extractable Nickel (Ni)	mg/kg	15	2.0	41	2.0	29	33	26	2.0	5182130
Acid Extractable Rubidium (Rb)	mg/kg	<2.0	2.0	2.5	2.0	2.9	2.9	3.4	2.0	5182130
Acid Extractable Selenium (Se)	mg/kg	<1.0	1.0	<1.0	1.0	<1.0	<1.0	<1.0	1.0	5182130
Acid Extractable Silver (Ag)	mg/kg	<0.50	0.50	<0.50	0.50	<0.50	<0.50	<0.50	0.50	5182130
Acid Extractable Strontium (Sr)	mg/kg	<5.0	5.0	7.7	5.0	7.3	11	12	5.0	5182130
Acid Extractable Thallium (Tl)	mg/kg	<0.10	0.10	0.10	0.10	<0.10	<0.10	<0.10	0.10	5182130
Acid Extractable Tin (Sn)	mg/kg	<2.0	2.0	<2.0	2.0	<2.0	<2.0	<2.0	2.0	5182130
Acid Extractable Uranium (U)	mg/kg	0.90	0.10	0.89	0.10	0.65	0.73	0.59	0.10	5182130
Acid Extractable Vanadium (V)	mg/kg	12	2.0	15	2.0	13	10	12	2.0	5182130
Acid Extractable Zinc (Zn)	mg/kg	57	5.0	84	5.0	71	72	69	5.0	5182130

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEO672		FEO673	FEO674			FEO675		
Sampling Date		2017/09/21		2017/09/21	2017/09/20			2017/09/21		
COC Number		D15412		D15412	D15412			D15412		
	UNITS	**GK17 BH 12B**	**RDL**	**GK17 BH 09B**	**GK17 BH 05B**	**RDL**	**QC Batch**	**GK17 BH 07B**	**RDL**	**QC Batch**
Metals										
Acid Extractable Aluminum (Al)	mg/kg	16000	10	20000	29000	10	5182130	14000	10	5182307
Acid Extractable Antimony (Sb)	mg/kg	<2.0	2.0	<2.0	<2.0	2.0	5182130	3.2	2.0	5182307
Acid Extractable Arsenic (As)	mg/kg	1400	20	470	340	2.0	5182130	14000	200	5182307
Acid Extractable Barium (Ba)	mg/kg	19	5.0	18	15	5.0	5182130	5.4	5.0	5182307
Acid Extractable Beryllium (Be)	mg/kg	<2.0	2.0	<2.0	<2.0	2.0	5182130	<2.0	2.0	5182307
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	2.0	<2.0	<2.0	2.0	5182130	<2.0	2.0	5182307
Acid Extractable Boron (B)	mg/kg	<50	50	<50	<50	50	5182130	<50	50	5182307
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	0.30	<0.30	<0.30	0.30	5182130	0.50	0.30	5182307
Acid Extractable Chromium (Cr)	mg/kg	20	2.0	18	29	2.0	5182130	29	2.0	5182307
Acid Extractable Cobalt (Co)	mg/kg	10	1.0	3.8	11	1.0	5182130	75	1.0	5182307
Acid Extractable Copper (Cu)	mg/kg	13	2.0	12	29	2.0	5182130	590	2.0	5182307
Acid Extractable Iron (Fe)	mg/kg	33000	50	38000	45000	50	5182130	41000	50	5182307
Acid Extractable Lead (Pb)	mg/kg	16	0.50	21	17	0.50	5182130	160	0.50	5182307
Acid Extractable Lithium (Li)	mg/kg	31	2.0	23	41	2.0	5182130	20	2.0	5182307
Acid Extractable Manganese (Mn)	mg/kg	540	2.0	280	560	2.0	5182130	200	2.0	5182307
Acid Extractable Mercury (Hg)	mg/kg	<0.10	0.10	0.19	0.20	0.10	5182130	11	0.10	5182307
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	2.0	<2.0	<2.0	2.0	5182130	<2.0	2.0	5182307
Acid Extractable Nickel (Ni)	mg/kg	18	2.0	8.8	30	2.0	5182130	110	2.0	5182307
Acid Extractable Rubidium (Rb)	mg/kg	4.2	2.0	6.0	5.3	2.0	5182130	<2.0	2.0	5182307
Acid Extractable Selenium (Se)	mg/kg	<1.0	1.0	1.4	1.2	1.0	5182130	<1.0	1.0	5182307
Acid Extractable Silver (Ag)	mg/kg	<0.50	0.50	<0.50	<0.50	0.50	5182130	<0.50	0.50	5182307
Acid Extractable Strontium (Sr)	mg/kg	5.0	5.0	<5.0	<5.0	5.0	5182130	<5.0	5.0	5182307
Acid Extractable Thallium (Tl)	mg/kg	<0.10	0.10	<0.10	<0.10	0.10	5182130	0.12	0.10	5182307
Acid Extractable Tin (Sn)	mg/kg	<2.0	2.0	<2.0	<2.0	2.0	5182130	<2.0	2.0	5182307
Acid Extractable Uranium (U)	mg/kg	0.42	0.10	0.53	0.73	0.10	5182130	0.94	0.10	5182307
Acid Extractable Vanadium (V)	mg/kg	14	2.0	22	19	2.0	5182130	9.1	2.0	5182307
Acid Extractable Zinc (Zn)	mg/kg	68	5.0	36	72	5.0	5182130	71	5.0	5182307

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7K9396
Report Date: 2017/09/28

Stantec Consulting Ltd
Client Project #: 121414898

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEO685		FEO686	FEO687		FEO688		
Sampling Date		2017/09/22		2017/09/22	2017/09/22		2017/09/21		
COC Number		D15413		D15413	D15413		D15413		
	UNITS	**BACKGROUND 01**	**QC Batch**	**BACKGROUND 02**	**BACKGROUND 03**	**RDL**	**DUP1**	**RDL**	**QC Batch**
Metals									
Acid Extractable Aluminum (Al)	mg/kg	18000	5182307	18000	16000	10	20000	10	5182323
Acid Extractable Antimony (Sb)	mg/kg	<2.0	5182307	<2.0	<2.0	2.0	<2.0	2.0	5182323
Acid Extractable Arsenic (As)	mg/kg	280	5182307	110	23	2.0	610	20	5182323
Acid Extractable Barium (Ba)	mg/kg	15	5182307	13	28	5.0	15	5.0	5182323
Acid Extractable Beryllium (Be)	mg/kg	<2.0	5182307	<2.0	<2.0	2.0	<2.0	2.0	5182323
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	5182307	<2.0	<2.0	2.0	<2.0	2.0	5182323
Acid Extractable Boron (B)	mg/kg	<50	5182307	<50	<50	50	<50	50	5182323
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	5182307	<0.30	<0.30	0.30	<0.30	0.30	5182323
Acid Extractable Chromium (Cr)	mg/kg	20	5182307	18	18	2.0	22	2.0	5182323
Acid Extractable Cobalt (Co)	mg/kg	6.8	5182307	3.1	11	1.0	10	1.0	5182323
Acid Extractable Copper (Cu)	mg/kg	19	5182307	11	21	2.0	32	2.0	5182323
Acid Extractable Iron (Fe)	mg/kg	31000	5182307	27000	26000	50	39000	50	5182323
Acid Extractable Lead (Pb)	mg/kg	22	5182307	12	18	0.50	18	0.50	5182323
Acid Extractable Lithium (Li)	mg/kg	29	5182307	21	26	2.0	33	2.0	5182323
Acid Extractable Manganese (Mn)	mg/kg	390	5182307	180	770	2.0	340	2.0	5182323
Acid Extractable Mercury (Hg)	mg/kg	0.13	5182307	0.14	0.11	0.10	3.4	0.10	5182323
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	5182307	<2.0	<2.0	2.0	<2.0	2.0	5182323
Acid Extractable Nickel (Ni)	mg/kg	17	5182307	8.5	20	2.0	23	2.0	5182323
Acid Extractable Rubidium (Rb)	mg/kg	5.9	5182307	5.0	7.3	2.0	2.6	2.0	5182323
Acid Extractable Selenium (Se)	mg/kg	<1.0	5182307	<1.0	<1.0	1.0	<1.0	1.0	5182323
Acid Extractable Silver (Ag)	mg/kg	<0.50	5182307	<0.50	<0.50	0.50	<0.50	0.50	5182323
Acid Extractable Strontium (Sr)	mg/kg	<5.0	5182307	<5.0	6.0	5.0	6.7	5.0	5182323
Acid Extractable Thallium (Tl)	mg/kg	<0.10	5182307	<0.10	<0.10	0.10	<0.10	0.10	5182323
Acid Extractable Tin (Sn)	mg/kg	<2.0	5182307	<2.0	<2.0	2.0	<2.0	2.0	5182323
Acid Extractable Uranium (U)	mg/kg	0.56	5182307	0.61	0.87	0.10	0.44	0.10	5182323
Acid Extractable Vanadium (V)	mg/kg	18	5182307	19	17	2.0	14	2.0	5182323
Acid Extractable Zinc (Zn)	mg/kg	46	5182307	30	57	5.0	99	5.0	5182323

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEO689		
Sampling Date		2017/09/22		
COC Number		D15413		
	UNITS	**DUP3**	**RDL**	**QC Batch**
Metals				
Acid Extractable Aluminum (Al)	mg/kg	13000	10	5182130
Acid Extractable Antimony (Sb)	mg/kg	<2.0	2.0	5182130
Acid Extractable Arsenic (As)	mg/kg	37	2.0	5182130
Acid Extractable Barium (Ba)	mg/kg	55	5.0	5182130
Acid Extractable Beryllium (Be)	mg/kg	<2.0	2.0	5182130
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	2.0	5182130
Acid Extractable Boron (B)	mg/kg	<50	50	5182130
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	0.30	5182130
Acid Extractable Chromium (Cr)	mg/kg	15	2.0	5182130
Acid Extractable Cobalt (Co)	mg/kg	8.7	1.0	5182130
Acid Extractable Copper (Cu)	mg/kg	7.9	2.0	5182130
Acid Extractable Iron (Fe)	mg/kg	29000	50	5182130
Acid Extractable Lead (Pb)	mg/kg	14	0.50	5182130
Acid Extractable Lithium (Li)	mg/kg	33	2.0	5182130
Acid Extractable Manganese (Mn)	mg/kg	460	2.0	5182130
Acid Extractable Mercury (Hg)	mg/kg	0.14	0.10	5182130
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	2.0	5182130
Acid Extractable Nickel (Ni)	mg/kg	23	2.0	5182130
Acid Extractable Rubidium (Rb)	mg/kg	7.2	2.0	5182130
Acid Extractable Selenium (Se)	mg/kg	<1.0	1.0	5182130
Acid Extractable Silver (Ag)	mg/kg	<0.50	0.50	5182130
Acid Extractable Strontium (Sr)	mg/kg	9.7	5.0	5182130
Acid Extractable Thallium (Tl)	mg/kg	<0.10	0.10	5182130
Acid Extractable Tin (Sn)	mg/kg	<2.0	2.0	5182130
Acid Extractable Uranium (U)	mg/kg	1.1	0.10	5182130
Acid Extractable Vanadium (V)	mg/kg	18	2.0	5182130
Acid Extractable Zinc (Zn)	mg/kg	39	5.0	5182130

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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MERCURY BY COLD VAPOUR AA (WATER)

Maxxam ID		FEO690		
Sampling Date		2017/09/22		
COC Number		D15413		
	UNITS	**MOOSE RIVER**	**RDL**	**QC Batch**
Metals				
Total Mercury (Hg)	ug/L	<0.013	0.013	5180639

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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ELEMENTS BY ICP/MS (WATER)

Maxxam ID		FEO690		
Sampling Date		2017/09/22		
COC Number		D15413		
	UNITS	**MOOSE RIVER**	**RDL**	**QC Batch**
Metals				
Total Aluminum (Al)	ug/L	250	5.0	5181964
Total Antimony (Sb)	ug/L	<1.0	1.0	5181964
Total Arsenic (As)	ug/L	17	1.0	5181964
Total Barium (Ba)	ug/L	5.8	1.0	5181964
Total Beryllium (Be)	ug/L	<1.0	1.0	5181964
Total Bismuth (Bi)	ug/L	<2.0	2.0	5181964
Total Boron (B)	ug/L	<50	50	5181964
Total Cadmium (Cd)	ug/L	0.014	0.010	5181964
Total Calcium (Ca)	ug/L	1600	100	5181964
Total Chromium (Cr)	ug/L	<1.0	1.0	5181964
Total Cobalt (Co)	ug/L	<0.40	0.40	5181964
Total Copper (Cu)	ug/L	<2.0	2.0	5181964
Total Iron (Fe)	ug/L	960	50	5181964
Total Lead (Pb)	ug/L	<0.50	0.50	5181964
Total Magnesium (Mg)	ug/L	570	100	5181964
Total Manganese (Mn)	ug/L	70	2.0	5181964
Total Molybdenum (Mo)	ug/L	<2.0	2.0	5181964
Total Nickel (Ni)	ug/L	<2.0	2.0	5181964
Total Phosphorus (P)	ug/L	<100	100	5181964
Total Potassium (K)	ug/L	210	100	5181964
Total Selenium (Se)	ug/L	<1.0	1.0	5181964
Total Silver (Ag)	ug/L	<0.10	0.10	5181964
Total Sodium (Na)	ug/L	2800	100	5181964
Total Strontium (Sr)	ug/L	9.8	2.0	5181964
Total Thallium (Tl)	ug/L	<0.10	0.10	5181964
Total Tin (Sn)	ug/L	<2.0	2.0	5181964
Total Titanium (Ti)	ug/L	2.1	2.0	5181964
Total Uranium (U)	ug/L	<0.10	0.10	5181964
Total Vanadium (V)	ug/L	<2.0	2.0	5181964
Total Zinc (Zn)	ug/L	<5.0	5.0	5181964

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.0°C

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5180639	Total Mercury (Hg)	2017/09/26	105	80 - 120	104	80 - 120	<0.013	ug/L	NC	20
5181964	Total Aluminum (Al)	2017/09/26	104	80 - 120	102	80 - 120	<5.0	ug/L	11	20
5181964	Total Antimony (Sb)	2017/09/26	103	80 - 120	99	80 - 120	<1.0	ug/L	NC	20
5181964	Total Arsenic (As)	2017/09/26	100	80 - 120	96	80 - 120	<1.0	ug/L	NC	20
5181964	Total Barium (Ba)	2017/09/26	101	80 - 120	97	80 - 120	<1.0	ug/L	5.9	20
5181964	Total Beryllium (Be)	2017/09/26	99	80 - 120	96	80 - 120	<1.0	ug/L		
5181964	Total Bismuth (Bi)	2017/09/26	107	80 - 120	103	80 - 120	<2.0	ug/L		
5181964	Total Boron (B)	2017/09/26	101	80 - 120	100	80 - 120	<50	ug/L	NC	20
5181964	Total Cadmium (Cd)	2017/09/26	102	80 - 120	96	80 - 120	<0.010	ug/L	2.2	20
5181964	Total Calcium (Ca)	2017/09/26	105	80 - 120	102	80 - 120	<100	ug/L	1.0	20
5181964	Total Chromium (Cr)	2017/09/26	102	80 - 120	98	80 - 120	<1.0	ug/L	3.8	20
5181964	Total Cobalt (Co)	2017/09/26	102	80 - 120	97	80 - 120	<0.40	ug/L		
5181964	Total Copper (Cu)	2017/09/26	100	80 - 120	96	80 - 120	<2.0	ug/L	3.2	20
5181964	Total Iron (Fe)	2017/09/26	105	80 - 120	102	80 - 120	<50	ug/L	2.6	20
5181964	Total Lead (Pb)	2017/09/26	101	80 - 120	97	80 - 120	<0.50	ug/L	NC	20
5181964	Total Magnesium (Mg)	2017/09/26	104	80 - 120	101	80 - 120	<100	ug/L	0.31	20
5181964	Total Manganese (Mn)	2017/09/26	103	80 - 120	99	80 - 120	<2.0	ug/L	10	20
5181964	Total Molybdenum (Mo)	2017/09/26	109	80 - 120	102	80 - 120	<2.0	ug/L		
5181964	Total Nickel (Ni)	2017/09/26	101	80 - 120	98	80 - 120	<2.0	ug/L	3.5	20
5181964	Total Phosphorus (P)	2017/09/26	107	80 - 120	103	80 - 120	<100	ug/L		
5181964	Total Potassium (K)	2017/09/26	105	80 - 120	102	80 - 120	<100	ug/L	0.73	20
5181964	Total Selenium (Se)	2017/09/26	102	80 - 120	97	80 - 120	<1.0	ug/L	NC	20
5181964	Total Silver (Ag)	2017/09/26	101	80 - 120	97	80 - 120	<0.10	ug/L		
5181964	Total Sodium (Na)	2017/09/26	102	80 - 120	98	80 - 120	<100	ug/L	0.51	20
5181964	Total Strontium (Sr)	2017/09/26	103	80 - 120	97	80 - 120	<2.0	ug/L	0.95	20
5181964	Total Thallium (Tl)	2017/09/26	107	80 - 120	101	80 - 120	<0.10	ug/L		
5181964	Total Tin (Sn)	2017/09/26	109	80 - 120	105	80 - 120	<2.0	ug/L		
5181964	Total Titanium (Ti)	2017/09/26	104	80 - 120	103	80 - 120	<2.0	ug/L		
5181964	Total Uranium (U)	2017/09/26	109	80 - 120	103	80 - 120	<0.10	ug/L	NC	20
5181964	Total Vanadium (V)	2017/09/26	102	80 - 120	97	80 - 120	<2.0	ug/L		
5181964	Total Zinc (Zn)	2017/09/26	101	80 - 120	99	80 - 120	<5.0	ug/L	3.2	20
5182130	Acid Extractable Aluminum (Al)	2017/09/27					<10	mg/kg	0.77	35

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5182130	Acid Extractable Antimony (Sb)	2017/09/27	100	75 - 125	106	75 - 125	<2.0	mg/kg	NC	35
5182130	Acid Extractable Arsenic (As)	2017/09/27	NC	75 - 125	102	75 - 125	<2.0	mg/kg	11	35
5182130	Acid Extractable Barium (Ba)	2017/09/27	NC	75 - 125	104	75 - 125	<5.0	mg/kg	0.21	35
5182130	Acid Extractable Beryllium (Be)	2017/09/27	109	75 - 125	106	75 - 125	<2.0	mg/kg	NC	35
5182130	Acid Extractable Bismuth (Bi)	2017/09/27	108	75 - 125	104	75 - 125	<2.0	mg/kg	NC	35
5182130	Acid Extractable Boron (B)	2017/09/27	90	75 - 125	108	75 - 125	<50	mg/kg	NC	35
5182130	Acid Extractable Cadmium (Cd)	2017/09/27	105	75 - 125	103	75 - 125	<0.30	mg/kg	NC	35
5182130	Acid Extractable Chromium (Cr)	2017/09/27	107	75 - 125	100	75 - 125	<2.0	mg/kg	0.12	35
5182130	Acid Extractable Cobalt (Co)	2017/09/27	108	75 - 125	101	75 - 125	<1.0	mg/kg	1.4	35
5182130	Acid Extractable Copper (Cu)	2017/09/27	103	75 - 125	97	75 - 125	<2.0	mg/kg	0.63	35
5182130	Acid Extractable Iron (Fe)	2017/09/27					<50	mg/kg	3.0	35
5182130	Acid Extractable Lead (Pb)	2017/09/27	NC	75 - 125	103	75 - 125	<0.50	mg/kg	4.2	35
5182130	Acid Extractable Lithium (Li)	2017/09/27	115	75 - 125	107	75 - 125	<2.0	mg/kg	1.5	35
5182130	Acid Extractable Manganese (Mn)	2017/09/27	NC	75 - 125	102	75 - 125	<2.0	mg/kg	0.94	35
5182130	Acid Extractable Mercury (Hg)	2017/09/27	103	75 - 125	103	75 - 125	<0.10	mg/kg	18	35
5182130	Acid Extractable Molybdenum (Mo)	2017/09/27	104	75 - 125	105	75 - 125	<2.0	mg/kg	NC	35
5182130	Acid Extractable Nickel (Ni)	2017/09/27	103	75 - 125	101	75 - 125	<2.0	mg/kg	3.3	35
5182130	Acid Extractable Rubidium (Rb)	2017/09/27	102	75 - 125	103	75 - 125	<2.0	mg/kg	1.2	35
5182130	Acid Extractable Selenium (Se)	2017/09/27	102	75 - 125	102	75 - 125	<1.0	mg/kg	NC	35
5182130	Acid Extractable Silver (Ag)	2017/09/27	105	75 - 125	101	75 - 125	<0.50	mg/kg	NC	35
5182130	Acid Extractable Strontium (Sr)	2017/09/27	109	75 - 125	104	75 - 125	<5.0	mg/kg	5.9	35
5182130	Acid Extractable Thallium (Tl)	2017/09/27	109	75 - 125	106	75 - 125	<0.10	mg/kg	NC	35
5182130	Acid Extractable Tin (Sn)	2017/09/27	111	75 - 125	106	75 - 125	<2.0	mg/kg	15	35
5182130	Acid Extractable Uranium (U)	2017/09/27	111	75 - 125	105	75 - 125	<0.10	mg/kg	4.7	35
5182130	Acid Extractable Vanadium (V)	2017/09/27	104	75 - 125	103	75 - 125	<2.0	mg/kg	5.0	35
5182130	Acid Extractable Zinc (Zn)	2017/09/27	NC	75 - 125	104	75 - 125	<5.0	mg/kg	34	35
5182307	Acid Extractable Aluminum (Al)	2017/09/27					<10	mg/kg	0.96	35
5182307	Acid Extractable Antimony (Sb)	2017/09/27	99	75 - 125	112	75 - 125	<2.0	mg/kg	NC	35
5182307	Acid Extractable Arsenic (As)	2017/09/27	NC	75 - 125	103	75 - 125	<2.0	mg/kg	14	35
5182307	Acid Extractable Barium (Ba)	2017/09/27	113	75 - 125	106	75 - 125	<5.0	mg/kg	6.0	35
5182307	Acid Extractable Beryllium (Be)	2017/09/27	104	75 - 125	104	75 - 125	<2.0	mg/kg	NC	35
5182307	Acid Extractable Bismuth (Bi)	2017/09/27	108	75 - 125	109	75 - 125	<2.0	mg/kg	NC	35

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5182307	Acid Extractable Boron (B)	2017/09/27	95	75 - 125	108	75 - 125	<50	mg/kg	NC	35
5182307	Acid Extractable Cadmium (Cd)	2017/09/27	103	75 - 125	104	75 - 125	<0.30	mg/kg	NC	35
5182307	Acid Extractable Chromium (Cr)	2017/09/27	104	75 - 125	100	75 - 125	<2.0	mg/kg	2.1	35
5182307	Acid Extractable Cobalt (Co)	2017/09/27	102	75 - 125	101	75 - 125	<1.0	mg/kg	2.0	35
5182307	Acid Extractable Copper (Cu)	2017/09/27	NC	75 - 125	97	75 - 125	<2.0	mg/kg	1.8	35
5182307	Acid Extractable Iron (Fe)	2017/09/27					<50	mg/kg	2.7	35
5182307	Acid Extractable Lead (Pb)	2017/09/27	108	75 - 125	106	75 - 125	<0.50	mg/kg	1.3	35
5182307	Acid Extractable Lithium (Li)	2017/09/27	113	75 - 125	110	75 - 125	<2.0	mg/kg	2.8	35
5182307	Acid Extractable Manganese (Mn)	2017/09/27	NC	75 - 125	102	75 - 125	<2.0	mg/kg	0.65	35
5182307	Acid Extractable Mercury (Hg)	2017/09/27	102	75 - 125	106	75 - 125	<0.10	mg/kg	NC	35
5182307	Acid Extractable Molybdenum (Mo)	2017/09/27	107	75 - 125	105	75 - 125	<2.0	mg/kg	NC	35
5182307	Acid Extractable Nickel (Ni)	2017/09/27	102	75 - 125	101	75 - 125	<2.0	mg/kg	3.9	35
5182307	Acid Extractable Rubidium (Rb)	2017/09/27	104	75 - 125	104	75 - 125	<2.0	mg/kg	8.2	35
5182307	Acid Extractable Selenium (Se)	2017/09/27	103	75 - 125	101	75 - 125	<1.0	mg/kg	NC	35
5182307	Acid Extractable Silver (Ag)	2017/09/27	103	75 - 125	102	75 - 125	<0.50	mg/kg	NC	35
5182307	Acid Extractable Strontium (Sr)	2017/09/27	107	75 - 125	104	75 - 125	<5.0	mg/kg	NC	35
5182307	Acid Extractable Thallium (Tl)	2017/09/27	107	75 - 125	109	75 - 125	<0.10	mg/kg	NC	35
5182307	Acid Extractable Tin (Sn)	2017/09/27	109	75 - 125	112	75 - 125	<2.0	mg/kg	NC	35
5182307	Acid Extractable Uranium (U)	2017/09/27	108	75 - 125	108	75 - 125	<0.10	mg/kg	7.0	35
5182307	Acid Extractable Vanadium (V)	2017/09/27	105	75 - 125	103	75 - 125	<2.0	mg/kg	4.2	35
5182307	Acid Extractable Zinc (Zn)	2017/09/27	NC	75 - 125	100	75 - 125	<5.0	mg/kg	2.5	35
5182323	Acid Extractable Aluminum (Al)	2017/09/27					<10	mg/kg	5.3	35
5182323	Acid Extractable Antimony (Sb)	2017/09/27	87	75 - 125	107	75 - 125	<2.0	mg/kg	NC	35
5182323	Acid Extractable Arsenic (As)	2017/09/27	NC	75 - 125	98	75 - 125	<2.0	mg/kg	12	35
5182323	Acid Extractable Barium (Ba)	2017/09/27	106	75 - 125	98	75 - 125	<5.0	mg/kg	11	35
5182323	Acid Extractable Beryllium (Be)	2017/09/27	106	75 - 125	90	75 - 125	<2.0	mg/kg	NC	35
5182323	Acid Extractable Bismuth (Bi)	2017/09/27	104	75 - 125	104	75 - 125	<2.0	mg/kg	NC	35
5182323	Acid Extractable Boron (B)	2017/09/27	70 (1)	75 - 125	90	75 - 125	<50	mg/kg	NC	35
5182323	Acid Extractable Cadmium (Cd)	2017/09/27	103	75 - 125	101	75 - 125	<0.30	mg/kg	NC	35
5182323	Acid Extractable Chromium (Cr)	2017/09/27	107	75 - 125	94	75 - 125	<2.0	mg/kg	9.6	35
5182323	Acid Extractable Cobalt (Co)	2017/09/27	105	75 - 125	95	75 - 125	<1.0	mg/kg	11	35
5182323	Acid Extractable Copper (Cu)	2017/09/27	107	75 - 125	92	75 - 125	<2.0	mg/kg	26	35

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5182323	Acid Extractable Iron (Fe)	2017/09/27					<50	mg/kg	6.5	35
5182323	Acid Extractable Lead (Pb)	2017/09/27	104	75 - 125	100	75 - 125	<0.50	mg/kg	1.1	35
5182323	Acid Extractable Lithium (Li)	2017/09/27	110	75 - 125	98	75 - 125	<2.0	mg/kg	3.3	35
5182323	Acid Extractable Manganese (Mn)	2017/09/27	NC	75 - 125	101	75 - 125	<2.0	mg/kg	16	35
5182323	Acid Extractable Mercury (Hg)	2017/09/27	99	75 - 125	101	75 - 125	<0.10	mg/kg	NC	35
5182323	Acid Extractable Molybdenum (Mo)	2017/09/27	104	75 - 125	103	75 - 125	<2.0	mg/kg	NC	35
5182323	Acid Extractable Nickel (Ni)	2017/09/27	107	75 - 125	95	75 - 125	<2.0	mg/kg	11	35
5182323	Acid Extractable Rubidium (Rb)	2017/09/27	100	75 - 125	103	75 - 125	<2.0	mg/kg	5.1	35
5182323	Acid Extractable Selenium (Se)	2017/09/27	104	75 - 125	99	75 - 125	<1.0	mg/kg	NC	35
5182323	Acid Extractable Silver (Ag)	2017/09/27	104	75 - 125	103	75 - 125	<0.50	mg/kg	NC	35
5182323	Acid Extractable Strontium (Sr)	2017/09/27	107	75 - 125	100	75 - 125	<5.0	mg/kg	NC	35
5182323	Acid Extractable Thallium (Tl)	2017/09/27	105	75 - 125	104	75 - 125	<0.10	mg/kg	NC	35
5182323	Acid Extractable Tin (Sn)	2017/09/27	102	75 - 125	103	75 - 125	<2.0	mg/kg	NC	35
5182323	Acid Extractable Uranium (U)	2017/09/27	106	75 - 125	101	75 - 125	<0.10	mg/kg	4.0	35
5182323	Acid Extractable Vanadium (V)	2017/09/27	106	75 - 125	95	75 - 125	<2.0	mg/kg	0.37	35
5182323	Acid Extractable Zinc (Zn)	2017/09/27	109	75 - 125	101	75 - 125	<5.0	mg/kg	9.7	35

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery is within QC acceptance limits. < 10 % of compounds in multi-component analysis in violation.

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Maxxam Job #: B7K9396
Report Date: 2017/09/28

Stantec Consulting Ltd
Client Project #: 121414898

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Eric Dearman, Scientific Specialist

Kevin MacDonald, Inorganics Supervisor

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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APPENDIX B4

Additional Phase II Environmental Site Assessment at the Former Moose River and Former G&K Mining Stamp Mills, Touquoy Gold Project, Moose River, NS

March 15, 2018
File: 121619250

Attention: James Millard, M.Sc., P.Geo.
Atlantic Gold Corporation
6749 Moose River Road, RR#2
Middle Musquodoboit, NS
B0N 1XO

Dear Mr. Millard,

Reference: Additional Phase II Environmental Site Assessment at the Former Moose River and Former G&K Mining Stamp Mills, Touquoy Gold Project, Moose River, NS

Background

Stantec Consulting Ltd. (Stantec) conducted a Phase I Environmental Site Assessment[1] (ESA) and then a Limited Phase II ESA[2] at the Touquoy Gold Project (the 'Site') in Moose River, Halifax County, NS in September 2017. The purpose of the limited Phase II ESA was to assess soil and groundwater conditions at the Site with respect to the former Moose River Gold Mines Stamp Mill, the former G&K Mining Stamp Mill, and associated tailings. Significant delineation work has already been conducted by Atlantic Gold in 2016, the investigation presented herein, builds upon these previous works. The Phase II ESA identified the following:

- Possible tailings were observed at eight of the thirty-three boreholes. Four of these boreholes were located outside of the previously estimated extent of tailings piles.
- Soil samples containing elevated concentrations of arsenic were collected from 21 of the 30 boreholes advanced in the areas of the two former stamp mills.
- Areas containing elevated gold concentrations tend to have elevated concentrations of arsenic due to the presence of arsenopyrite that is common in the geology of the area (Atlantic Gold, 2015). Therefore, elevated arsenic concentrations are expected to be present across the Site in historic tailings, historic waste rock/debris, and in near surface bedrock on or adjacent to the ore body.
- Concentrations of other metals parameters (including mercury) were not detected above the Tier 1 Environmental Quality Standards (EQS) in the soil samples tested as part of this

[1] Stantec. Phase I Environmental Site Assessment Historical Tailings Deposits at the Atlantic Gold Touquoy Gold Project, Moose River Gold Mines NS. Prepared for Atlantic Gold Corporation. October 6, 2017.
[2] Stantec. Draft Report: Limited Phase II Environmental Site Assessment. Moose River Gold Mines NS. Prepared for Atlantic Gold Corporation. September 29, 2017.

program. However, elevated concentrations (in comparison with the background sample results) are present. Mercury was commonly used in the amalgamation process of stamp mills.

- The concentrations of aluminum, arsenic, cadmium, and iron detected at the surface water sample collected from Moose River are within the range or slightly elevated in comparison with background surface water data; however, these concentrations are considered to be naturally occurring.
- Groundwater assessment was not able to be completed as part of this project because of equipment meeting refusal and an absence of shallow groundwater.

After discussions with Nova Scotia Environment (NSE), additional Phase II ESA work was undertaken to assist with determining appropriate remediation level for arsenic (through the collection of additional background samples) additional assessment of soil to further define the extent of elevated metals, and an assessment of groundwater conditions. Areas where additional delineation was required were selected for further sampling and analysis, and more background samples were taken to increase the understanding of the background values for arsenic and mercury in the area. The installation of future groundwater monitoring wells is planned as part of the future scope of work subsequent to remediation.

Updated Information Requested by NSE

At the request of NSE, this document has been updated to add several requested items. The soil descriptions that have been completed previously for the Phase II ESA work have been revised based on the guidance contained within this document, and are presented within Attachment D. Additionally, the raw laboratory data for all soil samples taken as part of the Phase II ESA work, and the additional Phase II ESA assessment has been included within Appendix E of this document. Further discussion regarding the acquisition of additional background samples, and the installation of groundwater monitoring wells in appropriate locations has also been included within this document.

Approach to Delineation of Tailings and Tailings Impacts

As discussed in the previous reports[1,2,3], the area of investigation is a site of historical gold exploration, mining and milling. Stamp mills, which are large mechanical crushers typically operated by water power or steam, were used to crush raw ore in a variety of locations. In addition, surficial deposits of waste rock and ore have historically been deposited in various locations in the area. Identified historical stamp mill locations are displayed in Attachment A, Figures 1 through 4 located within Attachment A at the end of this document.

A methodology for the identification of historical tailings was developed. Guidance was sought from available government and academic sources regarding Nova Scotia specific methodology for tailings identification. This methodology is presented at the end of this document within Appendix B, and was used for this assessment. Visual delineation from observations during testing pitting, combined with chemical analysis was used in conjunction with the previous historical

investigations and reports to further refine and delineate tailings and tailings impacts at the former Moose River Gold Mines Stamp Mill and the former G&K Mining Stamp Mill locations. This assessment included the use of the 126 previous samples taken by Atlantic Gold at the Moose River and G&K sites[3].

It should be noted that the additional assessment work did not include a groundwater assessment component at this time. It is the intent of Atlantic Gold to install groundwater wells in appropriate locations subsequent to remediation activities to confirm the results of remediation. As such, discussion of potential impacts to groundwater from the presence of historical tailings is not contained within this document, and will be addressed at a later date.

Methodology

A site reconnaissance was conducted by Stantec on September 19, 2017 to identify the former stamp mill locations, tailings piles, and proposed borehole locations.

Boreholes were advanced to a maximum depth of 1.2 m below ground surface using a hand auger and shovels. Samples were collected for logging the characteristics of the materials and for analytical testing. Soil samples were collected directly from the standard augers at indications of tailings or changes in stratigraphy. Samples were placed in laboratory supplied containers for potential laboratory analyses.

The samples were collected using sample jars provided by the laboratory provider (Maxxam) and were filled completely with soil. They were submitted to the laboratory within the recommended hold times.

Materials retrieved from the drilling operation were logged by Stantec personnel. The texture and composition of materials and the visual presence of historical mine tailings or other indications of potential impacts were recorded as per the guidance provided in Appendix B. The location of each borehole was recorded using a hand-held GPS with sub-meter accuracy. This data was used to place the borehole locations on the site plans.

All samples were collected following strict Stantec sampling procedures. Samples were uniquely labelled, and control was maintained through use of chain of custody forms. All samples were collected in laboratory supplied containers and preserved in insulated coolers. Appropriate sampling QA/QC procedures were adhered to at all times.

Field Program and Results

[3] Pelley, Drew. Delineation of Historic Gold Mine Tailings. Touquoy Gold Project. Moose River, Nova Scotia. Prepared for Atlantic Gold. February 2016.

March 15, 2018
James Millard, M.Sc., P.Geo.
Reference: Additional Phase II Environmental Site Assessment at the Former Moose River and Former G&K Mining Stamp Mills, Touquoy Gold Project, Moose River, NS

Due to the high variability in arsenic and mercury concentrations found in the initial investigation, additional background sample locations were selected by field staff in appropriate locations to assist with understanding the natural arsenic and mercury background concentrations around the investigation areas. Seventeen additional delineation test pits and five background samples were excavated between November 27 and 29, 2017. The locations of the test pits are shown on Figures 1 through 4, located in Attachment A at the end of this document. The samples from the test pits were submitted to Maxxam Analytics, Bedford, NS, SCC-Accredited Laboratory No. 161, for analysis of metals (including mercury). A summary of the laboratory analysis, including all previous samples taken by Stantec, is included within Attachment E, with the raw laboratory results located at the end of Attachment E.

The background arsenic concentrations ranged from 5.3 to 800 mg/kg. This is a significant range, but not unexpected given the geology of the area and the presence of arsenopyrite (Stantec, 2017). The background mercury concentrations ranged from <0.10 to 0.26 mg/kg. As a general approach, the maximum background concentration values for mercury and arsenic (0.26 mg/kg and 800 mg/kg respectively) were used as an identifier for the potential presence of tailings. It is also noted that elevated arsenopyrite can originate from a number of potential sources including proximity to outcropping ore, and historical waste rock and depress, as well as from historic tailings deposition.

Metals parameters (apart from arsenic), were either not detected or were detected at concentrations that did not exceed the Tier 1 EQS. Arsenic concentrations in one or more soil samples from 15 of the 17 test pits were found to exceed the Tier 1 EQS. Arsenic concentrations in one or more soil samples from 7 of the 17 test pits were found to exceed the identified background level for arsenic. Mercury concentrations in one or more soil samples from 8 of the 17 test pits were found to exceed the maximum background concentration.

Table 1, located in Attachment D, presents a summary of the physical description of the material encountered while obtaining samples. Using visual delineation obtained during the field visit, the approximate extent of tailings is shown on the attached Site Plans (Attachment A, Figures 1 through 4). The laboratory results for arsenic and mercury are displayed on the site plans, with each sample location being colour coded to show if there was an exceedance of the background levels for mercury or arsenic

The extents of the impacted area at each mill site have been modified from the original delineation. Increased certainty in background concentrations, combined with additional sample locations, has allowed further refinement. It should be noted that an area to the west of the G&K Stamp Mill did not display elevated mercury levels or visual indications of tailings, but still contained elevated arsenic levels as compared to the known local background. These areas may be impacted by the previous deposition of non-tailings waste material, as well as ore outcroppings that contain elevated arsenic. It should be noted that the approximate extent of tailings impacts at the former G&K Stamp Mill is encroaching the former Colonial Mining Company Stamp Mill and the former Touquoy Stamp Mill.

Recommendations

Due to the age of the tailings deposits, and the potential intermixing of tailings with natural materials and deposited waste rock, delineation of the extents of tailings impacts is an involved process. Firmly defining the extents of tailings impacts would require significantly more work, due to the age and complex deposition inherent to stamp mills.

The Industrial Approval[4] requires the removal of all tailings impacted material that is affected by project activities. Given this, and the future land use planned for each site, a proactive and comprehensive remediation process is recommended.

Groundwater wells should be installed in appropriate location for delineation purposes, to delineate and to understand any tailings impacts to the groundwater in each area. These wells should be tested for general chemistry and metals, and the results should be used to modify remediation activities, as required.

At the request of NSE, additional background samples and delineation activities should be undertaken to ensure a thorough understanding of the arsenic background in the area. It is recommended that at least six additional arsenic background samples (three at each site) be taken to increase the reliability of the background arsenic assessment.

It is recommended that the areas identified in this document that intersect with planned project activities, be remediated by the removal of tailings and historically impacted materials. Areas of identified elevated arsenic, which have not been positively identified as being derived from tailings impacts, should be included in designing remedial activities. This material should be contained within an appropriate and approved containment system, or treated offsite in a manner acceptable to NSE. These materials should be appropriately transported and disposed of in accordance with the Historical Tailings Management Plan currently being developed.

The remediation should be supervised by a qualified environmental professional, who should direct the removal of tailings to the extents presented in this document, while using physical properties of the tailing as a field guide during tailings impacted material excavation. It is recommended that confirmatory soil samples be collected during remediation at the extents of the pit, to ensure that all tailings and soil impacted by tailings are removed and disposed of in an appropriate disposal facility. In addition, it is recommended that additional samples be taken along the horizontal extents of each site, to enhance the reliability of the horizontal delineation of

[4] Nova Scotia Environment. Approval # 2012-084244-03. July 13, 2017.

the extents of the tailings, and provide additional assurance to regulators that the extents of the historic tailings are known. These samples should be tested for presence of metals, including mercury and arsenic that exceed the applicable remedial criteria.

This method of remediation would allow the removal of impacted materials in an efficient and adaptive manner, fulfilling Atlantic Golds approval requirements.

LIMITATION OF LIABILITY

This report was prepared for the sole benefit of Atlantic Gold Corporation. This report may not be used by any other person or entity without the express written consent of Atlantic Gold Corporation and Stantec Consulting Ltd. Any use which a third party makes of the report, or any reliance on decisions made based on it, are the responsibility of such third parties.

Stantec Consulting Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on the report.

Some of the information presented in this report was provided through existing documents and interviews. In certain instances, Stantec Consulting Ltd. was required to assume that the information provided is accurate.

The information and conclusions contained in the report were based upon work undertaken by trained professional and technical staff in accordance with generally accepted engineering and scientific practices current at the time the work was performed.

The statements presented will represent the best judgement of Stantec Consulting Ltd. based on the data obtained during the assessments. Due to the nature of assessment and the limited data available, Stantec Consulting Ltd. cannot warrant against undiscovered environmental liabilities and/or future claims associated with these storage tanks. Conclusions and statements presented in our deliverables should not be construed as legal advice.

Since the purpose of this Engineering Report is to identify compliance with respect to applicable regulations, the identification of Site conditions which may pose a non-environmental risk to buildings or people on the Site is beyond the scope of this assessment. Stantec Consulting Ltd. accepts no responsibility for damages, if any, suffered as a result of any non-environmental risk.

Should additional information become available which differs significantly from our understanding of conditions presented in this report, we request that this information be brought to our attention so that we may reassess the conclusions provided herein.

January 15, 2018
James Millard, M.Sc., P.Geo.
Reference: Additional Phase II Environmental Site Assessment at the Former Moose River and Former G&K Mining Stamp Mills, Touquoy Gold Project, Moose River, NS

We trust this meets with your requirements. Should you have any questions or require additional information, please contact the undersigned.

Sincerely,

STANTEC CONSULTING LTD.	**STANTEC CONSULTING LTD.**
Morgan Schauerte Atlantic Mining Sector Lead Phone: 902-468-7777 morgan.schauerte@stantec.com	Michael Charles, P.Eng Senior Principal Remediation Phone: 902-468-7777 michael.charles@stantec.com

Attachment: Attachment A – Figures
Attachment B – Methodology for Tailings Identification
Attachment C – Sample Photographs
Attachment D – Borehole Descriptions
Attachment E – Chemical Analysis Results

March 15, 2018
James Millard, M.Sc., P.Geo.
Reference: Additional Phase II Environmental Site Assessment at the Former Moose River and Former G&K Mining Stamp Mills, Touquoy Gold Project, Moose River, NS

Attachments

Attachment A

Figures

V:\1214\active\121414898\03_data\gis_cad\gis\mapping\mxd\ST_NS_121414898-013_MR_Mercury.mxd mhuskinsshupe

MR-17-BH-10
0.3

MR-17-BH-11
< 0.1

MR-17-BH-12
< 0.1

MR-17-BH-17
< 0.1

MR-17-BH-09
0.38

Former Moose River Gold Mines Stamp Mill

MR-17-BH-16
0.15

MR-17-BH-08
1.2

MR-17-BH-18
< 0.1

MR-17-BH-13
< 0.1

MR-17-BH-20
< 0.1

MR-17-BH-19
0.36

MR-17-BH-01
8.1

MR-17-BH-04
0.24

MR-17-BH-14
< 0.1

MR-17-BH-21
2.1

MR-17-BH-03
0.38

MR-17-BH-02
6.3

MR-17-BH-15
8.8

MR-17-BH-22
< 0.1

MR-17-BH-05
< 0.1

MR-17-BH-23
0.33

MR-17-BH-06
< 0.1

MR-17-BH-07
< 0.1

MR17BG02

MR17BG03

MR17BG01

Moose River Gold Mines Road

PID-00643205
PID-00643106
PID-00643122
PID-00643031
PID-40503468
PID-00643213
PID-40500647
PID-40535254
PID-40978520
PID-00642892
PID-41274606
PID-00643114
PID-00643254
PID-00643247
PID-00643130
PID-40980997
PID-40972176
PID-00643163

Borehole Locations*
- Possible Tailings Found
- Possible Tailings Not Found
- Mercury Concentrations Exceed Identified Background
- Mercury Concentrations Do Not Exceed Identified Background
- Background Soil Sample
- Surface Water Sample
- Stamp Mill
- Approximate Extent of Tailings Identified by Physical Observation
- Proposed Open Pit Boundary
- Building
- Local Road
- Resource Road
- Track
- Contour (5m)
- Contour (1m)
- Watercourse
- Waterbody
- Property Boundary

*Mercury values displayed in mg/kg

0 10 20 30 40 50
Metres

ST_NS_121414898-013 NAD 1983 CSRS UTM Zone 20N

N

Sources: Government of Nova Scotia

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Mercury Concentrations - Former Moose River Gold Mines Stamp Mill, Touquoy Gold Project

Stantec

ATLANTIC GOLD

Figure 1

V:\1214\active\121414898\03_data\gis_cad\gis\mapping\mxd\ST_NS_121414898-014_MR_Arsenic.mxd krozalska

MR-17-BH-10
260

MR-17-BH-11
40

MR-17-BH-12
29

MR-17-BH-17
38

MR-17-BH-09
1000

Former Moose
River Gold Mines
Stamp Mill

MR-17-BH-16
610

MR-17-BH-08
1100

MR-17-BH-18
1200

MR-17-BH-13
38

MR-17-BH-20
23

MR-17-BH-19
48

MR-17-BH-01
670

MR-17-BH-04
4300

MR-17-BH-14
19

MR-17-BH-21
570

MR-17-BH-03
480

MR-17-BH-02
1000

MR-17-BH-15
450

MR-17-BH-22
7

MR-17-BH-05
36

MR-17-BH-23
26

MR-17-BH-06
52

MR-17-BH-07
25

MR17BG02

MR17BG03

MR17BG01

Moose River Gold Mines Road

PID-00643205
PID-00643106
PID-00643122
PID-00643031
PID-40503468
PID-00643213
PID-40500647
PID-40535254
PID-40978520
PID-00642892
PID-41274606
PID-00643254
PID-00643247
PID-00643130
PID-40980997
PID-40972176
PID-00643163

Borehole Locations*
- Possible Tailings Found
- Possible Tailings Not Found
- Arsenic Concentrations Exceed Identified Background
- Arsenic Concentrations Do Not Exceed Identified Background
- Background Soil Sample
- Surface Water Sample
- Stamp Mill
- Approximate Extent of Tailings Identified by Physical Observation
- Proposed Open Pit Boundary
- Building
- Local Road
- Resource Road
- Track
- Contour (5m)
- Contour (1m)
- Watercourse
- Waterbody
- Property Boundary

*Arsenic values displayed in mg/kg

0 10 20 30 40 50
Metres

ST_NS_121414898-014 NAD 1983 CSRS UTM Zone 20N

N

Sources: Government of Nova Scotia

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Arsenic Concentrations - Former Moose River Gold Mines Stamp Mill, Touquoy Gold Project

Stantec

ATLANTIC GOLD

Figure 2

V:\1214\active\121414898\03_data\gis_cad\gis\mapping\mxd\ST_NS_121414898-016_GK_Mercury.mxd mhuskinsshupe

Former Moose River Gold Mines Provincial Park

Former Touquoy Stamp Mill

Former G&K Mining Stamp Mill

Former Colonial Mining Company Stamp Mill

Moose River

Moose River Gold Mines Road

Moose River Gold Mines Rd

GK-17-BH-01 < 0.1

GK-17-BH-02 < 0.1

GK-17-BH-03 0.12

GK-17-BH-04 < 0.1

GK-17-BH-05 < 0.1

GK-17-BH-06 4.8

GK-17-BH-07 6.6

GK-17-BH-08 0.13

GK-17-BH-09 < 0.1

GK-17-BH-10 4.5

GK-17-BH-11 6

GK-17-BH-12 0.11

GK-17-BH-13 0.14

GK-17-BH-14 < 0.1

GK-17-BH-15 0.19

GK-17-BH-16 3.1

GK-17-BH-17 0.44

GK-17-BH-18 < 0.1

GK-17-BH-19 2.6

GK-17-BH-20 0.17

GK-17-BH-21 < 0.1

GK-17-BH-22 0.8

GK-17-BH-23 0.14

GK-17-BH-24 0.32

GK17BG02

GK17BG01

BACKGROUND 01

BACKGROUND 02

BACKGROUND 03

Borehole Locations*

- Possible Tailings Found
- Possible Tailings Not Found
- Mercury Concentrations Exceed Identified Background
- Mercury Concentrations Do Not Exceed Identified Background
- Background Soil Sample
- Surface Water Sample
- Stamp Mill
- Approximate Extent of Tailings Identified by Physical Observation
- Proposed Open Pit Boundary
- Building
- Local Road
- Resource Road
- Track
- Contour (5m)
- Contour (1m)
- Watercourse
- Waterbody
- Wetland
- Property Boundary
- Former Provincial Park

*Mercury values displayed in mg/kg

0 10 20 30 40 50

Metres

ST_NS_121414898-016 NAD 1983 CSRS UTM Zone 20N

N

Sources: Government of Nova Scotia

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Mercury Concentrations – Former G&K Mining Stamp Mill, Touquoy Gold Project

Stantec

ATLANTIC GOLD

Figure 3

V:\1214\active\121414898\03_data\gis_cad\gis\mapping\mxd\ST_NS_121414898-017_GK_Arsenic.mxd mhuskinsshupe

Former Moose River Gold Mines Provincial Park

Moose River

Moose River Gold Mines Road

Moose River Gold Mines Rd

Former G&K Mining Stamp Mill

Former Touquoy Stamp Mill

Former Colonial Mining Company Stamp Mill

GK-17-BH-01 1400

GK-17-BH-02 4500

GK-17-BH-03 1100

GK-17-BH-04 94

GK-17-BH-05 170

GK-17-BH-06 700

GK-17-BH-07 18000

GK-17-BH-08 640

GK-17-BH-09 210

GK-17-BH-10 1200

GK-17-BH-11 6900

GK-17-BH-12 2200

GK-17-BH-13 6600

GK-17-BH-14 11000

GK-17-BH-15 6500

GK-17-BH-16 1200

GK-17-BH-17 1100

GK-17-BH-18 160

GK-17-BH-19 950

GK-17-BH-20 1100

GK-17-BH-21 500

GK-17-BH-22 1300

GK-17-BH-23 3000

GK-17-BH-24 1600

GK17BG02

GK17BG01

BACKGROUND 01

BACKGROUND 02

BACKGROUND 03

PID-00643031 PID-00485219 PID-00643114 PID-00642892 PID-40978520 PID-00643130 PID-00643057 PID-00643217 PID-00643254 PID-00514695 PID-002 PID-40449589 PID-40980997 PID-40972176 PID-00643163 PID-00643155 PID-00643189 PID-40338972 PID-00643148 PID-40449597 PID-40524233 PID-40524241 PID-00642744 PID-41342163 PID-00643171 PID-00568006

Borehole Locations*

- Possible Tailings Found
- Possible Tailings Not Found
- Arsenic Concentrations Exceed Identified Background
- Arsenic Concentrations Do Not Exceed Identified Background
- Background Soil Sample
- Surface Water Sample
- Stamp Mill
- Approximate Extent of Tailings Identified by Physical Observation
- Proposed Open Pit Boundary
- Building
- Local Road
- Resource Road
- Track
- Contour (5m)
- Contour (1m)
- Watercourse
- Waterbody
- Wetland
- Property Boundary
- Former Provincial Park

*Arsenic values displayed in mg/kg

0 10 20 30 40 50

Metres

ST_NS_121414898-017 NAD 1983 CSRS UTM Zone 20N

N

Sources: Government of Nova Scotia

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Arsenic Concentrations – Former G&K Mining Stamp Mill, Touquoy Gold Project

Stantec

ATLANTIC GOLD

Figure 4

Attachment B

Methodology for Tailings Identification

March 15, 2018

INTRODUCTION AND BACKGROUND

Nova Scotia has had historical gold mining operations since the 1800s, resulting in historical tailings deposits being found in the footprint of new development, or nearby residential housing[1]. The identification of tailings related impacts at historical milling sites can be complicated, due to the time and variety of operations that occured during historical milling. The following is a general methodology for identifying historical tailings including visual and material sampling and chemical analysis techniques. It should be noted that historical tailings delineation can be highly site specific, and as such professional judgement is a key component of any impact delineation exercise.

A review of available guidance from Nova Scotia Environment (NSE) and academic sources was undertaken. NSE guidance regarding the identification of tailings, excerpted from the NSE document is provided below[2].

- Tailings are a sand-like material, generally with no rocks mixed in.
- The colour of them can vary between light brown and dark grey.
- Tailings often look like a 'fine sand beach' but inland without the water

The bullets above are consistent with observations of historical tailings in the Cochrane Hill Gold District[3], the Montague and Goldenville Gold Districts[4].

Visual delineation methods, while useful, need to be combined with sampling and chemical analysis. Within Nova Scotia, gold deposits tend to occur in areas with high incidences of arsenopyrite[4]. Historical milling operations have used mercury in processing, as it was a common technology applied at this time. An understanding of background concentrations of arsenic and mercury is required, as naturally occurring levels due to the local rock formation can exceed applicable environmental quality guidelines.

A literature review has indicated that little formal guidance is available publicly from government sources regarding typical concentrations of arsenic and mercury backgrounds in gold bearing regions of Nova Scotia. Studies have been completed by independent organizations regarding arsenic levels within the Halifax regions, and academic organizations have completed studies at specific sites[4] but guidance is not available for all regions. Available literature has been reviewed to gain an understanding of arsenic and mercury background concentrations, and delineation methodologies applied.

Due to the variability in tailings age, deposition, weathering and local environmental background conditions, a defined set of chemical and physical criteria for the identification

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[1] https://novascotia.ca/nse/contaminatedsites/goldmines.asp
[2] https://novascotia.ca/nse/contaminatedsites/docs/goldminetailingpics.pdf
[3] Mosher, Andrea L. Environmental Impacts of Historical Mine Tailings Disposal at Cochrane Hill Gold District, Nova Scotia
[4] Parsons, Michael B. and Little, Megan E. Establishing geochemical baselines in forest soils for environmental risk assessment in the Montague and Goldenville gold districts, Nova Scotia, Canada. Atlantic Geology 51. 364-386. 2015.

tailings is not possible. However, based on this review of historical information and available research, a methodology for identification of historical tailings, and tailings impacts for each site was established, and is outlined below. A conversation was held with Michael Parsons[5] (who has published several studies related to historical tailings in Nova Scotia) regarding his general findings at other sites that may be applicable to this setting, which confirmed the applicability of Stantec's approach.

TAILINGS AND TAILINGS IMPACTS IDENTIFICATION METHODOLOGY

Site specific approaches need to be applied when undertaking tailings and tailings impacts investigations. A combination of physical visual identification (where possible) and chemical analysis methods are used for delineating the tailings and their associated impacts.

Physical identification is the primary method to initially ascertain whether an area contains historical tailings. Due to the primary method of processing used historically (stamp mills), there are physical characteristics common to tailings deposited in the late 19th/early 20th century. Physical samples should be collected in materials from areas where tailings historic deposits are suspected, and compared to the following general physical criteria:

- Fine grained, well sorted material, generally less than 1mm in size. Few or no large cobbles (or clasts) present.
- Highly bedded deposition, with visually identified depositional layers. An example of this bedding is displayed within Attachment C, Figure 1. Some areas may not display this layering depending on how the stamp mill and tailings deposition occured.
- Colour ranging from light greyish, through to a brownish red. The local ore body should be considered in this evaluation.

Background samples should be collected near the area of suspected tailings deposition. However, there are several considerations that should be observed when selecting a background location, including:

- Selecting a location that overlays the same host rock as the area of potential tailings deposition.
- Background samples should be collected in undisturbed areas that have not been recently worked or show signs of historical activities.
- Collection of samples at a similar depth to the tailings impact delineation samples, to account for historical weathering and the potential for arsenic transport.

When background samples have been taken and analyzed for chemical characteristics, an appropriate value for background parameters of interest should be selected. Chemical analysis results should be compared to the selected background chemical values as per standard Phase II methodology[6].

[5] Personal Communication with Michael Parsons. January 8th, 2018
[6] CAN/CSA-Z769-00 (R2013)

Attachment C

Sample Photographs

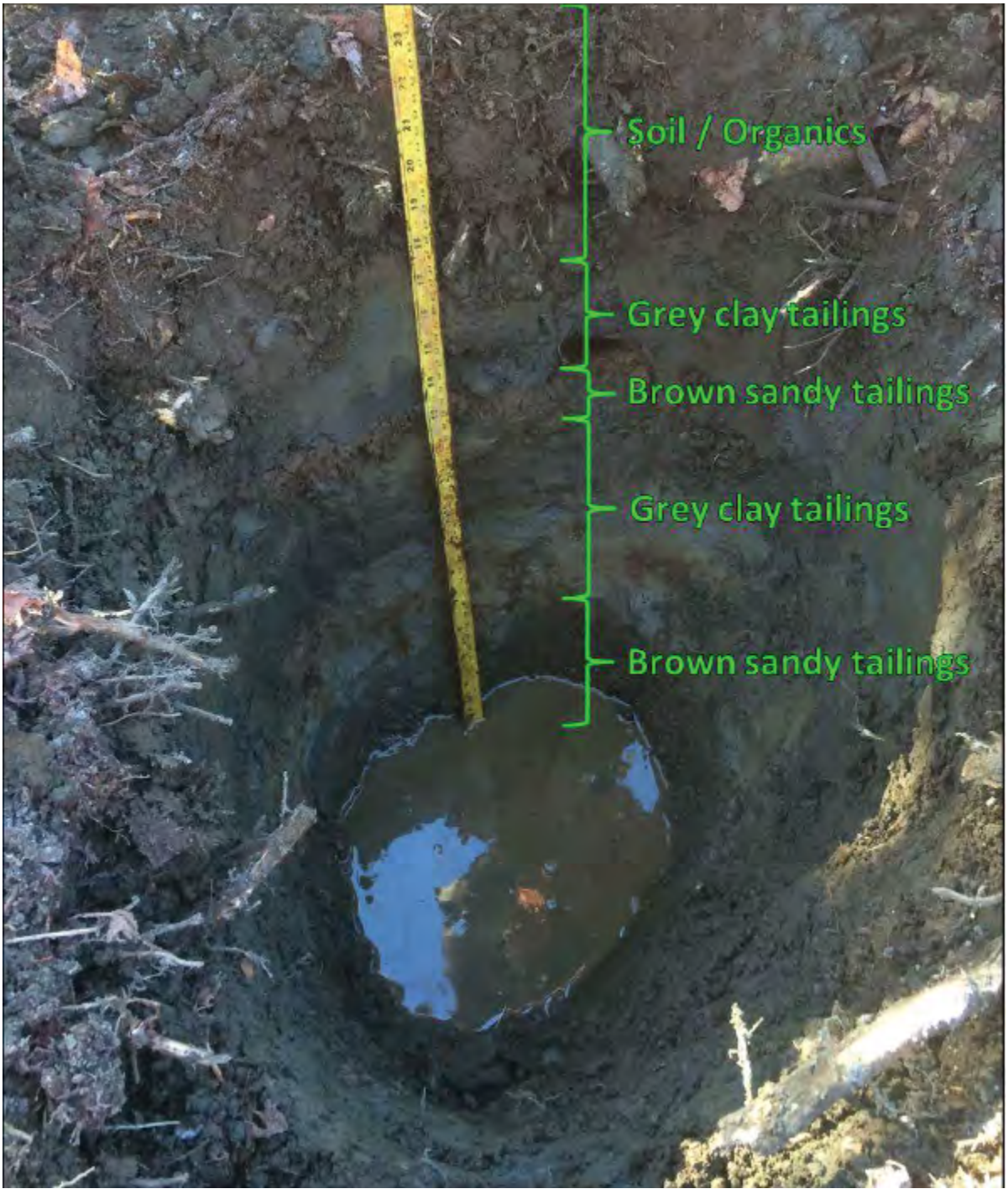

Figure 1 Example of intercalated clay and sandy tailings (Atlantic Gold, 2016)

Figure 2 Test Pit GK17-BH16. The following materials were identified: at 0-0.05m below ground surface (BGS) a black organic peat, at 0.05-0.20m BGS a well sorted grey silt (possible tailings) and at 0.20-0.45m BGS a poorly sorted brown silty sand and gravel with cobbles.

Figure 3 GK17-BH20. Possible tailings were not identified at this location. The following materials were identified: at 0-0.05m BGS a black organic rootmat and at 0.08-0.68m BGS a poorly sorted brown grey silty sand and gravel with cobbles.

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Figure 4 MR17-BH19. Possible tailings were identified in this location. The following materials were identified: at 0-0.08m BGS an organic rootmat, at 0.08-0.30m a well sorted grey silt with interspersed large cobbles (possible tailings) and at 0.30-0.55m a poorly sorted brown silty sand with cobbles.

Figure 5 MR17-BH20. Possible tailings were not identified in this location. The following materials were identified: at 0-0.08 BGS grass and rootmat and at 0.08-0.60m BGS a poorly sorted brown silty sand with trace gravel and cobbles.

March 15, 2018

Attachment D

Borehole Descriptions

Table C-1 **Test Pit Soil Description**
Atlantic Gold **Nova Scotia**
Stantec Consulting Ltd, Project No. 121414898

Location ID	Borehole Depth (mbg)	Soil Description
GK-BG-01	0-0.08	Grass and ROOTMAT
	0.080.59	Poorly sorted brown SILTY SAND and GRAVEL with cobbles Refusal on cobbles
GK-BG-02	0-0.15	Grass and ROOTMAT
	0.15-0.34	Grey brown SILTY SAND and GRAVEL with cobbles Refusal on cobbles
GK17-BH16	0-0.05	Black ORGANIC PEAT
	0.05-0.20	Well sorted grey SILT, possible tailings
	0.20-0.45	Poorly sorted brown SILTY SAND and GRAVEL with cobbles
GK17-BH17	0-0.08	Black ORGANIC ROOTMAT
	0.08-0.40	Poorly sorted brown grey SILTY SAND and GRAVEL with cobbles Refusal on cobbles
GK17-BH18	0.-0.05	Black ORGANIC PEAT
	0.05-0.48	Poorly sorted brown SILTY SAND and GRAVEL Refusal on cobbles
GK17-BH19	0-0.05	Black ORGANIC ROOTMAT and moss
	0.05-0.50	Poorly sorted brown SILTY SAND with sparse cobbles
GK17-BH20	0-0.08	ROOTMAT
	0.08-0.68	Poorly sorted brown SILTY SAND and GRAVEL Refusal on cobbles
GK17-BH21	0-0.05	Black ORGANIC PEAT
	0.05-0.30	Brown SILTY SAND
	0.30-0.45	Well sorted grey SILT, possible tailings Refusal on cobbles
GK17-BH22	0-0.10	Black ORGANIC PEAT
	0.10-0.35	Poorly sorted brown grey SILTY SAND and GRAVEL with cobbles Refusal on cobbles
GK17-BH23	0-0.05	Black ORGANIC ROOTMAT
	0.05-0.55	Poorly sorted brown SILTY SAND and GRAVEL Refusal on cobbles
GK17-BH24	0-0.08	Black ORGANIC PEAT
	0.08-0.50	Poorly sorted brown grey SILTY SAND and GRAVEL with cobbles Refusal on cobbles

Table C-1 Borehole Soil Description
Atlantic Gold Nova Scotia
Stantec Consulting Ltd, Project No. 121414898

Location ID	Borehole Depth (mbg)	Soil Description
MR17--BG01	0-0.12	MOSS/ORGANIC ROOTMAT
	0.12-0.57	Brown SILTY SAND and GRAVEL with cobbles Refusal on cobbles
MR17-BG02	0-0.08	ORGANIC ROOTMAT
	0.08-0.45	Brown SILTY SAND and GRAVEL with cobbles Refusal on cobbles
MR17-BG-03	0-0.15	PEAT and MOSS
	0.15-0.3	Grey SILTY SAND and GRAVEL Possible TILL Refusal on cobbles
MR17-BH16	0-0.08	Grass and ROOTMAT
	0.08-0.55	Poorly sorted brown SILTY SAND and GRAVEL Refusal on cobbles
MR17-BH17	0-0.10	ORGANIC ROOTMAT
	0.10-0.58	Poorly sorted grey brown SILTY SAND with gravel and cobbles Refusal on cobbles
MR17-BH18	0-0.05	ORGANIC ROOTMAT
	0.05-0.20	Well sorted grey SILT possible tailings
	0.20-0.50	Poorly sorted brown SILTY SAND and GRAVEL with cobbles Refusal on cobbles
MR17-BH19	0-0.08	ORGANIC ROOTMAT
	0.08-0.30	Well sorted grey SILT with interspersed large cobbles, possible tailings.
	0.30-0.55	Poorly Sorted brown SILTY SAND with cobbles Refusal on cobbles
MR17-BH20	0-0.08	Grass and ROOTMAT
	0.08-0.60	Poorly sorted brown SILTY SAND, trace gravel and cobbles
MR17-BH21	0-0.05	ORGANIC ROOTMAT
	0.05-0.20	Poorly sorted grey SILT
	0.02-0.55	Poorly sorted brown SILTY SAND and gravel Refusal
MR17-BH22	0-0.08	ORGANIC ROOTMAT
	0.08-0.39	Poorly sorted grey brown SILT with cobbles Refusal on cobbles
MR17-BH23	0-0.15	ORGANIC ROOTMAT
	0.15-0.50	Poorly sorted grey brown SILT, possible tailings

Table C-1 Borehole Soil Description
Atlantic Gold Nova Scotia
Stantec Consulting Ltd, Project No. 121414898

Location ID	Borehole Depth (mbg)	Soil Description
Background 01	0-0.44	Poorly sorted brown silty SAND and gravel Auger refusal on cobbles No tailings encountered
Background 02	0-0.28	Poorly sorted brown silty SAND and gravel Auger refusal on cobbles No tailings encountered
Background 03	0-0.42	Poorly sorted brown silty SAND and gravel Auger refusal on cobbles No tailings encountered
MR-17BH01	0-0.82	Well sorted grey brown silty TAILINGS Auger refusal on cobbles
MR-17BH02	0-0.38	Well sorted grey silty TAILINGS
	0.38-0.62	Poorly sorted brown silty SAND and gravel Auger refusal on cobbles No tailings encountered
MR-17BH03	0-0.60	Poorly sorted brown silty SAND and gravel with cobbles No tailings encountered
MR17-BH04	0-0.47	Poorly sorted brown silty SAND and gravel with cobbles Auger refusal on cobbles No tailings encountered
MR-17BH05	0-0.55	Poorly sorted brown silty SAND with gravel and cobbles
MR-17BH06	0-0.73	Poorly sorted brown silty sand with cobbles No tailings encountered
MR-17BH07	0-0.68	Poorly sorted brown silty sand with cobbles Auger refusal on cobbles No tailings encountered
MR-17BH08	0-0.46	Poorly sorted brown silty SAND, gravel and cobbles No tailings encountered
MR-17BH09	0-0.43	Poorly sorted brown silty SAND and gravel Auger refusal on cobbles No tailings encountered
MR-17BH10	0-0.47	Poorly sorted brown silty SAND, gravel and cobbles No tailings encountered
MR-17BH11	0-0.60	Poorly sorted brown silty sand with cobbles No tailings encountered
MR-17BH12	0-0.48	Poorly sorted brown silty SAND with cobbles No tailings encountered
MR-17BH13	0-0.41	Poorly grey silty Sand and gravel
	0.42-0.84	Poorly sorted silty SAND with gravel and cobbles

Table C-1 Borehole Soil Description
Atlantic Gold Nova Scotia
Stantec Consulting Ltd, Project No. 121414898

Location ID	Borehole Depth (mbg)	Soil Description
MR-17BH14	0-0.39	Well sorted brown silty SAND Auger refusal on cobbles No tailings encountered
MR-17BH15	0-0.30	Well sorted grey SILT Auger refusal on cobbles TAILINGS encountered
GK-17BH01	0-0.50	Grubbed area Poorly sorted brown silty SAND with gravel Auger refusal on inferred bedrock No tailings encountered
GK-17BH02	1.2	Edge of cut Poorly sorted brown silty SAND with gravel No tailings encountered
GK-17BH03	0-0.30	Poorly sorted brown silty sand with shale fragments Auger refusal on cobbles No tailings encountered
GK-17BH04	0-0.35	Poorly sorted brown silty sand with cobbles Auger refusal on cobbles No tailings encountered
GK-17BH05	0.18-0.21	Grey possible TAILINGS with cobbles
	0.21-0.40	Poorly brown silty SAND with gravel Auger refusal on cobbles
GK-17BH06	0-0.57	Well sorted grey silt TAILINGS Refusal on rock
GK-17BH07	0-0.32	Poorly sorted brown silty SAND
	0.32-0.75	Well sorted grey silt TAILINGS Auger refusal on cobbles
GK-17BH08	0-0.52	Poorly sorted brown silty sand with cobbles Auger refusal on cobbles No tailings encountered
GK-17BH09	0-0.45	Poorly sorted brown silty SAND with gravel and cobbles
	0.45-0.55	Well sorted grey SILT Possible TAILINGS
	0.72	Poorly sorted brown silty SAND with cobbles Auger refusal on cobbles
GK-17BH10	0.38	Poorly sorted brown silty SAND with gravel, cobbles & tree roots Auger refusal on cobbles No tailings encountered

Table C-1 Borehole Soil Description
Atlantic Gold Nova Scotia
Stantec Consulting Ltd, Project No. 121414898

Location ID	Borehole Depth (mbg)	Soil Description
GK-17BH11	0.37	Poorly sorted dark brown silty SAND and gravel Auger refusal on cobbles No tailings encountered
GK-17BH12	0-0.35	Well sorted grey silt with occasional gravel Tailings encountered
	0.35-0.60	Poorly sorted brown silty SAND and gravel Refusal on cobbles
GK-17BH13	0-0.38	Poorly sorted brown silty SAND with gravel Auger refusal on inferred bedrock No tailings encountered
GK-17BH14	0-0.62	Poorly sorted brown silty SAND with gravel Auger Refusal on cobbles No tailings encountered
GK-17BH15	0-0.36	Poorly sorted brown silty SAND with gravel Auger Refusal on cobbles No tailings encountered

Attachment E

Chemical Analysis Results

TABLE D-1 SOIL INORGANIC CHEMISTRY
Atlantic Gold Corporation
Touquoy Gold Project, Moose River, Nova Scotia
Stantec Consulting Ltd. Project No. 121414898

Parameters	Tier 1 EQS Industrial (mg/kg)	Background Sample Results (depth in mbg)		Sample ID																	
				Former Moose River Gold Mines Stamp Mill																	
		BACKGROUND max	BACKGROUND min	MR17 BH 01	MR17 BH 02A	MR17 BH 02B	MR17 BH 03		MR17 BH 04	MR17 BH 05	MR17 BH 06	MR17 BH 07	MR17 BH 08	MR17 BH 09	MR17 BH 10	MR17 BH 11	MR17 BH 12	MR17 BH 13A	MR17 BH 13B	MR17 BH 14	
Date Sampled:				21-Sep-17	21-Sep-17	21-Sep-17	21-Sep-17	Lab-Dup	21-Sep-17	21-Sep-17	22-Sep-17	22-Sep-17	22-Sep-17	22-Sep-17	22-Sep-17	22-Sep-17	22-Sep-17	22-Sep-17	22-Sep-17	22-Sep-17	DUP3
Aluminum	198,000	19,000	6,100	10,000	16,000	11,000	11,000	11,000	25,000	16,000	13,000	12,000	19,000	20,000	13,000	13,000	9,800	11,000	15,000	13,000	13,000
Antimony	63	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	5.0	<2.0	<2.0	<2.0	2.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Arsenic	31	**800**	5.3	**670**	**1,000**	**300**	**480**	**540**	**4,300**	**36**	**52**	25	**1,100**	**1,000**	**260**	**40**	29	**38**	15	19	**37**
Barium	140,000	33	13	6.0	15	33	100	100	11	44	24	36	33	33	34	13	13	25	53	56	55
Beryllium	320	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Bismuth	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Boron	24,000	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Cadmium	192	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Chromium	2,300	19	6.2	11	16	11	14	14	24	20	15	15	18	22	16	17	13	14	20	17	15
Cobalt	250	21	1.9	8.9	12	6.3	9.5	9.4	11	12	11	10	17	33	14	8.2	7.0	6.3	19	9.8	8.7
Copper	16,000	46	7.5	47	54	14	20	20	15	18	27	19	33	27	24	15	16	4.2	24	11	7.9
Iron	144,000	42,000	6,800	24,000	36,000	23,000	22,000	23,000	38,000	27,000	25,000	24,000	34,000	43,000	28,000	27,000	20,000	25,000	31,000	30,000	29,000
Lead	740	27	7.6	28	41	16	310	290	9.1	20	17	14	30	25	18	11	8.3	13	19	12	14
Lithium	-	30	11	18	27	22	21	21	23	30	23	23	24	34	30	26	21	24	29	35	33
Manganese	-	1700	110	490	770	380	790	790	420	800	780	820	1,100	2,400	860	530	400	440	1,600	560	460
Mercury	99	0.26	<0.10	8.1	6.3	1.4	0.38	0.32	0.24	<0.10	<0.10	<0.10	1.2	0.38	0.30	<0.10	<0.10	<0.10	<0.10	<0.10	0.14
Molybdenum	1,200	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Nickel	2,200	32	4.2	18	26	10	16	15	17	19	19	18	27	27	24	18	17	12	27	22	23
Rubidium	-	8.4	3.1	<2.0	<2.0	6.8	10	10	3.6	9.4	5.5	6.3	5.8	6.9	6.2	4.6	3.1	7.7	8.9	6.8	7.2
Selenium	1,135	1.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver	490	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Strontium	122,000	<5.0	<5.0	<5.0	7.8	11	10	11	8.0	6.7	5.5	6.1	15	6.1	6.3	5.8	<5.0	<5.0	5.6	10	9.7
Thallium	1	<0.10	0.12	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin	122,000	<2.0	<2.0	<2.0	<2.0	<2.0	2.7	3.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Uranium	300	0.81	0.27	0.37	0.47	0.54	0.67	0.70	0.83	0.83	0.90	0.78	1.1	1.2	1.4	0.80	0.89	0.56	0.99	1.2	1.1
Vanadium	160	24	8.4	7.5	11	15	16	15	20	22	16	17	19	17	15	16	12	20	21	17	18
Zinc	47,000	73	14	49	69	32	550	390	48	55	47	51	57	78	53	45	37	38	59	44	39
			Depth of sample	0 - 0.82	0 - 0.38	0.38 - 0.62	0 - 0.60		0 - 0.47	0 - 0.55	0 - 0.73	0 - 0.68	0 - 0.46	0 - 0.43	0 - 0.47	0 - 0.60	0 - 0.48	0 - 0.41	0.42 - 0.84	0 - 0.39	
			Tailings observed?	**Yes**	**Yes**	No	No		No	No	No	No	No	No	No	No	No	**Yes**	No	No	

Notes:

1. ' -' = no standard available
2. Lab-Dup = laboratory QA/QC duplicate; DUP# = field QA/QC duplicate
3. Tier 1 EQS = Tier 1 Environmental Quality Standards for Soil. From Nova Scotia's *Contaminated Sites Regulations* (July 6, 2013) Notification of Contamination Protocol; Table 1A/1B.
4. <# = parameter concentration below laboratory's reportable detection limit
5. mbg = meters below grade
6. * = sample collected at edge of cut
7. **Bold & Underlined** = parameter concentration exceeds the Tier 1 EQS

= Arsenic concentration exceeds Tier 1 EQS and is elevated above background

= Mercury concentration meets the Tier 1 EQS but is elevated above background

TABLE D-1 SOIL INORGANIC CHEMISTRY
Atlantic Gold Corporation
Touquoy Gold Project, Moose River, Nova Scotia
Stantec Consulting Ltd. Project No. 121414898

Parameters	Tier 1 EQS Industrial (mg/kg)	Background Sample Results (depth in mbg)		Sample ID												
				Former Moose River Gold Mines Stamp Mill												
		BACKGROUND max	BACKGROUND min	MR17 BH 15	MR17 BH16A	MR17 BH17A	MR17 BH18A	MR17 BH18B	MR17 BH19A	MR17 BH19B	MR17 BH20A	MR17 BH21A	MR17 BH21B	MR17 BH22A	MR17 BH23A	MR17 BH23A Lab-Dup
Date Sampled:				22-Sep-17	28-Nov-17	28-Nov-17	28-Nov-17	28-Nov-17	28-Nov-17	28-Nov-17	28-Nov-17	28-Nov-17	28-Nov-17	28-Nov-17	28-Nov-17	28-Nov-17
Aluminum	198,000	19,000	6,100	16,000	16,000	11,000	18,000	15,000	9,300	11,000	11,000	21,000	10,000	11,000	8,400	8,300
Antimony	63	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Arsenic	31	**800**	5.3	**450**	**610**	**38**	**1,200**	**180**	**48**	**51**	23	**570**	21	7	26	28
Barium	140,000	33	13	16	18	16	49	51	21	52	55	43	82	35	32	33
Beryllium	320	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Bismuth	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Boron	24,000	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Cadmium	192	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Chromium	2,300	19	6.2	18	18	13	38	22	12	16	15	22	15	15	11	11
Cobalt	250	21	1.9	12	18	7.9	17	13	5.2	12	9.6	11	12	6	4.7	4.9
Copper	16,000	46	7.5	56	30	14	48	8.3	4.8	12	12	22	21	3.3	6.8	6.6
Iron	144,000	42,000	6,800	34,000	37,000	19,000	34,000	32,000	15,000	27,000	22,000	44,000	25,000	17,000	14,000	14,000
Lead	740	27	7.6	49	14	7.7	23	24	13	11	11	25	14	9.9	13	13
Lithium	-	30	11	28	26	20	26	40	18	26	26	33	22	22	20	20
Manganese	-	1700	110	820	910	490	810	810	270	790	1,200	530	1,200	330	410	450
Mercury	99	0.26	<0.10	8.8	0.15	<0.10	<0.10	0.16	0.36	0.11	<0.10	2.1	<0.10	<0.10	0.33	0.29
Molybdenum	1,200	<2.0	<2.0	<2.0	<2.0	<2.0	2.1	2.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Nickel	2,200	32	4.2	20	29	15	24	19	9.4	20	20	21	22	12	13	12
Rubidium	-	8.4	3.1	2.1	4.4	4.6	8.4	7.8	4.7	5	5.2	3.4	4.8	7.5	3.5	3.5
Selenium	1,135	1.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver	490	<0.50	<0.50	<0.50	<0.50	<0.50	6.8	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Strontium	122,000	<5.0	<5.0	6.0	5.3	<5.0	8.3	7.6	<5.0	5.2	6.1	6.1	11	6.5	7.8	7.5
Thallium	1	<0.10	0.12	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin	122,000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Uranium	300	0.81	0.27	0.50	0.84	0.7	0.92	0.75	0.49	1.7	0.81	0.7	0.66	0.58	0.73	0.75
Vanadium	160	24	8.4	12	18	13	18	21	13	16	15	16	14	15	11	11
Zinc	47,000	73	14	72	59	33	71	59	32	52	45	93	42	37	31	32
			Depth of sample	0 - 0.30	0.08-0.55	0.10-0.58	0.05-0.20	0.20-0.50	0.08-0.30	0.30-0.55	0.08-0.60	0.05-0.20	0.20-0.55	0.08-0.39	0.15-0.50	0.15-0.50
			Tailings observed?	**Yes**	No	**Possible**	**Possible**	No	**Possible**	No	No	**Possible**	No	**Possible**	**Possible**	**Possible**

Notes:

1. ' -' = no standard available
2. Lab-Dup = laboratory QA/QC duplicate; DUP# = field QA/QC duplicate
3. Tier 1 EQS = Tier 1 Environmental Quality Standards for Soil. From Nova Scotia's *Contaminated Sites Regulations* (July 6, 2013) Notification of Contamination Protocol; Table 1A/1B.
4. <# = parameter concentration below laboratory's reportable detection limit
5. mbg = meters below grade
6. * = sample collected at edge of cut
7. **Bold & Underlined** = parameter concentration exceeds the Tier 1 EQS

= Arsenic concentration exceeds Tier 1 EQS and is elevated above background

= Mercury concentration meets the Tier 1 EQS but is elevated above background

TABLE D-1 SOIL INORGANIC CHEMISTRY
Atlantic Gold Corporation
Touquoy Gold Project, Moose River, Nova Scotia
Stantec Consulting Ltd. Project No. 121414898

Parameters	Tier 1 EQS Industrial (mg/kg)	Background Sample Results		Sample ID													
				Former G&K Mining Stamp Mill													
		BACKGROUND max	BACKGROUND min	GK17 BH 01		GK17 BH 02	GK17 BH 03	GK17 BH 04	GK17 BH05A		GK17 BH 05B	GK17 BH 06		GK17 BH 07A	GK17 BH 07B	GK17 BH 08	GK17 BH 09A
Date Sampled:				20-Sep-17	Lab-Dup	20-Sep-17	20-Sep-17	20-Sep-17	20-Sep-17	Lab-Dup	20-Sep-17	21-Sep-17	DUP1	21-Sep-17	21-Sep-17	21-Sep-17	21-Sep-17
Aluminum	198,000	19,000	6,100	16,000	17,000	15,000	17,000	12,000	7,900	8,400	29,000	21,000	20,000	10,000	14,000	27,000	6,900
Antimony	63	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	3.0	3.2	<2.0	<2.0
Arsenic	31	**800**	**5.3**	**1,400**	**1,600**	**4,500**	**1,100**	**94**	**170**	**190**	**340**	**700**	**610**	**18,000**	**14,000**	**640**	**210**
Barium	140,000	33	13	11	11	26	20	28	20	18	15	16	15	<5.0	5.4	14	23
Beryllium	320	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Bismuth	-	<2.0	<2.0	<2.0	<2.0	<2.0	2.4	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.4	<2.0	<2.0	<2.0
Boron	24,000	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Cadmium	192	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.50	<0.30	<0.30
Chromium	2,300	19	6.2	18	18	18	19	13	6.2	6.8	29	23	22	13	29	27	6.2
Cobalt	250	21	1.9	25	25	23	30	6.7	3.6	3.2	11	12	10	12	75	24	3.0
Copper	16,000	46	7.5	51	52	26	47	12	9.0	12	29	38	32	38	590	45	7.9
Iron	144,000	42,000	6,800	39,000	40,000	36,000	43,000	21,000	14,000	14,000	45,000	40,000	39,000	57,000	41,000	44,000	14,000
Lead	740	27	7.6	25	25	22	82	16	5.7	5.6	17	22	18	41	160	31	10
Lithium	-	30	11	26	25	23	27	16	6.9	7.1	41	33	33	17	20	41	5.8
Manganese	-	1700	110	910	910	1,000	1,000	560	220	190	560	340	340	320	200	670	270
Mercury	99	0.26	<0.10	<0.10	<0.10	<0.10	0.12	<0.10	<0.10	<0.10	0.20	4.8	3.4	6.6	11	0.13	<0.10
Molybdenum	1,200	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Nickel	2,200	32	4.2	38	39	23	48	12	9.3	10	30	26	23	41	110	37	7.3
Rubidium	-	8.4	3.1	2.9	2.6	3.1	2.7	5.3	3.0	2.8	5.3	3.1	2.6	<2.0	<2.0	4.4	2.7
Selenium	1,135	1.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver	490	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Strontium	122,000	<5.0	<5.0	<5.0	<5.0	5.9	7.1	<5.0	<5.0	<5.0	<5.0	6.9	6.7	<5.0	<5.0	<5.0	<5.0
Thallium	1.0	<0.10	0.12	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.12	<0.10	<0.10
Tin	122,000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Uranium	300	0.81	0.27	0.60	0.64	0.97	0.73	0.56	0.34	0.36	0.73	0.46	0.44	0.37	0.94	0.71	0.33
Vanadium	160	24	8.4	13	12	12	12	18	11	11	19	14	14	9.4	9.1	19	14
Zinc	47,000	73	14	76	74	57	87	31	17	18	72	99	99	63	71	94	18
			Depth of sample	0.50		1.2*	0.30	0.35	0.18 - 0.21		0.21 - 0.40	0 - 0.57		0 - 0.32	0.32 - 0.75	0.52	0.45 - 0.55
			Tailings observed?	No		No	No	No	**Possible**		No	**Yes**		No	**Yes**	No	**Possible**

TABLE D-1 SOIL INORGANIC CHEMISTRY
Atlantic Gold Corporation
Touquoy Gold Project, Moose River, Nova Scotia
Stantec Consulting Ltd. Project No. 121414898

Parameters	Tier 1 EQS Industrial (mg/kg)	Background Sample Results		Sample ID																	
				Former G&K Mining Stamp Mill																	
		BACKGROUND max	BACKGROUND min	GK17 BH 09B	GK17 BH 10	GK17 BH 11	GK17 BH 12A	GK17 BH 12B	GK17 BH 13	GK17 BH 14	GK17 BH 15	GK17 BH16A	GK17 BH16B	GK17 BH17A	GK17 BH18A	GK17 BH19A	GK17 BH20A	GK17 BH21A	GK17 BH21B	GK17 BH22A	GK17 BH22A Lab-Dup
Date Sampled:				21-Sep-17	21-Sep-17	21-Sep-17	21-Sep-17	21-Sep-17	21-Sep-17	21-Sep-17	21-Sep-17	27-Nov-17	27-Nov-17	27-Nov-17	27-Nov-17	27-Nov-17	27-Nov-17	27-Nov-17	27-Nov-17	27-Nov-17	27-Nov-17
Aluminum	198,000	19,000	6,100	20,000	17,000	14,000	19,000	16,000	17,000	14,000	13,000	19,000	14,000	15,000	13,000	16,000	19,000	13,000	14,000	17,000	19,000
Antimony	63	<2.0	<2.0	<2.0	<2.0	2.9	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Arsenic	31	**800**	**5.3**	**470**	**1,200**	**6,900**	**2,200**	**1,400**	**6,600**	**11,000**	**6,500**	**1,200**	**1,400**	**1,100**	**160**	**950**	**1,100**	**500**	**680**	**1,300**	**1,300**
Barium	140,000	33	13	18	37	43	29	19	28	57	34	12	18	24	35	<5.0	15	11	14	29	33
Beryllium	320	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Bismuth	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.9	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Boron	24,000	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Cadmium	192	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.52	0.31	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Chromium	2,300	19	6.2	18	18	15	21	20	18	16	15	20	15	15	17	17	20	12	15	20	22
Cobalt	250	21	1.9	3.8	16	18	29	10	21	29	17	22	19	16	11	15	20	4.3	11	26	27
Copper	16,000	46	7.5	12	34	24	53	13	46	46	33	68	47	35	20	61	41	11	21	15	26
Iron	144,000	42,000	6,800	38,000	37,000	42,000	44,000	33,000	45,000	52,000	33,000	41,000	32,000	30,000	26,000	51,000	40,000	24,000	32,000	35,000	38,000
Lead	740	27	7.6	21	27	52	110	16	29	56	33	24	29	17	15	25	31	9.4	14	35	42
Lithium	-	30	11	23	26	23	36	31	27	22	23	29	22	21	25	24	28	19	19	29	31
Manganese	-	1700	110	280	870	1,800	1,900	540	810	1,400	1,200	660	960	610	900	510	690	280	420	2,000	2,100
Mercury	99	0.26	<0.10	0.19	4.5	6.0	0.11	<0.10	0.14	<0.10	0.19	3.1	1.4	0.44	<0.10	2.6	0.17	<0.10	0.18	0.8	0.87
Molybdenum	1,200	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Nickel	2,200	32	4.2	8.8	28	15	41	18	29	33	26	28	27	26	21	40	31	10	14	19	20
Rubidium	-	8.4	3.1	6.0	4.3	<2.0	2.5	4.2	2.9	2.9	3.4	2.2	4.2	3.8	5.6	<2.0	4.2	5.3	4.1	7.7	8.7
Selenium	1,135	1.6	<1.0	1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.4	1.3
Silver	490	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Strontium	122,000	<5.0	<5.0	<5.0	5.3	<5.0	7.7	5.0	7.3	11	12	<5.0	5	8.7	6	<5.0	<5.0	<5.0	<5.0	6.2	7.1
Thallium	1	<0.10	0.12	<0.10	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.11
Tin	122,000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Uranium	300	0.81	0.27	0.53	0.71	0.90	0.89	0.42	0.65	0.73	0.59	0.46	0.49	0.7	0.85	0.43	0.62	0.4	0.45	0.92	0.99
Vanadium	160	24	8.4	22	18	12	15	14	13	10	12	12	12	16	16	11	16	12	17	15	16
Zinc	47,000	73	14	36	67	57	84	68	71	72	69	89	69	71	50	85	76	39	47	70	76
			Depth of sample	0.72	0.38	0.37	0.35 - 0.60	0 - 0.35	0 - 0.38	0 - 0.62	0 - 0.36	0.05-0.20	0.20-0.45	0.08-0.40	0.05-0.48	0.05-0.50	0.08-0.68	0.05-0.30	0.30-0.45	0.10-0.35	0.10-0.35
			Tailings observed?	No	No	No	No	**Yes**	No	No	No	**Possible**	No	No	No	No	No	No	**Possible**	No	No

Notes:

1. ' -' = no standard available
2. Lab-Dup = laboratory QA/QC duplicate; DUP# = field QA/QC duplicate
3. Tier 1 EQS = Tier 1 Environmental Quality Standards for Soil. From Nova Scotia's *Contaminated Sites Regulations* (July 6, 2013) Notification of Contamination Protocol; Table 1A/1B.
4. <# = parameter concentration below laboratory's reportable detection limit
5. mbg = meters below grade
6. * = sample collected at edge of cut
7. **Bold & Underlined** = parameter concentration exceeds the Tier 1 EQS

= Arsenic concentration exceeds Tier 1 EQS and is elevated above background

= Mercury concentration meets the Tier 1 EQS but is elevated above background

TABLE D-1 SOIL INORGANIC CHEMISTRY
Atlantic Gold Corporation
Touquoy Gold Project, Moose River, Nova Scotia
Stantec Consulting Ltd. Project No. 121414898

Parameters	Tier 1 EQS Industrial (mg/kg)	Background Sample Results		Sample ID		
				Former G&K Mining Stamp Mill		
		BACKGROUND max	BACKGROUND min	GK17 BH22A Lab-Dup 2	GK17 BH23A	GK17 BH24A
Date Sampled:				27-Nov-17	27-Nov-17	27-Nov-17
Aluminum	198,000	19,000	6,100	N/A	16,000	14,000
Antimony	63	<2.0	<2.0	N/A	<2.0	<2.0
Arsenic	31	**800**	**5.3**	N/A	**3,000**	**1,600**
Barium	140,000	33	13	N/A	25	21
Beryllium	320	<2.0	<2.0	N/A	<2.0	<2.0
Bismuth	-	<2.0	<2.0	N/A	<2.0	<2.0
Boron	24,000	<50	<50	N/A	<50	<50
Cadmium	192	<0.30	<0.30	N/A	<0.30	<0.30
Chromium	2,300	19	6.2	N/A	17	17
Cobalt	250	21	1.9	N/A	19	25
Copper	16,000	46	7.5	17	36	48
Iron	144,000	42,000	6,800	N/A	38,000	36,000
Lead	740	27	7.6	N/A	25	18
Lithium	-	30	11	N/A	24	26
Manganese	-	1700	110	N/A	870	1,100
Mercury	99	0.26	<0.10	N/A	0.14	0.32
Molybdenum	1,200	<2.0	<2.0	N/A	<2.0	<2.0
Nickel	2,200	32	4.2	N/A	24	34
Rubidium	-	8.4	3.1	N/A	3	<2.0
Selenium	1,135	1.6	<1.0	N/A	<1.0	<1.0
Silver	490	<0.50	<0.50	N/A	<0.50	<0.50
Strontium	122,000	<5.0	<5.0	N/A	<5.0	<5.0
Thallium	1	<0.10	0.12	N/A	<0.10	<0.10
Tin	122,000	<2.0	<2.0	N/A	<2.0	<2.0
Uranium	300	0.81	0.27	N/A	0.63	0.81
Vanadium	160	24	8.4	N/A	13	12
Zinc	47,000	73	14	N/A	66	70
			Depth of sample	0.10-0.35	0.05-0.55	0.08-0.50
			Tailings observed?	No	No	No

Notes:

1. ' -' = no standard available
2. Lab-Dup = laboratory QA/QC duplicate; DUP# = field QA/QC duplicate
3. Tier 1 EQS = Tier 1 Environmental Quality Standards for Soil. From Nova Scotia's *Contaminated Sites Regulations* (July 6, 2013) Notification of Contamination Protocol; Table 1A/1B.
4. <# = parameter concentration below laboratory's reportable detection limit
5. mbg = meters below grade
6. * = sample collected at edge of cut
7. **Bold & Underlined** = parameter concentration exceeds the Tier 1 EQS

= Arsenic concentration exceeds Tier 1 EQS and is elevated above background

= Mercury concentration meets the Tier 1 EQS but is elevated above background

TABLE D-2 **BACKGROUND SOIL INORGANIC CHEMISTRY**
Atlantic Gold Corporation
Touquoy Gold Project, Moose River, Nova Scotia
Stantec Consulting Ltd. Project No. 121414898

Parameters	Tier 1 EQS Industrial (mg/kg)	Background Sample Results (depth in mbg)								Max	Min
		BACKGROUND 01	BACKGROUND 02	BACKGROUND 03	GK17 BG01A	GK17 BG02A	MR17 BG01A	MR17 BG02A	MR17 BG03A		
Date Sampled:		22-Sep-17	22-Sep-17	22-Sep-17	29-Nov-17	29-Nov-17	29-Nov-17	29-Nov-17	29-Nov-17		
Aluminum	198,000	18,000	18,000	16,000	19,000	17,000	16,000	15,000	6,100	19,000	6,100
Antimony	63	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Arsenic	31	**280**	**110**	23	**280**	**800**	19	20	5.3	800	5.3
Barium	140,000	15	13	28	20	16	13	33	15	33	13
Beryllium	320	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Bismuth	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Boron	24,000	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Cadmium	192	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Chromium	2,300	20	18	18	19	19	17	16	6.2	19	6.2
Cobalt	250	6.8	3.1	11	4.4	21	3.6	19	1.9	21	1.9
Copper	16,000	19	11	21	11	46	12	7.5	<2.0	46	7.5
Iron	144,000	31,000	27,000	26,000	42,000	38,000	25,000	21,000	6,800	42,000	6,800
Lead	740	22	12	18	27	22	10	14	7.6	27	7.6
Lithium	-	29	21	26	16	27	19	30	11	30	11
Manganese	-	390	180	770	340	1,000	200	1,700	110	1,700	110
Mercury	99	0.13	0.14	0.11	0.26	0.13	<0.10	0.12	<0.10	0.26	<0.10
Molybdenum	1,200	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.1	<2.0	<2.0	<2.0
Nickel	2,200	17	8.5	20	10	32	7.7	13	4.2	32	4.2
Rubidium	-	5.9	5.0	7.3	3.8	3.1	5.7	8.4	4.8	8.4	3.1
Selenium	1,135	<1.0	<1.0	<1.0	1.6	<1.0	<1.0	1.1	<1.0	1.6	<1.0
Silver	490	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Strontium	122,000	<5.0	<5.0	6.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Thallium	1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.12	<0.10	<0.10	0.12
Tin	122,000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Uranium	300	0.56	0.61	0.87	0.48	0.81	0.67	0.74	0.27	0.81	0.27
Vanadium	160	18	19	17	24	14	21	15	8.4	24	8.4
Zinc	47,000	46	30	57	37	73	25	42	14	73	14
Sample Depth (mbg):		0 - 0.44	0 - 0.28	0 - 0.42	0.08-0.59	0.05-0.41	0.12-0.57	0.08-0.45	0.05-0.30		
Tailings Observed (Yes or No):		No	No	No	No	No	No	No	No		

Notes:

1. ' -' = no standard available
2. Lab-Dup = laboratory QA/QC duplicate; DUP# = field QA/QC duplicate
3. Tier 1 EQS = Tier 1 Environmental Quality Standards for Soil. From Nova Scotia's *Contaminated Sites Regulations* (July 6, 2013) Notification of Contamination Protocol; Table 1A/1B.
4. <# = parameter concentration below laboratory's reportable detection limit
5. mbg = meters below grade
6. * = sample collected at edge of cut
7. **Bold & Underlined** = parameter concentration exceeds the Tier 1 EQS

Your Project #: 121414896
Your C.O.C. #: D 15202, D 28503, D 28504

Attention:Morgan Schauerte

Stantec Consulting Ltd
40 Highfield Park Drive
Suite 102
Dartmouth, NS
B3A 0A3

Report Date: 2017/12/07
Report #: R4899592
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7R1346
Received: 2017/11/30, 13:58

Sample Matrix: Soil
Samples Received: 27

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Metals Solids Acid Extr. ICPMS	5	2017/12/05	2017/12/05	ATL SOP 00058	EPA 6020A R1 m
Metals Solids Acid Extr. ICPMS	22	2017/12/05	2017/12/06	ATL SOP 00058	EPA 6020A R1 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Your Project #: 121414896
Your C.O.C. #: D 15202, D 28503, D 28504

Attention:Morgan Schauerte

Stantec Consulting Ltd
40 Highfield Park Drive
Suite 102
Dartmouth, NS
B3A 0A3

Report Date: 2017/12/07
Report #: R4899592
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7R1346
Received: 2017/11/30, 13:58

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Marie Muise, Key Account Specialist
Email: MMuise@maxxam.ca
Phone# (902)420-0203 Ext:253
==========
This report has been generated and distributed using a secure automated process.
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B7R1346
Report Date: 2017/12/07

Stantec Consulting Ltd
Client Project #: 121414896
Sampler Initials: JO

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FRA269	FRA270		FRA271	FRA272	FRA272		
Sampling Date		2017/11/27	2017/11/27		2017/11/27	2017/11/27	2017/11/27		
COC Number		D 15202	D 15202		D 15202	D 15202	D 15202		
	UNITS	**GK17 BH19A**	**GK17 BH16A**	**QC Batch**	**GK17 BH16B**	**GK17 BH22A**	**GK17 BH22A Lab-Dup**	**RDL**	**QC Batch**
Metals									
Acid Extractable Aluminum (Al)	mg/kg	16000	19000	5298975	14000	17000	19000	10	5299111
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	5298975	<2.0	<2.0	<2.0	2.0	5299111
Acid Extractable Arsenic (As)	mg/kg	950	1200	5298975	1400	1300	1300	20	5299111
Acid Extractable Barium (Ba)	mg/kg	<5.0	12	5298975	18	29	33	5.0	5299111
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	5298975	<2.0	<2.0	<2.0	2.0	5299111
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	5298975	<2.0	<2.0	<2.0	2.0	5299111
Acid Extractable Boron (B)	mg/kg	<50	<50	5298975	<50	<50	<50	50	5299111
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	5298975	<0.30	<0.30	<0.30	0.30	5299111
Acid Extractable Chromium (Cr)	mg/kg	17	20	5298975	15	20	22	2.0	5299111
Acid Extractable Cobalt (Co)	mg/kg	15	22	5298975	19	26	27	1.0	5299111
Acid Extractable Copper (Cu)	mg/kg	61	68	5298975	47	15	26 (1)	2.0	5299111
Acid Extractable Iron (Fe)	mg/kg	51000	41000	5298975	32000	35000	38000	50	5299111
Acid Extractable Lead (Pb)	mg/kg	25	24	5298975	29	35	42	0.50	5299111
Acid Extractable Lithium (Li)	mg/kg	24	29	5298975	22	29	31	2.0	5299111
Acid Extractable Manganese (Mn)	mg/kg	510	660	5298975	960	2000	2100	2.0	5299111
Acid Extractable Mercury (Hg)	mg/kg	2.6	3.1	5298975	1.4	0.80	0.87	0.10	5299111
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	5298975	<2.0	<2.0	<2.0	2.0	5299111
Acid Extractable Nickel (Ni)	mg/kg	40	28	5298975	27	19	20	2.0	5299111
Acid Extractable Rubidium (Rb)	mg/kg	<2.0	2.2	5298975	4.2	7.7	8.7	2.0	5299111
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	5298975	<1.0	1.4	1.3	1.0	5299111
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	5298975	<0.50	<0.50	<0.50	0.50	5299111
Acid Extractable Strontium (Sr)	mg/kg	<5.0	<5.0	5298975	5.0	6.2	7.1	5.0	5299111
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	5298975	<0.10	<0.10	0.11	0.10	5299111
Acid Extractable Tin (Sn)	mg/kg	<2.0	<2.0	5298975	<2.0	<2.0	<2.0	2.0	5299111
Acid Extractable Uranium (U)	mg/kg	0.43	0.46	5298975	0.49	0.92	0.99	0.10	5299111
Acid Extractable Vanadium (V)	mg/kg	11	12	5298975	12	15	16	2.0	5299111
Acid Extractable Zinc (Zn)	mg/kg	85	89	5298975	69	70	76	5.0	5299111

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
(1) Poor RPD due to sample inhomogeneity. Results confirmed with repeat digestion and analysis.

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Maxxam Job #: B7R1346
Report Date: 2017/12/07

Stantec Consulting Ltd
Client Project #: 121414896
Sampler Initials: JO

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FRA272	FRA273	FRA274	FRA275	FRA276	FRA277		
Sampling Date		2017/11/27	2017/11/27	2017/11/27	2017/11/27	2017/11/27	2017/11/27		
COC Number		D 15202	D 15202	D 15202	D 15202	D 15202	D 15202		
	UNITS	**GK17 BH22A Lab-Dup 2**	**GK17 BH23A**	**GK17 BH24A**	**GK17 BH21A**	**GK17 BH21B**	**GK17 BH20A**	**RDL**	**QC Batch**
Metals									
Acid Extractable Aluminum (Al)	mg/kg	N/A	16000	14000	13000	14000	19000	10	5299111
Acid Extractable Antimony (Sb)	mg/kg	N/A	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	5299111
Acid Extractable Arsenic (As)	mg/kg	N/A	3000	1600	500	680	1100	20	5299111
Acid Extractable Barium (Ba)	mg/kg	N/A	25	21	11	14	15	5.0	5299111
Acid Extractable Beryllium (Be)	mg/kg	N/A	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	5299111
Acid Extractable Bismuth (Bi)	mg/kg	N/A	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	5299111
Acid Extractable Boron (B)	mg/kg	N/A	<50	<50	<50	<50	<50	50	5299111
Acid Extractable Cadmium (Cd)	mg/kg	N/A	<0.30	<0.30	<0.30	<0.30	<0.30	0.30	5299111
Acid Extractable Chromium (Cr)	mg/kg	N/A	17	17	12	15	20	2.0	5299111
Acid Extractable Cobalt (Co)	mg/kg	N/A	19	25	4.3	11	20	1.0	5299111
Acid Extractable Copper (Cu)	mg/kg	17	36	48	11	21	41	2.0	5299111
Acid Extractable Iron (Fe)	mg/kg	N/A	38000	36000	24000	32000	40000	50	5299111
Acid Extractable Lead (Pb)	mg/kg	N/A	25	18	9.4	14	31	0.50	5299111
Acid Extractable Lithium (Li)	mg/kg	N/A	24	26	19	19	28	2.0	5299111
Acid Extractable Manganese (Mn)	mg/kg	N/A	870	1100	280	420	690	2.0	5299111
Acid Extractable Mercury (Hg)	mg/kg	N/A	0.14	0.32	<0.10	0.18	0.17	0.10	5299111
Acid Extractable Molybdenum (Mo)	mg/kg	N/A	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	5299111
Acid Extractable Nickel (Ni)	mg/kg	N/A	24	34	10	14	31	2.0	5299111
Acid Extractable Rubidium (Rb)	mg/kg	N/A	3.0	<2.0	5.3	4.1	4.2	2.0	5299111
Acid Extractable Selenium (Se)	mg/kg	N/A	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	5299111
Acid Extractable Silver (Ag)	mg/kg	N/A	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5299111
Acid Extractable Strontium (Sr)	mg/kg	N/A	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	5299111
Acid Extractable Thallium (Tl)	mg/kg	N/A	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	5299111
Acid Extractable Tin (Sn)	mg/kg	N/A	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	5299111
Acid Extractable Uranium (U)	mg/kg	N/A	0.63	0.81	0.40	0.45	0.62	0.10	5299111
Acid Extractable Vanadium (V)	mg/kg	N/A	13	12	12	17	16	2.0	5299111
Acid Extractable Zinc (Zn)	mg/kg	N/A	66	70	39	47	76	5.0	5299111

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B7R1346
Report Date: 2017/12/07

Stantec Consulting Ltd
Client Project #: 121414896
Sampler Initials: JO

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FRA278		FRA279	FRA280			FRA281		
Sampling Date		2017/11/27		2017/11/28	2017/11/28			2017/11/28		
COC Number		D 15202		D 28503	D 28503			D 28503		
	UNITS	**GK17 BH18A**	**QC Batch**	**MR17 BH19A**	**MR17 BH19B**	**RDL**	**QC Batch**	**MR17 BH21A**	**RDL**	**QC Batch**
Metals										
Acid Extractable Aluminum (Al)	mg/kg	13000	5299111	9300	11000	10	5298975	21000	10	5299111
Acid Extractable Antimony (Sb)	mg/kg	<2.0	5299111	<2.0	<2.0	2.0	5298975	<2.0	2.0	5299111
Acid Extractable Arsenic (As)	mg/kg	160	5299111	48	51	2.0	5298975	570	20	5299111
Acid Extractable Barium (Ba)	mg/kg	35	5299111	21	52	5.0	5298975	43	5.0	5299111
Acid Extractable Beryllium (Be)	mg/kg	<2.0	5299111	<2.0	<2.0	2.0	5298975	<2.0	2.0	5299111
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	5299111	<2.0	<2.0	2.0	5298975	<2.0	2.0	5299111
Acid Extractable Boron (B)	mg/kg	<50	5299111	<50	<50	50	5298975	<50	50	5299111
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	5299111	<0.30	<0.30	0.30	5298975	<0.30	0.30	5299111
Acid Extractable Chromium (Cr)	mg/kg	17	5299111	12	16	2.0	5298975	22	2.0	5299111
Acid Extractable Cobalt (Co)	mg/kg	11	5299111	5.2	12	1.0	5298975	11	1.0	5299111
Acid Extractable Copper (Cu)	mg/kg	20	5299111	4.8	12	2.0	5298975	22	2.0	5299111
Acid Extractable Iron (Fe)	mg/kg	26000	5299111	15000	27000	50	5298975	44000	50	5299111
Acid Extractable Lead (Pb)	mg/kg	15	5299111	13	11	0.50	5298975	25	0.50	5299111
Acid Extractable Lithium (Li)	mg/kg	25	5299111	18	26	2.0	5298975	33	2.0	5299111
Acid Extractable Manganese (Mn)	mg/kg	900	5299111	270	790	2.0	5298975	530	2.0	5299111
Acid Extractable Mercury (Hg)	mg/kg	<0.10	5299111	0.36	0.11	0.10	5298975	2.1	0.10	5299111
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	5299111	<2.0	<2.0	2.0	5298975	<2.0	2.0	5299111
Acid Extractable Nickel (Ni)	mg/kg	21	5299111	9.4	20	2.0	5298975	21	2.0	5299111
Acid Extractable Rubidium (Rb)	mg/kg	5.6	5299111	4.7	5.0	2.0	5298975	3.4	2.0	5299111
Acid Extractable Selenium (Se)	mg/kg	<1.0	5299111	<1.0	<1.0	1.0	5298975	<1.0	1.0	5299111
Acid Extractable Silver (Ag)	mg/kg	<0.50	5299111	<0.50	<0.50	0.50	5298975	<0.50	0.50	5299111
Acid Extractable Strontium (Sr)	mg/kg	6.0	5299111	<5.0	5.2	5.0	5298975	6.1	5.0	5299111
Acid Extractable Thallium (Tl)	mg/kg	<0.10	5299111	<0.10	<0.10	0.10	5298975	<0.10	0.10	5299111
Acid Extractable Tin (Sn)	mg/kg	<2.0	5299111	<2.0	<2.0	2.0	5298975	<2.0	2.0	5299111
Acid Extractable Uranium (U)	mg/kg	0.85	5299111	0.49	1.7	0.10	5298975	0.70	0.10	5299111
Acid Extractable Vanadium (V)	mg/kg	16	5299111	13	16	2.0	5298975	16	2.0	5299111
Acid Extractable Zinc (Zn)	mg/kg	50	5299111	32	52	5.0	5298975	93	5.0	5299111

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7R1346
Report Date: 2017/12/07

Stantec Consulting Ltd
Client Project #: 121414896
Sampler Initials: JO

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FRA282		FRA283		FRA284	FRA284		
Sampling Date		2017/11/28		2017/11/28		2017/11/28	2017/11/28		
COC Number		D 28503		D 28503		D 28503	D 28503		
	UNITS	**MR17 BH21B**	**QC Batch**	**MR17 BH22A**	**QC Batch**	**MR17 BH23A**	**MR17 BH23A Lab-Dup**	**RDL**	**QC Batch**
Metals									
Acid Extractable Aluminum (Al)	mg/kg	10000	5299111	11000	5298975	8400	8300	10	5298978
Acid Extractable Antimony (Sb)	mg/kg	<2.0	5299111	<2.0	5298975	<2.0	<2.0	2.0	5298978
Acid Extractable Arsenic (As)	mg/kg	21	5299111	7.0	5298975	26	28	2.0	5298978
Acid Extractable Barium (Ba)	mg/kg	82	5299111	35	5298975	32	33	5.0	5298978
Acid Extractable Beryllium (Be)	mg/kg	<2.0	5299111	<2.0	5298975	<2.0	<2.0	2.0	5298978
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	5299111	<2.0	5298975	<2.0	<2.0	2.0	5298978
Acid Extractable Boron (B)	mg/kg	<50	5299111	<50	5298975	<50	<50	50	5298978
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	5299111	<0.30	5298975	<0.30	<0.30	0.30	5298978
Acid Extractable Chromium (Cr)	mg/kg	15	5299111	15	5298975	11	11	2.0	5298978
Acid Extractable Cobalt (Co)	mg/kg	12	5299111	6.0	5298975	4.7	4.9	1.0	5298978
Acid Extractable Copper (Cu)	mg/kg	21	5299111	3.3	5298975	6.8	6.6	2.0	5298978
Acid Extractable Iron (Fe)	mg/kg	25000	5299111	17000	5298975	14000	14000	50	5298978
Acid Extractable Lead (Pb)	mg/kg	14	5299111	9.9	5298975	13	13	0.50	5298978
Acid Extractable Lithium (Li)	mg/kg	22	5299111	22	5298975	20	20	2.0	5298978
Acid Extractable Manganese (Mn)	mg/kg	1200	5299111	330	5298975	410	450	2.0	5298978
Acid Extractable Mercury (Hg)	mg/kg	<0.10	5299111	<0.10	5298975	0.33	0.29	0.10	5298978
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	5299111	<2.0	5298975	<2.0	<2.0	2.0	5298978
Acid Extractable Nickel (Ni)	mg/kg	22	5299111	12	5298975	13	12	2.0	5298978
Acid Extractable Rubidium (Rb)	mg/kg	4.8	5299111	7.5	5298975	3.5	3.5	2.0	5298978
Acid Extractable Selenium (Se)	mg/kg	<1.0	5299111	<1.0	5298975	<1.0	<1.0	1.0	5298978
Acid Extractable Silver (Ag)	mg/kg	<0.50	5299111	<0.50	5298975	<0.50	<0.50	0.50	5298978
Acid Extractable Strontium (Sr)	mg/kg	11	5299111	6.5	5298975	7.8	7.5	5.0	5298978
Acid Extractable Thallium (Tl)	mg/kg	<0.10	5299111	<0.10	5298975	<0.10	<0.10	0.10	5298978
Acid Extractable Tin (Sn)	mg/kg	<2.0	5299111	<2.0	5298975	<2.0	<2.0	2.0	5298978
Acid Extractable Uranium (U)	mg/kg	0.66	5299111	0.58	5298975	0.73	0.75	0.10	5298978
Acid Extractable Vanadium (V)	mg/kg	14	5299111	15	5298975	11	11	2.0	5298978
Acid Extractable Zinc (Zn)	mg/kg	42	5299111	37	5298975	31	32	5.0	5298978

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B7R1346
Report Date: 2017/12/07

Stantec Consulting Ltd
Client Project #: 121414896
Sampler Initials: JO

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FRA285		FRA286		FRA287			FRA288		
Sampling Date		2017/11/28		2017/11/28		2017/11/28			2017/11/28		
COC Number		D 28503		D 28503		D 28503			D 28503		
	UNITS	**MR17 BH18A**	**RDL**	**MR17 BH18B**	**RDL**	**MR17 BH16A**	**RDL**	**QC Batch**	**MR17 BH20A**	**RDL**	**QC Batch**
Metals											
Acid Extractable Aluminum (Al)	mg/kg	18000	10	15000	10	16000	10	5298975	11000	10	5298978
Acid Extractable Antimony (Sb)	mg/kg	<2.0	2.0	<2.0	2.0	<2.0	2.0	5298975	<2.0	2.0	5298978
Acid Extractable Arsenic (As)	mg/kg	1200	20	180	2.0	610	20	5298975	23	2.0	5298978
Acid Extractable Barium (Ba)	mg/kg	49	5.0	51	5.0	18	5.0	5298975	55	5.0	5298978
Acid Extractable Beryllium (Be)	mg/kg	<2.0	2.0	<2.0	2.0	<2.0	2.0	5298975	<2.0	2.0	5298978
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	2.0	<2.0	2.0	<2.0	2.0	5298975	<2.0	2.0	5298978
Acid Extractable Boron (B)	mg/kg	<50	50	<50	50	<50	50	5298975	<50	50	5298978
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	0.30	<0.30	0.30	<0.30	0.30	5298975	<0.30	0.30	5298978
Acid Extractable Chromium (Cr)	mg/kg	38	2.0	22	2.0	18	2.0	5298975	15	2.0	5298978
Acid Extractable Cobalt (Co)	mg/kg	17	1.0	13	1.0	18	1.0	5298975	9.6	1.0	5298978
Acid Extractable Copper (Cu)	mg/kg	48	2.0	8.3	2.0	30	2.0	5298975	12	2.0	5298978
Acid Extractable Iron (Fe)	mg/kg	34000	50	32000	50	37000	50	5298975	22000	50	5298978
Acid Extractable Lead (Pb)	mg/kg	23	0.50	24	0.50	14	0.50	5298975	11	0.50	5298978
Acid Extractable Lithium (Li)	mg/kg	26	2.0	40	2.0	26	2.0	5298975	26	2.0	5298978
Acid Extractable Manganese (Mn)	mg/kg	810	2.0	810	2.0	910	2.0	5298975	1200	2.0	5298978
Acid Extractable Mercury (Hg)	mg/kg	<0.10	0.10	0.16	0.10	0.15	0.10	5298975	<0.10	0.10	5298978
Acid Extractable Molybdenum (Mo)	mg/kg	2.1	2.0	2.2	2.0	<2.0	2.0	5298975	<2.0	2.0	5298978
Acid Extractable Nickel (Ni)	mg/kg	24	2.0	19	2.0	29	2.0	5298975	20	2.0	5298978
Acid Extractable Rubidium (Rb)	mg/kg	8.4	2.0	7.8	2.0	4.4	2.0	5298975	5.2	2.0	5298978
Acid Extractable Selenium (Se)	mg/kg	<1.0	1.0	<1.0	1.0	<1.0	1.0	5298975	<1.0	1.0	5298978
Acid Extractable Silver (Ag)	mg/kg	6.8	0.50	<0.50	0.50	<0.50	0.50	5298975	<0.50	0.50	5298978
Acid Extractable Strontium (Sr)	mg/kg	8.3	5.0	7.6	5.0	5.3	5.0	5298975	6.1	5.0	5298978
Acid Extractable Thallium (Tl)	mg/kg	<0.10	0.10	<0.10	0.10	<0.10	0.10	5298975	<0.10	0.10	5298978
Acid Extractable Tin (Sn)	mg/kg	<2.0	2.0	<2.0	2.0	<2.0	2.0	5298975	<2.0	2.0	5298978
Acid Extractable Uranium (U)	mg/kg	0.92	0.10	0.75	0.10	0.84	0.10	5298975	0.81	0.10	5298978
Acid Extractable Vanadium (V)	mg/kg	18	2.0	21	2.0	18	2.0	5298975	15	2.0	5298978
Acid Extractable Zinc (Zn)	mg/kg	71	5.0	59	5.0	59	5.0	5298975	45	5.0	5298978

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7R1346
Report Date: 2017/12/07

Stantec Consulting Ltd
Client Project #: 121414896
Sampler Initials: JO

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FRA289		FRA290		FRA291		FRA292		
Sampling Date		2017/11/28		2017/11/27		2017/11/29		2017/11/29		
COC Number		D 28504		D 28504		D 28504		D 28504		
	UNITS	**MR17 BH17A**	**RDL**	**GK17 BH17A**	**RDL**	**GK17 BG01A**	**RDL**	**GK17 BG02A**	**RDL**	**QC Batch**
Metals										
Acid Extractable Aluminum (Al)	mg/kg	11000	10	15000	10	19000	10	17000	10	5298978
Acid Extractable Antimony (Sb)	mg/kg	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	5298978
Acid Extractable Arsenic (As)	mg/kg	38	2.0	1100	20	280	2.0	800	20	5298978
Acid Extractable Barium (Ba)	mg/kg	16	5.0	24	5.0	20	5.0	16	5.0	5298978
Acid Extractable Beryllium (Be)	mg/kg	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	5298978
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	5298978
Acid Extractable Boron (B)	mg/kg	<50	50	<50	50	<50	50	<50	50	5298978
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	0.30	<0.30	0.30	<0.30	0.30	<0.30	0.30	5298978
Acid Extractable Chromium (Cr)	mg/kg	13	2.0	15	2.0	19	2.0	19	2.0	5298978
Acid Extractable Cobalt (Co)	mg/kg	7.9	1.0	16	1.0	4.4	1.0	21	1.0	5298978
Acid Extractable Copper (Cu)	mg/kg	14	2.0	35	2.0	11	2.0	46	2.0	5298978
Acid Extractable Iron (Fe)	mg/kg	19000	50	30000	50	42000	50	38000	50	5298978
Acid Extractable Lead (Pb)	mg/kg	7.7	0.50	17	0.50	27	0.50	22	0.50	5298978
Acid Extractable Lithium (Li)	mg/kg	20	2.0	21	2.0	16	2.0	27	2.0	5298978
Acid Extractable Manganese (Mn)	mg/kg	490	2.0	610	2.0	340	2.0	1000	2.0	5298978
Acid Extractable Mercury (Hg)	mg/kg	<0.10	0.10	0.44	0.10	0.26	0.10	0.13	0.10	5298978
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	5298978
Acid Extractable Nickel (Ni)	mg/kg	15	2.0	26	2.0	10	2.0	32	2.0	5298978
Acid Extractable Rubidium (Rb)	mg/kg	4.6	2.0	3.8	2.0	3.8	2.0	3.1	2.0	5298978
Acid Extractable Selenium (Se)	mg/kg	<1.0	1.0	<1.0	1.0	1.6	1.0	<1.0	1.0	5298978
Acid Extractable Silver (Ag)	mg/kg	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	5298978
Acid Extractable Strontium (Sr)	mg/kg	<5.0	5.0	8.7	5.0	<5.0	5.0	<5.0	5.0	5298978
Acid Extractable Thallium (Tl)	mg/kg	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	5298978
Acid Extractable Tin (Sn)	mg/kg	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	5298978
Acid Extractable Uranium (U)	mg/kg	0.70	0.10	0.70	0.10	0.48	0.10	0.81	0.10	5298978
Acid Extractable Vanadium (V)	mg/kg	13	2.0	16	2.0	24	2.0	14	2.0	5298978
Acid Extractable Zinc (Zn)	mg/kg	33	5.0	71	5.0	37	5.0	73	5.0	5298978

RDL = Reportable Detection Limit
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Maxxam Job #: B7R1346
Report Date: 2017/12/07

Stantec Consulting Ltd
Client Project #: 121414896
Sampler Initials: JO

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FRA293	FRA294	FRA295		
Sampling Date		2017/11/29	2017/11/29	2017/11/29		
COC Number		D 28504	D 28504	D 28504		
	UNITS	**MR17 BG01A**	**MR17 BG02A**	**MR17 BG03A**	**RDL**	**QC Batch**
Metals						
Acid Extractable Aluminum (Al)	mg/kg	16000	15000	6100	10	5298978
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	2.0	5298978
Acid Extractable Arsenic (As)	mg/kg	19	20	5.3	2.0	5298978
Acid Extractable Barium (Ba)	mg/kg	13	33	15	5.0	5298978
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	2.0	5298978
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	2.0	5298978
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	50	5298978
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	<0.30	0.30	5298978
Acid Extractable Chromium (Cr)	mg/kg	17	16	6.2	2.0	5298978
Acid Extractable Cobalt (Co)	mg/kg	3.6	19	1.9	1.0	5298978
Acid Extractable Copper (Cu)	mg/kg	12	7.5	<2.0	2.0	5298978
Acid Extractable Iron (Fe)	mg/kg	25000	21000	6800	50	5298978
Acid Extractable Lead (Pb)	mg/kg	10	14	7.6	0.50	5298978
Acid Extractable Lithium (Li)	mg/kg	19	30	11	2.0	5298978
Acid Extractable Manganese (Mn)	mg/kg	200	1700	110	2.0	5298978
Acid Extractable Mercury (Hg)	mg/kg	<0.10	0.12	<0.10	0.10	5298978
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	2.1	<2.0	2.0	5298978
Acid Extractable Nickel (Ni)	mg/kg	7.7	13	4.2	2.0	5298978
Acid Extractable Rubidium (Rb)	mg/kg	5.7	8.4	4.8	2.0	5298978
Acid Extractable Selenium (Se)	mg/kg	<1.0	1.1	<1.0	1.0	5298978
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	0.50	5298978
Acid Extractable Strontium (Sr)	mg/kg	<5.0	<5.0	<5.0	5.0	5298978
Acid Extractable Thallium (Tl)	mg/kg	<0.10	0.12	<0.10	0.10	5298978
Acid Extractable Tin (Sn)	mg/kg	<2.0	<2.0	<2.0	2.0	5298978
Acid Extractable Uranium (U)	mg/kg	0.67	0.74	0.27	0.10	5298978
Acid Extractable Vanadium (V)	mg/kg	21	15	8.4	2.0	5298978
Acid Extractable Zinc (Zn)	mg/kg	25	42	14	5.0	5298978

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.7°C

Results relate only to the items tested.

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Maxxam Job #: B7R1346
Report Date: 2017/12/07

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 121414896
Sampler Initials: JO

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5298975	Acid Extractable Aluminum (Al)	2017/12/05					<10	mg/kg	0.067	35
5298975	Acid Extractable Antimony (Sb)	2017/12/05	85	75 - 125	96	75 - 125	<2.0	mg/kg	NC	35
5298975	Acid Extractable Arsenic (As)	2017/12/05	98	75 - 125	100	75 - 125	<2.0	mg/kg	6.2	35
5298975	Acid Extractable Barium (Ba)	2017/12/05	NC	75 - 125	99	75 - 125	<5.0	mg/kg	4.2	35
5298975	Acid Extractable Beryllium (Be)	2017/12/05	100	75 - 125	101	75 - 125	<2.0	mg/kg	NC	35
5298975	Acid Extractable Bismuth (Bi)	2017/12/05	98	75 - 125	98	75 - 125	<2.0	mg/kg	NC	35
5298975	Acid Extractable Boron (B)	2017/12/05	96	75 - 125	100	75 - 125	<50	mg/kg	NC	35
5298975	Acid Extractable Cadmium (Cd)	2017/12/05	100	75 - 125	100	75 - 125	<0.30	mg/kg	NC	35
5298975	Acid Extractable Chromium (Cr)	2017/12/05	102	75 - 125	98	75 - 125	<2.0	mg/kg	8.9	35
5298975	Acid Extractable Cobalt (Co)	2017/12/05	97	75 - 125	97	75 - 125	<1.0	mg/kg	2.8	35
5298975	Acid Extractable Copper (Cu)	2017/12/05	98	75 - 125	98	75 - 125	<2.0	mg/kg	1.2	35
5298975	Acid Extractable Iron (Fe)	2017/12/05					<50	mg/kg	4.8	35
5298975	Acid Extractable Lead (Pb)	2017/12/05	96	75 - 125	97	75 - 125	<0.50	mg/kg	1.8	35
5298975	Acid Extractable Lithium (Li)	2017/12/05	106	75 - 125	103	75 - 125	<2.0	mg/kg	1.3	35
5298975	Acid Extractable Manganese (Mn)	2017/12/05	NC	75 - 125	101	75 - 125	<2.0	mg/kg	1.9	35
5298975	Acid Extractable Mercury (Hg)	2017/12/05	96	75 - 125	100	75 - 125	<0.10	mg/kg	NC	35
5298975	Acid Extractable Molybdenum (Mo)	2017/12/05	97	75 - 125	101	75 - 125	<2.0	mg/kg	NC	35
5298975	Acid Extractable Nickel (Ni)	2017/12/05	102	75 - 125	100	75 - 125	<2.0	mg/kg	27	35
5298975	Acid Extractable Rubidium (Rb)	2017/12/05	99	75 - 125	99	75 - 125	<2.0	mg/kg	1.2	35
5298975	Acid Extractable Selenium (Se)	2017/12/05	101	75 - 125	103	75 - 125	<1.0	mg/kg	NC	35
5298975	Acid Extractable Silver (Ag)	2017/12/05	101	75 - 125	97	75 - 125	<0.50	mg/kg	NC	35
5298975	Acid Extractable Strontium (Sr)	2017/12/05	110	75 - 125	98	75 - 125	<5.0	mg/kg	11	35
5298975	Acid Extractable Thallium (Tl)	2017/12/05	99	75 - 125	99	75 - 125	<0.10	mg/kg	6.3	35
5298975	Acid Extractable Tin (Sn)	2017/12/05	117	75 - 125	102	75 - 125	<2.0	mg/kg	NC	35
5298975	Acid Extractable Uranium (U)	2017/12/05	98	75 - 125	98	75 - 125	<0.10	mg/kg	0.61	35
5298975	Acid Extractable Vanadium (V)	2017/12/05	99	75 - 125	99	75 - 125	<2.0	mg/kg	4.2	35
5298975	Acid Extractable Zinc (Zn)	2017/12/05	NC	75 - 125	103	75 - 125	<5.0	mg/kg	1.3	35
5298978	Acid Extractable Aluminum (Al)	2017/12/05					<10	mg/kg	1.1	35
5298978	Acid Extractable Antimony (Sb)	2017/12/05	95	75 - 125	102	75 - 125	<2.0	mg/kg	NC	35
5298978	Acid Extractable Arsenic (As)	2017/12/05	98	75 - 125	100	75 - 125	<2.0	mg/kg	9.1	35
5298978	Acid Extractable Barium (Ba)	2017/12/05	107	75 - 125	100	75 - 125	<5.0	mg/kg	4.4	35

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5298978	Acid Extractable Beryllium (Be)	2017/12/05	101	75 - 125	101	75 - 125	<2.0	mg/kg	NC	35
5298978	Acid Extractable Bismuth (Bi)	2017/12/05	101	75 - 125	98	75 - 125	<2.0	mg/kg	NC	35
5298978	Acid Extractable Boron (B)	2017/12/05	86	75 - 125	101	75 - 125	<50	mg/kg	NC	35
5298978	Acid Extractable Cadmium (Cd)	2017/12/05	99	75 - 125	102	75 - 125	<0.30	mg/kg	NC	35
5298978	Acid Extractable Chromium (Cr)	2017/12/05	101	75 - 125	99	75 - 125	<2.0	mg/kg	0.22	35
5298978	Acid Extractable Cobalt (Co)	2017/12/05	100	75 - 125	97	75 - 125	<1.0	mg/kg	3.1	35
5298978	Acid Extractable Copper (Cu)	2017/12/05	101	75 - 125	98	75 - 125	<2.0	mg/kg	2.7	35
5298978	Acid Extractable Iron (Fe)	2017/12/05					<50	mg/kg	0.16	35
5298978	Acid Extractable Lead (Pb)	2017/12/05	98	75 - 125	98	75 - 125	<0.50	mg/kg	1.6	35
5298978	Acid Extractable Lithium (Li)	2017/12/05	107	75 - 125	102	75 - 125	<2.0	mg/kg	2.1	35
5298978	Acid Extractable Manganese (Mn)	2017/12/05	NC	75 - 125	101	75 - 125	<2.0	mg/kg	8.7	35
5298978	Acid Extractable Mercury (Hg)	2017/12/05	98	75 - 125	101	75 - 125	<0.10	mg/kg	11	35
5298978	Acid Extractable Molybdenum (Mo)	2017/12/05	104	75 - 125	103	75 - 125	<2.0	mg/kg	NC	35
5298978	Acid Extractable Nickel (Ni)	2017/12/05	102	75 - 125	100	75 - 125	<2.0	mg/kg	2.1	35
5298978	Acid Extractable Rubidium (Rb)	2017/12/05	98	75 - 125	98	75 - 125	<2.0	mg/kg	2.0	35
5298978	Acid Extractable Selenium (Se)	2017/12/05	101	75 - 125	103	75 - 125	<1.0	mg/kg	NC	35
5298978	Acid Extractable Silver (Ag)	2017/12/05	101	75 - 125	102	75 - 125	<0.50	mg/kg	NC	35
5298978	Acid Extractable Strontium (Sr)	2017/12/05	105	75 - 125	97	75 - 125	<5.0	mg/kg	3.5	35
5298978	Acid Extractable Thallium (Tl)	2017/12/05	100	75 - 125	100	75 - 125	<0.10	mg/kg	NC	35
5298978	Acid Extractable Tin (Sn)	2017/12/05	108	75 - 125	102	75 - 125	<2.0	mg/kg	NC	35
5298978	Acid Extractable Uranium (U)	2017/12/05	98	75 - 125	98	75 - 125	<0.10	mg/kg	1.6	35
5298978	Acid Extractable Vanadium (V)	2017/12/05	101	75 - 125	100	75 - 125	<2.0	mg/kg	7.0	35
5298978	Acid Extractable Zinc (Zn)	2017/12/05	106	75 - 125	99	75 - 125	<5.0	mg/kg	1.7	35
5299111	Acid Extractable Aluminum (Al)	2017/12/06					<10	mg/kg	8.2	35
5299111	Acid Extractable Antimony (Sb)	2017/12/06	96	75 - 125	100	75 - 125	<2.0	mg/kg	NC	35
5299111	Acid Extractable Arsenic (As)	2017/12/06	NC	75 - 125	101	75 - 125	<2.0	mg/kg	2.2	35
5299111	Acid Extractable Barium (Ba)	2017/12/06	111	75 - 125	98	75 - 125	<5.0	mg/kg	12	35
5299111	Acid Extractable Beryllium (Be)	2017/12/06	100	75 - 125	99	75 - 125	<2.0	mg/kg	NC	35
5299111	Acid Extractable Bismuth (Bi)	2017/12/06	97	75 - 125	97	75 - 125	<2.0	mg/kg	NC	35
5299111	Acid Extractable Boron (B)	2017/12/06	83	75 - 125	99	75 - 125	<50	mg/kg	NC	35
5299111	Acid Extractable Cadmium (Cd)	2017/12/06	104	75 - 125	100	75 - 125	<0.30	mg/kg	NC	35

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5299111	Acid Extractable Chromium (Cr)	2017/12/06	100	75 - 125	98	75 - 125	<2.0	mg/kg	6.7	35
5299111	Acid Extractable Cobalt (Co)	2017/12/06	101	75 - 125	97	75 - 125	<1.0	mg/kg	5.8	35
5299111	Acid Extractable Copper (Cu)	2017/12/06	98	75 - 125	98	75 - 125	<2.0	mg/kg	54 (1)	35
5299111	Acid Extractable Iron (Fe)	2017/12/06					<50	mg/kg	6.5	35
5299111	Acid Extractable Lead (Pb)	2017/12/06	106	75 - 125	97	75 - 125	<0.50	mg/kg	17	35
5299111	Acid Extractable Lithium (Li)	2017/12/06	93	75 - 125	102	75 - 125	<2.0	mg/kg	7.9	35
5299111	Acid Extractable Manganese (Mn)	2017/12/06	NC	75 - 125	100	75 - 125	<2.0	mg/kg	5.5	35
5299111	Acid Extractable Mercury (Hg)	2017/12/06	92	75 - 125	101	75 - 125	<0.10	mg/kg	7.8	35
5299111	Acid Extractable Molybdenum (Mo)	2017/12/06	106	75 - 125	100	75 - 125	<2.0	mg/kg	NC	35
5299111	Acid Extractable Nickel (Ni)	2017/12/06	99	75 - 125	98	75 - 125	<2.0	mg/kg	4.9	35
5299111	Acid Extractable Rubidium (Rb)	2017/12/06	96	75 - 125	98	75 - 125	<2.0	mg/kg	12	35
5299111	Acid Extractable Selenium (Se)	2017/12/06	101	75 - 125	102	75 - 125	<1.0	mg/kg	5.6	35
5299111	Acid Extractable Silver (Ag)	2017/12/06	96	75 - 125	100	75 - 125	<0.50	mg/kg	NC	35
5299111	Acid Extractable Strontium (Sr)	2017/12/06	104	75 - 125	100	75 - 125	<5.0	mg/kg	14	35
5299111	Acid Extractable Thallium (Tl)	2017/12/06	99	75 - 125	98	75 - 125	<0.10	mg/kg	14	35
5299111	Acid Extractable Tin (Sn)	2017/12/06	104	75 - 125	102	75 - 125	<2.0	mg/kg	NC	35
5299111	Acid Extractable Uranium (U)	2017/12/06	98	75 - 125	98	75 - 125	<0.10	mg/kg	7.0	35
5299111	Acid Extractable Vanadium (V)	2017/12/06	97	75 - 125	100	75 - 125	<2.0	mg/kg	6.2	35
5299111	Acid Extractable Zinc (Zn)	2017/12/06	NC	75 - 125	102	75 - 125	<5.0	mg/kg	8.6	35

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Poor RPD due to sample inhomogeneity. Results confirmed with repeat digestion and analysis.

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Maxxam Job #: B7R1346
Report Date: 2017/12/07

Stantec Consulting Ltd
Client Project #: 121414896
Sampler Initials: JO

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Eric Dearman, Scientific Specialist

Mike MacGillivray, Scientific Specialist (Inorganics)

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Your Project #: 121414898

Attention:Morgan Schauerte

Stantec Consulting Ltd
40 Highfield Park Drive
Suite 102
Dartmouth, NS
B3A 0A3

Your C.O.C. #: D15196, D15197, D15411, D15412, D15413

Report Date: 2017/09/28
Report #: R4742516
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7K9396
Received: 2017/09/25, 11:03

Sample Matrix: Soil
Samples Received: 41

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Metals Solids Acid Extr. ICPMS	4	2017/09/26	2017/09/26	ATL SOP 00058	EPA 6020A R1 m
Metals Solids Acid Extr. ICPMS	37	2017/09/26	2017/09/27	ATL SOP 00058	EPA 6020A R1 m

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Mercury - Total (CVAA,LL)	1	2017/09/26	2017/09/26	ATL SOP 00026	EPA 245.1 R3 m
Metals Water Total MS	1	2017/09/26	2017/09/26	ATL SOP 00058	EPA 6020A R1 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Your Project #: 121414898

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Your C.O.C. #: D15196, D15197, D15411, D15412, D15413

Report Date: 2017/09/28
Report #: R4742516
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7K9396
Received: 2017/09/25, 11:03

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Marie Muise, Key Account Specialist
Email: MMuise@maxxam.ca
Phone# (902)420-0203 Ext:253

==========

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Maxxam Job #: B7K9396
Report Date: 2017/09/28

Stantec Consulting Ltd
Client Project #: 121414898

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEO614	FEO615	FEO616	FEO616	FEO617		FEO618		
Sampling Date		2017/09/21	2017/09/21	2017/09/21	2017/09/21	2017/09/21		2017/09/21		
COC Number		D15196	D15196	D15196	D15196	D15196		D15196		
	UNITS	**MR17 BH 01**	**MR17 BH 02A**	**MR17 BH 03**	**MR17 BH 03 Lab-Dup**	**MR17 BH 04**	**RDL**	**MR17 BH 05**	**RDL**	**QC Batch**
Metals										
Acid Extractable Aluminum (Al)	mg/kg	10000	16000	11000	11000	25000	10	16000	10	5182130
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	<2.0	5.0	2.0	<2.0	2.0	5182130
Acid Extractable Arsenic (As)	mg/kg	670	1000	480	540	4300	20	36	2.0	5182130
Acid Extractable Barium (Ba)	mg/kg	6.0	15	100	100	11	5.0	44	5.0	5182130
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	<2.0	2.0	5182130
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	<2.0	2.0	5182130
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	<50	50	<50	50	5182130
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	<0.30	<0.30	<0.30	0.30	<0.30	0.30	5182130
Acid Extractable Chromium (Cr)	mg/kg	11	16	14	14	24	2.0	20	2.0	5182130
Acid Extractable Cobalt (Co)	mg/kg	8.9	12	9.5	9.4	11	1.0	12	1.0	5182130
Acid Extractable Copper (Cu)	mg/kg	47	54	20	20	15	2.0	18	2.0	5182130
Acid Extractable Iron (Fe)	mg/kg	24000	36000	22000	23000	38000	50	27000	50	5182130
Acid Extractable Lead (Pb)	mg/kg	28	41	310	290	9.1	0.50	20	0.50	5182130
Acid Extractable Lithium (Li)	mg/kg	18	27	21	21	23	2.0	30	2.0	5182130
Acid Extractable Manganese (Mn)	mg/kg	490	770	790	790	420	2.0	800	2.0	5182130
Acid Extractable Mercury (Hg)	mg/kg	8.1	6.3	0.38	0.32	0.24	0.10	<0.10	0.10	5182130
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	<2.0	2.0	5182130
Acid Extractable Nickel (Ni)	mg/kg	18	26	16	15	17	2.0	19	2.0	5182130
Acid Extractable Rubidium (Rb)	mg/kg	<2.0	<2.0	10	10	3.6	2.0	9.4	2.0	5182130
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	<1.0	<1.0	1.2	1.0	<1.0	1.0	5182130
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	<0.50	0.50	5182130
Acid Extractable Strontium (Sr)	mg/kg	<5.0	7.8	10	11	8.0	5.0	6.7	5.0	5182130
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	5182130
Acid Extractable Tin (Sn)	mg/kg	<2.0	<2.0	2.7	3.1	<2.0	2.0	<2.0	2.0	5182130
Acid Extractable Uranium (U)	mg/kg	0.37	0.47	0.67	0.70	0.83	0.10	0.83	0.10	5182130
Acid Extractable Vanadium (V)	mg/kg	7.5	11	16	15	20	2.0	22	2.0	5182130
Acid Extractable Zinc (Zn)	mg/kg	49	69	550	390	48	5.0	55	5.0	5182130

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEO619	FEO620		FEO621	FEO622		FEO623		
Sampling Date		2017/09/22	2017/09/22		2017/09/22	2017/09/22		2017/09/22		
COC Number		D15196	D15196		D15196	D15196		D15196		
	UNITS	**MR17 BH 06**	**MR17 BH 07**	**RDL**	**MR17 BH 08**	**MR17 BH 09**	**RDL**	**MR17 BH 10**	**RDL**	**QC Batch**
Metals										
Acid Extractable Aluminum (Al)	mg/kg	13000	12000	10	19000	20000	10	13000	10	5182307
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	2.0	2.1	<2.0	2.0	<2.0	2.0	5182307
Acid Extractable Arsenic (As)	mg/kg	52	25	2.0	1100	1000	20	260	2.0	5182307
Acid Extractable Barium (Ba)	mg/kg	24	36	5.0	33	33	5.0	34	5.0	5182307
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	2.0	<2.0	<2.0	2.0	<2.0	2.0	5182307
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	2.0	<2.0	<2.0	2.0	<2.0	2.0	5182307
Acid Extractable Boron (B)	mg/kg	<50	<50	50	<50	<50	50	<50	50	5182307
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	0.30	<0.30	<0.30	0.30	<0.30	0.30	5182307
Acid Extractable Chromium (Cr)	mg/kg	15	15	2.0	18	22	2.0	16	2.0	5182307
Acid Extractable Cobalt (Co)	mg/kg	11	10	1.0	17	33	1.0	14	1.0	5182307
Acid Extractable Copper (Cu)	mg/kg	27	19	2.0	33	27	2.0	24	2.0	5182307
Acid Extractable Iron (Fe)	mg/kg	25000	24000	50	34000	43000	50	28000	50	5182307
Acid Extractable Lead (Pb)	mg/kg	17	14	0.50	30	25	0.50	18	0.50	5182307
Acid Extractable Lithium (Li)	mg/kg	23	23	2.0	24	34	2.0	30	2.0	5182307
Acid Extractable Manganese (Mn)	mg/kg	780	820	2.0	1100	2400	2.0	860	2.0	5182307
Acid Extractable Mercury (Hg)	mg/kg	<0.10	<0.10	0.10	1.2	0.38	0.10	0.30	0.10	5182307
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	2.0	<2.0	<2.0	2.0	<2.0	2.0	5182307
Acid Extractable Nickel (Ni)	mg/kg	19	18	2.0	27	27	2.0	24	2.0	5182307
Acid Extractable Rubidium (Rb)	mg/kg	5.5	6.3	2.0	5.8	6.9	2.0	6.2	2.0	5182307
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	1.0	<1.0	<1.0	1.0	<1.0	1.0	5182307
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	0.50	<0.50	<0.50	0.50	<0.50	0.50	5182307
Acid Extractable Strontium (Sr)	mg/kg	5.5	6.1	5.0	15	6.1	5.0	6.3	5.0	5182307
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	0.10	<0.10	<0.10	0.10	<0.10	0.10	5182307
Acid Extractable Tin (Sn)	mg/kg	<2.0	<2.0	2.0	<2.0	<2.0	2.0	<2.0	2.0	5182307
Acid Extractable Uranium (U)	mg/kg	0.90	0.78	0.10	1.1	1.2	0.10	1.4	0.10	5182307
Acid Extractable Vanadium (V)	mg/kg	16	17	2.0	19	17	2.0	15	2.0	5182307
Acid Extractable Zinc (Zn)	mg/kg	47	51	5.0	57	78	5.0	53	5.0	5182307

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7K9396
Report Date: 2017/09/28

Stantec Consulting Ltd
Client Project #: 121414898

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEO631	FEO632	FEO633	FEO634	FEO635	FEO636		
Sampling Date		2017/09/22	2017/09/22	2017/09/22	2017/09/22	2017/09/22	2017/09/21		
COC Number		D15197	D15197	D15197	D15197	D15197	D15197		
	UNITS	**MR17 BH 11**	**MR17 BH 12**	**MR17 BH 13A**	**MR17 BH 14**	**MR17 BH 15**	**MR17 BH 02B**	**RDL**	**QC Batch**
Metals									
Acid Extractable Aluminum (Al)	mg/kg	13000	9800	11000	13000	16000	11000	10	5182307
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	5182307
Acid Extractable Arsenic (As)	mg/kg	40	29	38	19	450	300	2.0	5182307
Acid Extractable Barium (Ba)	mg/kg	13	13	25	56	16	33	5.0	5182307
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	5182307
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	5182307
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	<50	<50	50	5182307
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.30	5182307
Acid Extractable Chromium (Cr)	mg/kg	17	13	14	17	18	11	2.0	5182307
Acid Extractable Cobalt (Co)	mg/kg	8.2	7.0	6.3	9.8	12	6.3	1.0	5182307
Acid Extractable Copper (Cu)	mg/kg	15	16	4.2	11	56	14	2.0	5182307
Acid Extractable Iron (Fe)	mg/kg	27000	20000	25000	30000	34000	23000	50	5182307
Acid Extractable Lead (Pb)	mg/kg	11	8.3	13	12	49	16	0.50	5182307
Acid Extractable Lithium (Li)	mg/kg	26	21	24	35	28	22	2.0	5182307
Acid Extractable Manganese (Mn)	mg/kg	530	400	440	560	820	380	2.0	5182307
Acid Extractable Mercury (Hg)	mg/kg	<0.10	<0.10	<0.10	<0.10	8.8	1.4	0.10	5182307
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	5182307
Acid Extractable Nickel (Ni)	mg/kg	18	17	12	22	20	10	2.0	5182307
Acid Extractable Rubidium (Rb)	mg/kg	4.6	3.1	7.7	6.8	2.1	6.8	2.0	5182307
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	5182307
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5182307
Acid Extractable Strontium (Sr)	mg/kg	5.8	<5.0	<5.0	10	6.0	11	5.0	5182307
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	5182307
Acid Extractable Tin (Sn)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	5182307
Acid Extractable Uranium (U)	mg/kg	0.80	0.89	0.56	1.2	0.50	0.54	0.10	5182307
Acid Extractable Vanadium (V)	mg/kg	16	12	20	17	12	15	2.0	5182307
Acid Extractable Zinc (Zn)	mg/kg	45	37	38	44	72	32	5.0	5182307

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7K9396
Report Date: 2017/09/28

Stantec Consulting Ltd
Client Project #: 121414898

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEO637		FEO644	FEO644	FEO645	FEO646		
Sampling Date		2017/09/22		2017/09/20	2017/09/20	2017/09/20	2017/09/20		
COC Number		D15197		D15411	D15411	D15411	D15411		
	UNITS	**MR17 BH 13B**	**RDL**	**GK17 BH 01**	**GK17 BH 01 Lab-Dup**	**GK17 BH 2**	**GK17 BH 03**	**RDL**	**QC Batch**
Metals									
Acid Extractable Aluminum (Al)	mg/kg	15000	10	16000	17000	15000	17000	10	5182307
Acid Extractable Antimony (Sb)	mg/kg	<2.0	2.0	<2.0	<2.0	<2.0	<2.0	2.0	5182307
Acid Extractable Arsenic (As)	mg/kg	15	2.0	1400	1600	4500	1100	20	5182307
Acid Extractable Barium (Ba)	mg/kg	53	5.0	11	11	26	20	5.0	5182307
Acid Extractable Beryllium (Be)	mg/kg	<2.0	2.0	<2.0	<2.0	<2.0	<2.0	2.0	5182307
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	2.0	<2.0	<2.0	<2.0	2.4	2.0	5182307
Acid Extractable Boron (B)	mg/kg	<50	50	<50	<50	<50	<50	50	5182307
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	0.30	<0.30	<0.30	<0.30	<0.30	0.30	5182307
Acid Extractable Chromium (Cr)	mg/kg	20	2.0	18	18	18	19	2.0	5182307
Acid Extractable Cobalt (Co)	mg/kg	19	1.0	25	25	23	30	1.0	5182307
Acid Extractable Copper (Cu)	mg/kg	24	2.0	51	52	26	47	2.0	5182307
Acid Extractable Iron (Fe)	mg/kg	31000	50	39000	40000	36000	43000	50	5182307
Acid Extractable Lead (Pb)	mg/kg	19	0.50	25	25	22	82	0.50	5182307
Acid Extractable Lithium (Li)	mg/kg	29	2.0	26	25	23	27	2.0	5182307
Acid Extractable Manganese (Mn)	mg/kg	1600	2.0	910	910	1000	1000	2.0	5182307
Acid Extractable Mercury (Hg)	mg/kg	<0.10	0.10	<0.10	<0.10	<0.10	0.12	0.10	5182307
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	2.0	<2.0	<2.0	<2.0	<2.0	2.0	5182307
Acid Extractable Nickel (Ni)	mg/kg	27	2.0	38	39	23	48	2.0	5182307
Acid Extractable Rubidium (Rb)	mg/kg	8.9	2.0	2.9	2.6	3.1	2.7	2.0	5182307
Acid Extractable Selenium (Se)	mg/kg	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	1.0	5182307
Acid Extractable Silver (Ag)	mg/kg	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	0.50	5182307
Acid Extractable Strontium (Sr)	mg/kg	5.6	5.0	<5.0	<5.0	5.9	7.1	5.0	5182307
Acid Extractable Thallium (Tl)	mg/kg	<0.10	0.10	<0.10	<0.10	<0.10	<0.10	0.10	5182307
Acid Extractable Tin (Sn)	mg/kg	<2.0	2.0	<2.0	<2.0	<2.0	<2.0	2.0	5182307
Acid Extractable Uranium (U)	mg/kg	0.99	0.10	0.60	0.64	0.97	0.73	0.10	5182307
Acid Extractable Vanadium (V)	mg/kg	21	2.0	13	12	12	12	2.0	5182307
Acid Extractable Zinc (Zn)	mg/kg	59	5.0	76	74	57	87	5.0	5182307

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B7K9396
Report Date: 2017/09/28

Stantec Consulting Ltd
Client Project #: 121414898

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEO647		FEO648	FEO648			FEO649		
Sampling Date		2017/09/20		2017/09/20	2017/09/20			2017/09/21		
COC Number		D15411		D15411	D15411			D15411		
	UNITS	**GK17 BH 04**	**QC Batch**	**GK17 BH 05A**	**GK17 BH 05A Lab-Dup**	**RDL**	**QC Batch**	**GK17 BH 06**	**RDL**	**QC Batch**
Metals										
Acid Extractable Aluminum (Al)	mg/kg	12000	5182307	7900	8400	10	5182323	21000	10	5182307
Acid Extractable Antimony (Sb)	mg/kg	<2.0	5182307	<2.0	<2.0	2.0	5182323	<2.0	2.0	5182307
Acid Extractable Arsenic (As)	mg/kg	94	5182307	170	190	2.0	5182323	700	20	5182307
Acid Extractable Barium (Ba)	mg/kg	28	5182307	20	18	5.0	5182323	16	5.0	5182307
Acid Extractable Beryllium (Be)	mg/kg	<2.0	5182307	<2.0	<2.0	2.0	5182323	<2.0	2.0	5182307
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	5182307	<2.0	<2.0	2.0	5182323	<2.0	2.0	5182307
Acid Extractable Boron (B)	mg/kg	<50	5182307	<50	<50	50	5182323	<50	50	5182307
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	5182307	<0.30	<0.30	0.30	5182323	<0.30	0.30	5182307
Acid Extractable Chromium (Cr)	mg/kg	13	5182307	6.2	6.8	2.0	5182323	23	2.0	5182307
Acid Extractable Cobalt (Co)	mg/kg	6.7	5182307	3.6	3.2	1.0	5182323	12	1.0	5182307
Acid Extractable Copper (Cu)	mg/kg	12	5182307	9.0	12	2.0	5182323	38	2.0	5182307
Acid Extractable Iron (Fe)	mg/kg	21000	5182307	14000	14000	50	5182323	40000	50	5182307
Acid Extractable Lead (Pb)	mg/kg	16	5182307	5.7	5.6	0.50	5182323	22	0.50	5182307
Acid Extractable Lithium (Li)	mg/kg	16	5182307	6.9	7.1	2.0	5182323	33	2.0	5182307
Acid Extractable Manganese (Mn)	mg/kg	560	5182307	220	190	2.0	5182323	340	2.0	5182307
Acid Extractable Mercury (Hg)	mg/kg	<0.10	5182307	<0.10	<0.10	0.10	5182323	4.8	0.10	5182307
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	5182307	<2.0	<2.0	2.0	5182323	<2.0	2.0	5182307
Acid Extractable Nickel (Ni)	mg/kg	12	5182307	9.3	10	2.0	5182323	26	2.0	5182307
Acid Extractable Rubidium (Rb)	mg/kg	5.3	5182307	3.0	2.8	2.0	5182323	3.1	2.0	5182307
Acid Extractable Selenium (Se)	mg/kg	<1.0	5182307	<1.0	<1.0	1.0	5182323	<1.0	1.0	5182307
Acid Extractable Silver (Ag)	mg/kg	<0.50	5182307	<0.50	<0.50	0.50	5182323	<0.50	0.50	5182307
Acid Extractable Strontium (Sr)	mg/kg	<5.0	5182307	<5.0	<5.0	5.0	5182323	6.9	5.0	5182307
Acid Extractable Thallium (Tl)	mg/kg	<0.10	5182307	<0.10	<0.10	0.10	5182323	<0.10	0.10	5182307
Acid Extractable Tin (Sn)	mg/kg	<2.0	5182307	<2.0	<2.0	2.0	5182323	<2.0	2.0	5182307
Acid Extractable Uranium (U)	mg/kg	0.56	5182307	0.34	0.36	0.10	5182323	0.46	0.10	5182307
Acid Extractable Vanadium (V)	mg/kg	18	5182307	11	11	2.0	5182323	14	2.0	5182307
Acid Extractable Zinc (Zn)	mg/kg	31	5182307	17	18	5.0	5182323	99	5.0	5182307

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B7K9396
Report Date: 2017/09/28

Stantec Consulting Ltd
Client Project #: 121414898

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEO650			FEO651		FEO652		FEO653		
Sampling Date		2017/09/21			2017/09/21		2017/09/21		2017/09/21		
COC Number		D15411			D15411		D15411		D15411		
	UNITS	**GK17 BH 07A**	**RDL**	**QC Batch**	**GK17 BH 08**	**RDL**	**GK17 BH 09A**	**RDL**	**GK17 BH 10**	**RDL**	**QC Batch**
Metals											
Acid Extractable Aluminum (Al)	mg/kg	10000	10	5182307	27000	10	6900	10	17000	10	5182130
Acid Extractable Antimony (Sb)	mg/kg	3.0	2.0	5182307	<2.0	2.0	<2.0	2.0	<2.0	2.0	5182130
Acid Extractable Arsenic (As)	mg/kg	18000	200	5182307	640	20	210	2.0	1200	20	5182130
Acid Extractable Barium (Ba)	mg/kg	<5.0	5.0	5182307	14	5.0	23	5.0	37	5.0	5182130
Acid Extractable Beryllium (Be)	mg/kg	<2.0	2.0	5182307	<2.0	2.0	<2.0	2.0	<2.0	2.0	5182130
Acid Extractable Bismuth (Bi)	mg/kg	2.4	2.0	5182307	<2.0	2.0	<2.0	2.0	<2.0	2.0	5182130
Acid Extractable Boron (B)	mg/kg	<50	50	5182307	<50	50	<50	50	<50	50	5182130
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	0.30	5182307	<0.30	0.30	<0.30	0.30	<0.30	0.30	5182130
Acid Extractable Chromium (Cr)	mg/kg	13	2.0	5182307	27	2.0	6.2	2.0	18	2.0	5182130
Acid Extractable Cobalt (Co)	mg/kg	12	1.0	5182307	24	1.0	3.0	1.0	16	1.0	5182130
Acid Extractable Copper (Cu)	mg/kg	38	2.0	5182307	45	2.0	7.9	2.0	34	2.0	5182130
Acid Extractable Iron (Fe)	mg/kg	57000	50	5182307	44000	50	14000	50	37000	50	5182130
Acid Extractable Lead (Pb)	mg/kg	41	0.50	5182307	31	0.50	10	0.50	27	0.50	5182130
Acid Extractable Lithium (Li)	mg/kg	17	2.0	5182307	41	2.0	5.8	2.0	26	2.0	5182130
Acid Extractable Manganese (Mn)	mg/kg	320	2.0	5182307	670	2.0	270	2.0	870	2.0	5182130
Acid Extractable Mercury (Hg)	mg/kg	6.6	0.10	5182307	0.13	0.10	<0.10	0.10	4.5	0.10	5182130
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	2.0	5182307	<2.0	2.0	<2.0	2.0	<2.0	2.0	5182130
Acid Extractable Nickel (Ni)	mg/kg	41	2.0	5182307	37	2.0	7.3	2.0	28	2.0	5182130
Acid Extractable Rubidium (Rb)	mg/kg	<2.0	2.0	5182307	4.4	2.0	2.7	2.0	4.3	2.0	5182130
Acid Extractable Selenium (Se)	mg/kg	<1.0	1.0	5182307	<1.0	1.0	<1.0	1.0	<1.0	1.0	5182130
Acid Extractable Silver (Ag)	mg/kg	<0.50	0.50	5182307	<0.50	0.50	<0.50	0.50	<0.50	0.50	5182130
Acid Extractable Strontium (Sr)	mg/kg	<5.0	5.0	5182307	<5.0	5.0	<5.0	5.0	5.3	5.0	5182130
Acid Extractable Thallium (Tl)	mg/kg	<0.10	0.10	5182307	<0.10	0.10	<0.10	0.10	<0.10	0.10	5182130
Acid Extractable Tin (Sn)	mg/kg	<2.0	2.0	5182307	<2.0	2.0	<2.0	2.0	<2.0	2.0	5182130
Acid Extractable Uranium (U)	mg/kg	0.37	0.10	5182307	0.71	0.10	0.33	0.10	0.71	0.10	5182130
Acid Extractable Vanadium (V)	mg/kg	9.4	2.0	5182307	19	2.0	14	2.0	18	2.0	5182130
Acid Extractable Zinc (Zn)	mg/kg	63	5.0	5182307	94	5.0	18	5.0	67	5.0	5182130

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7K9396
Report Date: 2017/09/28

Stantec Consulting Ltd
Client Project #: 121414898

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEO667		FEO668		FEO669	FEO670	FEO671		
Sampling Date		2017/09/21		2017/09/21		2017/09/21	2017/09/21	2017/09/21		
COC Number		D15412		D15412		D15412	D15412	D15412		
	UNITS	**GK17 BH 11**	**RDL**	**GK17 BH 12A**	**RDL**	**GK17 BH 13**	**GK17 BH 14**	**GK17 BH 15**	**RDL**	**QC Batch**
Metals										
Acid Extractable Aluminum (Al)	mg/kg	14000	10	19000	10	17000	14000	13000	10	5182130
Acid Extractable Antimony (Sb)	mg/kg	2.9	2.0	<2.0	2.0	<2.0	<2.0	<2.0	2.0	5182130
Acid Extractable Arsenic (As)	mg/kg	6900	200	2200	20	6600	11000	6500	200	5182130
Acid Extractable Barium (Ba)	mg/kg	43	5.0	29	5.0	28	57	34	5.0	5182130
Acid Extractable Beryllium (Be)	mg/kg	<2.0	2.0	<2.0	2.0	<2.0	<2.0	<2.0	2.0	5182130
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	2.0	<2.0	2.0	<2.0	2.9	<2.0	2.0	5182130
Acid Extractable Boron (B)	mg/kg	<50	50	<50	50	<50	<50	<50	50	5182130
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	0.30	<0.30	0.30	<0.30	0.52	0.31	0.30	5182130
Acid Extractable Chromium (Cr)	mg/kg	15	2.0	21	2.0	18	16	15	2.0	5182130
Acid Extractable Cobalt (Co)	mg/kg	18	1.0	29	1.0	21	29	17	1.0	5182130
Acid Extractable Copper (Cu)	mg/kg	24	2.0	53	2.0	46	46	33	2.0	5182130
Acid Extractable Iron (Fe)	mg/kg	42000	50	44000	50	45000	52000	33000	50	5182130
Acid Extractable Lead (Pb)	mg/kg	52	0.50	110	0.50	29	56	33	0.50	5182130
Acid Extractable Lithium (Li)	mg/kg	23	2.0	36	2.0	27	22	23	2.0	5182130
Acid Extractable Manganese (Mn)	mg/kg	1800	2.0	1900	2.0	810	1400	1200	2.0	5182130
Acid Extractable Mercury (Hg)	mg/kg	6.0	0.10	0.11	0.10	0.14	<0.10	0.19	0.10	5182130
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	2.0	<2.0	2.0	<2.0	<2.0	<2.0	2.0	5182130
Acid Extractable Nickel (Ni)	mg/kg	15	2.0	41	2.0	29	33	26	2.0	5182130
Acid Extractable Rubidium (Rb)	mg/kg	<2.0	2.0	2.5	2.0	2.9	2.9	3.4	2.0	5182130
Acid Extractable Selenium (Se)	mg/kg	<1.0	1.0	<1.0	1.0	<1.0	<1.0	<1.0	1.0	5182130
Acid Extractable Silver (Ag)	mg/kg	<0.50	0.50	<0.50	0.50	<0.50	<0.50	<0.50	0.50	5182130
Acid Extractable Strontium (Sr)	mg/kg	<5.0	5.0	7.7	5.0	7.3	11	12	5.0	5182130
Acid Extractable Thallium (Tl)	mg/kg	<0.10	0.10	0.10	0.10	<0.10	<0.10	<0.10	0.10	5182130
Acid Extractable Tin (Sn)	mg/kg	<2.0	2.0	<2.0	2.0	<2.0	<2.0	<2.0	2.0	5182130
Acid Extractable Uranium (U)	mg/kg	0.90	0.10	0.89	0.10	0.65	0.73	0.59	0.10	5182130
Acid Extractable Vanadium (V)	mg/kg	12	2.0	15	2.0	13	10	12	2.0	5182130
Acid Extractable Zinc (Zn)	mg/kg	57	5.0	84	5.0	71	72	69	5.0	5182130

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEO672		FEO673	FEO674			FEO675		
Sampling Date		2017/09/21		2017/09/21	2017/09/20			2017/09/21		
COC Number		D15412		D15412	D15412			D15412		
	UNITS	**GK17 BH 12B**	**RDL**	**GK17 BH 09B**	**GK17 BH 05B**	**RDL**	**QC Batch**	**GK17 BH 07B**	**RDL**	**QC Batch**
Metals										
Acid Extractable Aluminum (Al)	mg/kg	16000	10	20000	29000	10	5182130	14000	10	5182307
Acid Extractable Antimony (Sb)	mg/kg	<2.0	2.0	<2.0	<2.0	2.0	5182130	3.2	2.0	5182307
Acid Extractable Arsenic (As)	mg/kg	1400	20	470	340	2.0	5182130	14000	200	5182307
Acid Extractable Barium (Ba)	mg/kg	19	5.0	18	15	5.0	5182130	5.4	5.0	5182307
Acid Extractable Beryllium (Be)	mg/kg	<2.0	2.0	<2.0	<2.0	2.0	5182130	<2.0	2.0	5182307
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	2.0	<2.0	<2.0	2.0	5182130	<2.0	2.0	5182307
Acid Extractable Boron (B)	mg/kg	<50	50	<50	<50	50	5182130	<50	50	5182307
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	0.30	<0.30	<0.30	0.30	5182130	0.50	0.30	5182307
Acid Extractable Chromium (Cr)	mg/kg	20	2.0	18	29	2.0	5182130	29	2.0	5182307
Acid Extractable Cobalt (Co)	mg/kg	10	1.0	3.8	11	1.0	5182130	75	1.0	5182307
Acid Extractable Copper (Cu)	mg/kg	13	2.0	12	29	2.0	5182130	590	2.0	5182307
Acid Extractable Iron (Fe)	mg/kg	33000	50	38000	45000	50	5182130	41000	50	5182307
Acid Extractable Lead (Pb)	mg/kg	16	0.50	21	17	0.50	5182130	160	0.50	5182307
Acid Extractable Lithium (Li)	mg/kg	31	2.0	23	41	2.0	5182130	20	2.0	5182307
Acid Extractable Manganese (Mn)	mg/kg	540	2.0	280	560	2.0	5182130	200	2.0	5182307
Acid Extractable Mercury (Hg)	mg/kg	<0.10	0.10	0.19	0.20	0.10	5182130	11	0.10	5182307
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	2.0	<2.0	<2.0	2.0	5182130	<2.0	2.0	5182307
Acid Extractable Nickel (Ni)	mg/kg	18	2.0	8.8	30	2.0	5182130	110	2.0	5182307
Acid Extractable Rubidium (Rb)	mg/kg	4.2	2.0	6.0	5.3	2.0	5182130	<2.0	2.0	5182307
Acid Extractable Selenium (Se)	mg/kg	<1.0	1.0	1.4	1.2	1.0	5182130	<1.0	1.0	5182307
Acid Extractable Silver (Ag)	mg/kg	<0.50	0.50	<0.50	<0.50	0.50	5182130	<0.50	0.50	5182307
Acid Extractable Strontium (Sr)	mg/kg	5.0	5.0	<5.0	<5.0	5.0	5182130	<5.0	5.0	5182307
Acid Extractable Thallium (Tl)	mg/kg	<0.10	0.10	<0.10	<0.10	0.10	5182130	0.12	0.10	5182307
Acid Extractable Tin (Sn)	mg/kg	<2.0	2.0	<2.0	<2.0	2.0	5182130	<2.0	2.0	5182307
Acid Extractable Uranium (U)	mg/kg	0.42	0.10	0.53	0.73	0.10	5182130	0.94	0.10	5182307
Acid Extractable Vanadium (V)	mg/kg	14	2.0	22	19	2.0	5182130	9.1	2.0	5182307
Acid Extractable Zinc (Zn)	mg/kg	68	5.0	36	72	5.0	5182130	71	5.0	5182307

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7K9396
Report Date: 2017/09/28

Stantec Consulting Ltd
Client Project #: 121414898

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEO685		FEO686	FEO687		FEO688		
Sampling Date		2017/09/22		2017/09/22	2017/09/22		2017/09/21		
COC Number		D15413		D15413	D15413		D15413		
	UNITS	**BACKGROUND 01**	**QC Batch**	**BACKGROUND 02**	**BACKGROUND 03**	**RDL**	**DUP1**	**RDL**	**QC Batch**
Metals									
Acid Extractable Aluminum (Al)	mg/kg	18000	5182307	18000	16000	10	20000	10	5182323
Acid Extractable Antimony (Sb)	mg/kg	<2.0	5182307	<2.0	<2.0	2.0	<2.0	2.0	5182323
Acid Extractable Arsenic (As)	mg/kg	280	5182307	110	23	2.0	610	20	5182323
Acid Extractable Barium (Ba)	mg/kg	15	5182307	13	28	5.0	15	5.0	5182323
Acid Extractable Beryllium (Be)	mg/kg	<2.0	5182307	<2.0	<2.0	2.0	<2.0	2.0	5182323
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	5182307	<2.0	<2.0	2.0	<2.0	2.0	5182323
Acid Extractable Boron (B)	mg/kg	<50	5182307	<50	<50	50	<50	50	5182323
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	5182307	<0.30	<0.30	0.30	<0.30	0.30	5182323
Acid Extractable Chromium (Cr)	mg/kg	20	5182307	18	18	2.0	22	2.0	5182323
Acid Extractable Cobalt (Co)	mg/kg	6.8	5182307	3.1	11	1.0	10	1.0	5182323
Acid Extractable Copper (Cu)	mg/kg	19	5182307	11	21	2.0	32	2.0	5182323
Acid Extractable Iron (Fe)	mg/kg	31000	5182307	27000	26000	50	39000	50	5182323
Acid Extractable Lead (Pb)	mg/kg	22	5182307	12	18	0.50	18	0.50	5182323
Acid Extractable Lithium (Li)	mg/kg	29	5182307	21	26	2.0	33	2.0	5182323
Acid Extractable Manganese (Mn)	mg/kg	390	5182307	180	770	2.0	340	2.0	5182323
Acid Extractable Mercury (Hg)	mg/kg	0.13	5182307	0.14	0.11	0.10	3.4	0.10	5182323
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	5182307	<2.0	<2.0	2.0	<2.0	2.0	5182323
Acid Extractable Nickel (Ni)	mg/kg	17	5182307	8.5	20	2.0	23	2.0	5182323
Acid Extractable Rubidium (Rb)	mg/kg	5.9	5182307	5.0	7.3	2.0	2.6	2.0	5182323
Acid Extractable Selenium (Se)	mg/kg	<1.0	5182307	<1.0	<1.0	1.0	<1.0	1.0	5182323
Acid Extractable Silver (Ag)	mg/kg	<0.50	5182307	<0.50	<0.50	0.50	<0.50	0.50	5182323
Acid Extractable Strontium (Sr)	mg/kg	<5.0	5182307	<5.0	6.0	5.0	6.7	5.0	5182323
Acid Extractable Thallium (Tl)	mg/kg	<0.10	5182307	<0.10	<0.10	0.10	<0.10	0.10	5182323
Acid Extractable Tin (Sn)	mg/kg	<2.0	5182307	<2.0	<2.0	2.0	<2.0	2.0	5182323
Acid Extractable Uranium (U)	mg/kg	0.56	5182307	0.61	0.87	0.10	0.44	0.10	5182323
Acid Extractable Vanadium (V)	mg/kg	18	5182307	19	17	2.0	14	2.0	5182323
Acid Extractable Zinc (Zn)	mg/kg	46	5182307	30	57	5.0	99	5.0	5182323

RDL = Reportable Detection Limit
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ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FEO689		
Sampling Date		2017/09/22		
COC Number		D15413		
	UNITS	**DUP3**	**RDL**	**QC Batch**
Metals				
Acid Extractable Aluminum (Al)	mg/kg	13000	10	5182130
Acid Extractable Antimony (Sb)	mg/kg	<2.0	2.0	5182130
Acid Extractable Arsenic (As)	mg/kg	37	2.0	5182130
Acid Extractable Barium (Ba)	mg/kg	55	5.0	5182130
Acid Extractable Beryllium (Be)	mg/kg	<2.0	2.0	5182130
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	2.0	5182130
Acid Extractable Boron (B)	mg/kg	<50	50	5182130
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	0.30	5182130
Acid Extractable Chromium (Cr)	mg/kg	15	2.0	5182130
Acid Extractable Cobalt (Co)	mg/kg	8.7	1.0	5182130
Acid Extractable Copper (Cu)	mg/kg	7.9	2.0	5182130
Acid Extractable Iron (Fe)	mg/kg	29000	50	5182130
Acid Extractable Lead (Pb)	mg/kg	14	0.50	5182130
Acid Extractable Lithium (Li)	mg/kg	33	2.0	5182130
Acid Extractable Manganese (Mn)	mg/kg	460	2.0	5182130
Acid Extractable Mercury (Hg)	mg/kg	0.14	0.10	5182130
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	2.0	5182130
Acid Extractable Nickel (Ni)	mg/kg	23	2.0	5182130
Acid Extractable Rubidium (Rb)	mg/kg	7.2	2.0	5182130
Acid Extractable Selenium (Se)	mg/kg	<1.0	1.0	5182130
Acid Extractable Silver (Ag)	mg/kg	<0.50	0.50	5182130
Acid Extractable Strontium (Sr)	mg/kg	9.7	5.0	5182130
Acid Extractable Thallium (Tl)	mg/kg	<0.10	0.10	5182130
Acid Extractable Tin (Sn)	mg/kg	<2.0	2.0	5182130
Acid Extractable Uranium (U)	mg/kg	1.1	0.10	5182130
Acid Extractable Vanadium (V)	mg/kg	18	2.0	5182130
Acid Extractable Zinc (Zn)	mg/kg	39	5.0	5182130

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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MERCURY BY COLD VAPOUR AA (WATER)

Maxxam ID		FEO690		
Sampling Date		2017/09/22		
COC Number		D15413		
	UNITS	**MOOSE RIVER**	**RDL**	**QC Batch**
Metals				
Total Mercury (Hg)	ug/L	<0.013	0.013	5180639

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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ELEMENTS BY ICP/MS (WATER)

Maxxam ID		FEO690		
Sampling Date		2017/09/22		
COC Number		D15413		
	UNITS	**MOOSE RIVER**	**RDL**	**QC Batch**
Metals				
Total Aluminum (Al)	ug/L	250	5.0	5181964
Total Antimony (Sb)	ug/L	<1.0	1.0	5181964
Total Arsenic (As)	ug/L	17	1.0	5181964
Total Barium (Ba)	ug/L	5.8	1.0	5181964
Total Beryllium (Be)	ug/L	<1.0	1.0	5181964
Total Bismuth (Bi)	ug/L	<2.0	2.0	5181964
Total Boron (B)	ug/L	<50	50	5181964
Total Cadmium (Cd)	ug/L	0.014	0.010	5181964
Total Calcium (Ca)	ug/L	1600	100	5181964
Total Chromium (Cr)	ug/L	<1.0	1.0	5181964
Total Cobalt (Co)	ug/L	<0.40	0.40	5181964
Total Copper (Cu)	ug/L	<2.0	2.0	5181964
Total Iron (Fe)	ug/L	960	50	5181964
Total Lead (Pb)	ug/L	<0.50	0.50	5181964
Total Magnesium (Mg)	ug/L	570	100	5181964
Total Manganese (Mn)	ug/L	70	2.0	5181964
Total Molybdenum (Mo)	ug/L	<2.0	2.0	5181964
Total Nickel (Ni)	ug/L	<2.0	2.0	5181964
Total Phosphorus (P)	ug/L	<100	100	5181964
Total Potassium (K)	ug/L	210	100	5181964
Total Selenium (Se)	ug/L	<1.0	1.0	5181964
Total Silver (Ag)	ug/L	<0.10	0.10	5181964
Total Sodium (Na)	ug/L	2800	100	5181964
Total Strontium (Sr)	ug/L	9.8	2.0	5181964
Total Thallium (Tl)	ug/L	<0.10	0.10	5181964
Total Tin (Sn)	ug/L	<2.0	2.0	5181964
Total Titanium (Ti)	ug/L	2.1	2.0	5181964
Total Uranium (U)	ug/L	<0.10	0.10	5181964
Total Vanadium (V)	ug/L	<2.0	2.0	5181964
Total Zinc (Zn)	ug/L	<5.0	5.0	5181964

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.0°C

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5180639	Total Mercury (Hg)	2017/09/26	105	80 - 120	104	80 - 120	<0.013	ug/L	NC	20
5181964	Total Aluminum (Al)	2017/09/26	104	80 - 120	102	80 - 120	<5.0	ug/L	11	20
5181964	Total Antimony (Sb)	2017/09/26	103	80 - 120	99	80 - 120	<1.0	ug/L	NC	20
5181964	Total Arsenic (As)	2017/09/26	100	80 - 120	96	80 - 120	<1.0	ug/L	NC	20
5181964	Total Barium (Ba)	2017/09/26	101	80 - 120	97	80 - 120	<1.0	ug/L	5.9	20
5181964	Total Beryllium (Be)	2017/09/26	99	80 - 120	96	80 - 120	<1.0	ug/L		
5181964	Total Bismuth (Bi)	2017/09/26	107	80 - 120	103	80 - 120	<2.0	ug/L		
5181964	Total Boron (B)	2017/09/26	101	80 - 120	100	80 - 120	<50	ug/L	NC	20
5181964	Total Cadmium (Cd)	2017/09/26	102	80 - 120	96	80 - 120	<0.010	ug/L	2.2	20
5181964	Total Calcium (Ca)	2017/09/26	105	80 - 120	102	80 - 120	<100	ug/L	1.0	20
5181964	Total Chromium (Cr)	2017/09/26	102	80 - 120	98	80 - 120	<1.0	ug/L	3.8	20
5181964	Total Cobalt (Co)	2017/09/26	102	80 - 120	97	80 - 120	<0.40	ug/L		
5181964	Total Copper (Cu)	2017/09/26	100	80 - 120	96	80 - 120	<2.0	ug/L	3.2	20
5181964	Total Iron (Fe)	2017/09/26	105	80 - 120	102	80 - 120	<50	ug/L	2.6	20
5181964	Total Lead (Pb)	2017/09/26	101	80 - 120	97	80 - 120	<0.50	ug/L	NC	20
5181964	Total Magnesium (Mg)	2017/09/26	104	80 - 120	101	80 - 120	<100	ug/L	0.31	20
5181964	Total Manganese (Mn)	2017/09/26	103	80 - 120	99	80 - 120	<2.0	ug/L	10	20
5181964	Total Molybdenum (Mo)	2017/09/26	109	80 - 120	102	80 - 120	<2.0	ug/L		
5181964	Total Nickel (Ni)	2017/09/26	101	80 - 120	98	80 - 120	<2.0	ug/L	3.5	20
5181964	Total Phosphorus (P)	2017/09/26	107	80 - 120	103	80 - 120	<100	ug/L		
5181964	Total Potassium (K)	2017/09/26	105	80 - 120	102	80 - 120	<100	ug/L	0.73	20
5181964	Total Selenium (Se)	2017/09/26	102	80 - 120	97	80 - 120	<1.0	ug/L	NC	20
5181964	Total Silver (Ag)	2017/09/26	101	80 - 120	97	80 - 120	<0.10	ug/L		
5181964	Total Sodium (Na)	2017/09/26	102	80 - 120	98	80 - 120	<100	ug/L	0.51	20
5181964	Total Strontium (Sr)	2017/09/26	103	80 - 120	97	80 - 120	<2.0	ug/L	0.95	20
5181964	Total Thallium (Tl)	2017/09/26	107	80 - 120	101	80 - 120	<0.10	ug/L		
5181964	Total Tin (Sn)	2017/09/26	109	80 - 120	105	80 - 120	<2.0	ug/L		
5181964	Total Titanium (Ti)	2017/09/26	104	80 - 120	103	80 - 120	<2.0	ug/L		
5181964	Total Uranium (U)	2017/09/26	109	80 - 120	103	80 - 120	<0.10	ug/L	NC	20
5181964	Total Vanadium (V)	2017/09/26	102	80 - 120	97	80 - 120	<2.0	ug/L		
5181964	Total Zinc (Zn)	2017/09/26	101	80 - 120	99	80 - 120	<5.0	ug/L	3.2	20
5182130	Acid Extractable Aluminum (Al)	2017/09/27					<10	mg/kg	0.77	35

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5182130	Acid Extractable Antimony (Sb)	2017/09/27	100	75 - 125	106	75 - 125	<2.0	mg/kg	NC	35
5182130	Acid Extractable Arsenic (As)	2017/09/27	NC	75 - 125	102	75 - 125	<2.0	mg/kg	11	35
5182130	Acid Extractable Barium (Ba)	2017/09/27	NC	75 - 125	104	75 - 125	<5.0	mg/kg	0.21	35
5182130	Acid Extractable Beryllium (Be)	2017/09/27	109	75 - 125	106	75 - 125	<2.0	mg/kg	NC	35
5182130	Acid Extractable Bismuth (Bi)	2017/09/27	108	75 - 125	104	75 - 125	<2.0	mg/kg	NC	35
5182130	Acid Extractable Boron (B)	2017/09/27	90	75 - 125	108	75 - 125	<50	mg/kg	NC	35
5182130	Acid Extractable Cadmium (Cd)	2017/09/27	105	75 - 125	103	75 - 125	<0.30	mg/kg	NC	35
5182130	Acid Extractable Chromium (Cr)	2017/09/27	107	75 - 125	100	75 - 125	<2.0	mg/kg	0.12	35
5182130	Acid Extractable Cobalt (Co)	2017/09/27	108	75 - 125	101	75 - 125	<1.0	mg/kg	1.4	35
5182130	Acid Extractable Copper (Cu)	2017/09/27	103	75 - 125	97	75 - 125	<2.0	mg/kg	0.63	35
5182130	Acid Extractable Iron (Fe)	2017/09/27					<50	mg/kg	3.0	35
5182130	Acid Extractable Lead (Pb)	2017/09/27	NC	75 - 125	103	75 - 125	<0.50	mg/kg	4.2	35
5182130	Acid Extractable Lithium (Li)	2017/09/27	115	75 - 125	107	75 - 125	<2.0	mg/kg	1.5	35
5182130	Acid Extractable Manganese (Mn)	2017/09/27	NC	75 - 125	102	75 - 125	<2.0	mg/kg	0.94	35
5182130	Acid Extractable Mercury (Hg)	2017/09/27	103	75 - 125	103	75 - 125	<0.10	mg/kg	18	35
5182130	Acid Extractable Molybdenum (Mo)	2017/09/27	104	75 - 125	105	75 - 125	<2.0	mg/kg	NC	35
5182130	Acid Extractable Nickel (Ni)	2017/09/27	103	75 - 125	101	75 - 125	<2.0	mg/kg	3.3	35
5182130	Acid Extractable Rubidium (Rb)	2017/09/27	102	75 - 125	103	75 - 125	<2.0	mg/kg	1.2	35
5182130	Acid Extractable Selenium (Se)	2017/09/27	102	75 - 125	102	75 - 125	<1.0	mg/kg	NC	35
5182130	Acid Extractable Silver (Ag)	2017/09/27	105	75 - 125	101	75 - 125	<0.50	mg/kg	NC	35
5182130	Acid Extractable Strontium (Sr)	2017/09/27	109	75 - 125	104	75 - 125	<5.0	mg/kg	5.9	35
5182130	Acid Extractable Thallium (Tl)	2017/09/27	109	75 - 125	106	75 - 125	<0.10	mg/kg	NC	35
5182130	Acid Extractable Tin (Sn)	2017/09/27	111	75 - 125	106	75 - 125	<2.0	mg/kg	15	35
5182130	Acid Extractable Uranium (U)	2017/09/27	111	75 - 125	105	75 - 125	<0.10	mg/kg	4.7	35
5182130	Acid Extractable Vanadium (V)	2017/09/27	104	75 - 125	103	75 - 125	<2.0	mg/kg	5.0	35
5182130	Acid Extractable Zinc (Zn)	2017/09/27	NC	75 - 125	104	75 - 125	<5.0	mg/kg	34	35
5182307	Acid Extractable Aluminum (Al)	2017/09/27					<10	mg/kg	0.96	35
5182307	Acid Extractable Antimony (Sb)	2017/09/27	99	75 - 125	112	75 - 125	<2.0	mg/kg	NC	35
5182307	Acid Extractable Arsenic (As)	2017/09/27	NC	75 - 125	103	75 - 125	<2.0	mg/kg	14	35
5182307	Acid Extractable Barium (Ba)	2017/09/27	113	75 - 125	106	75 - 125	<5.0	mg/kg	6.0	35
5182307	Acid Extractable Beryllium (Be)	2017/09/27	104	75 - 125	104	75 - 125	<2.0	mg/kg	NC	35
5182307	Acid Extractable Bismuth (Bi)	2017/09/27	108	75 - 125	109	75 - 125	<2.0	mg/kg	NC	35

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5182307	Acid Extractable Boron (B)	2017/09/27	95	75 - 125	108	75 - 125	<50	mg/kg	NC	35
5182307	Acid Extractable Cadmium (Cd)	2017/09/27	103	75 - 125	104	75 - 125	<0.30	mg/kg	NC	35
5182307	Acid Extractable Chromium (Cr)	2017/09/27	104	75 - 125	100	75 - 125	<2.0	mg/kg	2.1	35
5182307	Acid Extractable Cobalt (Co)	2017/09/27	102	75 - 125	101	75 - 125	<1.0	mg/kg	2.0	35
5182307	Acid Extractable Copper (Cu)	2017/09/27	NC	75 - 125	97	75 - 125	<2.0	mg/kg	1.8	35
5182307	Acid Extractable Iron (Fe)	2017/09/27					<50	mg/kg	2.7	35
5182307	Acid Extractable Lead (Pb)	2017/09/27	108	75 - 125	106	75 - 125	<0.50	mg/kg	1.3	35
5182307	Acid Extractable Lithium (Li)	2017/09/27	113	75 - 125	110	75 - 125	<2.0	mg/kg	2.8	35
5182307	Acid Extractable Manganese (Mn)	2017/09/27	NC	75 - 125	102	75 - 125	<2.0	mg/kg	0.65	35
5182307	Acid Extractable Mercury (Hg)	2017/09/27	102	75 - 125	106	75 - 125	<0.10	mg/kg	NC	35
5182307	Acid Extractable Molybdenum (Mo)	2017/09/27	107	75 - 125	105	75 - 125	<2.0	mg/kg	NC	35
5182307	Acid Extractable Nickel (Ni)	2017/09/27	102	75 - 125	101	75 - 125	<2.0	mg/kg	3.9	35
5182307	Acid Extractable Rubidium (Rb)	2017/09/27	104	75 - 125	104	75 - 125	<2.0	mg/kg	8.2	35
5182307	Acid Extractable Selenium (Se)	2017/09/27	103	75 - 125	101	75 - 125	<1.0	mg/kg	NC	35
5182307	Acid Extractable Silver (Ag)	2017/09/27	103	75 - 125	102	75 - 125	<0.50	mg/kg	NC	35
5182307	Acid Extractable Strontium (Sr)	2017/09/27	107	75 - 125	104	75 - 125	<5.0	mg/kg	NC	35
5182307	Acid Extractable Thallium (Tl)	2017/09/27	107	75 - 125	109	75 - 125	<0.10	mg/kg	NC	35
5182307	Acid Extractable Tin (Sn)	2017/09/27	109	75 - 125	112	75 - 125	<2.0	mg/kg	NC	35
5182307	Acid Extractable Uranium (U)	2017/09/27	108	75 - 125	108	75 - 125	<0.10	mg/kg	7.0	35
5182307	Acid Extractable Vanadium (V)	2017/09/27	105	75 - 125	103	75 - 125	<2.0	mg/kg	4.2	35
5182307	Acid Extractable Zinc (Zn)	2017/09/27	NC	75 - 125	100	75 - 125	<5.0	mg/kg	2.5	35
5182323	Acid Extractable Aluminum (Al)	2017/09/27					<10	mg/kg	5.3	35
5182323	Acid Extractable Antimony (Sb)	2017/09/27	87	75 - 125	107	75 - 125	<2.0	mg/kg	NC	35
5182323	Acid Extractable Arsenic (As)	2017/09/27	NC	75 - 125	98	75 - 125	<2.0	mg/kg	12	35
5182323	Acid Extractable Barium (Ba)	2017/09/27	106	75 - 125	98	75 - 125	<5.0	mg/kg	11	35
5182323	Acid Extractable Beryllium (Be)	2017/09/27	106	75 - 125	90	75 - 125	<2.0	mg/kg	NC	35
5182323	Acid Extractable Bismuth (Bi)	2017/09/27	104	75 - 125	104	75 - 125	<2.0	mg/kg	NC	35
5182323	Acid Extractable Boron (B)	2017/09/27	70 (1)	75 - 125	90	75 - 125	<50	mg/kg	NC	35
5182323	Acid Extractable Cadmium (Cd)	2017/09/27	103	75 - 125	101	75 - 125	<0.30	mg/kg	NC	35
5182323	Acid Extractable Chromium (Cr)	2017/09/27	107	75 - 125	94	75 - 125	<2.0	mg/kg	9.6	35
5182323	Acid Extractable Cobalt (Co)	2017/09/27	105	75 - 125	95	75 - 125	<1.0	mg/kg	11	35
5182323	Acid Extractable Copper (Cu)	2017/09/27	107	75 - 125	92	75 - 125	<2.0	mg/kg	26	35

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5182323	Acid Extractable Iron (Fe)	2017/09/27					<50	mg/kg	6.5	35
5182323	Acid Extractable Lead (Pb)	2017/09/27	104	75 - 125	100	75 - 125	<0.50	mg/kg	1.1	35
5182323	Acid Extractable Lithium (Li)	2017/09/27	110	75 - 125	98	75 - 125	<2.0	mg/kg	3.3	35
5182323	Acid Extractable Manganese (Mn)	2017/09/27	NC	75 - 125	101	75 - 125	<2.0	mg/kg	16	35
5182323	Acid Extractable Mercury (Hg)	2017/09/27	99	75 - 125	101	75 - 125	<0.10	mg/kg	NC	35
5182323	Acid Extractable Molybdenum (Mo)	2017/09/27	104	75 - 125	103	75 - 125	<2.0	mg/kg	NC	35
5182323	Acid Extractable Nickel (Ni)	2017/09/27	107	75 - 125	95	75 - 125	<2.0	mg/kg	11	35
5182323	Acid Extractable Rubidium (Rb)	2017/09/27	100	75 - 125	103	75 - 125	<2.0	mg/kg	5.1	35
5182323	Acid Extractable Selenium (Se)	2017/09/27	104	75 - 125	99	75 - 125	<1.0	mg/kg	NC	35
5182323	Acid Extractable Silver (Ag)	2017/09/27	104	75 - 125	103	75 - 125	<0.50	mg/kg	NC	35
5182323	Acid Extractable Strontium (Sr)	2017/09/27	107	75 - 125	100	75 - 125	<5.0	mg/kg	NC	35
5182323	Acid Extractable Thallium (Tl)	2017/09/27	105	75 - 125	104	75 - 125	<0.10	mg/kg	NC	35
5182323	Acid Extractable Tin (Sn)	2017/09/27	102	75 - 125	103	75 - 125	<2.0	mg/kg	NC	35
5182323	Acid Extractable Uranium (U)	2017/09/27	106	75 - 125	101	75 - 125	<0.10	mg/kg	4.0	35
5182323	Acid Extractable Vanadium (V)	2017/09/27	106	75 - 125	95	75 - 125	<2.0	mg/kg	0.37	35
5182323	Acid Extractable Zinc (Zn)	2017/09/27	109	75 - 125	101	75 - 125	<5.0	mg/kg	9.7	35

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery is within QC acceptance limits. < 10 % of compounds in multi-component analysis in violation.

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Maxxam Job #: B7K9396
Report Date: 2017/09/28

Stantec Consulting Ltd
Client Project #: 121414898

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Eric Dearman, Scientific Specialist

Kevin MacDonald, Inorganics Supervisor

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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APPENDIX B5

Lorax Environmental Memo – Metal Leaching Behaviour of Touquoy Historic Tailings, Touquoy Gold Project, Moose River, NS

TECHNICAL MEMORANDUM

To:	**James Millard, Atlantic Gold Corp.;**	**Date: February 14, 2018**
	Danielle Finlayson-Bourque, Atlantic Gold Corp.	
From:	**Timo Kirchner & Bruce Mattson**	**Project #: A457-1**
Subject:	**Metal Leaching Behaviour of Touquoy Historic Tailings**	

1. Introduction

The Touquoy Gold Project, owned by Atlantic Gold Corporation (Atlantic Gold), is located in the Moose River Gold Mines District, around 60 km northeast of Halifax, Nova Scotia and has commenced operations in September 2017. The project area encompasses the sites of several former stamp mills that produced gold in the late 19th and early 20th centuries, discharging mercury-rich tailings into the immediate environment. Two tailings deposits associated with the G&K Stamp Mill (~1904-1915) and the Moose River Gold Mines Stamp Mill (~1882-1907) were determined to fall within the footprint of an upcoming open pit expansion and will therefore need to be relocated (Utley, 2007). AGC's proposed management strategy is that these materials be excavated and re-deposited into a low-permeability cell contained within the boundaries of the Touquoy Tailings Management Facility (TMF). To constrain the design criteria for this engineered cell, several studies have been conducted to delineate the extent of the historic tailings footprint within surrounding soils based on visual characteristics and geochemical analyses (Utley, 2007; Atlantic Gold, 2016; Stantec, 2017a, 2017b). It was estimated that a total of 53,900 m^3 of tailings intersect the final pit perimeter and are destined for re-handling. The Nova Scotia Department of Environment (NSE) raised concerns with regards to the potential for Hg (and other metal) leaching from historic tailings under storage conditions that would be encountered in the TMF and requested further investigation. To that end, Lorax Environmental Services Ltd. (Lorax) conducted a series of geochemical tests including static analyses and short-term leach tests to assess the potential for metal mobilization from historic tailings in contact with ROM supernatant. The following chapter outlines the methodology used in this assessment, followed by a discussion of the results in Section 3. Lastly, Section 4 discusses the implications and recommendations with respect to the storage design of the historic tailings.

2. Methods

2.1 Sampling Method

Multiple locations within the footprint of both historic tailings perimeters (G&K Stamp Mill and Moose River Gold Mines Stamp Mill) were identified for the collection of *five* historic tailings samples. Lorax guided the sample selection which was based primarily on spatial coverage within

both deposits and geochemical representation based on information provided in Atlantic Gold (2016) and Stantec (2017). Stantec conducted the sampling from bore-holes using a gas-powered hand auger. Characteristics of soil layers and the presence of tailings were recorded and the samples were then composited along the length of the entire bore-hole. Table 1 presents the sample IDs and any information documented during the sampling process.

The ROM tailings slurry was placed into 20L pails by Atlantic Gold in the mill from the tailings stream that had undergone SO_2/air treatment (for CN-destruction) and ferric sulphate addition (As attenuation). These buckets were sent to the Lorax office in Vancouver were the supernatant water was decanted after the bulk of the tailings solids had settled. This water sample was then sent to ALS laboratories in Burnaby for chemical analysis and for use as the SFE solvent.

2.2 Geochemical Testing & Analyses

All five tailings samples were characterized for solid-phase properties, including acid-base-accounting (total sulphur, sulphide sulphur, total C, organic C) and metal content (ICP-analysis on aqua-regia digest). For the leach experimental component, a modified shake flask extraction (SFE) test was employed where 250 g of historic tailings are agitated in 750 mL of water for 24 hours, followed by the ICP-analysis of the leachate. All but one procedural specifications were conducted in accordance with the method outlined in Price (2009). One deviation from this protocol was that the solvent used for the leach test represented ROM tailings supernatant supplied by Atlantic Gold instead of deionized water. This adjustment was undertaken to mimic the geochemical conditions

Table 1:
Specifications of Historic Tailings Samples Collected by Stantec

Location ID	Borehole Depth *(mbg)*	Soil Description
MRT14-041B	0-0.08	ORGANIC ROOTMAT
	0.08-0.25	Well Sorted SILT possible tailings
	0.25-0.55	Poorly Sorted Brown SILT SAND and GRAVEL
MRT-14025A	0-0.08	Grass and ROOTMAT
	0.08-0.65	Well Sorted Brown grey SILTY SAND Possible tailings
MRT-14048B	0.-0.08	Grass and ROOTMAT
	0.08-0.72	SILTY SAND and GRAVEL Possible tailings
MRT-15-197C	0-0.08	ORGANIC ROOTMAT
	0.08-0.55	Poorly Sorted Grey SILTY SAND and GRAVEL with cobbles
MRT-15-155A	0-0.08	Black ORGANIC ROOTMAT
	0.08-0.65	Well Sorted Brown SILTY SAND, trace gravel and grey silt Possible tailings

expected in the Touquoy TMF which may affect the elemental mobility of historic tailings constituents in contact with supernatant water that is chemically altered during the mill and SO_2/air-treatment process.

3. Result and Discussion

3.1 Solid-Phase Characterization

An overview of selected results of the solid-phase analysis for the five historic tailings samples is given in Table 2. The ABA results show relatively low total S concentrations of less than <0.1 % for all samples where sample MRT14-048B contains the highest amounts of total S (0.09%). Sulphide sulphur makes up variable fractions of total sulphur with the highest absolute and amounts being 0.03% measured in samples MRT15-197C and MRT14-048B (Table 2). The remaining sulphur is inferred to be bound in organic solids and sulphate minerals. Generally, sulphide minerals are considered the main form of acid potential in a rock sample, however without more comprehensive static testwork it cannot be precluded that other sulphur-hosts also contribute to acid generation upon reaction with water.

Total carbon is distributed relatively evenly between the organic and the inorganic fraction with

the exception of sample MRT15-197C which predominantly hosts organic carbon. Inorganic carbon is generally hosted in carbonate minerals which, depending on the composition of the mineral, can be effective acid neutralizers. Specifically, calcite and dolomite afford the maximum neutralization potential, whereas Fe- and Mn-bearing carbonate phases such as ankerite and siderite have reduced or zero neutralization potential. Across the five analyzed tailings samples, the range of inorganic carbon was found to be 0.09-0.34%, systematically larger than the respective sulphur contents. Considering paste pH values which range from 4.5 to 6.0 (Table 2), it can be inferred that the inorganic carbon contained in the historic tailings samples is not effectively buffering acidity and likely comprises the above-mentioned Fe- and Mn-bearing carbonate phases.

The primary parameter of concern in the Touquoy historic tailings is Hg which is enriched in the solid-phase an pore waters due to its use in the amalgamation process during historic gold processing in stamp mills. Hg values range from 0.87 to 14.8 ppm with an average value of 6.9 ppm. In comparison, Atlantic Gold (2016) reported consistent average Hg concentrations of 6.5 and 7.3 ppm for inferred historic tailings from the G&K Gold and the Moose River Gold areas, respectively. In this study, adjacent till samples showed average Hg contents of around 1.5 ppm.

In tailings, other metals/metalloids are commonly elevated as a result of their association with ore materials. However, in Nova Scotian soils, a variety of solid-phase species, and arsenic in particular, are naturally enriched such that Hg is inferred to be the most reliable geochemical tailings identifier (Goodwin *et al.*, 2008; Atlantic Gold, 2016). Based on this assessment, sample

Table 2:
Solid-Phase Geochemical Results for the Touquoy Historic Tailings Samples

	Units	MRT15-155A	MRT15-197C	MRT14-048B	MRT14-025A	MRT14-041B
Stamp Mill		*G&K*	*G&K*	*Moose River*	*Moose River*	*Moose River*
ABA						
Total S	%	0.060	0.050	0.090	0.030	0.020
Sulphide S	%	0.010	0.030	0.030	0.020	0.010
Total C	%	0.61	2.6	0.24	0.15	0.65
Organic C	%	0.30	2.3	0.13	0.060	0.31
Inorganic C	%	0.31	0.28	0.11	0.090	0.34
NPR		14	15	3.3	8.0	45
Metals						
Al	%	1.9	2.3	2.6	1.2	1.3
As	ppm	6350	494	1565	1035	155
B	ppm	*<10*	*<10*	*<10*	*<10*	*<10*
Ba	ppm	40	50	60	30	60
Ca	%	0.050	0.11	0.10	0.040	0.090
Cd	ppm	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*
Co	ppm	11	5.0	14	6.0	8.0
Cr	ppm	21	25	26	14	16
Cu	ppm	40	33	38	43	17
Fe	%	6.3	4.1	4.7	2.8	2.3
Hg	ppm	11	5.3	2.9	15	0.87
K	%	0.22	0.26	0.30	0.16	0.15
Mg	%	0.95	1.1	1.2	0.54	0.39
Mn	ppm	371	338	411	482	558
Mo	ppm	2.0	1.0	*<1*	*<1*	1
Na	%	0.020	0.020	0.020	0.020	0.030
Ni	ppm	27	12	27	15	16
Pb	ppm	42	66	28	42	14
Sb	ppm	4.0	*<2*	*<2*	*<2*	*<2*
Sr	ppm	7.0	12	11	8.0	14
U	ppm	*<10*	*<10*	*<10*	*<10*	*<10*
V	ppm	15	17	19	11	19
Zn	ppm	83	93	100	46	39

MRT14-041B, which show a comparably low Hg (and As) content, may not classify as historic tailings but rather as an ambient soil/till.

3.2 Shake Flask Extraction Test

Chemical analysis of the ROM supernatant was completed before the initiation of the SFE test. The results of the supernatant composition are shown in Table 3. The use of ROM supernatant water for the SFE test is critical for two reasons. First, dissolved species contained within the supernatant may affect the solubility of species released from the historic tailings. For example,

cyanide and ammonia are known to form strong complexes with various metals increasing their mobility in tailings contact waters (Devuyst *et al.*, 1989; Dzombak *et al.*, 2006). Second, the knowledge of pre-test elemental supernatant composition allows for the calculation of the actual

Table 3:
Geochemical Composition of ROM Tailings Supernatant Used for SFE testing

	ROM Supernatant
	mg/L
pH	8.15
Alkalinity (as $CaCO_3$)	107
Anions and Nutrients	
Ammonia (as N)	31
Chloride (Cl)	21
Nitrate (as N)	1.4
Nitrite (as N)	0.74
Phosphorus (P)	0.016
Sulphate (SO_4)	651
Cyanides	
WAD Cyanide	0.021
Total Cyanide	0.086
Dissolved Metals	
Al	0.049
Sb	0.0063
As	0.59
Ba	0.021
B	0.036
Cd	*<0.000005*
Ca	96
Cr	0.00012
Co	0.055
Cu	0.052
Fe	0.036
Pb	0.000020
Mg	7.9
Mn	0.066
Hg	*<0.000005*
Mo	0.0092
Ni	0.011
K	72
Se	0.00068
Si	1.3
Na	230
Sr	0.23
U	0.0011
V	0.00048
Zn	*<0.0005*

load released from the historic tailings during the SFE. This, in turn, allows for an assessment of the relative impact of historic tailings deposition on TMF waters (pore and pond water).

As evident from the measured pH range of 5.9 to 7.1, the historic tailings contribute acidity (or consume alkalinity) in the moderately alkaline supernatant solution (pH = 8.15; Table 3). Acid production can occur via various reaction pathways, including sulphide oxidation, the release of stored loads (in the form of sulphate minerals), and/or the precipitation of metal (oxy-)hydroxides consuming OH^- ions. Given the low sulphide content and long exposure time (>100 years) of the historic tailings samples, it the latter two mechanisms are inferred to represent the primary source of acidity. Organic species and the influence of ambient soils may further affect the pH in the historic tailings samples. The fact that the inherent carbonate carbon (Table 2) does not appear to buffer pH above 8 suggests that it is either insufficient or not acid-neutralizing. Indeed, the two samples with the highest solid-phase Fe contents depressed the supernatant pH to 5.9 and 6.4 which is in the range of the siderite ($FeCO_3$) equilibrium (*e.g.,* Blowes *et al.*, 2003).

To provide an overview and to screen potential species of concern associated with the historic tailings, Table 4 presents SFE results as a ratio of concentrations measured in the shake flask solution after 24h-contact with the tailings materials (C_{SFE}) versus the original supernatant concentrations (C_{super}). This ratio (C_{SFE}/C_{super}) gives insight into relative elemental loads leached or attenuated. In Table 4, C_{SFE}/C_{super} tha are greater than 50 were shaded in dark orange and represent strong (relative) leaching potential. Light orange highlights identify moderate leaching potentials with C_{SFE}/C_{super} values of between 5 and 50.

With the exception of sample MRT14-041B which released no detectable Hg, all studied samples leached relatively high amounts of Hg to produce SFE eluate concentrations that are at least 60 times higher than those measured in the supernatant. Absolute concentrations ranged from 0.00031 mg/L to 0.0625 mg/L, where the highest value was observed in sample MRT14-25A also contains the highest amounts of solid-phase Hg (15 ppm). Other species that were strongly leached from the historic tailings in at least one SFE test include Cd (1x), Mn (1x), Fe (2x), and Pb (2x) (Table 4). Note that, of these, Fe and Pb were strongly leached only from historic tailings from the G&K Gold stamp mill. Moderate leaching potentials ($5< C_{SFE}/C_{super}<50$) were observed for Al (1x), Ba (1x), Cd (2x), Cr (1x), Mn (2x), Ni (1x), Pb (1x) and Zn (1x). Interestingly, despite its high solid-phase concentration, As was not found to be significantly leached from the historic tailings but in most samples became attenuated upon mixing. This can be explained by the already relatively high As concentrations measured in the ROM supernatant water (0.59 mg/L; Table 3). Several species (e.g., Sb, Cr, Cu, Mo, U) were removed from the supernatant solution in most or all SFE tests via attenuation processes such as adsorption onto the fine historic tailings or (co-) precipitation into phases that became insoluble in response to changing geochemical conditions. Note that only elements with a median C_{SFE}/C_{super} (exclusive of sample MRT14-041B) of greater than 3 were carried forward for the loading assessment presented in the next section.

Table 4:
SFE Concentrations Normalized to the Pre-Test Supernatant Geochemistry (C_{SFE}/C_{super})

	MRT15-155A	MRT15-197C	MRT14-048B	MRT14-025A	MRT14-041B	Median
Stamp Mill	*G&K*	*G&K*	*Moose River*	*Moose River*	*Moose River*	
pH	5.9	7.1	6.4	7.1	6.8	
Anions/Nutrients						
Ammonia (as N)	0.70	0.83	0.90	0.90	0.67	0.86
Chloride (Cl)	1.0	0.96	0.92	0.99	0.98	0.98
Nitrate (as N)	0.93	0.96	0.92	0.99	1.1	0.94
Nitrite (as N)	0.58	0.79	0.84	0.90	0.64	0.82
Phosphate (as P)	6.7	8.9	0.91	0.79	1.1	3.8
Sulfate (SO4)	0.89	0.94	1.0	0.93	0.94	0.94
Dissolved Metals						
Al	2.2	26	0.15	0.10	0.66	1.2
Sb	0.34	0.91	1.2	0.31	0.16	0.63
As	2.7	0.99	0.75	0.045	0.019	0.87
Ba	1.2	1.8	3.5	1.6	6.8	1.7
B	0.75	0.69	0.83	0.86	0.78	0.79
Cd	***DL***	10	206	12	***DL***	11
Ca	0.46	0.81	0.76	0.62	0.85	0.69
Cr	***DL***	13	***DL***	***DL***	***DL***	DL
Co	2.2	0.96	4.1	0.95	0.95	1.6
Cu	0.23	0.79	0.18	0.12	0.083	0.20
Fe	52	152	0.87	1.1	5.0	26
Pb	101	1788	***DL***	***DL***	5.4	51
Mg	0.87	0.62	0.93	0.81	1.2	0.84
Mn	24	6.5	84	3.7	0.24	15
Hg	62	162	65	12500	***DL***	114
Mo	0.037	0.49	0.17	0.065	0.060	0.12
Ni	1.4	0.93	36	1.1	0.36	1.3
K	0.64	0.64	0.68	0.72	0.41	0.66
Se	1.4	0.94	1.8	1.0	1.2	1.2
Si	3.5	2.2	2.1	2.5	2.5	2.3
Na	0.78	0.80	0.82	0.85	0.80	0.81
Sr	0.47	0.95	0.73	0.89	1.5	0.81
Tl	2.5	2.5	4.3	4.9	2.5	3.4
U	0.024	0.50	0.011	***DL***	0.015	0.018
V	***DL***	4.8	***DL***	***DL***	***DL***	DL
Zn	***DL***	***DL***	48	***DL***	***DL***	DL

Notes: DL = analysis below detection;
Dark orange shadings indicate a C_{SFE}/C_{super} ratio of >50; light orange shadings indicate a C_{SFE}/C_{super} ratio of between 5 and 50. Median values highlighted in green represent values that are >3 and these species are considered in the loading assessment. Sample MRT14-041B was conservatively excluded in these statistics as this sample is low in Hg and may not represent tailings.

3.3 Loading Assessment

3.3.1 Fixed Model Assumptions

In order to put the described geochemical tests into context and assess the potential impact of the historic tailings materials on the TMF and downstream water quality, a high-level loading assessment was generated. As mentioned above, this model only considers dissolved species that have a calculated median C_{SFE}/C_{super} of >3 (Table 4). All other species did not produce concentrations that were, across the various analyzed samples, significantly higher than what is already observed in the ROM supernatant. Importantly, such species (*e.g.*, As, Cu, Sb, Se) may still be leached from the historic tailings however, due to the already elevated concentrations in the process water, are unlikely to worsen the overall TMF water quality.

For the purpose of this exercise, all water in the TMF pond and pore water was assumed to have a geochemical composition that is identical to the supernatant sample used in this study. Especially for As and Cu this is important, since these parameters are already high in concentration in the ROM supernatant sample. The maximum leachable geochemical load added to the supernatant for a given species ($L_{a,i}$) was calculated as the difference in dissolved loading before and after the SFE test normalized to 1 kg of material:

$$L_{a,i} = (C_{SFE,i} \times 0.75\ L - C_{Super,i} \times 0.75\ L) \times 4 \qquad \text{(Eq. 1).}$$

Average $L_{a,i}$ values were subsequently derived for each species to account for the various historic tailings materials tested. As for median C_{SFE}/C_{super} values (Table 4, sample MRT14-041B was excluded from this calculation due to its geochemical characteristics. The resulting average $L_{a,i}$ values used for model input as well as further assumptions relating to the physical environment are summarized in Table 5. Note that tailings volumes and the TMF water balance are based on information from Stantec (2016, 2018a, b; pers. comm.). In the absence of actual measurements, the bulk density of 1.6 t/m^3 was selected based on a typical range of tailings bulk densities from other sites.

3.3.2 Worst Case

The most conservative approach in distributing the loads from the historic tailings into the TMF is to assume that the full maximum leachable load ($L_{a,i}$) is being added to a predicted volume of ROM supernatant (V_{super}) upon rinsing or inundation. The final concentration ($C_{f,i}$) resulting from the historic tailings load contribution is calculated as:

$$C_{f,i} = (L_{a,i} + C_{super,i} \times V_{super}) / V_{super} \qquad \text{(Eq. 2).}$$

Defining the volume of supernatant that is available for complete mixing with the released historic tailings load is subject to a large uncertainty and was not modelled in detail within the scope of

Table 5:
Summary of Input Assumptions Made for the Historic Tailings Loading Model

Parameter	Unit	Value
Historic Tailings Specifications		
Historic tailings volume	m^3	53,883
Bulk density	t/m^3	1.6
Historic tailings mass	t	86,213
Average Geochemical Load added ($L_{a,i}$)		
Phosphate (as P) - dissolved	mg/kg	0.16
Cd - dissolved	mg/kg	0.00088
Fe - dissolved	mg/kg	5.4
Pb - dissolved	mg/kg	0.029
Mn - dissolved	mg/kg	5.7
Hg - dissolved	mg/kg	0.048
Tl - dissolved	mg/kg	0.00034
TMF Water Balance		
Water in pond (March 2018)	m^3	860,100
Annual decant volume	m^3	1,530,267

this exercise. Instead, it was conservatively assumed that the parameters modelled would report to the tailings pond instantaneously in March 2018.

Table 6 shows the results of this calculation in comparison with CCME water quality guidelines for the protection of freshwater aquatic life (where available). The assessment indicates that Hg is the most problematic species exceeding the CCME guidelines by a factor of 185. An absolute modelled value of 0.0048 mg/L is a drastic increase in Hg concentration from the supernatant baseline (<0.000005 mg/L; Table 3). The remaining species all fall within a factor of 2 of these guidelines, although no freshwater quality standards are proposed for P and Mn.

3.3.3 Conservative Case

The above predictions are merely a screening tool and stem from extreme worst case conditions that are unlikely to occur within the TMF environment. Based on the following rationales, more realistic assumptions were implemented to produce a Conservative Scenario. In the Conservative Case scenario, it is estimated that the contaminant transport to the tailings pond will take place over a several years. The following adjusted assumptions were implemented:

- The geochemical loads will not be released instantaneously since it will take time for water (precipitation or ROM supernatant) to be transported from the containment cell. Even once this has happened, much of the geochemical load will be initially stored in place and only a portion of this load will be transported towards the tailings pond via seepage and

diffusion. The proposed storage conditions for the historic tailings are such that transport of dissolved mass will initially be limited by the seepage rate from the historic tailings containment cell. Later in the operational life of the facility, the containment cell will be covered and, at this time, additional transport mechanisms into the pond will be invoked via diffusion and the expulsion of porewater via compaction of the tailings. For the purpose of the Conservative Case model a range of "loading factors" was considered.

- The relative water volume in which the contaminant load is dispersed in will directly affect the concentrations in TMF pore and pond water. Rather than the initial pond water volume accounted for in the Worst Case scenario, it was assumed that the annual water volume decanted into the polishing pond would be available for contaminant dispersion.

The result of this revised model decreases all parameters of concern except Hg well below CCME guidelines where available. Assuming that 10% of the historic tailings materials would contribute annually to contaminant release, Hg would still be predicted to show a concentration of 0.00031 mg/L, over an order of magnitude (12x) higher than the respective CCME guideline (Table 6). The effect of the relative proportion of geochemical load release on Hg concentrations is illustrated in Figure 1, highlighting the importance of infiltration and seepage control.

It is important to note that the presented models are based on very limited geochemical and physical input data and should be considered high-level considerations rather than water quality predictions. For example, this model does not account for seepage pathways, kinetic and solubility controls, precipitation, recycling/decanting of water, and ROM tailings addition. Nevertheless, it was identified that Hg may become elevated in the tailings pond water if the historic tailings are not adequately isolated.

Table 6:
High-Level Loading Model Output for a Conservative and a Best Estimate Scenario

	Worst Case	**Conservative Case (10% load release)**	**CCME**
	mg/L	*mg/L*	*mg/L*
P	0.031	0.017	N/A
Cd	0.000093	0.000011	0.000090
Fe	0.57	0.07	0.30
Pb	0.0029	0.0002	0.0032
Mn	0.64	0.10	N/A
Hg	0.0048	0.00031	0.000026
Tl	0.000078	0.000047	0.00080

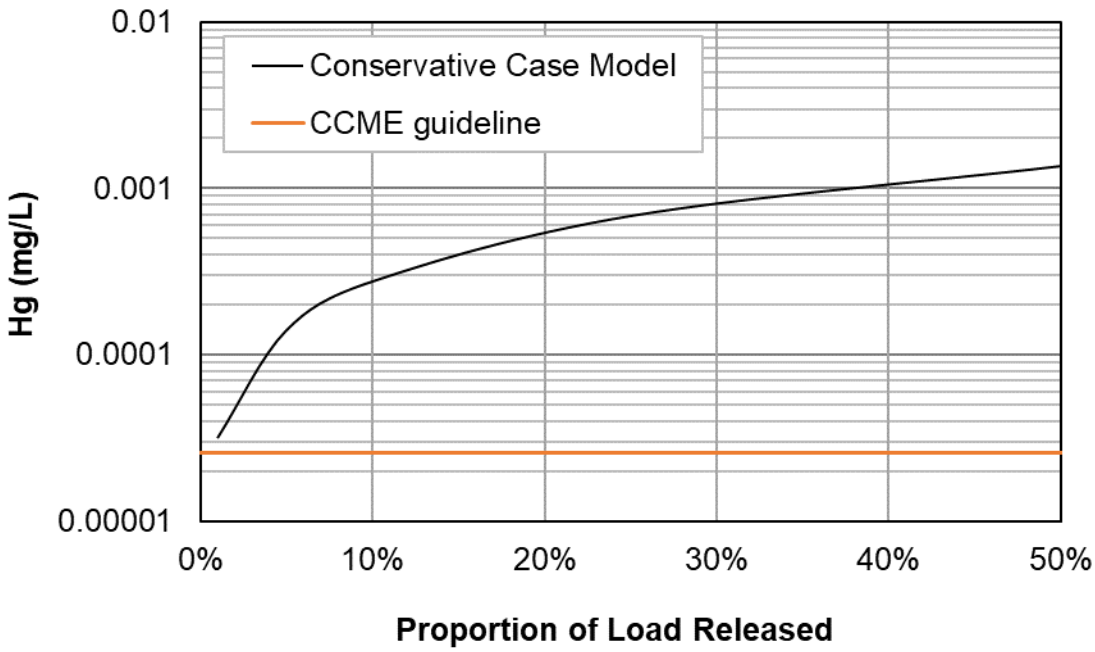

Figure 1: Modeled Hg concentration in the Touquoy tailings pond as a function of the portion of the load released

4. Conclusions and Recommendations

A set of five historic tailings samples were submitted for geochemical testing to investigate their metal leaching capacity and implications on storage within the Touquoy TMF. Key findings from this assessment can be summarized as follows:

- The historic tailings materials have relatively low sulphur content with sulphide sulphur measured at 0.03% or less;
- Carbon generally higher in content and is hosted in both organic and inorganic phases. Slightly acidic paste pH values suggest that neutralization potential is insufficient to counteract any released acidity and therefore carbonate minerals are likely to represent Fe- and Mn-bearing phases such as siderite and/or ankerite;
- While several species are relatively high in the studied materials, Hg appears to be the most reliable geochemical tracer of historic tailings in comparison with native soils. Sample MRT14-041B showed relatively low Hg and As contents and was therefore considered to be primarily made up of natural soil rather than historic tailings. This sample was conservatively excluded from the metal leaching assessment;
- The comparison of supernatant concentrations before and after contact with the historic tailings identified the following species as potential parameters of concern: P, Cd, Fe, Pb, Mn, Hg, and Tl. Of these, showed the strongest relative leaching potential with a median

enrichment C_{SFE}/C_{super} factor of >100. Other species may become mobilized from the historic tailings cell (*e.g.*, As, Cu), although due to their already high concentrations in the ROM supernatant, the historic tailings are unlikely to worsen the TMF water quality;

- Two high-level model scenarios (worst case and conservative) were presented to assess the impact of historic tailings placement on the downgradient TMF pond and pore water quality. Model result were compared to CCME guidelines and demonstrated that under the conservative model scenario where 10% of the available load is released from the containment cell to the tailings pond, only Hg exceeds its respective CCME guidelines and does so by about an order of magnitude (0.003 versus 0.00026 mg/L, respectively).

In the light of the elevated Hg concentrations expected in the historic tailings porewater as per the findings above, a number of recommendations can be made with respect to the material storage conditions:

- A berm should be installed to physically isolate the historic tailings from the surrounding materials and to inhibit surface runoff during rainfall events;
- The storage location should be chosen such that seepage is captured within the Touquoy TMF. If this is not possible, consideration of an engineered low-permeability layer at the base of the tailings deposition cell to minimize seepage loss to groundwater;
- Tailings materials should be stored in a confined cell with a relatively small footprint to minimize infiltration rates and contact with tailings pond water. This will minimize contaminant release since transport mechanisms from the tailings cell to the tailings pond may become diffusion-controlled later in the operational life of the facility; and
- A cover should be considered to limit diffusive flux from the historic tailings to the tailings pond. ROM tailings could be considered as cover material if adequate thickness and porosity can be achieved and placed over the historic tailings containment cell.

5. Closure

This technical memorandum was prepared and reviewed by the Lorax staff below.

Prepared by:	Reviewed by
Original Signed	***Original Signed***
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