TETRA TECH

Design Report for Operation Landfill (Stage 1), Meliadine Gold Project

PRESENTED TO

Agnico Eagle Mines Limited

JULY 13, 2017
ISSUED FOR USE
FILE: 704-ENG.EARC03076-01.WM13

AGNICO EAGLE DOCUMENT NUMBER: 6515-E-132-007-132-REP-010

REVISION: 0

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EXECUTIVE SUMMARY

Agnico Eagle Mines Limited (Agnico Eagle) is developing the Meliadine Gold Project (the project). The mine is located approximately 25 km north of Rankin Inlet, Nunavut. Agnico Eagle retained Tetra Tech Canada Inc. (Tetra Tech) to conduct a detailed design of the Operation Landfill (Stage 1) for the Project.

This report summarizes the site conditions, design basis, considerations, and criteria and presents the detailed design of the Stage 1 operation landfill, including construction drawings and material quantities.

An operation landfill (Stage 1) is required to permanently store acceptable waste materials during mine pre-production and early operation. The acceptable waste materials are non-salvageable, non-hazardous, non-putrescible solid industrial wastes that have a low leachate and low heat generation potential and cannot be incinerated in the site's incinerator.

The proposed landfill will be situated at the northeast corner of the proposed Waste Rock Storage Facility 1 (WRSF1). This location was selected to facilitate site drainage management, minimize overall environmental footprint of the project, facilitate easy access and final closure/reclamation, and provide sufficient storage capacity and operation flexibility.

The leachate from the proposed landfill is anticipated to be of low ionic strength due to controls on materials to be placed in the landfill, and, as a result, site-specific landfill leachate management and a liner system to contain any leachate from the landfill are not considered necessary for the landfill.

The proposed landfill will have a floor pad over the original ground and perimeter berms that confine the area of waste disposal and act as a wind shield to reduce windblown debris. The design of the berms will not assume that they will be in a frozen state or impermeable to seepage/leakage.

The landfill will be progressively filled in an orderly manner. Waste materials will be placed at one starting point close to the entrance and then the active waste area will be progressively advanced. The waste materials will be dumped in rows in the active waste area, compacted with heavy equipment, and covered by intermediate soil/rockfill cover layers with a minimum thickness of 0.3 m after compaction, as required, to reduce windblown debris and minimize the attraction of wildlife to the landfill.

The landfill floor has a natural gentle slope of approximately 3.5% downhill from the southwest side to the northeast side. Therefore, internal runoff and drainage will naturally flow towards the lower areas around the northeast side, where temporary water ponding may occur during an annual spring freshet or a rainfall event before the water gradually seeps through the northeast perimeter berm.

The natural runoff water and drainage/seepage from the landfill will naturally flow through a chain of internal water ponds (H13 to H6) and eventually flow into a final internal water collection pond (CP1) that was retained by a water retention dike (D-CP1) with a geomembrane liner system keyed into foundation permafrost. The water in CP1 will be monitored for water quality and treated before being discharged into Meliadine Lake through a pipeline with a diffuser after the water quality meets the discharge criteria.

A quality control/quality assurance (QA/QC) program is required during construction of the landfill to ensure that construction-sensitive features of the design are achieved. The landfill geotechnical performance should be regularly monitored during the landfill operation with an annual geotechnical site inspection by the Designer or a qualified geotechnical engineer.

TABLE OF CONTENTS

LIST OF TABLES IN TEXT

APPENDIX SECTIONS

APPENDICES

LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Agnico Eagle Mines Limited and their agents. Tetra Tech Canada Inc. (Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Agnico Eagle Mines Limited, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in Tetra Tech Canada Inc.'s Services Agreement. Tetra Tech's General Conditions are provided in Appendix B of this report.

1.0 INTRODUCTION

Agnico Eagle Mines Limited (Agnico Eagle) is developing the Meliadine Gold Project (the project). The mine is located approximately 25 km north of Rankin Inlet, Nunavut. Situated on the western shore of Hudson Bay, the proposed project site is located on the peninsula between the east, south, and west basins of Meliadine Lake (63°01'23.8"N, 92°13'6.42"W). A general location plan for the project is shown on Drawing 65-697-230-203 in Appendix A.

The current project focuses on the development of the Tiriganiaq gold deposit which will be mined using conventional open-pit and underground mining operations. A new Type “A” Water Licence (No. 2AM-MEL1631) was awarded in 2016 to Agnico Eagle for the development of the project.

Agnico Eagle retained Tetra Tech Canada Inc. (Tetra Tech) to undertake the following tasks associated with the landfill:

- Conduct the detailed design of the Operation Landfill (Stage 1) to produce construction drawings; and
- Prepare the design report for the Operation Landfill (Stage 1), in accordance with the requirements in Part D of the Type “A” Water Licence (No. 2AM-MEL1631).

This report summarizes the site conditions, design basis, considerations, and criteria, and presents the detailed design of the Stage 1 operation landfill. In addition, construction related items including construction drawings for the Stage 1 operation landfill are presented.

This report is prepared to meet the requirements in the Type “A” Water Licence No. 2AM-MEL1631 – Agnico Eagle Mines Limited for the Meliadine Gold Project (Part D, item 2).

2.0 GENERAL SITE CONDITIONS

2.1 Climate and Meteorology

The project site lies within the Southern Arctic Climatic Region where daylight reaches a minimum of 4 hours per day in winter and a maximum of 20 hours per day in summer. The nearest weather station is Rankin Inlet A (Station 2303401), located approximately 25 km south of the project site. The closest long-term regional evaporation station operated by Environment Canada is in Churchill, Manitoba. The monthly mean air temperature is typically above 0°C for the months of June to September, and is below 0°C between October and May. July is typically the warmest month and January the coldest. Winters are typically long and cold, while summers are short and cool. Spring and autumn are short. The mean annual temperature for the period of record from 1981 to 2009 was -10.4°C.

The total annual average precipitation at the project site is 405 mm/year, presents almost equally as snow and rainfall (Golder 2013). Average annual evaporation for small waterbodies in the project area is estimated to be 323 mm between June and September. The average annual loss of snowpack to sublimation and snow redistribution is estimated to vary between 46% and 52% of the total precipitation for the winter period and occurs between October and May (Golder 2013).

The region is known for high winds, which are due in part to the broad, flat, uninterrupted landscape offered to moving air masses. The wind blows from the north and north-northwest direction more than 30% of the time. The mean values for wind speed show that the north-northwest, together with north and northwest winds, have the highest speeds and tend to be the strongest. Mean monthly wind speeds are typically between 19 km/hour and 27 km/hour.

The climate in the project region is projected to be warmer for the 2020s, 2050s, and 2080s time horizons when compared to the observed historic values (Agnico Eagle and Golder 2014). Precipitation shows an increase compared to historical values, but the majority of projections are not significantly different from the annual recorded precipitation values.

2.2 Topography

The dominant terrain in the project area comprises glacial landforms such as drumlins (glacial till), eskers (gravel and sand), and lakes. A series of low relief ridges are composed of glacial deposits, oriented in a northwest-southeast direction, which control the regional surface drainage patterns. The property is about 60 metres above sea level (masl) in low-lying topography with numerous lakes. Surface waters are usually frozen by early October and remain frozen until early June.

2.3 Permafrost

The project site is located within the Southern Arctic terrestrial eco-zone, one of the coldest and driest regions of Canada, in a zone of continuous permafrost. Continuous permafrost to depths of between 360 m to 495 m is expected based on historical and recent ground temperature data from thermistors installed near Tiriganiaq, F-Zone, and Discovery deposits (Golder 2012b). The measured ground temperature data indicates that the active layer is 1.0 m to 3.0 m in areas of shallow soils and areas away from the influence of lakes. It is anticipated that the active layer adjacent to lakes or below a body of moving water such as a stream could be deeper. The typical permafrost ground temperatures at the depths of zero annual amplitude (typically at a depth of below 15 m) are in the range of -5.0°C to -7.5°C in the areas away from lakes and streams. The geothermal gradient ranges from 0.012 C°/m to 0.02 C°/m (Golder 2012b).

2.4 Groundwater

In areas of continuous permafrost, there are generally two groundwater flow regimes: a shallow groundwater flow regime located in the active layer near the ground surface, and a deep groundwater flow regime located beneath permafrost. From late spring to early autumn, when temperatures are above 0˚C, the active layer thaws. Within the active layer, the water table is expected to be a subdued replica of topography, and is expected to parallel the topographic surface. The project area groundwater in the active layer flows to local depressions and ponds that drain to larger lakes.

The permafrost in the rock in the project area is generally assumed to be impermeable to groundwater flow. The shallow groundwater flow regime, therefore, has little to no hydraulic connection with the deep groundwater regime.

2.5 Subsurface Conditions

A number of site investigation programs were carried out at the project site in 1998, 1999, 2007, 2009, 2011, 2012, 2013, 2014, 2015, and 2016.

In general, the near surface stratigraphy comprises a veneer of organic material, underlain by non-cohesive soils (i.e. silty sand and sandy silt) with cobbles and boulders. The overburden thickness ranges between 1.5 m and 17.8 m and is underlain by greywacke, medium to strong with some fracturing and frost jacking of the upper bedrock surface. A layer of ice-rich overburden (silt or sand) has been observed in some of the drilled boreholes. Overburden soils with excess ice (Vc, Vs, Vx, and Vr) were observed in most of the boreholes. Massive icy beds up to 1.25 m thick were also encountered. The estimated percentage (by volume) of the excess visible ice ranged from 2% to more than 50% in the overburden soils. Limited soil porewater salinity tests (EBA 2013) indicated that the overburden soils may have a porewater salinity of up to 4 parts per thousand (ppt) for shallow sandy soils, up to 7 ppt for shallow silty soils, and up to 12 ppt for deep silty soils.

2.6 Seismic Zone

The project site is situated in an area of low seismic risk. The peak ground acceleration (PGA) for the area was estimated from the 2015 National Building Code of Canada seismic hazard website (http://earthquakesscanada.nrcan.gc.ca). The estimated PGA is 0.022 g for a 5% in 50-year probability of exceedance (0.001 per annum or 1 in 1,000 year return) and 0.037 g for a 2% in 50-year probability of exceedance (0.000404 per annum or 1 in 2,475 year return) for the area.

2.7 Other Relevant Data

The raw land survey data, a 1-m contour digital map of the ground surface and 0.5 m contour lake bathymetric data for selected lakes at the project site were provided to Tetra Tech by Agnico Eagle. Survey data for selected areas were recently provided to Tetra Tech and were incorporated into the original digital map for the design in this project.

3.0 DESIGN BASIS

3.1 Landfill Management Plan

Agnico Eagle (2015a) presented the landfill and waste management plan for the Meliadine Gold Project and it formed a component of the documentation series produced for the Type “A” Water Licence application. The plan described the preliminary design basis and operational procedures for the landfill to be constructed at the project site.

The key points for the landfill design and operation, as described in Agnico Eagle (2015a), includes the following:

- The proposed landfill will not be a conventional landfill; it will be a controlled landfill that only receives the waste acceptable for placement in the landfill, as specified in Section 4.3 of Agnico Eagle (2015a).
- Acceptable items that will be disposed of in the landfill will be those that are non-salvageable, non-hazardous, non-putrescible solid industrial wastes that have a low leachate and low heat generation potential and cannot be incinerated in the site’s incinerator.
- The leachate from the proposed landfill is anticipated to be of low ionic strength due to controls on materials to be placed in the landfill, and, as a result, site-specific landfill leachate management and a liner system to contain any leachate from the landfill are not considered necessary for the landfill.
- The proposed landfill will have a floor pad over the original ground and perimeter berms that confine the area of waste disposal and act as a wind shield to reduce windblown debris. The design of the berms will not assume that they will be in a frozen state or permanently impermeable to leakage.
- The landfill will be progressively filled in an orderly manner. Waste materials will be placed at one starting point close to the entrance and then the active waste area will be progressively advanced. The waste

materials will be dumped in rows in the active waste area, compacted with heavy equipment, and covered by intermediate soil/rockfill cover layers with a minimum thickness of 0.3 m after compaction, as required, to reduce windblown debris and minimize the attraction of wildlife to the landfill.

3.2 Construction and Operation Schedules and Assumptions

An exploration landfill has been constructed at the site and permitted to receive the waste materials that are acceptable for landfill disposal at the site during the exploration and early pre-production period until the end of Year -3 (2017). The operation landfill to be constructed will receive the acceptable waste materials at the end of Year -3 (2017).

The operation landfill will be constructed in stages to save initial construction materials/cost and better adapt to potential future adjustments in estimated annual volumes of the waste materials to be placed in the landfill over its operation life. The landfill is planned to be constructed in three stages:

- Stage 1: for the waste materials that will be produced from end of Year -3 (2017) up to Year 4 (2023);
- Stage 2: for the waste materials that will be produced during the remaining mine operation life after the design capacity of the Stage 1 landfill is fully occupied; and
- Closure: for the waste materials that will be produced during mine decommissioning and interim mine closure.

This report only focuses on the design of the Stage 1 operation landfill. The following construction and operation schedules are assumed for the design of the Stage 1 operation landfill:

- Start construction in mid-August 2017;
- Complete construction in mid-November 2017;
- Start operation by the end of 2017; and
- Complete Stage 1 operation until its design capacity is fully occupied (by the end of 2023 for design).

It is planned that the perimeter berms of the Stage 1 operation landfill will be expanded outwards and raised during the Stage 2 construction to accommodate more waste materials that will be generated during the remaining mine operation. For preliminary planning, the Stage 2 landfill can be designed in 2021 or 2022. The construction of the Stage 2 landfill should be completed by the end of 2023 or earlier. The actual design and construction schedules for the Stage 2 landfill will depend on the actual landfill operation observation and requirements during Stage 1.

3.3 Estimated Volume of Materials to be Placed in Stage 1 Operation Landfill

The estimated volumes of the waste materials to be placed in the Stage 1 operation landfill are as follows:

- 260 m^3 end of 2017 and in 2018 (construction/pre-production);
- 572 m^3 in 2019 (construction/pre-production to early operation); and
- 884 m^3 in each of 2020 to 2023 (early mine operation).

These values are estimated based on the annual waste volumes presented in Agnico Eagle (2015a). There will be operation flexibility in the landfill design that allows for less or more annual waste volumes to be managed in the landfill. For example, if more or less waste materials than estimated are generated during operation, the design and construction schedules for the Stage 2 landfill can be adjusted accordingly to accommodate the potential total waste volume difference.

In addition, intermediate soil/rockfill covers will be regularly placed over the compacted waste surfaces during landfill operation to reduce windblown debris and minimize the attraction of wildlife to the landfill. The typical thickness of the intermediate soil/rock cover after compaction is assumed to be 0.3 m. It is assumed that one intermediate soil/rockfill cover is required for every 0.5 m to 0.8 m thick lift of compacted waste materials.

3.4 Location of Proposed Landfill

The proposed landfill was presented in Figure 1 of Agnico Eagle (2015a) and is shown on Drawings 65-697-230-203 and 65-697-230-204 in Appendix A of this report. The proposed landfill will be situated at the northeast corner of the proposed Waste Rock Storage Facility 1 (WRSF1) where mine waste rock will be placed during mine operation.

This location was selected to facilitate site drainage management, minimize overall environmental footprint of the project, facilitate easy access and final closure/reclamation, and provide sufficient storage capacity and operation flexibility. More details were described in Section 1.2 of Agnico Eagle (2015a).

3.5 Geotechnical Conditions in the Proposed Landfill Area

The nearest borehole to the proposed landfill location is GT12-17, which was drilled during the summer 2012 site investigation (Golder 2012a), is approximately 25 m from the west corner of the proposed landfill. The borehole logs indicate that the overburden thickness is 8.5 m with 0.05 m peat, 3.6 m silty sand and sand, 3.45 m boulders and cobbles, and 1.4 m sandy silt followed by slightly weather to fresh, strong greywacke or siltstone bedrock. The measured moisture contents of the overburden soils ranged from 9% to 26%. Ice conditions of the soils were not indicated in the borehole logs.

3.6 Construction Materials

The construction materials for the landfill will include the following:

- Run-of-mine Rockfill (sourced from the waste rock from mine development);
- Transition Rockfill (processed from the waste rock from mine development); and
- Granular Fill (processed from the waste rock from mine development or natural eskers).

A baseline geochemical characterization program for the project was initiated in 2008 and consisted of static and kinetic testing methods to assess the chemical composition of the mine waste and overburden, its potential to generate acid rock drainage and its potential for metal leaching (ML) upon exposure to ambient conditions.

Golder (2012c) documented the waste geochemical characterization programs carried out from 1998 to 2011 for the project. The key findings included the following:

- The waste rock from the Tiriganiaq deposit area is considered to be non-potentially acid generating (NAG) and has a low potential for ML. Kinetic tests at various scales indicate that drainage water quality will meet Metal Mining Effluent Regulations (MMER) monthly mean effluent limits.

- The overburden at the site will be NAG, and that leachate concentrations are generally lower than waste rock and will meet MMER monthly mean effluent limits. Waste rock and overburden have compatible geochemical characteristics such that these materials can be managed together in the same disposal facilities.

Therefore, the waste rock from the mine development, fill materials sourced from the rock, and overburden materials will be NAG and have low potential of ML.

3.7 Parameters for Precipitation and Surface Runoff

Various parameters for surface runoff estimation are presented in Table 3.1. These parameters are adopted from Appendix B of the Water Management Plan (Agnico Eagle 2015b).

Table 3.1: Various Parameters for Surface Runoff Estimation

Item	Value
Estimated snow melt water equivalent during a 1 in 2 return (mean) spring freshet	103 mm
Annual net runoff on disturbed land surface for a mean (1 in 2 return) precipitation year	251 mm (133 mm in June, 36 mm in July, 43 mm in August, 31 mm in September, and 8 mm in October)
Estimated snow melt water equivalent during a 1 in 100 return wet year spring freshet	171 mm
Annual net runoff on disturbed land surface for a 1 in 100 return wet precipitation year	466 mm (219 mm in June, 69 mm in July, 91 mm in August, 68 mm in September, and 19 mm in October)
Precipitation for a mean (1 in 2 return) 24-hour duration extreme rainfall event	33 mm
Precipitation for a 1 in 100 return wet 24-hour duration extreme rainfall event	65 mm

4.0 DESIGN OF STAGE 1 OPERATION LANDFILL

4.1 Key Design Considerations

In addition to the design basis described in Section 3.0, the landfill is designed based on the following key considerations:

- The landfill will have a floor base with perimeter berms, constructed over the original ground to avoid excavation and disturbance of the permafrost foundation.
- The floor base will be constructed with transition rockfill (150 mm minus), which separates the waste materials from the original ground and provides a solid working pad for the waste placement.
- The perimeter berms will be mainly constructed with run-of-mine waste rock. A thin layer of granular fill (20 mm minus) will be placed over the inside slopes of the berms to serve as a filter zone to reduce potential loss of finer particles in the waste materials through the berms when internal drainage water seeps through the berms. A transition rockfill layer between the granular fill layer and the run-of-mine waste rock will be constructed to protect the granular fill layer.
- The landfill floor has a natural gentle slope of approximately 3.5% downhill from the southwest side to the northeast side. Therefore, internal runoff and drainage will naturally flow towards the lower areas around the

northeast side, where temporary water ponding may occur during spring freshet or a rainfall event before the water gradually seeps through the northeast perimeter berm.

- The natural runoff water and drainage/seepage from the landfill will naturally flow through a chain of internal water ponds (H13 to H6) and eventually flow into a final internal water collection pond (CP1) that is retained by a water retention dike (D-CP1) with a geomembrane liner system keyed into foundation permafrost. The water in CP1 will be monitored for water quality and treated before being discharged into Meliadine Lake through a pipeline with a diffuser after the water quality meets the discharge criteria.
- An access road from the Industrial Site area, along the original ground ridge on the northwest side of the landfill, to the southwest side of the landfill perimeter berm will be constructed to serve the landfill during its construction and operation. The design of the access road will be carried out by others. The access road will also serve as an access ramp to the southwest perimeter berm of the landfill during its operation. Therefore, an external access ramp over the outside slope of the southwest perimeter berm is not included in the current landfill design.
- Waste placement in the landfill will start in the area close to the access road on the southwest side and progressively advance downhill towards the northeast perimeter berm. This will facilitate internal water management since the lower basin area along the northeast side will serve as a temporary internal water collection pond. The waste materials and associated intermediate soil/rockfill covers placed inside of the southwest perimeter berm will also serve as an internal access ramp from the berm crest to the inside of the landfill..

4.2 Plan Layout, Sections, and Key Parameters

The Stage 1 landfill design drawings are presented in Appendix A. Drawings 65-697-230-203 to 204 show the landfill location and layout plans. Drawings 65-697-230-205 to 207 present the typical design sections and four sections through the landfill. Table 4.1 summarizes the key design parameters for the landfill.

Table 4.1: Key Design Parameters for Landfill

Parameter	Value
Side Slopes of Perimeter Berms	2.5(H):1(V) for outside slopes and 2.0(H):1(V) for inside slopes
Typical Berm Crest Width	4 m
Berm Height	0.3 m (min.) to 4.1 m (max.)
Berm Crest Elevation	76.3 m to 77.2 m
Fill Thickness above Original Ground for Floor Base	0.5 m
Landfill Footprint Area	7,953 m^2
Total Storage Volume from Floor Base to Crests of Perimeter Berms	9,444 m^3

4.3 Internal Water Management

As described in Section 4.1, internal runoff and drainage in the landfill will naturally flow towards the lower areas around the northeast side, where temporary water ponding may occur during an annual spring freshet or a rainfall event before the water gradually seeps through the northeast perimeter berm. Table 4.2 summarizes key parameters for internal water management of the landfill.

Table 4.2: Key Parameters for Landfill Internal Water Management

Parameter	Value
Landfill Internal Catchment Area	5,016 m^2
Estimated Total Volume of Runoff Water in Landfill during a Mean Spring Freshet (including up to 220 m^3 of water equivalent volume estimated for potential additional snow drifting inside the landfill basin)	520 to 740 m^3
Estimated Total Volume of Runoff Water in Landfill during a 1 in 100 Return Wet Spring Freshet (including up to 100 m^3 of water equivalent volume estimated for potential additional snow drifting inside the landfill basin)	860 to 960 m^3
Estimated Total Volume of Runoff Water in Landfill during a Mean (1 in 2 Return) 24-hour Duration Extreme Rainfall Event	165 m^3
Estimated Total Volume of Runoff Water in Landfill during a 1 in 100 Return Wet 24-hour Duration Extreme Rainfall Event	326 m^3

Under a worst case that no water is assumed to seep through the perimeter berms during spring freshet or a heavy rainfall event, the maximum water depth in the lower area inside the northeast perimeter berm is estimated to be 0.4 m to 1.5 m. This short-term water ponding in the area is acceptable. The water will gradually seep through the perimeter berms soon after the spring freshet or rainfall event.

4.4 Thermal Assessment

Permafrost is expected to exist beneath the footprint of the landfill. With the placement of waste materials and intermediate soil/rock covers in the landfill, it is expected that the top surface of the permafrost will rise into the original active layer that exists prior to the landfill construction and may even rise into a portion of the landfilled materials. However, the Stage 1 landfill design does not rely on the permafrost development or thermal conditions of the landfill.

4.5 Stability Evaluation

The side slopes of the landfill perimeter berms were adopted based on past experience and limit equilibrium slope stability analyses that were conducted for similar earth berms designed for the Meliadine Project. The analyses evaluated several scenarios including short-term construction and long-term operation (both static and seismic loading conditions).

To ensure reasonable safety of earthworks, a safety factor is usually introduced in geotechnical stability analyses. Generally, the selection of a design factor of safety for an earth structure depends on the importance of the structure, potential failure consequences, and uncertainties involved in design loads and soil parameters. The minimum design factors of safety adopted for the landfill are presented in Table 4.3.

Table 4.3: Design Minimum Factors of Safety for Landfill

Loading Conditions	Minimum Factor of Safety
Static loading, short-term, end of construction	1.3
Static loading, long-term, normal operating	1.3 for shallow slip; 1.5 for deep-seated slip
Seismic loading (pseudo-static), long-term, normal operating	1.1

The calculated minimum factors of safety for the landfill perimeter berms meet or exceed the adopted minimum factors of safety.

4.6 Seepage Evaluation

The internal runoff and drainage water will seep through the perimeter berms, mainly the northeast perimeter berm. The seepage rate will depend on the water head against the berms and the hydraulic permeability of the berms. Based on an assumed hydraulic conductivity value of 1E-5 m/s for the granular fill, the estimated seepage rate through the perimeter berms is 45 m^3/day for a water head of 0.4 m and 380 m^3/day for a water head of 1.0 m. These seepage rates suggest that any water ponded inside the landfill would seep through the perimeter berms within a short period of time.

The seepage from the landfill will naturally flow into H13 from where the water eventually flows into CP1 because the landfill is within the natural catchment boundary of CP1.

4.7 Deformation Considerations

The majority of potential deformations of the rockfill used for landfill construction are expected to occur during the construction stage. The landfill will be constructed in late summer and fall 2017 when the foundation soils in the annual active layer are unfrozen. With placement of the overlying rockfill, the majority of deformations in the unfrozen foundation soils will occur during the construction stage.

The ice conditions in the overburden soils below the landfill footprint are unknown. Ice-rich soils may exist. Creep-induced deformations may occur in the ice-rich soils under shear loading in the areas beneath the slopes of the perimeter berms. Nevertheless, it is expected that the deformations would be relatively small and tolerable, and will not detrimentally affect normal operation of the landfill.

5.0 CONSTRUCTION OF LANDFILL

5.1 Construction Materials and Estimated Quantities

The landfill drawings for construction are presented in Appendix A. The general considerations of the construction materials for the landfill are presented in Section 3.6 of this report.

Table 5.1 presents the estimated in-place quantities of the construction materials for the landfill.

Table 5.1: Estimated In-Place Material Quantities for Construction of Stage 1 Landfill

Item	Estimated In-Place Quantity after Compaction	Material Source and Key Specifications
Type A: Run-of-Mine Rockfill (600 mm minus)	8,290 m^3	To be sourced from run-of-mine rock stockpiles or mine operation; maximum particle size of 600 mm.
Type B: Transition Rockfill (150 mm minus)	2,080 m^3	To be processed from the rock stockpiles or other sources approved by the Design Engineer and the Owner; maximum particle size of 150 mm.
Type C: Granular Fill or Esker Sand (20 mm minus)	305 m^3	To be processed from the rock stockpiles or other sources approved by the Design Engineer and the Owner; maximum particle size of 20 mm; fines (<0.08 mm) content of 4% to 10%.

It should be noted that the actual quantities could be different from those estimated due to the following reasons:

- The foundation soils may settle during the landfill construction; and
- Field observations during construction may lead to design and construction related modifications, which may in turn affect the quantities.

5.2 Water Management and Erosion Control during Construction

Based on the current landfill construction schedule, the landfill fill materials will be placed in later summer or early fall. Runoff water from the rockfill materials during landfill construction is expected under a rainfall event. The runoff will naturally flow into internal pond H13 and eventually into CP1. As a result, a separate water collection system is not required.

5.3 Quality Control and Quality Assurance

A quality control/quality assurance (QA/QC) program is required during construction of the landfill to ensure that construction-sensitive features of the design are achieved.

As part of the field QA/QC program, daily field reports should be prepared by the on-site construction QA/QC team to document the construction activities associated with landfill construction. The daily report will include, but not be limited to the following:

- Up to date information of daily construction activities including a list of equipment on-site and weather conditions;
- A summary of visual inspections and observations;
- Records of any construction deficiency and appropriate actions taken, if any;
- Records of QA/QC testing results and monitoring data; and
- Report on construction and design changes made during construction.

Upon the completion of the construction activities, an as-built construction report will be prepared and submitted to the regulators within 90 days after construction is completed. The report should provide all relevant supporting documentation compiled during implementation of the QA/QC plan. The construction report will include, but not be limited to the following:

- Construction drawings based on the as-built survey information of the surface of all materials placed;
- Actual construction quantities;
- All testing records, a summary of all test sample locations, collection methods, and test results;
- Summary of the construction issues and resolution applied;
- Report on construction and design changes made during construction; and
- Installation details of any required instrumentation or monitoring devices, if any.

5.4 Surveying Requirements

A Survey Contractor should be retained to carry out as-built surveying and documentation to verify quantities and produce as-built drawings.

The Survey Contractor should carry out, at a minimum, the following tasks:

- Survey original ground within the landfill footprint prior to the commencement of construction.
- During and after construction, the following tasks should be performed:
  - Provide staking to guide construction;
  - Survey the as-built conditions of fills including different material boundaries as required;
  - Survey any measurement for payment items;
  - Provide quantities of fill materials on critical stages or as required;
  - Provide AutoCAD drawings showing three-dimensional (3D) lines and surfaces of the fill materials at critical stages of construction or as required; and
  - Provide the as-built AutoCAD drawings showing 3D lines and surfaces of the fill materials after the completion of each structure.

6.0 OPERATION AND MONITORING OF LANDFILL

6.1 Landfill Operation Management

The operation of the landfill needs to be properly managed by the Site Services department, with the support of the Site Environmental department, and includes the following components:

- Safety and environmental protection measures;
- Waste acceptance procedures;
- Day-to-day landfill operation procedures, including waste placement and compaction, and intermediate soil/rockfill cover placement and compaction;
- Seepage water monitoring; and
- Reporting.

6.2 Landfill Storage Capacity for Operation Planning

The Stage 1 operation landfill is designed to accommodate the following three components:

- Non-salvageable, non-hazardous, non-putrescible solid industrial wastes to be placed in the landfill;
- Soil/rockfill materials for intermediate covers over the compacted wastes; and
- Internal runoff/drainage water that may be temporarily ponded inside of the landfill during a spring freshet or an extreme rainfall event.

The soil/rockfill materials for the intermediate covers over the compacted wastes can be sourced from the following:

- Suitable rockfill materials with a maximum particle size of 150 mm or less, and no frozen lumps and no ice/snow if placed during winter;
- Unfrozen overburden till soils with a maximum particle size of 150 mm; or
- Unfrozen, treated soils from landfarm operation.

Table 6.1 summarizes the estimated storage capacities for Stage 1 landfill operation planning.

Table 6.1: Estimated Storage Capacities for Stage 1 Landfill Operation Planning

Item	Estimated Volumes	Comments
Total Storage Capacity of Stage 1 Operation Landfill	9,444 m^3	Total storage capacity in the Stage 1 operation landfill from the floor base to the crests of perimeter berms.
Estimated Total Waste Volume to Landfill	4,368 m^3	Estimated volume of compacted waste materials during Stage 1 operation.
Estimated Volume of Intermediate Soil/Rockfill Cover	3,021 m^3	Assumed typical thickness of 0.3 m for each intermediate soil/rock cover after compaction; Assumed one intermediate soil/rock cover for every 0.5 m to 0.8 m thick lift of compacted waste materials.
Remaining Capacity for Temporary Storage of Internal Runoff and Drainage	2,055 m^3	Estimated total volume of runoff water in landfill during a 1 in 100 return wet spring freshet is up to 960 m^3 (assuming no seepage through the berms); the available capacity of 2,055 m^3 includes the capacity for freeboard and is adequate.

As stated in Section 3.3, in case that more or less waste materials than estimated are generated during Stage 1 landfill operation, the design and construction schedules for the Stage 2 landfill can be adjusted accordingly to accommodate the potential total waste volume difference.

6.3 Key Considerations in Landfill Operation and Monitoring

Detailed landfill operation and monitoring procedures are not described in this report. Key considerations in landfill operation and monitoring include, but not limited to, the following:

- Staff (including equipment operators) working in the landfill must be trained for safety, environmental protection, operation procedures, and monitoring procedures.
- Waste material acceptance procedures should be established before landfill operation to avoid placing non-acceptable materials into the landfill.
- As described in Section 4.1, the access road to the landfill will also serve as an access ramp to the southwest perimeter berm of the landfill during its operation. Waste placement in the landfill will start in the area close to the access road on the southwest side and gradually advance downhill towards the northeast perimeter berm. The waste materials and associated intermediate soil/rockfill covers placed inside of the southwest perimeter berm will also serve as an internal access ramp from the berm crest to the inside of the landfill.
- Placing waste materials and associated intermediate soil/rockfill covers should not dislocate nearby soils/rockfill over the inside berm slopes of the landfill.

- It is suggested that an intermediate soil/rock cover is placed for every 0.5 m to 0.8 m thick lift of compacted waste materials. The typical thickness of each intermediate soil/rock cover after compaction should be no less than 0.3 m.
- Snow and ice should not be buried below waste materials and associated intermediate soil/rockfill covers.
- In the event that greater volumes of leachate, or leachate with high ionic strength is found coming from the landfilled wastes, an investigation would be undertaken to determine the cause. This could lead to changes in the configuration and/or management of the landfill to further limit water coming in contact with landfill materials and/or modify the water management strategy in this area.
- The geotechnical performance of the landfill should be regularly monitored during the landfill operation; an annual geotechnical site inspection by the Designer or a qualified geotechnical engineer should be conducted to inspect/document the landfill performance and identify any remedial measures that need to be taken.

7.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech Canada Inc.

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/jf

PERMIT TO PRACTICE
TETRA TECH CANADA INC.

Signature ____________

Date ____________

PERMIT NUMBER: P 018
NT/NU Association of Professional
Engineers and Geoscientists

REFERENCES

Agnico Eagle and Golder, 2014. Volume 5.0 – Atmospheric Environment and Impact Assessment, Final Environmental Impact Statement (FEIS) – Meliadine Gold Project, Nunavut (Doc. 288-1314280007 Ver 0 submitted to NIRB).

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Golder, 2012a. SD 2-4B Factual Report on 2012 Geotechncial Drilling Program – Meliadine Gold Project, Nunavut. Final Report Submitted to Agnico-Eagle Mines Ltd. by Golder Associates, November 29, 2012.

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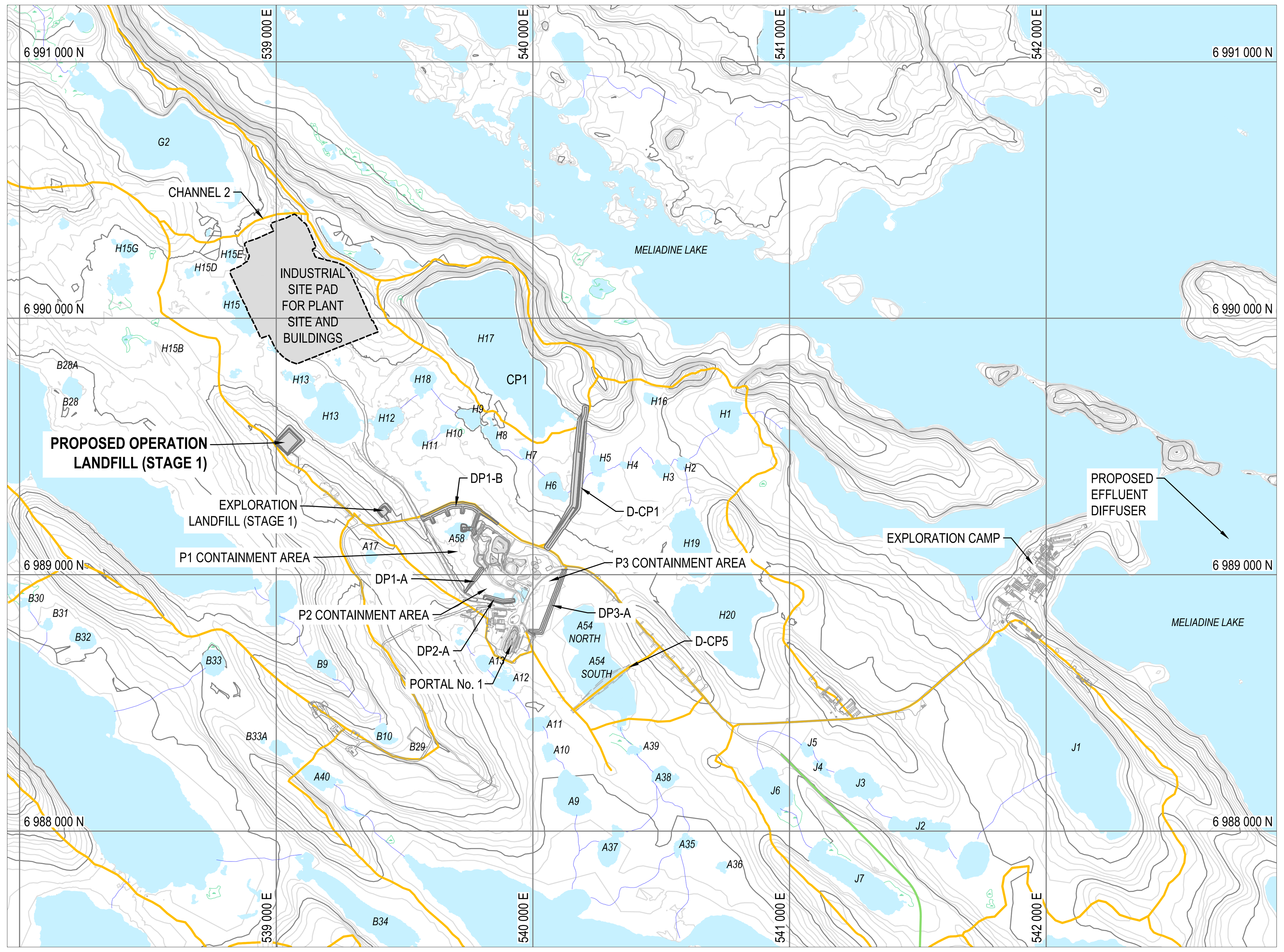
APPENDIX A

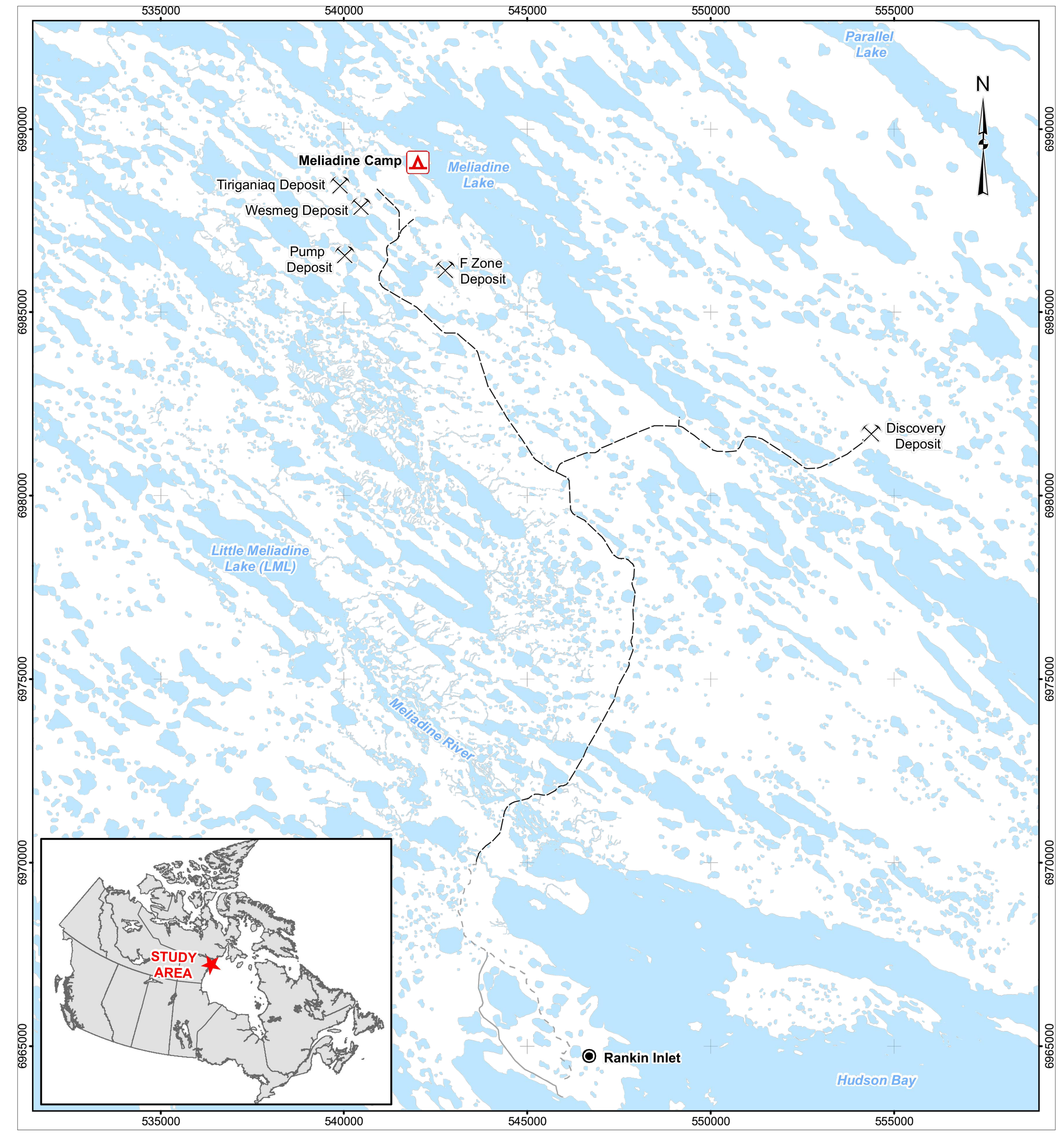
LANDFILL DRAWINGS FOR CONSTRUCTION

NO. DESSIN DRAWING NO. 65-697-230-203

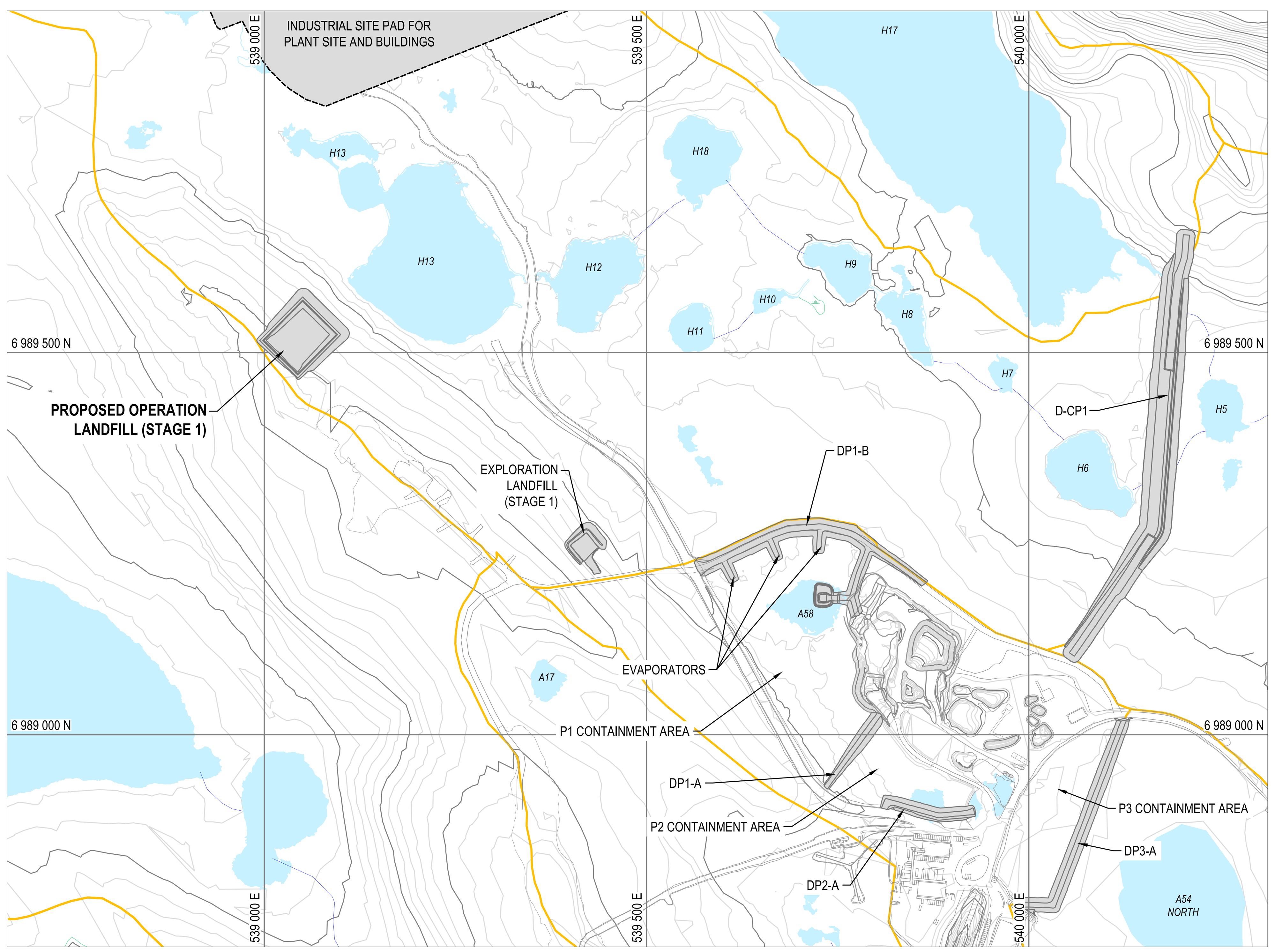
FORMAT ARCHD



GENERAL SITE LOCATION
SCALE: 1:15,000



LOCATION MAP
SCALE: N.T.S.



OPERATION LANDFILL (STAGE 1) SITE LOCATION
SCALE: 1:5,000

OPERATION LANDFILL (STAGE 1) CONSTRUCTION DRAWING INDEX

DRAWING NUMBER	REV.	DRAWING TITLE
65-697-230-203	0	OPERATION LANDFILL (STAGE 1) GENERAL LOCATION PLAN
65-697-230-204	0	OPERATION LANDFILL (STAGE 1) LAYOUT PLAN
65-697-230-205	0	OPERATION LANDFILL (STAGE 1) CROSS-SECTIONS A-A AND B-B
65-697-230-206	0	OPERATION LANDFILL (STAGE 1) CROSS-SECTIONS C-C AND D-D
65-697-230-207	0	OPERATION LANDFILL (STAGE 1) TYPICAL DETAILS AND MATERIAL QUANTITIES

TETRA TECH EBA

NOTES GÉNÉRALES / GENERAL NOTES

PERMIT TO PRACTICE
TETRA TECH CANADA INC.
Signature
Date Feb 8, 2017
PERMIT NUMBER: P 018
NT/NU Association of Professional Engineers and Geoscientists

POUR CONSTRUCTION
FOR CONSTRUCTION
DATE: 2017-02-08

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
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AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
0	2017-02-08	ISSUED FOR CONSTRUCTION	GZ	KJ	
A	2017-01-23	ISSUED FOR REVIEW	GZ	KJ	

REVISIONS

REGISTERED PROFESSIONAL ENGINEER G. ZHANG LICENSEE NWT/NU Feb 08 2017

REGISTERED PROFESSIONAL ENGINEER KEVIN W. JONES LICENSEE N.W.T. Feb. 8, 2017

TITRE / TITLE
AGNICO EAGLE MELIADINE GOLD PROJECT

OPERATION LANDFILL (STAGE 1)
GENERAL LOCATION PLAN

DESSINÉ PAR / DRAWN BY	EL	DATE 2017-01-23
VERIFIÉ PAR / CHECKED BY	GZ	2017-01-23
APPROUVÉ PAR / APPROVED BY	KJ	2017-01-23
ÉCHELLE / SCALE	AS SHOWN	DATE 2017-01-23

NO. DESSIN / DRAWING NO. 65-697-230-203

NO. PROJET / PROJECT NO.	REVISION	FEUILLE / SHT
6515	0	1 / 5

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