Waste Rock Storage Facility 6 (WRSF6) Design Report and Drawings, Meliadine Gold Mine, Nunavut

PRESENTED TO

Agnico Eagle Mines Limited

DECEMBER 13, 2024
ISSUED FOR USE
FILE: ENG.EARC03140-38
AGNICO EAGLE DOCUMENT NUMBER: 65-686-230-REP-004

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EXECUTIVE SUMMARY

Agnico Eagle Mines Limited (Agnico Eagle) is operating the Meliadine Gold Mine (the Mine), located approximately 25 km north of Rankin Inlet. The current operation consists of mining the Tiriganiaq deposit with two open pits and an underground operation under the existing Nunavut Water Board Type A Water Licence (2AM-MEL1631). The amended Type A Water Licence will allow Agnico Eagle to mine the Wesmeg, Wesmeg North, Pump, FZone, and Discovery deposits that were included in the 2014 Final Environmental Impact Statement and Nunavut Impact Review Board Project Certificate No.006.

As per the current mine plan, Waste Rock Storage Facility 6 (WRSF6) is required to accommodate the overburden and waste rock that will be produced from the mining of the deposits at Pump. Tetra Tech Canada Inc. was retained by Agnico Eagle to carry out the detailed design and to prepare a design report and Issued for Construction Drawings (IFC) for WRSF6. The report and IFC drawings are intended to meet the requirements of Part D, Items 1 and 2 of the Amended Type A Water Licence.

The mine plan is expected to change over the course of operations as a result of ongoing engagement, changes in market conditions, advanced drilling, and engineering optimization or other factors. To consider the potential change of the mine plan, WRSF6 will be designed and constructed in two stages. Stage 1 of WRSF6 will occupy a smaller footprint which is within the permitted WRSF6 footprint from the 2024 Type A Water Licence Amendment. WRSF6 will eventually expand in Stage 2 to reach the permitted WRSF6 footprint.

The design of Stage 1 of WRSF6 was based on the refined mine plan for Pump deposits. Under the refined mine plan, the mining at the Pump area will be developed in two phases. Approximately 1.2 Mt of overburden and 2.5 Mt of waste rock will be produced during Phase 1 mine development. Phase 2 mine development may involve Pump01 open pit pushback and open pit mining at Pump03 depending on the economic potential and market condition. Approximately 0.7 Mt of overburden and 2.5 Mt of waste rock are expected to be produced from the Phase 2 mine development.

A technical memorandum summarizing the design basis for WRFS6 was prepared and attached in Appendix A. Slope stability analyses were conducted to facilitate the development of the typical section of WRSF6 and thermal analyses were also conducted to evaluate the long-term thermal condition of WRSF6 and its foundation under adopted design climate change scenario (CMIP6 SSP2-4.5). The results from the thermal analyses were used to estimate the input parameters of the ice-rich silt and sand foundation for the slope stability analyses. The calculated factor of safety for WRSF6 meet or exceed the adopted design criteria and Agnico Eagle's requirements for all loading scenarios. Details on the thermal and stability analyses were attached to Appendix C and Appendix D, respectively.

A mine waste deposition plan was developed based on the mine waste production schedule and design storage of WRSF6. Construction method and procedure were established to ensure that performance of WRSF6 meets the design intent. Various water management infrastructures including channel, berm, and sump will be designed and constructed to manage the runoff water from WRSF6. Performance monitoring plan was also developed which includes the installation of ground temperature cables and inclinometers, regular visual inspection, and annual inspection by a qualified Geotechnical Engineer.

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ACRONYMS & ABBREVIATIONS

Acronyms/Abbreviations	Definition
AEP	Annual Exceedance Probability
Agnico Eagle	Agnico Eagle Mines Limited
ARD	Acid Rock Drainage
CP	Collection Pond
FEIS	Final Environmental Impact Statement
FoS	Factor of Safety
Golder	Golder Associates Ltd.
GTC	Ground Temperature Cables
H	Horizontal
IF	Iron Formation
IFC	Issued for Construction
Lorax	Lorax Environmental Services
MWMP	Mine Waste Management Plan
masl	Metres Above Sea Level
The Mine	Meliadine Gold Mine
ML	Metal Leaching
Non-PAG	Non-potentially Acid Generating
NP	Neutralization Potential
NWB	Nunavut Water Board
OMS	Operation, Maintenance, and Surveillance
PAG	Potential Acid Generating
PGA	Peak Ground Acceleration
Ppt	Parts per Thousand
TDS	Total Dissolved Solids
Tetra Tech	Tetra Tech Canada Inc.
TSF	Tailings Storage Facility
V	Vertical
WRSF	Waste Rock Storage Facility
WSP	WSP Canada Inc.

1.0 INTRODUCTION

Agnico Eagle Mines Limited (Agnico Eagle) is operating the Meliadine Gold Mine (the Mine), located approximately 25 km north of Rankin Inlet and 80 km southwest from Chesterfield Inlet in the Kivalliq Region of Nunavut. Situated on the western shore of Hudson Bay, the Meliadine site is located on a peninsula between the east, south, and west basins of Meliadine Lake (63°1’23.8’’N, 92°13’6.42"W). A general location plan for the Mine is shown in Figure 1.

The current operation consists of mining the Tiriganiaq deposit with two open pits and an underground operation under the existing Nunavut Water Board Type A Water Licence (2AM-MEL1631). In January 2024, Agnico Eagle submitted a Water Licence Amendment application to support the completion of licensing components approved under Project Certificate No. 006. The 2024 Water Licence Amendment will allow Agnico Eagle to mine the Wesmeg, Wesmeg North, Pump, FZone, and Discovery deposits that were included in the 2014 Final Environmental Impact Statement (FEIS) and Nunavut Impact Review Board Project Certificate No.006. The amended Type A Water Licence was approved by the Minister of Northern Affairs on November 22, 2024.

Fragmented rock material with no economic value generated from underground and open pit developments, as well as overburden produced from open pit stripping activities, require storage in permanent, engineered facilities. Waste material created thus far during mine development has been used for numerous construction projects on the site, with excess waste being generated for the first time during Q4 of 2019. Two waste rock storage facilities (WRSFs) including WRSF1 and WRSF3 have been constructed for the co-disposal of these mine waste produced from Tiriganiaq open pits and underground mine operations. To facilitate further development of the mine, WRSF6 is required to accommodate the overburden and waste rock that will be produced from the mining of the deposits at Pump. Tetra Tech Canada Inc. (Tetra Tech) was retained by Agnico Eagle to carry out the detailed design of WRSF6.

This report summarizes the site conditions, design basis, consideration, design criteria, engineering analyses, and presents the detailed design, Issued for Construction (IFC) drawings for WRSF6. This report is also intended to meet the requirements of Part D, Items 1 and 2 of the Amended Type A Water Licence.

2.0 GENERAL SITE CONDITIONS

2.1 Climate and Meteorology

The Mine 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 Mine 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. The mean annual temperature for the period of record from 1994 to 2023 was -9.8°C based on the measured air temperature data at Rankin Inlet.

The annual total precipitation under mean conditions at the Mine site is 394 mm/year and falls almost equally as snow and rainfall (Tetra Tech 2021a). Average annual evaporation for small waterbodies in the Mine site 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 expanses offered to moving air masses. The wind blows generally from the northwest and north-northwest direction. The mean values for wind speed show that the north-northwest, together with northwest winds, have the highest speeds and tend to be the strongest. Mean monthly wind speeds are typically between 19 km/hour and 29 km/hour, with an average of 22.3 km/hour.

2.2 Environmental Setting

The dominant terrain in the Mine 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 Mine is about 60 m above sea level (masl) in low-lying topography with numerous lakes.

The surveyed lake surface elevations in the Mine area range from about 51 masl at Meliadine Lake to about 74 masl for local small, perched lakes. Lakes formed by glaciofluvial processes or glacial processes, are common throughout the Mine area. Most of the perched lakes at the Mine site are relatively shallow (less than 2 m water depth). Late winter ice thicknesses on freshwater lakes in the Mine area range between 1.0 m and 2.3 m with an average thickness of 1.7 m. Ice covers usually appear by the end of October and are completely formed in early November. The spring freshet typically begins in mid-June and is complete by early July (Golder 2012a).

2.3 Permafrost

The Mine site is located within the Southern Arctic terrestrial eco-zone which is one of the coldest and driest regions of Canada, in a zone of continuous permafrost. Continuous permafrost to depths of between 285 m to 430 m is expected based on ground temperature data from thermistors installed near Tiriganiaq, FZone, and Discovery deposits (WSP 2024a). The measured ground temperature data indicates that the active layer ranges from 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 the depth of below 18 m) are in the range of -5.9°C to -7.0°C in the areas away from lakes and streams. The geothermal gradient ranges from 0.015°C/m to 0.02°C/m (WSP 2024a).

Open taliks (defined by the 0-degree isotherm) are predicted to be present beneath portions of each of the following lakes near the proposed open pits: Lake B4, B5, B7, A6, A8, and CH6. Closed talik is interpreted below Lake D4 based on the 0-degree isotherm interpreted from the thermal model (WSP 2024b).

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. Groundwater in the active layer flows to local depressions and ponds that drain to larger lakes in the Mine area.

The permafrost in the rock in the Mine area would be virtually impermeable to groundwater flow. The shallow groundwater flow regime, therefore, has little to no hydraulic connection with the deep groundwater regime. A numerical hydrogeological model for the deep groundwater flow regime was developed in 2012 and updated several times in 2016, 2019, and 2021. It was reported that the elevations of the larger lakes with taliks extending down to the deep groundwater regime (referred to as open taliks) provide the principal driving force for deep groundwater flow. Through thermal modelling, open-taliks were suggested to exist beneath Lake B4, Lake B5, Lake B7, Lake A6, Lake A8, Lake CH6, and Lake D4. Hydrogeological testing conducted at the Project site indicated that the bulk bedrock is generally of low hydraulic conductivity, ranged from $1x10^{-10}$ m/s to $6x10^{-9}$ m/s (Agnico Eagle 2022). Groundwater velocities in the deep groundwater regime are very low and on the order of 0.2 m/year to 0.3 m/year.

To a lesser degree, groundwater beneath the permafrost is influenced by density differences due to the upward diffusion of deep-seated brines (density-driven flow). In the Canadian Shield, concentrations of Total Dissolved Solids (TDS) in groundwater increase with depth, primarily in response to upward diffusion of deep-seated brines. A “West Bay”-type well was installed in 2011 at the site near the proposed Tiriganiaq UG infrastructure to establish a baseline for deep groundwater quality. A second “West Bay”-type well was installed in 2020 near the Discovery deposit to collect more baseline data. Mean salinity of groundwater below the permafrost has been estimated at approximately 61,000 mg/L. Salinity can induce a freezing point depression, creating a cryopeg in permafrost where water can be unfrozen even though the temperature is below 0°C. The freezing point depression was calculated to be equivalent to -3.3°C (with salinity approximately 61,000 mg/L), suggesting the depth to the basal cryopeg is between about 350 m and 375 m below ground surface in the Mine area (Golder 2012a).

2.5 Seismic Zone

The Mine site is in an area of low seismic risk and is classified as “Class C” based on the ground conditions. The Peak Ground Acceleration (PGA) for a reference “Class C” site under various Annual Exceedance Probability (AEP) was estimated using the 2020 National Building Code of Canada Seismic Hazard Tool. The estimated PGA is 0.0285 g for a 5% in 50-year probability of exceedance (0.001 per annum or 1 in 1,000 year return) and 0.0498 g for a 2% in 50-year probability of exceedance (0.000404 per annum or 1 in 2,475 year return) for the Mine site.

3.0 DESIGN BASIS

3.1 Overall Mine Development Plan

As part of the documentation series produced for the Type “A” Water Licence Amendment application, Agnico Eagle presented a *Mine Waste Management Plan (MWMP)* Version 11 for the mine site in January 2024 (Agnico Eagle 2024a). Key points for the design and construction of the WRSFs from the 2024 MWMP Version 11 included the following:

- A total of approximately 179.6 Mt of waste rock will be produced through the mining of the Tiriganiaq, Wesmeg/Wesmeg North, Pump, FZone, and Discovery deposits over an operational mine life of 12 years from 2020 to 2031. Most of the waste rock produced (about 153 Mt) will be placed within the designated WRSFs. The remaining 27 Mt of waste rock will be used to backfill the Tiriganiaq underground mine, for construction activities (including thermal protection and aggregate production to support the open pits) and as Tailings Storage Facility (TSF) closure cover material.

- A total of approximately 34.5 Mt of overburden will be produced during construction activities and the development of the open pits, with about 33.7 Mt co-disposed within the WRSFs. The remaining, approximately 0.8 Mt, may be stored in a temporary overburden stockpile that will be used as cover material for progressive closure and reclamation of activities.

The detailed overall mine waste production schedule, quantities, and distribution by year can be found in the MWMP Version 11 (Agnico Eagle 2024a).

3.2 Refined Mine Plan for Pump Deposit

The mine plan was continuously refined by Agnico Eagle to optimize productivity and efficiencies. More specifically for Pump deposit, the total quantities of waste rock and overburden based on the refined mine plan has decreased compared to the overall mine plan presented in the MWMP Version 11 (Agnico Eagle 2024a). It is important to note that the mine plan is expected to change over the course of operations because of ongoing engagement, changes in market conditions, advanced drilling, and engineering optimization or other factors.

Under the refined mine plan, the mining at the Pump area will be developed in two phases.

Phase 1 mine development is expected to produce approximately 1.2 Mt of overburden and 2.5 Mt of waste rock. Approximately 0.7 Mt of overburden and 2.5 Mt of waste rock are expected to be produced from the Phase 2 mine development.

Table 1 summarizes the overall production schedule, quantities, and distribution of the mine waste by year based on the refined mine plan for Pump deposits for Phase 1. A detailed breakdown of mine waste quantities from the Phase 2 development were not provided to Tetra Tech.

Table 1: Yearly Mine Waste Production (Phase 1)

Year	Overburden (tonne)	Waste Rock (tonne)
2025	860,000	1,560,000
2026	57,000	120,000
2027	230,000	500,000
2028	0	200,000
2029	0	31,000
2030	0	520
2031	37,000	50,000
Total	**1,184,000**	**2,501,520**

Of the total 1.2 Mt of overburden produced during Phase 1 mine development, approximately 0.13 Mt of it will be used for construction and surface backfill, and the remaining 1.07 Mt will be stored in WRSF6 and co-disposed with the waste rock.

Of the total 2.5 Mt of waste rock produced during the Phase 1 mine development, approximately 1.0 Mt of it will be used for infrastructure construction, open pit thermal cover, backfill, and other operational needs, and the remaining 1.5 Mt will be stored in WRSF6.

A more detailed yearly breakdown of mine waste quantities and distribution can be found in the Design Basis Memo attached in Appendix A.

3.3 Mine Waste Properties and Characteristic

3.3.1 Overburden Geotechnical Properties

A total of 22 geotechnical boreholes have been drilled to collect data that will facilitate the design of various infrastructure around the Pump area. Limited geotechnical data is available for the overburden material within the proposed open pits footprints at the Pump area. The overburden material generally consists of a thin layer of organic material overlying sandy gravel or gravelly sand overlying silty sand or sandy silty till and boulders. A layer of lakebed sediment is expected within the proposed open pits footprint at Pump. The overburden soils below the lakebed are expected to have similar characteristic as observed in the boreholes drilled (Tetra Tech 2024a). The overburden at the mine generally is non-plastic in nature (Golder 2010). Two specific gravity tests and six pore-water salinity tests were conducted on the overburden samples collected from the 2023 geotechnical drilling program. The average specific gravity from the tests is 2.7 (EBA 2013). Based on the laboratory test result and knowledge gained from the detailed design and operation of the existing WRSF1 and WRSF3 at the mine, overburden materials are assumed to have a specific gravity of 2.70 and an in-place density of 1.62 t/m^3 after being placed for the design of WRSF6. The tested pore-water salinity ranges from 4.0 parts per thousand (ppt) to 12 ppt with an average of 7 ppt (EBA 2013). The porewater salinity for the overburden material is assumed to be 7 ppt for the design of WRSF6 to consider the impact of the freezing point depression.

3.3.2 Waste Rock Geotechnical Characteristics

Most of the waste rock at the Pump deposit area is greywacke, and generally classified as medium to strong with uniaxial compressive strength of 36 MPa to 60 MPa (Tetra Tech 2024a). Waste rock from underground is typically classified as a 600 mm minus material, with rock from the open pits expected to be of a larger particle size (1,000 mm minus).

For the detailed design of WRSF6, the specific gravity and in-place density for waste rock were assumed to be consistent with the values used for the detailed design of WRSF1 and WRSF3 at the Mine with a specific gravity of 2.82 and an in-place density of 1.88 t/m^3 after being placed in waste rock storage facility. Based on the knowledge gained from the operation of the existing WRSF1 and WRSF3, the values of the specific gravity and in-place density of waste rock are on the conservative (lower) side for mine waste management.

3.3.3 Geochemical Characteristics

Agnico Eagle conducted a comprehensive geochemical characterization program in 2014 to support the FEIS (Golder 2014). In 2022, Agnico Eagle conducted another geochemical characterization program by undertaking a series of static and kinetic tests (Lorax 2022). The purpose of the geochemical characterization program conducted in 2022 was to supplement the 2014 study and to determine the acid rock drainage and metal leaching (ARD/ML) potential of the geologic materials expected to be disturbed by mining activities at the Meliadine Mine. The key findings from the geochemical characterization programs are summarized below:

- Waste rock that is classified as potentially acid generating (PAG) or Uncertain is mostly Iron Formation (IF) waste rock. About 50% of IF waste rock at Pump was classified as Uncertain and about 7% of Mafic Volcanic waste rock was classified as PAG. Waste rock from other lithologies/formations were classified as non-PAG. Considering all waste rock produced, approximately 5% of total waste rock from the proposed open pits at the Pump area are expected to be classified as PAG or Uncertain.

- The dominant carbonate mineral in IF waste rock has a potential for the long-term neutralization capacity of acid drainage. Overall, the carbonate mineral composition is highest in the Pump deposits compared to other deposits at the mine.

- Paste pH is a primary indicator of the presence of existing buffering capacity or water-soluble acidity. When the paste pH values are less than 5.5, neutralization potential (NP) present is limited or non-exist. Higher paste pH values imply the presence of immediately available NP. Based on the Acid Base Accounting results from the laboratory tests samples from the Pump area, the paste pH ranges from 8.1 to 8.9 for the waste rock collected from the Pump area.
- Geochemical characterization of overburden for the 2014 FEIS (Golder 2014), showed that overburden was non-acid generating, and contained low metal concentrations. Salinity associated with overburden was found to be 0 in the active layer, and increased with depth below the active layer until it becomes relatively constant at a depth below 6 m. The overburden salinity rinsing test results on the samples collected at a 0 to 12.4 m depth range from the Pump area showed that the TDS loads ranges from 583 mg/kg to 962 mg/kg (Lorax 2022).

3.4 Location and Surface Conditions

WRSF6 will be located to the south of the Pump deposit and southeast of Lake B4. Figure 2 presents the 2024 existing infrastructure and proposed footprint of WRSF6 in relation to other site infrastructure, including the water management facilities and haulage roads.

The permitted footprint of WRSF6 is approximately 35 ha while Stage 1 of WRSF6 will occupy approximately 24 ha. WRSF6 is located southeast of Lake B4 and north of Lake B45. WRSF6 envelops some esker outcrops in the middle of the facility. Most of the facility seats on relatively flat ground with slopes up to 7% to the northeast towards dewatered Lakes B37 and B38. Vegetation in the area consists of localized moss/peat cover. No waterbody is within the footprint of WRSF6.

3.5 Subsurface Geotechnical Conditions

Geotechnical drilling programs were conducted to collect data for the proper understanding of subsurface geotechnical conditions within the WRSF6 footprint (Golder 2012b, Tetra Tech 2024a, Tetra Tech 2024b). A total of 11 non-destructive boreholes were drilled within the WRSF6 footprint, and 11 boreholes (five destructive holes and six non-destructive holes) were drilled around the west and south perimeters of the WRSF6. Figure 3 presents the locations of the boreholes drilled. Table 2 summarizes the key geotechnical information of the overburden soils along with the bedrock depths. The detailed geotechnical information and borehole logs can be found in Golder (2012b) and Tetra Tech (2021b, 2024a, and 2024b).

The subsurface of WRSF6 generally consists of a layer of organic materials, underlain by various layers of Boulders, Cobbles, Silt, Sand, Silt and Sand, Ice + Sand, Gravel and Sand, Ice + Silt and Sand, Gravel and Greywacke bedrock. Excess ice was observed in all boreholes. Encountered excess ice cryostructures include Nbe, Vs, Vx, and Vc. Vs excess ice occurred in the form of clear lenticular and wavey ice lenses. Measured volumetric ice content varied from 10% (GT24-35) to 65% (GT24-38). The gravimetric moisture content of the overburden varied from 6.1% at a depth of 5.50 m (GT24-30) to 45.6% at a depth of 3.92 m (GT24-33). Within the WRSF6 footprint, the depth (from ground surface) to bedrock ranged from approximately 4.05 m (GT24-32) to 17.4 m (GT24-37). The laboratory tested unconfined compressive strength of the greywacke bedrock ranged from 22.6 MPa (GT24-34) to 60.1 MPa (GT24-39).

Table 2: Geotechnical Information of Overburden Soils within and near the WRSF6 Footprint

Borehole No.	Organic Layer Thickness (m)	Major Overburden Soil Types	Ground Ice Conditions	Bedrock Depth (m)
GT24-30	0.3	Peat, Gravel, Ice + Gravel, Sand	Nbn, Nbe, Vs, Excess Ice Content 30% to 52%	7.75
GT24-31	0	Boulders, Silt, Sand	Nbn, Vc, Excess Ice Content 5%	5.9
GT24-32	0.05	Peat, Sand and Gravel, Silt and Cobbles, Ice + Sand and Gravel	Nbn, Nbe, Vs, Vc, Vx, Excess Ice Content 1% to 56%	4.05
GT24-33	0.55	Peat, Silt, Sand	Nbn, Vs, Excess Ice Content 10%	5.15
GT24-34	0.2	Peat, Sand and Gravel, Silt, Clay, Cobbles and Boulders	Nbn, Nbe, Vs, Excess Ice Content 25% to 35%	5.4
GT24-35	0.1	Peat, Gravel and Sand, Sand, Silt, Gravel	Nbn, Nbe, Vs, Vx, Vc, Excess Ice Content 1% to 30%	12.25
GT24-36	0.8	Peat, Sand, Silt	Nbn, Vs, Excess Ice Content 25% to 48%	12.3
GT24-37	0.1	Peat, Boulders, Silt, Sand and Gravel, Gravel, Sand	Nbn, Nbe, Vs, Vc, Excess Ice Content 5% to 50%	17.4
GT24-38	0.1	Peat, Gravel, Sand, Ice + Sand, Silt, Gravel	Nbn, Nbe, ICE, Vs, Excess Ice Content 10% to 65%	16.7
GT24-39	0.25	Peat, Silt, Ice + Sand, Sand	Nbn, Nbe, Vs, Vx, Vc, ICE, Excess Ice Content 10% to 60%	17.2
GT24-42	0.07	Peat; Gravel and Sand; Ice + Silt and Sand; Sand; Silt and Sand; Silt; Gravel	Nbn, Nbe, Vs, Vx, Excess Ice Content 1% to 20%	11.6
GT11-16	0.07	Peat, Sandy Silt, Gravel, Gravelly Silt and Sand, Clayey Silt	Nbn, Vs, 3.4% to 5.7%	13.1
GT24-40	0.15	Peat; Sand; Sand and Silt; Sand and Gravel	Nbn, Nbe, Vr, Vx, Vs, Excess Ice Content 10% to 15%	13.8
GT24-41	0.05	Peat; Sand; Gravel and Sand; Ice + Sand and Gravel; Silt and Sand	Nbn, Nbe, Vs, Vr, Excess Ice Content 5% to 15%	15.5
GT24-43	0.05	Peat; Cobbles; Gravel; Cobbles and Boulders; Sand; Silt; Sand and Gravel; Clay	Nbn, Nbe, Vs, Vx, Excess Ice Content 5 to 15%	9.2
GT24-44	0.08	Peat; Sand; Ice + Sand; Silt; Cobbles; Sand and Gravel;	Nbn, Vc, Excess Ice Content 15% to 55%	10.5
GT24-45	0.60	Cobbles; Gravel and Sand; Sand;	Vc, Vs, Vx, Excess Ice Content 3% to 5%	9.0

3.6 Additional Key Design Considerations

In addition to the expected waste rock production schedule, quantities, and geochemical characteristics, several other factors were considered to facilitate the design of WRSF6, including:

- **Closure Objectives:** The design of WRSF6 considers and meets the closure objectives stated in the Meliadine Interim Closure and Reclamation Plan – Update 2024, (Agnico Eagle 2024b). The key closure objectives are:
  - The physical stability of WRSF6 will be maintained under long-term climate change, static, and seismic conditions, with the deformation under the tolerable thresholds.

  - The WRSF6 will be geochemically stable with minimized generation of ARD/ML and cover material will not be required to reduce the water infiltration.
  - Contact water meets water licence criteria and safe for human and wildlife.
  - No further re-shaping or re-arranging of the side slopes will be required during the closure. The geometry of WRSF6 will blend in with the surrounding topography and meet future land use targets after closure.
  - Limited dust and erosion concern in long term.
- **Site Climate Conditions:** The geographic location of the mine site was maximized to promote freezing of the mine waste, freeze-back of the underlying foundation soils, and encourage permafrost development in the facility. Overburden will be excavated and placed in the winter to maintain is frozen condition or to promote freeze-back. Waste rock will be placed in summer and winter.
- **Environmental Obligations:** To avoid impacts on fish-bearing habitat a suitable buffer distance was maintained from protected natural lakes and the overall footprint minimized.
- **Water Management:** Where feasible, clean natural runoff will be diverted away from the facility to avoid contact with and flowing through the mine waste. Water management infrastructure will be constructed to facilitate the collection and management of contact water from WRSF6 during operations to avoid potentially negative impacts to the receiving environment.
- **Geotechnical Stability:** To maintain the short- and long-term physical stability of the facility under the designed climate change scenario.
- **Constructability/Operation:**
  - It is reasonably assumed that both the overburden and waste rock are to be geochemically similar in that neither material requires a means to prevent oxidation and can be co-disposed within the same facility based on the findings from the geochemical characterization programs.
  - Stage construction to meet the permitting requirements and maintain minimum safe distances between the open pits and WRSF6. A minimum setback distance of 80 m between WRSF6 and the open pits was maintained for the current design.
  - The waste materials will be placed in lifts, with each lift having a maximum thickness of 5 m for water rock and 2.5 m for overburden to promote the freezeback of the foundation and waste materials.

4.0 DESIGN OF WRSF6

4.1 Design Concept and Parameters

To address the numerous considerations presented in the design basis for WRSF6, both overburden and waste rock materials will be co-disposed within the same facility. Geochemically, both the overburden and waste rock are similar in that neither material requires a means to prevent oxidation. The overburden will be encapsulated within the waste rock to increase the overall stability of the facility.

As stated in Section 3.2, the mine plan is expected to change over the course of operations due to various factors. To consider the potential change of the mine plan, WRSF6 will be designed and constructed in two stages. Stage 1 of WRSF6 will occupy a smaller footprint which is within the permitted WRSF6 footprint from the 2024 Type A Water Licence Amendment. WRSF6 will eventually expand in Stage 2 to attain the permitted WRSF6 footprint.

The current detailed design of WRSF6 is focused on Stage 1 and based on the refined mine plan for the Pump deposits as presented in Table 1. The mine waste produced from Phase 1 mine development will be stored within the northwest portion of Stage 1 of WRSF6 (referred to as WRSF6 Phase 1). The mine waste produced from Phase 2 mine development will be stored within the southeast portion of Stage 1 of WRSF6 (referred to as WRSF6 Phase 2). The mine waste produced from future mine plan changes (e.g. potential pit pushback) will be stored within the footprint of Stage 2 of WRSF6.

Table 3 presents the key parameters adopted for the detailed WRSF6 design, while the IFC drawings, including typical cross sections, are provided in Appendix B. The key design parameters were developed based on the stability results, required storage volume, production schedule, experience gained from the detailed design of WRSF1 and WRSF3, and observed performance of the existing WRSF1 and WRSF3 at the Mine.

Table 3: Key Design Parameters for WRSF6

Design Parameters	Values
Maximum height of each overburden and waste rock bench (m)	5.0
Angle of repose for overburden	1.8 Horizontal (H):1 Vertical (V)
Angle of repose for waste rock	1.3H:1V
Average overall overburden side slopes	4.0H:1V
Average overall waste rock side slopes	3.0H:1V
Typical width of horizontal offset for overburden at each bench (m)	12
Typical width of horizontal offset for waste rock at each bench (m)	10
Internal overburden setback distance from the toe of the WRSF6 (m)	40
Maximum height (elevation) above original ground (m) (masl)	35 (99)
Assumed waste rock in-place bulk density (t/m^3)	1.88
Assumed overburden in-place bulk density (t/m^3)	1.62

4.2 WRSF6 Design Storage

Based on the key design parameters presented in Table 3, three-dimensional geometry models of WRSF6 were created in Civil 3D software. The design storages with elevations for WRSF6 Phase1 and Phase 2 are presented in Table 4 and Table 5, respectively.

Table 4: Design Storages for Waste Rock and Overburden with Elevations for WRSF6 Phase 1

Bench Elevation (m)	Storage Volume for Waste Rock Blow Each Bench (m^3)	Storage Volume for Overburden Blow Each Bench (m^3)
64	34,000	0
69	170,000	99,000
74	460,000	430,000
79	760,000	680,000
84	1,100,000	830,000
89	1,400,000	830,000
94	1,600,000	830,000
99	1,800,000	830,000

Table 5: Design Storages for Waste Rock and Overburden with Elevations for WRSF6 Phase 2

Bench Elevation (m)	Storage Volume for Waste Rock Blow Each Bench (m^3)	Storage Volume for Overburden Blow Each Bench (m^3)
64	660	0
69	79,000	44,000
74	230,000	220,000
79	380,000	380,000
84	560,000	490,000
89	780,000	490,000
94	970,000	490,000
99	1,100,000	490,000

As presented in Tables 4 and 5, WRSF6 Phase 1 provides for a total of 2.6 Mm^3 of storage capacity, and WRSF6 Phase 2 provides a total of 1.6 Mm^3 of storage capacity.

Based on the waste rock and overburden production plan from the refined mine plan for the Pump Area and the design storage of Stage 1 WRFS6, the mine waste placement only attains a top elevation of 89 m. Stage 1 WRFS6 is designed with a crest elevation of 99 m to provide maximum storage capacity and contingency for any potential change that may result in an increase in the mine waste production. The Stage 1 WRSF6 ultimate geometry with crest elevation of 99 m was evaluated in the engineering analyses.

4.3 Thermal Analysis

Thermal analyses were conducted to estimate the thermal conditions of the overburden, waste rock, and the foundation soils during mine operations and closure for the detailed design of WRSF6. Thermal analyses were carried out using Tetra Tech's proprietary finite element computer model, GEOTHERM, and considered long-term climate change scenario. The technical memo for the thermal analysis can be found in Appendix C of this report.

Given the placement schedule provided in Section 6.0 and the assumptions adopted in the thermal analyses (e.g., initial waste and foundation soil temperatures), results of the thermal analyses are summarised as follows:

- An active layer approximately 4 m in depth below the surface of the WRSF6 will form. Since most of the material was assumed to be placed during winter/spring, the waste rock and overburden below the active layer zone is expected to remain frozen after placement.
- The predicted temperatures of the placed waste materials below the active layer in WRSF6 range from -0.5°C to -2.0°C within 100 years of assumed climate change conditions (CMIP6 SSP2-4.5) after initial mine closure.
- The predicted long-term (by 2128) ground temperatures in the ice-rich sand/silt foundation soils within the footprint of WRSF6 range from -0.5°C to -2.5°C depending on the distance from the WRSF6 toe.

The thermal model will be reviewed on a periodic basis and updated if required, as ground/waste temperature monitoring data and as-built information becomes available.

4.4 Slope Stability Analysis

Limit equilibrium analyses were conducted to calculate the deterministic factor of safety (FoS) against slope failure under both static and pseudo-static (seismic) conditions. A total of seven design cross sections of WRSF6 (five sections for WRSF6 Phase 1 and two sections for WRSF6 Phase 2) were evaluated under short- term (during construction) and long-term (after construction) loading conditions. All analyses were conducted using the two-dimensional, limit equilibrium software, Slope/W of GeoStudio (Seequent 2021). The Morgenstern-Price method with a half-sine interslice force assumption was adopted in the analyses.

The slope stability acceptance criteria for WRSF6 were developed based on the agreements between Agnico Eagle and Tetra Tech and guidelines in Hawley and Cunning (2017), which consider locations of failure, slope slip mechanisms, failure consequence, confidence levels in stability analysis, input parameters, key assumptions, proximity to mining open pit, and site conditions. Table 6 summarizes the adopted stability criteria for the design of WRSF6. Details on the development of the acceptance criteria and rationale for the selection of the minimum factors of safety can be found in the WRSF6 Design Basis Memo, as attached in Appendix A.

Table 6: Adopted Stability Criteria for the WRSF6 Design

Potential Failure Mechanism and Conditions	Consequence of Failure	Confidence Level	Minimum Factor of Safety for Static Loading	Minimum Factor of Safety for Pseudo-static Loading [c]
Surficial, shallow slips	Low	High	1.1	-
Local deep-seated slips and temporary internal slopes	Moderate	Moderate	1.4	-
Long-term, global deep-seated slips for base cases [a]	High	Moderate	1.5	1.1
Long-term, global deep-seated slips for sensitivity case with conservative assumptions [b]	High	Moderate	1.4	1.1

(a): Base case considers the normal soil properties derived from laboratory tests and thermal analysis and the ground water table at the original ground surface.

(b): Sensitivity case considers the condition with an elevated phreatic surface at the top of the overburden waste and conservative ice-rich soil properties.

(c): Pseudo-static loading was only considered for global deep-seated slip failure under long-term conditions (after construction).

Table 7 summarizes the minimum FoS calculated among all seven sections under various failure mechanisms and corresponding minimum acceptable FoS adopted for the WRSF6 design. Details on the slope stability analysis at each section under different loading conditions can be found in Appendix D of this report.

Table 7: Summary of Slope Stability Analysis Results

Potential Failure Mechanism and Conditions	Required Minimum FoS	Calculated Minimum FoS	Comment
Surficial, shallow slips, short-term (construction), static	1.1	1.3	Section B - Shallow slip close to the toe, failure limited to first bench
Local deep-seated slips and/or temporary internal slopes, short-term, static	1.4	1.5	Section G - Local deep-seated slip failure, failure involved two benches
Long-term, static, global deep-seated slips for base cases	1.5	1.7	Section C – Global deep-seated slip failure
Long-term, static global deep-seated slips for sensitivity case with conservative assumptions	1.4	1.4	Section C and Section E – Global deep-seated slip with elevated phreatic surface at top of overburden waste and conservative properties for ice-rich silt
Long-term, pseudo-static, global deep-seated slips for base cases	1.1	1.4	Section C and Section E – Global deep-seated slip failure under pseudo-static loading conditions
Long-term, pseudo-static, global deep-seated slips for sensitivity case with conservative assumptions	1.1	1.1	Section C – Global deep-seated slip under pseudo-static loading conditions with elevated phreatic surface at top of overburden waste and conservative properties for ice-rich silt

The results in Table 7 of this report and in Table 5 of Appendix D (slope stability analysis technical memo) indicate that all calculated FoS for WRSF6 meet or exceed the adopted design criteria and Agnico Eagle's requirements for all loading scenarios given the assumed waste material and ground conditions. The stability analyses did not consider the freeze back and permafrost development in WRSF6 that is expected to occur in the waste material. The physical stability of WRSF6 does not rely on frozen condition of the mine waste, any freezeback in the mine waste will bring additional benefit to the stability and overall performance of WRSF6.

The stability analyses highlight the linkage between the WRSF6 construction schedule and the global stability of the facility due to the assumed presence of a continuous layer of ice-rich silt approximately 1.0 m to 1.5 m below the ground surface. The strength parameters of the ice-rich sand/silt in the foundation soils are dependent on the temperatures of these foundation soils. Consideration of this layer of material is discussed further in the thermal analysis (Section 4.3), overall deposition plan (Section 5.0), and monitoring (Section 8.0) portions of this report.

4.5 Deformation Assessment

4.5.1 Creep Deformation Assessment

Frozen soils and ice act as visco-elastic materials under loading and exhibit time dependent deformation (creep). As noted in Section 3.4, the foundation soils underlying WRSF6 tend to be ice-rich, with excess or visible ice observed in most of the boreholes where recovery was possible. Similar foundation conditions are observed under the WRSF1, WRSF3, and TSF at the Mine. A soil deformation analysis to consider the long-term creep of the ice-rich silt layer in the foundation was conducted to evaluate the potential long-term deformation behaviours of the TSF at the Mine (Tetra Tech EBA 2014). The analysis was carried out using FLAC 7.0, a commercial two-dimensional explicit finite-difference program for engineering applications. The modelled section of the TSF in the analysis had a maximum height of 33 m and side slopes ranging from 3H:1V to 4H:1V. The detailed analysis results were documented in Tetra Tech EBA (2014).

WRSF6 has similar foundation conditions, maximum design height, and overall side slopes as the TSF. The TSF creep analysis was adjusted for the WRSF6 design parameters and the predicted ground temperatures from the thermal analysis. The results of this updated creep analysis are summarized as follows:

- Maximum horizontal displacements ranging from 0.01 m to 0.06 m per year are expected to occur at the middle of the WRSF6 side slopes; and
- Maximum vertical displacements ranging from 0.005 m to 0.03 m per year are expected on the crest of the WRSF6 side slopes.

It is expected that the ice-rich silt layer will deform in a primary or secondary creep state and undergo ductile deformation which is not assumed to be detrimental to the performance of WRSF6.

4.5.2 Earthquake Induced Deformation Assessment

The earthquake-induced deformation of WRSF6 was assessed to serve as an initial screening tool to determine the requirement for an advanced dynamic stress-strain deformation analysis for the design of WRSF6. The earthquake-induced deformation was estimated based on the simplified procedure proposed by N. M. Newmark (N. M. Newmark 1965). In this procedure, the earthquake-induced deformation was simplified as a function of sliding resistance, which is relevant to the embankment design (i.e., static FoS and embankment slope angle), and the earthquake-induced motion (i.e., ground acceleration and period of earthquake pulses).

The values for the relevant parameters used to estimate the earthquake-induced deformation in this study include:

- The minimum calculated FoS (1.5) under long-term static loading conditions from the stability analyses was used for the assessment.
- The overall slope angle of WRSF6 is 18.5° (with an overall slope of 3H:1V).
- A fundamental period of 0.21s was adopted for the estimation of WRSF6 deformation as per the study conducted by M. E. Kan et al. which suggests that the fundamental period of earthquake pulse in stable continental regions ranges from 0.21s to 0.45s (M. E. Kan et al. 2017).
- The maximum ground acceleration of 0.2 g was estimated based on a study conducted by H. B. Seed et al. for stiff sites assuming an earthquake magnitude of 6.5 at 20 miles (H. B. Seed et al. 1976). Compared to the historical earthquake records near Rankin Inlet, the maximum ground acceleration under an earthquake magnitude of 6.5 estimated based on the study by H. B. Seed et al. is on the conservative side for this assessment.

Based on the values listed above and the simplified procedure proposed by N. M. Newmark, the estimated deformation for WRSF6 due to an earthquake magnitude of 6.5 is at the magnitude of 10 cm. It is Tetra Tech's opinion that WRSF6 is expected to maintain its structural integrity and still meet the design intent under the earthquake induced deformation given the nature of material placed in WRSF6.

5.0 WRSF6 DEPOSITION PLAN

The overall deposition plan considers the requirement to promote freeze-back of the waste material and the underlying original ground, the mine waste production schedule, as well as minimize haulage distances. The general schedule of deposition per lift (elevation) for WRSF6 Phase 1, as well as the expected volumes of the placed material is summarized in Table 8.

Table 8: Waste Placement Schedule for WRSF6 Phase 1

Waste Type	Bench Top Elevation (m)	Approximate Period of Mine Waste Placement	Accumulated Volume of Overburden or Waste Rock (m^3)
Overburden	69 and 74	January 2025 to February 2025	450,000
Overburden	79	March 2025 to April 2025	560,000
Overburden	84	December 2026 to April 2027	710,000
Waste Rock	74	January 2025 to March 2025	530,000
Waste Rock	79	April 2025 to May 2025 and December 2026 to March 2027	890,000
Waste Rock	84	April 2027 to December 2027	1,200,000
Waste Rock	89	January 2028 to March 2028	1,500,000
Waste Rock	94	Future deposition for Phase 2 mine development	1,700,000
Waste Rock	99	Future deposition for Phase 2 mine development	1,900,000

To further promote freeze-back and permafrost development in the waste material and original ground surface, particularly within the ice-rich silt layer, the following placement strategies will be adopted:

- Reduced overburden lifts. Overburden to be placed at Benches 69 m and 74 m will be placed to maximum lift heights of 2.5 m. The reduced lift thickness of these overburden benches is expected to provide better consolidation of the material at the base, increase stability, and reduce thermal losses.
- Timing of overburden placement. As shown in Table 8, overburden placement will be optimized to ensure below freezing conditions are maintained in the original ground.

Thermal monitoring will occur in the natural ground and at the base of the facility to verify the assumptions made during the design process as described in Section 8.0.

6.0 CONSTRUCTION METHODS AND PROCEDURES

6.1 Pre-Construction

Limited pre-construction activities are required at WRSF6 prior to waste placement and the design assumes that all waste material will be placed directly over original ground. Excess snow and/or ice will be removed from the ground surface before placement and efforts will be made to avoid placement in areas of localized water accumulation.

As stated in Section 3.4, there are some esker outcrops in the middle of the facility. The esker material can be excavated and stockpiled at a designated area for future construction use. A topographical survey of the ground surface will be completed prior to waste placement.

6.2 Operational Construction and Maintenance

The general construction sequence of WRSF6 during operations will be as follows:

- Excess snow/ice will be pushed out of the dumping area with a bulldozer during winter placement.

- Conduct a topographical survey of the original ground surface and place stakes marking the limits of overburden and waste rock.
- Overburden will be hauled and end-dumped to its designated location. The material will be spread after dumping into controlled lifts (with maximum lift thickness of 2.5 m) using a suitable equipment (e.g., CAT D8 bulldozer). The overburden material will be track-packed by the dozer or haul truck to break the frozen chunks if there is any and reduce the voids in the overburden material. The side slopes of each lift will be to the natural angle of repose (approximately 1.8H:1V).
- Waste rock will be hauled and end-dumped to its designated location. The material will be placed and pushed around the perimeter of the overburden as cover material. Each lift of waste rock placed will be compacted by traffic. The side slopes of each bench of waste rock will be to the natural angle of repose (approximately 1.3H:1V). The maximum lift thickness during waste placement should be limited to 5.0 m for the waste rock placement.
- Waste rock identified as PAG will be encapsulated within the center of WRSF6. The PAG storage areas will be located at minimum 15 m, in a horizontal distance, from the edge of WRSF6.

Further details regarding the overall deposition plan are provided in Section 5.0.

The overburden placement is planned to take place in the winter season to promote the freeze-back and permafrost development in the waste material based on the current mine plan. Following winter placement of overburden materials, settlement may be observed in the spring and summer months if there is not enough or no thermal cover. The settlement may cause surface cracking, depressions, and sinkholes at localized areas. If excessive deformations and settlements occur during the waste placement, additional overburden material and/or waste rock will be placed and compacted in the appropriate zones.

After construction, the most likely settlements could occur in the centre of the WRSF6 where overburden material is to be placed and encapsulated with waste rock. To reduce the risk of the formation of depression zones and potential water ponding, the final lift of the overburden material could be placed with a slope of minimum 4% from the centre of the pile to the perimeter.

6.3 Quality Control

A quality control plan will be developed and included as part of the Operation, Maintenance, and Surveillance (OMS) plan for the WRSF6. This plan is expected to include on-going verification of design assumptions and parameters, including monitoring of ground/waste temperatures and on-going ARD/ML testing.

7.0 WATER MANAGEMENT

The water management system of WRSF6 Phase 1 consists of a diversion channel (Channel11), a water collection pond (Collection Pond 9 (CP9) formed by the Pump01 open pit), a water diversion berm (Berm 4), and a thermal protection berm (CP9 Thermal Berm). The design and drawings of the water management infrastructure including Channel 11, CP9 Thermal Berm, and Berm 4 are documented in a separate design report (Tetra Tech 2024c).

The management strategy related to the runoff/seepage water for WRSF6 Phase 1 is summarized as follows:

1. Seepage and runoff from the north and southeast portions of WRSF6 Phase 1 will naturally flow or be rediverted by a diversion berm to CP9. Water collected in CP9 will be directly or indirectly pumped into CP1 for treatment prior to discharge into Meliadine Lake.

2. Seepage and runoff from the south and west portions of WRSF6 Phase 1 will be diverted by Channel 11 and collected in CP9.

3. No water from WRSF6 Phase 1 will be allowed to directly or indirectly discharge to the adjacent receiving environment (e.g. Lake B45 and Lake B4).

The water management system of WRSF6 Phase 2 consists of a water storage sump (Sump P5), a thermal berm (P5 Berm), and a diversion channel (Channel12). These water management infrastructures are to be designed and constructed for the WRSF6 Phase 2 construction. The management strategy related to the runoff/seepage water for WRSF6 Phase 2 is summarized as follows:

1. Seepage and runoff from the north and southeast portions of WRSF6 Phase 2 will naturally flow to Sump P5. Water collected in Sump P5 will be directly or indirectly pumped into CP1 for treatment prior to discharge into Meliadine Lake.

2. Seepage and runoff from the south and west portions of WRSF6 Phase 2 will be diverted to Sump P5 by Channel12.

3. No water from WRSF6 Phase 2 will be allowed to directly or indirectly discharge to the adjacent receiving environment (e.g., Lake B45 and Lake B4).

All water management infrastructure will remain in place until mine closure activities are completed, and monitoring results demonstrate that the contact water quality from the WRSF6 meets the discharge criteria established in the Type A Water Licence. Further details on the site-wide water management plan are provided in the *Water Management Plan Version 14* (Agnico Eagle 2024c).

8.0 MONITORING AND INSPECTION

Performance monitoring is an integral part of the operation of any structure in an arctic environment. Geotechnical instrumentation is required to monitor the behavior of the placed waste materials and the underlying foundation during operation. The instrumentation is intended to provide the following information:

- Confirmation that the performance of the foundation soils and placed waste materials are consistent with the predictions made during the design studies, notably in terms of stability, deformation, seepage, and thermal analyses.

- Early warning of the development of potentially adverse trends such as seepage, deformation, and permafrost degradation.

Performance monitoring will be through ground temperature cables (GTCs) and inclinometers. Three vertical GTCs were installed approximately 15 m into the original ground at Boreholes GT24-30, GT24-33, and GT24-37 during the 2024 drilling program. These existing GTCs will be extended and terminated at the toe of WRSF6. Three additional horizontal and/or vertical GTCs will be installed during the construction to monitor the subsurface ground temperature. Two vertical GTCs will be installed through the mine waste after the construction to monitor the ground temperature in the mine waste zone. Three sets of ShapeArray inclinometers are planned for WRSF6. One ShapeArray inclinometer will be installed prior to the material placement in deep overburden between the northwest toe of WRSF6 Phase 1 and the Pump01 open pit to monitor the potential movement of the overburden towards the pit wall. The other two sets of ShapeArray inclinometers will be installed when the Stage 1 WRSF6 expands to Stage 2 footprint and Pump01 open pit pushback occurs. Additional GTCs and inclinometers may be installed if required after review of monitoring data and operational performance. Thermistor readings will be measured once a month during the first year, and then on a quarterly basis during operation, with the measured readings analyzed and reported in the annual inspection report. Details on the ShapeArray inclinometers and GTCs installation and monitoring plan are presented in the design drawings, as attached in Appendix B.

Visual inspection and monitoring can provide early warning of many conditions that can contribute to structure failures and incidents. Agnico Eagle will undertake daily visual inspections of WRSF6 during active development and monthly inspections when placement activities cease on an interim/seasonal basis. Once construction of WRSF6 is complete, visual inspection will continue on a semi-annual basis until closure. The frequency of the inspection may vary depending on the construction activities and season but will be aligned with the inspection and monitoring protocols established by Agnico Eagle. Records of all inspections will be maintained, and any potential hazards/risks will be identified, including deformations, seepage, slumping, or any other signs of instability.

An annual inspection, in accordance with Part I, Items 13 and 14 of Water Licence-2AM-MEL1631 will be conducted by a qualified Geotechnical Engineer to document the performance of the facility. The reports will be submitted to the Nunavut Water Board (NWB) as per the water license requirements.

Further details regarding the monitoring and inspection plan for the WRSF6 will be included in the OMS manual.

9.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Agnico Eagle Mines Limited (Agnico Eagle) 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, 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 document is subject to the Limitations on Use of this Document attached in Appendix E or Contractual Terms and Conditions executed by both parties.

10.0 CLOSURE

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

Respectfully submitted,
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Date 2024-12-13

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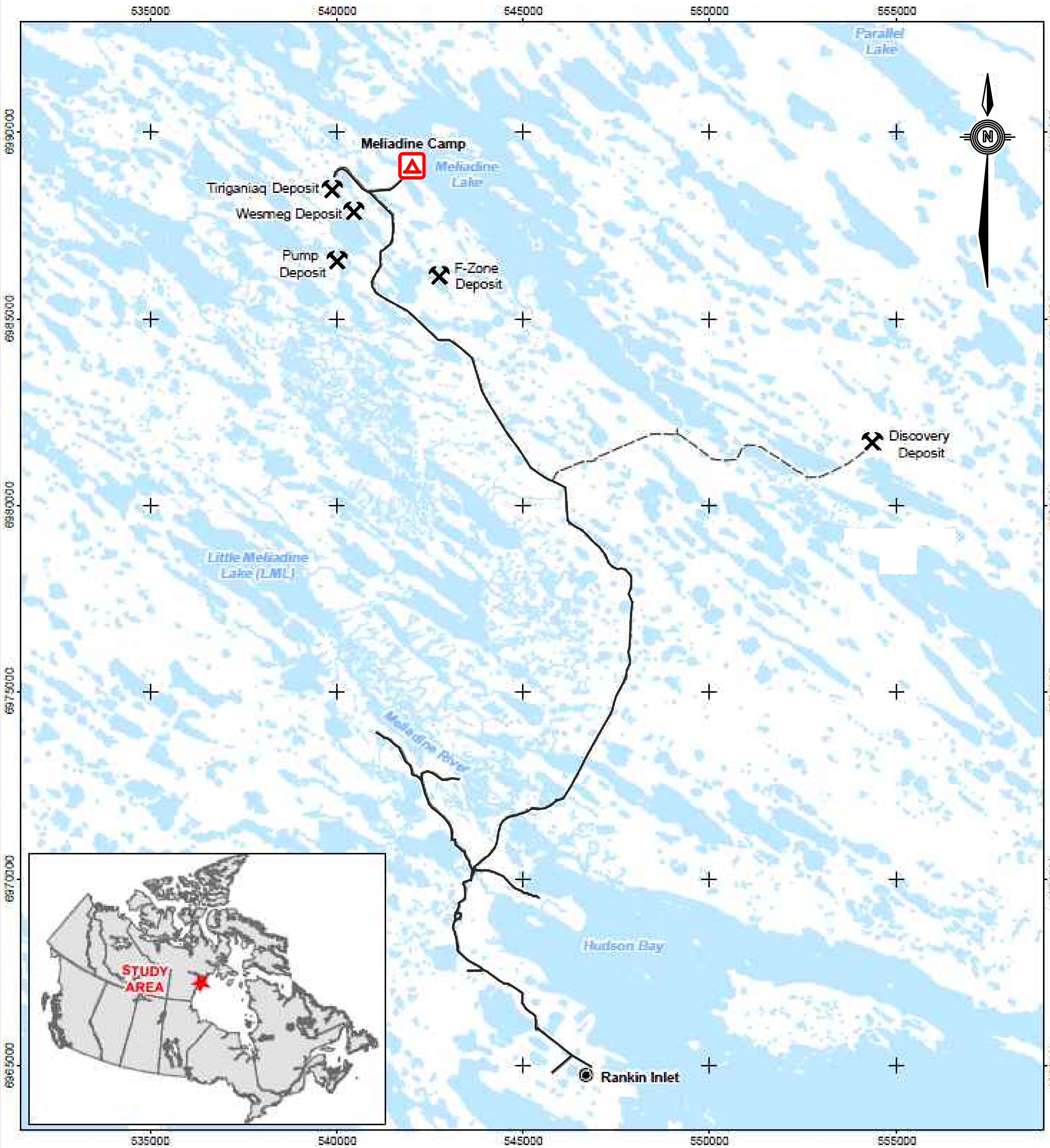
FIGURES

C:\Users\hongwei.xia\OneDrive - Tetra Tech, Inc_Meliadine\Meliadine MAA Study\Technical Memo\Figures for MAA\Figure 1-1 Site Location.dwg [FIGURE 1] June 27, 2024 - 9:42:13 am (BY: XIA, HONGWEI)



NOTES
BASED ON DRAWING PROVIDED BY AGNICO EAGLE MINES LTD.
DATUM: NAD83 PROJECTION: UTM ZONE 15

0 5 000 m
Scale 1: 150 000

STATUS
ISSUED FOR USE

LEGEND

- EXISTING CAMP
- MELIADINE GOLD DEPOSIT
- EXISTING ROAD
- PROPOSED ROAD
- WATERBODY

CLIENT
AGNICO EAGLE

TETRA TECH

MELIADINE GOLD MINE
NUNAVUT, CANADA

SITE LOCATION PLAN

PROJECT NO.	DWN	CKD	REV
EARC03284-01	HX	NG	0
OFFICE	DATE		
EDM	JUNE 27. 2024		

Figure 1

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DRAWING NO.

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A	ISSUED FOR USE	11-10-2024	DS
REV	DESCRIPTION	DATE	PAR BY

REVISIONS

TETRA TECH

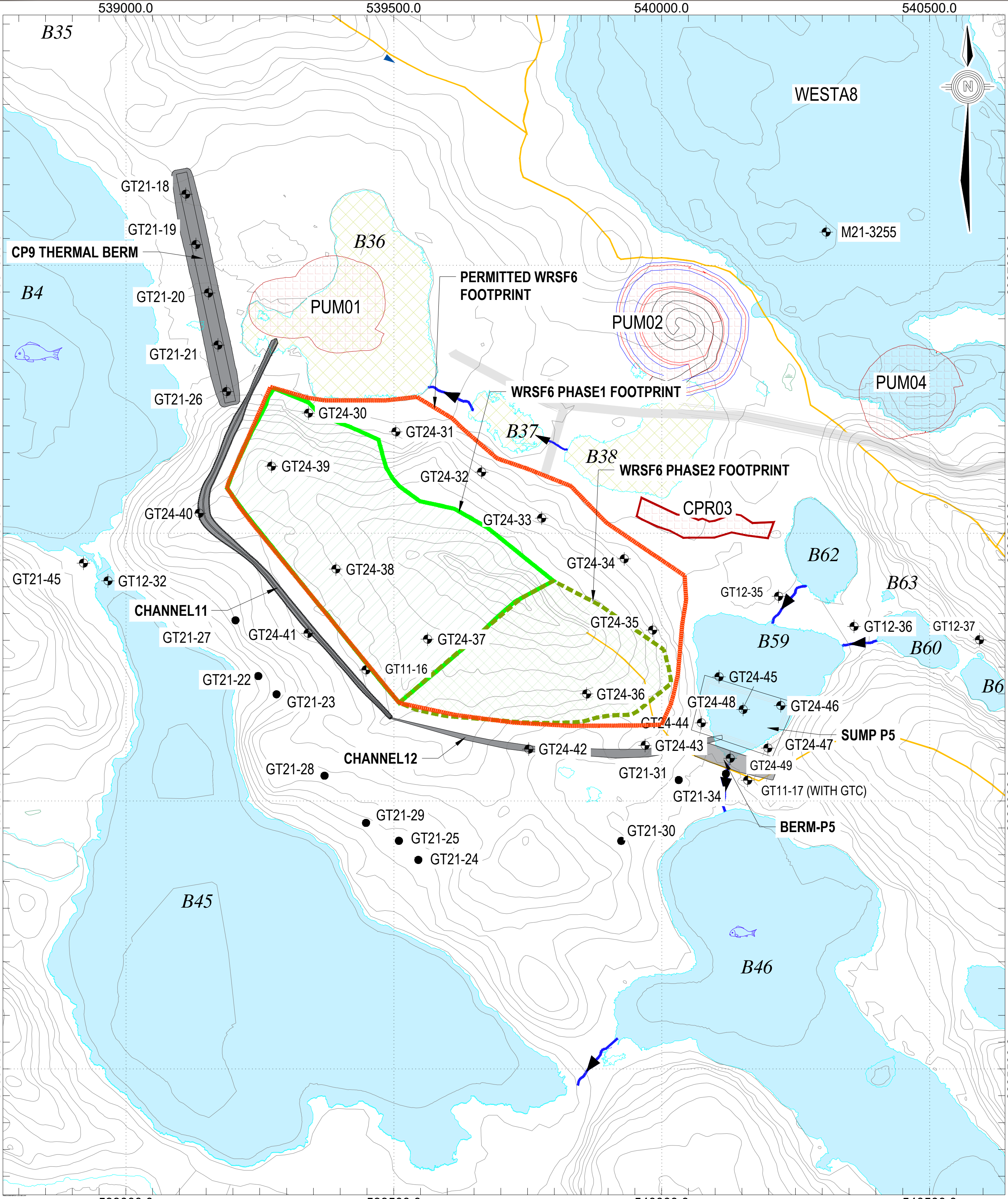
AGNICO EAGLE

DESSINÉ PAR DRAWN BY	DS	DATE	11-10-2024
VÉRIFIÉ PAR CHECKED BY	HX		11-10-2024
APPROUVÉ PAR APPROVED BY	HX		11-10-2024
PROJET NO. PROJECT NO.	ENG.EARC03140-39		
DATE	11-10-2024		

TITRE/TITLE
AGNICO EAGLE – GOLD MINE
FIGURE 2–2024 MELIADINE SITE LAYOUT AND PROPOSED WRSF6 WITH WATER MANAGEMENT INFRASTRUCTURE

ÉCHELLE SCALE 1:20000 FICHIER FILE .DWG
NO. DESSIN DRAWING NO. REVISION A FEUILLE / SHEET 1 / 1

Q:\Edmonton\Engineering\E141\Projects_MELIADINE\General Site Layout Plan-Existing 2024.dwg-2013-02-19 14:03:29



Q:\Edmonton\Engineering\E141\Projects_MELIADINE\ENG.EARC03140-38 WRSF6 Design\Figure 3 - Proposed WRSF6 Footprint with Borehole Locations.dwg [FIGURE 3] October 15, 2024 - 1:49:17 pm (BY: SOSNIUK, DEVON)

LEGEND:

- EXISTING BOREHOLE (DESTRUCTIVE)
- EXISTING BOREHOLE

0 500m

Scale: 1:10,000 @ 8.5"x11"

CLIENT

AGNICO EAGLE

TETRA TECH

MELIADINE GOLD MINE, CANADA

PROPOSED WRSF6 FOOTPRINT WITH BOREHOLE LOCATIONS

PROJECT NO.	DWN	CKD	REV	
ENG.EARC03140-38	DS	HX	A	**FIGURE 3**
OFFICE	DATE			
EDM	OCTOBER 03, 2024			

APPENDIX A

WRSF6 DESIGN BASIS MEMO

TETRA TECH

TECHNICAL MEMO

ISSUED FOR USE

To:	Justin Bieber, Agnico Eagle Marielle Limoges, Agnico Eagle	**Date:**	December 13, 2024
c:	Jawad Haloui, Agnigo Eagle	**Memo No.:**	01
From:	Fai, Ndofor, P.Geo., Tetra Tech Hongwei Xia, P.Eng., Tetra Tech Linping Wu, P.Eng., Tetra Tech	**File:**	ENG.EARC03140-38
Subject:	Design Basis for Waste Rock Storage Facility 6 (WRSF6) Detailed Engineering Design, Meliadine Gold Mine, Nunavut		

1.0 INTRODUCTION

Agnico Eagle Mines Limited (Agnico Eagle) is operating the Meliadine Gold Mine (the Meliadine Mine) which is located approximately 25 km north of Rankin Inlet, Nunavut. The current operation consists of mining the Tiriganiaq deposit with two open pits and an underground operation under the existing Nunavut Water Board Type A Water Licence (2AM-MEL1631). In January 2024, Agnico Eagle submitted a Water Licence Amendment application to support the completion of licensing components approved under Nunavut Impact Review Board Project Certificate No. 006. The 2024 Water Licence Amendment will allow Agnico Eagle to mine the Wesmeg, Wesmeg North, Pump, FZone, and Discovery deposits that were included in the 2014 Final Environmental Impact Statement (FEIS) and Project Certificate No.006.

As per the current mine plan, Waste Rock Storage Facility 6 (WRSF6) is required to accommodate the overburden and waste rock that will be produced from the mining of the deposits at Pump, which was included in the 2024 Water Licence Amendment application. Tetra Tech Canada Inc. (Tetra Tech) was retained by Agnico Eagle to conduct a detailed engineering design of WRSF6. A prefeasibility level study (PFS) for WRSF6 was completed by Tetra Tech in 2023 (Tetra Tech 2023) to support the Type A Water Licence Amendment application, and a geotechnical site investigation was conducted in Winter 2024 (Tetra Tech 2024a) to support the detailed engineering design of WRSF6.

Tetra Tech has prepared this Design Basis Memorandum (DBM) to inform Agnico Eagle's project team and Agnico Eagle's Engineer of Record of the design basis, criteria, and parameters that will be used for the detailed design of WRSF6. This DBM is meant to be a living document for the design of WRSF6 and will be updated as required to incorporate any changes in the design and mine operations. This DBM will be attached as an appendix to WRSF6 detailed design report.

2.0 DESIGN BASIS

2.1 Waste Rock and Overburden Definitions

The term "waste rock" designates all fragmented rock mass that has no economic value and needs to be stored separately. Waste rock is also commonly referred to as "mine rock" in the mining industry. Typically, waste rock is produced during the initial stripping and the subsequent development of open pits and underground mining.

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The term "overburden" designates all soils above the bedrock that need to be stripped prior to developing the open pits. The overburden at the Meliadine Mine generally consists of a thin layer of organic material or lakebed sediment overlying a layer of non-cohesive soils with variable amounts of silt, sand, gravel, cobbles, and boulders.

2.2 Mine Waste Production Schedule and Quantities

Four gold deposits at Pump (i.e., Pump01, Pump02, Pump03, and Pump04) will be mined in two phases based on the mine development plan proposed by Agnico Eagle.

Phase 1 mining is expected to produce approximately 1.2 Mt of overburden and 2.5 Mt of waste rock based on the mine plan provided by Agnico Eagle on July 17, 2024. Active mining at Pump is planned to commence in 2025 and complete in 2031, followed by the closure phase. Table 1 summarizes the yearly mine waste production quantities for the mine development at Pump. A portion of the waste materials is expected to be used for construction, open pit thermal cover, and other operational needs. Table 2 lists the estimated yearly mine waste consumption for Phase 1 development. Table 3 presents the yearly mine waste quantities to be stored in WRSF6.

Approximately 0.7 Mt of overburden and 2.5 Mt of waste rock are expected to be produced from the Phase 2 development. A detailed breakdown of mine waste quantities from the Phase 2 development were not provided to Tetra Tech.

Table 1: Yearly Mine Waste Production (Phase 1)

Year	Overburden (tonne)	Waste Rock (tonne)
2025	860,000	1,560,000
2026	57,000	120,000
2027	230,000	500,000
2028	0	200,000
2029	0	31,000
2030	0	520
2031	37,000	50,000
Total	**1,184,000**	**2,501,520**

Table 2: Estimated Yearly Mine Waste Consumption (Phase 1)

Year	Overburden Consumption (tonne)		Waste Rock Consumption (tonne)		
	Construction Needs	Surface Backfill	Construction Needs	Thermal Cover	Operational Needs
2025	61,000	-	200,000	180,000	5,000
2026	7,000	-	77,000	-	1,000
2027	21,000	-	-	-	4,000
2028	-	-	-	-	-
2029	-	-	-	-	32,000
2030	-	-	-	-	130,000
2031	-	37,000	-	-	300,000
2032	-	-	-	-	110,000
Sub-total	***89,000***	***37,000***	***277,000***	***180,000***	***582,000***
Total	**126,000**		**1,039,000**		

Table 3: Yearly Mine Waste Quantities to be Stored in WRSF6 (Phase 1)

Year	Overburden Quantities (tonne)	Waste Rock Quantities (tonne)
2025	800,000	1,200,000
2026	50,000	44,000
2027	200,000	500,000
2028	-	200,000
2029	-	(580)
2030	-	(130,000)
2031	-	(250,000)
2032	-	(110,000)
Total	**1,050,000**	**1,453,420**

Note: Values in the brackets are the waste rock quantities to be removed from WRSF6 for construction or other operational needs.

2.3 Mine Waste Management and Deposition Plan

The overburden and waste rock produced from the mining development at the Pump area will be co-disposed within WRSF6, with the overburden encapsulated at the centre with waste rock. Like the proposed mine development at Pump, WRSF6 will be constructed in two phases. The mine waste from the Phase 1 open pit development will be stored within the WRSF6 Phase 1 footprint while that from the potential Phase 2 mine development will be stored within the WRSF6 Phase 2 footprint.

A preliminary deposition plan was developed based on the mine waste production plan and storage curve for WRSF6. Table 4 summarizes the preliminary deposition plan and will be updated when the final geometry of WRSF6 is determined.

Table 4: Preliminary Waste Rock and Overburden Deposition Plan for Phase 1

Location of Mine Waste Placement	Approximate Period of Mine Waste Placement
Benches 69 m and 74m of overburden	January 2025 to February 2025
Bench 79 m of overburden	March 2025 to April 2025
Bench 84 m of overburden	December 2026
Bench 84 m of overburden	January 2027 to April 2027
Bench 74 m of waste rock	January 2025 to March 2025
Bench 79 m of waste rock	April 2025 to May 2025
Bench 79 m of waste rock	December 2026 to March 2027
Bench 84 m of waste rock	April 2027 to December 2027
Bench 89 m of waste rock*	January 2028 to March 2028*

*: Waste rock cover for Bench 84 m of overburden, the placement schedule depends on the production schedule at other open pits.

2.4 Mine Waste Geotechnical Properties

2.4.1 Overburden Geotechnical Properties

A total of 21 geotechnical boreholes have been drilled to collect data that will facilitate the design of various infrastructure around the Pump area. Limited geotechnical data is available for the overburden material within the proposed open pits footprints at the Pump area. The overburden material generally consists of a thin layer of organic material overlying sandy gravel or gravelly sand overlying silty sand or sandy silty till and boulders. A layer of lakebed sediment is expected within the proposed open pits footprint at Pump. The overburden soils below the lakebed are expected to have similar characteristic as observed in the boreholes drilled (Tetra Tech 2024a). The overburden at the Meliadine Mine generally is non-plastic in nature (Golder 2010). Two specific gravity tests and six pore-water salinity tests were conducted on the overburden samples collected from the 2023 geotechnical drilling program. The average specific gravity from the tests is 2.7 (EBA 2013). Based on the laboratory test result and knowledge gained from the detailed design and operation of the existing WRSF1 and WRSF3 at the Meliadine Mine, overburden materials are assumed to have a specific gravity of 2.70 and an in-place density of 1.62 t/m^3 after being placed for the design of WRSF6. The tested pore-water salinity ranges from 4.0 parts per thousand (ppt) to 12 ppt with an average of 7 ppt (EBA 2013). The porewater salinity for the overburden material is assumed to be 7 ppt for the design of WRSF6 to consider the impact of the freezing point depression.

2.4.2 Waste Rock Geotechnical Characteristics

Most of the waste rock at the Pump deposit area is greywacke, and generally classified as medium to strong with uniaxial compressive strength of 36 MPa to 60 MPa (Tetra Tech 2024a). Waste rock from underground is typically classified as a 600 mm minus material, with rock from the open pits expected to be of a larger particle size (1,000 mm minus).

For the detailed design of WRSF6, the specific gravity and in-place density for waste rock were assumed to be consistent with the values used for the detailed design of WRSF1 and WRSF3 at the Meliadine Mine with a specific gravity of 2.82 and an in-place density of 1.88 t/m^3 after being placed in waste rock storage facility. Based on the knowledge gained from the operation of the existing WRSF1 and WRSF3, the values of the specific gravity and in-place density of waste rock are on the conservative (lower) side for mine waste management.

2.5 Mine Waste Geochemical Characteristics

Agnico Eagle conducted a comprehensive geochemical characterization program in 2014 to support the FEIS (Golder 2014a). In 2022, Agnico Eagle conducted another geochemical characterization program by undertaking a series of static and kinetic tests (Lorax Environmental Services 2022). The purpose of the geochemical characterization program conducted in 2022 was to supplement the 2014 study and to determine the acid rock drainage and metal leaching (ARD/ML) potential of the geologic materials expected to be disturbed by mining activities at the Meliadine Mine. The key findings from the geochemical characterization programs are summarized below:

- Waste rock that is classified as potentially acid generating (PAG) or Uncertain is mostly Iron Formation (IF) waste rock. About 50% of IF waste rock at Pump was classified as Uncertain and about 7% of Mafic Volcanic waste rock was classified as PAG. Waste rock from other lithologies/formations were classified as non-PAG. Considering all waste rock produced, approximately 5% of total waste rock from the proposed open pits at the Pump area are expected to be classified as PAG or Uncertain.
- The dominant carbonate mineral in IF waste rock has a potential for the long-term neutralization capacity of acid drainage. Overall, the carbonate mineral composition is highest in the Pump deposits compared to other deposits at the Meliadine Mine.
- Paste pH is a primary indicator of the presence of existing buffering capacity or water-soluble acidity. When the paste pH values are less than 5.5, neutralization potential (NP) present is limited or non-exist. Higher paste pH values imply the presence of immediately available NP. Based on the Acid Base Accounting results from the laboratory tests samples from the Pump area, the paste pH ranges from 8.1 to 8.9 for the waste rock collected from the Pump area.
- Geochemical characterization of overburden for the 2014 FEIS (Golder 2014a), showed that overburden was non-acid generating, and contained low metal concentrations. Salinity associated with overburden was found to be 0 in the active layer, and increased with depth below the active layer until it becomes relatively constant at a depth below 6 m. The overburden salinity rinsing test results on the samples collected at a 0 to 12.4 m depth range from the Pump area showed that the total dissolved solids loads ranges from 583 mg/kg to 962 mg/kg (Lorax 2022).

2.6 Additional Key Design Considerations

In addition to the expected waste rock production schedule, quantities, and geochemical characteristics, a number of other factors were considered to facilitate the design of WRSF6, including:

- **Closure Objectives:** The design of WRSF6 will consider and meet the closure objectives stated in the Meliadine Interim Closure and Reclamation Plan – Update 2020, (SNC Lavalin 2022). The key closure objectives are:
  - The physical stability of WRSF6 will be maintained under long-term climate change, static, and seismic conditions, with the deformation under the tolerable thresholds.
  - The WRSF6 will be geochemically stable with minimized generation of ARD/ML, and cover material will not be required to reduce the water infiltration.
  - Contact water meets water discharge criteria established in the Water Licence.
  - No further re-shaping or re-arranging of the side slopes will be required during the closure. The geometry of WRSF6 will blend in with the surrounding topography and meet future land use targets after closure.

  - Limited dust and erosion concern in long term.

- **Site Climate Conditions:** The geographic location of the mine site will be maximized to promote freezing of the mine waste, freeze-back of the underlying foundation soils, and encourage permafrost development in the facility. Overburden will be excavated and placed in the winter to maintain the frozen condition of the overburden or to promote the freeze-back. Waste rock will be placed in summer and winter.

- **Environmental Obligations:** To avoid impacts on fish-bearing habitat a suitable buffer distance will be maintained from protected natural lakes and the overall footprint minimized.

- **Water Management:** where feasible, clean natural runoff will be diverted away from the facility to avoid contact with and flowing through the mine waste. Water management infrastructure will be constructed to facilitate the collection and management of contact water from WRSF6 during operations to avoid potentially negative impacts to the receiving environment.

- **Geotechnical Stability:** To maintain the short- and long-term physical stability of the facility under the designed climate change scenario.

- **Constructability/Operation:**

  - It is reasonably assumed that both the overburden and waste rock are to be geochemically similar in that neither material requires a means to prevent oxidation and can be co-disposed within the same facility based on the findings from the geochemical characterization programs.

  - Stage construction to meet the permitting requirements and maintain minimum safe distances between the open pits and WRSF6. A minimum setback distance of 80 m between WRSF6 and open pits will be maintained for the current design. Due to the potential pushback of Pump01 in the future, the setback distance between WRSF6 and Pump01 may need to be reduced to 40 m. The feasibility of reducing the setback distance to 40 m will have to be assessed through the performance monitoring activities and data collected during operation and verified by slope stability analyses.

  - The waste materials will be placed in lifts, with each lift having a maximum thickness of 5 m to promote the freezeback of the foundation and waste materials.

2.7 Subsurface Geotechnical Conditions

Geotechnical drilling programs were conducted to collect data for the proper understanding of subsurface geotechnical conditions within the WRSF6 footprint (Golder 2012a, Tetra Tech 2024a, Tetra Tech 2024b). A total of 11 non-destructive boreholes were drilled within the WRSF6 footprint, and 11 boreholes (five destructive holes and six non-destructive holes) were drilled around the west and south perimeters of the WRSF6. Figure 1 presents the locations of the boreholes drilled. Table 5 summarizes the key geotechnical information of the overburden soils along with the bedrock depths. The detailed geotechnical information and borehole logs can be found in Golder (2012a) and Tetra Tech (2021, 2024a, and 2024b).

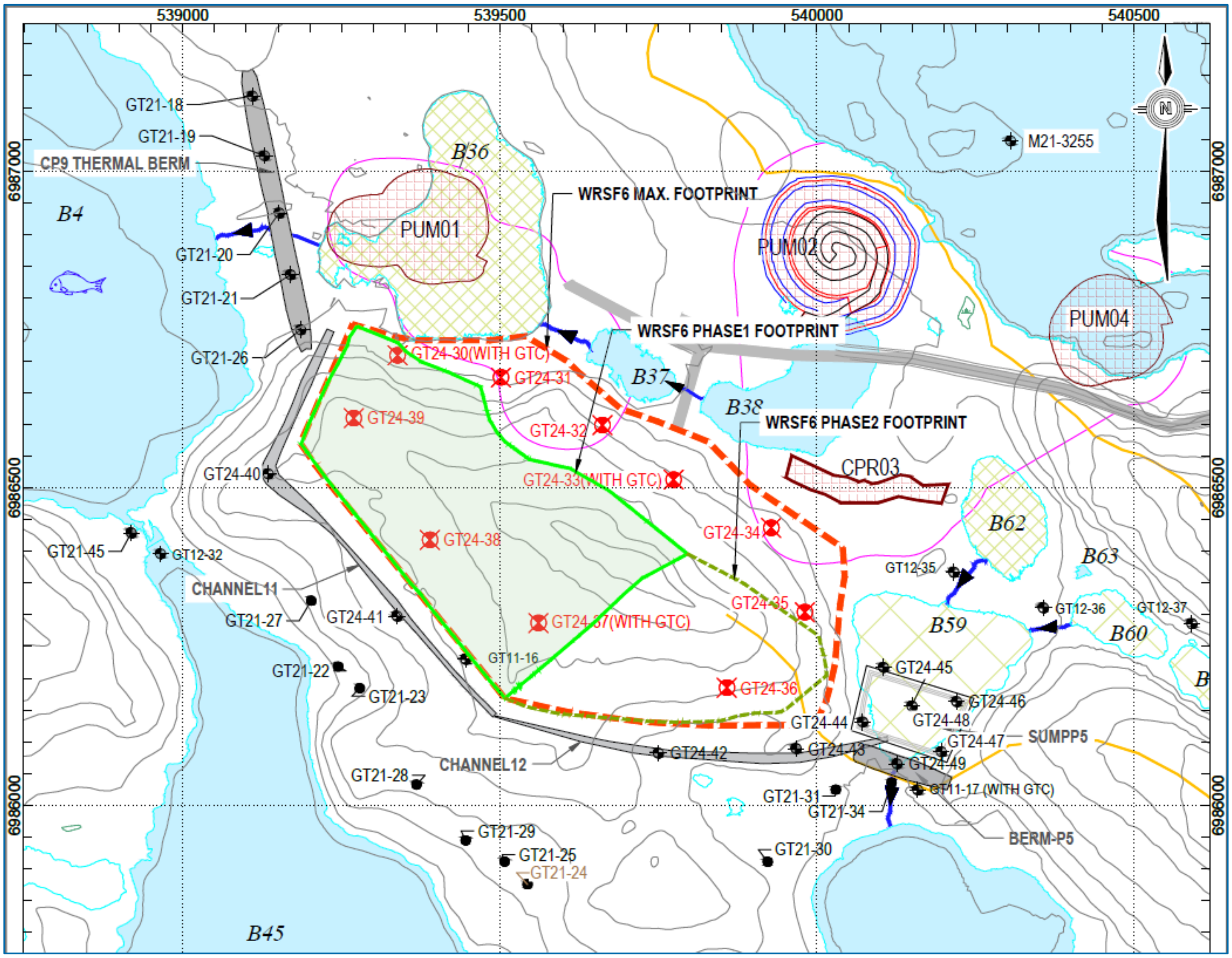

Figure 1: Boreholes Drilled within and Near the WRSF6 Footprint

Table 5: Geotechnical Information of Overburden Soils within and near the WRSF6 Footprint

Borehole No.	Organic Layer Thickness (m)	Major Overburden Soil Types	Ground Ice Conditions	Bedrock Depth (m)
GT24-30	0.3	Peat, Gravel, Ice + Gravel, Sand	Nbn, Nbe, Vs, Excess Ice Content 30-52%	7.75
GT24-31	0	Boulders, Silt, Sand	Nbn, Vc, Excess Ice Content 5%	5.9
GT24-32	0.05	Peat, Sand and Gravel, Silt and Cobbles, Ice + Sand and Gravel	Nbn, Nbe, Vs, Vc, Vx, Excess Ice Content 1-56%	4.05
GT24-33	0.55	Peat, Silt, Sand	Nbn, Vs, Excess Ice Content 10%	5.15
GT24-34	0.2	Peat, Sand and Gravel, Silt, Clay, Cobbles and Boulders	Nbn, Nbe, Vs, Excess Ice Content 25-35%	5.4
GT24-35	0.1	Peat, Gravel and Sand, Sand, Silt, Gravel	Nbn, Nbe, Vs, Vx, Vc, Excess Ice Content 1-30%	12.25

Table 5: Geotechnical Information of Overburden Soils within and near the WRSF6 Footprint

Borehole No.	Organic Layer Thickness (m)	Major Overburden Soil Types	Ground Ice Conditions	Bedrock Depth (m)
GT24-36	0.8	Peat, Sand, Silt	Nbn, Vs, Excess Ice Content 25-48%	12.3
GT24-37	0.1	Peat, Boulders, Silt, Sand and Gravel, Gravel, Sand	Nbn, Nbe, Vs, Vc, Excess Ice Content 5-50%	17.4
GT24-38	0.1	Peat, Gravel, Sand, Ice + Sand, Silt, Gravel	Nbn, Nbe, ICE, Vs, Excess Ice Content 10-65%	16.7
GT24-39	0.25	Peat, Silt, Ice + Sand, Sand	Nbn, Nbe, Vs, Vx, Vc, ICE, Excess Ice Content 10-60%	17.2
GT24-42	0.07	Peat; Gravel and Sand; Ice + Silt and Sand; Sand; Silt and Sand; Silt; Gravel	Nbn, Nbe, Vs, Vx, Excess Ice Content 1 to 20%	11.6
GT11-16	0.07	Peat, Sandy Silt, Gravel, Gravelly Silt and Sand, Clayey Silt	Nbn, Vs, 3.4-5.7%	13.1
GT24-40	0.15	Peat; Sand; Sand and Silt; Sand and Gravel	Nbn, Nbe, Vr, Vx, Vs, Excess Ice Content 10% to 15%	13.8
GT24-41	0.05	Peat; Sand; Gravel and Sand; Ice + Sand and Gravel; Silt and Sand	Nbn, Nbe, Vs, Vr, Excess Ice Content 5% to 15%	15.5
GT24-43	0.05	Peat; Cobbles; Gravel; Cobbles and Boulders; Sand; Silt; Sand and Gravel; Clay	Nbn, Nbe, Vs, Vx, Excess Ice Content 5 to 15%	9.2
GT24-44	0.08	Peat; Sand; Ice + Sand; Silt; Cobbles; Sand and Gravel;	Nbn, Vc, Excess Ice Content 15% to 55%	10.5
GT24-45	0.60	Cobbles; Gravel and Sand; Sand;	Vc, Vs, Vx, Excess Ice Content 3% to 5%	9.0

The subsurface of WRSF6 generally consists of a layer of organic materials, underlain by various layers of Boulders, Cobbles, Silt, Sand, Silt and Sand, Ice + Sand, Gravel and Sand, Ice + Silt and Sand, Gravel and Greywacke bedrock. Excess ice was observed in all boreholes. Encountered excess ice cryostructures include Nbe, Vs, Vx, and Vc. Vs excess ice occurred in the form of clear lenticular and wavey ice lenses. Measured volumetric ice content varied from 10% (GT24-35) to 65% (GT24-38). The gravimetric moisture content of the overburden varied from 6.1% at a depth of 5.50 m (GT24-30) to 45.6% at a depth of 3.92 m (GT24-33). Within the WRSF6 footprint, the depth (from ground surface) to bedrock ranged from approximately 4.05 m (GT24-32) to 17.4 m (GT24-37). The laboratory tested unconfined compressive strength of the greywacke bedrock ranged from 22.6 MPa (GT24-34) to 60.1 MPa (GT24-39).

3.0 DESIGN CRITERIA AND METHODOLOGY

3.1 Design Concept and Key Parameters

The design concept of WRSF6 was framed based on the observed performance of the existing WRSF1 and WRSF3 currently in operation at the Meliadine Mine and the following key assumptions.

- Overburden and waste rock materials will be co-disposed within WRSF6 with overburden encapsulated at the center of WRSF6.

- A transition filter zone will not be required between the overburden and waste rock. The waste rock encapsulating the overburden will provide sufficient thermal and erosion protection under long term conditions.
- The waste rock and overburden will be placed in lifts with designed setback distances between each bench and at their various angles of repose. It is assumed that capping and regrading of the side slopes will not be required for closure, which is aligned with the current strategy that prevails at the site.

Table 6 presents the key design parameters developed during the PFS for WRSF6 in 2023 (Tetra Tech 2023).

Table 6: WRSF6 Key Design Parameters from PFS Design

Design Parameters	Values
Maximum height of each overburden and waste rock bench (m)	5.0
Angle of repose for overburden	1.8 Horizontal (H):1 Vertical (V)
Angle of repose for waste rock	1.3H:1V
Average overall overburden side slope	4.0H:1V [(a)]
Average overall waste rock side slope	3.0H:1V [(a)]
Typical width of horizontal offset for overburden at each bench (m)	12 [(a)]
Typical width of horizontal offset for waste rock at each bench (m)	10 [(a)]
Internal overburden setback distance from the toe of the WRSF6 (m)	40
Maximum height (elevation) above original ground (m) (masl)	35 (99)
Assumed waste rock in-place bulk density (t/m^3)	1.88
Assumed overburden in-place bulk density (t/m^3)	1.62

[(a):] These key parameters will be verified and optimized as needed based on results obtained from the thermal and stability analyses that will be performed during the detailed design process.

3.2 Thermal Analyses

3.2.1 General

Ice-rich (ice content greater than 30% by volume or bulk density less than 1,700 kg/m^3) frozen soils were observed in most of the boreholes drilled within the WRSF6 footprint, particularly along the west and south perimeters due to their relative flat topography and poor drainage conditions. The long-term stability of WRSF6 depends on the long-term shear strength of the ice-rich materials in the foundation and the long-term cohesion of the ice-rich material depends on its temperatures – the colder the soil, the higher its long-term cohesion. Therefore, the permafrost temperatures of the ice-rich materials under the designed long-term climate change scenarios will have to be determined for the slope stability analysis.

3.2.2 Methodology

Thermal analyses will be carried out to estimate the permafrost temperatures in the foundation under the designed long-term climate change scenarios using Tetra Tech's proprietary finite element computer model, GEOTHERM. GEOTHERM has the capacity to simulate transient heat conduction with phase changes considering a variety of boundary conditions, including heat flux, convective heat flux, and temperature and ground-air boundaries. The heat exchange at the ground surface is modelled with an energy balance equation considering air temperatures, wind velocity, snow depth, and solar radiation. The model facilitates the inclusion of temperature phase change relationships for saline soils, such that any freezing depression and unfrozen water content variations can be explicitly modelled.

GEOTHERM has been verified by comparing its results with closed-form analytical solutions and many different field observations. The model has formed the basis for thermal evaluations and designs of a substantial number of projects in the Arctic and sub-Arctic regions since 1980s, including the design of WRSF1, WRSF3, Tailings Storage Facility (TSF), water retention dikes, and thermal berms currently in operation at the Meliadine Mine.

For the detailed design of WRSF6, one-dimensional thermal analysis will first be carried out to calibrate the model to the measured ground temperature data collected from the GTCs installed within the WRSF6 footprint. Upon the completion of the model calibration, two-dimensional thermal analyses at a typical section of WRSF6 will be carried out to simulate the construction sequence during mine operation and estimate the long-term thermal conditions under the designed climate change scenarios.

3.2.3 Mean Climate Data

Climatic data required for the thermal analyses includes monthly air temperature, wind speed, solar radiation, and snow cover. Table 7 summarizes the mean climate data to be used for the thermal analyses.

Table 7: Mean Climate Data at the Meliadine Mine Site

Month	Average Monthly Air Temperature (°C) [(a)]	Monthly Wind Speed (km/h) [(b)]	Monthly Average Snow Cover (m) [(c)]	Daily Solar Radiation (W/m^2) [(d)]
January	-29.6	24.2	0.28	9.1
February	-30.0	23.6	0.31	38.7
March	-24.5	23.5	0.36	119.5
April	-15.5	22.6	0.35	206.4
May	-5.1	22.2	0.19	259.7
June	4.9	20.3	0.03	252.0
July	11.2	19.4	0.00	226.4
August	10.3	20.9	0.00	160.8
September	4.6	23.8	0.00	124.9
October	-3.5	26.3	0.04	41.3
November	-15.9	25.1	0.14	14.4
December	-23.8	24.0	0.24	3.7
Average	**-9.8**	**23.0**	N/A	N/A

Notes:

[(a)] Based on measured monthly air temperatures at Rankin Inlet station (1994-2023).

[(b)] Measured wind speed data at Rankin Inlet station (1981-2010 Climate Normals).

[(c)] Based on measured snow cover data at Rankin Inlet station (1983-2012).

[(d)] Based on measured solar radiation data at Baker Lake station (1951-1980).

3.2.4 Climate Change Projection

The historical air temperature data at Rankin Inlet indicated that the long-term climatic trend is warming. Based on the observed warming trend in the historical air temperatures and state-of-practice, the thermal analysis for the detailed design of WRSF6 should consider the long-term effects of climate change.

The Government of Canada published new climate change scenarios from the Coupled Model Intercomparison Project Phase 6 (CMIP6) in 2021. The climate scenarios are presented in the Canadian Climate Data and Scenarios (CCDS) website (https://climate-scenarios.canada.ca/?page=main). The results of the climate scenarios from the CMIP6 climate models were used in the latest Intergovernmental Panel on Climate Change (IPCC) Assessment

Report (AR6). The website provides projected seasonal climate changes for each province in Canada. A series of tables with projections of climate change computed from the CMIP6 climate models are provided. Projections are based on the Shared Socioeconomic Pathway (SSP) scenarios, which combine elements from the new narratives about future societal development with the previous Representative Concentration Pathways (RCPs) scenarios. Seasonal averages of projected changes in climate are available for the SSP2.6, SSP4.5, and SSP8.5. In this study, the intermediate scenario, CMIP6 SSP4.5 will be adopted in the thermal analysis as the Base Case which represent a “medium” scenario with stabilization of radiative forcing around 2100. Table 8 summarizes the projected seasonal air temperature changes in Nunavut for the climate change scenario CMIP6 SSP4.5.

Table 8: Projected Seasonal Air Temperature Changes under CMIP6 SSP4.5 Scenarios for Nunavut (Government of Canada)

Period	Projected Seasonal Air Temperature Changes (50th (median) percentiles) from 1995-2014 Baseline under SSP4.5 Scenario for Nunavut (°C)			
	Winter	Spring	Summer	Autumn
2021-2040	2.05	1.35	0.77	2.10
2041-2060	4.19	2.46	1.44	3.58
2061-2080	5.58	3.15	1.91	4.68
2081-2100	6.72	3.81	2.38	5.41

3.2.5 Material Properties for Thermal Analyses

Thermal properties of the materials to be used for the thermal analyses will be determined indirectly from well-established correlations with soil index properties (Farouki 1986; Johnston 1981) or experience. Soil index properties will be estimated from available geotechnical information and past experience. Table 9 presents the material properties for waste rock, overburden waste, and bedrock to be used for the thermal analyses. The material properties for foundation soils will be determined during the detailed design and documented in a technical memo for thermal analyses. The material properties for mine waste and bedrock presented in Table 9 are consistent with the properties used for the detailed design of WRSF1 and WRSF3 at the Meliadine mine.

The porewater salinity is assumed to be 7 ppt for the overburden waste and foundation overburden soils, 2 ppt for the waste rock, and 0 ppt for bedrock in the thermal analysis based on the available salinity test results (EBA 2013).

Table 9: Material Properties for Mine Waste and Bedrock

Material	Water Content (%)	Bulk Density (Kg/m^3)	Thermal Conductivity (W/m-K)		Specific Heat (kJ/kg-K)		Latent Heat (MJ/m^3)
			Frozen	Unfrozen	Frozen	Unfrozen	
Waste Rock	3	1,960	1.04	1.26	0.77	0.83	19
Overburden Waste	17	1,760	1.59	1.18	0.93	1.24	85
Bedrock	1	2,660	3.0	3.0	0.75	0.77	9

3.2.6 Material Placement Schedule and Initial Temperature

The material placement schedule for the thermal analyses will be based on the deposition plan presented in Table 4. The following assumed initial waste temperature at placement will be used for the thermal analyses:

- -5.0°C for the materials placed in the Winter season (December to February).

- -3.0°C for the materials placed in the Spring season (March to May).
- 5.0°C for the materials placed in the Summer season (June to August).
- 1.0°C for the materials placed in the Fall season (September to November).

3.2.7 Model Boundary Conditions

To consider the snow drifting and impact of active placement of mine waste, snow cover thickness over the top of WRSF6 surfaces will be assumed to be 50% of mean monthly snow cover thickness during active placement of mine waste and 100% of mean monthly snow cover thickness after the completion of the mine waste placement. Snow cover thickness on the slope of WRSF6 and over the original ground will be assumed to be 100% of mean monthly snow cover thickness during the active placement and after the completion of the mine waste placement.

A geothermal gradient of 0.017°C/m at depth (WSP 2024) will be applied to the base of the model.

3.3 Slope Stability Assessment

3.3.1 General

Slope stability assessments will be conducted on five typical sections to validate and refine the preliminary design geometry presented in Section 3.1, Table 6. Various conditions will be considered in the stability assessment including:

- Stability under static loading during construction.
- Stability under static loading after construction (long-term conditions).
- Stability under seismic (pseudo-static) loading after construction.
- Other parametric sensitivity cases (e.g., elevated water table and thawing ice-rich foundation, setback distance between the WRSF and open pit).

The locations of the selected typical sections to be used for the slope stability assessments are presented in Figure 2.

3.3.2 Methodology

Two-dimensional limit equilibrium analyses will be conducted to calculate the factor of safety (FoS) against slope failure during construction and in the long-term post construction of WRSF6. The analyses will consider both static and seismic loading conditions. Potential post-construction seismic loading will be modelled as pseudo-static with a design horizontal peak acceleration to the waste material to represent the transient seismic accelerations that may be induced during the designed earthquake. The pseudo-static analysis will serve as an initial screening tool to determine the requirements for an advanced seismic deformation analysis.

All analyses will be conducted using the two-dimensional, limit equilibrium software, Slope/W of GeoStudio 2021 (Seequent 2021). The widely accepted Morgenstern-Price method with a half-sine interslice force assumption will be adopted in the analyses. The principles underlying the method of limit equilibrium analyses of slope stability are as follows:

- A slip mechanism is postulated;
- The shear resistance required to equilibrate the assumed slip mechanism is calculated by means of statics;
- The calculated shear resistance required for equilibrium is compared with the available shear strength in terms of FoS; and
- The slip surface with the lowest FoS is determined through iteration.

A design FoS will be prescribed to account for the uncertainty and variability in the strength, foundation soils, pore-water pressure parameters, and to limit deformations.

3.3.3 Design Criteria for Factor of Safety

The British Columbia Mine Waste Rock Pile Research Committee published the first stability acceptance criteria developed specifically for mine waste rock dumps in 1991 – *Mined Rock and Overburden Piles, Investigation and Design Manual, Interim Guidelines*, May 1991 (Piteau Associates Engineering Ltd 1991). The interim guidelines provide the minimum recommended FoS based on the combined consideration of the potential scale of instability (shallow failure versus overall, deep-seated failure), design basis (short-term versus long-term), confidence (shear strength parameters and analysis method), and the consequence of instability.

The latest design guideline published by Hawley and Cunning (2017) – *Guidelines for Mine Waste Dump and Stockpile Design* provides guidelines for assigning stability criteria and FoS for various waste rock pile configurations and site conditions. The suggested stability acceptance criteria are based on the failure consequence and confidence level in foundation conditions, waste material properties, piezometric pressures, overall fill slope angles, height of repose angle slopes, and precipitation. However, the guidelines in Hawley and Cunning (2017) do not explicitly consider the potential scale of instability and design basis as the interim guidelines (PAE 1991) did. The potential scale of instability and design basis were implicitly grouped into the “Consequence” category by considering both the impact of the potential instability, which is often related to the scale or size and mechanism of instability, and the service life of the structure.

The guidelines in Hawley and Cunning (2017) are considered as an update and improvement to the previous (PAE 1991) interim design acceptability criteria, which did not specifically distinguish between factors such as the size of a facility, consequence of failure, or confidence in foundation conditions. The stability acceptance criteria for the design of WRSF6 will be developed based on the *Guidelines for Mine Waste Dump and Stockpile Design* (Hawley and Cunning 2017). The stability acceptance criteria suggested by Hawley and Cunning (2017) is presented in Table 10.

Table 10: Suggested Stability Acceptance Criteria by Hawley and Cunning (2017)

Consequence[1]	Confidence[2]	Minimum FoS for Static Analysis	Minimum FoS for Pseudo-Static Analysis
Low	Low	1.3-1.4	1.05-1.1
	Moderate	1.2-1.3	1.0-1.05
	High	1.1-1.2	1.0
Moderate	Low	1.4-1.5	1.1-1.15
	Moderate	1.3-1.4	1.05-1.1
	High	1.2-1.3	1.0-1.05
High	Low	>1.5	1.15
	Moderate	1.4-1.5	1.1-1.15
	High	1.3-1.4	1.05-1.1

1. **Consequence of Failure:**

   Low – waste dumps and stockpiles with overall fill slopes less than 25° and less than 100 m high and repose angle slopes less than 50 m high. No critical infrastructure or unrestricted access within potential runout shadow. Limited potential for environmental impact. Long-term (more than 5 years) exposure for sites subject to very low to low (less than 350 mm) annual precipitation; medium-term (1 to 5 years) exposure for sites subject to moderate (350 mm to 1,000 mm) annual precipitation; short-term (less than 1 year) exposure for sites subject to high (1,000 mm to 2,000 mm) annual precipitation; dry season construction/operation only for sites subject to very high (more than 2,000 mm) annual precipitation or intensive rainy season(s).

   Moderate – waste dumps with overall fill slopes less than 30° and less than 250 m high or repose angle slopes less than 100 m high. No critical infrastructure or unrestricted access, or robust containment/mitigative measures to protect critical infrastructure and access within potential runout shadow. Potential for moderate environmental impact, but manageable. Long-term (more than 5 years) exposure for sites subject to moderate (350 mm to 1,000 mm) annual precipitation; medium-term (1 to 5 years) exposure for sites subject to high (1,000 mm to 2,000 mm) annual precipitation; short-term (less than 1 year) exposure for sites subject to very high (more than 2,000 mm) annual precipitation or intensive rainy season(s).

   High – waste dumps with overall fill slopes more than 30° and more than 250 m high, or with repose angle slopes more than 200 m high. Critical infrastructure or unrestricted access within potential runout shadow with limited runout mitigation/containment measures. Potential for high environmental impact that would be difficult to manage. Long-term exposure (more than 5 years) for sites subject to high (1,000 mm to 2,000 mm) annual precipitation; medium-term (1 to 5 years) exposure for sites subject to very high (more than 2,000 mm) annual precipitation or intensive rainy season(s).

2. **Confidence Level:**

   Low – limited confidence in foundation conditions, waste material properties, piezometric pressures, analysis technique, or potential instability mechanism(s). Poorly defined or optimistic input parameters; high data variability. For proposed structures, investigations at the conceptual level with limited supporting data. For existing structures, poorly documented or unknown construction and operational history; lack of monitoring records; unknown or poor historical performance.

   Moderate – moderate confidence in foundation conditions, waste material properties, piezometric pressures, analysis technique, or potential failure mechanism(s). Input parameters adequately defined; moderate data variability. For proposed structures, investigations at the pre-feasibility study level with adequate supporting data. For existing structures, reasonably complete construction documentation and monitoring records; fair historical performance.

   High – high confidence in foundation conditions, waste material properties, piezometric pressures, analysis technique, and instability mechanism(s). Well-defined, conservative input parameters; low data variability. For proposed structures, investigations at the feasibility study level with comprehensive supporting data. For existing structures, well-documented construction and monitoring records and good historical performance."

The stability acceptance criteria for the WRSF6 design are adopted to capture locations of failure, slope slip mechanisms, failure consequence, confidence levels in stability analysis, input parameters, key assumptions, proximity to mining open pit, and site conditions. Table 11 lists the key considerations, consequence and confidence classifications, and adopted stability criteria for the design of WRSF6.

Table 11: Adopted Stability Criteria for WRSF6 Design

Potential Failure Mechanism and Conditions	Consequence of Failure	Confidence Level	Minimum Factor of Safety for Static Loading	Minimum Factor of Safety for Pseudo-static Loading [(a)]
Surficial, shallow slips (during construction)	Low	High	1.1	-
Local deep-seated slips and temporary internal slopes (during construction)	Moderate	Moderate	1.4	-
Long-term, global deep-seated slips for base cases (after construction)	High	Moderate	1.5	1.1[(b)]
Long-term, global deep-seated slips for sensitivity cases with conservative assumptions (after construction)	High	Moderate	1.4	1.1[(b)]

[(a)]: Pseudo-static loading was only considered for global deep-seated slip failure under long-term conditions (after construction)

[(b)]: In the event that the calculated FoS under pseudo-static loading is significantly less than minimum required FoS (1.1), a dynamic deformation numerical analysis will be conducted to estimate the deformation of WRSF6 under seismic loading.

The consequence of failure and confidence level in Table 11 are based on the following considerations and rationales:

- The surficial, shallow slips (no deeper than 5 m, shallow failure close to the side slope of waste rock or overburden) are classified as **Low** consequence due to the small size of the potential slip material and **High** confidence level due to reasonably conservative strength parameters assumed for surficial waste rock and overburden.
- The consequence of failure is classified as **Moderate** for local deep-seated slips (no greater than 15 m deep) and temporary internal slopes between Phase 1 and Phase 2 of WRSF6. The confidence level in the analysis input parameters and assumptions is **Moderate** for this potential failure mechanism given the quantity and quality of the data available within WRSF6 footprint, the understanding of overall site subsurface conditions, and relatively conservative strength parameters assumed for the foundation soils.
- The consequence of failure is classified as **High** for global deep-seated slips. This is due to the following factors:
  - Relatively moderate size of slip material if failure occurs;
  - Overall design of 18.5°, which is less than 30° slopes from crest to toe;
  - Repose angle slopes of 5 m high;
  - Moderate (mean annual precipitation of 412 mm, which is between 350 mm and 1,000 mm) annual precipitation; and
  - The run out from a deep-seated failure may slide into adjacent mining open pit (Pump01) and/or fish bearing lakes (e.g., Lakes B4 and B45), which may cause loss of life and/or significant loss or deterioration of habitat.

For the global deep-seated slip failure mechanism under long-term static loading conditions, the adopted FoS was selected either from the upper bound or lower bound listed in the guidelines by considering the conservatism of the assumptions adopted for the analyses. The upper bound value of the suggested FoS (1.5) was selected for global deep-seat failure for base cases and the lower bound value (1.4) was selected for the global deep-seat failure for sensitivity cases with conservative assumptions.

The adopted stability criteria listed in Table 11 apply to all seven typical sections as shown in Figure 2.

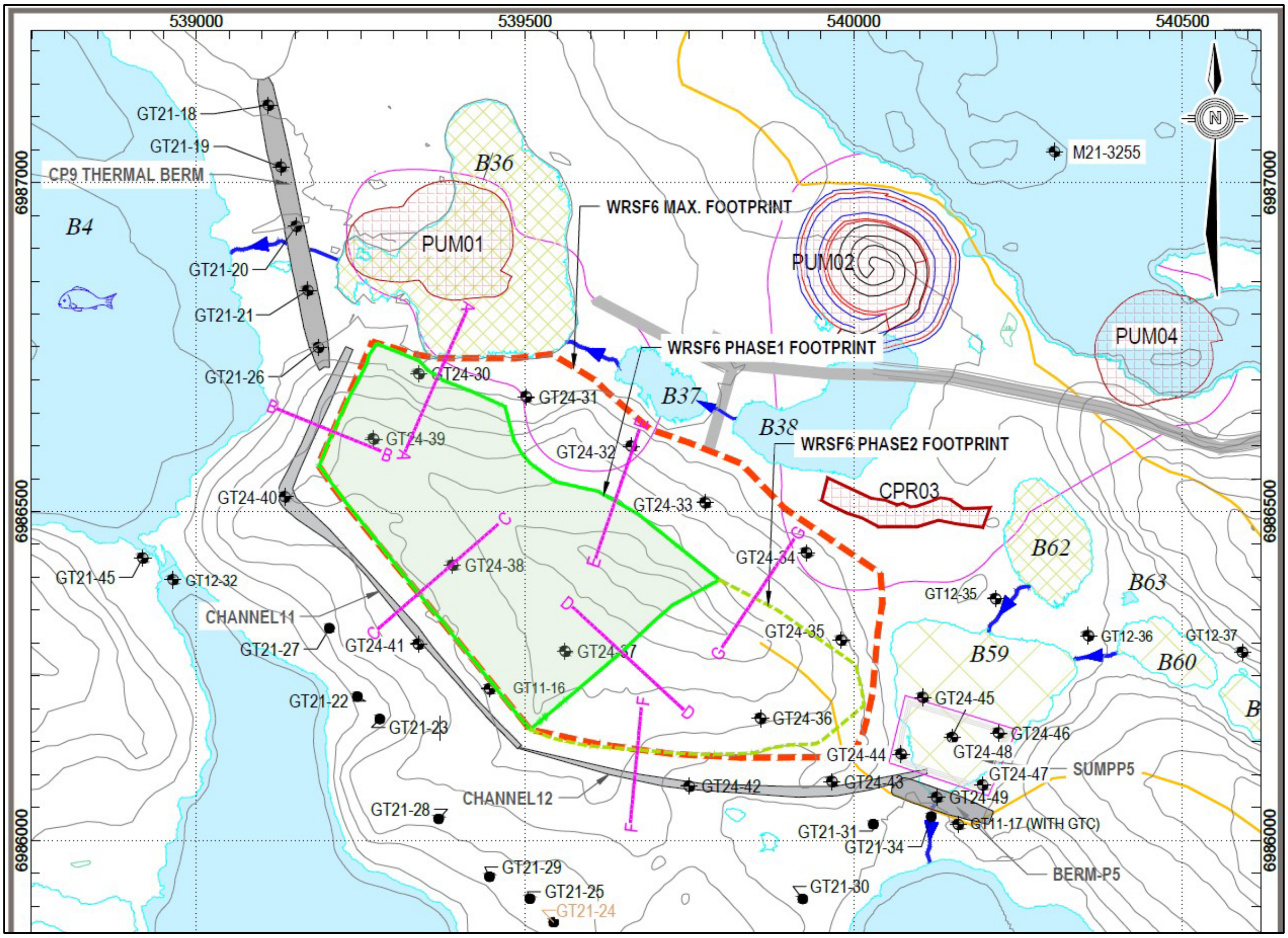

Figure 2: Selected Sections for Slope Stability Analyses

3.3.4 Foundation Conditions and Soil Profile

The overall geotechnical subsurface conditions underlying the WRSF6 area are summarized in Section 2.4 It is expected that the thin organic layer will be compressed under loads from waste rock and overburden placed above, and its shear strength parameters would be close to that of the underlying overburden soils (sand and silt or ice-rich silt). The organic material is localized within the footprint of WRSF6, and it is expected that some organic material will be removed during the snow-removal process prior to the mine waste placement or will be compressed under loads from waste rock and overburden. Therefore, any local presence of the compressed thin organic layer will not be specially modelled and will be represented by the equivalent underlying overburden soils in the stability analyses.

- **Soil Profile at Section A**

Three boreholes were drilled near Section A, including GT24-30, GT24-31, and GT24-39. Based on the borehole logs, subsurface conditions at Section A generally consists of a thin layer of peat, overlying a sand and gravel layer, a silt layer, a sand and gravel layer, and bedrock. In the stability analysis, it will be assumed that the foundation soils at Section A consists of a 0.5 m thick layer of sand and gravel, a 1.5 m thick layer of ice-rich silt, 2.0 m thick layer of ice-poor silt, and a 4.0 m thick layer of sand and gravel over bedrock.

- **Soil Profile at Section B**

Two boreholes were drilled near Section B, including GT24-39 and GT24-40. Based on the borehole logs, subsurface conditions at Section B generally consists of a thin layer of peat, overlying a layer of sand or gravelly silt, a layer of silt, a layer of sand and silt, a layer of sand and gravel, and bedrock. In the stability analysis, it will be assumed that the foundation soils at Section B consists of a 0.5 m thick layer of sand, a 2.0 m thick layer of ice-rich silt, a 5.5 m thick layer of sand and silt, and a 6.0 m thick layer of sand and gravel over bedrock.

- **Soil Profile at Section C**

Two boreholes (GT24-38 and GT24-41) were drilled near Section C. Based on the borehole logs, subsurface conditions at Section C consist of a thin layer of organic peat, a layer of sand, a layer of silt or silt and sand, a layer of sand and gravel, and bedrock. In the stability analysis, it will be assumed that the foundation soils at Section C consists of a 1.5 m thick layer of sand, a 1.0 m thick layer of ice-rich sand, a 2.5 m thick layer of ice-poor silt, a 4.0 m thick layer of silty sand, and a 5.0 m thick layer of sand and gravel over bedrock.

- **Soil Profile at Section D**

Two boreholes were drilled near Section D, including GT24-36 and GT24-37. Based on the borehole logs, subsurface conditions at Section D consist of a layer of organic peat, a layer of sand, a layer of silt or silt and sand, a layer of sand or gravel, and bedrock. In the stability analysis, the foundation condition at Section D will be assumed to consist of a 1.0 m thick layer of sand, a 1.5 m thick layer of ice-rich silt, a 1.5 m thick layer of sand and gravel, a 5.0 m thick layer of silt and sand, and a 1.0 m thick layer of gravel over bedrock.

- **Soil Profile at Section E**

Two boreholes were drilled near Section E, including GT24-32 and GT24-33. Based on the borehole logs, subsurface conditions at Section E consist of a layer of organic peat, a layer of sand and gravel, a layer of silt, a layer of sand or sand and gravel, and bedrock. In the stability analysis, the foundation condition at Section E will be assumed to consist of a 0.5 m thick layer of sand and gravel, a 2.0 m thick layer of ice-rich silt, and a 2.5 m thick layer of sand and gravel over bedrock.

- **Soil Profile at Section F**

Two boreholes were drilled near Section F, including GT24-36 and GT24-42. Based on the borehole logs, subsurface conditions at Section F consist of a layer of organic peat, a layer of sand, a layer of silt or silt and sand, a layer of sand or gravel, and bedrock. In the stability analysis, the foundation condition at Section F will be assumed to consist of a 1.0 m thick layer of sand, a 1.5 m thick layer of ice-rich silt, a 1.5 m thick layer of sand and gravel, a 5.0 m thick layer of silt and sand, and a 1.0 m thick layer of gravel over bedrock.

- **Soil Profile at Section G**

Two boreholes were drilled near Section G, including GT24-34 and GT24-35. Based on the borehole logs, subsurface conditions at Section G consist of a layer of organic peat, a layer of sand and gravel, a layer of silt, a layer of sand or sand and gravel, and bedrock. In the stability analysis, the foundation condition at Section G will be assumed to consist of a 1.0 m thick layer of sand and gravel, a 2.0 m thick layer of ice-poor silt, a 3.0 m thick layer of sandy silt, a 1.5 m thick layer of sand and gravel, and a 4.5 m thick layer of sand over bedrock.

3.3.5 Material Properties

Soil strength tests on thawed and reconstituted samples collected from the WRSF6 footprint are limited with two direct shear tests conducted (Tetra Tech 2024a). There are 18 soil strength tests conducted through laboratory direct shear and consolidated-undrained triaxial tests on various thawed and reconstituted samples collected from past drilling programs at different locations of the Meliadine Mine for other infrastructure designs (EBA 2013, Tetra Tech 2021). The material properties to be used in the stability analyses were estimated based on all available testing results at the Meliadine Mine, literature review, experience on similar materials, and engineering judgement. Figure 3 presents the inferred residual internal angles of friction measured from the laboratory tests on various soil types.

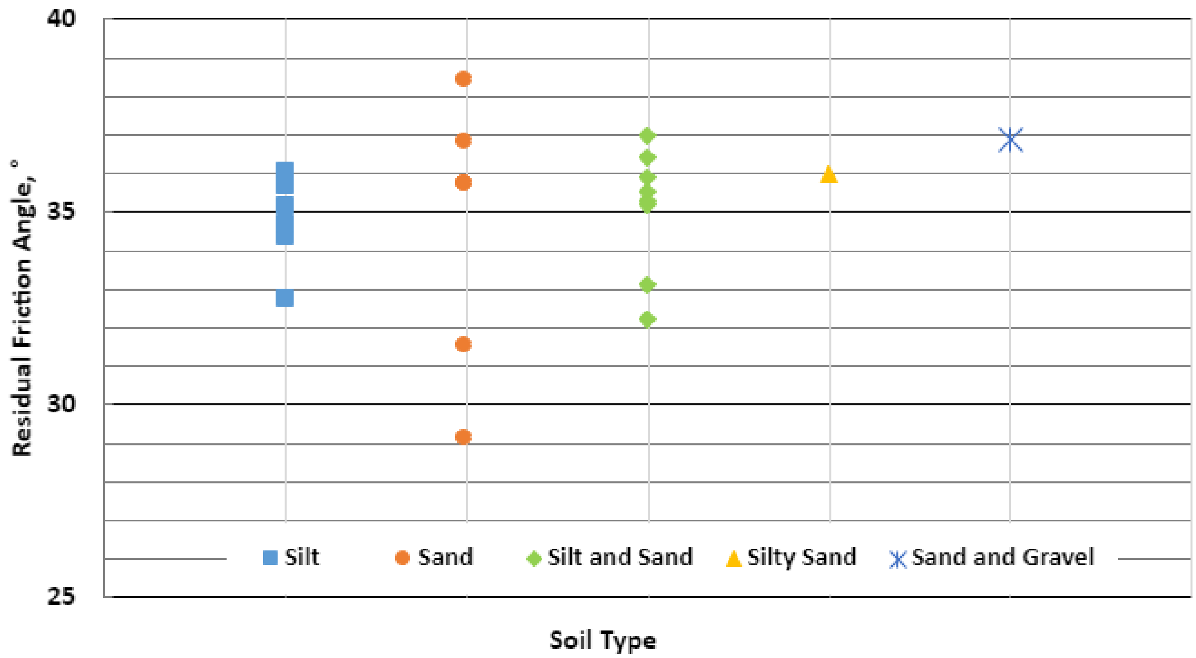

Figure 3: Inferred Residual Internal Angle of Friction on Various Soils from Laboratory Tests

As presented in Figure 3, the residual internal angle of friction ranges from 32° to 36° for silt, 29° to 38° for sand, and 32° to 37° for silt and sand. These values from the laboratory tests are relatively on the high side. In this study, the angle of internal friction for silt will be assumed to be 28°, which is the same as that used for the WRSF1 and WRSF3 detailed designs. The angle of internal friction will be conservatively assumed to be 32° for sand, and 31° for silt and sand. Only one sample was tested for silty sand, and sand and gravel, with inferred residual internal angles of friction of 36° and 37°, respectively. In this detailed design, the angle of internal friction is assumed to be 32° and 34° for silty sand and sand and gravel, respectively.

Of importance to the slope stability assessment is the strength of the ice-rich silt in the foundation. The frozen ice-rich soils are expected to behave as frictional materials for any short-term loading conditions (i.e., during construction or during any pseudo-static analysis) and are expected to behave as cohesive materials during long-term loading conditions.

In short-term loading, the same properties determined for silt material under thawed state (angle of internal friction of 28°) will be used for ice-rich silt material. The long-term cohesion of the ice-rich soil depends on its temperatures – the colder the soil, the higher its long-term cohesion. The long-term cohesion of the frozen ice-rich silt will be estimated based on the predicted temperatures from the thermal analysis and the publication by Weaver and

Morgenstern (1981) and then adjusted for the frozen fraction (change with soil temperature) of the soil porewater for an assumed porewater salinity of 7 ppt.

Douglas (2002) established a large database of published and unpublished triaxial testing undertaken on rockfill and carried out an extensive statistical analysis of the factors affecting its strength. The database determined that a non-linear relationship exists between the secant friction angle (ϕ'_{sec}) of the rockfill and normal stress (σ_n) as shown in Figure 4.

The normal stress for the proposed WRSF6 ranges from 100 kPa to 700 kPa, therefore, the interpreted friction angle based on Douglas (2002) for waste rock ranges from 48° (at normal stress of 100 kPa) to 39° (at normal stress of 700 kPa). The non-linear relationship derived by Douglas (2002) could be used for the slope stability assessment by applying the non-linear function in the Slope/W model. To keep the simplicity for the design of WRSF6, the shear strength of the waste rock will be assigned based on the zones with different thicknesses. Three different zones will be assigned with Zone 1 between 0 and 15 m depth (perpendicular to the outer slope), Zone 2 between 15 m and 25 m depth, and Zone 3 between 25 m and 35 m depth. An angle of internal friction of 42°, 40°, and 39° will be assigned to Zone1, Zone 2, and Zone 3, respectively.

The overburden waste material is expected to behave as a frictional material in both short-term and long-term loading conditions. The friction angle of the overburden waste will be conservatively assumed as 28° based on Tetra Tech's experience with similar materials at the Meliadine Mine and other northern mine sites.

The bedrock within the WRSF6 footprint is a competent greywacke with depths ranging from approximately 4.05 m to 17.4 m. The strength of the bedrock is much greater than that of the overburden and therefore it will not control the stability. For modelling purposes, the bedrock will be assumed to be impenetrable.

Table 12 summarizes material properties that will be used for the stability analysis of WRSF6.

Table 12: Material Properties for the WRSF6 Stability Analyses

Material	Effective Angle of Internal Friction, ø (º)	Cohesion, c (kPa)	Unit Weight ϒ (kN/m³)	Comments
Waste Rock Zone 1 (0 to 15 m depth)	42	0	19	Similar to the non-linear relationship derived by Douglas (2002), see the text in Section 3.3.5 for the rationale.
Waste Rock Zone 2 (15 to 25 m depth)	40	0	19	
Waste Rock Zone 3 (25 to 35 m depth)	39	0	19	
Overburden Waste	28	0	17	Conservative. Based on Tetra Tech's experience with similar materials at the Meliadine and other northern mine sites.
Thawed Silt	28	0	17	The internal friction angles from laboratory tests (32° to 36°) are on the high side for silt. In this study, an internal friction angle of 28° for silt is assumed, which is the same as that adopted in the WRSF1 and WRSF3 detailed designs.
Sand (Ice-Poor or Thawed)	32	0	18	The laboratory test results indicated that the residual internal angle of friction ranges from 29° to 38° for sand. In this study, an internal friction angle of 32° is conservatively assumed for sand.
Silty Sand (Ice-Poor or Thawed)	32	0	18	A residual internal angle of friction of 36° was measured from one silty sand sample. In this study, a lower value of 32° is conservatively assumed for. It also falls in the suggested typical range of 27° to 34° for silty sand (Carter and Bentley 1991; Obrzud and Truty 2012)
Silt and Sand (Ice-Poor or Thawed)	31	0	18	The laboratory test results indicated that the residual internal angle of friction ranges from 32° to 37° for silt and sand. In this study, an internal friction angle of 31° is conservatively assumed for silt and sand.
Sand and Gravel (Ice-Poor or Thawed)	34	0	20	A residual internal angle of friction of 37° was measured from one sand and gravel sample. In this study, a lower value of 34° is conservatively assumed.
Gravel (Ice-Poor or Thawed)	35	0	20	Ice-Poor gravel will behave as a frictional material in both short-term and long-term loading conditions. The friction angle of the gravel was conservatively assumed as 35° based on Tetra Tech's experience with gravels at other northern mining projects.
Ice-Rich Silt	0	Temperature dependent	16	To be determined based on the predicted temperatures from the thermal analysis and the publication by Weaver and Morgenstern (1981) and then adjusted for the impact of porewater salinity on freezing point depression.
Thawing Ice-Rich Silt	28	0	16	The same properties as thawed silt above.
Ice-Poor Silt	28	0	17	Similar behavior as thawed silt in the long-term. The same shear strength was assumed as thawed silt.

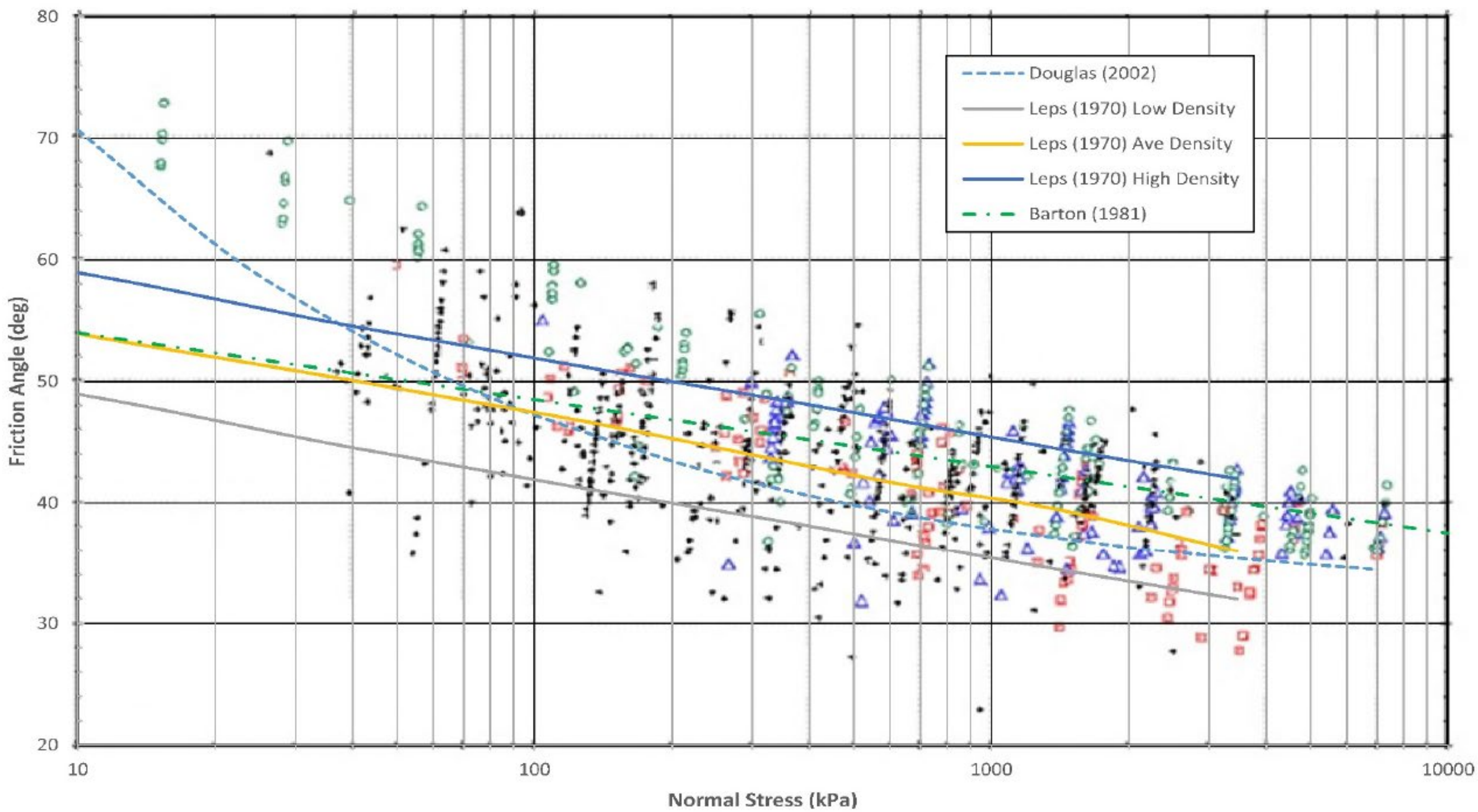

Figure 4: Secant Friction Angle of Rockfill vs. Normal Stress

3.3.6 Other Input Parameters

3.3.6.1 Excess Pore-Water Pressure

Excess pore-water pressure generated due to the waste placement above the original ground is not expected when the foundation soils are in a frozen condition. Excess pore-water pressure may be generated when the foundation soils are in the process of thawing during the summer period, if thawing occurs at a faster rate than that the excess pore-water pressure is produced. To consider the potential excess pore-water pressure generation in the short-term, an assumed piezometric line (at the original ground surface), together with a pore pressure coefficient ($\overline{B)}$ or pore-pressure ratio (Ru) can be used in the short-term analyses. Under the assumption that the excess pore-water pressure can only be generated in the thawing foundation soil layers, the initial pore pressure is often small enough to be considered negligible. Hence, the pore-water pressure coefficient ($\overline{B)}$ is equivalent to the pore-water pressure ratio (Ru).

Morgenstern and Nixon studied the consolidation of thawing soils and concluded that the excess pore-water pressures and the degree of consolidation in thawing soils depend primarily on the thawing consolidation ratio (R) (Morgenstern and Nixon 1971). Closed form solutions were introduced to calculate the normalized pore pressure distribution in the thawing layer under different thawing consolidation ratios. The thaw consolidation ratio, R, can be calculated using the following equation:

$$R = \frac{\alpha}{2\sqrt{C_v}}$$

where:

α denotes a constant, which can be determined through thermal analysis; and

C_v denotes the coefficient of consolidation of the thawing soil.

One consolidation test was performed on a remolded sample collected during the 2024 drilling program. The calculated coefficient of consolidation, C_v, based on the standard consolidation theory (square root of time method), ranges from 17.3 m^2/year to 71.7 m^2/year with an average of 37 m^2/year (Tetra Tech 2024a).

For the short-term loading condition, the pore-water pressure ratio, Ru, will be estimated based on the calculated thaw consolidation ratio and published design chart by Morgenstern and Nixon (1971).

For long-term static and seismic loading conditions, it is assumed that there is no excess pore water pressure.

3.3.6.2 Seismicity

The Meliadine Mine is situated in an area of low seismic risk and site-specific probabilistic or deterministic seismic hazard studies were not conducted. The peak ground acceleration (PGA) under a potential earthquake at the Meliadine Mine was estimated from the 2020 National Building Code of Canada seismic hazard website (http://www.earthquakescanada.nrcan.gc.ca/hazard-alea/interpolat/calc-en.php). The estimated PGA is 0.0285 g for a 5% in 50-year probability of exceedance (0.001 per annum or 1 in 1,000 year return) and 0.0498 g for a 2% in 50-year probability of exceedance (0.000404 per annum or 1 in 2,475 year return) for the area. A horizontal PGA of 0.0498 g will be used for the analyses under seismic (pseudo-static) loading conditions for the design of WRSF6.

4.0 LIQUEFACTION POTENTIAL

Liquefaction potential (under both static and cyclic loading) of the overburden waste and foundation overburden soils for WRSF6 is considered as very low risk due to the following factors:

- The foundation overburden soils are expected to be in frozen conditions, except for a small zone of seasonal unfrozen soils in the active layer close to the lowermost toe of WRSF6;
- Under the worst-case scenario that the foundation soils are thawed in the long term under the climate change scenario, the thawing rate is expected to be very slow with no excess pore-water pressure generated;
- The waste rock and overburden are expected to be in unsaturated conditions during waste placement and are predicted to be in frozen conditions in the long term (after freeze back if initially placed in unfrozen conditions);
- In the case that waste rock and overburden are thawed in the long-term under the climate change scenario, liquefaction potential is expected to be very low due to no free water table and the characteristics of the waste rock and overburden; and
- The Meliadine Mine site is in an area of low seismic risk.

Provided the factors abovementioned, failure of WRSF6 caused by liquefaction is not considered as a credible failure mechanism. Liquefaction assessment will not be conducted for the design of WRSF6.

5.0 DEFORMATION OF WRSF6 AND ITS FOUNDATION

It is expected that some of the waste materials (especially the overburden waste), which are to be placed in frozen conditions and within the active layer (annual freeze-thaw) zones, will settle when they are initially thawed during the thawing seasons after placement. Most of the thaw settlement will occur during the construction period or several years after the waste placement. Based on the monitoring performance of the existing WRSF1 and WRSF3 at the Meliadine Mine, this expected settlement is acceptable and not expected to be detrimental to the overall stability of WRSF6.

Ice-rich soils tend to creep under shear loading. The ice-rich silt layer in the foundation of WRSF6 may creep under loading of the waste rock and overburden. The magnitude of the creep-induced deformations will mainly depend on the stress state, temperature, thickness, and porewater salinity of the ice-rich layer.

A soil deformation analysis to consider the long-term creep of the ice-rich silt layer in the foundation was conducted to evaluate the potential long-term deformation behaviours of the TSF at the Meliadine Mine (Tetra Tech EBA, 2014). The analysis was carried out using FLAC 7.0, a commercial two-dimensional explicit finite-difference program for engineering applications. The modelled section of the TSF in the analysis had a maximum height of 33 m and side slopes of 3H:1V to 4H:1V. The detailed analysis results were documented in Tetra Tech EBA (2014).

WRSF6 has similar foundation conditions, maximum design height, and overall side slope as the TSF. The potential horizontal and vertical deformations of WRSF6 due to the creep of the ice-rich silt layer in the foundation will be assessed based on the analysis results for the TSF and the predicted temperatures in the ice-rich silt layer for WRSF6 from the thermal analysis. It is expected that the ice-rich silt layer will deform in a primary or secondary creep state and undergo ductile deformation which is not assumed to be detrimental to the performance of WRSF6.

The earthquake-induced displacement of WRSF6 will be estimated based on the simplified procedure proposed by N. M. Newmark in 1965 (N. M. Newmark 1965). The procedure takes into account both the design configurations and earthquake loadings, and has been widely accepted for preliminary deformation assessment of dams and embankments under seismic activities. This earthquake-induced displacement assessment using the simplified procedure will serve as an initial screening tool to determine the requirement of an advanced dynamic stress-strain deformation analysis for the design of WRSF6.

6.0 MONITORING PLAN

Performance monitoring is an integral part of the operation of critical infrastructure at the Meliadine Mine. Geotechnical instrumentation is required to monitor the behavior of the placed waste materials and the underlying foundation during operation. The instrumentation is intended to provide the following information:

- Confirmation that the performance of the foundation soils and placed waste materials are consistent with the predictions made during the design studies, notably in terms of stability, deformation, and thermal analyses.
- Early warning of the development of potentially adverse trends such as deformation and permafrost degradation.

Performance monitoring will be through ground temperature cables (GTCs) and inclinometers. Three vertical GTCs were installed during the 2024 drilling program. These existing GTCs will be extended and terminated at the toe of WRSF6. Three additional horizontal and/or vertical GTCs will be installed during the construction to monitor the subsurface ground temperature. Two vertical GTCs will be installed through the mine waste after the construction to monitor the ground temperature in the mine waste zone. A minimum three sets of ShapeArray inclinometers will be installed prior to the material placement in deep overburden between the northwest toe of WRSF6 and the Pump01 open pit to monitor the potential movement of the overburden towards the pit wall. One set of ShapeArray inclinometer will be installed during the initial construction of WRSF6 with the others being installed should WRSF6 expand to WRSF 6 Stage 2 footprint. Additional GTCs and inclinometers may be installed if required after review of monitoring data and operational performance.

Regular visual inspection will be conducted during the construction phase. The frequency of the visual inspection will depend on the material placement activities and construction phases. An annual geotechnical inspection will be conducted by a qualified Geotechnical Engineer as per the conditions in the Type A Water Licence (2AM-MEL1631).

7.0 CLOSURE

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

Respectfully submitted,
Tetra Tech Canada Inc.

REGISTERED PROFESSIONAL ENGINEER
L. WU
LICENSEE
NT/NU
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PERMIT TO PRACTICE
TETRA TECH CANADA INC.

Signature ____________

Date 2024-12-13

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

/jf

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APPENDIX A

TETRA TECH'S LIMITATIONS ON USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

GEOTECHNICAL

1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the “Professional Document”).

The Professional Document is intended for the sole use of TETRA TECH’s Client (the “Client”) as specifically identified in the TETRA TECH Services Agreement or other Contractual Agreement entered into with the Client (either of which is termed the “Contract” herein). TETRA TECH does not accept any responsibility for the accuracy of any of the data, analyses, recommendations or other contents of the Professional Document when it is used or relied upon by any party other than the Client, unless authorized in writing by TETRA TECH.

Any unauthorized use of the Professional Document is at the sole risk of the user. TETRA TECH accepts no responsibility whatsoever for any loss or damage where such loss or damage is alleged to be or, is in fact, caused by the unauthorized use of the Professional Document.

Where TETRA TECH has expressly authorized the use of the Professional Document by a third party (an “Authorized Party”), consideration for such authorization is the Authorized Party’s acceptance of these Limitations on Use of this Document as well as any limitations on liability contained in the Contract with the Client (all of which is collectively termed the “Limitations on Liability”). The Authorized Party should carefully review both these Limitations on Use of this Document and the Contract prior to making any use of the Professional Document. Any use made of the Professional Document by an Authorized Party constitutes the Authorized Party’s express acceptance of, and agreement to, the Limitations on Liability.

The Professional Document and any other form or type of data or documents generated by TETRA TECH during the performance of the work are TETRA TECH’s professional work product and shall remain the copyright property of TETRA TECH.

The Professional Document is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of TETRA TECH. Additional copies of the Document, if required, may be obtained upon request.

1.2 ALTERNATIVE DOCUMENT FORMAT

Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH’s “Instruments of Professional Service”), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH’s Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH’s Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

Electronic files submitted by TETRA TECH have been prepared and submitted using specific software and hardware systems. TETRA TECH makes no representation about the compatibility of these files with the Client’s current or future software and hardware systems.

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by persons other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this report, at or on the development proposed as of the date of the Professional Document requires a supplementary investigation and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, TETRA TECH has not been retained to investigate, address or consider and has not investigated, addressed or considered any environmental or regulatory issues associated with development on the subject site.

1.8 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems and methods employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. TETRA TECH does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

1.9 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

1.10 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historic environment. TETRA TECH does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional investigation and review may be necessary.

1.11 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

1.12 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

1.13 INFLUENCE OF CONSTRUCTION ACTIVITY

There is a direct correlation between construction activity and structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques are known.

1.14 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, as well as the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

1.15 DRAINAGE SYSTEMS

Where temporary or permanent drainage systems are installed within or around a structure, the systems which will be installed must protect the structure from loss of ground due to internal erosion and must be designed so as to assure continued performance of the drains. Specific design detail of such systems should be developed or reviewed by the geotechnical engineer. Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function.

1.16 BEARING CAPACITY

Design bearing capacities, loads and allowable stresses quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition assumed. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions assumed in this report in fact exist at the site.

1.17 SAMPLES

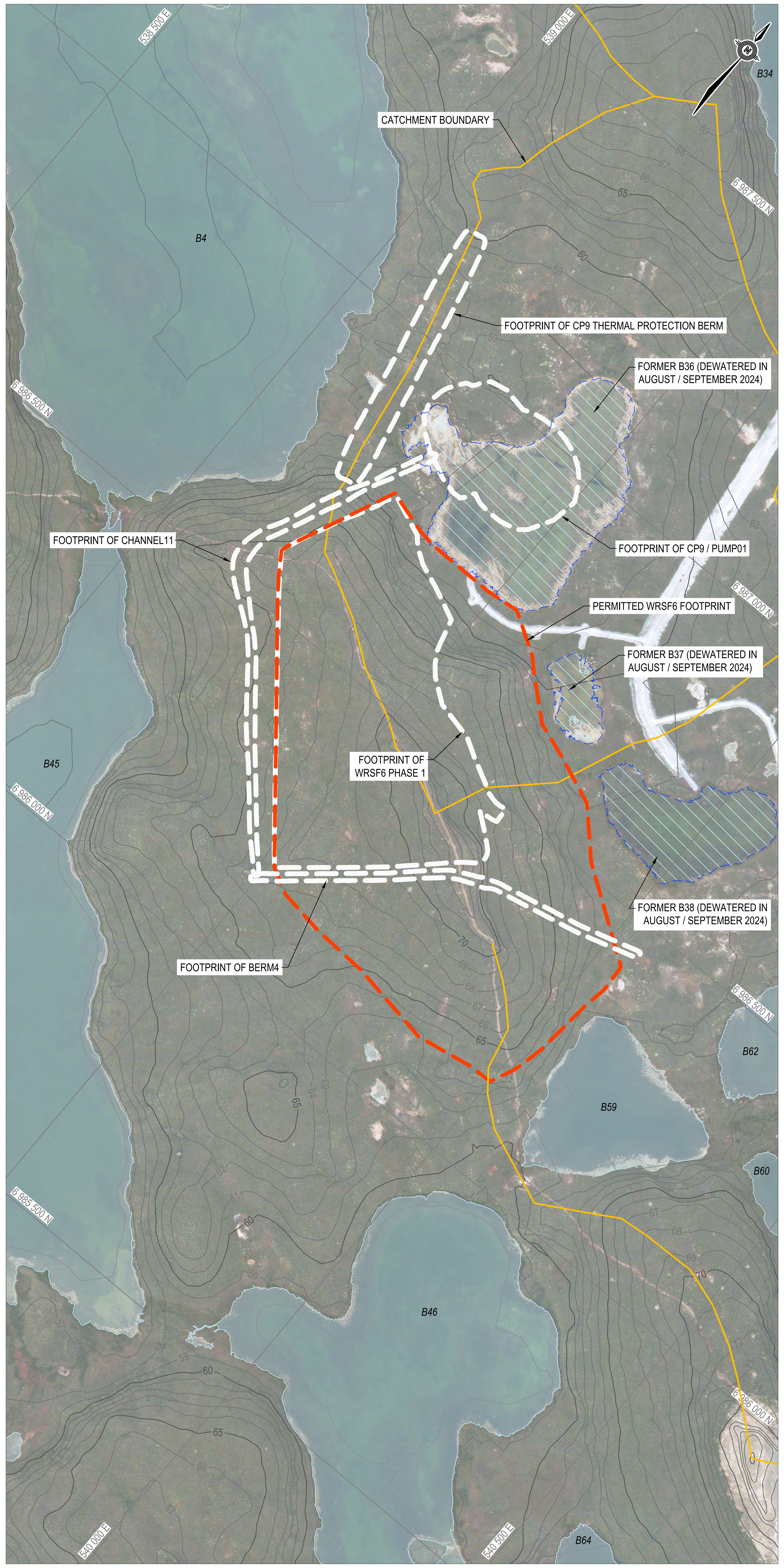
TETRA TECH will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the Client's expense upon written request, otherwise samples will be discarded.

APPENDIX B

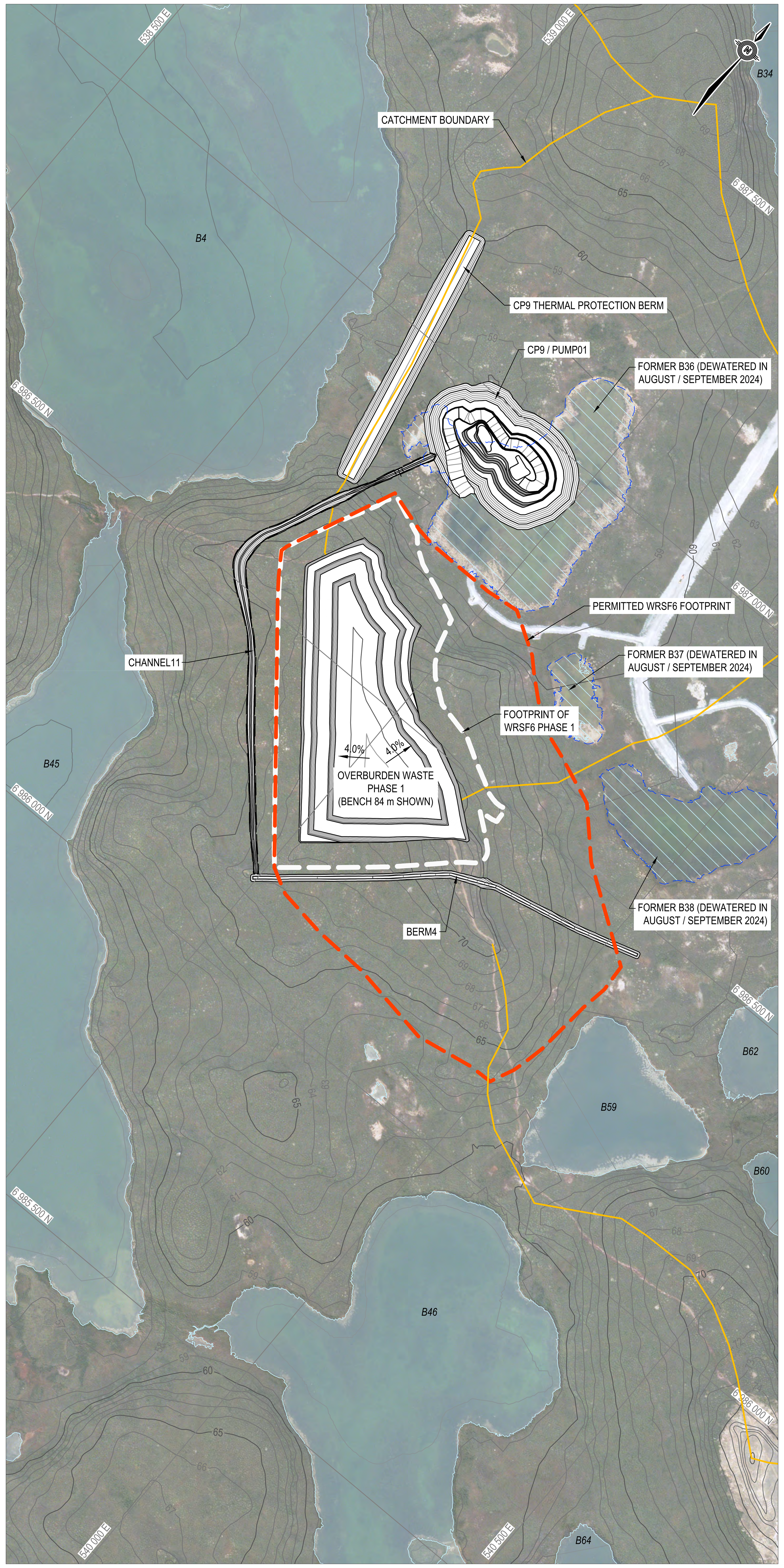
WRSF6 ISSUED FOR CONSTRUCTION DRAWINGS

NO. DESSIN DRAWING NO. 65–686–230–003

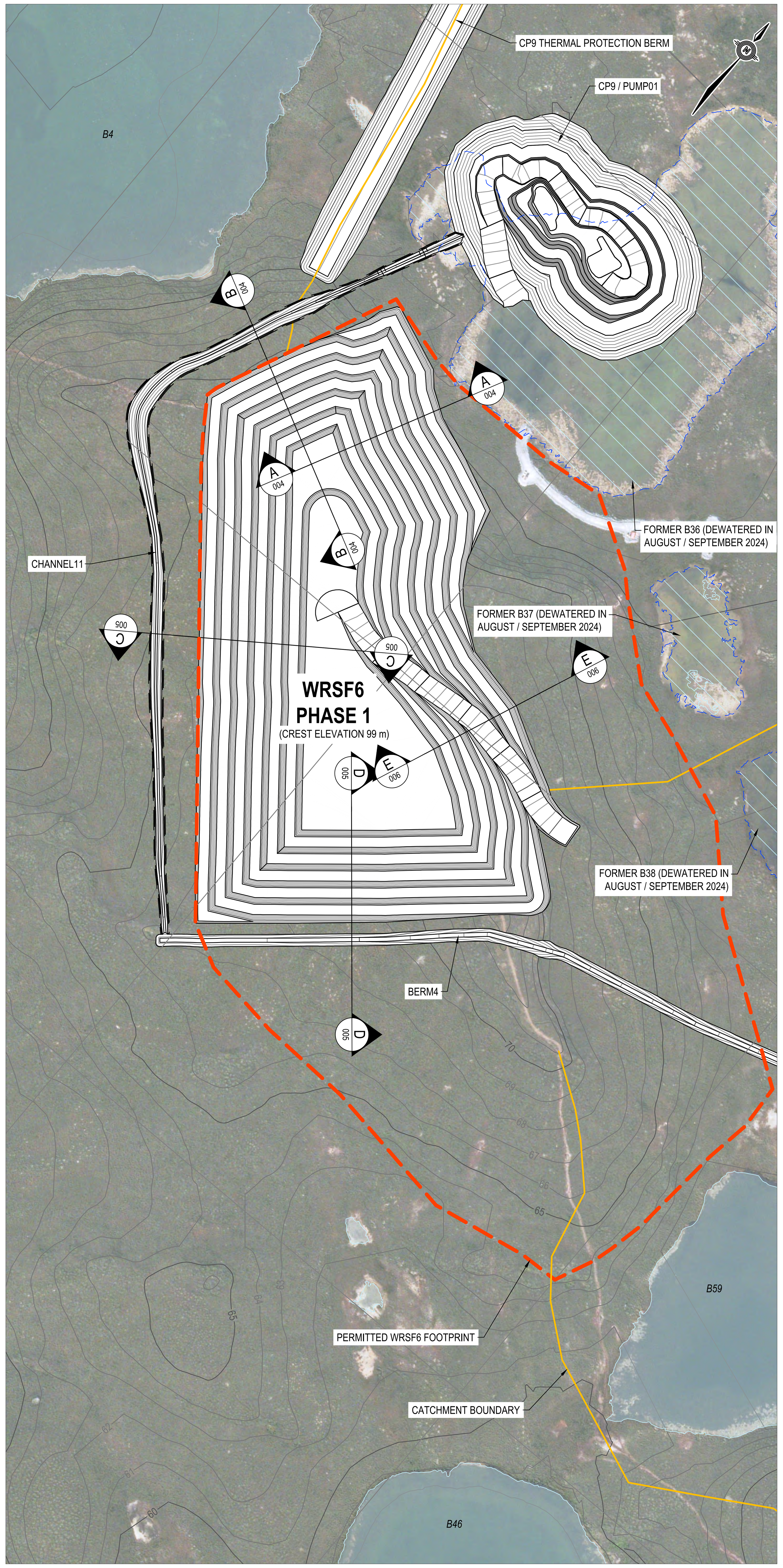
FORMAT ARCHD



PLAN VIEW SHOWING CURRENT CONDITION
SCALE = 1:5000

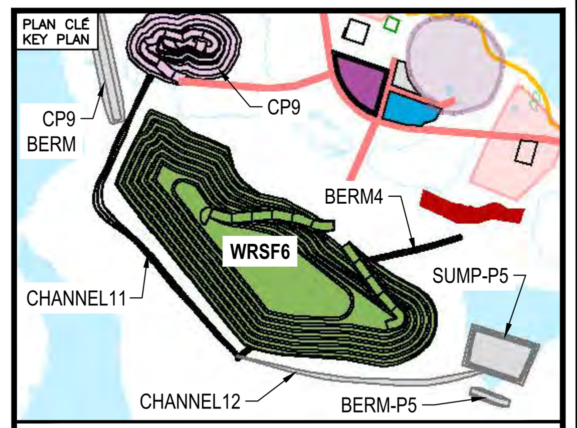


INTERNAL DESIGN GEOMETRY OF OVERBURDEN WASTE IN WRSF6 PHASE 1
SCALE = 1:5000



DESIGN GEOMETRY OF WASTE ROCK OUTSIDE SHELL FOR WRSF6 PHASE 1
SCALE = 1:3000

PLAN CLÉ KEY PLAN



TETRA TECH

NOTES GÉNÉRALES / GENERAL NOTES

1. THE WRFS6 DESIGN PRESENTED HEREIN HAS BEEN BASED ON THE WASTE ROCK AND OVERBURDEN PRODUCTION PLAN THAT WAS PROVIDED ON JULY 17, 2024 AND THE CORRESPONDING PRELIMINARY WASTE ROCK AND OVERBURDEN DEPOSITION PLAN THAT WAS DEVELOPED FOR THE DESIGN OF WRSF6. THE WRSF6 DESIGN SHOULD BE REVIEWED OR UPDATED (IF REQUIRED) IF THE FINAL WASTE ROCK AND OVERBURDEN PLACEMENT PLAN FOR WRSF6 ESPECIALLY THE PLACEMENT PLAN FOR THE INITIAL BENCHES (69 m AND 74 m) OF THE WASTE ROCK AND OVERBURDEN IS DIFFERENT FROM THAT USED IN THE DESIGN.
2. THE MAXIMUM LIFT THICKNESS IN WRSF6 PLACEMENT SHOULD BE LIMITED TO 2.5 m FOR THE OVERBURDEN WASTE AND TO 5.0 m FOR THE WASTE ROCK.
3. ANY SNOW WITHIN THE FOOTPRINT OF WRSF6 SHOULD BE COMPLETED REMOVED PRIOR TO PLACEMENT OF OVERBURDEN WASTE AND WASTE ROCK IN WRSF6.
4. WASTE ROCK IDENTIFIED AS PAG WILL BE ENCAPSULATED WITHIN THE CENTER OF WRSF6. THE PAG STORAGE AREAS WILL BE LOCATED AT MINIMUM 15 m, IN A HORIZONTAL DISTANCE, FROM THE EDGE OF WRSF6.
5. TO REDUCE THE RISK OF THE FORMATION OF DEPRESSION ZONES AND POTENTIAL WATER PONDING, THE FINAL LIFT OF THE OVERBURDEN MATERIAL COULD BE PLACED WITH A SLOPE OF MINIMUM 4% FROM THE CENTER OF THE PILE TO THE PERIMETER.

REGISTERED PROFESSIONAL ENGINEER H. XIA LICENSEE NT/NU 2024-12-13

PERMIT TO PRACTICE
TETRA TECH CANADA INC.
Signature
Date 2024-12-13
PERMIT NUMBER: P 018
NT/NU Association of Professional Engineers and Geoscientists

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

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AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
0	2024–12–13	ISSUED FOR CONSTRUCTION	HX	HX	

REVISIONS

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TITRE / TITLE
AGNICO EAGLE MELIADINE GOLD MINE

MELIADINE WRSF6 DETAILED DESIGN:
PHASE 1 PLAN VIEW

DESSINÉ PAR DRAWN BY	EL	DATE 2024–12–13
VERIFIÉ PAR CHECKED BY	HX	2024–12–13
APPROUVÉ PAR APPROVED BY	HX	2024–12–13
ÉCHELLE SCALE	AS SHOWN	DATE 2024–12–13

NO. DESSIN DRAWING NO. 65–686–230–003

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NO. DESSIN / DRAWING NO. 65-686-230-004

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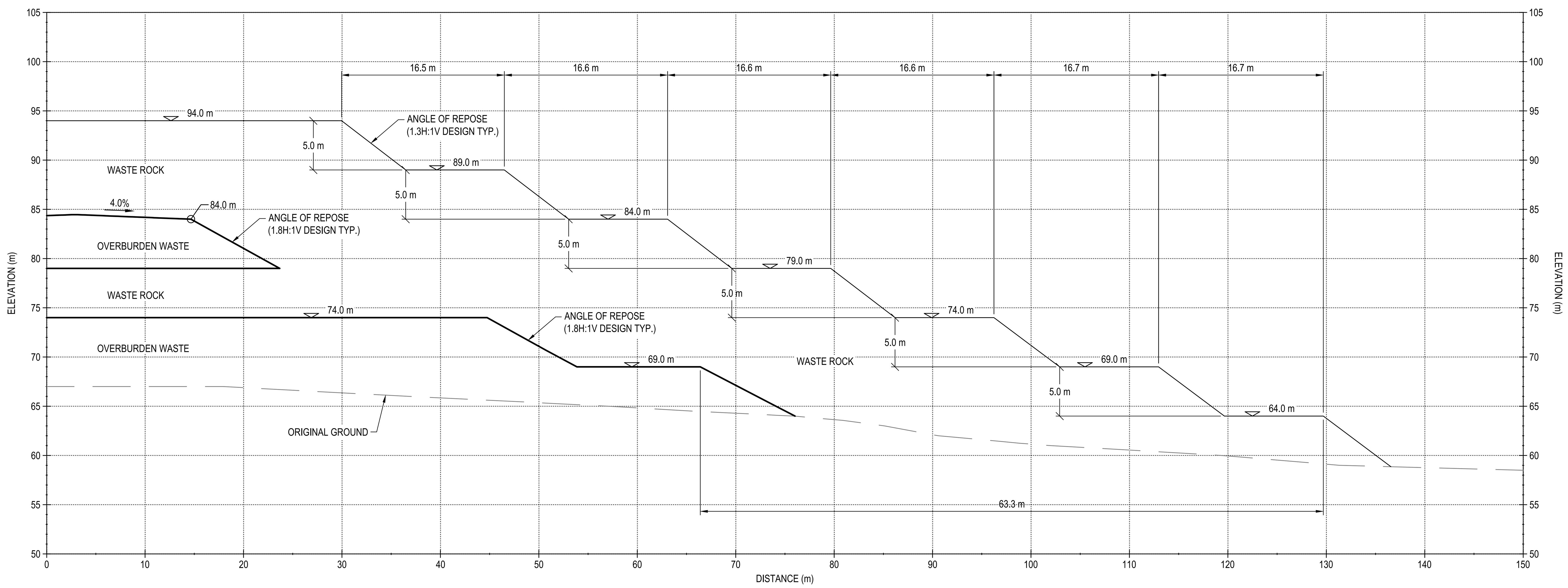

A / 003 SECTION
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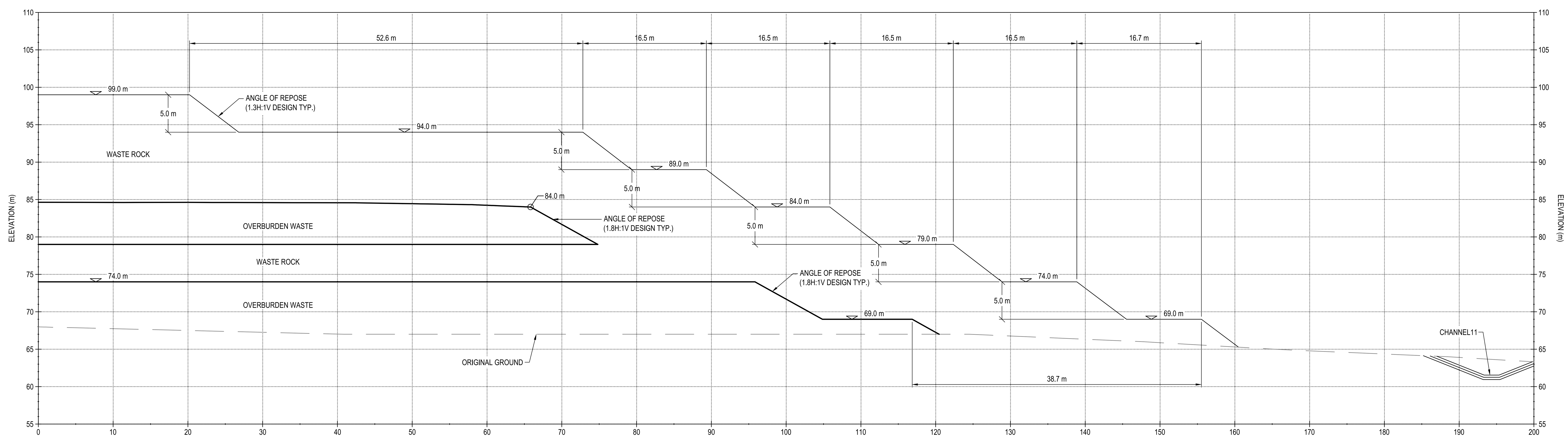
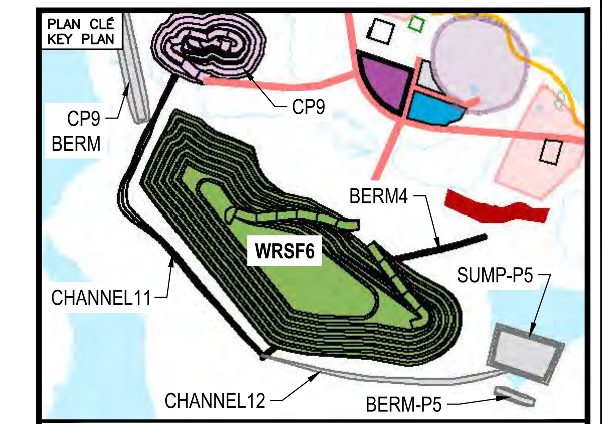


B / 003 SECTION
SCALE: 1:300

PLAN CLÉ / KEY PLAN



TETRA TECH

NOTES GÉNÉRALES / GENERAL NOTES

1. THE WRSF6 DESIGN PRESENTED HEREIN HAS BEEN BASED ON THE WASTE ROCK AND OVERBURDEN PRODUCTION PLAN THAT WAS PROVIDED ON JULY 17, 2024 AND THE CORRESPONDING PRELIMINARY WASTE ROCK AND OVERBURDEN DEPOSITION PLAN THAT WAS DEVELOPED FOR THE DESIGN OF WRSF6. THE WRSF6 DESIGN SHOULD BE REVIEWED OR UPDATED (IF REQUIRED) IF THE FINAL WASTE ROCK AND OVERBURDEN PLACEMENT PLAN FOR WRSF6 ESPECIALLY THE PLACEMENT PLAN FOR THE INITIAL BENCHES (69 m AND 74 m) OF THE WASTE ROCK AND OVERBURDEN IS DIFFERENT FROM THAT USED IN THE DESIGN.
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5. TO REDUCE THE RISK OF THE FORMATION OF DEPRESSION ZONES AND POTENTIAL WATER PONDING, THE FINAL LIFT OF THE OVERBURDEN MATERIAL COULD BE PLACED WITH A SLOPE OF MINIMUM 4% FROM THE CENTER OF THE PILE TO THE PERIMETER.

REGISTERED PROFESSIONAL ENGINEER — LICENSEE — NT/NU — 2024-12-13

PERMIT TO PRACTICE
TETRA TECH CANADA INC.
Signature
Date 2024-12-13
PERMIT NUMBER: P 018
NT/NU Association of Professional Engineers and Geoscientists

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
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AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
0	2024-12-13	ISSUED FOR CONSTRUCTION	HX	HX	

REVISIONS

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TITRE / TITLE
AGNICO EAGLE MELIADINE GOLD MINE

MELIADINE WRSF6 DETAILED DESIGN:
SECTIONS A AND B

DESSINÉ PAR / DRAWN BY	EL	DATE 2024-12-13
VÉRIFIÉ PAR / CHECKED BY	HX	2024-12-13
APPROUVÉ PAR / APPROVED BY	HX	2024-12-13
ÉCHELLE / SCALE	1:300	DATE 2024-12-13
NO. DESSIN / DRAWING NO.	65-686-230-004	
NO. PROJET / PROJECT NO. 6542	REVISION 0	FEUILLE / SHT 2 / 12

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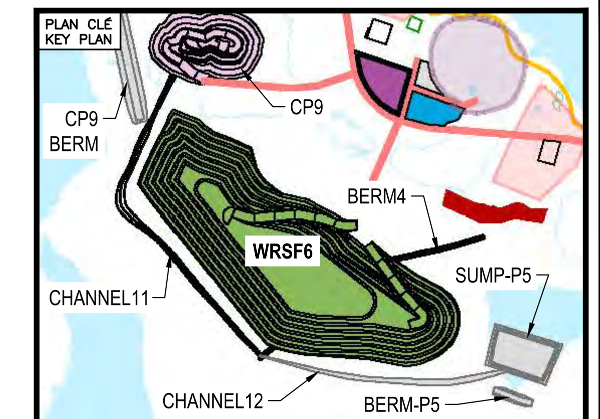

TETRA TECH

NOTES GÉNÉRALES / GENERAL NOTES

1. THE WRFS6 DESIGN PRESENTED HEREIN HAS BEEN BASED ON THE WASTE ROCK AND OVERBURDEN PRODUCTION PLAN THAT WAS PROVIDED ON JULY 17, 2024 AND THE CORRESPONDING PRELIMINARY WASTE ROCK AND OVERBURDEN DEPOSITION PLAN THAT WAS DEVELOPED FOR THE DESIGN OF WRSF6. THE WRSF6 DESIGN SHOULD BE REVIEWED OR UPDATED (IF REQUIRED) IF THE FINAL WASTE ROCK AND OVERBURDEN PLACEMENT PLAN FOR WRSF6 ESPECIALLY THE PLACEMENT PLAN FOR THE INITIAL BENCHES (69 m AND 74 m) OF THE WASTE ROCK AND OVERBURDEN IS DIFFERENT FROM THAT USED IN THE DESIGN.
2. THE MAXIMUM LIFT THICKNESS IN WRSF6 PLACEMENT SHOULD BE LIMITED TO 2.5 m FOR THE OVERBURDEN WASTE AND TO 5.0 m FOR THE WASTE ROCK.
3. ANY SNOW WITHIN THE FOOTPRINT OF WRSF6 SHOULD BE COMPLETED REMOVED PRIOR TO PLACEMENT OF OVERBURDEN WASTE AND WASTE ROCK IN WRSF6.
4. WASTE ROCK IDENTIFIED AS PAG WILL BE ENCAPSULATED WITHIN THE CENTER OF WRSF6. THE PAG STORAGE AREAS WILL BE LOCATED AT MINIMUM 15 m, IN A HORIZONTAL DISTANCE, FROM THE EDGE OF WRSF6.
5. TO REDUCE THE RISK OF THE FORMATION OF DEPRESSION ZONES AND POTENTIAL WATER PONDING, THE FINAL LIFT OF THE OVERBURDEN MATERIAL COULD BE PLACED WITH A SLOPE OF MINIMUM 4% FROM THE CENTER OF THE PILE TO THE PERIMETER.

REGISTERED PROFESSIONAL ENGINEER
H. XIA
LICENSEE
NTNU
2024-12-13

PERMIT TO PRACTICE
TETRA TECH CANADA INC.
Signature
Date 2024-12-13
PERMIT NUMBER: P 018
NT/NU Association of Professional Engineers and Geoscientists

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
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AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
0	2024-12-13	ISSUED FOR CONSTRUCTION	HX	HX	

REVISIONS

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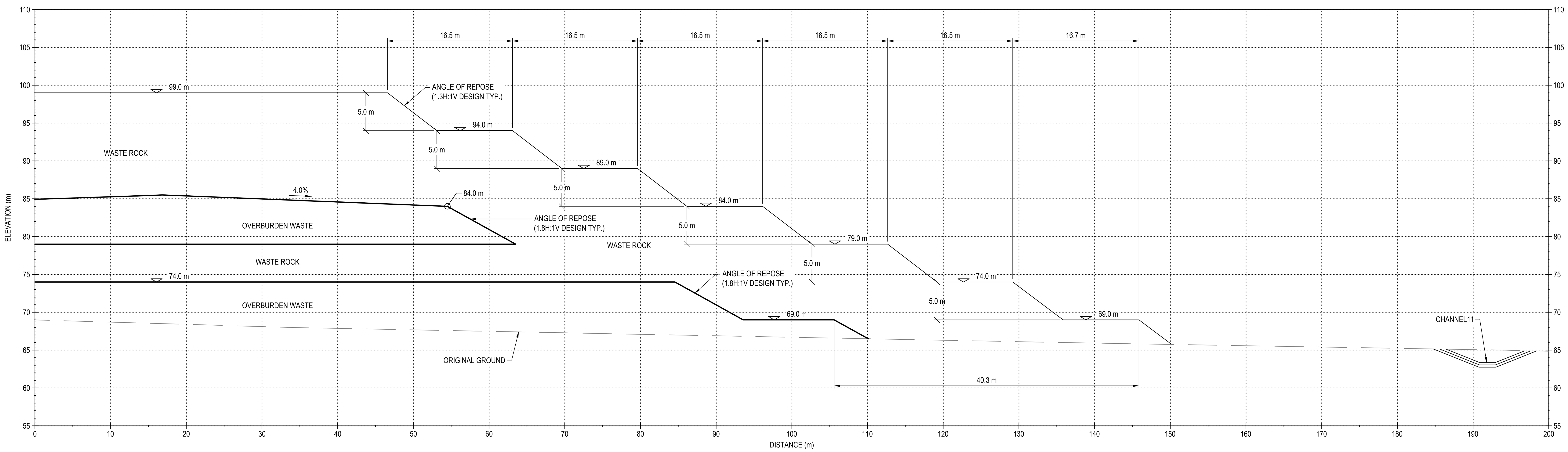
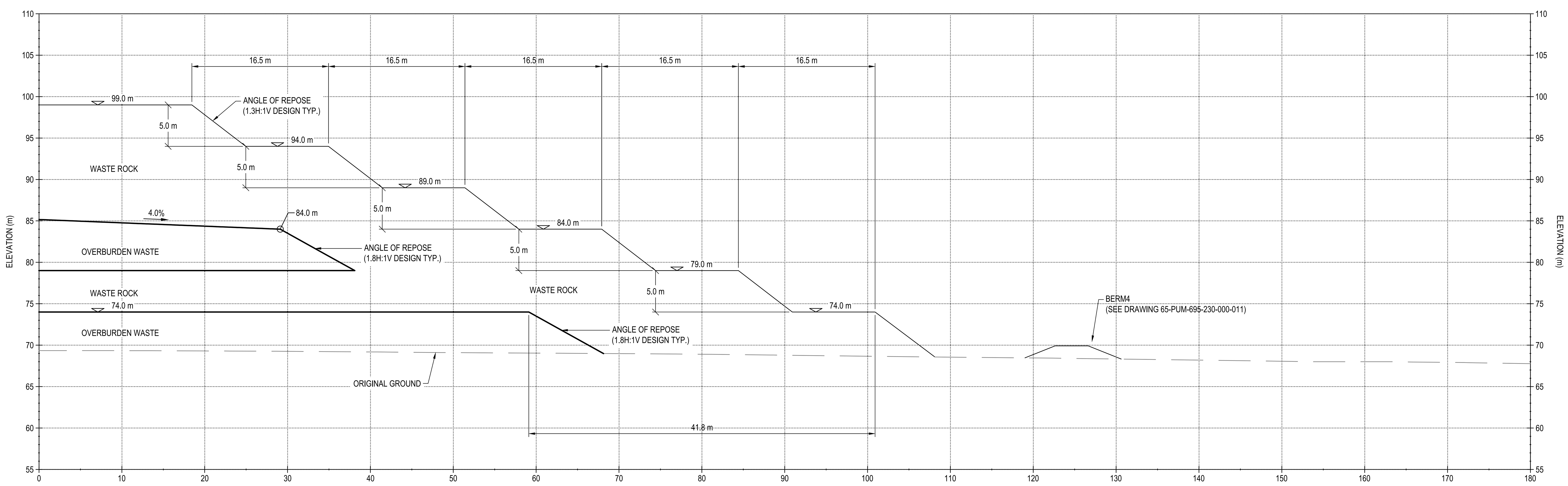
TITRE / TITLE
AGNICO EAGLE MELIADINE GOLD MINE

MELIADINE WRSF6 DETAILED DESIGN: SECTIONS C AND D

DESSINÉ PAR DRAWN BY	EL	DATE 2024-12-13
VERIFIÉ PAR CHECKED BY	HX	2024-12-13
APPROUVÉ PAR APPROVED BY	HX	2024-12-13
ÉCHELLE SCALE 1:300		DATE 2024-12-13
NO. DESSIN DRAWING NO.	65-686-230-005	
NO. PROJET PROJECT NO. 6542	REVISION 0	FEUILLE / SHT 3 / 12



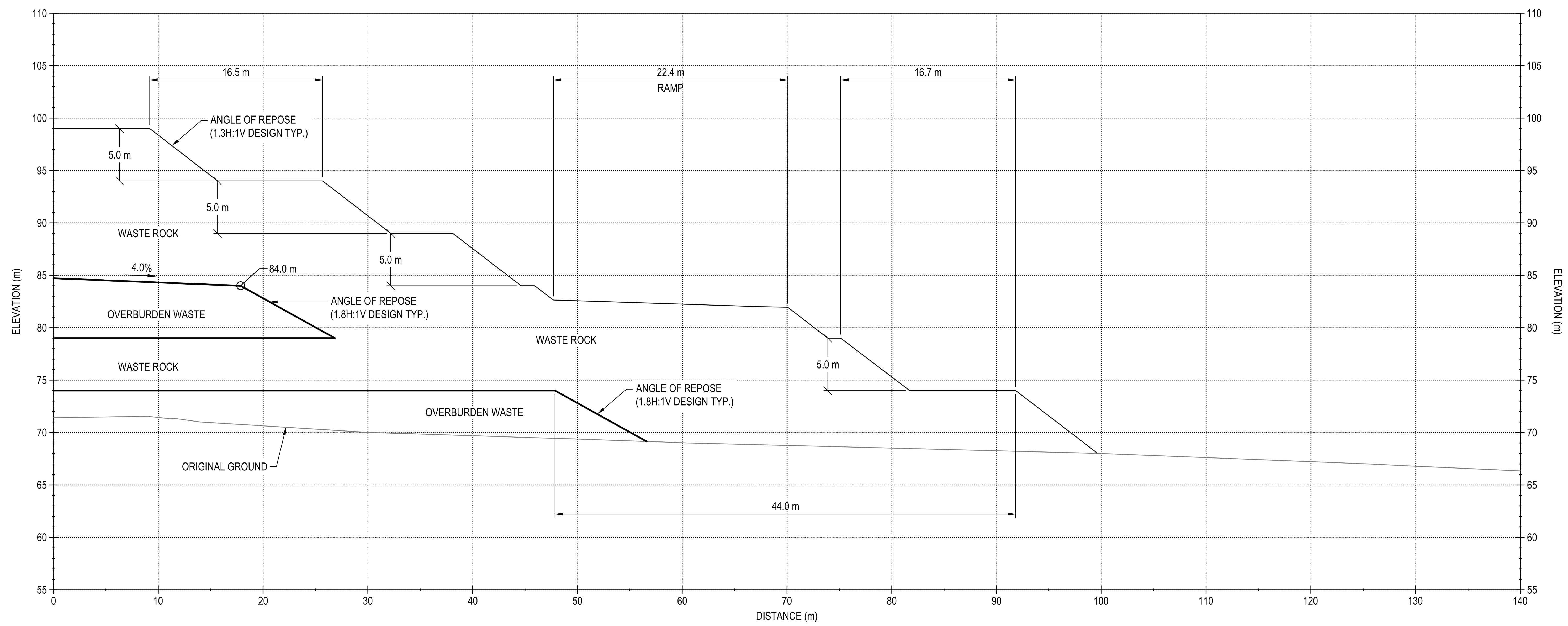
C 003 SECTION
SCALE: 1:300



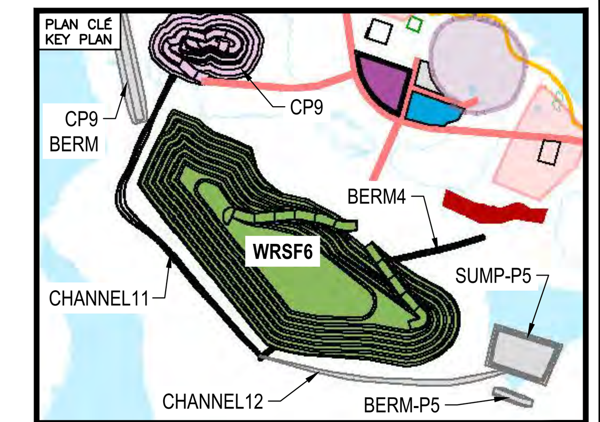
D 003 SECTION
SCALE: 1:300

NO. DESSIN DRAWING NO. 65-686-230-006

FORMAT ARCHD



E 003 SECTION
SCALE: 1:300



TETRA TECH

NOTES GÉNÉRALES / GENERAL NOTES

1. THE WRFS6 DESIGN PRESENTED HEREIN HAS BEEN BASED ON THE WASTE ROCK AND OVERBURDEN PRODUCTION PLAN THAT WAS PROVIDED ON JULY 17, 2024 AND THE CORRESPONDING PRELIMINARY WASTE ROCK AND OVERBURDEN DEPOSITION PLAN THAT WAS DEVELOPED FOR THE DESIGN OF WRSF6. THE WRSF6 DESIGN SHOULD BE REVIEWED OR UPDATED (IF REQUIRED) IF THE FINAL WASTE ROCK AND OVERBURDEN PLACEMENT PLAN FOR WRSF6 ESPECIALLY THE PLACEMENT PLAN FOR THE INITIAL BENCHES (69 m AND 74 m) OF THE WASTE ROCK AND OVERBURDEN IS DIFFERENT FROM THAT USED IN THE DESIGN.
2. THE MAXIMUM LIFT THICKNESS IN WRSF6 PLACEMENT SHOULD BE LIMITED TO 2.5 m FOR THE OVERBURDEN WASTE AND TO 5.0 m FOR THE WASTE ROCK.
3. ANY SNOW WITHIN THE FOOTPRINT OF WRSF6 SHOULD BE COMPLETED REMOVED PRIOR TO PLACEMENT OF OVERBURDEN WASTE AND WASTE ROCK IN WRSF6.
4. WASTE ROCK IDENTIFIED AS PAG WILL BE ENCAPSULATED WITHIN THE CENTER OF WRSF6. THE PAG STORAGE AREAS WILL BE LOCATED AT MINIMUM 15 m, IN A HORIZONTAL DISTANCE, FROM THE EDGE OF WRSF6.
5. TO REDUCE THE RISK OF THE FORMATION OF DEPRESSION ZONES AND POTENTIAL WATER PONDING, THE FINAL LIFT OF THE OVERBURDEN MATERIAL COULD BE PLACED WITH A SLOPE OF MINIMUM 4% FROM THE CENTER OF THE PILE TO THE PERIMETER.

REGISTERED PROFESSIONAL ENGINEER H. XIA LICENSEE NT/NU 2024-12-13

PERMIT TO PRACTICE
TETRA TECH CANADA INC.
Signature
Date 2024-12-13
PERMIT NUMBER: P 018
NT/NU Association of Professional Engineers and Geoscientists

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
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AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
0	2024-12-13	ISSUED FOR CONSTRUCTION	HX	HX	

REVISIONS

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TITRE / TITLE
AGNICO EAGLE MELIADINE GOLD MINE

MELIADINE WRSF6 DETAILED DESIGN: SECTIONS E

DESSINÉ PAR DRAWN BY	EL	DATE 2024-12-13
VÉRIFIÉ PAR CHECKED BY	HX	2024-12-13
APPROUVÉ PAR APPROVED BY	HX	2024-12-13
ÉCHELLE SCALE	1:300	DATE 2024-12-13

NO. DESSIN DRAWING NO. 65-686-230-006

NO. PROJET PROJECT NO.	REVISION	FEUILLE / SHT
6542	0	4 / 12

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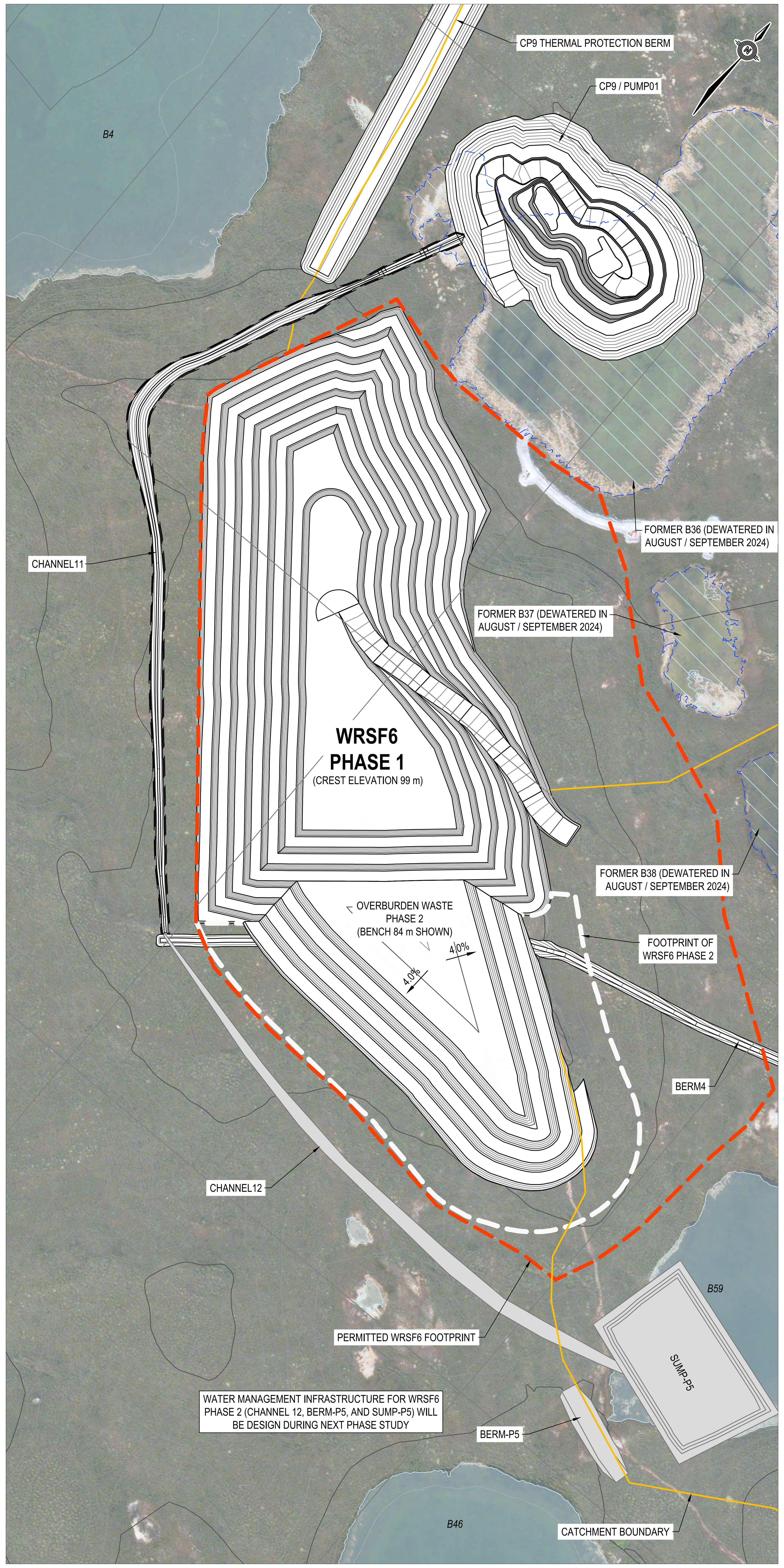
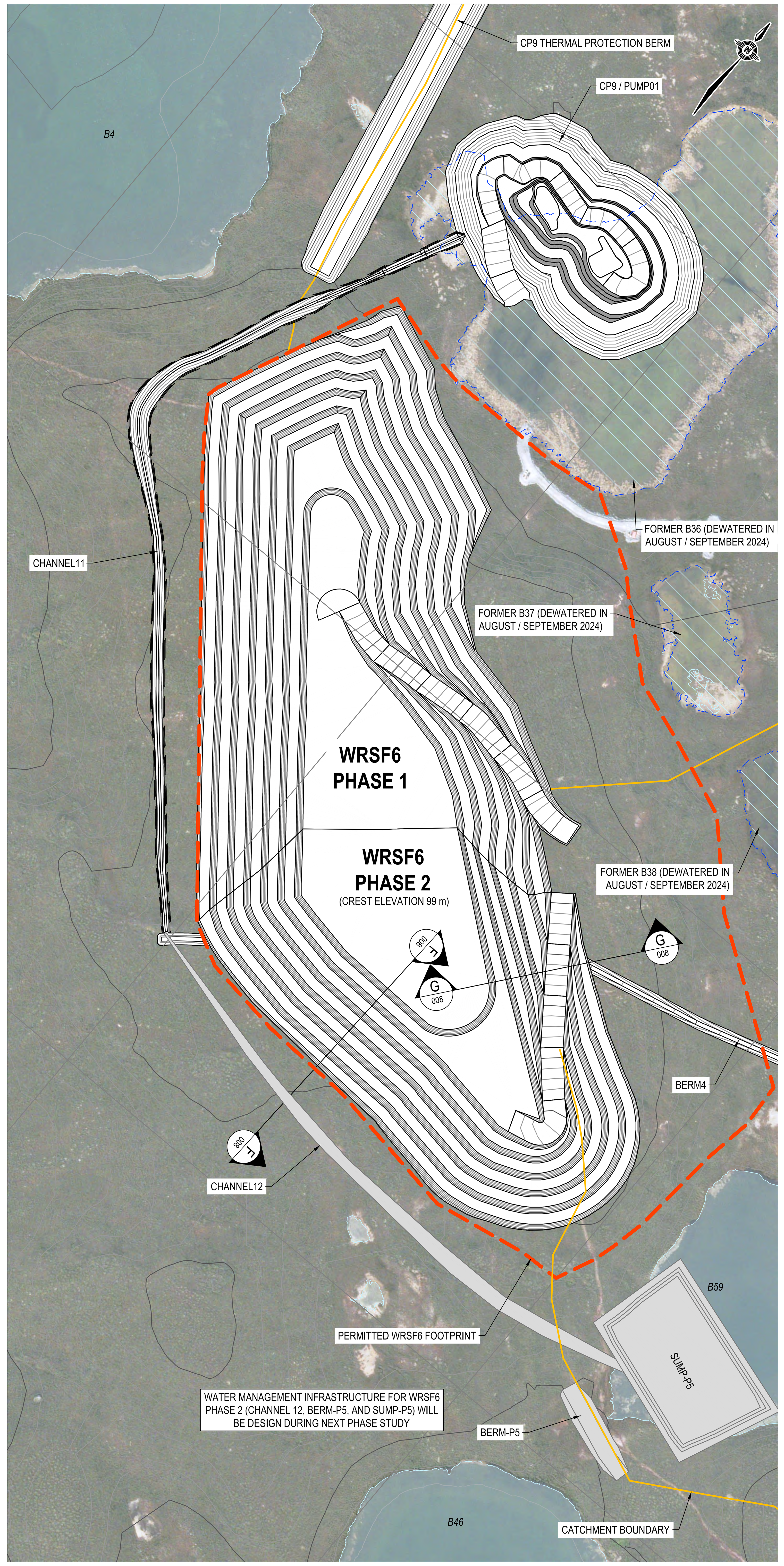
FILE NO. 65-686-230-006.dwg

NO. DESSIN / DRAWING NO. 65-686-230-007



INTERNAL DESIGN GEOMETRY OF OVERBURDEN WASTE IN WRSF6 PHASE 2

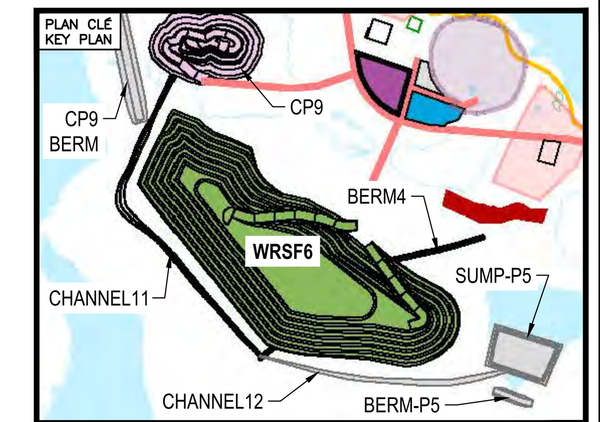
SCALE = 1:3000



DESIGN GEOMETRY OF WASTE ROCK OUTSIDE SHELL FOR WRSF6 PHASE 2

SCALE = 1:3000

PLAN CLÉ / KEY PLAN



TETRA TECH

NOTES GÉNÉRALES / GENERAL NOTES

1. THE WRFS6 DESIGN PRESENTED HEREIN HAS BEEN BASED ON THE WASTE ROCK AND OVERBURDEN PRODUCTION PLAN THAT WAS PROVIDED ON JULY 17, 2024 AND THE CORRESPONDING PRELIMINARY WASTE ROCK AND OVERBURDEN DEPOSITION PLAN THAT WAS DEVELOPED FOR THE DESIGN OF WRSF6. THE WRSF6 DESIGN SHOULD BE REVIEWED OR UPDATED (IF REQUIRED) IF THE FINAL WASTE ROCK AND OVERBURDEN PLACEMENT PLAN FOR WRSF6 ESPECIALLY THE PLACEMENT PLAN FOR THE INITIAL BENCHES (69 m AND 74 m) OF THE WASTE ROCK AND OVERBURDEN IS DIFFERENT FROM THAT USED IN THE DESIGN.
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REGISTERED PROFESSIONAL ENGINEER H. XIA LICENSEE NT/NU 2024-12-13

PERMIT TO PRACTICE
TETRA TECH CANADA INC.
Signature
Date 2024-12-13
PERMIT NUMBER: P 018
NT/NU Association of Professional Engineers and Geoscientists

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
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AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
0	2024-12-13	ISSUED FOR CONSTRUCTION	HX	HX	

REVISIONS

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TITRE / TITLE

AGNICO EAGLE MELIADINE GOLD MINE

MELIADINE WRSF6 DETAILED DESIGN: PHASE 2 PLAN VIEW

DESSINÉ PAR / DRAWN BY	EL	DATE	2024-12-13
VÉRIFIÉ PAR / CHECKED BY	HX		2024-12-13
APPROUVÉ PAR / APPROVED BY	HX		2024-12-13
ÉCHELLE / SCALE	1:3000	DATE	2024-12-13
NO. DESSIN / DRAWING NO.	65-686-230-007		
NO. PROJET / PROJECT NO.	6542	REVISION 0	FEUILLE / SHT 5 / 12

FORMAT ARCHD

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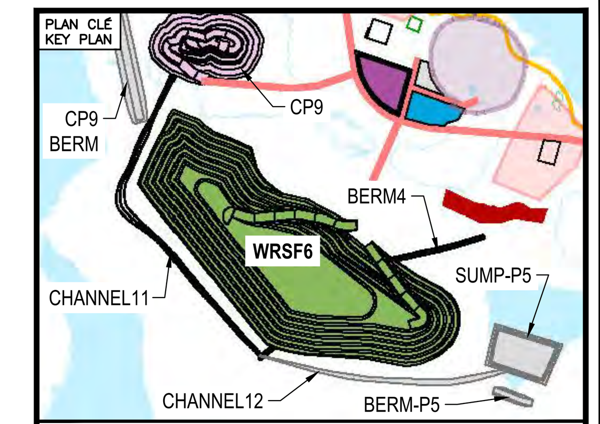
FILE NO. 65-686-230-007.dwg

NO. DESSIN / DRAWING NO. 65-686-230-008

FORMAT ARCHD



TETRA TECH

NOTES GÉNÉRALES / GENERAL NOTES

1. THE WRSF6 DESIGN PRESENTED HEREIN HAS BEEN BASED ON THE WASTE ROCK AND OVERBURDEN PRODUCTION PLAN THAT WAS PROVIDED ON JULY 17, 2024 AND THE CORRESPONDING PRELIMINARY WASTE ROCK AND OVERBURDEN DEPOSITION PLAN THAT WAS DEVELOPED FOR THE DESIGN OF WRSF6. THE WRSF6 DESIGN SHOULD BE REVIEWED OR UPDATED (IF REQUIRED) IF THE FINAL WASTE ROCK AND OVERBURDEN PLACEMENT PLAN FOR WRSF6 ESPECIALLY THE PLACEMENT PLAN FOR THE INITIAL BENCHES (69 m AND 74 m) OF THE WASTE ROCK AND OVERBURDEN IS DIFFERENT FROM THAT USED IN THE DESIGN.
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REGISTERED PROFESSIONAL ENGINEER — H. XIA — LICENSEE — NT/NU

PERMIT TO PRACTICE
TETRA TECH CANADA INC.
Signature
Date 2024-12-13
PERMIT NUMBER: P 018
NT/NU Association of Professional Engineers and Geoscientists

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
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AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
0	2024-12-13	ISSUED FOR CONSTRUCTION	HX	HX	

REVISIONS

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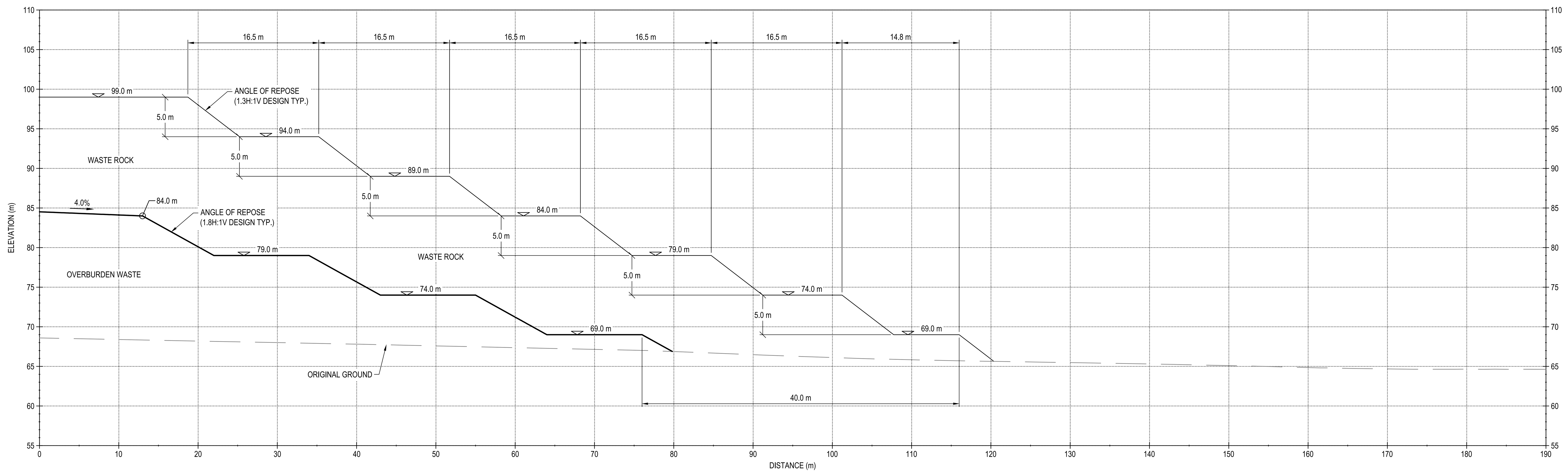
TITRE / TITLE
AGNICO EAGLE MELIADINE GOLD MINE

MELIADINE WRSF6 DETAILED DESIGN: SECTIONS F AND G

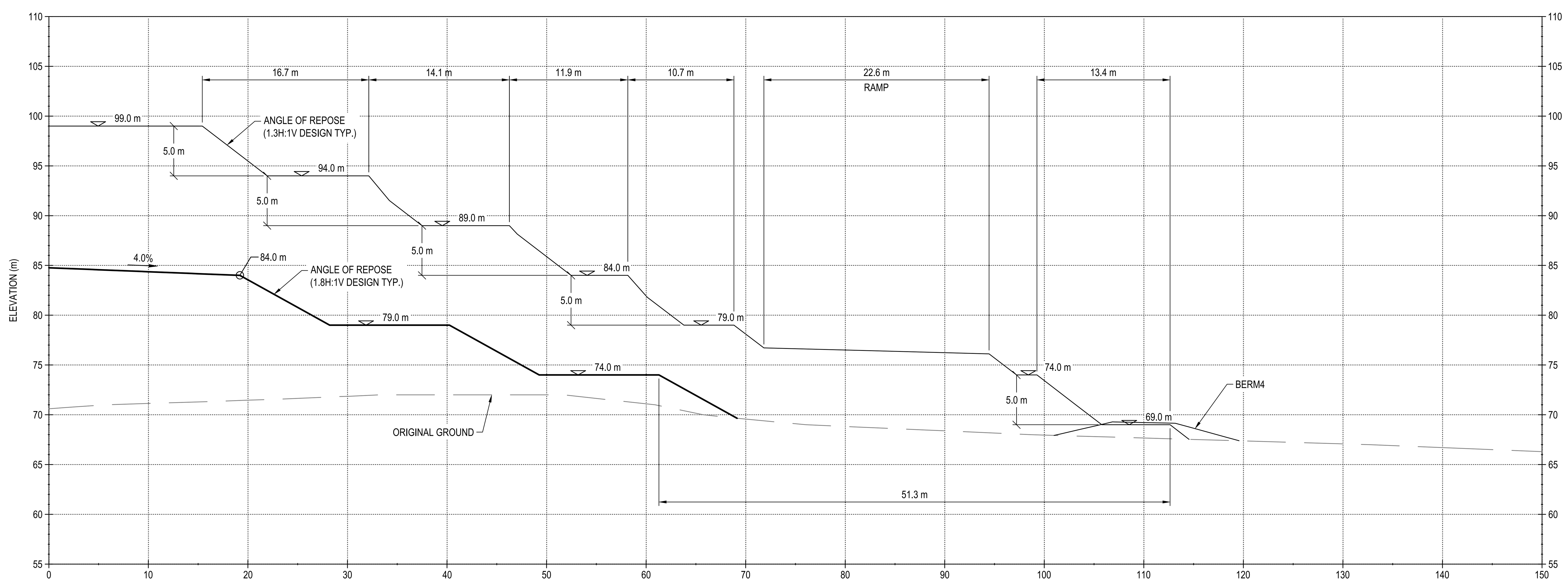
DESSINÉ PAR / DRAWN BY	EL	DATE	2024-12-13
VÉRIFIÉ PAR / CHECKED BY	HX		2024-12-13
APPROUVÉ PAR / APPROVED BY	HX		2024-12-13
ÉCHELLE / SCALE	1:300	DATE	2024-12-13

NO. DESSIN / DRAWING NO. 65-686-230-008

NO. PROJET / PROJECT NO.	REVISION	FEUILLE / SHT
6542	0	6 / 12



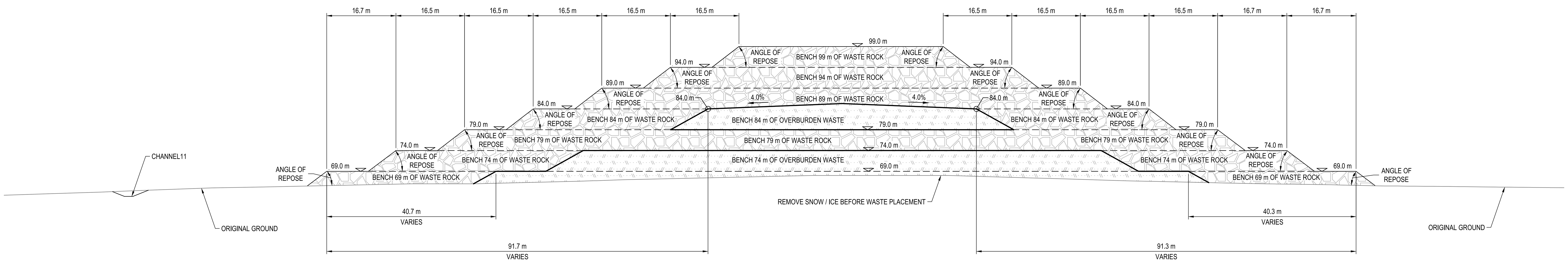
C 007 SECTION
SCALE: 1:300



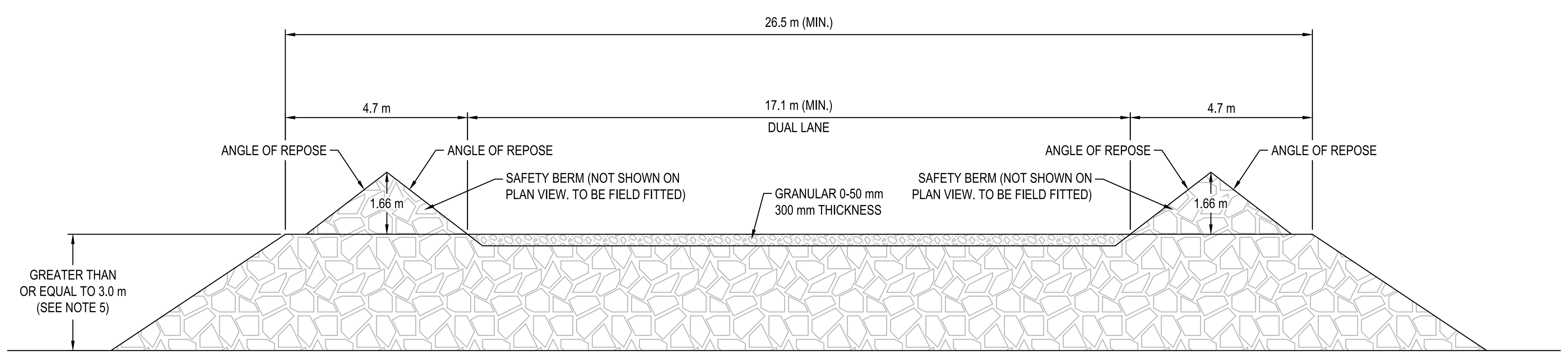
D 007 SECTION
SCALE: 1:300

NO. DESSIN
DRAWING NO. 65-686-230-009

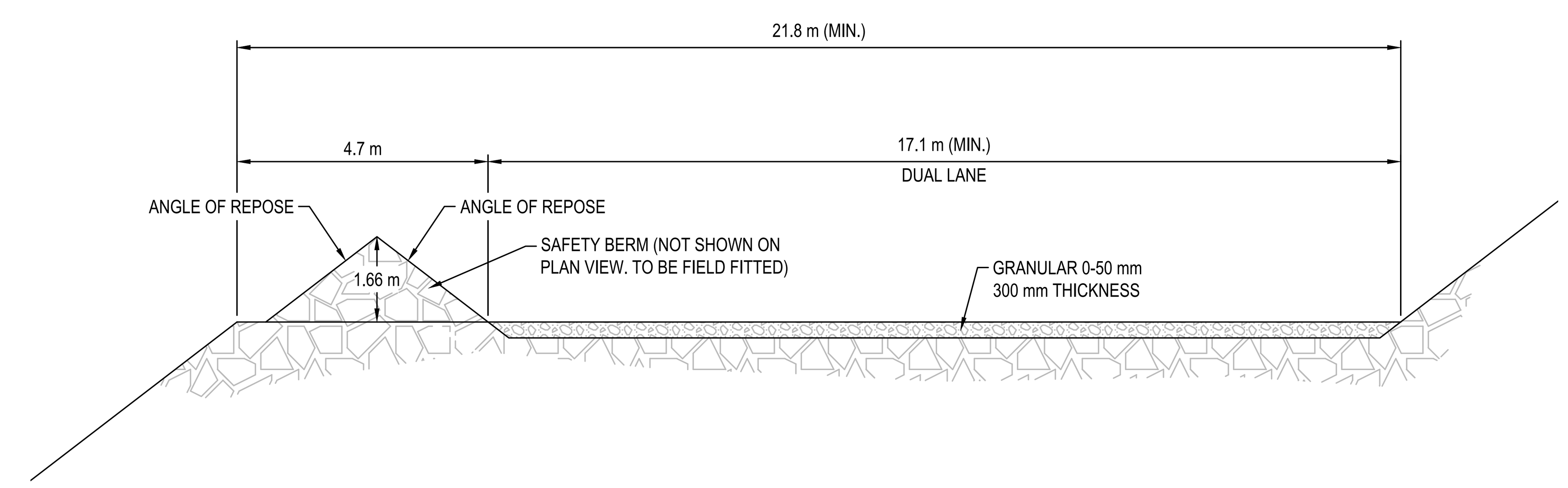
FORMAT ARCHD



TYPICAL SECTION WITHOUT ACCESS RAMP
N.T.S.

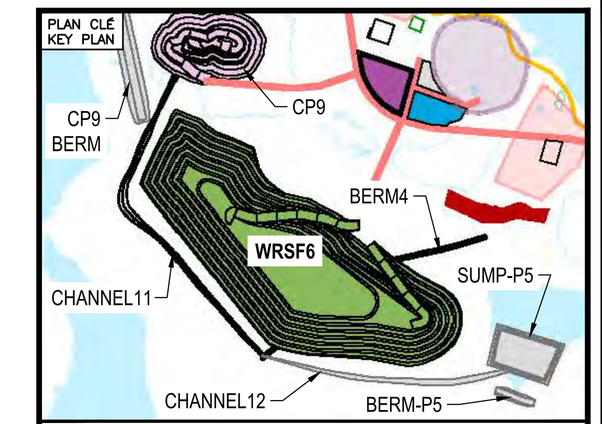


TYPICAL ACCESS RAMP FOR HAUL ROAD WITH TWO SIDE SAFETY BERMS
N.T.S.



TYPICAL ACCESS RAMP FOR HAUL ROAD WITH ONE SIDE SAFETY BERM
N.T.S.

PLAN CLÉ
KEY PLAN



TETRA TECH

NOTES GÉNÉRALES / GENERAL NOTES

1. THE WRSF6 DESIGN PRESENTED HEREIN HAS BEEN BASED ON THE WASTE ROCK AND OVERBURDEN PRODUCTION PLAN THAT WAS PROVIDED ON JULY 17, 2024 AND THE CORRESPONDING PRELIMINARY WASTE ROCK AND OVERBURDEN DEPOSITION PLAN THAT WAS DEVELOPED FOR THE DESIGN OF WRSF6. THE WRSF6 DESIGN SHOULD BE REVIEWED OR UPDATED (IF REQUIRED) IF THE FINAL WASTE ROCK AND OVERBURDEN PLACEMENT PLAN FOR WRSF6 ESPECIALLY THE PLACEMENT PLAN FOR THE INITIAL BENCHES (69 m AND 74 m) OF THE WASTE ROCK AND OVERBURDEN IS DIFFERENT FROM THAT USED IN THE DESIGN.
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REGISTERED PROFESSIONAL ENGINEER
LICENSEE
NT/NU

PERMIT TO PRACTICE
TETRA TECH CANADA INC.
Signature
Date 2024-12-13
PERMIT NUMBER: P 018
NT/NU Association of Professional Engineers and Geoscientists

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
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AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
0	2024-12-13	ISSUED FOR CONSTRUCTION	HX	HX	

REVISIONS

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TITRE / TITLE
AGNICO EAGLE MELIADINE GOLD MINE

MELIADINE WRSF6 DETAILED DESIGN:
TYPICAL SECTION AND ACCESS RAMP

DESSINÉ PAR DRAWN BY	EL	DATE	2024-12-13
VÉRIFIÉ PAR CHECKED BY	HX		2024-12-13
APPROUVÉ PAR APPROVED BY	HX		2024-12-13
ÉCHELLE SCALE	NOT TO SCALE	DATE	2024-12-13

NO. DESSIN DRAWING NO. 65-686-230-009

NO. PROJET PROJECT NO.	REVISION	FEUILLE / SHT
6542	0	7 / 12

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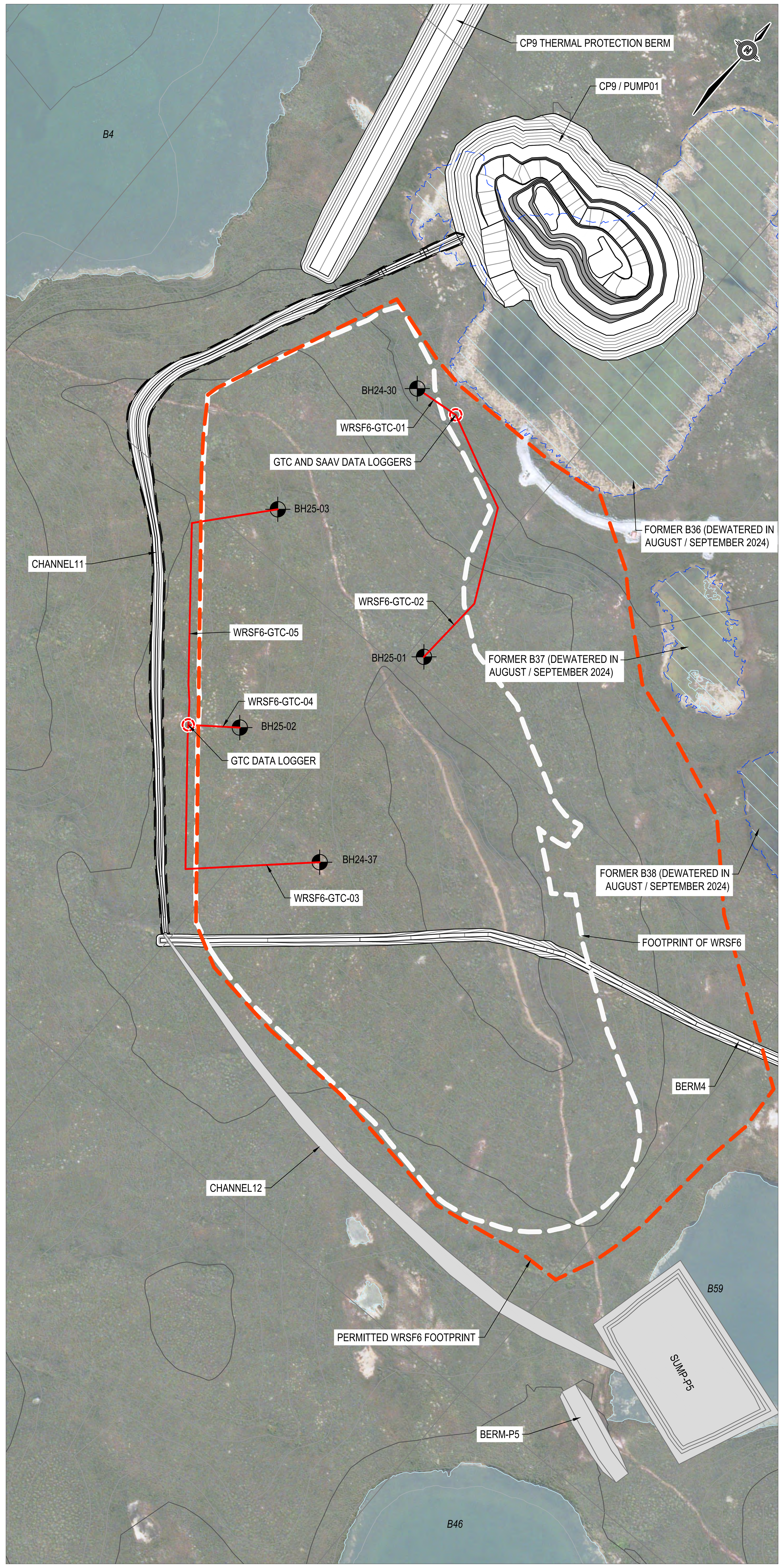
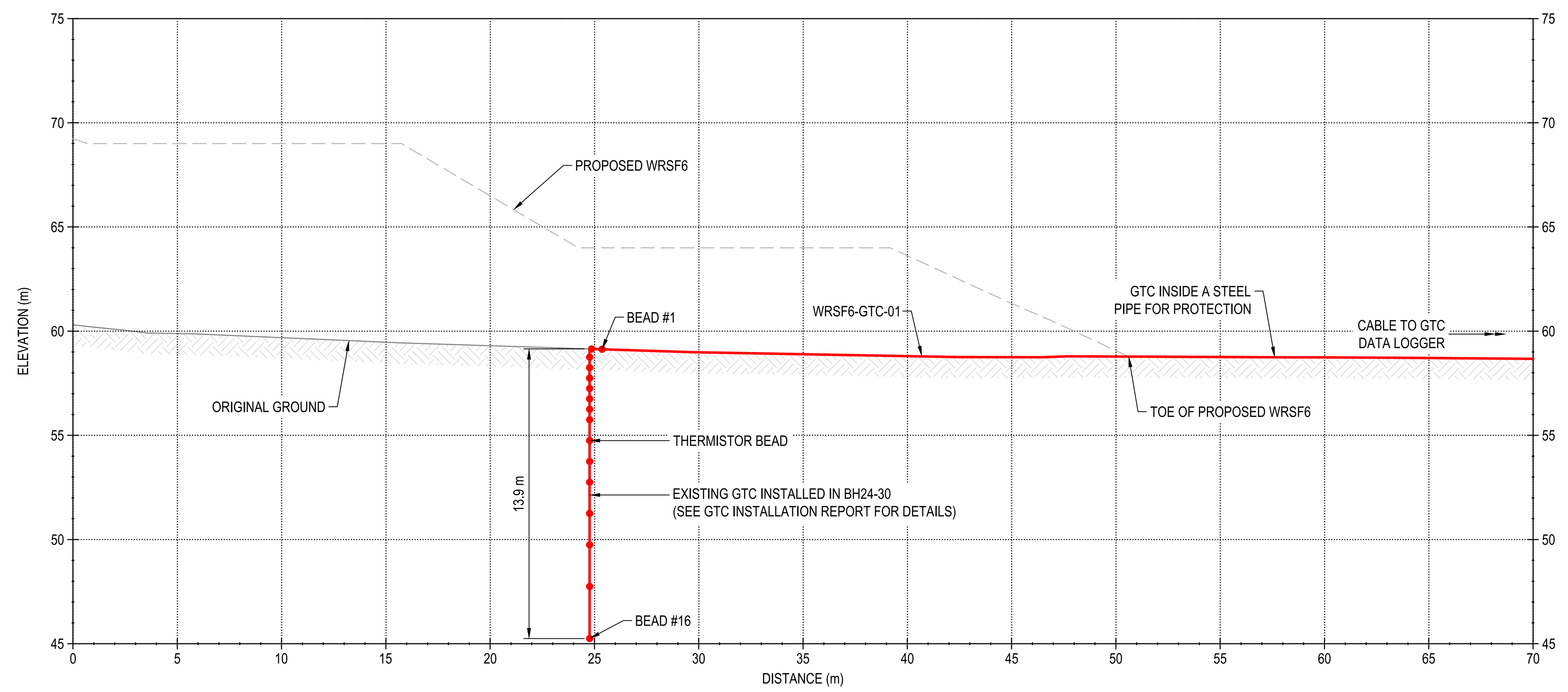


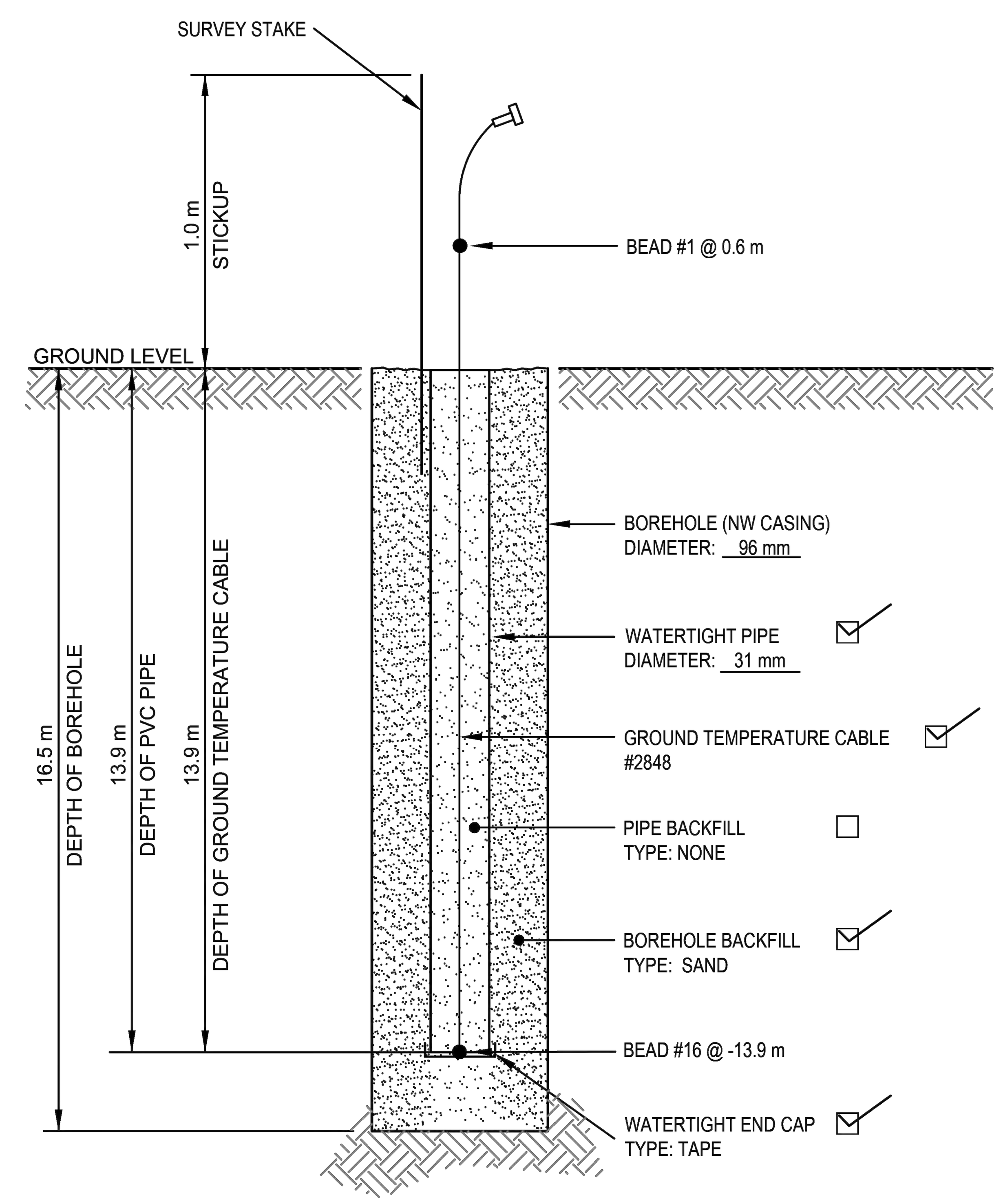
INTERNAL DESIGN GEOMETRY OF OVERBURDEN WASTE IN WRSF6 PHASE 2

SCALE = 1:3000



WRSF6-GTC-01 (BH24-30)

SCALE = 1:200



BEAD NO.	DEPTH BELOW OG
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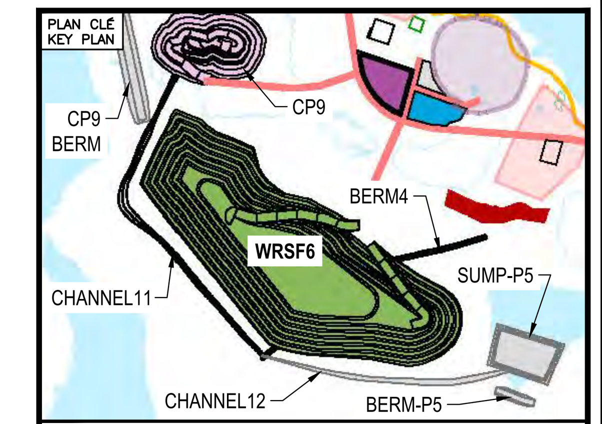
2	0.1
3	-0.4
4	-0.9
5	-1.4
6	-1.9
7	-2.4
8	-2.9
9	-3.4
10	-4.4
11	-5.4
12	-6.4
13	-7.9
14	-9.4
15	-11.4
16	-13.9

PLAN CLÉ KEY PLAN



TETRA TECH

NOTES GÉNÉRALES / GENERAL NOTES

1. A TOTAL OF 16 THERMISTOR BEADS FOR EACH GROUND TEMPERATURE CABLE.

PERMIT TO PRACTICE TETRA TECH CANADA INC.
Signature
Date 2024-12-13
PERMIT NUMBER: P 018
NT/NU Association of Professional Engineers and Geoscientists

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
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AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
0	2024-12-13	ISSUED FOR CONSTRUCTION	HX	HX	

REVISIONS

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TITRE / TITLE

AGNICO EAGLE MELIADINE GOLD MINE

MELIADINE WRSF6 DETAILED DESIGN: GROUND TEMPERATURE CABLE AND THERMISTOR BEAD LOCATIONS FOR WRSF6-GTC-01

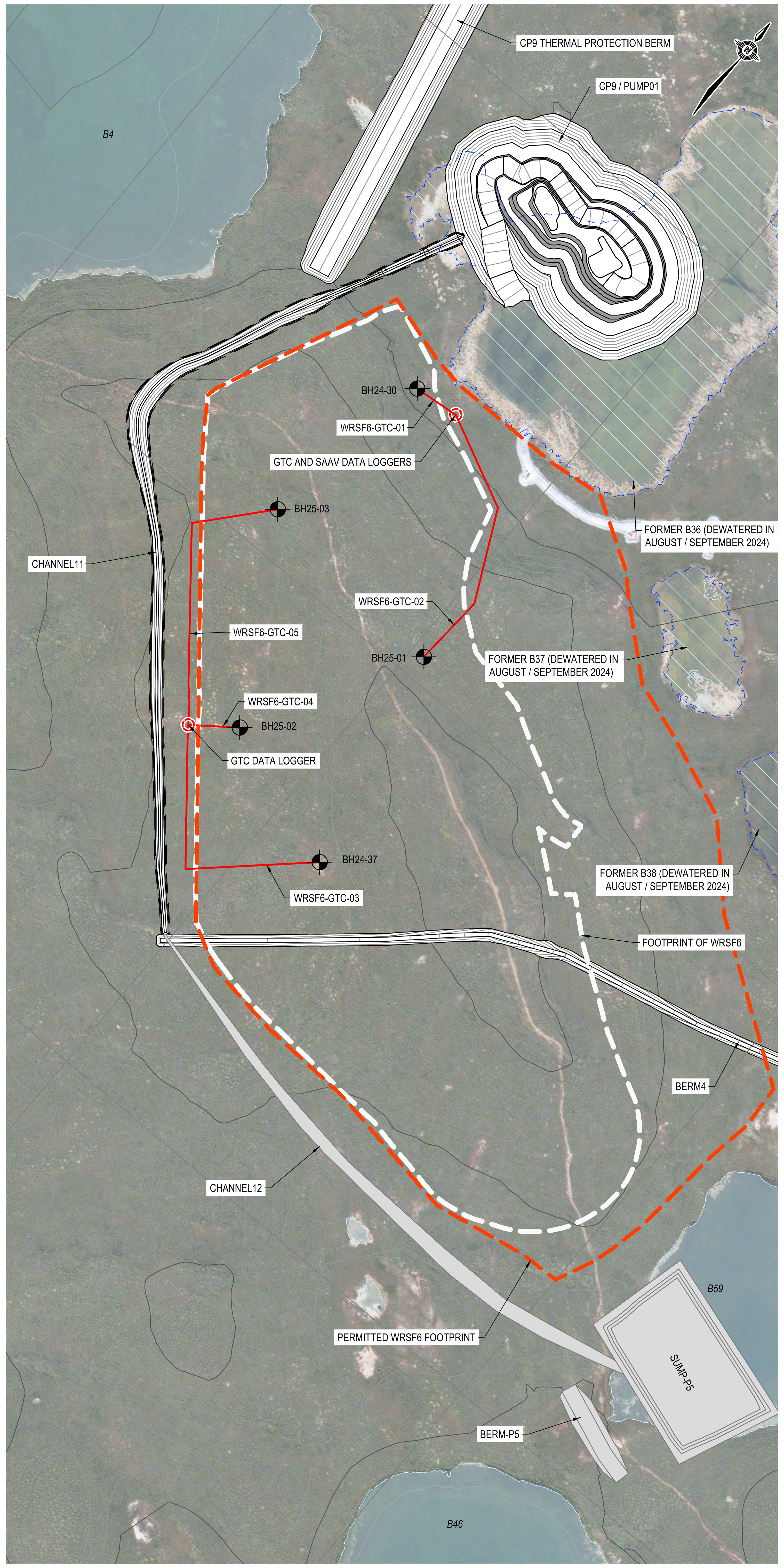
DESSINÉ PAR DRAWN BY	EL	DATE 2024-12-13
VÉRIFIÉ PAR CHECKED BY	HX	2024-12-13
APPROUVÉ PAR APPROVED BY	HX	2024-12-13
ÉCHELLE SCALE	AS SHOWN	DATE 2024-12-13

NO. DESSIN DRAWING NO. 65-686-230-010

NO. PROJET PROJECT NO. 6542 — REVISION 0 — FEUILLE / SHT 8 / 12

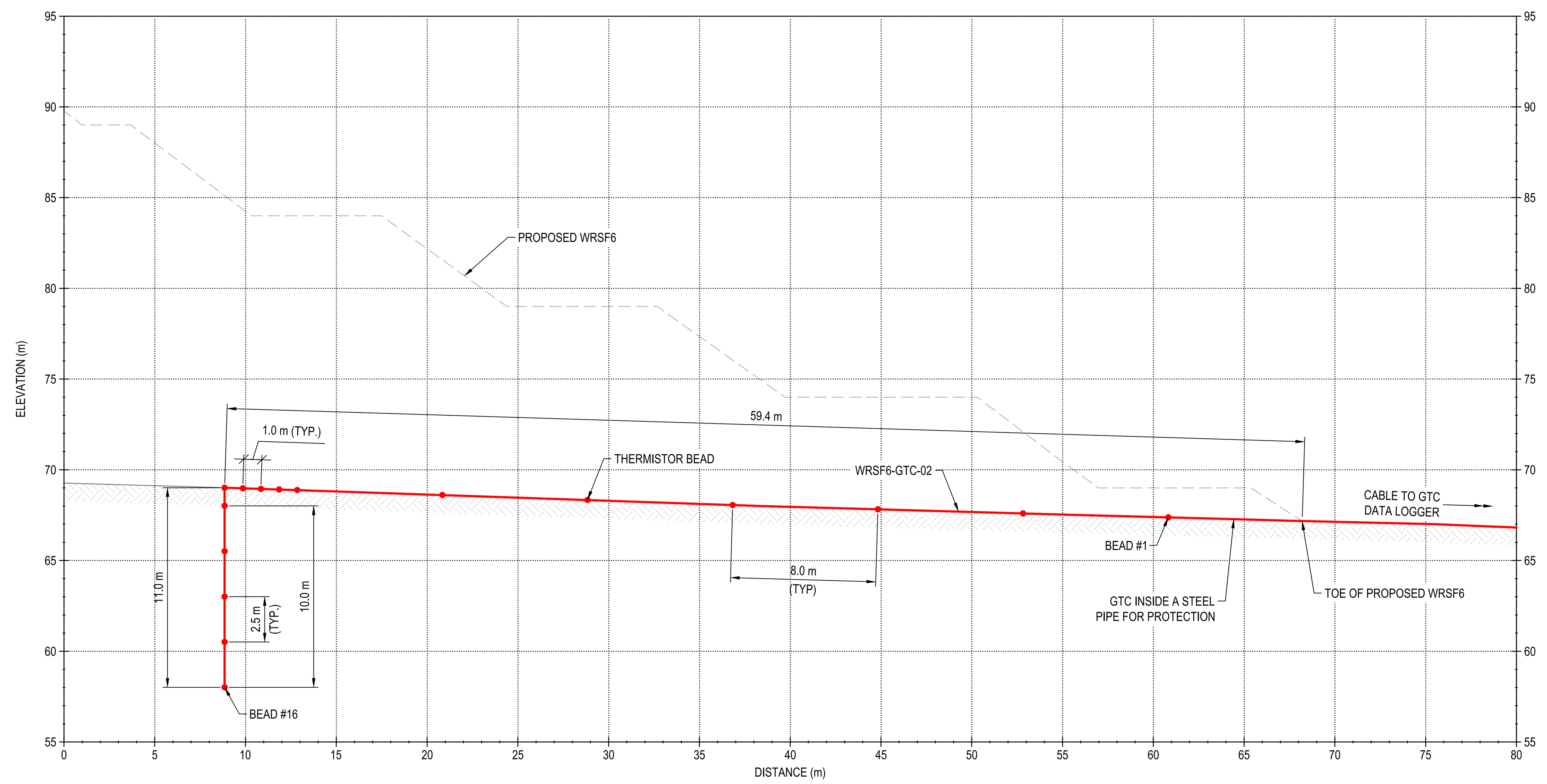
NO. DESSIN DRAWING NO. 65-686-230-011

FORMAT ARCHD



INTERNAL DESIGN GEOMETRY OF OVERBURDEN WASTE IN WRSF6 PHASE 2

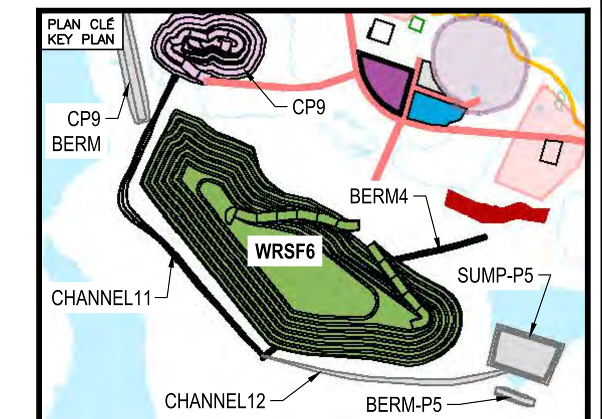
SCALE = 1:3000



WRSF6-GTC-02 (BH25-01)

SCALE = 1:200

PLAN CLÉ KEY PLAN



TETRA TECH

NOTES GÉNÉRALES / GENERAL NOTES

1. A TOTAL OF 16 THERMISTOR BEADS FOR EACH GROUND TEMPERATURE CABLE.

PERMIT TO PRACTICE TETRA TECH CANADA INC.

Signature

Date 2024-12-13

PERMIT NUMBER: P 018

NT/NU Association of Professional Engineers and Geoscientists

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
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AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
0	2024-12-13	ISSUED FOR CONSTRUCTION	HX	HX	

REVISIONS

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TITRE / TITLE

AGNICO EAGLE MELIADINE GOLD MINE

MELIADINE WRSF6 DETAILED DESIGN: GROUND TEMPERATURE CABLE AND THERMISTOR BEAD LOCATIONS FOR WRSF6-GTC-02

DESSINÉ PAR / DRAWN BY	EL	DATE 2024-12-13
VÉRIFIÉ PAR / CHECKED BY	HX	2024-12-13
APPROUVÉ PAR / APPROVED BY	HX	2024-12-13
ÉCHELLE / SCALE	AS SHOWN	DATE 2024-12-13

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NO. PROJET / PROJECT NO.	REVISION	FEUILLE / SHT
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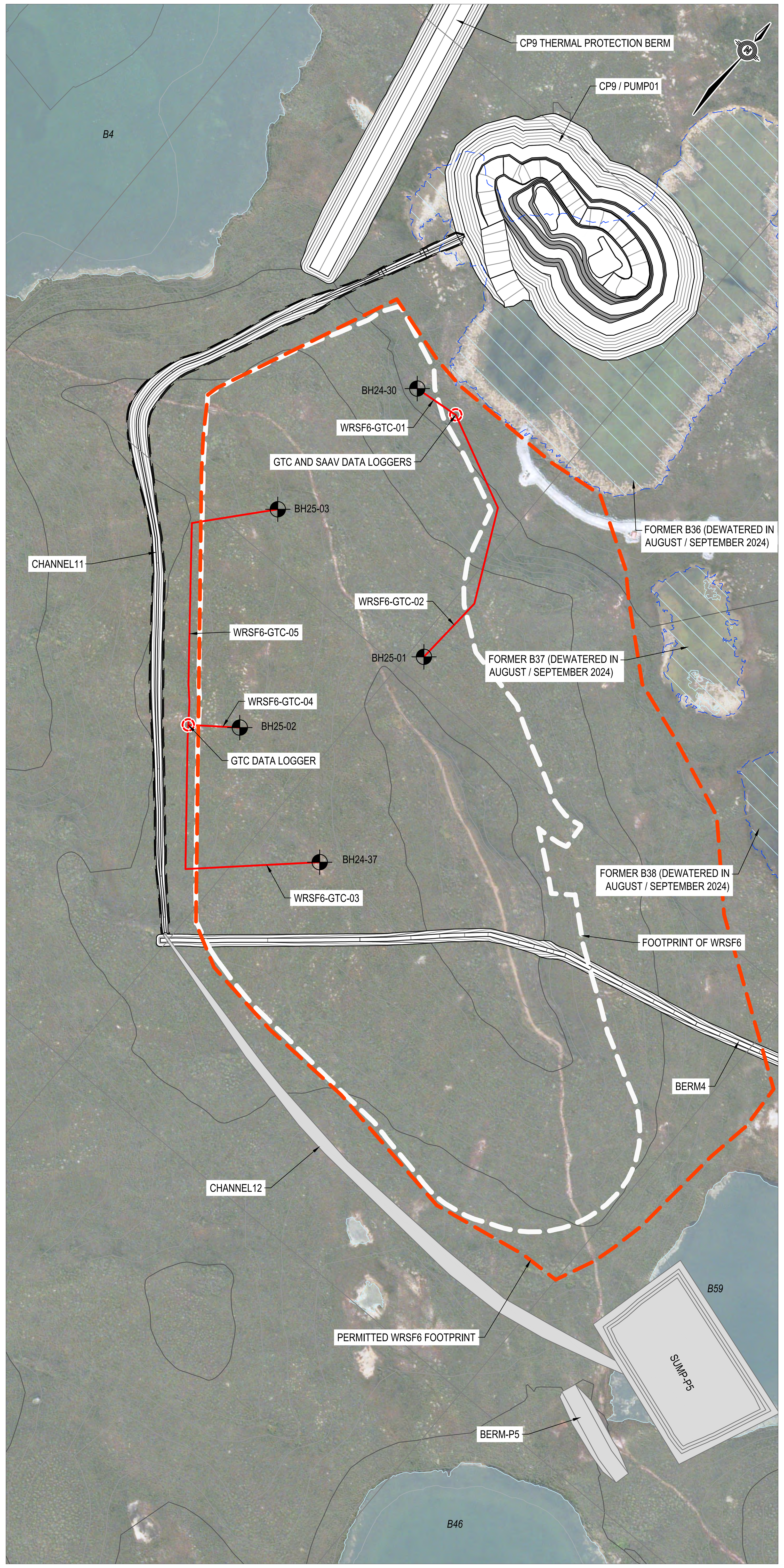

INTERNAL DESIGN GEOMETRY OF OVERBURDEN WASTE IN WRSF6 PHASE 2

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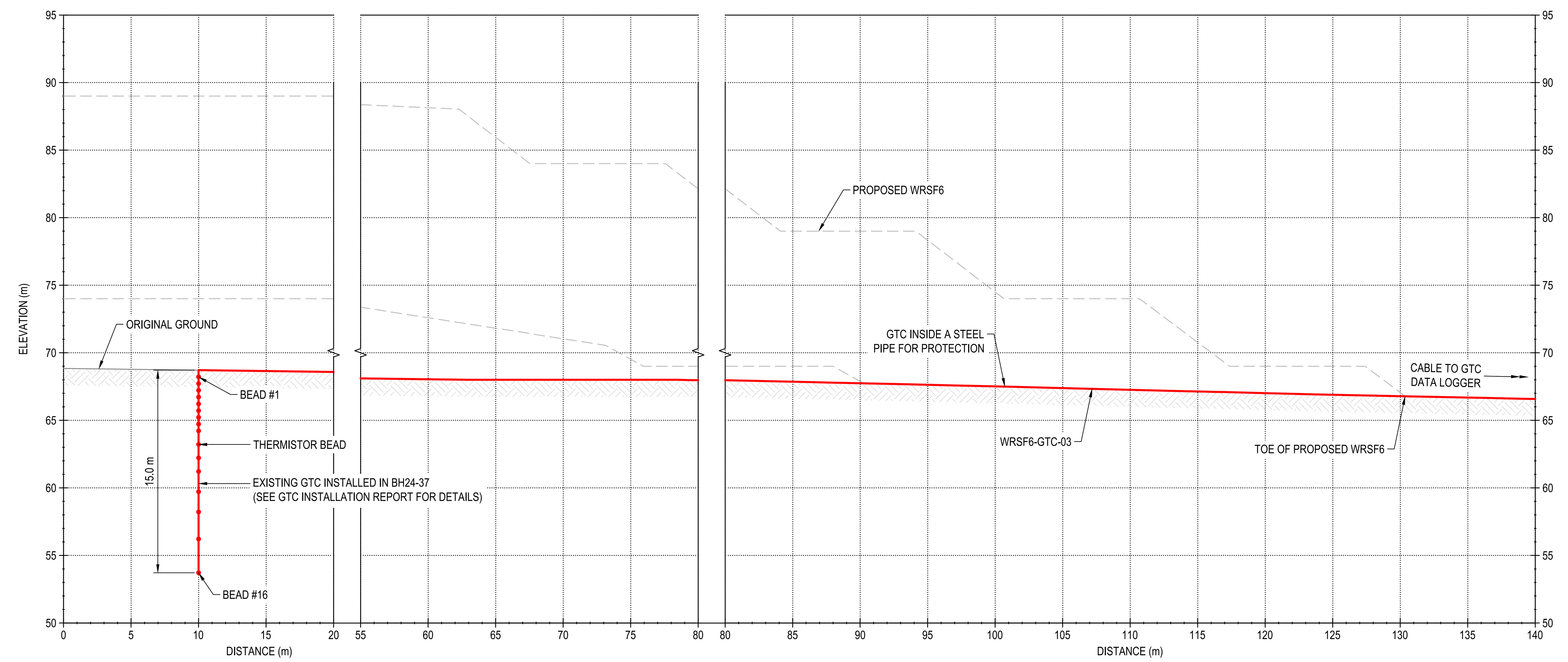

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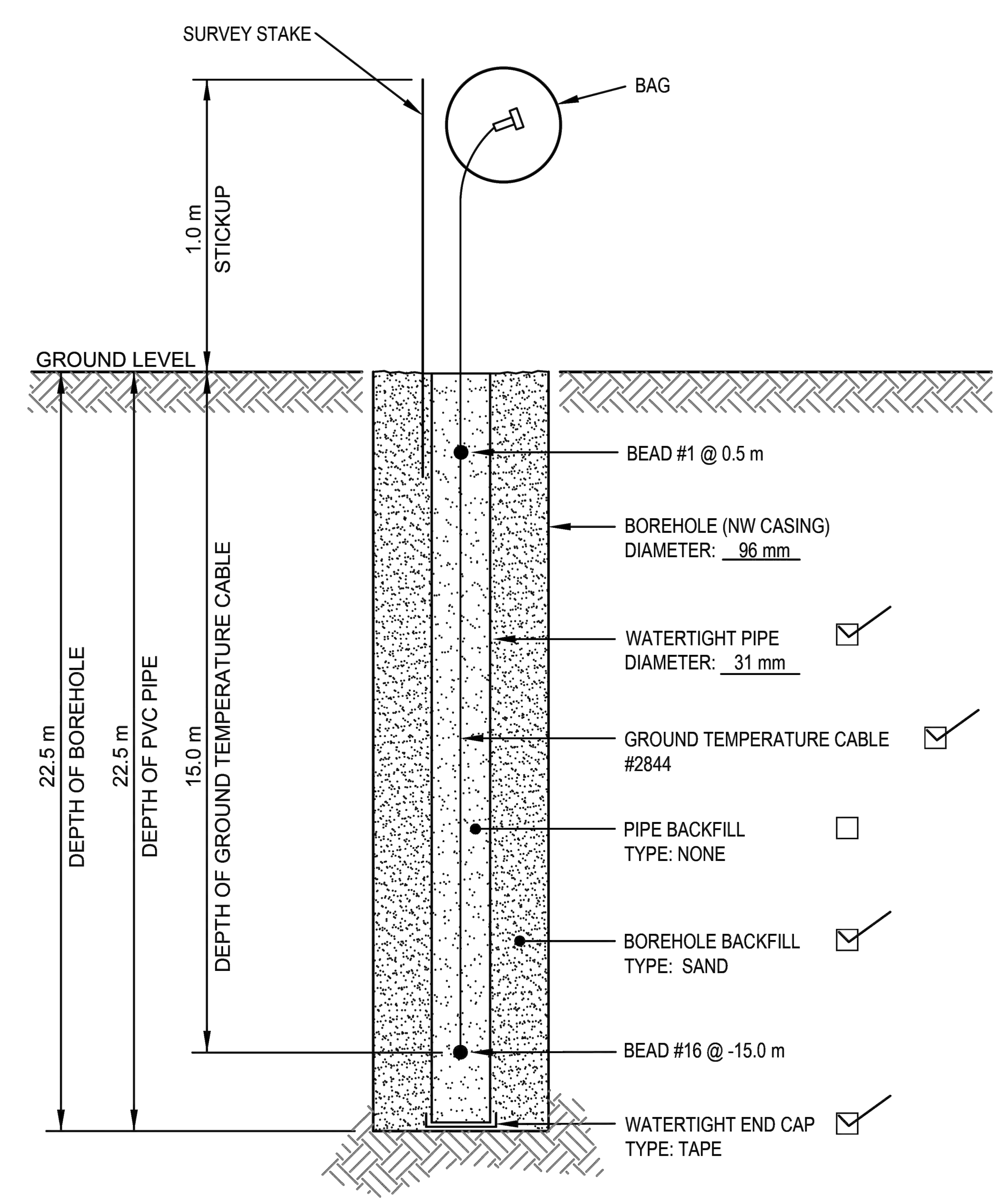
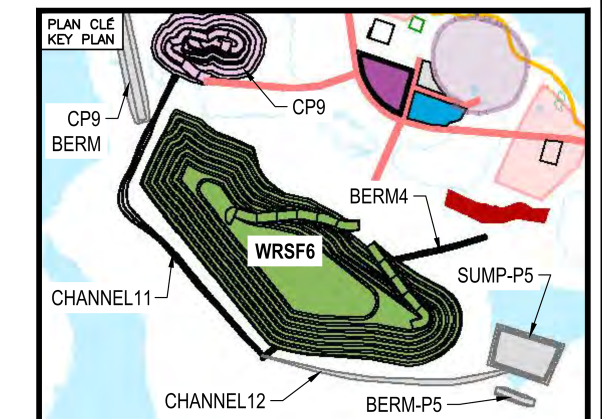


BEAD NO.	DEPTH BELOW OG
1	-0.5
2	-1.0
3	-1.5
4	-2.0
5	-2.5
6	-3.0
7	-3.5
8	-4.0
9	-4.5
10	-5.5
11	-6.5
12	-7.5
13	-9.0
14	-10.5
15	-12.5
16	-15.0

PLAN CLÉ / KEY PLAN



TETRA TECH

NOTES GÉNÉRALES / GENERAL NOTES

1. A TOTAL OF 16 THERMISTOR BEADS FOR EACH GROUND TEMPERATURE CABLE.

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TITRE / TITLE
AGNICO EAGLE MELIADINE GOLD MINE

MELIADINE WRSF6 DETAILED DESIGN: GROUND TEMPERATURE CABLE AND THERMISTOR BEAD LOCATIONS FOR WRSF6-GTC-03

		DATE
DESSINÉ PAR / DRAWN BY	EL	2024-12-13
VÉRIFIÉ PAR / CHECKED BY	HX	2024-12-13
APPROUVÉ PAR / APPROVED BY	HX	2024-12-13
ÉCHELLE / SCALE	AS SHOWN	2024-12-13

NO. DESSIN / DRAWING NO. 65-686-230-012

NO. PROJET / PROJECT NO.	REVISION	FEUILLE / SHT
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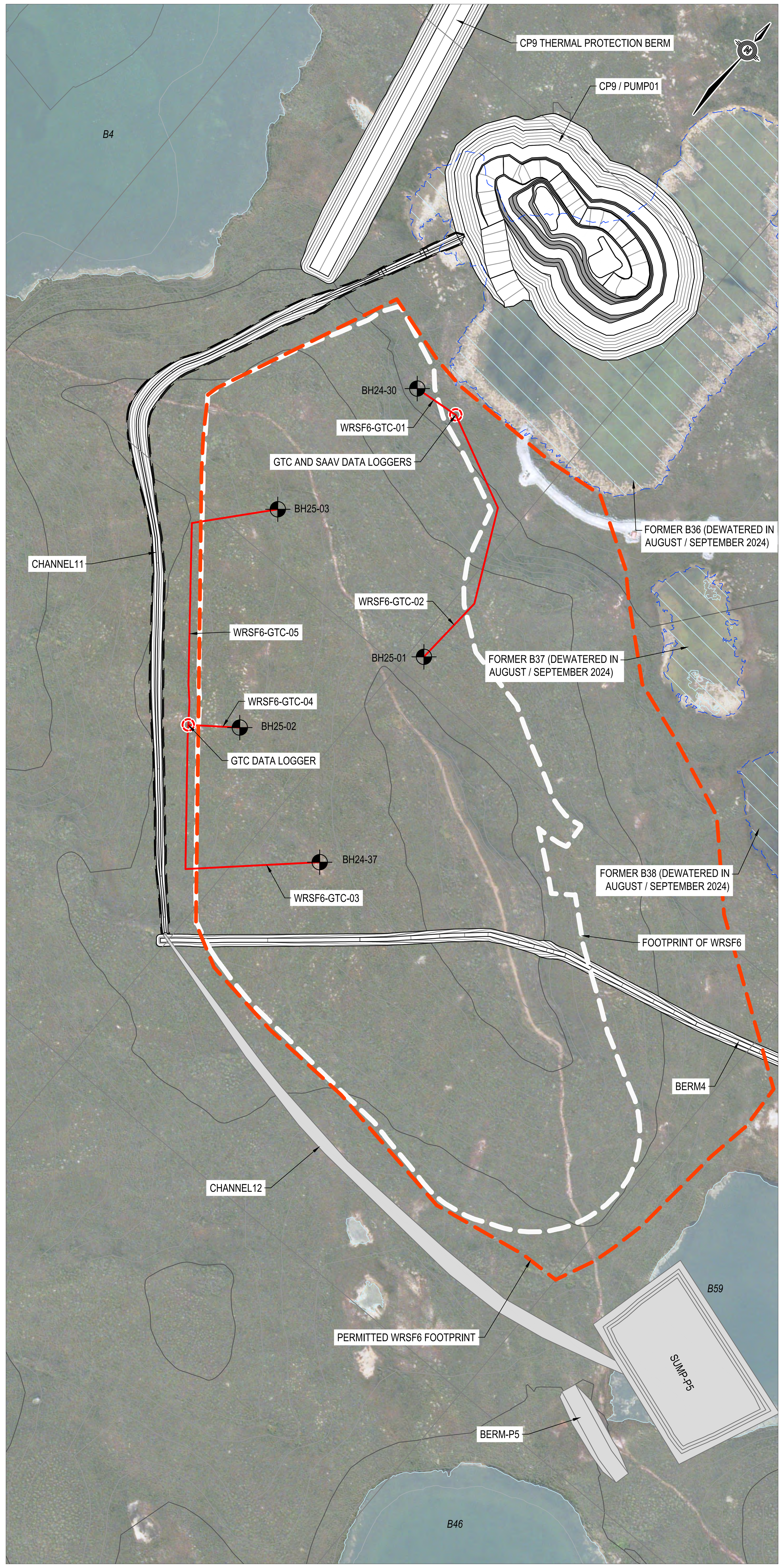
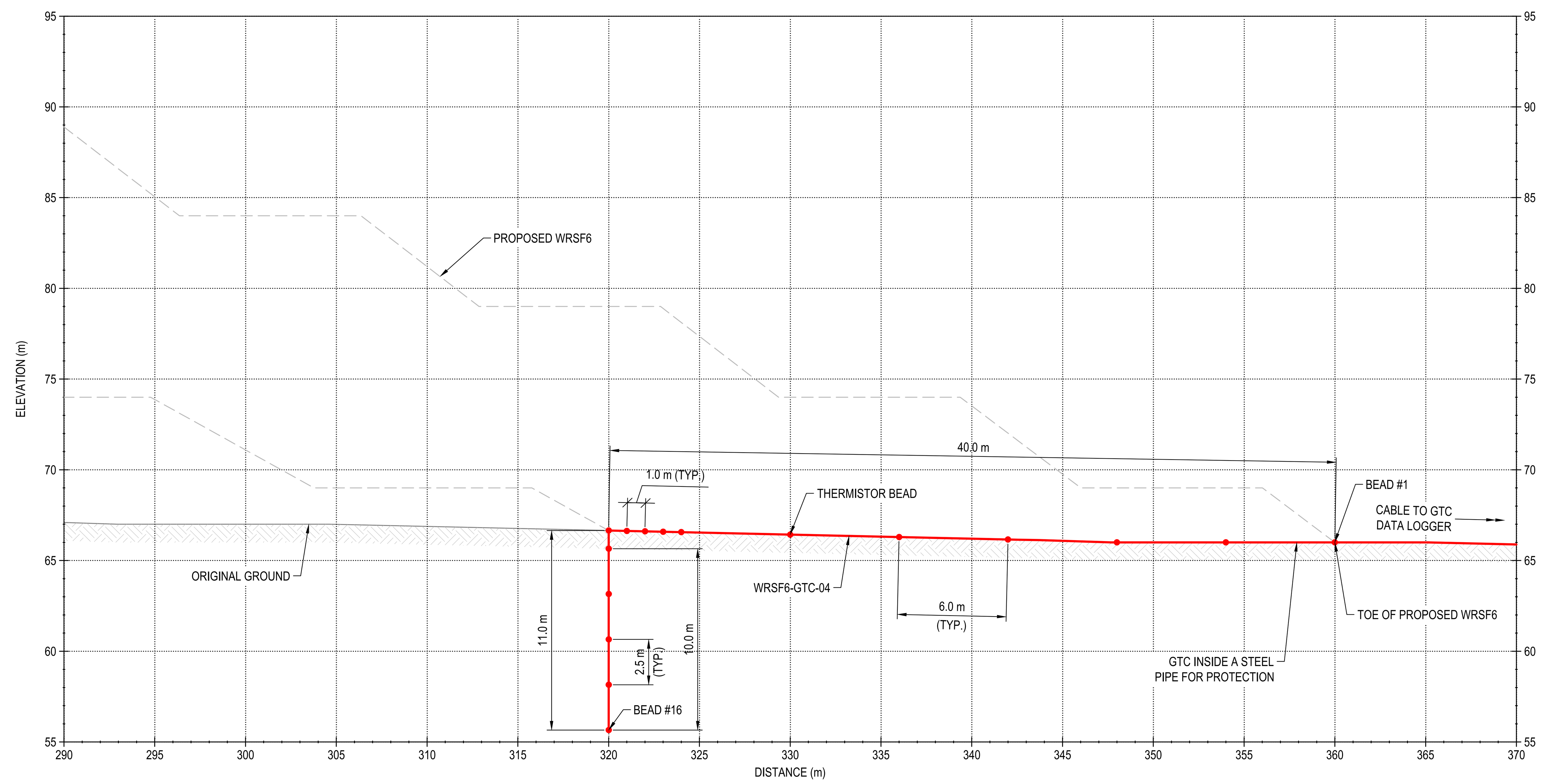
NO. DESSIN DRAWING NO. 65-686-230-013

FORMAT ARCHD



PLAN VIEW SHOWING LOCATIONS OF GROUND TEMPERATURE CABLES FOR WRSF6

SCALE = 1:3000



WRSF6-GTC-04 (BH25-02)

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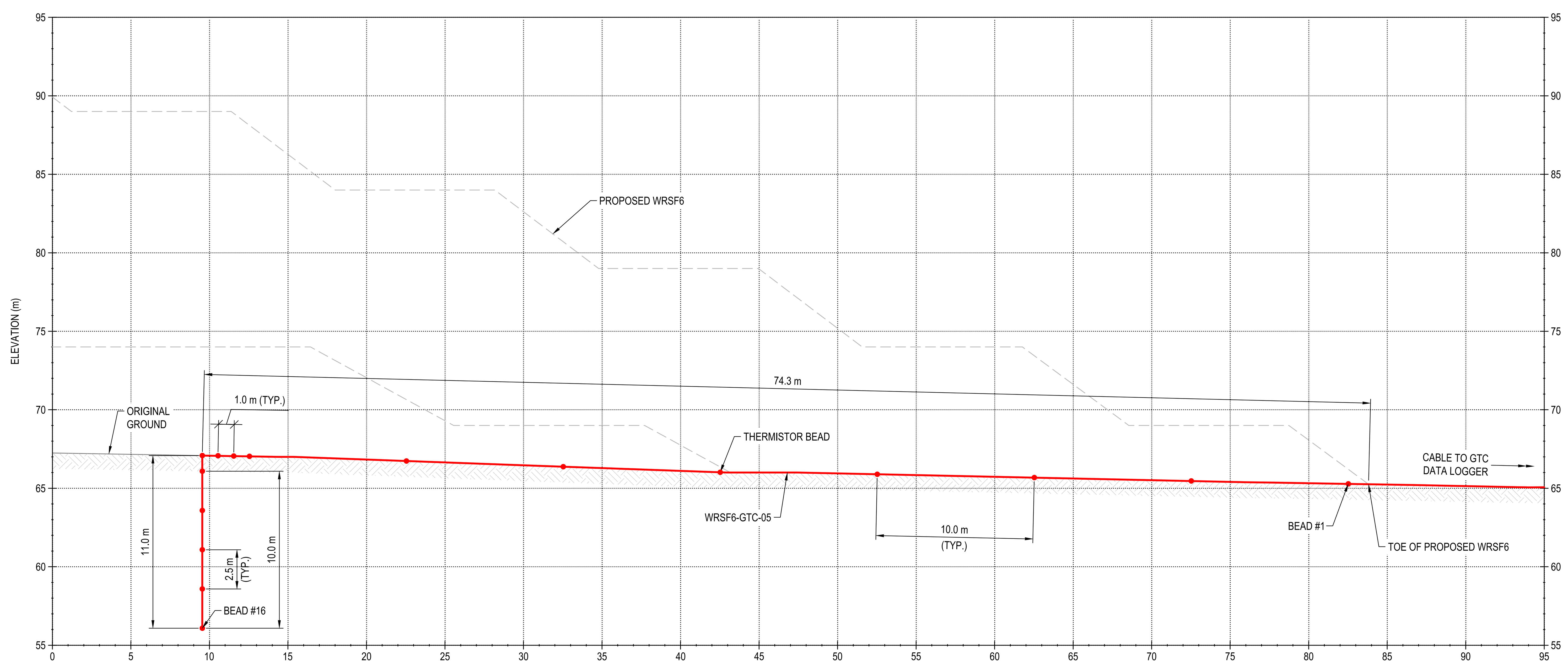
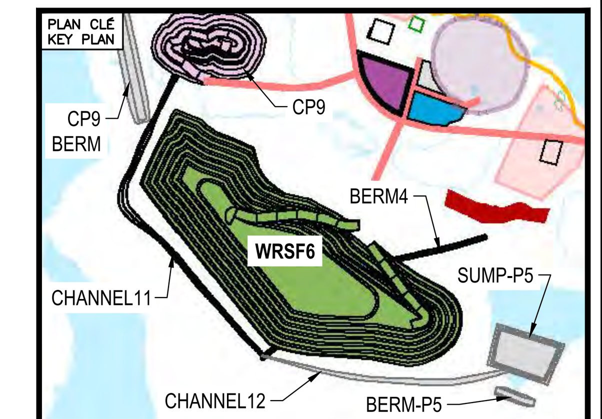


WRSF6-GTC-05 (BH25-03)

SCALE = 1:200

PLAN CLÉ KEY PLAN



TETRA TECH

NOTES GÉNÉRALES / GENERAL NOTES

1. A TOTAL OF 16 THERMISTOR BEADS FOR EACH GROUND TEMPERATURE CABLE.

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0	2024-12-13	ISSUED FOR CONSTRUCTION	HX	HX	

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TITRE / TITLE
AGNICO EAGLE MELIADINE GOLD MINE

MELIADINE WRSF6 DETAILED DESIGN: GROUND TEMPERATURE CABLE AND THERMISTOR BEAD LOCATIONS FOR WRSF6-GTC-04 AND WRSF6-GTC-05

DESSINÉ PAR DRAWN BY	EL	DATE	2024-12-13
VÉRIFIÉ PAR CHECKED BY	HX		2024-12-13
APPROUVÉ PAR APPROVED BY	HX		2024-12-13
ÉCHELLE SCALE	AS SHOWN	DATE	2024-12-13

NO. DESSIN DRAWING NO. 65-686-230-013

NO. PROJET PROJECT NO.	REVISION	FEUILLE / SHT
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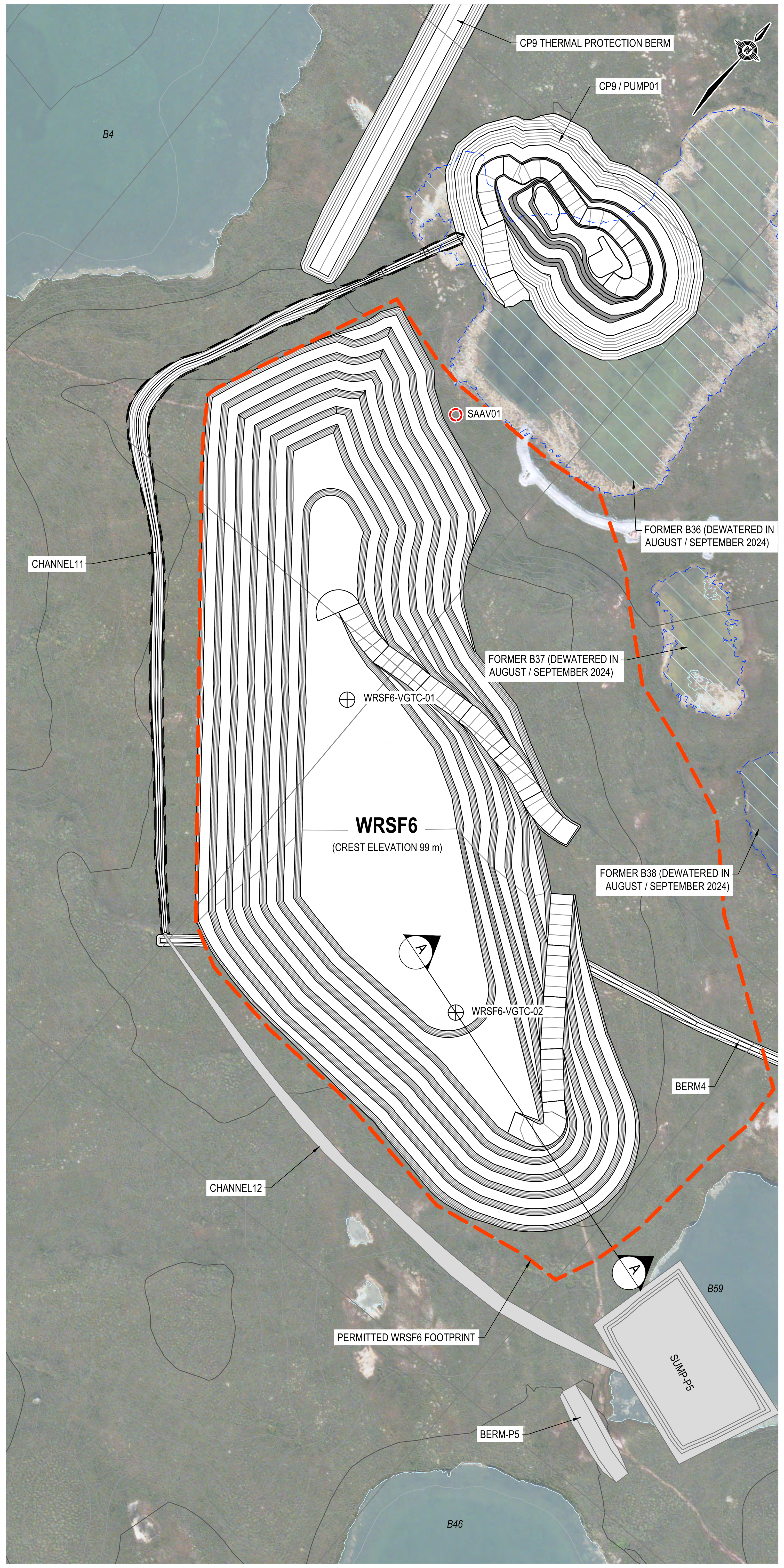
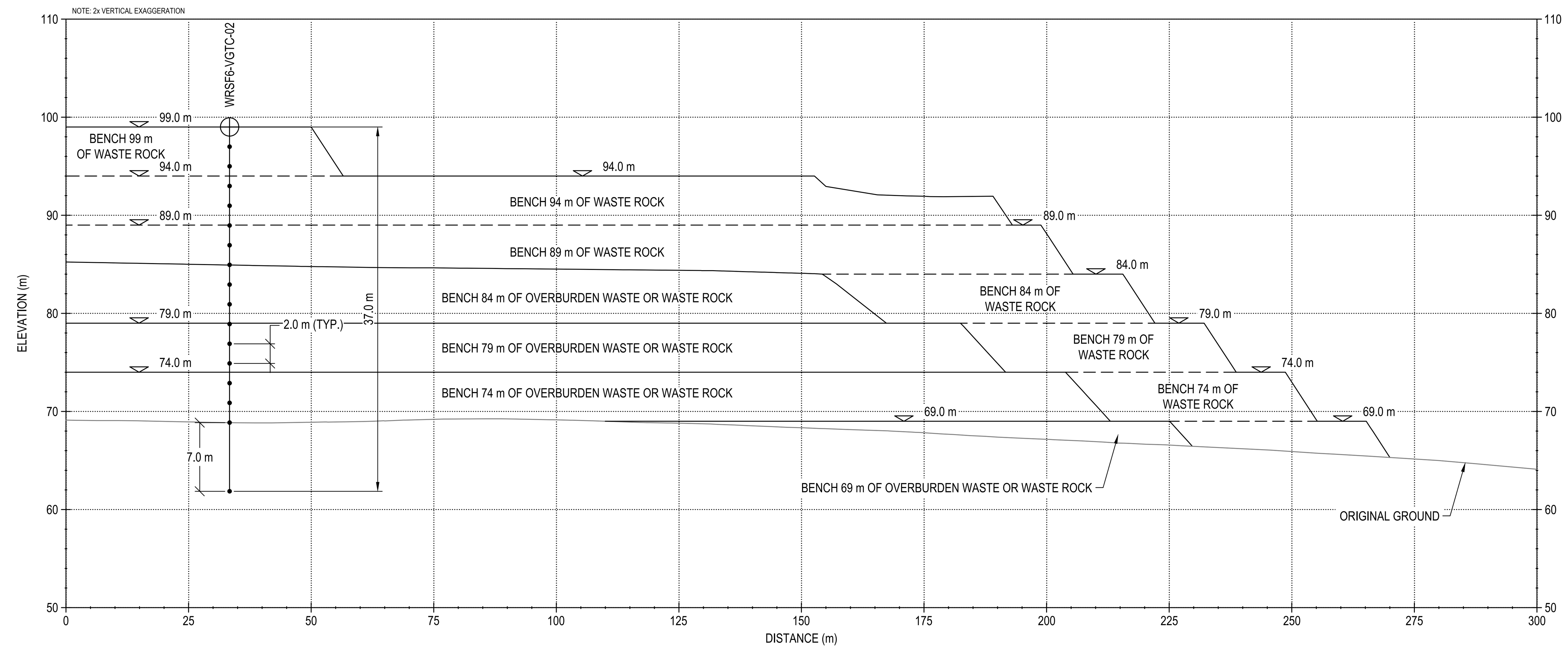
NO. DESSIN DRAWING NO. 65-686-230-014



PLAN VIEW SHOWING LOCATIONS OF GROUND TEMPERATURE CABLES FOR WRSF6
SCALE = 1:3000



A INSTRUMENTATION
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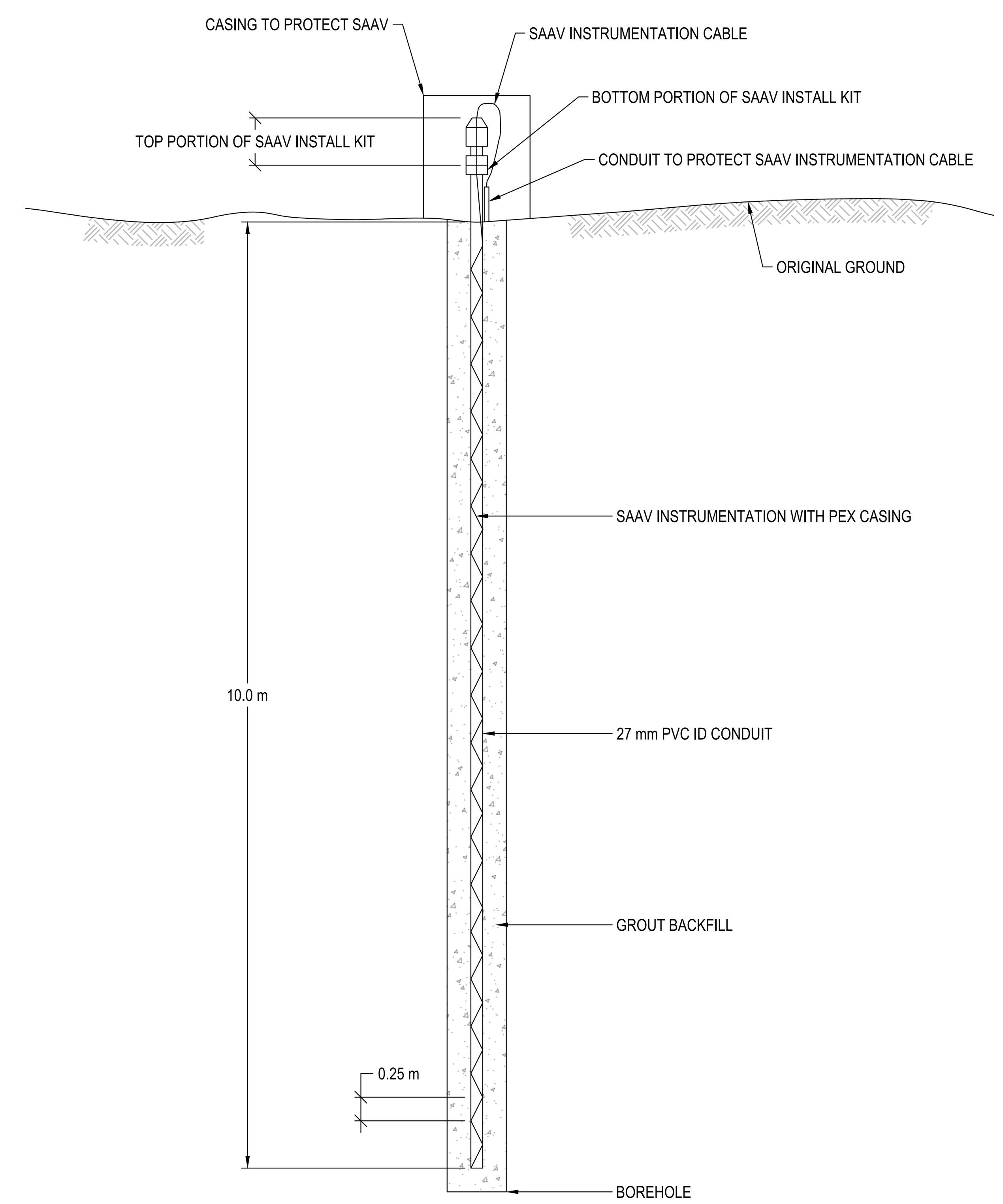
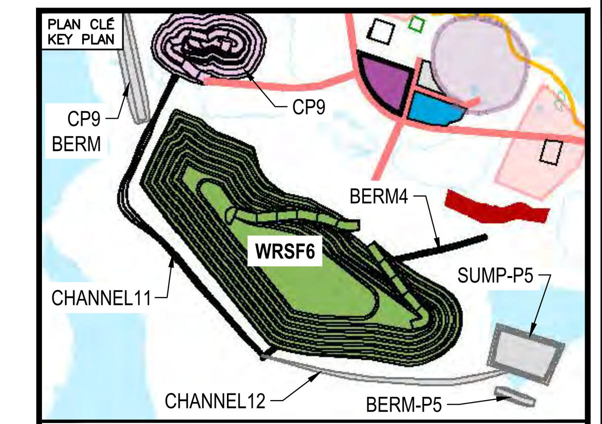
WRSF6 GTC AND SAAV LAYOUT POINTS		
POINT	NORTHING	EASTING
BH24-30	6 986 719.00	539 341.00
BH24-37	6 986 306.00	539 564.00
BH25-01	6 986 523.68	539 513.32
BH25-02	6 986 356.31	539 420.57
BH25-03	6 986 542.28	539 312.64
SAAV01	6 986 723.61	539 385.99
WRSF6-VGTC-01	6 986 444.00	539 483.00
WRSF6-VGTC-02	6 986 279.00	539 759.00

WRSF6 VGTC BEAD SPACING AND LENGTH		
ELEVATION (m)	GTC BEAD	GTC BEAD SPACING (m)
99.0		
98.0	1	0
97.0	2	1
96.0	3	1
95.0	4	1
93.0	5	2
91.0	6	2
89.0	7	2
86.0	8	3
83.0	9	3
80.0	10	3
77.0	11	3
74.0	12	3
71.0	13	3
68.0	14	3
65.0	15	3
62.0	16	3
CABLE LENGTH: 39 m = 37.0 m FROM TOP OF WRSF6 TO 7 m BELOW THE EG PLUS 2.0 m LEAD LENGTH		



TYPICAL SECTION – SAAV
SCALE: 1:50



TETRA TECH

NOTES GÉNÉRALES / GENERAL NOTES

1. A TOTAL OF 16 THERMISTOR BEADS FOR EACH GROUND TEMPERATURE CABLE.
2. ONE 10 m DEEP SHAPEARRAY INCLINOMETER BETWEEN WRSF6 TOE AND PUMP01 OPEN PIT.
3. THE GROUND TEMPERATURE CABLE CONFIGURATION SHOWN IN SECTION 'A' FOR WRSF6-VGTC-02 APPLIES TO WRSF6-VGTC-01.

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0	2024-12-13	ISSUED FOR CONSTRUCTION	HX	HX	

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TITRE / TITLE
AGNICO EAGLE MELIADINE GOLD MINE

MELIADINE WRSF6 DETAILED DESIGN: GROUND TEMPERATURE CABLE, THERMISTOR BEAD AND SHAPEARRAY INCLINOMETER LOCATIONS

DESSINÉ PAR DRAWN BY	EL	DATE 2024-12-13
VERIFIÉ PAR CHECKED BY	HX	2024-12-13
APPROUVÉ PAR APPROVED BY	HX	2024-12-13
ÉCHELLE SCALE	AS SHOWN	DATE 2024-12-13
NO. DESSIN DRAWING NO.	65-686-230-014	
NO. PROJET PROJECT NO. 6542	REVISION 0	FEUILLE / SHT 12 / 12

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APPENDIX C

WRSF6 THERMAL ANALYSIS MEMO

TETRA TECH

TECHNICAL MEMO

ISSUED FOR USE

To:	Justin Bieber, Agnico Eagle Marielle Limoges, Agnico Eagle	**Date:**	December 13, 2024
c:	Jawad Haloui, Agnigo Eagle	**Memo No.:**	001
From:	Fai Ndofor, P.Geo., Tetra Tech Hongwei Xia, P.Eng., Tetra Tech Linping Wu, P.Eng., Tetra Tech	**File:**	704-ENG.EARC03140-38
Subject:	Thermal Analysis for Waste Rock Storage Facility 6 (WRSF6), Meliadine Gold Mine, Nunavut		

1.0 INTRODUCTION

Agnico Eagle Mines Limited (Agnico Eagle) is operating the Meliadine Gold Mine (the Meliadine Mine) which is located approximately 25 km north of Rankin Inlet, Nunavut. The current operation consists of mining the Tiriganiaq deposit with two open pits and an underground operation under the existing Nunavut Water Board Type A Water Licence (2AM-MEL1631). In January 2024, Agnico Eagle submitted a Water Licence Amendment application to support the completion of licensing components approved under Nunavut Impact Review Board Project Certificate No. 006. The 2024 Water Licence Amendment will allow Agnico Eagle to mine the Wesmeg, Wesmeg North, Pump, FZone, and Discovery deposits that were included in the 2014 Final Environmental Impact Statement (FEIS) and Project Certificate No.006.

As per the current mine plan, Waste Rock Storage Facility 6 (WRSF6) is required to accommodate the overburden and waste rock that will be produced from the mining of the deposits at Pump, which was included in the 2024 Water Licence Amendment application. Tetra Tech Canada Inc. was retained by Agnico Eagle to carry out the detailed design and to prepare a design report and Issued for Construction Drawings for WRSF6. To support the detailed design of WRSF6, thermal analyses were carried out to evaluate the thermal conditions of WRSF6 and its foundation during waste placement and under long-term climate change conditions. The objectives of the analyses are to provide supporting information for the stability analyses for the design of WRSF6 and to evaluate the thermal performance of WRSF6 under long-term climate change conditions. This technical memorandum summarizes the methodology, input parameters, assumptions, and findings of the thermal analyses. This technical memorandum will be included as an appendix to the WRSF6 design report.

2.0 GENERAL SITE CONDITIONS

2.1 Climate and Meteorology

The Meliadine Mine 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 Meliadine Mine 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

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summers are short and cool. The mean annual temperature for the period of record from 1994 to 2023 was -9.8°C based on the measured air temperature data at Rankin Inlet.

The annual total precipitation under mean condition at the Meliadine Mine site is 394 mm/year and falls almost equally as snow and rainfall (Tetra Tech 2021a). Average annual evaporation for small waterbodies in the Meliadine Mine site 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 expanses offered to moving air masses. The wind blows generally from the northwest and north-northwest direction. The mean values for wind speed show that the north-northwest, together with northwest winds, have the highest speeds and tend to be the strongest. Mean monthly wind speeds are typically between 19 km/hour and 29 km/hour, with an average of 22.3 km/hour.

2.2 General Subsurface Conditions

Geotechnical drilling programs were conducted to collect data for the proper understanding of subsurface geotechnical conditions within the WRSF6 footprint (Golder 2012a, Tetra Tech 2021b, Tetra Tech 2024a, Tetra Tech 2024b). A total of 22 boreholes have been drilled within or near the perimeters of the WRSF6 footprint. The locations of the borehole drilled are presented on Figure 1.

In general, the subsurface of WRSF6 consists of a layer of organic materials, underlain by various layers of Boulders, Cobbles, Silt, Sand, Silt and Sand, Ice + Sand, Gravel and Sand, Ice + Silt and Sand, Gravel and Greywacke bedrock. Excess ice was observed in all boreholes within the footprint. Encountered excess ice cryostructures include Nbe, Vs, Vx, and Vc. Vs excess ice occurred in the form of clear lenticular and wavey ice lenses. Measured volumetric ice content varied from 10% to 65%. The gravimetric moisture content of the overburden varied from 6.1% at a depth of 5.50 m to 45.6% at a depth of 3.92 m. Within the WRSF6 footprint, the depth (from ground surface) to bedrock ranged from approximately 4.05 m to 17.4 m. The laboratory tested unconfined compressive strength of the greywacke bedrock ranged from 22.6 MPa to 60.1 MPa. The detailed geotechnical information and borehole logs can be found in Golder (2012a) and Tetra Tech (2021b, 2024a, and 2024b).

2.3 Ground Temperature and Permafrost Condition

The Meliadine Mine site is located within the Southern Arctic terrestrial eco-zone which is one of the coldest and driest regions of Canada, in a zone of continuous permafrost. Continuous permafrost to depths of between 285 m to 430 m is expected based on ground temperature data from thermistors installed near Tiriganiaq, FZone, and Discovery deposits (WSP 2024). The measured ground temperature data indicates that the active layer ranges from 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 the depth of below 18 m) are in the range of -5.9°C to -7.0°C in the areas away from lakes and streams. The geothermal gradient ranges from 0.015°C/m to 0.02°C/m (WSP 2024).

3.0 THERMAL ANLYSES

3.1 General

Thermal analyses were carried out using Tetra Tech's proprietary finite element computer model, GEOTHERM. The model simulates transient heat conduction with change of phase considering a variety of boundary conditions, including heat flux, convective heat flux, and temperature and ground-air boundaries. The heat exchange at the ground surface is modelled with an energy balance equation considering air temperatures, wind velocity, snow depth, and solar radiation. The model facilitates the inclusion of temperature phase change relationships for saline soils, such that any freezing depression and unfrozen water content variations can be explicitly modelled.

GEOTHERM has been verified by comparing its results with closed-form analytical solutions and many different field observations. The model has formed the basis for thermal evaluations and designs of a substantial number of projects in the Arctic and sub-Arctic regions since the 1980s, including mine waste storage facilities, dams, foundations, pipelines, utilidor systems, and landfills.

The two-dimensional thermal analysis for WRSF6 was firstly carried out to calibrate model parameters with the climatic and soil conditions of the original ground, and to compare with measured ground temperature data collected from the ground temperature cables (GTCs) installed in the Winter 2024 geotechnical drilling program. Thereafter, two-dimensional thermal analyses of a typical section for the WRSF6 were carried out to simulate the construction sequence during mine operation. Thermal analyses were then conducted to predict long-term thermal conditions under adopted climatic and boundary conditions.

3.2 Thermal Model Calibration

A two-dimensional thermal analysis was carried out to calibrate the model with the climatic and soil conditions of the original ground prior to WRSF6 construction, and to compare the results with measured ground temperatures. Three GTCs at Boreholes GT24-30, GT24-33, and GT24-37 were installed within the WRSF6 footprint in February 2024 during the Winter 2024 drilling program. The thermal model was calibrated using the temperature readings from GTCs at GT24-37 (close to the southeast boundary of the proposed WRSF6 Phase 1 boundary). Measured ground temperatures are available from June 15, 2024 and July 12, 2024. It is Tetra Tech's understanding that the ground temperatures at Borehole GT24-37 already attained thermal equilibrium on June 15, 2024 and July 12, 2024.

Based on the geotechnical conditions of the foundation within the WRSF6 footprint, a generalized soil profile of the original ground was developed and used for the calibration analysis. The soil profile adopted in the calibration consists of a 1.0 m thick layer of sand, a 1.5 m thick layer of ice-rich silt, a 1.5 m thick layer of sand and gravel, a 5.0 m thick layer of silt and sand, and a 1.0 m thick layer of gravel over bedrock. The material properties for the soils used in the calibration model are presented in Table 1. The thermal properties were determined indirectly from well-established correlations with soil index properties (Farouki 1986; Johnston 1981). Soil index properties were estimated from available geotechnical information and experience with similar soils.

Table 1: Material Properties Used in Model Calibration for WRSF6

Material	Water Content (%)	Bulk Density (Mg/m^3)	Thermal Conductivity (W/m-K)		Specific Heat (kJ/kg-K)		Latent Heat (MJ/m^3)
			Frozen	Unfrozen	Frozen	Unfrozen	
Sand	20	1.8	2.28	1.54	0.96	1.31	100
Ice-rich Silt	30	1.6	2.18	1.27	1.05	1.53	125
Sand and Gravel	10	2	2.06	1.8	0.86	1.05	62
Silt and Sand	10	1.8	2	1.9	0.86	1.05	55
Gravel	6	2	1.76	1.96	0.81	0.93	38
Bedrock	1	2.66	3	3	0.75	0.77	9

Table 2 summarizes the predicted ground temperatures from the calibration model and the measured ground temperatures at selected depths below the original ground surface for Borehole GT24-37 on June 15, 2024, and July 12, 2024. Figure 2 presents the comparison between the measured ground temperatures and the predicted ground temperatures from the thermal calibration model. A good agreement was obtained between the measured and modelled ground temperatures. The calibration results suggest that the model and key input parameters are reasonable and can be used for the thermal analysis of WRSF6.

Table 2: Comparison of Measured and Predicted Ground Temperatures

Depth below Ground Surface (m)	June 15, 2024		July 12, 2024	
	Estimated Temperature (°C)	Measured Temperature (°C)	Estimated Temperature (°C)	Measured Temperature (°C)
1.5	-4.75	-3.83	-2.77	-2.59
2.5	-5.83	-5.43	-4.35	-4.18
3.5	-6.17	-6.02	-5.31	-4.84
4.5	-6.10	-6.02	-5.53	-5.32
5.5	-5.78	-5.99	-5.55	-5.56
6.5	-5.50	-5.80	-5.48	-5.67
7.5	-5.29	*	-5.36	-5.67
10.5	-5.15	-5.20	-5.22	-5.67

Note:
*: No data from field measurement.

3.3 Mean Climatic Data

Climatic data required for the thermal analyses includes monthly air temperature, wind speed, solar radiation, and snow cover. The closest meteorological station with available long-term climatic data is at Rankin Inlet. The mean monthly air temperatures, wind speed, and snow cover at Rankin Inlet Station were adopted from Environment and Natural Resources Canada's website (https://climate.weather.gc.ca/climate_normals/index_e.html) and Climate Data website (Download — ClimateData.ca). Mean daily solar radiation data for the period of 1951 to 1980 at Baker Lake station (Environment Canada 1982) were adopted for the Meliadine Mine site. Table 3 summarizes the mean climatic data for the Meliadine Mine site.

Table 3: Mean Climatic Data at Meliadine Mine Site

Month	Monthly Air Temperature (°C)[(a)]	Monthly Wind Speed (km/h)[(b)]	Monthly Average Snow Cover (m)[(c)]	Daily Solar Radiation (W/m^2)[(d)]
January	-29.6	24.2	0.28	9.1
February	-30.0	23.6	0.31	38.7
March	-24.6	23.5	0.36	119.5
April	-15.5	22.6	0.35	206.4
May	-5.1	22.2	0.19	259.7
June	4.9	20.3	0.03	252.0
July	11.2	19.4	0.00	226.4
August	10.3	20.9	0.00	160.8
September	4.6	23.8	0.00	124.9
October	-3.5	26.3	0.04	41.3
November	-15.9	25.1	0.14	14.4
December	-23.8	24.0	0.24	3.7
Mean	**-9.7**	**23.0**		

Notes:
[(a)] Measured monthly air temperatures at Rankin Inlet station (1994-2023).
[(b)] Measured wind speed data at Rankin Inlet station (1981-2010 Climate Normals).
[(c)] Based on measured snow cover data at Rankin Inlet station (1983-2012).
[(d)] Measured solar radiation data at Baker Lake station (1951-1980).

3.4 Climate Change Projection

The historical air temperature data at Rankin Inlet indicated that the long-term climatic trend is warming. Based on the observed warming trend in the historical air temperatures and state-of-practice, the thermal analysis for the detailed design of WRSF6 should consider the long-term effects of climate change.

The Government of Canada published new climate change scenarios from the Coupled Model Intercomparison Project Phase 6 (CMIP6) in 2021. The climate scenarios are presented in the Canadian Climate Data and Scenarios (CCDS) website (https://climate-scenarios.canada.ca/?page=main). The results of the climate scenarios from the CMIP6 climate models were used in the latest Intergovernmental Panel on Climate Change (IPCC) Assessment Report (AR6). The website provides projected seasonal climate changes for each province in Canada. A series of tables with projections of climate change computed from the CMIP6 climate models are provided. Projections are based on the Shared Socioeconomic Pathway (SSP) scenarios, which combine elements from the new narratives about future societal development with the previous Representative Concentration Pathways (RCPs) scenarios. Seasonal averages of projected changes in climate are available for five SSP scenarios with different levels of radiative forcing, including SSP1-1.9, SSP1-2.6, SSP2-4.5, SSP3-7.0, SSP4-6.0, and SSP5-8.5. In this study, the intermediate scenario, CMIP6 SSP2-4.5 was adopted in the thermal analysis which represent a reasonably conservative scenario. Table 4 summarizes the projected seasonal air temperature changes in Nunavut for the climate change scenario CMIP6 SSP2-4.5.

Table 4: Projected Seasonal Air Temperature Changes under CMIP6 SSP2-4.5 Scenarios for Nunavut (Government of Canada)

Period	Projected Seasonal Air Temperature Changes (50th (median) percentiles) from 1995-2014 Baseline under SSP2-4.5 Scenario for Nunavut (°C)			
	Winter	**Spring**	**Summer**	**Autumn**
2021-2040	2.05	1.35	0.77	2.10
2041-2060	4.19	2.46	1.44	3.58
2061-2080	5.58	3.15	1.91	4.68
2081-2100	6.72	3.81	2.38	5.41

Table 5 presents the predicted monthly air temperatures for several selected years under CMIP6 SSP2-4.5 climate change scenario. The climate change scenario CMIP6 SSP2-4.5 predicts that snow depth is expected to slightly decrease with time in Nunavut. This snow depth reduction in the long term was not considered in the thermal analyses, for conservative consideration. Less snow cover depth in winter tends to result in colder ground temperatures in WRSF6 and its foundation.

Table 5: Measured and Projected Monthly Air Temperatures for Selected Years based on CMIP6 SSP2-4.5 Scenario

Month	Average Measured Monthly Air Temperature (1994-2023) (a) (°C)	Projected Monthly Air Temperature in 2028 (b) (°C)	Projected Monthly Air Temperature in 2058 (b) (°C)	Projected Monthly Air Temperature in 2100(b) (°C)
January	-29.6	-27.7	-24.9	-22.4
February	-30	-28.2	-25.4	-22.8
March	-24.6	-23.4	-21.9	-20.5
April	-15.5	-14.3	-12.8	-11.4
May	-5.1	-3.9	-2.4	-1.0
June	4.9	5.6	6.5	7.5
July	11.2	11.9	12.8	13.8
August	10.3	11	11.9	12.8
September	4.6	6.4	8.5	10.2
October	-3.5	-1.7	0.4	2.1
November	-15.9	-14	-12.0	-10.3
December	-23.8	-21.9	-19.1	-16.6
Mean	**-9.8**	**-8.4**	**-6.5**	**-4.9**

Notes:

(a) Based on measured data at Rankin Inlet weather station (1994-2023).

(b) Predicted based on measured air temperatures at Rankin Inlet (1994-2023) and the climate change scenario CMIP6 SSP2-4.5 for Nunavut, as summarized in Table 4.

3.5 Soil Profile and Material Properties

Two dimensional thermal analyses were carried out to evaluate the thermal conditions during the construction phase and the selected long-term climate change scenario. The generalized soil profile used in the calibration model was used for the WRSF6 thermal analyses and consists of a 1.0 m thick layer of sand, a 1.5 m thick layer of ice-rich silt, a 1.5 m thick layer of sand and gravel, a 5.0 m thick layer of silt and sand, and a 1.0 m thick layer of gravel over bedrock. The localized thin layer of organic material within the WRSF6 foundation was not modelled in the thermal analyses. It is expected that some of the organic material will be removed during the snow-removal process prior to the mine waste placement or will be compressed under loads from waste rock and overburden. In addition, organic material generally serves as a thermal blanket due to its low thermal conductivity, therefore, the thermal results are expected to be conservative if the organic material is not considered in the thermal analyses.

Thermal properties of the materials in the thermal analyses are determined indirectly from well-established correlations with soil index properties (Farouki 1986; Johnston 1981). Soil index properties were estimated from past geotechnical drilling programs (Golder 2012a, Tetra Tech 2024a, Tetra Tech 2024b) or assumed based experience with similar soils. The pore-water salinity of overburden ranges from 4.0 parts per thousand (ppt) to 12 ppt with an average of 7 ppt (EBA 2013). In this thermal analysis, the porewater salinity was assumed to be 7 ppt for the overburden waste and foundation overburden soils, 2 ppt for the waste rock, and 0 ppt for bedrock in the thermal analysis. Table 6 summarized the material properties used in the thermal analyses.

Table 6: Material Properties Used in Thermal Analyses for WRSF6

Material	Water Content (%)	Bulk Density (Mg/m^3)	Thermal Conductivity (W/m-K)		Specific Heat (kJ/kg-K)		Latent Heat (MJ/m^3)
			Frozen	Unfrozen	Frozen	Unfrozen	
Waste Rock	3	1.96	1.02	1.26	0.77	0.83	19
Overburden Waste	17	1.76	1.59	1.18	0.93	1.24	85
Sand	20	1.8	2.28	1.54	0.96	1.31	100
Ice-rich Silt	30	1.6	2.18	1.27	1.05	1.53	125
Sand and Gravel	10	2	2.06	1.8	0.86	1.05	62
Silt and Sand	10	1.8	2	1.9	0.86	1.05	55
Gravel	6	2	1.76	1.96	0.81	0.93	38
Bedrock	1	2.66	3	3	0.75	0.77	9

3.6 Boundary Conditions

Climate conditions were applied to the WRSF6 and ground surfaces exposed to air. The projected monthly air temperatures from the climate change scenario CMIP6 SSP2-4.5 were used in the thermal analyses for the period of the waste rock and overburden placement (i.e., from 2025 to 2028) and after construction (after 2028) to account for the climate change. To consider the snow drifting and impact of active placement of mine waste, snow cover thickness over the top of WRSF6 surfaces was assumed to be 50% of mean monthly snow cover thickness during active placement of mine waste and 100% of mean monthly snow cover thickness after the completion of the mine waste placement. Snow cover thickness on the slope of WRSF6 and over the original ground was assumed to be 100% of mean monthly snow cover thickness during the active placement and after the completion of the mine waste placement.

The geothermal gradient ranges from 0.015°C/m to 0.02°C/m (WSP 2024). A geothermal gradient of 0.017°C/m at depth was adopted for thermal analyses.

3.7 Waste Rock and Overburden Placement Schedule

The waste rock and overburden placement schedule for WRSF6 construction adopted in the thermal analyses was based on the mine waste production schedule and deposition plan presented in the Design Basis Memo (Tetra Tech 2024c). Figure 3 presents the typical section and lift sequence adopted in the thermal analyses.

Table 7 summarizes the waste rock and overburden deposition plan for WRSF6 Phase 1. Table 8 presents the mine waste placement schedules and assumed initial material temperature for the mine waste used in the thermal analyses of WRSF6. More details on the mine waste production schedule and deposition plan can be found in the Design Basis Memo (Tetra Tech 2024c).

Table 7: Preliminary Waste Rock and Overburden Deposition Plan for WRSF6 Phase 1

Location of Mine Waste Placement	Approximate Period of Mine Waste Placement
Benches 69 m and 74m of overburden	January 2025 to February 2025
Bench 79 m of overburden	March 2025 to April 2025
Bench 84 m of overburden	December 2026
Bench 84 m of overburden	January 2027 to April 2027
Bench 74 m of waste rock	January 2025 to March 2025
Bench 79 m of waste rock	April 2025 to May 2025
Bench 79 m of waste rock	December 2026 to March 2027
Bench 84 m of waste rock	April 2027 to December 2027
Bench 89 m of waste rock*	January 2028 to March 2028*

*: Waste rock cover for Bench 84 m of overburden, the placement schedule depends on the production schedule at other open pits.

Table 8: Waste Placement Schedules Simulated and Assumed Initial Material Temperature in Thermal Analysis of WRSF6

Waste Type	Bench Top Elevation (m)	Approximate Period of Mine Waste Placement	Waste Placement Completion Time Simulated in Thermal Analyses	Assumed Initial Temperature when Placed (°C)	Bench Thickness (m)
Overburden	69 and 74	January 2025 to February 2025	January 1, 2025	-5	Up to 5.0
Overburden	79	March 2025 to April 2025	March 1, 2025	-3	5.0
Overburden	84	December 2026 to April 2027	December 1, 2026	-5	5.0
Waste Rock	74	January 2025 to March 2025	January 1, 2025	-5	5.0
Waste Rock	79	April 2025 to May 2025 and December 2026 to March 2027	April 1, 2025	-3	5.0
Waste Rock	84	April 2027	April 1, 2027	-3	5.0
Waste Rock	89	January 2028 to March 2028	January 1, 2028	-5	5.0

Based on the waste rock and overburden production plan provided by Agnico Eagle on July 17, 2024 and the design capacity of WRFS6, the mine waste placement only attains a top elevation of 89 m. WRSF6 is designed with a crest elevation of 99 m to provide maximum storage capacity and contingency for any potential change that be result in an increase in mine waste production plan. In order to estimate the thermal conditions under short-term construction and long-term climate change scenarios WRSF6 with a top elevation of 89 m was modelled as the base case for the thermal analyses. The long-term thermal performance of WRSF6 with the designed crest elevation at 99 m was also evaluated.

4.0 RESULTS

The results of the thermal analyses are presented in the attached Figures 4 to 22.

- Figures 4 to 6 present the predicted isotherms on October 1, for Years 2025, 2026, and 2027, respectively, during active placement of waste rock and overburden in WRSF6.
- Figures 7 to 13 present the predicted isotherms on October 1 for Years 2028, 2038, 2048, 2068, 2088, 2108, and 2128, respectively, after the completion of waste rock and overburden placement in WRSF6.
- Figure 14 shows the predicted temperature profiles (trumpet curves) on October 1 for Years 2028, 2038, 2048, 2068, 2088, 2108, and 2128 at a location through the crest of WRSF6.
- Figures 15 to 18 shows the predicted temperature profiles at the middle of Benches 84 m, 79 m, 74 m, and 69 m, respectively.
- Figure 19 shows the predicted temperature profiles at the toe of WRSF6.
- Figure 20 presents the predicted temperature history along top of the ice-rich layer during the construction of WRSF6.
- Figure 21 presents the predicted temperature history along top of the ice-rich layer after construction of the WRSF6 with a top elevation of 89 m.
- Figure 22 presents the predicted temperature history along the top of the ice-rich layer after construction of WRSF6 with a crest elevation of 99 m.

These figures indicate that the ground temperatures within the WRSF6 and its foundation change with time and location. Since most of the material was assumed to be placed during winter/spring, the waste rock and overburden below the active layer zone are expected to remain frozen after placement. In the period between 2028 and 2038, the temperatures of waste rock and overburden in the central zone below the top benches (elevation <85 m) will get colder (-4°C to -5°C, see Figures 7 and 8). Thereafter, the predicted temperatures begin to gradually warm up due to the assumed long-term climate change. By 2128, the predicted waste rock and overburden temperatures in zones that are 5 m below the top of the waste rock surface, range between -0.5°C and -2.0°C (see Figure 13).

The long-term strength of an ice-rich foundation soil depends on the temperature of the soil. The estimated ground temperature of the ice-rich foundation material underlying WRSF6 is required for the WRSF6 stability analysis. Figure 20 presents the predicted ground temperatures with time at five selected locations along the top surface of the ice-rich layer in the WRSF6 foundation during the construction stage. Similarly Figures 21 and 22 present the predicted ground temperatures with time at the five selected locations after completion of the WRSF6 construction. These figures suggest that the temperatures change with time and location. The predicted ground temperatures in the ice-rich silt/sand layer in the foundation range from between 1.0°C and -2.6°C after 100 years (by 2128) under the adopted climate change scenario. The following five zones with different ground temperature ranges were delineated in the ice-rich layers based on the thermal results:

- Zone 1 with ground temperature warmer than -0.5°C, located from WRSF6 toe to 20 m inside of the WRSF6 toe. This zone was considered as unfrozen zone due to the pore water salinity caused the freezing point depression.
- Zone 2 with ground temperature ranging between -0.5°C and -1.0°C, located from 20 m to 35 m inside of the WRSF6 toe.
- Zone 3 with ground temperature ranging between -1.0°C and -1.5°C, located from 35 m to 60 m inside of the WRSF6 toe.
- Zone 4 with ground temperature ranging between -1.5°C and -2.0°C, located from 60 m to 90 m inside of the WRSF6 toe.
- Zone 5 with ground temperature ranging colder than -2.0°C, located from 90 m inside of the WRSF6 toe to the center of the WRSF6.

These five zones in the ice-rich soil layers with different temperature ranges will be considered in the stability analysis for the WRSF6 design.

5.0 DISCUSSIONS AND RECOMMENDATIONS

The predicted ground temperatures in WRSF6 and its foundation in this memorandum are based on the waste rock and overburden production plan that was provided to Tetra Tech by Agnico Eagle on July 17, 2024 and the corresponding preliminary waste rock and overburden placement plan that was developed for the design of WRSF6. Of concern is the temperature of an ice-rich layer in the WRSF6 foundation (approximately 1 to 2.5 metres below the original ground surface). The predicted ground temperature of the ice-rich layer has been used in the stability analysis for the design of WRSF6.

Previous experiences with WRSF1 and WRSF3 indicate that the placement schedules and initial temperatures of the waste rock and overburden, especially the initial benches of the overburden waste placed over the original ground, will have an influence on the predicted ground temperature in the ice-rich layer underlying WRSF. For example, if these initial benches are placed in unfrozen conditions in warmer seasons, the temperature in the ice-rich foundation layer may warm up and take more time for freeze back, and therefore impact the slope stability of WRSF6. Tetra Tech recommends that the initial benches of the future overburden waste be placed in the months when both the original ground and the overburden waste are in a frozen condition which will be equivalent to the conditions modelled in the thermal analyses.

It is recommended that the maximum lift thickness during waste placement be limited to 2.5 m for the overburden waste and to 5.0 m for the waste rock, and the initial benches of overburden waste be placed in the winter to accelerate the freeze back process. In the event that the initial benches (69 m and 74 m) of the waste rock and overburden are placed in the summer months and significantly thicker than recommended, the thermal and stability analyses should be reviewed and updated if required.

The actual temperatures of WRSF6 and its foundation may vary from the estimated temperatures from the thermal model due to various assumptions adopted in the thermal analyses. It is recommended that GTCs be installed at selected locations to monitor the actual ground thermal conditions of WRSF6 and its foundation during construction and after the completion of WRSF6. The results from the monitoring can be used to evaluate the actual thermal performance of WRSF6, and to calibrate the thermal model for future predictions if required. The proposed locations and details for the GTCs will be presented in the design drawings for WRSF6.

6.0 LIMITATIONS OF MEMO

This memo 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 document is subject to the Limitations on Use of this Document attached in the Appendix or Contractual Terms and Conditions executed by both parties.

7.0 CLOSURE

We trust this technical memo 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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PERMIT TO PRACTICE
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Signature ____________________

Date 2024-12-13

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

/jf

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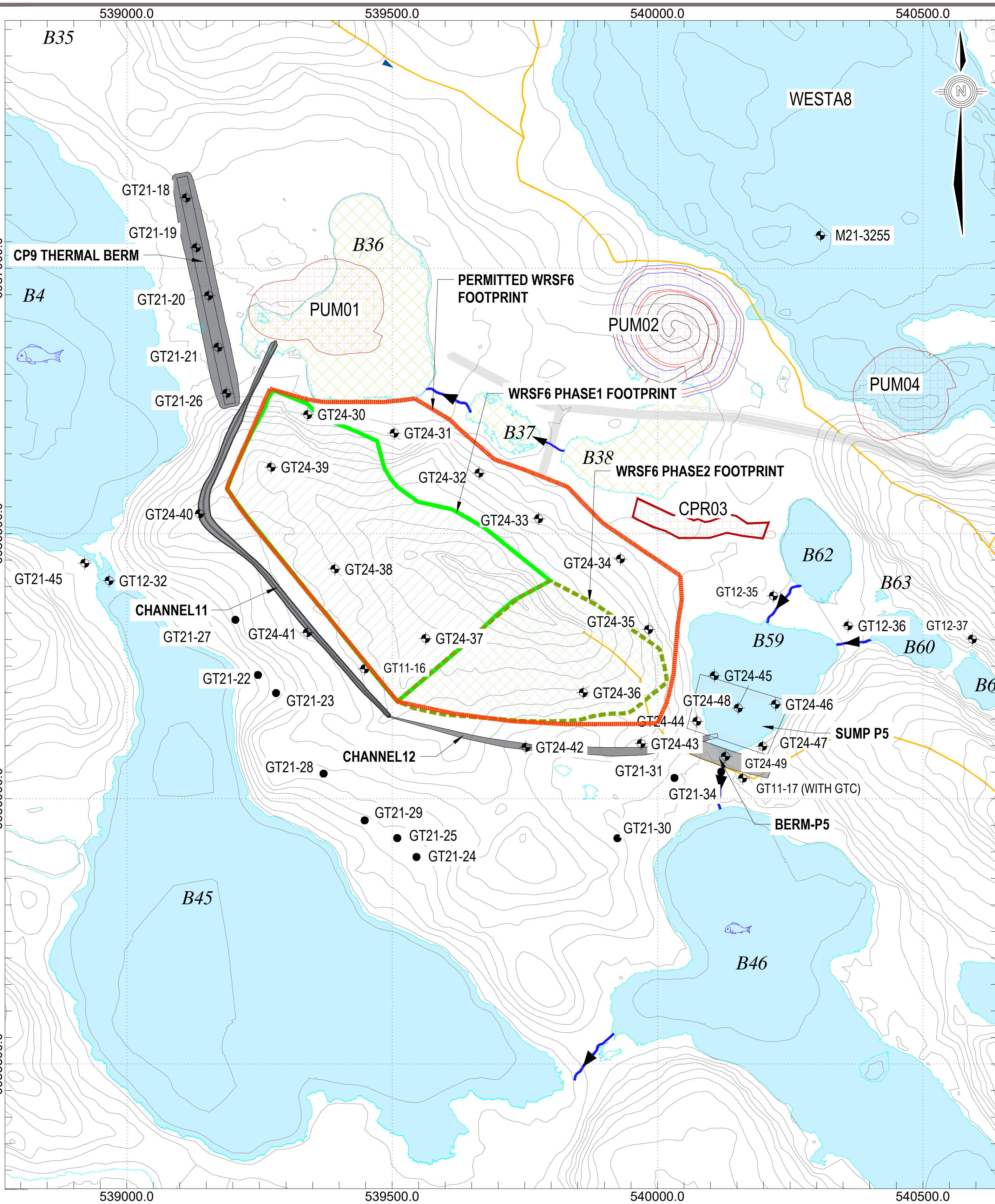
FIGURES



Q:\Edmonton\Engineering\E141\Projects_MELIADINE\ENG.EARC03140-38 WRSF6 Design\Figure 3 - Proposed WRSF6 Footprint with Borehole Locations.dwg [FIGURE 3] October 15, 2024 - 1:49:17 pm (BY: SOSNIUK, DEVON)

LEGEND:

- ● EXISTING BOREHOLE (DESTRUCTIVE)
- EXISTING BOREHOLE

0 500m

Scale: 1:10,000 @ 8.5"x11"

CLIENT

AGNICO EAGLE

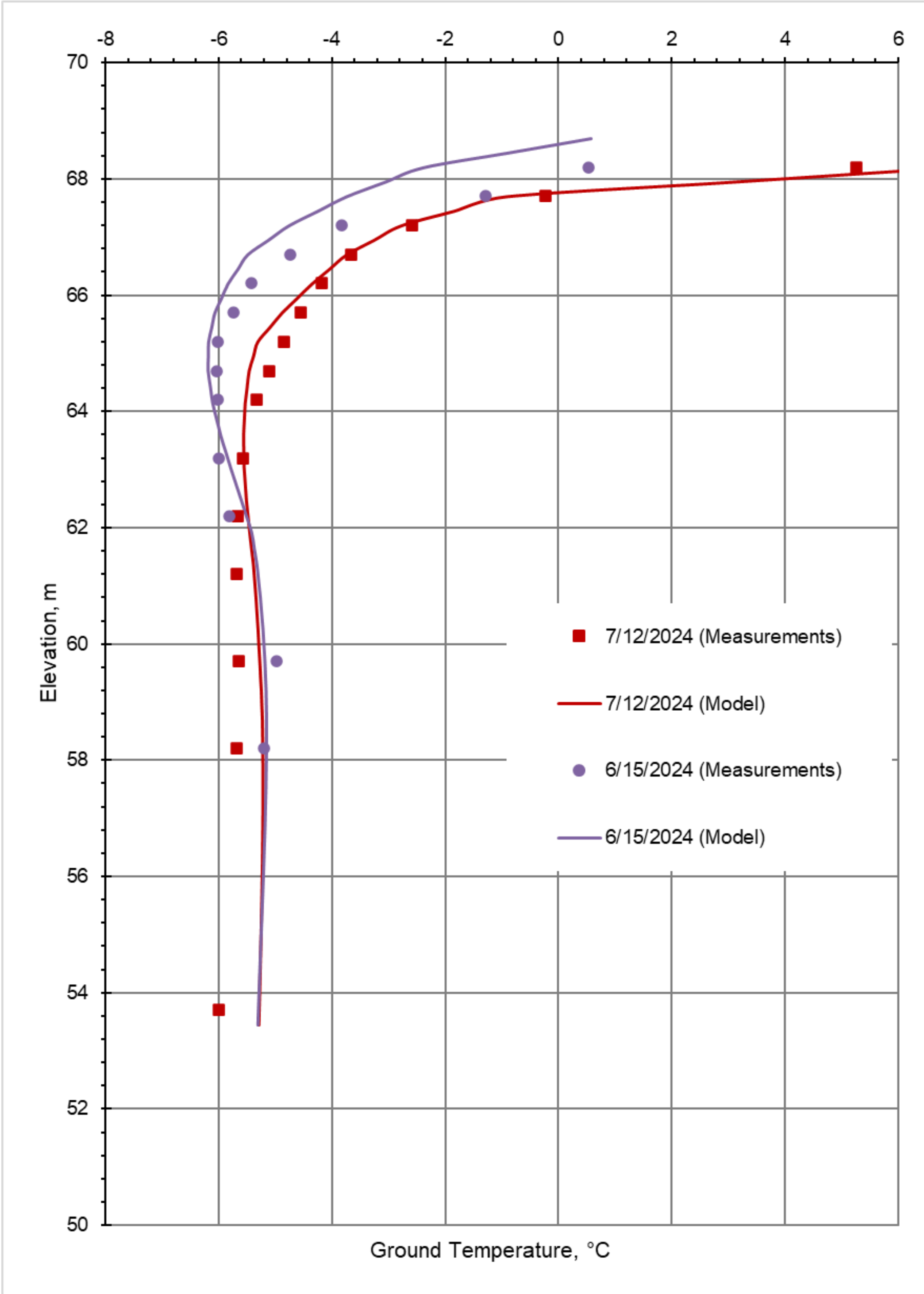
TETRA TECH

MELIADINE GOLD MINE, CANADA

PROPOSED WRSF6 FOOTPRINT WITH BOREHOLE LOCATIONS

PROJECT NO.	DWN	CKD	REV
ENG.EARC03140-38	DS	HX	A
OFFICE	DATE		
EDM	OCTOBER 03, 2024		

FIGURE 1



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NOTES

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MELIADINE GOLD MINE, CANADA

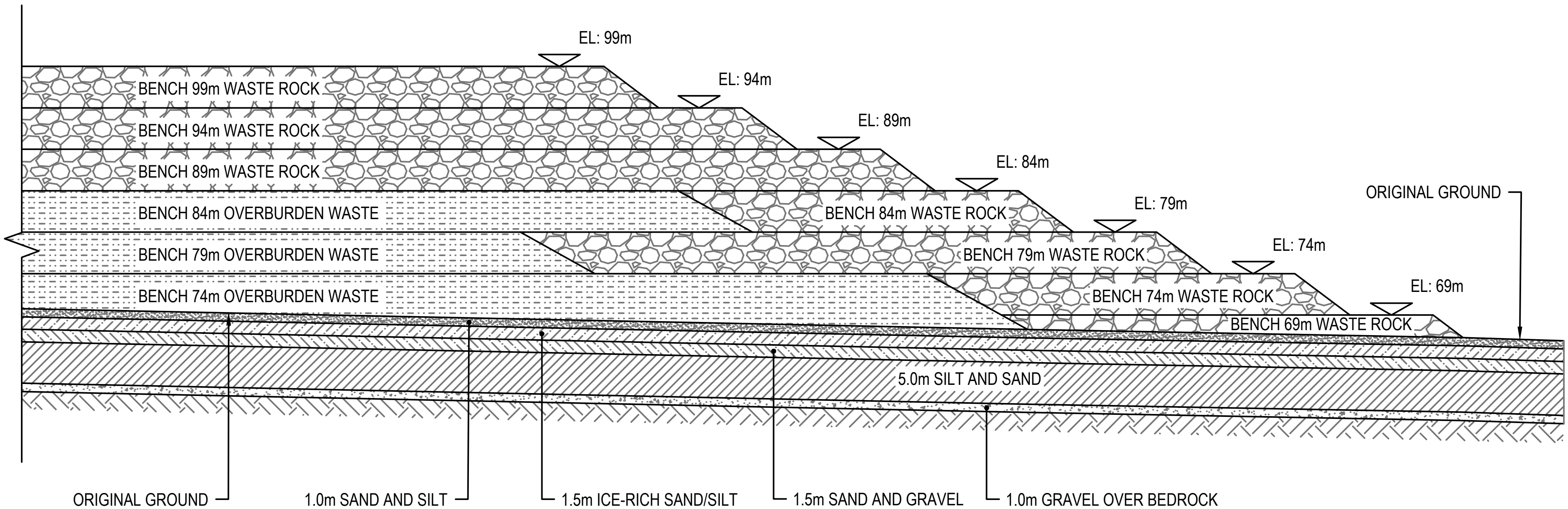
Comparison of Measured Temperatures at GT24-37 with Modelled Results in Calibration Thermal Analysis

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	LW	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure 2

C:\Users\robin.chen\OneDrive - Tetra Tech, Inc\Documents\Hongwei\LPing\09-25-2024\Figure 2.dwg [FIGURE 2] September 25, 2024 - 11:53:11 am (BY: CHEN, ROBIN)



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NOTES

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Scale: 1:750 @ 8.5"x11"

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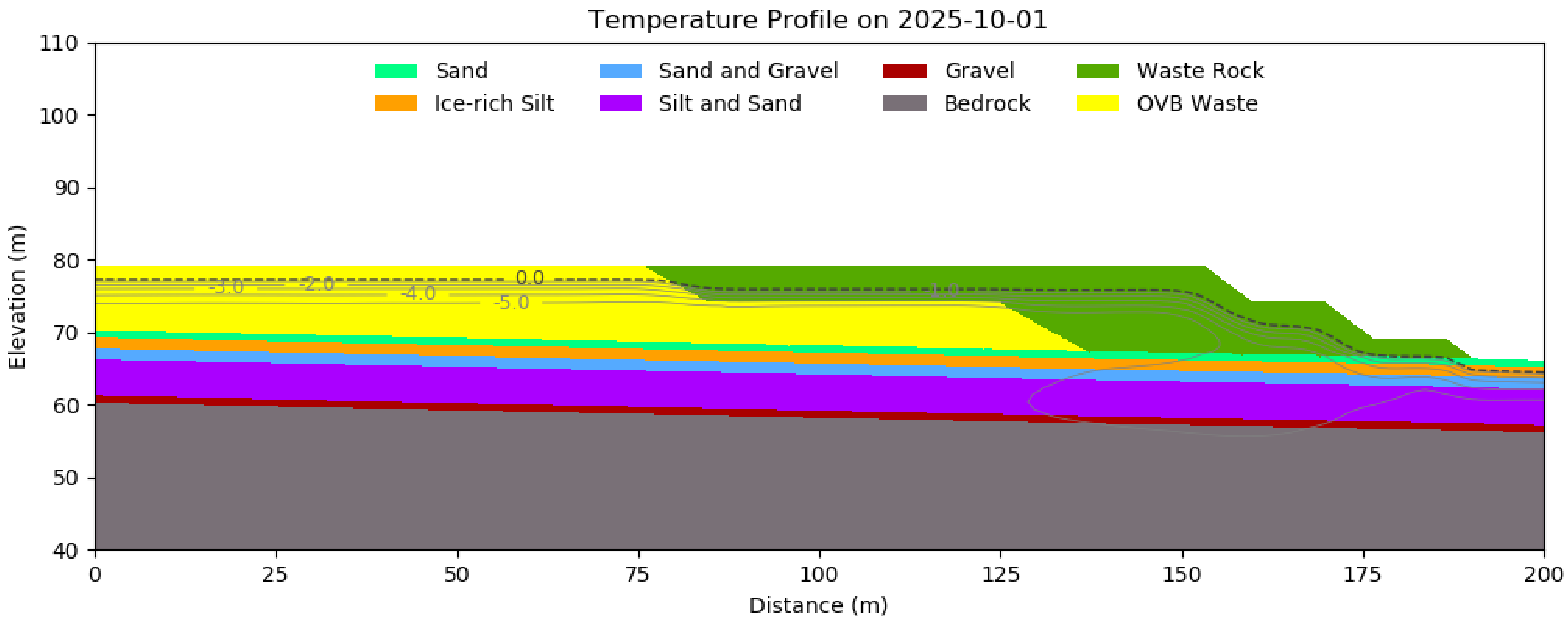
MELIADINE GOLD MINE, CANADA

Section And Placement Benches For Thermal Analysis Of WRDF 6

PROJECT NO.	DWN	CKD	REV	
ENG.EARC03140-38	RC	LW	A	FIGURE 3
OFFICE	DATE			
EDM	September 25, 2024			



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NOTES

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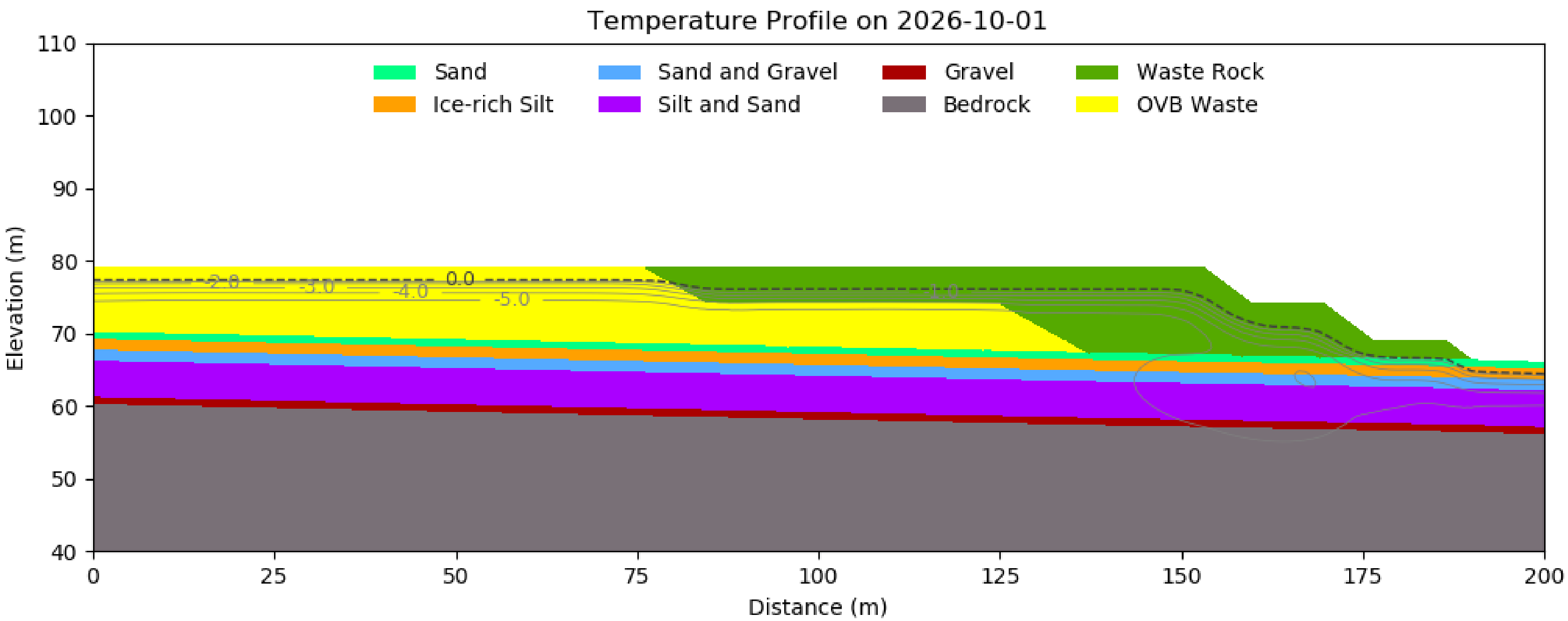
MELIADINE GOLD MINE, CANADA

Predicted Isotherms on October 1, 2025

PROJECT NO.	DWN	CKD	APVD	REV	
ENG.EARC03140-38	LW	HX	HX		**Figure 4**
OFFICE	DATE				
EDM	SEPTEMBER 2024				



LEGEND

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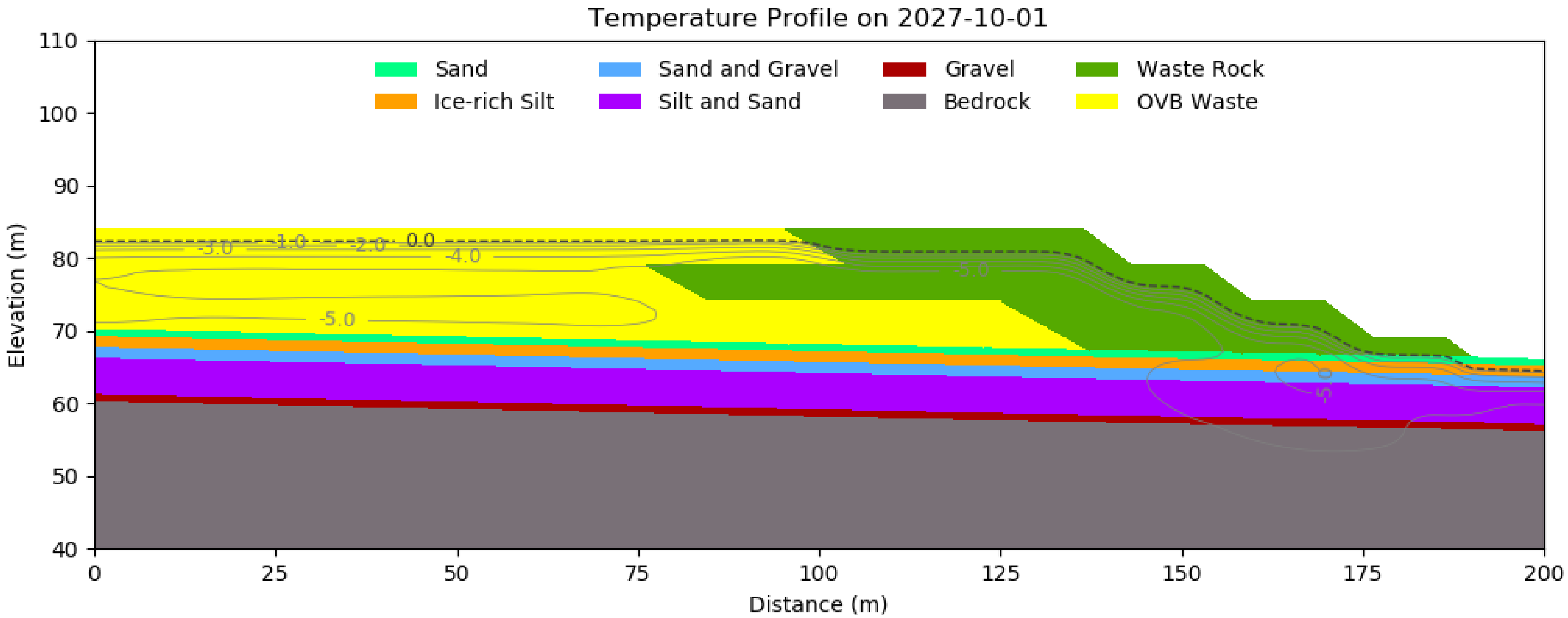
MELIADINE GOLD MINE, CANADA

Predicted Isotherms on October 1, 2026

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	LW	HX	HX	
OFFICE	DATE			
EDM	SEPTEMBER 2024			

Figure 5



LEGEND

NOTES

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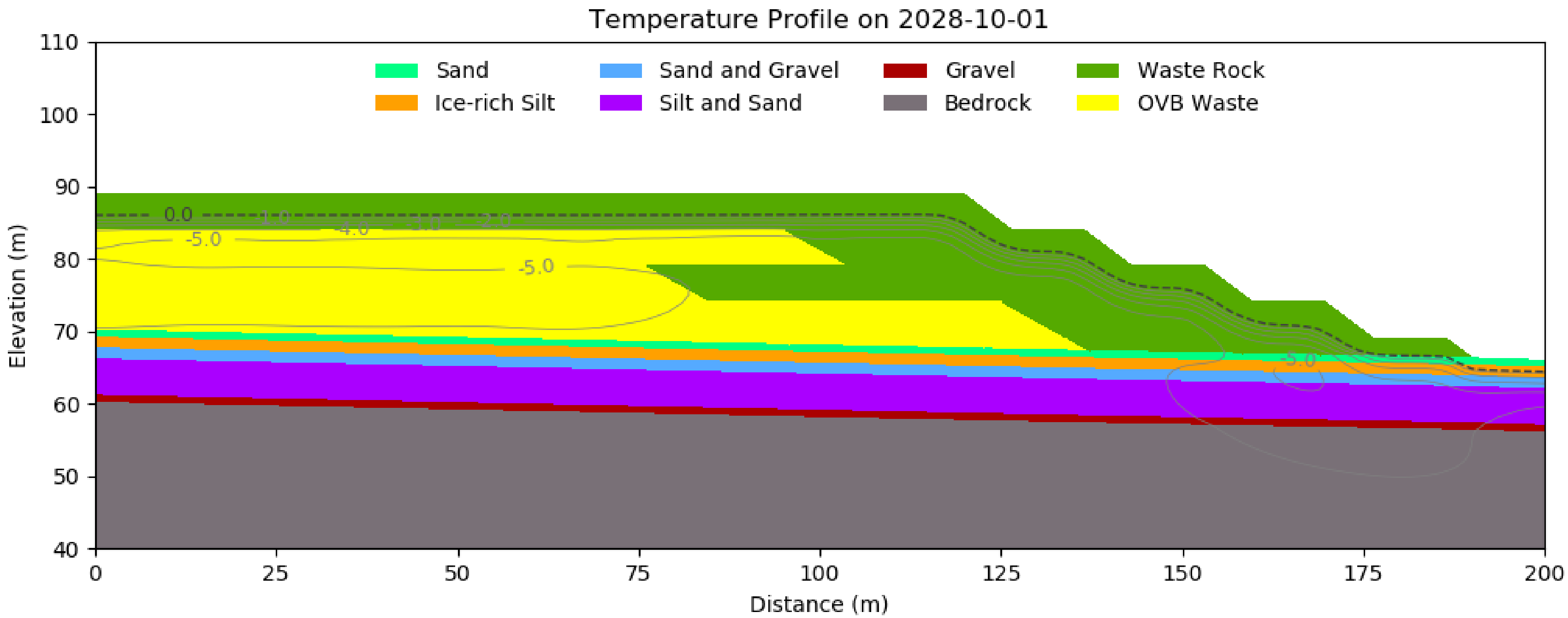
Predicted Isotherms on October 1, 2027

PROJECT NO.	DWN	CKD	APVD	REV	
ENG.EARC03140-38	LW	HX	HX		**Figure 6**
OFFICE	DATE				
EDM	SEPTEMBER 2024				



LEGEND

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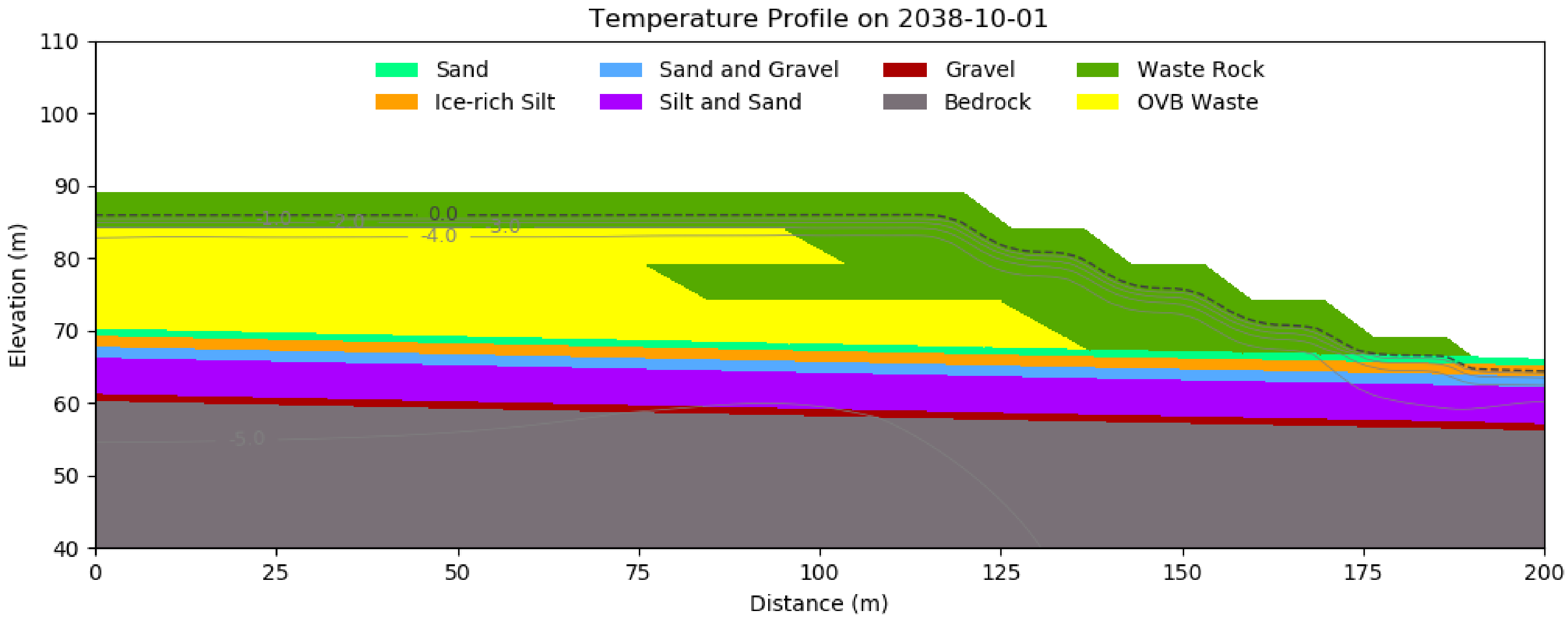
MELIADINE GOLD MINE, CANADA

Predicted Isotherms on October 1, 2028

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	LW	HX	HX	
OFFICE	DATE			
EDM	SEPTEMBER 2024			

Figure 7



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NOTES

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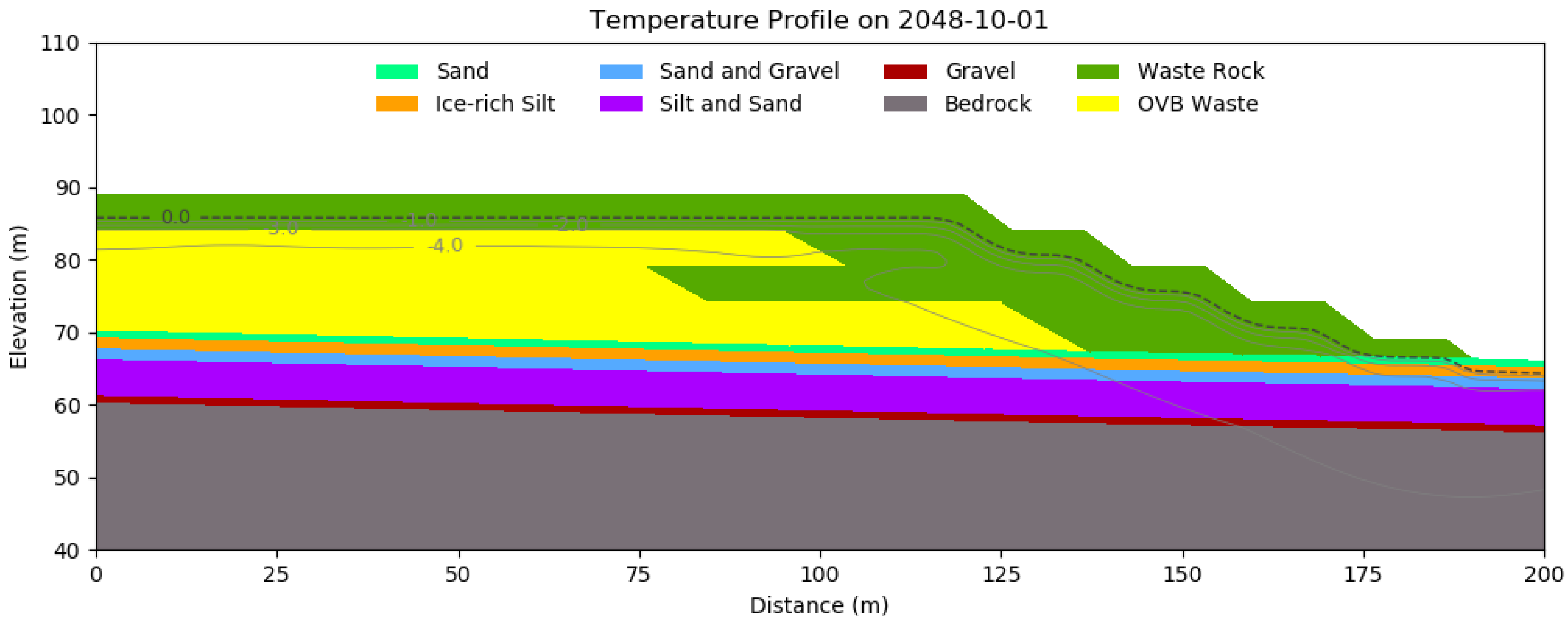
MELIADINE GOLD MINE, CANADA

Predicted Isotherms on October 1, 2038

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	LW	HX	HX	
OFFICE	DATE			
EDM	SEPTEMBER 2024			

Figure 8



LEGEND

NOTES

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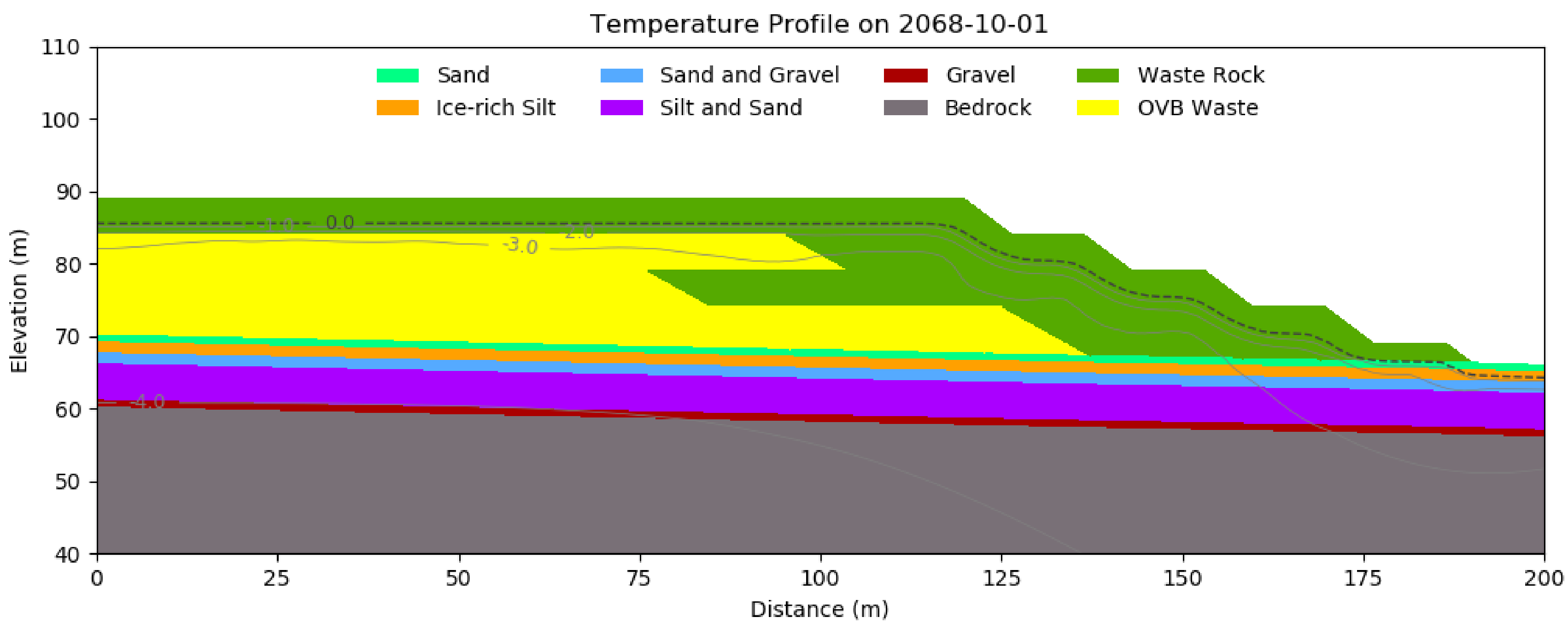
MELIADINE GOLD MINE, CANADA

Predicted Isotherms on October 1, 2048

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	LW	HX	HX	
OFFICE	DATE			
EDM	SEPTEMBER 2024			

Figure 9



LEGEND

NOTES

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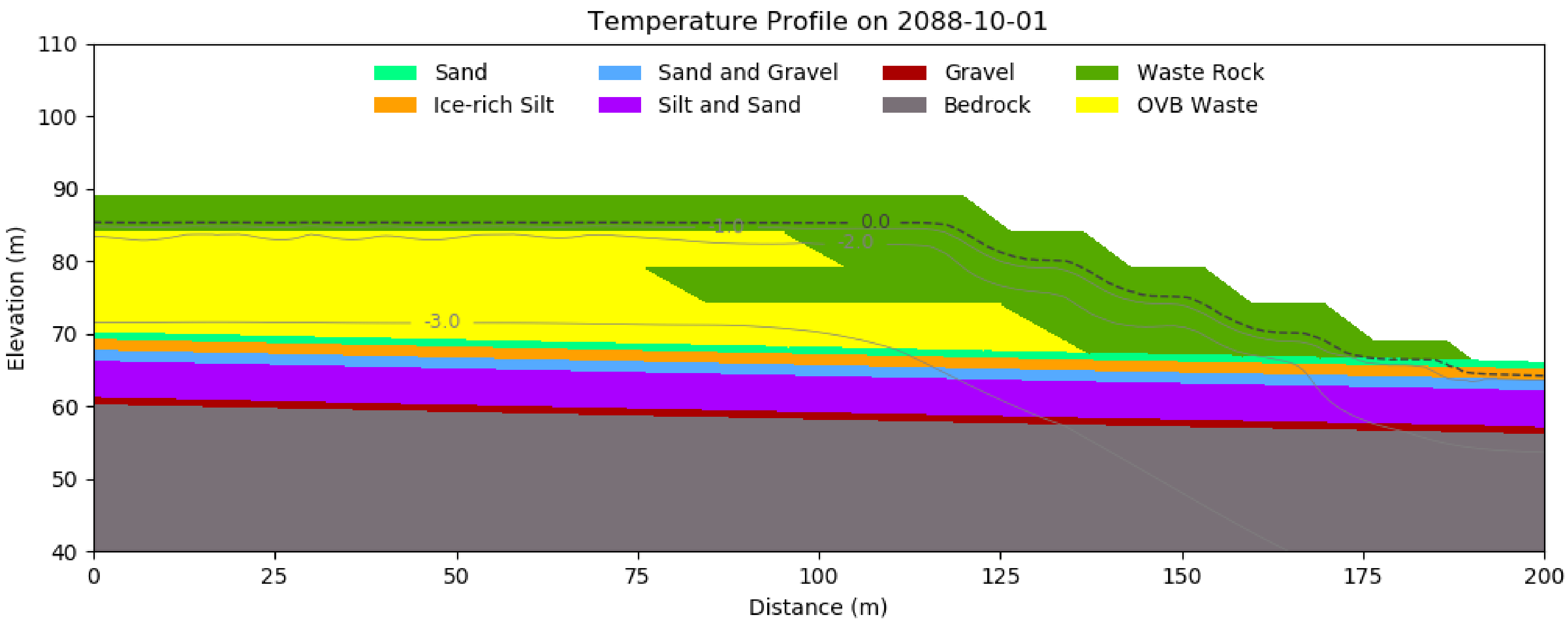
MELIADINE GOLD MINE, CANADA

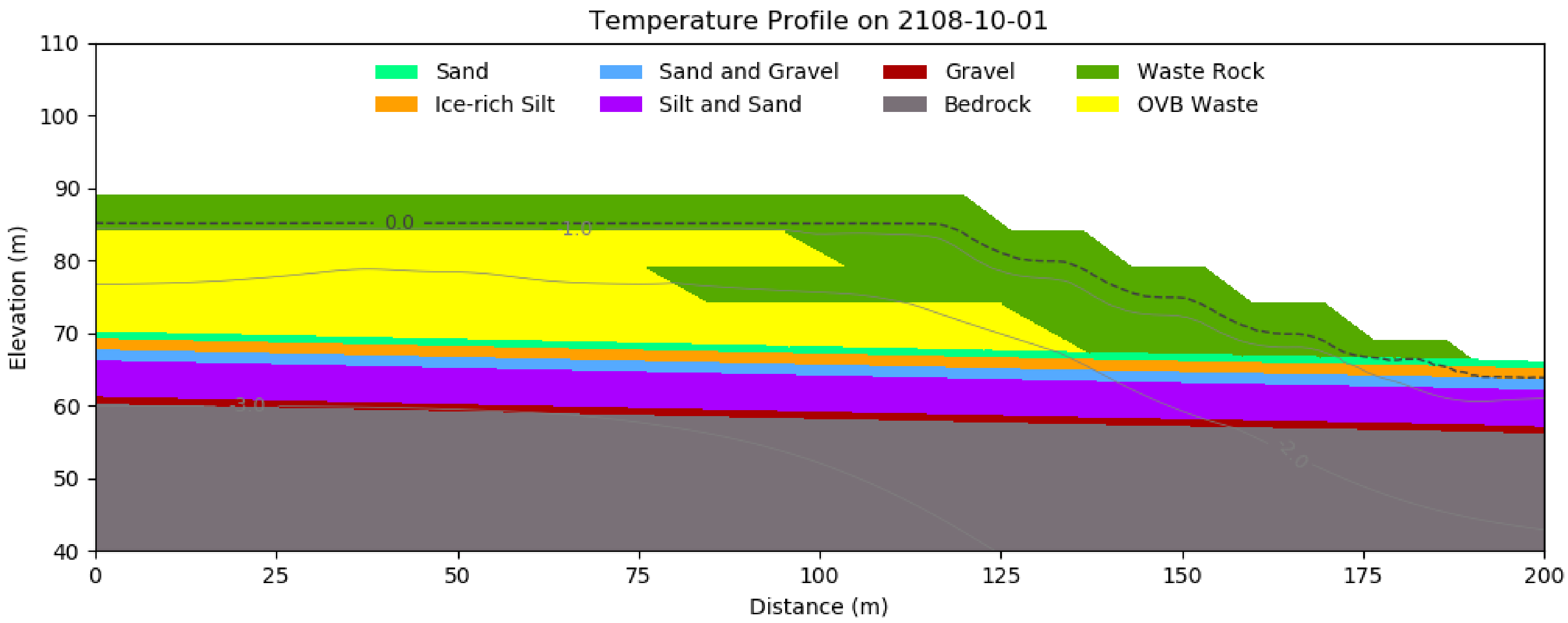
Predicted Isotherms on October 1, 2068

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	LW	HX	HX	
OFFICE	DATE			
EDM	SEPTEMBER 2024			

Figure 10



LEGEND	NOTES	CLIENT	MELIADINE GOLD MINE, CANADA
		AGNICO EAGLE	Predicted Isotherms on October 1, 2088
	STATUS ISSUED FOR USE	TETRA TECH	PROJECT NO.: ENG.EARC03140-38; DWN: LW; CKD: HX; APVD: HX; REV: OFFICE: EDM; DATE: SEPTEMBER 2024 Figure 11



LEGEND

NOTES

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CLIENT

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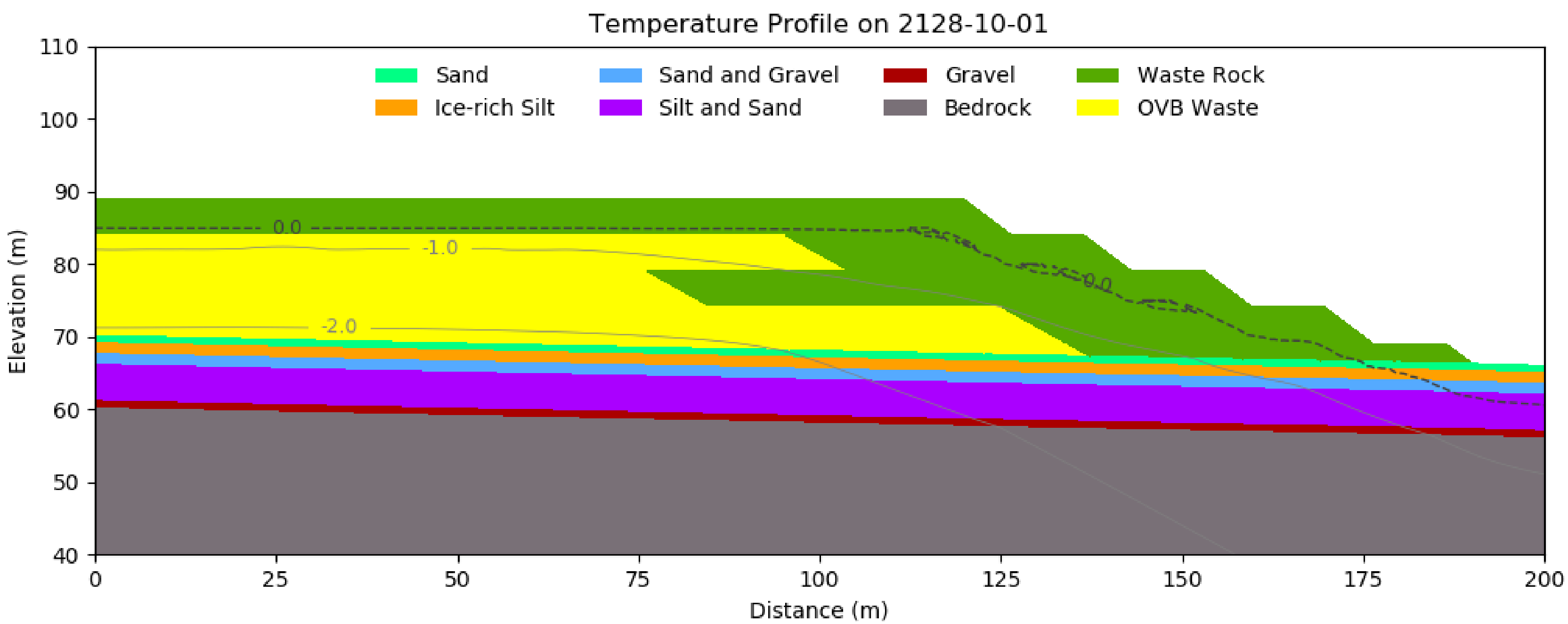
TETRA TECH

MELIADINE GOLD MINE, CANADA

Predicted Isotherms on October 1, 2108

PROJECT NO.	DWN	CKD	APVD	REV	
ENG.EARC03140-38	LW	HX	HX		**Figure 12**
OFFICE	DATE				
EDM	SEPTEMBER 2024				



LEGEND

NOTES

STATUS
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CLIENT

AGNICO EAGLE

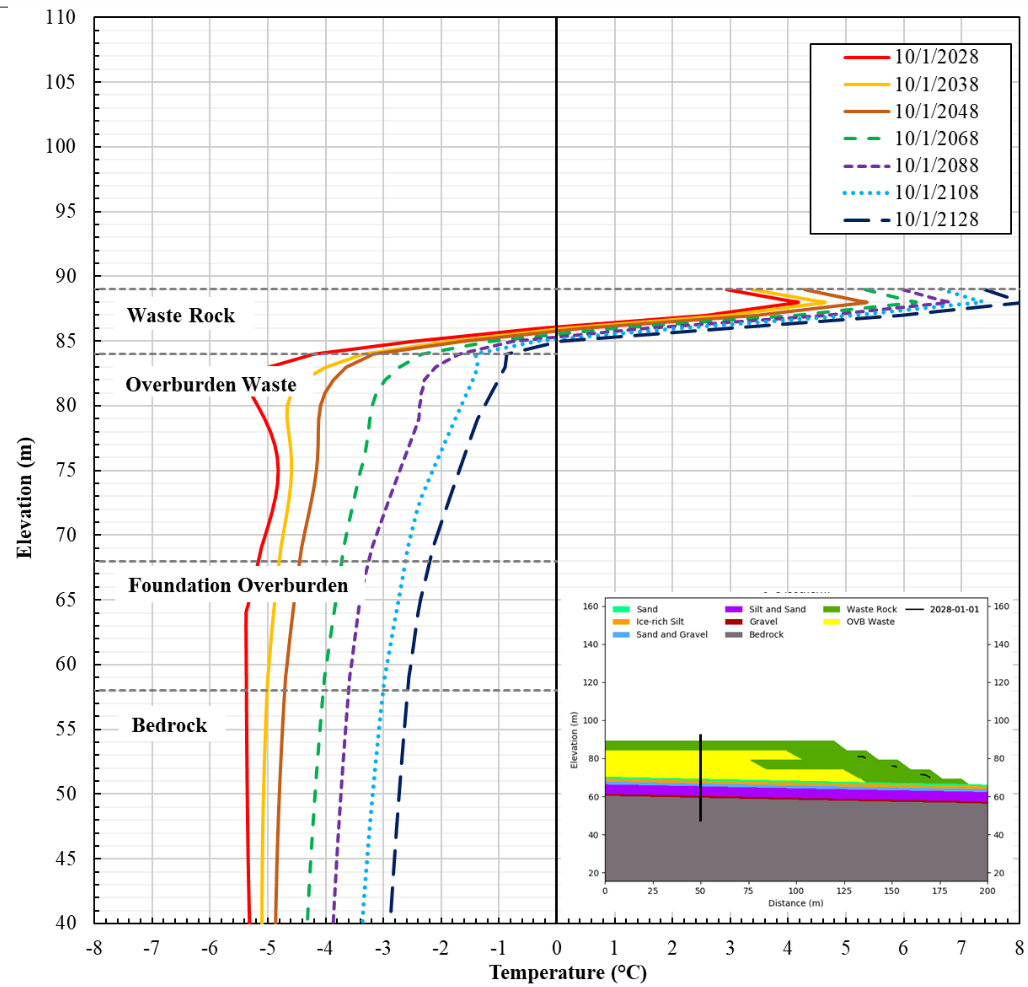
TETRA TECH

MELIADINE GOLD MINE, CANADA

Predicted Isotherms on October 1, 2128

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	LW	HX	HX	
OFFICE	DATE			
EDM	SEPTEMBER 2024			

Figure 13



LEGEND

NOTES

STATUS
ISSUED FOR USE

CLIENT

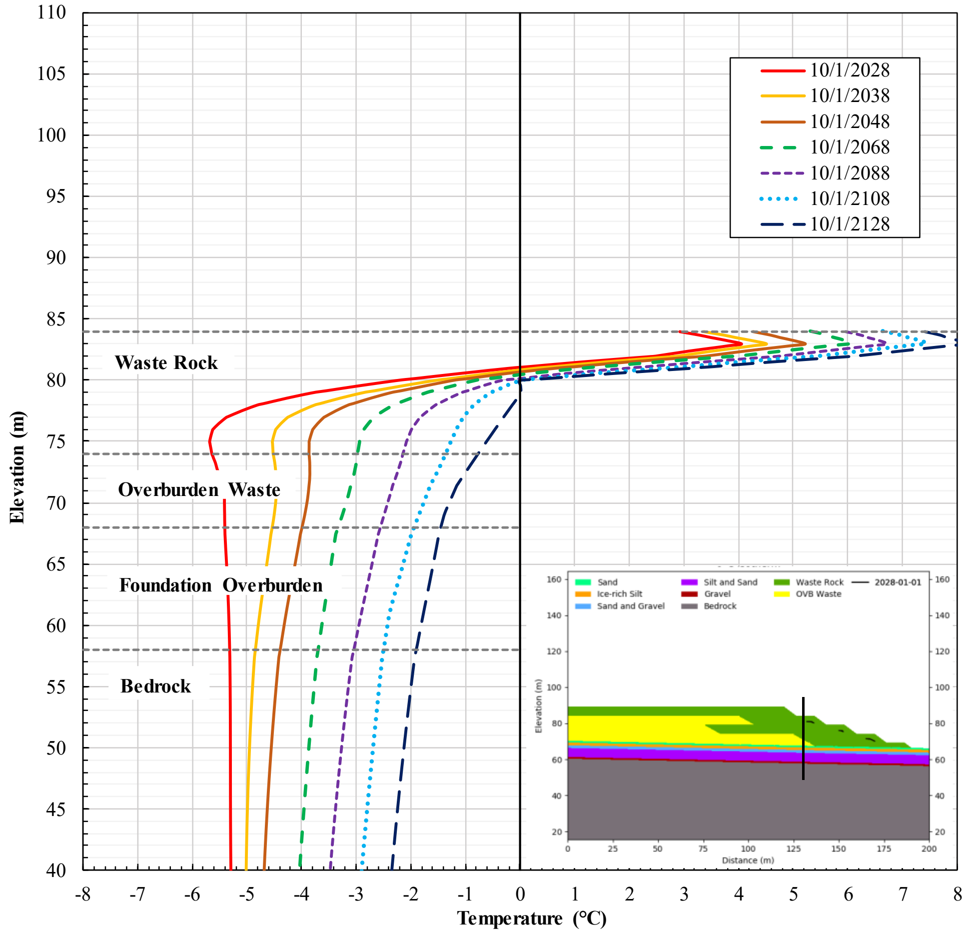
AGNICO EAGLE

TETRA TECH

MELIADINE GOLD MINE, CANADA

Predicted Temperature Profiles in Selected Years at Middle of Bench 89 m

PROJECT NO.	DWN	CKD	APVD	REV	
ENG.EARC03140-38	LW	HX	HX		Figure 14
OFFICE	DATE				
EDM	SEPTEMBER 2024				



LEGEND

NOTES

STATUS
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TETRA TECH

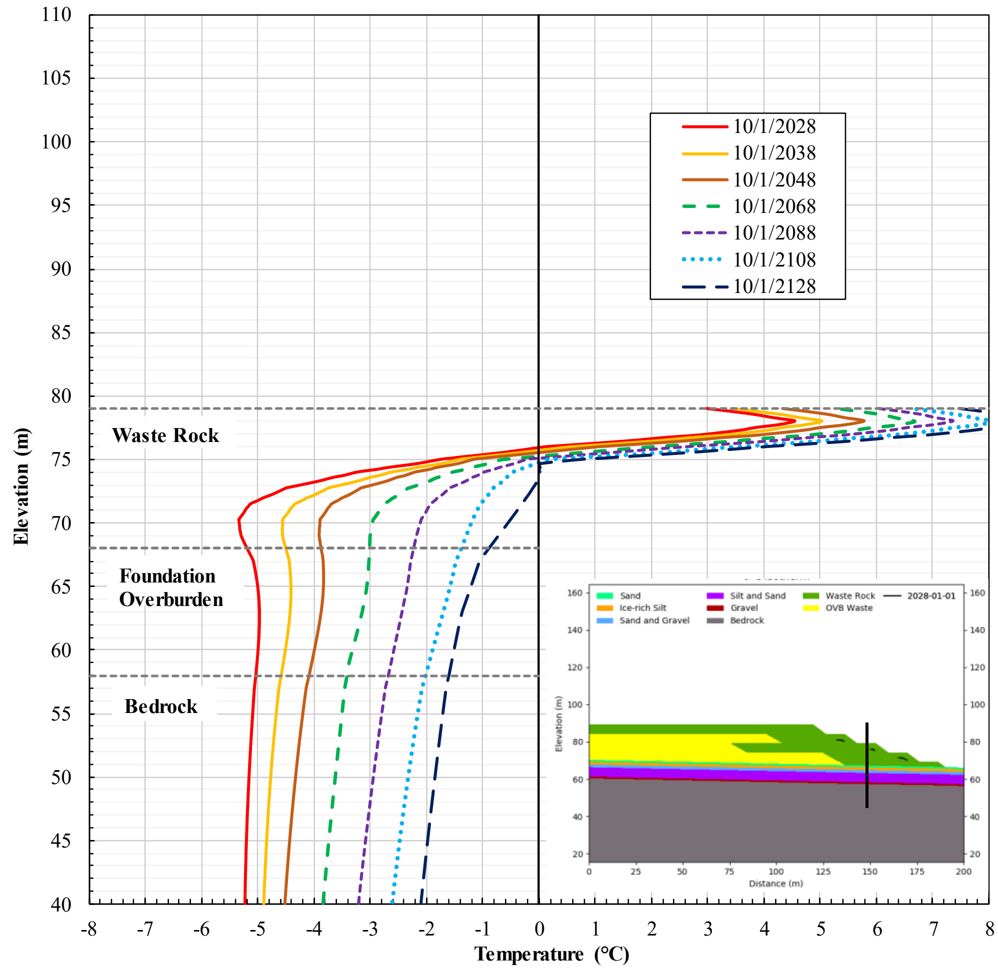
MELIADINE GOLD MINE, CANADA

Predicted Temperature Profiles in Selected Years at Middle of Bench 84 m

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	LW	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure 15



LEGEND

NOTES

STATUS
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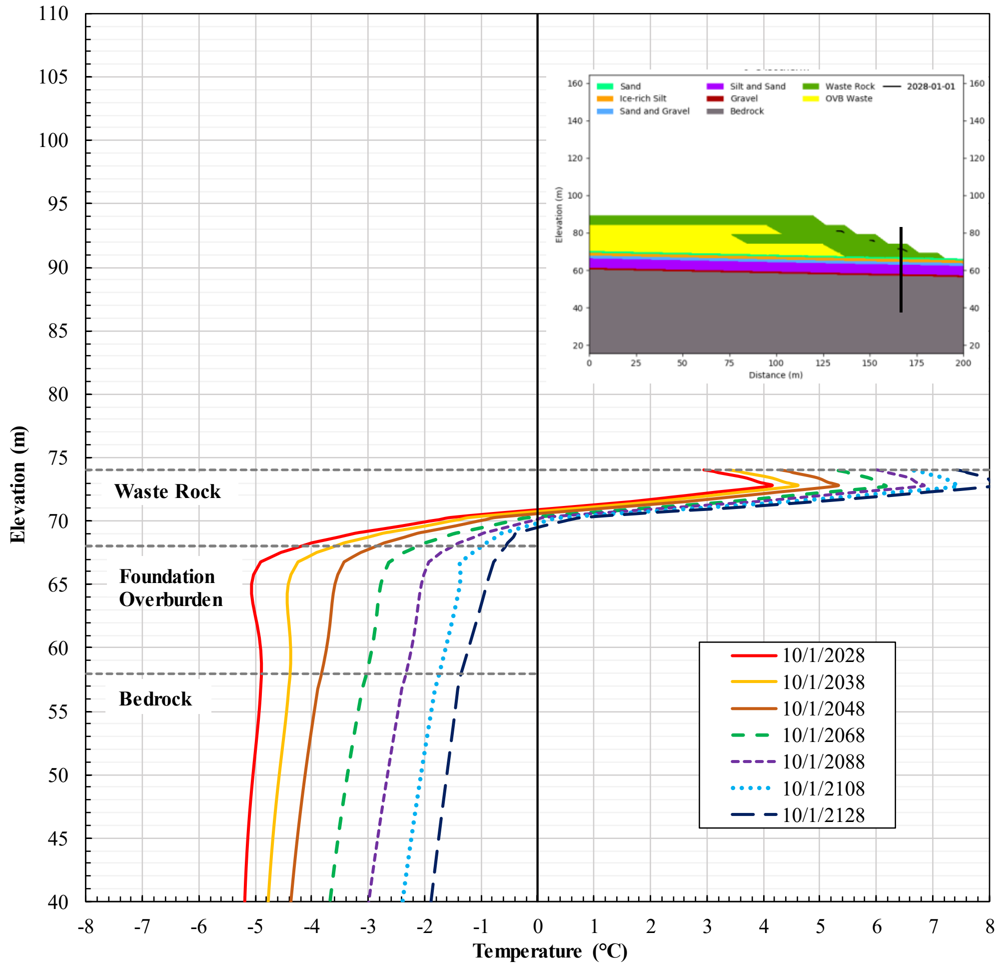
MELIADINE GOLD MINE, CANADA

Predicted Temperature Profiles in Selected Years at Middle of Bench 79 m

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	LW	HX	HX	
OFFICE	DATE			
EDM	SEPTEMBER 2024			

Figure 16



LEGEND

NOTES

STATUS
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TETRA TECH

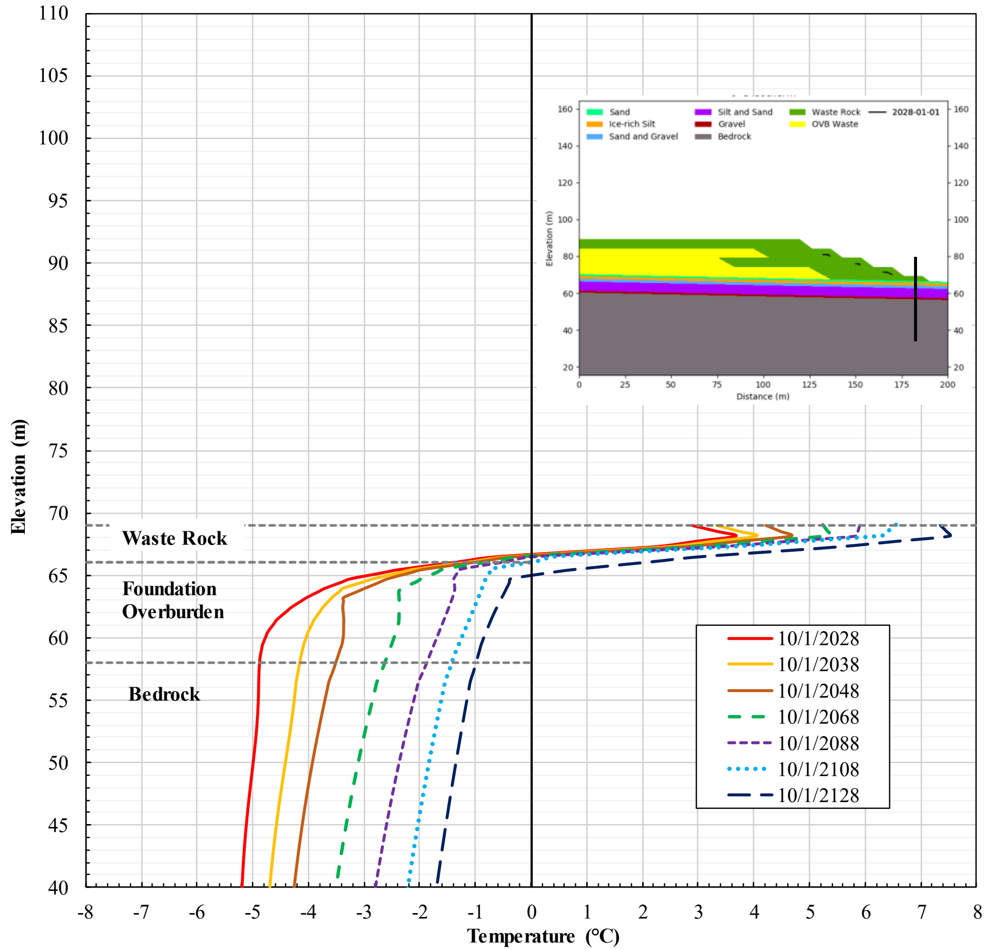
MELIADINE GOLD MINE, CANADA

Predicted Temperature Profiles in Selected Years at Middle of Bench 74 m

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	LW	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure 17



LEGEND

NOTES

STATUS
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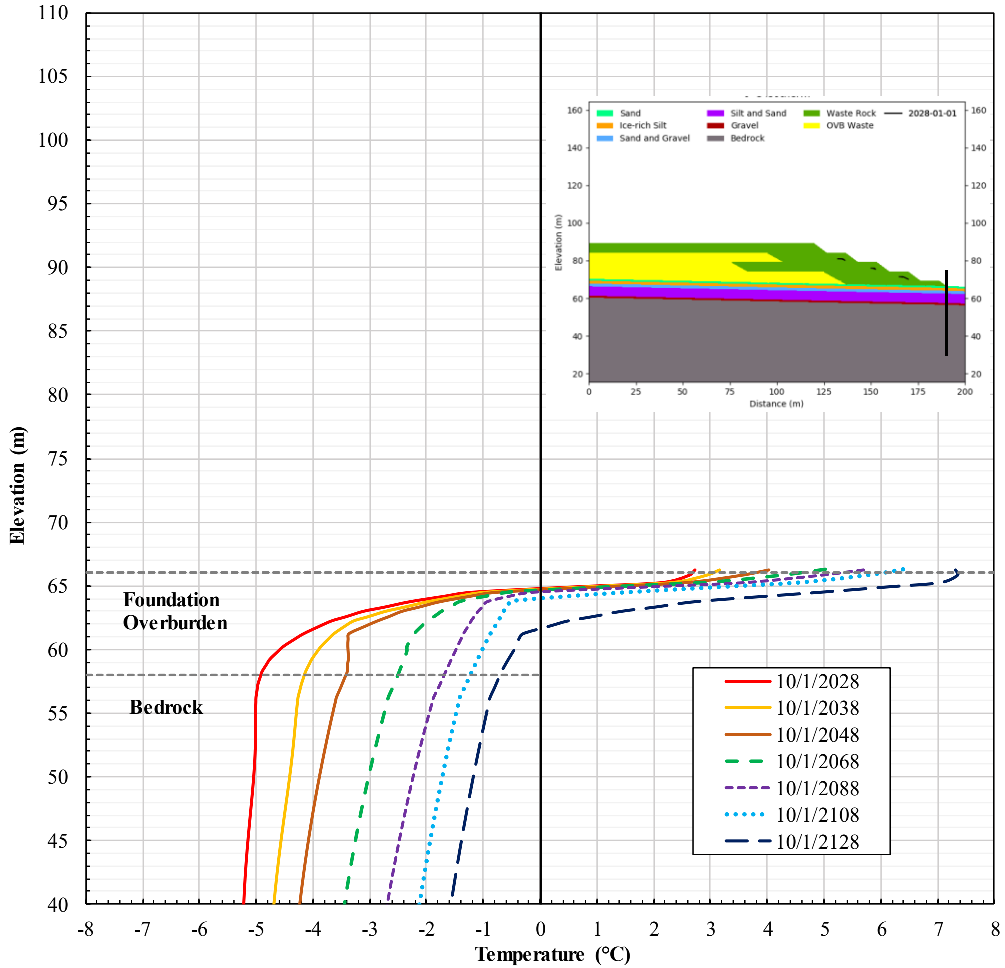
TETRA TECH

MELIADINE GOLD MINE, CANADA

Predicted Temperature Profiles in Selected Years at Middle of Bench 69 m

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	LW	HX	HX	
OFFICE	DATE			
EDM	SEPTEMBER 2024			

Figure 18



LEGEND

NOTES

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

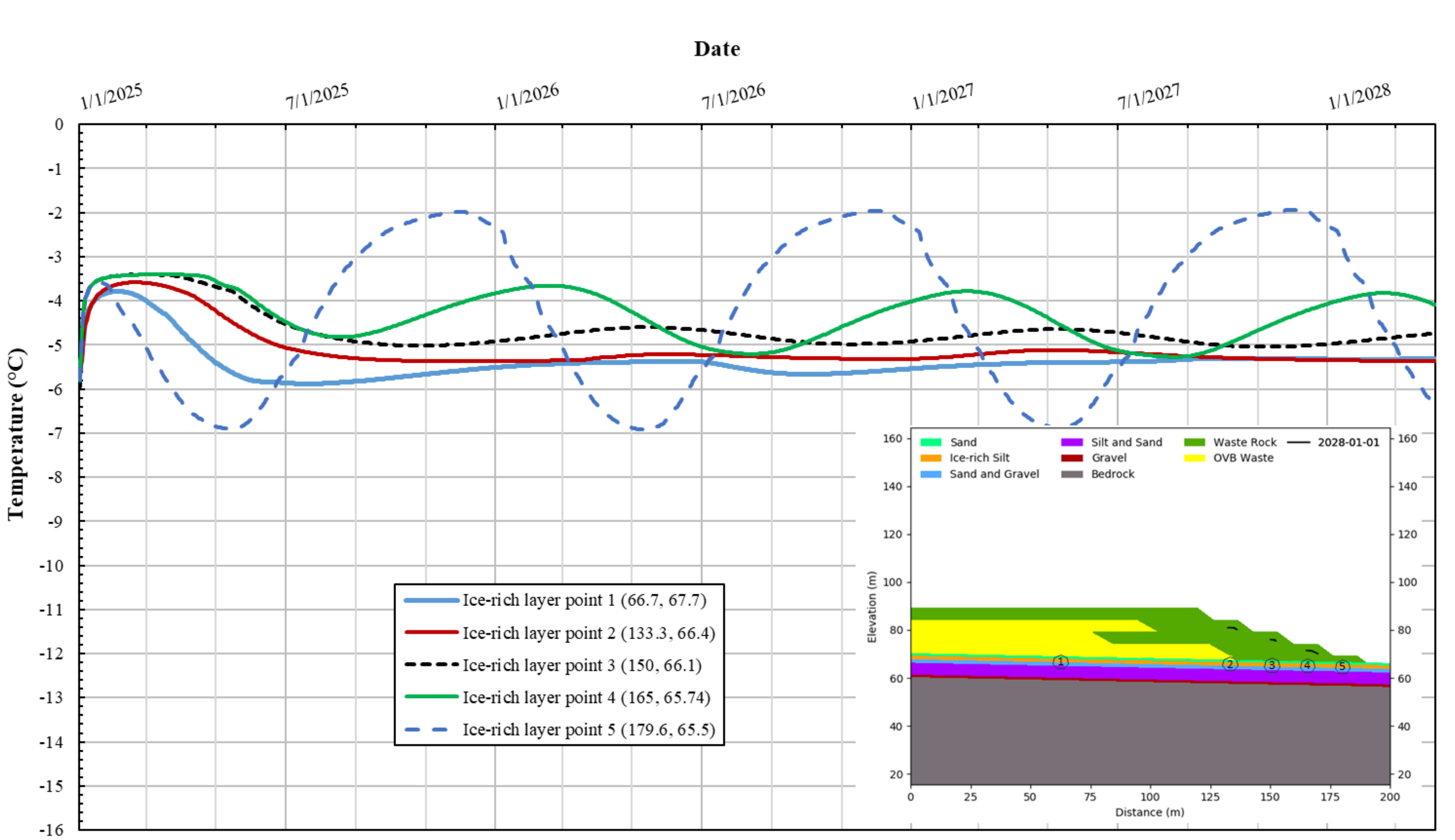
TETRA TECH

MELIADINE GOLD MINE, CANADA

Predicted Temperature Profiles in Selected Years at the Toe

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	LW	HX	HX	
OFFICE	DATE			
EDM	SEPTEMBER 2024			

Figure 19



LEGEND

NOTES

STATUS
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CLIENT

AGNICO EAGLE

TETRA TECH

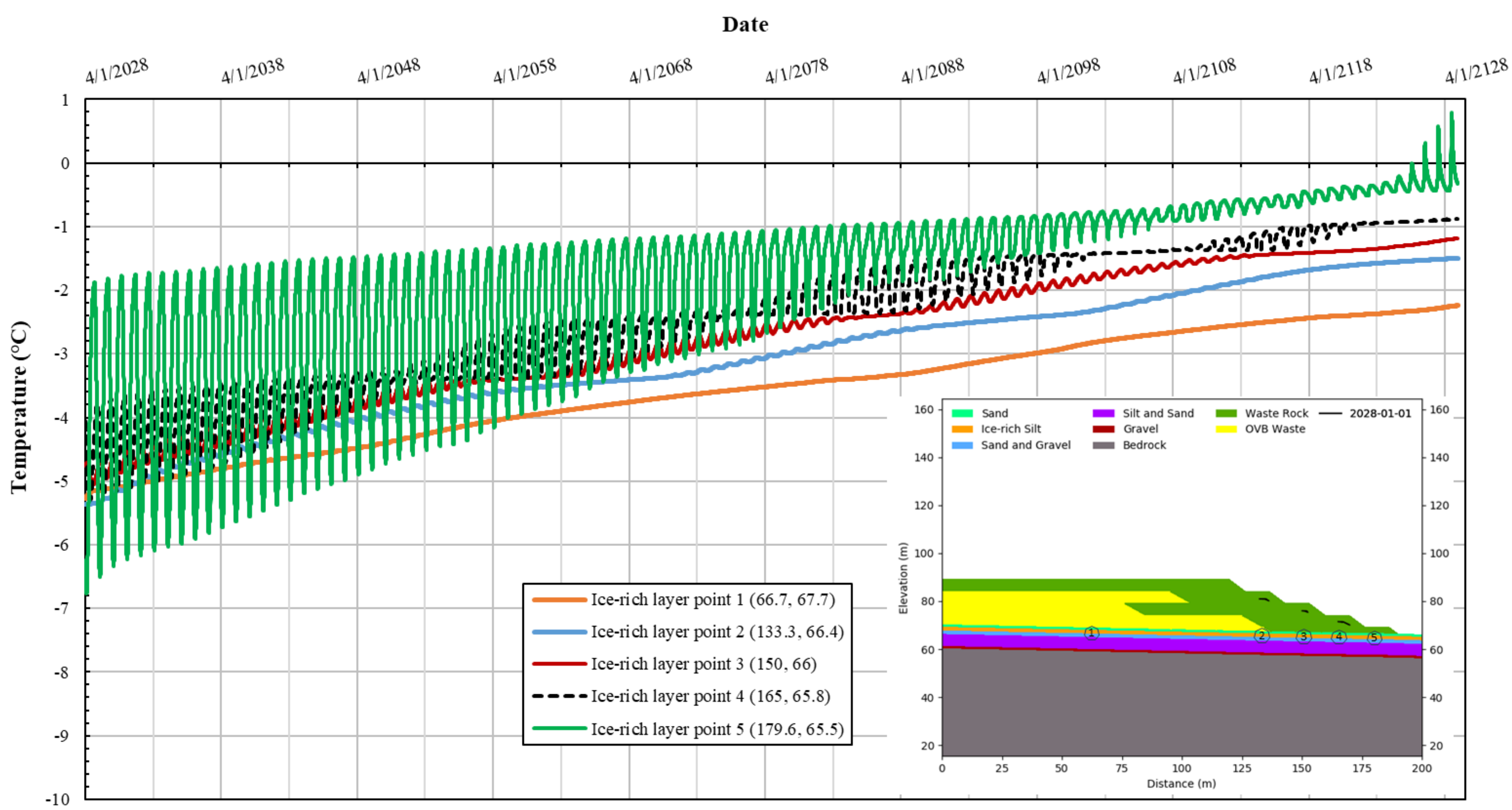
MELIADINE GOLD MINE, CANADA

Predicted Temperature Profiles Along Top of Ice-rich layer during the construction (crest elevation of 89m)

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	LW	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure 20



LEGEND

NOTES

STATUS
ISSUED FOR USE

CLIENT

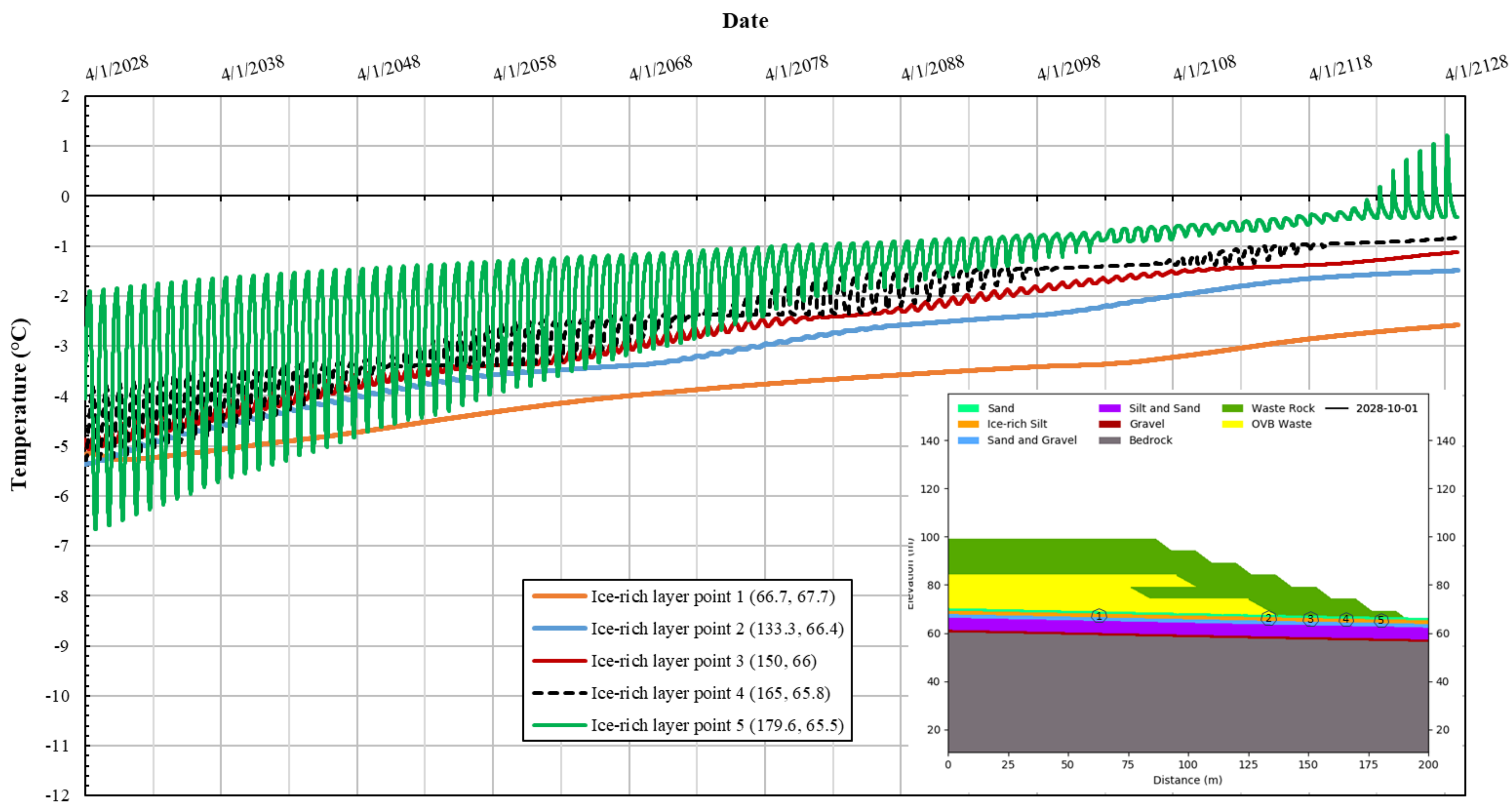
AGNICO EAGLE

TETRA TECH

MELIADINE GOLD MINE, CANADA

Predicted Temperature Profiles Along Top of Ice-rich layer after the construction (crest elevation of 89m)

PROJECT NO.	DWN	CKD	APVD	REV	
ENG.EARC03140-38	LW	HX	HX		Figure 21
OFFICE	DATE				
EDM	SEPTEMBER 2024				



LEGEND

NOTES

STATUS
ISSUED FOR USE

CLIENT

AGNICO EAGLE

TETRA TECH

MELIADINE GOLD MINE, CANADA

Predicted Temperature Profiles Along Top of Ice-rich layer after the construction (crest elevation of 99m)

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	LW	HX	HX	
OFFICE	DATE			
EDM	SEPTEMBER 2024			

Figure 22

APPENDIX A

TETRA TECH'S LIMITATIONS ON USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

GEOTECHNICAL

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Both electronic file and/or hard copy versions of TETRA TECH’s Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH’s Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

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If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by persons other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this report, at or on the development proposed as of the date of the Professional Document requires a supplementary investigation and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, TETRA TECH has not been retained to investigate, address or consider and has not investigated, addressed or considered any environmental or regulatory issues associated with development on the subject site.

1.8 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems and methods employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. TETRA TECH does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

1.9 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

1.10 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historic environment. TETRA TECH does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional investigation and review may be necessary.

1.11 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

1.12 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

1.13 INFLUENCE OF CONSTRUCTION ACTIVITY

There is a direct correlation between construction activity and structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques are known.

1.14 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, as well as the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

1.15 DRAINAGE SYSTEMS

Where temporary or permanent drainage systems are installed within or around a structure, the systems which will be installed must protect the structure from loss of ground due to internal erosion and must be designed so as to assure continued performance of the drains. Specific design detail of such systems should be developed or reviewed by the geotechnical engineer. Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function.

1.16 BEARING CAPACITY

Design bearing capacities, loads and allowable stresses quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition assumed. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions assumed in this report in fact exist at the site.

1.17 SAMPLES

TETRA TECH will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the Client’s expense upon written request, otherwise samples will be discarded.

APPENDIX D

WRSF6 SLOPE STABILITY MEMO

TETRA TECH

TECHNICAL MEMO

ISSUED FOR USE

To:	Justin Bieber, Agnico Eagle Marielle Limoges, Agnico Eagle	**Date:**	December 13, 2024
c:	Jawad Haloui, Agnigo Eagle	**Memo No.:**	001
From:	Fai, Ndofor, P.Geo., Tetra Tech Hongwei Xia, P.Eng., Tetra Tech Yawu Liang, E.I.T., Tetra Tech	**File:**	ENG.EARC03140-38
Subject:	Stability Analyses for Waste Rock Storage Facility 6 (WRSF6), Meliadine Gold Mine, Nunavut		

1.0 INTRODUCTION

Agnico Eagle Mines Limited (Agnico Eagle) is operating the Meliadine Gold Mine (the Meliadine Mine) which is located approximately 25 km north of Rankin Inlet, Nunavut. The current operation consists of mining the Tiriganiaq deposit with two open pits and an underground operation under the existing Nunavut Water Board Type A Water Licence (2AM-MEL1631). In January 2024, Agnico Eagle submitted a Water Licence Amendment application to support the completion of licensing components approved under Nunavut Impact Review Board Project Certificate No. 006. The 2024 Water Licence Amendment will allow Agnico Eagle to mine the Wesmeg, Wesmeg North, Pump, FZone, and Discovery deposits that were included in the 2014 Final Environmental Impact Statement (FEIS) and Project Certificate No.006.

As per the current mine plan, Waste Rock Storage Facility 6 (WRSF6) is required to accommodate the overburden and waste rock that will be produced from the mining of the deposits at Pump, which was included in the 2024 Water Licence Amendment application. Tetra Tech Canada Inc. (Tetra Tech) was retained by Agnico Eagle to carry out the detailed design and to prepare a design report and Issued for Construction Drawings (IFC) for WRSF6. To support the detailed design of WRSF6, slope stability analyses were performed to assist in developing typical cross-sections and design of WRSF6.

This technical memorandum summarizes the methodology, design criteria, input parameters, assumptions, and results from the slope stability analyses. This technical memorandum will be included as an appendix to the WRSF6 design report.

2.0 GENERAL SITE CONDITIONS

2.1 Climate

The Meliadine Mine 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 Meliadine Mine 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. The mean annual temperature for the period of record from 1994 to 2023 was -9.8°C based on the measured air temperature data at Rankin Inlet.

Tetra Tech Canada Inc.
14940 - 123 Avenue
Edmonton, AB T5V 1B4 CANADA
Tel 780.451.2121 Fax 780.454.5688

The annual total precipitation under mean condition at the Meliadine Mine site is 394 mm/year and falls almost equally as snow and rainfall (Tetra Tech 2021a). Average annual evaporation for small waterbodies in the Meliadine Mine site 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 expanses offered to moving air masses. The wind blows generally from the northwest and north-northwest direction. The mean values for wind speed show that the north-northwest, together with northwest winds, have the highest speeds and tend to be the strongest. Mean monthly wind speeds are typically between 19 km/hour and 29 km/hour, with an average of 22.3 km/hour.

2.2 Subsurface Conditions

Geotechnical drilling programs were conducted to collect data for the proper understanding of subsurface geotechnical conditions within the WRSF6 footprint (Golder 2012a, Tetra Tech 2021b, Tetra Tech 2024a, Tetra Tech 2024b). A total of 22 boreholes have been drilled within or near the perimeters of the WRSF6 footprint. The locations of the boreholes drilled are presented on Figure 1.

In general, the subsurface of WRSF6 consists of a layer of organic materials, underlain by various layers of Boulders, Cobbles, Silt, Sand, Silt and Sand, Ice + Sand, Gravel and Sand, Ice + Silt and Sand, Gravel and Greywacke bedrock. Excess ice was observed in all boreholes within the footprint. Encountered excess ice cryostructures include Nbe, Vs, Vx, and Vc. Vs excess ice occurred in the form of clear lenticular and wavey ice lenses. Measured volumetric ice content varied from 10% to 65%. The gravimetric moisture content of the overburden varied from 6.1% at a depth of 5.50 m to 45.6% at a depth of 3.92 m. Within the WRSF6 footprint, the depth (from ground surface) to bedrock ranged from approximately 4.05 m to 17.40 m. The laboratory tested unconfined compressive strength of the greywacke bedrock ranged from 22.6 MPa to 60.1 MPa. The detailed geotechnical information and borehole logs can be found in Golder (2012a) and Tetra Tech (2021b, 2024a, and 2024b).

2.3 Ground Temperature and Permafrost Condition

The Meliadine Mine site is located within the Southern Arctic terrestrial eco-zone which is one of the coldest and driest regions of Canada, in a zone of continuous permafrost. Continuous permafrost to depths of between 285 m to 430 m is expected based on ground temperature data from thermistors installed near Tiriganiaq, FZone, and Discovery deposits (WSP 2024). The measured ground temperature data indicates that the active layer ranges from 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 the depth of below 18 m) are in the range of -5.9°C to -7.0°C in the areas away from lakes and streams. The geothermal gradient ranges from 0.015°C/m to 0.02°C/m (WSP 2024).

3.0 WASTE ROCK AND OVERBURDEN PROPERTIES, PRODUCTION, AND PLACEMENT PLAN FOR WRSF6

3.1 Waste Rock and Overburden Properties

Most of the waste rock at the Pump deposit area is greywacke, and generally classified as medium to strong with uniaxial compressive strengths ranging from 36 MPa to 60 MPa (Tetra Tech 2024a). Waste rock from underground is typically classified as a 600 mm minus material, with rock from the open pits expected to be of a larger particle size (1,000 mm minus).

Based on the available borehole data around the Pump area, the overburden material generally consists of a thin layer of organic material overlying sandy gravel or gravelly sand overlying silty sand or sandy silty till and boulders. A layer of lakebed sediment is expected within the proposed open pits footprint at Pump. The overburden soils below the lakebed are expected to have similar characteristic as observed in the boreholes drilled (Tetra Tech 2024a). The overburden at the Meliadine Mine generally is non-plastic in nature (Golder 2010).

According to the geochemical characterization program conducted by Agnico Eagle in 2022, approximately 5% of total waste rock from the proposed open pits at the Pump area is expected to be classified as potentially acid generating (PAG) or Uncertain (Lorax 2022). Geochemical characterization of overburden for the 2014 FEIS (Golder 2014), showed that overburden was non acid generating, and contained low metal concentrations.

It is reasonably assumed from the findings from the geochemical characterization programs that both the overburden and waste rock are geochemically similar in that neither material requires a means to prevent oxidation and can be co-disposed within the same facility.

More details on the waste rock and overburden properties (geotechnical and geochemical) are documented in the WRSF6 Design Basis Memo (Tetra Tech 2024c).

3.2 Waste Rock and Overburden Production Plan

Based on the mine development plan proposed by Agnico Eagle on July 17, 2024 for the Pump deposits, the mining will be developed in two phases.

Phase 1 mining is expected to produce approximately 1.2 Mt of overburden and 2.5 Mt of waste rock. Active mining at Pump is planned to commence in 2025 and complete in 2031, followed by the closure phase. A portion of the waste materials is expected to be used for construction, underground backfill, open pit thermal cover, and other operational needs. A total of 1.1 Mt of overburden and 1.5 Mt of waste rock are expected to be stored in the WRSF6 Phase 1 footprint. A detailed breakdown of mine waste quantities for the Phase 1 development can be found in the WRSF6 Design Basis Memo (Tetra Tech 2024c).

Approximately 0.7 Mt of overburden and 2.5 Mt of waste rock are expected to be produced from the Phase 2 development. A detailed breakdown of mine waste quantities from the Phase 2 development were not provided to Tetra Tech.

3.3 Preliminary Waste Rock and Overburden Placement Plan for WRSF6

The overburden and waste rock produced from the mining development at the Pump area will be co-disposed within WRSF6, with the overburden encapsulated at the centre with waste rock. Like the proposed mine development at Pump, WRSF6 will be constructed in two phases. The mine waste from the Phase 1 open pit development will be stored within the WRSF6 Phase 1 footprint while that from the potential Phase 2 mine development will be stored in WRSF Phase 1 above bench 89 m and the WRSF6 Phase 2 footprint.

Table 1 summarizes the waste rock and overburden deposition plan for WRSF6 Phase 1. More details on the mine waste production schedule and deposition plan can be found in the Design Basis Memo (Tetra Tech 2024c).

Table 1: Preliminary Waste Rock and Overburden Deposition Plan for Phase 1

Location of Mine Waste Placement	Approximate Period of Mine Waste Placement
Benches 69 m and 74m of overburden	January 2025 to February 2025
Bench 79 m of overburden	March 2025 to April 2025
Bench 84 m of overburden	December 2026
Bench 84 m of overburden	January 2027 to April 2027
Bench 74 m of waste rock	January 2025 to March 2025
Bench 79 m of waste rock	April 2025 to May 2025
Bench 79 m of waste rock	December 2026 to March 2027
Bench 84 m of waste rock	April 2027 to December 2027
Bench 89 m of waste rock*	January 2028 to March 2028*
Bench 94 m of waste rock	Future deposition for Phase 2 mine development
Bench 99 m of waste rock	Future deposition for Phase 2 mine development

*: Waste rock cover for Bench 84 m of overburden, the placement schedule depends on the production schedule at other open pits.

Based on the waste rock and overburden production plan provided by Agnico Eagle on July 17, 2024 and the design capacity of WRFS6, the mine waste placement for Phase 1 only attains a top elevation of 89 m. WRSF6 is designed with a crest elevation of 99 m to provide maximum storage capacity and contingency for any potential change that may result in an increase in mine waste production plan. The WRSF6 ultimate geometry with crest elevation of 99 m was evaluated in the slope stability analyses.

4.0 STABILITY ANALYSIS METHODOLOGY AND ACCEPTANCE CRITERIA

4.1 Methodology

Limit equilibrium analyses were conducted to determine the factor of safety (FoS) against slope failure during construction and in the long term after the construction of WRSF6. All analyses were conducted using the two-dimensional, limit equilibrium software, Slope/W of GeoStudio (Seequent 2021). The Morgenstern-Price method with a half-sine interslice force assumption was adopted in the analyses. The analyses were conducted to evaluate the slope stability of WRSF6 during several stages of construction and post-construction. Potential post-construction seismic loading was modelled as pseudo-static with a design horizontal peak acceleration.

The principles underlying the method of limit equilibrium analyses of slope stability are as follows:

- A slip mechanism is postulated;
- The shear resistance required to equilibrate the assumed slip mechanism is calculated by means of statics;
- The calculated shear resistance required for equilibrium is compared with the available shear strength in terms of factor of safety; and
- The slip surface with the lowest FoS is determined through iteration.

A design FoS is used to account for the uncertainty and variability in the strength and pore water pressure parameters, and to limit deformations.

4.2 Stability Acceptance Criteria for Factors of Safety

The slope stability acceptance criteria for WRSF6 were developed based on guidelines in Hawley and Cunning (2017), which consider locations of failure, slope slip mechanisms, failure consequence, confidence levels in stability analysis, input parameters, key assumptions, proximity to mining open pit, and site conditions. Table 2 lists the key considerations, consequence and confidence classifications, and adopted stability criteria for the design of WRSF6. Details on the development of the acceptance criteria for FoS can be found in the WRSF6 Design Basis Memo (Tetra Tech 2024c).

Table 2: Adopted Stability Criteria for the WRSF6 Design

Potential Failure Mechanism and Conditions	Consequence of Failure	Confidence Level	Minimum Factor of Safety for Static Loading	Minimum Factor of Safety for Pseudo-static Loading [(a)]
Surficial, shallow slips	Low	High	1.1	-
Local deep-seated slips and temporary internal slopes	Moderate	Moderate	1.4	-
Long-term, global deep-seated slips for base cases	High	Moderate	1.5	1.1
Long-term, global deep-seated slips for sensitivity case with conservative assumptions	High	Moderate	1.4	1.1

[(a)]:Pseudo-static loading condition was not considered in the short-term construction phase.

5.0 STABILITY ANALYSIS INPUT DATA AND CASES

5.1 Foundation Soil Profile

The overall geotechnical subsurface conditions underlying the WRSF6 area are summarized in Section 2.2. It is expected that the thin organic layer will be compressed under loads from waste rock and overburden placed above, and its shear strength parameters would be close to that of the underlying overburden soils (sand and silt or ice-rich silt). The organic material is localized within the footprint of WRSF6, and it is expected that some organic material will be removed during the snow-removal process prior to the mine waste placement or will be compressed under loads from waste rock and overburden. Therefore, any local presence of the compressed thin organic layer was not specially modelled and can be represented by the equivalent underlying overburden soils in the stability analyses.

Based on the bench slope geometry, foundation conditions, and proximity to adjacent facilities, five typical sections (Sections A to E) from Phase 1 and two Sections (Section F and Section G) from Phase 2 were selected for slope stability analyses. The generalized foundation soil profiles for each section, derived from nearby borehole logs, are summarized in Table 3. Details on the subsurface conditions for each section are provided in the WRSF6 Design Basis Memo (Tetra Tech 2024c). Figure 2 illustrates the locations of all sections on the WRSF6 plan.

Table 3: Foundation Soil Profile for Each Section

Section		Soil Type	Depth (m)	Boreholes Nearby
WRSF6 Phase 1	Section A	Sand and gravel	0-0.5	GT24-30, GT24-31, and GT24-39
		Ice-rich silt	0.5-2.0	
		Ice-poor silt	2.0-4.0	
		Sand and gravel	4.0-8.0	
		Bedrock	-	
	Section B	Sand	0-0.5	GT24-39, and GT24-40
		Ice-rich silt	0.5-2.5	
		Sand and silt	2.5-8.0	
		Sand and gravel	8.0-14.0	
		Bedrock	-	
	Section C	Sand	0-1.5	GT24-38, and GT24-41
		Ice-rich sand	1.5-2.5	
		Ice-poor silt	2.5-5.0	
		Silty sand	5.0-9.0	
		Sand and gravel	9.0-14.0	
		Bedrock	-	
	Section D	Sand	0-1.0	GT24-36, GT24-37, and GT24-42
		Ice-rich silt	1.0-2.5	
		Sand and gravel	2.5-4.0	
		Silt and sand	4.0-9.0	
		Gravel	9.0-10.0	
		Bedrock	-	
	Section E	Sand and gravel	0-0.5	GT24-32, and GT24-33
		Ice-rich silt	0.5-2.5	
		Sand and gravel	2.5-5.0	
		Bedrock	-	

Table 3: Foundation Soil Profile for Each Section

Section		Soil Type	Depth (m)	Boreholes Nearby
WRSF6 Phase 2	Section F	Sand	0-1.0	GT24-36, and GT24-42
		Ice-rich silt	1.0-2.5	
		Sand and gravel	2.5-4.0	
		Silt and sand	4.0-9.0	
		Gravel	9.0-10.0	
		Bedrock	-	
	Section G	Sand and gravel	0-1.0	GT24-34, and GT24-35
		Ice-poor silt	1.0-3.0	
		Sandy silt	3.0-6.0	
		Sand and Gravel	6.0-7.5	
		Sand	7.5-12	
		Bedrock	-	

5.2 Material Properties

The material properties to be used in the stability analyses were estimated based on all available testing results at the Meliadine Mine, literature review, experience on similar materials, and engineering judgement. Table 4 summarizes the material properties used for the WRSF6 stability analyses. Details on the material properties can be found in the WRSF6 Design Basis Memo (Tetra Tech 2024c). Ice-rich silt behaves as a frictional material in the short-term but as a cohesive (frictionless) material in the long-term. For short-term loading, the same properties determined for thawed silt were applied to ice-rich silt. The long-term cohesion of frozen ice-rich silt was estimated using predicted temperatures in the layer of ice-rich silt at the five zones delineated from thermal analysis (Tetra Tech 2024d) and the research by Weaver and Morgenstern (1981). Ice-rich sand is assumed to have similar properties to ice-rich silt, as the behavior of ice-rich soils is predominantly controlled by the ice.

Table 4: Material Properties for the WRSF6 Stability Analyses

Material	Effective Angle of Internal Friction, ϕ, (°)	Cohesion, *c*, (kPa)	Unit Weight, γ, (kN/m^3)
Waste Rock Zone 1 (0 to 15 m depth) (1)	42	0	19
Waste Rock Zone 2 (15 m to 25 m depth) (1)	40	0	19
Overburden Waste	28	0	17
Sand (Ice-Poor or Thawed)	32	0	18
Silty Sand (Ice-Poor or Thawed)	32	0	18
Sandy Silt (Ice-Poor or Thawed)	30	0	18
Silt and Sand (Ice-Poor or Thawed)	31	0	18
Sand and Gravel (Ice-Poor or Thawed)	34	0	20

Table 4: Material Properties for the WRSF6 Stability Analyses

Material		Effective Angle of Internal Friction, Ø, (º)	Cohesion, *c*, (kPa)	Unit Weight, ϒ, (kN/m^3)
Gravel (Ice-Poor or Thawed)		35	0	20
Ice-Rich Silt [2] Ice-Rich Sand[3]	-0.5°C to -1°C	0	60	16
	-1°C to -1.5°C	0	100	16
	-1.5°C to -2°C	0	120	16
	< -2°C	0	150	16
Thawing Ice-Rich Silt		28	0	16
Thawed Ice-Rich Silt		28	0	17
Ice-Poor Silt		28	0	17

Notes:
(1) Depth is measured perpendicular to the outer slope.
(2) Based on a porewater salinity of 7 ppt, temperatures warmer than -0.5°C are considered unfrozen due to the freezing point depression.
(3) Ice-rich sand properties for Section C, same properties of ice-rich silt were assumed for ice-rich sand.

5.3 Other Input Parameters

5.3.1 Excess Pore-Water Pressure

Thermal analysis was conducted to estimate the thawing rate of ice-rich layer in the foundation. The thermal analysis assumes that the mine waste will be placed in the summer season with an initial material temperature of 10°C. The thawing rate estimated from the thermal analysis is expected to be on the conservative side as the initial first two benches of mine waste will be placed during the winter season to promote the freezeback. Based on the thawing rate of ice-rich silt obtained from thermal analyses and the coefficient of consolidation reported in Tetra Tech (2024a), the pore pressure ratio (Ru) for ice-rich silt was estimated at 0.15 using the calculated thaw consolidation ratio and the published design chart by Morgenstern and Nixon (1971). Since the initial pore pressure is often small enough to be considered negligible, the pore-water pressure coefficient ($\bar{B}$) is equivalent to the pore-water pressure ratio (Ru). An $\bar{B}$ of 0.2 was adopted for ice-rich silt for the conservatism in the slope stability analyses and an $\bar{B}$ of 0.1 was used for coarse soils such as sand or gravel. An assumed piezometric line, along with a pore pressure coefficient ($\bar{B}$), was used to simulate the excess pore-water pressure generated in the thawing foundation soil layers under short-term loading conditions. The excess pore water pressure is expected to dissipate over time; therefore, it is assumed that no excess pore water pressure will be present under long-term static loading conditions.

5.3.2 Seismicity

The Meliadine Mine is situated in an area of low seismic risk and site-specific probabilistic or deterministic seismic hazard studies were not conducted. The peak ground acceleration (PGA) under a potential earthquake at the Meliadine Mine was estimated from the 2020 National Building Code of Canada seismic hazard website (http://www.earthquakescanada.nrcan.gc.ca/hazard-alea/interpolat/calc-en.php). The estimated PGA is 0.0285 g for a 5% in 50-year probability of exceedance (0.001 per annum or 1 in 1,000 year return) and 0.0498 g for a 2% in 50-year probability of exceedance (0.000404 per annum or 1 in 2,475 year return) for the area. A horizontal PGA of 0.0498 g was used for the analyses under seismic (pseudo-static) loading conditions for the design of WRSF6.

5.4 Cases Evaluated

Various preliminary stability analyses were undertaken to develop the typical design section for WRSF6. The typical design section and final design geometry of WRSF6 will be presented in the design drawings to be attached to the WRSF6 design report.

Seven design sections were evaluated in the final stability analyses. Figures 3 to 6 present the detailed information for each section. These sections were selected based on the following:

- Section A was selected to represent the typical section for the area where the original ground has a steeper downward surface slope and close to Pump01 pit, which is less favorable and more critical for slope stability;
- Sections B and C were chosen to represent typical sections on the northwest and west sides of WRSF6, near Channel 11;
- Section D was selected for the southeast side of WRSF6 Phase 1;
- Section E represents the typical section with the access ramp on the north side of WRSF6 Phase 1;
- Section F represents typical section without the access ramp in Phase 2; and
- Section G represents section where the original ground has a steeper downward slope and includes the access ramp for WRSF6 Phase 2.

Various conditions were evaluated for WRSF6 slope stability:

- Slope stability under static loading during construction;
- Slope stability under long-term static loading conditions after construction;
- Slope stability under seismic (pseudo-static) loading after construction;
- Parametric sensitivity analysis cases with an elevated phreatic surface and conservative ice-rich soil properties; and
- Sensitivity analysis case at Section A with a shorter offset distance (40 m) from Pump01 pit perimeter.

6.0 FINAL STABILITY ANALYSIS RESULTS FOR THE DESIGN OF WRSF6

The calculated FoS in the stability analyses for WRSF6 are summarized below in Table 5 together with the required minimum FoS. Figures A1 to G8 in Appendix A show selected slope stability analysis cases and results. The results in Table 5 suggests that the calculated FoS for each stability analysis meets or exceeds the adopted stability criteria as outlined in Section 4.2.

Table 5: Summary of Slope Stability Analysis Results for WRSF6

Section	Conditions			Required Minimum Factor of Safety	Calculated Minimum Factor of Safety	Figure No.	Comments
A	Placement of waste rock and overburden during construction, static loading	Bench 74.0 m of waste rock and overburden	Shallow Slip	1.1	1.6	A1	Shallow slip close to the toe, failure limited to first bench, with 80 m offset distance from Pump01 open pit perimeter
			Local Deep-seated slip	1.4	1.8	A2	Local deep-seated slip failure, failure involved two benches, with 80 m offset distance from Pump01 open pit perimeter
		Bench 84.0 m of waste rock and overburden	Shallow Slip	1.1	1.6	A3	Shallow slip close to the toe, failure limited to first bench, with 80 m offset distance from Pump01 open pit perimeter
			Local Deep-seated slip	1.4	1.8	A4	local deep-seated slip failure, failure involved two benches, with 80 m offset distance from Pump01 open pit perimeter
	Long-term after construction, base case	Static loading		1.5	1.8	A5	Global deep-seated slip, with 80 m offset distance from Pump01 open pit perimeter
		Pseudo-static loading		1.1	1.5	A6	
	Long-term after construction, sensitivity case	Static loading		1.4	1.5	A7	Global deep-seated slip with elevated phreatic surface at top of overburden waste and conservative properties for ice-rich silt, with 80 m offset distance from Pump01 open pit perimeter
		Pseudo-static loading		1.1	1.2	A8	
		Static loading		1.5	1.9	A9	Global deep-seated slip cut through WRSF6, with 40 m offset distance from Pump01 open pit perimeter
		Pseudo-static loading		1.1	1.6	A10	

Table 5: Summary of Slope Stability Analysis Results for WRSF6

<table>
<tr><th rowspan="2">Section</th><th rowspan="2" colspan="3">Conditions</th><th>Required</th><th>Calculated</th><th>Figure</th><th rowspan="2">Comments</th></tr>
<tr><th>Minimum Factor of Safety</th><th>Minimum Factor of Safety</th><th>No.</th></tr>
<tr><td rowspan="8">B</td><td rowspan="4">Placement of waste rock and overburden during construction, static loading</td><td rowspan="2">Bench 74.0 m of waste rock and overburden</td><td>Shallow Slip</td><td>1.1</td><td>1.3</td><td>B1</td><td>Shallow slip close to the toe, failure limited to first bench</td></tr>
<tr><td>Local Deep-seated slip</td><td>1.4</td><td>1.8</td><td>B2</td><td>local deep-seated slip failure, failure involved two benches</td></tr>
<tr><td rowspan="2">Bench 94.0 m of waste rock and overburden</td><td>Shallow Slip</td><td>1.1</td><td>1.3</td><td>B3</td><td>Shallow slip close to the toe, failure limited to first bench</td></tr>
<tr><td>Local Deep-seated slip</td><td>1.4</td><td>1.9</td><td>B4</td><td>local deep-seated slip failure, failure involved four benches</td></tr>
<tr><td rowspan="2">Long-term after construction, base case</td><td colspan="2">Static loading</td><td>1.5</td><td>1.8</td><td>B5</td><td rowspan="2">Global deep-seated slip</td></tr>
<tr><td colspan="2">Pseudo-static loading</td><td>1.1</td><td>1.5</td><td>B6</td></tr>
<tr><td rowspan="2">Long-term after construction, sensitivity case</td><td colspan="2">Static loading</td><td>1.4</td><td>1.6</td><td>B7</td><td rowspan="2">Global deep-seated slip with elevated phreatic surface at top of overburden waste and conservative properties for ice-rich silt</td></tr>
<tr><td colspan="2">Pseudo-static loading</td><td>1.1</td><td>1.3</td><td>B8</td></tr>
<tr><td rowspan="8">C</td><td rowspan="4">Placement of waste rock and overburden during construction, static loading</td><td rowspan="2">Bench 74.0 m of waste rock and overburden</td><td>Shallow Slip</td><td>1.1</td><td>1.6</td><td>C1</td><td>Shallow slip close to the toe, failure limited to first bench</td></tr>
<tr><td>Local Deep-seated slip</td><td>1.4</td><td>1.9</td><td>C2</td><td>local deep-seated slip failure, failure involved two benches</td></tr>
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<tr><td colspan="2">Pseudo-static loading</td><td>1.1</td><td>1.4</td><td>C6</td></tr>
<tr><td rowspan="2">Long-term after construction, sensitivity case</td><td colspan="2">Static loading</td><td>1.4</td><td>1.4</td><td>C7</td><td rowspan="2">Global deep-seated slip with elevated phreatic surface at top of overburden waste and conservative properties for ice-rich silt</td></tr>
<tr><td colspan="2">Pseudo-static loading</td><td>1.1</td><td>1.1</td><td>C8</td></tr>
</table>

Table 5: Summary of Slope Stability Analysis Results for WRSF6

<table>
<tr><th rowspan="2">Section</th><th rowspan="2" colspan="3">Conditions</th><th>Required</th><th>Calculated</th><th>Figure</th><th rowspan="2">Comments</th></tr>
<tr><th>Minimum Factor of Safety</th><th>Minimum Factor of Safety</th><th>No.</th></tr>
<tr><td rowspan="8">D</td><td rowspan="4">Placement of waste rock and overburden during construction, static loading</td><td rowspan="2">Bench 79.0 m of waste rock and overburden</td><td>Shallow Slip</td><td>1.1</td><td>1.4</td><td>D1</td><td>Shallow slip close to the toe, failure limited to first bench</td></tr>
<tr><td>Local Deep-seated slip</td><td>1.4</td><td>1.8</td><td>D2</td><td>local deep-seated slip failure, failure involved two benches</td></tr>
<tr><td rowspan="2">Bench 94.0 m of waste rock and overburden</td><td>Shallow Slip</td><td>1.1</td><td>1.4</td><td>D3</td><td>Shallow slip close to the toe, failure limited to first bench</td></tr>
<tr><td>Local Deep-seated slip</td><td>1.4</td><td>1.8</td><td>D4</td><td>local deep-seated slip failure, failure involved two benches</td></tr>
<tr><td rowspan="2">Long-term after construction, base case</td><td colspan="2">Static loading</td><td>1.5</td><td>1.8</td><td>D5</td><td rowspan="2">Global deep-seated slip</td></tr>
<tr><td colspan="2">Pseudo-static loading</td><td>1.1</td><td>1.6</td><td>D6</td></tr>
<tr><td rowspan="2">Long-term after construction, sensitivity case</td><td colspan="2">Static loading</td><td>1.4</td><td>1.5</td><td>D7</td><td rowspan="2">Global deep-seated slip with elevated phreatic surface at top of overburden waste and conservative properties for ice-rich silt</td></tr>
<tr><td colspan="2">Pseudo-static loading</td><td>1.1</td><td>1.3</td><td>D8</td></tr>
<tr><td rowspan="8">E</td><td rowspan="4">Placement of waste rock and overburden during construction, static loading</td><td rowspan="2">Bench 79.0 m of waste rock and overburden</td><td>Shallow Slip</td><td>1.1</td><td>1.4</td><td>E1</td><td>Shallow slip close to the toe, failure limited to first bench</td></tr>
<tr><td>Local Deep-seated slip</td><td>1.4</td><td>1.8</td><td>E2</td><td>local deep-seated slip failure, failure involved two benches</td></tr>
<tr><td rowspan="2">Bench 94.0 m of waste rock and overburden</td><td>Shallow Slip</td><td>1.1</td><td>1.4</td><td>E3</td><td>Shallow slip close to the toe, failure limited to first bench</td></tr>
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<tr><td rowspan="2">Long-term after construction, base case</td><td colspan="2">Static loading</td><td>1.5</td><td>1.7</td><td>E5</td><td rowspan="2">Global deep-seated slip</td></tr>
<tr><td colspan="2">Pseudo-static loading</td><td>1.1</td><td>1.4</td><td>E6</td></tr>
<tr><td rowspan="2">Long-term after construction, sensitivity case</td><td colspan="2">Static loading</td><td>1.4</td><td>1.4</td><td>E7</td><td rowspan="2">Global deep-seated slip with elevated phreatic surface at top of overburden waste and conservative properties for ice-rich silt</td></tr>
<tr><td colspan="2">Pseudo-static loading</td><td>1.1</td><td>1.2</td><td>E8</td></tr>
</table>

Table 5: Summary of Slope Stability Analysis Results for WRSF6

Section	Conditions			Required Minimum Factor of Safety	Calculated Minimum Factor of Safety	Figure No.	Comments
F	Placement of waste rock and overburden during construction, static loading	Bench 74.0 m of waste rock and overburden	Shallow Slip	1.1	1.6	F1	Shallow slip close to the toe, failure limited to first bench
			Local Deep-seated slip	1.4	1.8	F2	local deep-seated slip failure, failure involved two benches
		Bench 94.0 m of waste rock and overburden	Shallow Slip	1.1	1.6	F3	Shallow slip close to the toe, failure limited to first bench
			Local Deep-seated slip	1.4	1.8	F4	local deep-seated slip failure, failure involved two benches
	Long-term after construction, base case	Static loading		1.5	1.8	F5	Global deep-seated slip
		Pseudo-static loading		1.1	1.5	F6	
	Long-term after construction, sensitivity case	Static loading		1.4	1.6	F7	Global deep-seated slip with elevated phreatic surface at top of overburden waste and conservative properties for ice-rich silt
		Pseudo-static loading		1.1	1.2	F8	
G	Placement of waste rock and overburden during construction, static loading	Bench 79.0 m of waste rock and overburden	Shallow Slip	1.1	2.2	G1	Shallow slip close to the toe, failure limited to first bench
			Local Deep-seated slip	1.4	1.5	G2	Local deep-seated slip failure, failure involved two benches
		Bench 84.0 m of waste rock and overburden	Local Deep-seated slip	1.4	1.5	G3	Local deep-seated slip failure, failure involved two benches
		Bench 94.0 m of waste rock and overburden	Local Deep-seated slip	1.4	1.5	G4	Local deep-seated slip failure, failure involved two benches
	Long-term after construction, base case	Static loading		1.5	2.0	G5	Global deep-seated slip
		Pseudo-static loading		1.1	1.7	G6	
	Long-term after construction, sensitivity case	Static loading		1.4	1.9	G7	Global deep-seated slip with elevated phreatic surface at top of overburden waste and conservative properties for ice-rich silt
		Pseudo-static loading		1.1	1.6	G8	

7.0 SUMMARY AND RECOMMENDATIONS

A series of slope stability analyses were carried out to assist in developing the typical design section and final design of WRSF6. The results of the analyses for the final design sections with a minimum 80 m setback distance between the toe of WRSF6 and the Pump01 open pit perimeter indicate that the calculated minimum FoS for WRSF6 meet or exceed the adopted minimum factors of safety for design under various conditions.

A sensitivity case with the setback distance of 40 m between the toe of WRSF6 and the Pump01 open pit perimeter was also assessed to facilitate the planning of potential open pit pushback and expansion of WRSF6. The calculated minimum FoS for this sensitivity case also meet or exceed the adopted minimum factors of safety for design under long-term static and pseudo-static loading conditions. The overall slope stability is sensitive to the long-term cohesion of the ice-rich soil in the foundation. The long-term cohesion is a function of ground temperature, which in turn is affected by the placement thickness, schedule, and initial temperature of the waste rock and overburden, especially the initial benches (elevation 69 m and 74 m) of the overburden placed over the original ground. It is recommended that the maximum lift thickness during waste placement be limited to 2.5 m for the overburden waste and to 5.0 m for the waste rock, and the initial benches of overburden waste be placed in winter season to utilize the frozen ground condition for a better overall slope stability.

The current design sections and geometry of WRSF6 are based on the waste rock and overburden production plan that was provided on July 17, 2024, and the corresponding preliminary waste rock and overburden placement plan that was developed for the design of WRSF6. The stability of WRSF6 should be reviewed and reassessed if the actual waste rock and overburden placement plan for the construction of WRSF6, especially the placement plan for the initial benches of the waste rock and overburden, is significantly different from the assumed placement schedule in the slope analysis provided in this memorandum.

It is recommended that regular visual inspections of WRSF6 be performed during and after its construction to identify any signs of excess deformation, instability, or distress. If any of these signs are identified, the information should be provided to Tetra Tech to evaluate the root cause and develop a mitigation plan if required.

8.0 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 document is subject to the Limitations on Use of this Document attached in Appendix B or Contractual Terms and Conditions executed by both parties.

9.0 CLOSURE

We trust this technical memo 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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PERMIT TO PRACTICE
TETRA TECH CANADA INC.

Signature ____________________

Date 2024-12-13

PERMIT NUMBER: P 018
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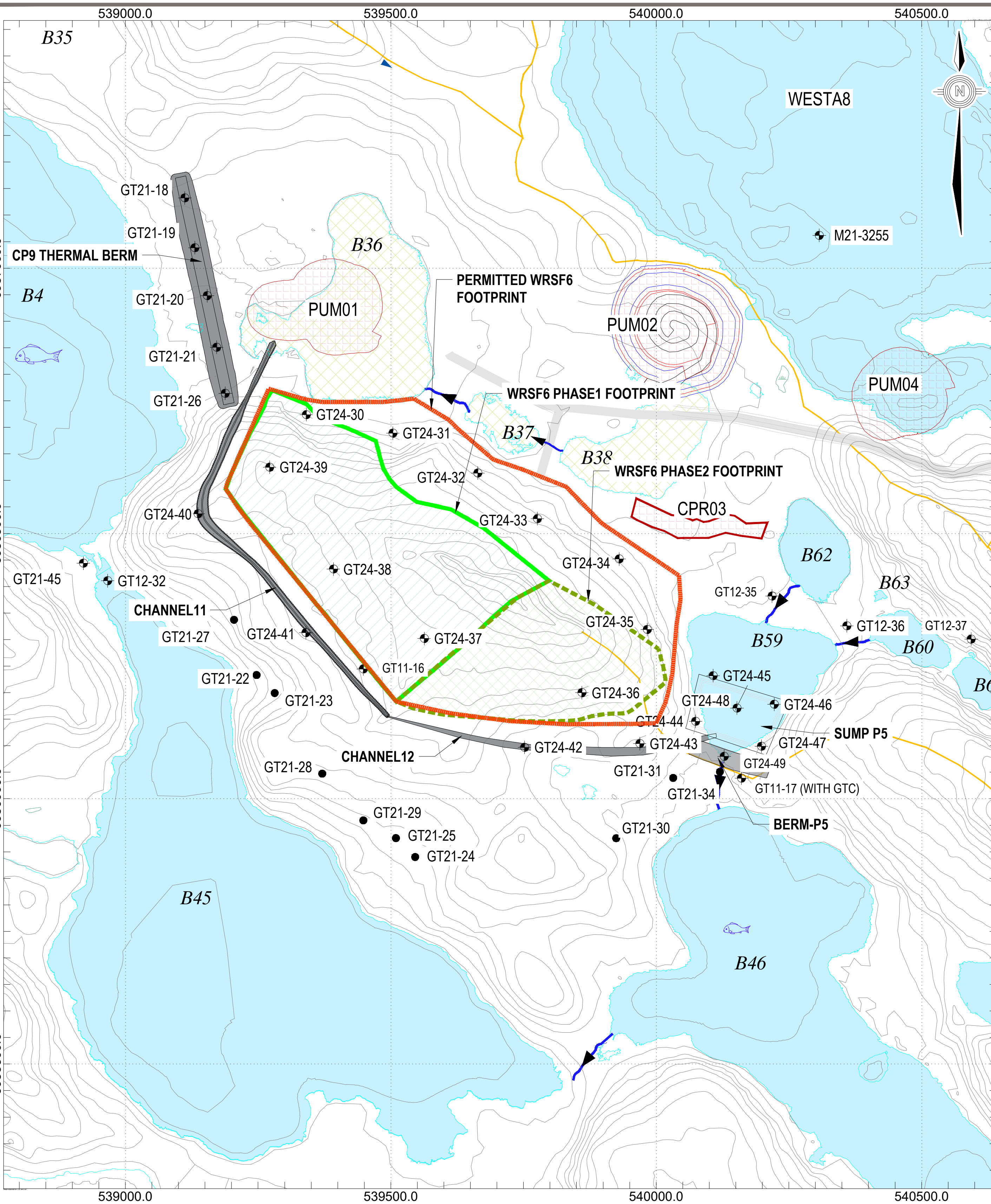
FIGURES



Q:\Edmonton\Engineering\E141\Projects_MELIADINE\ENG.EARC03140-38 WRSF6 Design\Figure 3 - Proposed WRSF6 Footprint with Borehole Locations.dwg [FIGURE 3] October 15, 2024 - 1:49:17 pm (BY: SOSNIUK, DEVON)

LEGEND:

- ● EXISTING BOREHOLE (DESTRUCTIVE)
- ⊕ EXISTING BOREHOLE

0 500m

Scale: 1:10,000 @ 8.5"x11"

CLIENT

AGNICO EAGLE

TETRA TECH

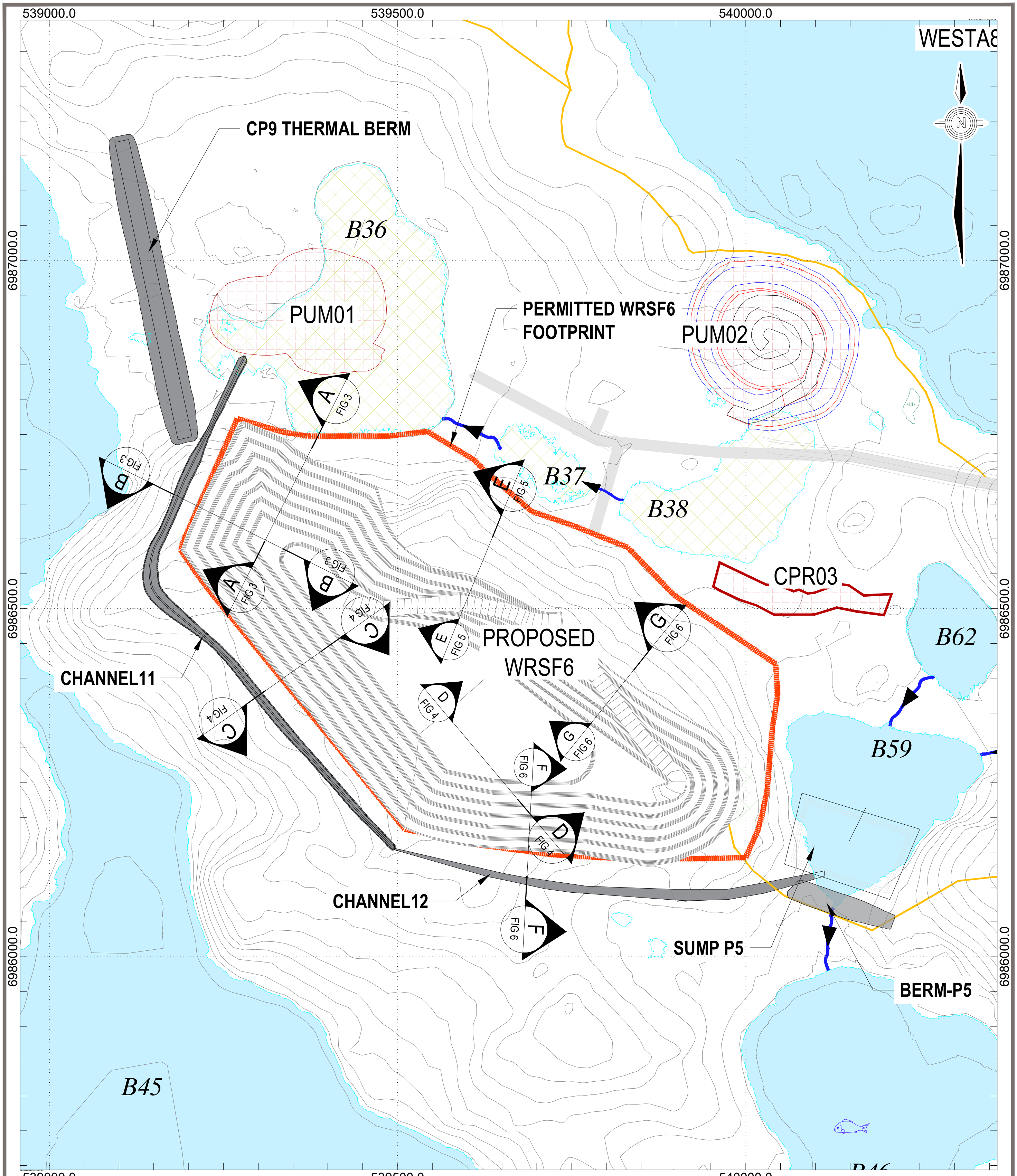
MELIADINE GOLD MINE, CANADA

PROPOSED WRSF6 FOOTPRINT WITH BOREHOLE LOCATIONS

PROJECT NO.	DWN	CKD	REV
ENG.EARC03140-38	DS	HX	A

OFFICE	DATE
EDM	OCTOBER 03, 2024

FIGURE 1



LEGEND:

0 250m

Scale: 1:7,500 @ 8.5"x11"

CLIENT

AGNICO EAGLE

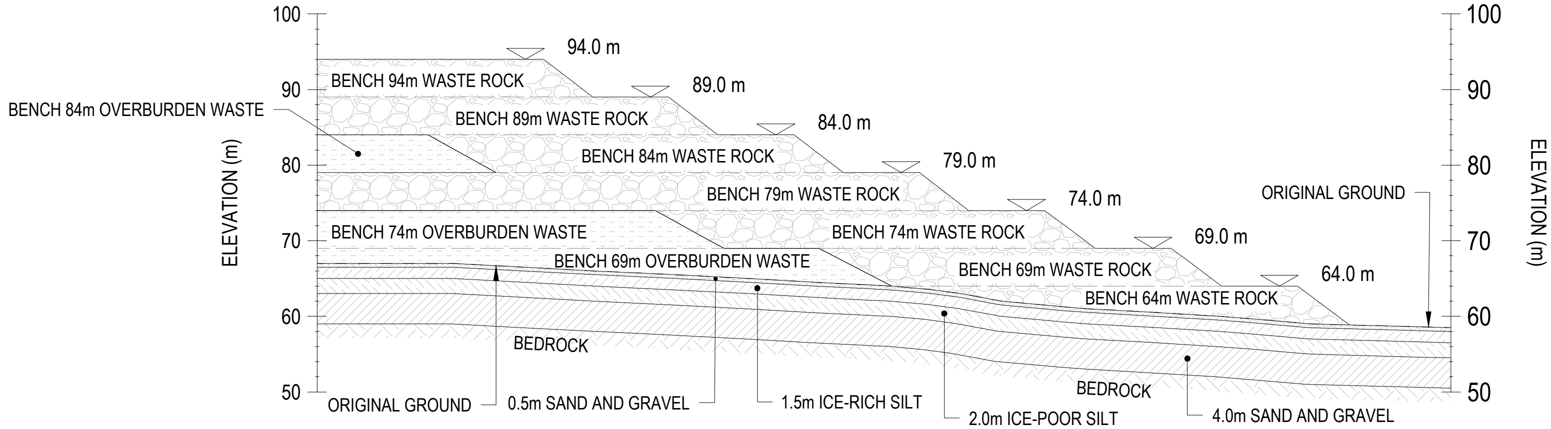
TETRA TECH

MELIADINE GOLD MINE, CANADA

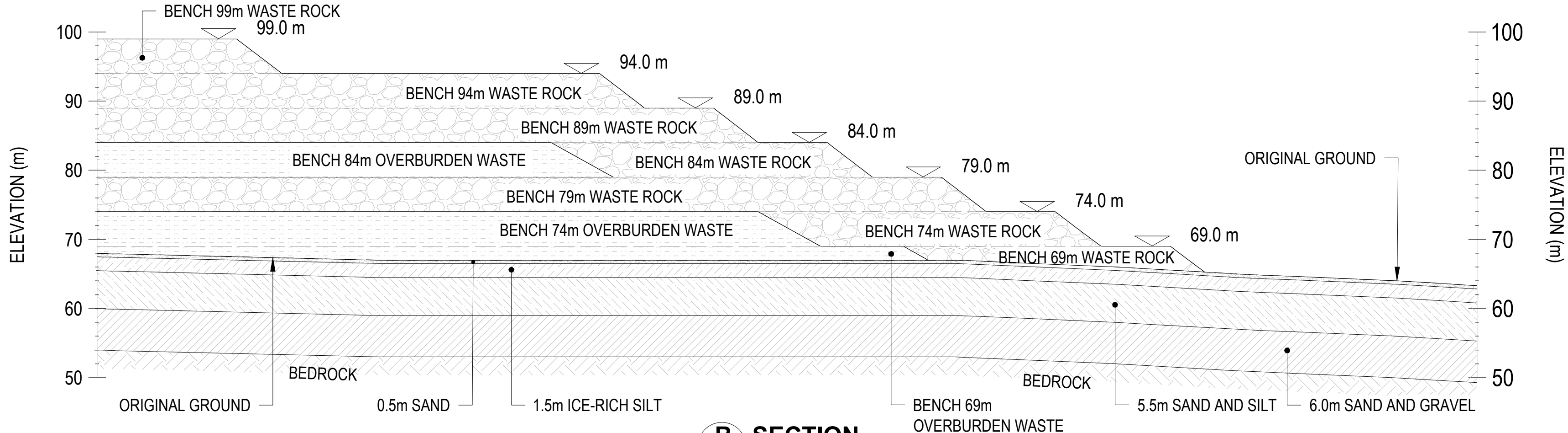
LOCATION OF SECTIONS
FOR STABILITY ANALYSES

PROJECT NO.	DWN	CKD	REV
ENG.EARC03140-38	DS	HX	A
OFFICE	DATE		
EDM	OCTOBER 03, 2024		

FIGURE 2



A SECTION
Fig 2 SCALE: 1:1000



B SECTION
Fig 2 SCALE: 1:1000

0 50m
Scale: 1:1,000 @ 8.5"x11"

CLIENT
AGNICO EAGLE
TETRA TECH

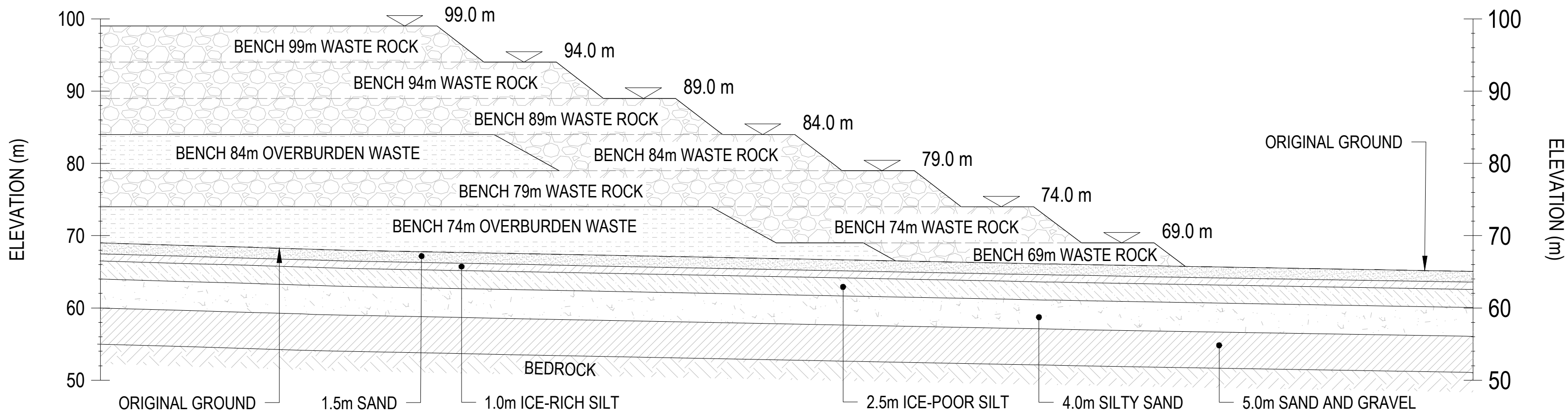
Stability Analysis of WRSF6
Meliadine Gold Mine, NU

SECTIONS A AND B FOR STABILITY ANALYSIS OF WRSF6 PHASE 1

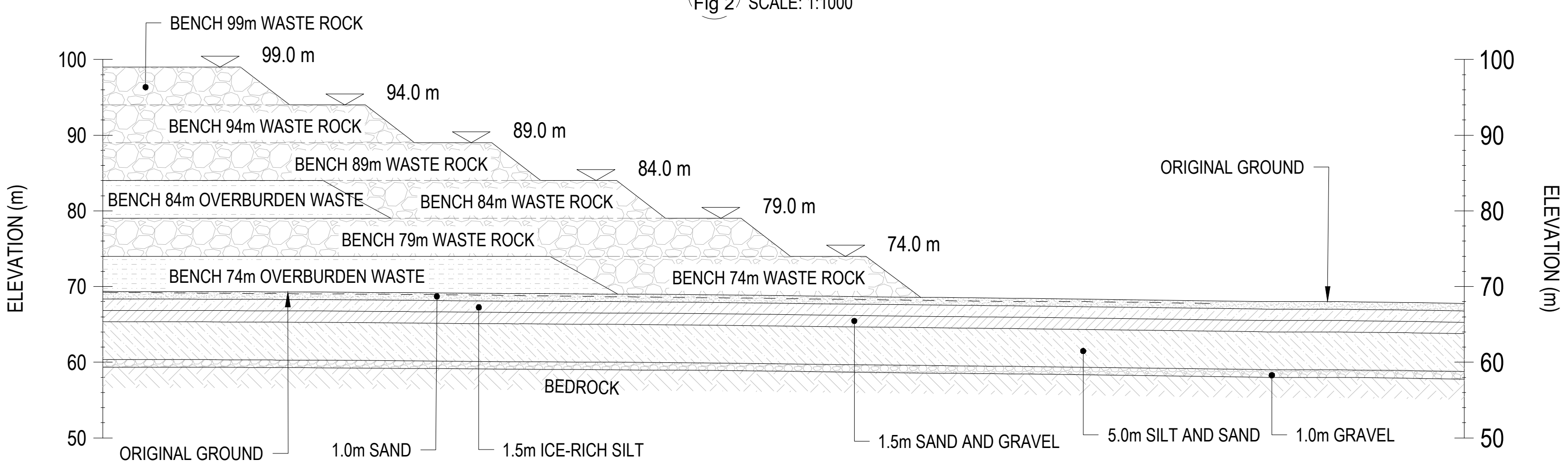
PROJECT NO.	DWN	CKD	REV
ENG.EARC03140-38	RC	YL	A

OFFICE	DATE
EDM	October 9, 2024

FIGURE 3



C SECTION
Fig 2 SCALE: 1:1000



D SECTION
Fig 2 SCALE: 1:1000

0 25m
Scale: 1:750 @ 8.5"x11"

CLIENT
AGNICO EAGLE
TETRA TECH

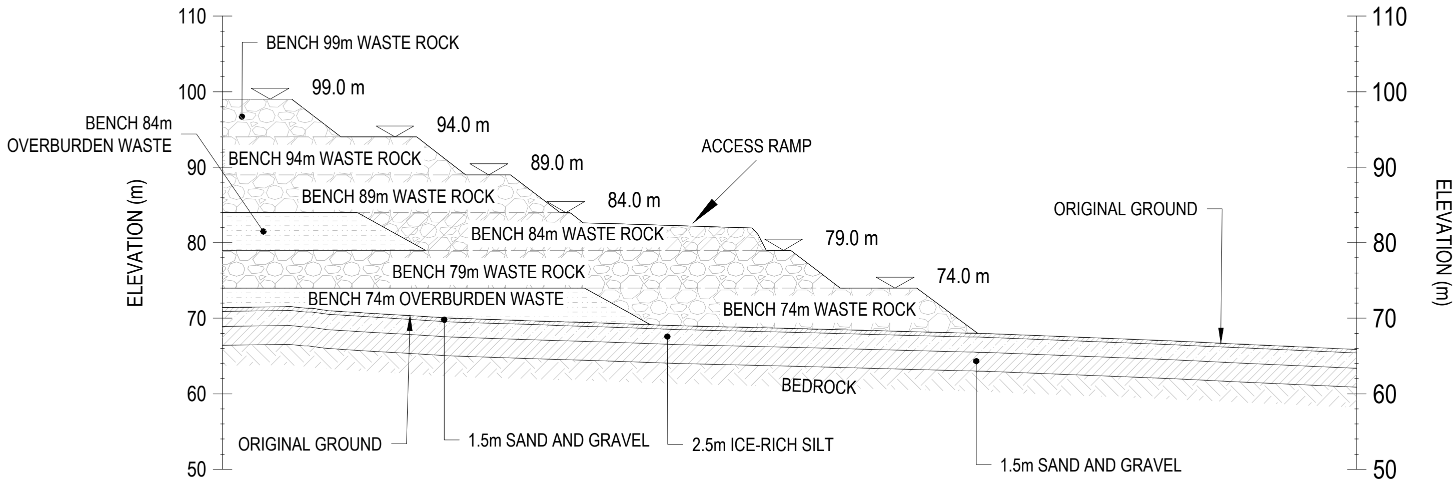
Stability Analysis of WRSF6
Meliadine Gold Mine, NU

SECTIONS C AND D FOR
STABILITY ANALYSIS OF WRSF6 PHASE 1

PROJECT NO.	DWN	CKD	REV
ENG.EARC03140-38	RC	YL	A

OFFICE	DATE
EDM	October 9, 2024

FIGURE 4



E SECTION
Fig 2 SCALE: 1:1000

0 25m
Scale: 1:750 @ 8.5"x11"

CLIENT

AGNICO EAGLE

TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU

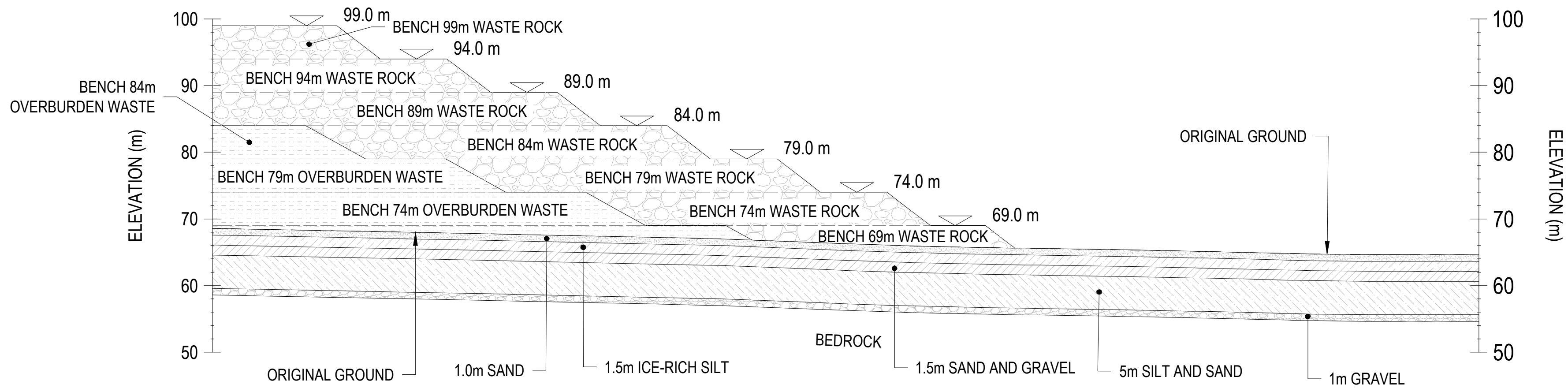
SECTION E FOR
STABILITY ANALYSIS OF WRSF6 PHASE 1

PROJECT NO.	DWN	CKD	REV
ENG.EARC03140-38	RC	YL	A

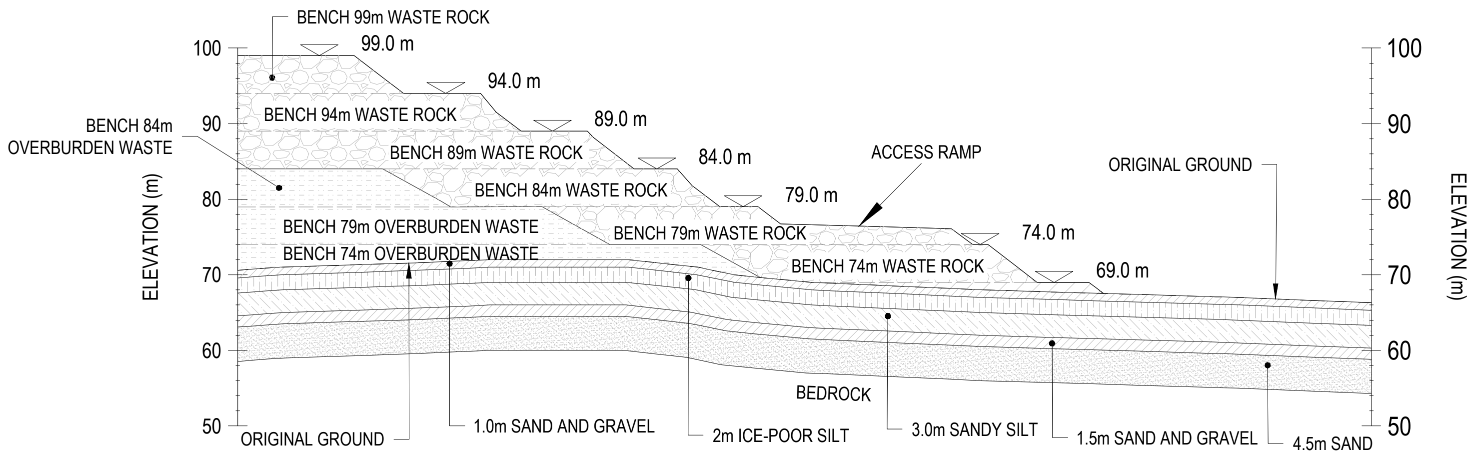
OFFICE	DATE
EDM	October 9, 2024

FIGURE 5

Q:\Edmonton\Engineering\E141\Projects_MELIADINE\ENG.EARC03140-38 WRSF6 Design\Stability Analysis\WRSF6 Stability Analysis-Figure 3 to 6.dwg [FIGURE 6] October 09, 2024 - 2:28:25 pm (BY: LIANG, YAWU)



F SECTION
Fig 2 SCALE: 1:1000



G SECTION
Fig 2 SCALE: 1:1000

0 25m
Scale: 1:750 @ 8.5"x11"

CLIENT
AGNICO EAGLE
TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU

SECTIONS F AND G FOR STABILITY ANALYSIS OF WRSF6 PHASE 2

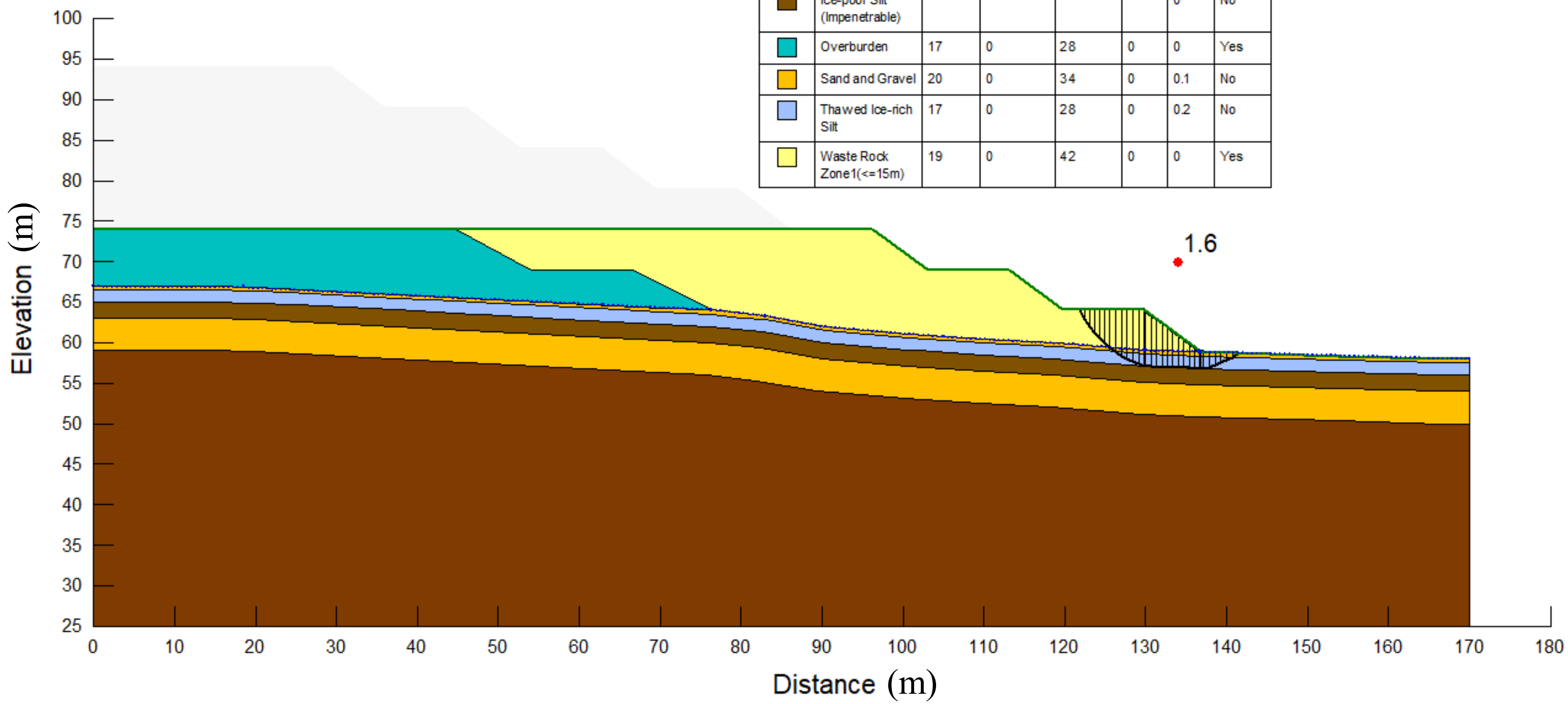
PROJECT NO.	DWN	CKD	REV
ENG.EARC03140-38	RC	YL	A

OFFICE	DATE
EDM	October 9, 2024

FIGURE 6

APPENDIX A

STABILITY ANALYSIS RESULTS



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	Phi-B	B-bar	Add Weight
	Bedrock					0	No
	Ice-poor Silt (Impenetrable)					0	No
	Overburden	17	0	28	0	0	Yes
	Sand and Gravel	20	0	34	0	0.1	No
	Thawed Ice-rich Silt	17	0	28	0	0.2	No
	Waste Rock Zone1(<=15m)	19	0	42	0	0	Yes

LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

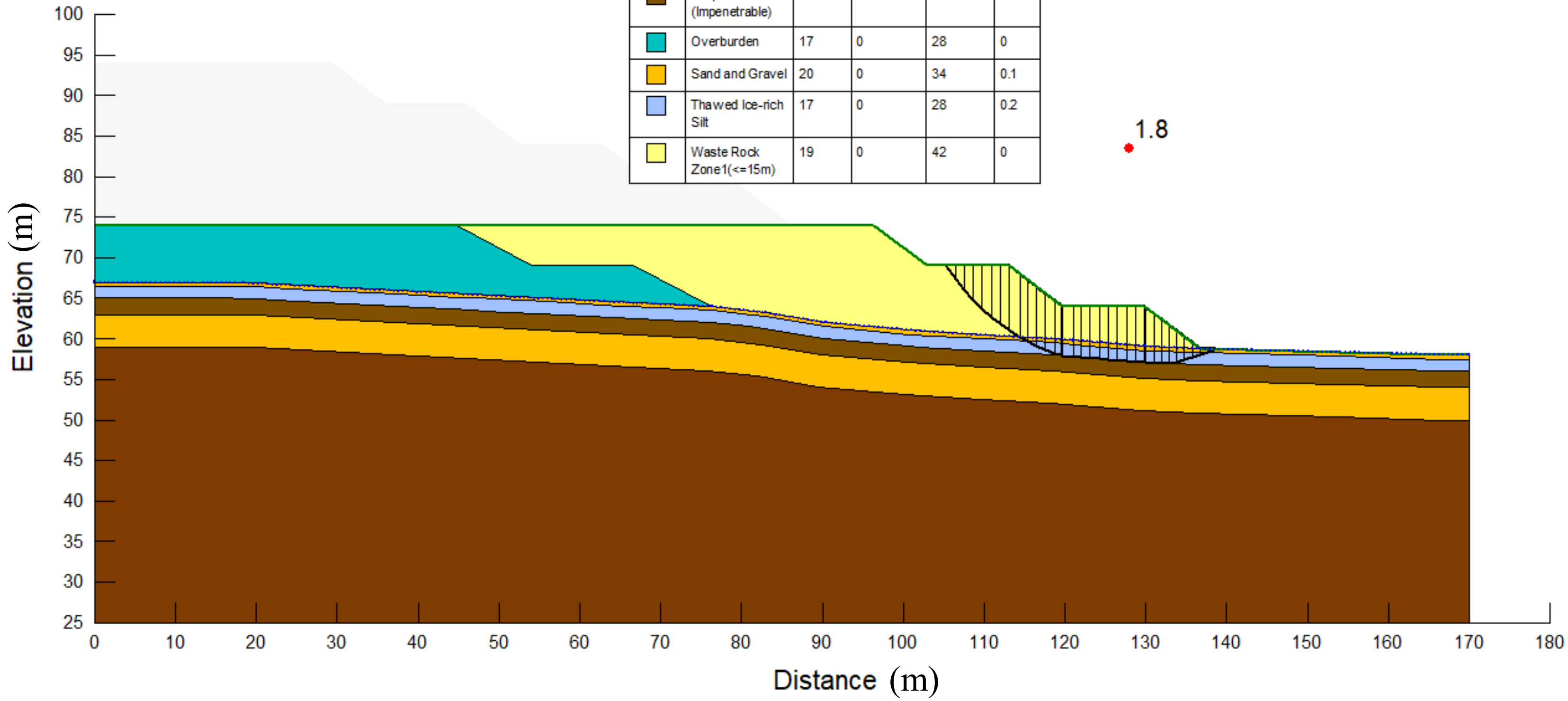
TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU
Section A- Bench 74.0 m of Waste Rock and Overburden during Construction, Shallow Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure A1



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar
	Bedrock				0
	Ice-poor Silt (Impenetrable)				0
	Overburden	17	0	28	0
	Sand and Gravel	20	0	34	0.1
	Thawed Ice-rich Silt	17	0	28	0.2
	Waste Rock Zone1(<=15m)	19	0	42	0

LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

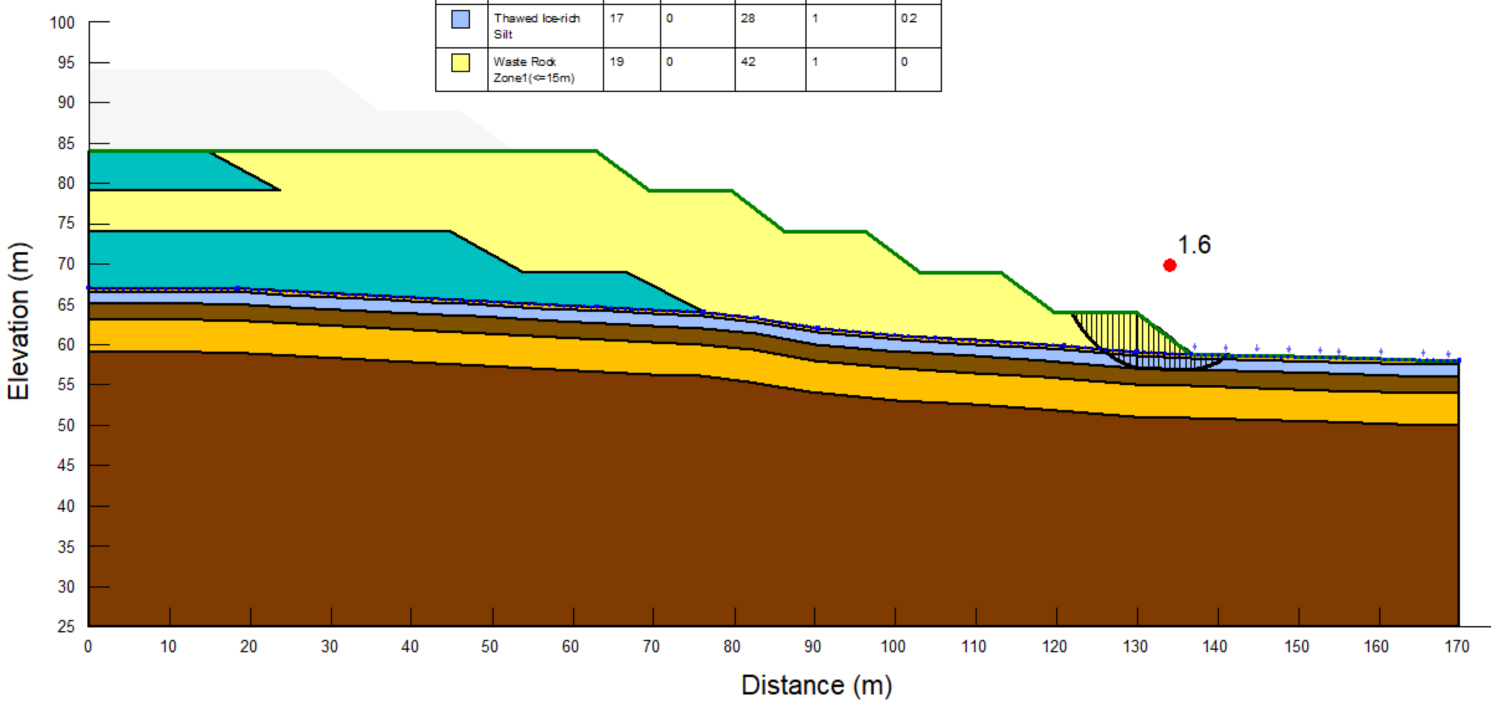
Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section A- Bench 74.0 m of Waste Rock and Overburden during Construction, Local Deep-Seated Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure A2



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	Piezometric Surface	Bbar
	Bedrock				1	0
	Ice-poor Silt (Impenetrable)				1	0
	Overburden	17	0	28	1	0
	Sand and Gravel	20	0	34	1	0.1
	Thawed Ice-rich Silt	17	0	28	1	0.2
	Waste Rock Zone1(<=15m)	19	0	42	1	0

LEGEND

NOTES

Note: During construction, static-loading

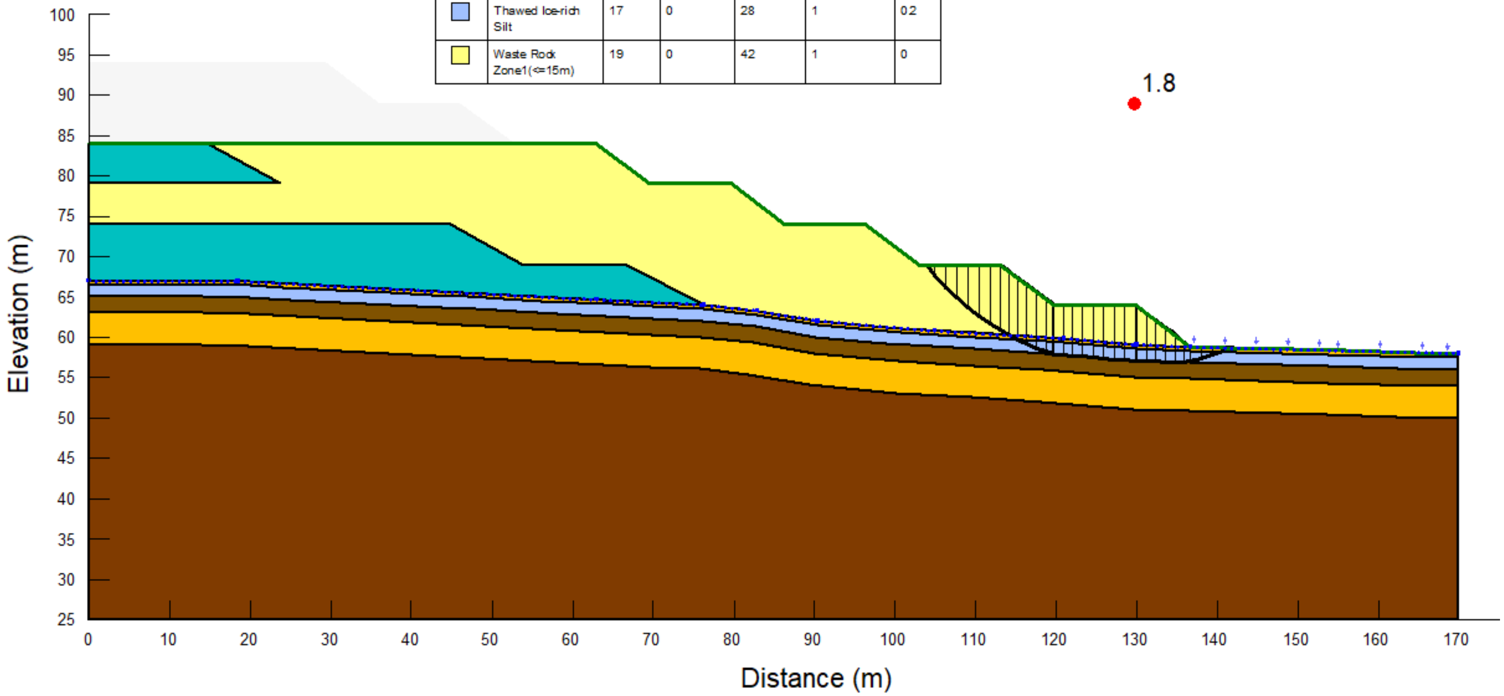
STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU
Section A- Bench 84.0 m of Waste Rock and Overburden during Construction, Shallow Slip

PROJECT NO.	DWN	CKD	APVD	REV	
ENG.EARC03140-38	YL	HX	HX		**Figure A3**
OFFICE	DATE				
EDM	SEPTEMBER 2024				



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	Piezometric Surface	B-bar
	Bedrock				1	0
	Ice-poor Silt (Impenetrable)				1	0
	Overburden	17	0	28	1	0
	Sand and Gravel	20	0	34	1	0.1
	Thawed Ice-rich Silt	17	0	28	1	0.2
	Waste Rock Zone1(<=15m)	19	0	42	1	0

LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

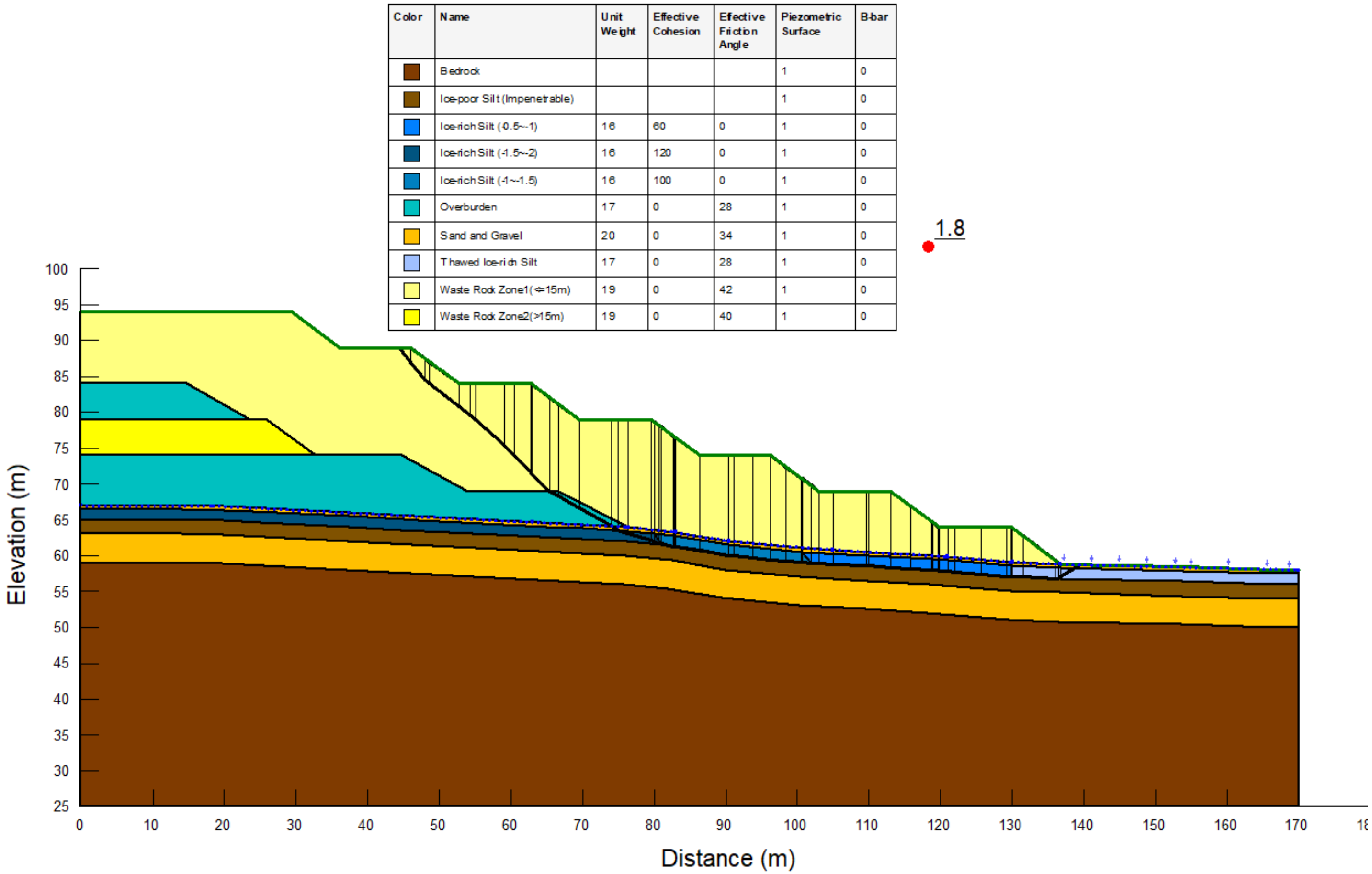
Stability Analysis of WRSF6
Meliadine Gold Mine, NU
Section A- Bench 84.0 m of Waste Rock and Overburden during Construction, Local Deep-Seated Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure A4

Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	Piezometric Surface	B-bar
	Bedrock				1	0
	Ice-poor Silt (Impenetrable)				1	0
	Ice-rich Silt (-0.5~-1)	16	60	0	1	0
	Ice-rich Silt (-1.5~-2)	16	120	0	1	0
	Ice-rich Silt (-1~-1.5)	16	100	0	1	0
	Overburden	17	0	28	1	0
	Sand and Gravel	20	0	34	1	0
	Thawed Ice-rich Silt	17	0	28	1	0
	Waste Rock Zone1(<=15m)	19	0	42	1	0
	Waste Rock Zone2(>15m)	19	0	40	1	0



LEGEND

NOTES

Note: Long-term static loading after construction

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

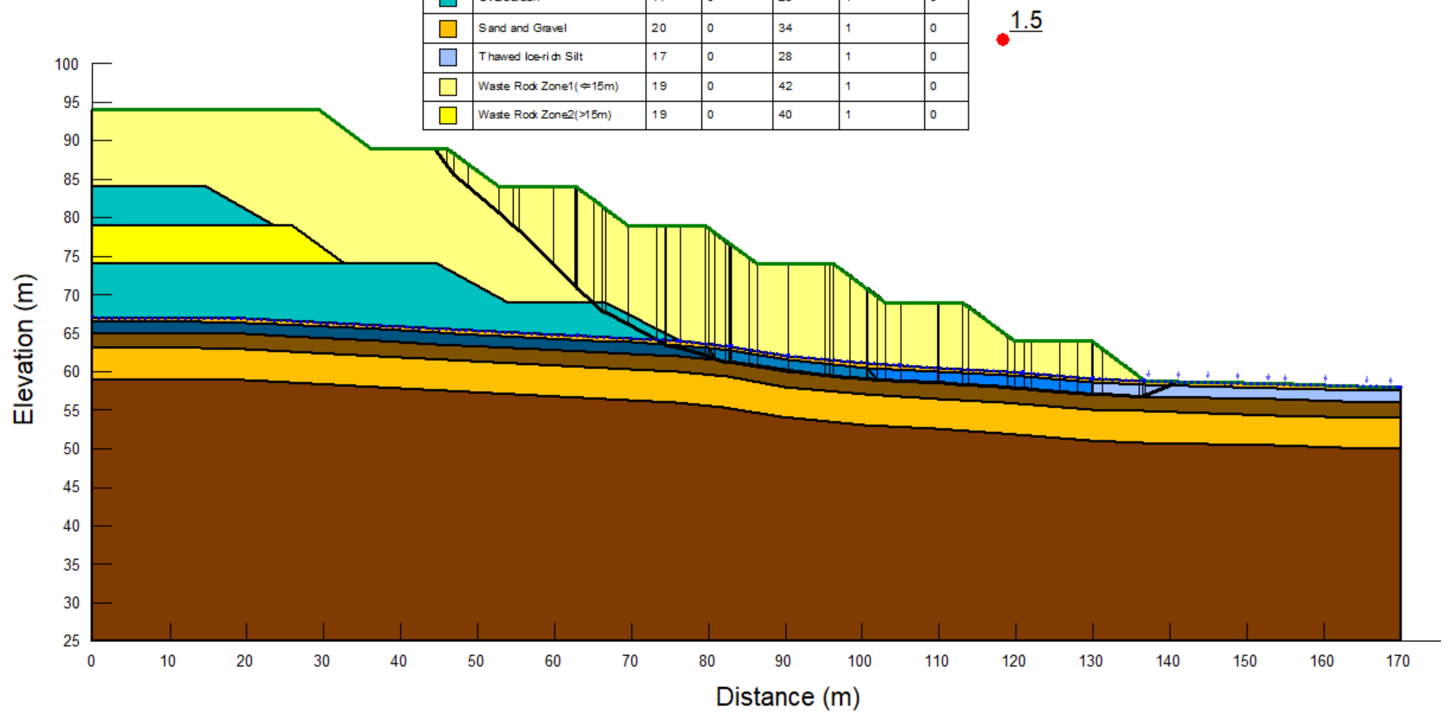
Stability Analysis of WRSF6
Meliadine Gold Mine, NU
Section A- Crest at 94 m Long-term Static Loading, Global Deep-Seated Slip, Base Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure A5

Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	Piezometric Surface	B-bar
	Bedrock				1	0
	Ice-poor Silt (Impenetrable)				1	0
	Ice-rich Silt (-0.5~-1)	16	60	0	1	0
	Ice-rich Silt (-1.5~-2)	16	120	0	1	0
	Ice-rich Silt (-1~-1.5)	16	100	0	1	0
	Overburden	17	0	28	1	0
	Sand and Gravel	20	0	34	1	0
	Thawed Ice-rich Silt	17	0	28	1	0
	Waste Rock Zone1(<=15m)	19	0	42	1	0
	Waste Rock Zone2(>15m)	19	0	40	1	0



LEGEND

NOTES

Note: Pseudo-static loading after construction
PGA=0.0498g

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

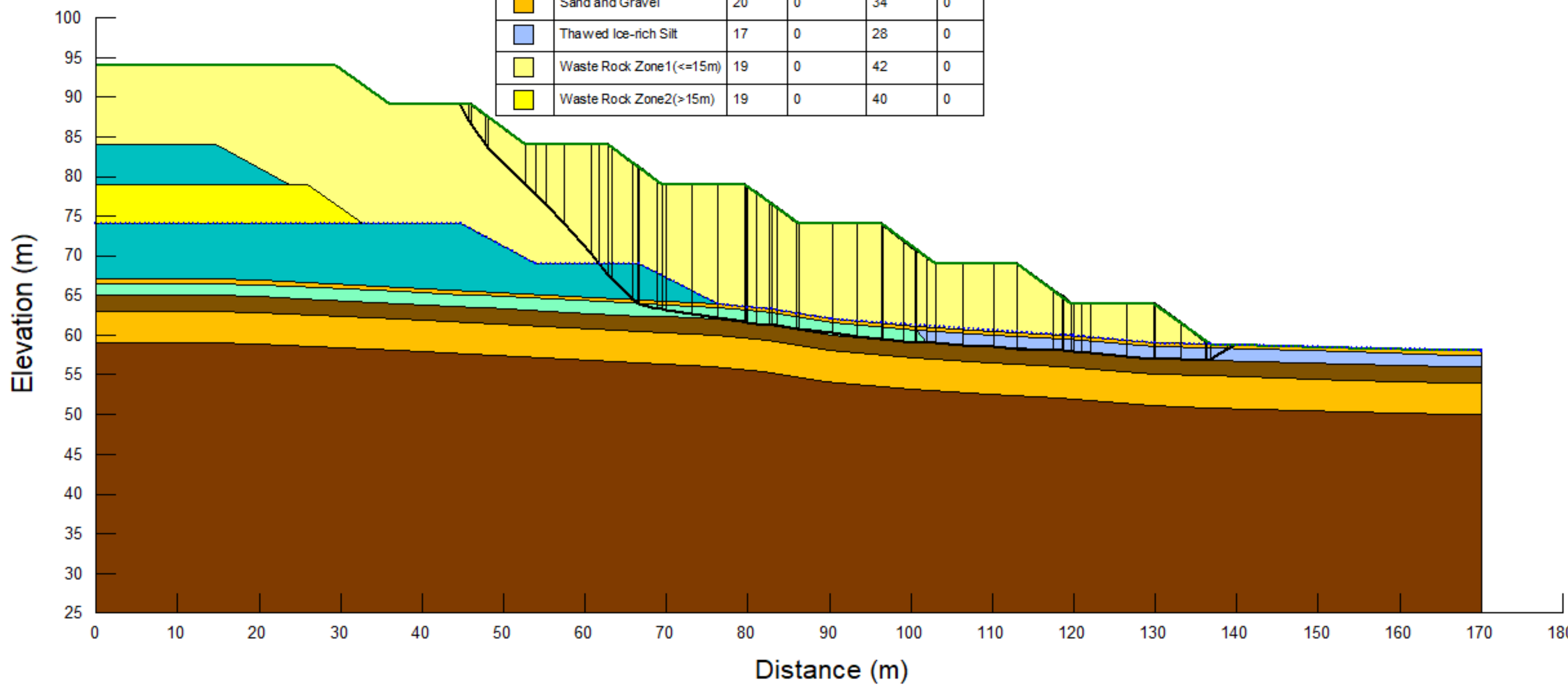
TETRA TECH

Stability Analysis of WRSF6 Meliadine Gold Mine, NU

Section A- Crest at 94 m Long-term Pseudo-Static Loading, Global Deep-Seated Slip, Base Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	
OFFICE	DATE			
EDM	SEPTEMBER 2024			

Figure A6



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar
	Bedrock				0
	Ice-poor Silt (Impenetrable)				0
	Ice-rich Silt (<-1.0)	16	60	0	0
	Overburden	17	0	28	0
	Sand and Gravel	20	0	34	0
	Thawed Ice-rich Silt	17	0	28	0
	Waste Rock Zone1(<=15m)	19	0	42	0
	Waste Rock Zone2(>15m)	19	0	40	0

LEGEND

NOTES

Note: Long-term static loading after construction

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

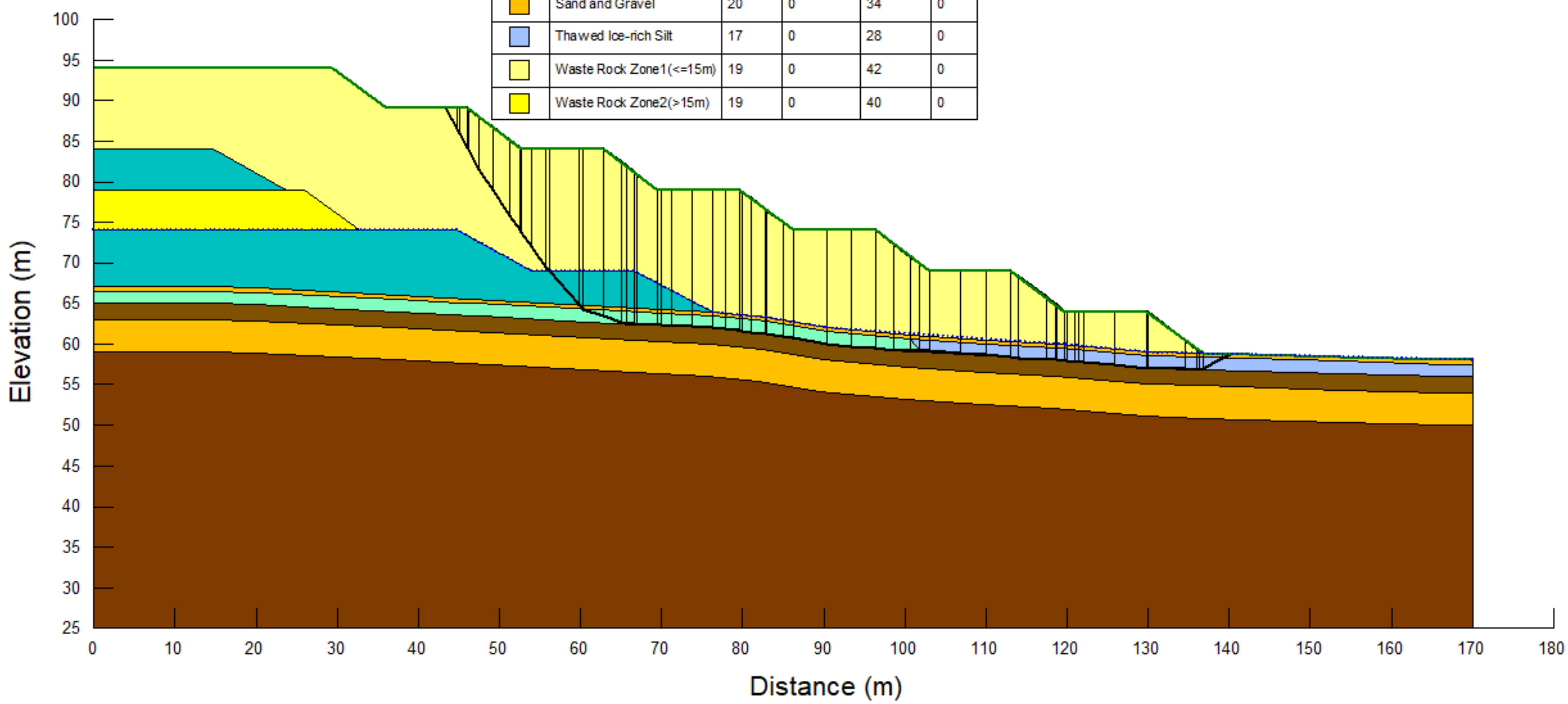
Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section A- Crest at 94 m Long-term Static Loading, Global Deep-Seated Slip, Sensitivity Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure A7



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar
	Bedrock				0
	Ice-poor Silt (Impenetrable)				0
	Ice-rich Silt (<-1.0)	16	60	0	0
	Overburden	17	0	28	0
	Sand and Gravel	20	0	34	0
	Thawed Ice-rich Silt	17	0	28	0
	Waste Rock Zone1 (<=15m)	19	0	42	0
	Waste Rock Zone2 (>15m)	19	0	40	0

LEGEND

NOTES

Note: Pseudo-static loading after construction, PGA=0.0498g

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

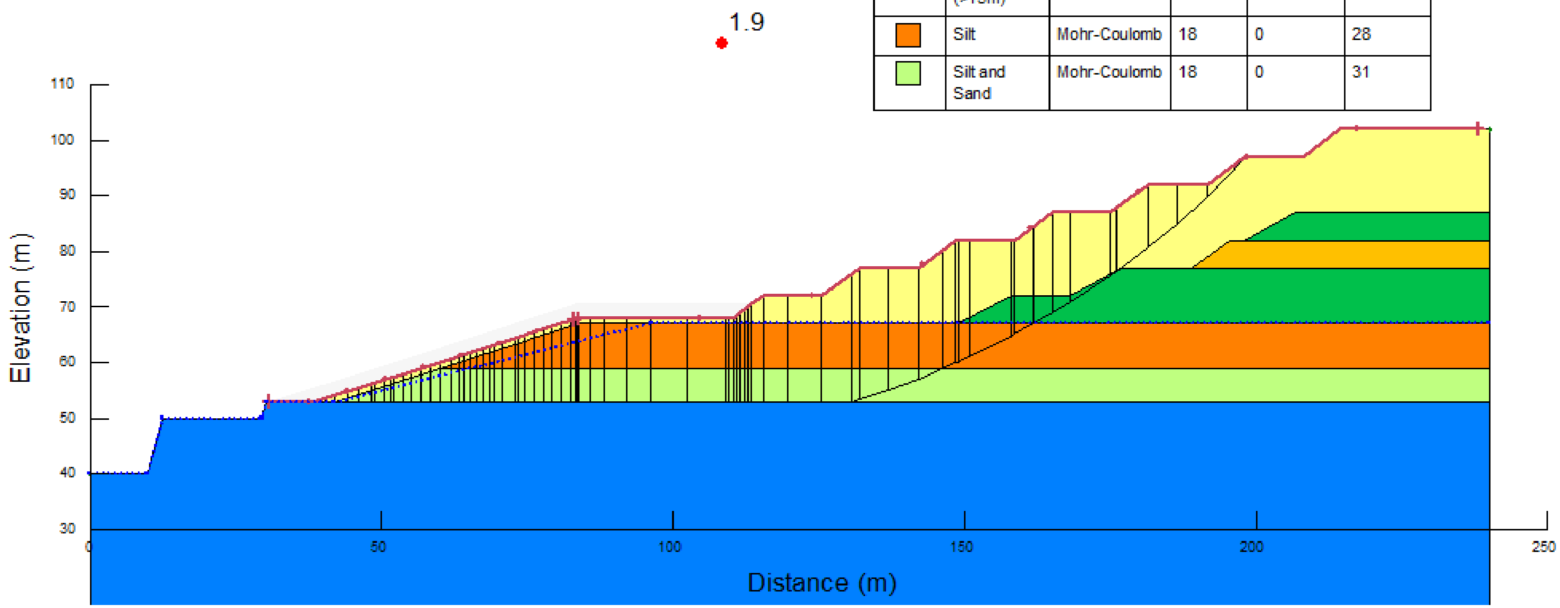
TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU
Section A- Crest at 94 m Long-term Pseudo-Static Loading, Global Deep-Seated Slip, Sensitivity Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	
OFFICE	DATE			
EDM	SEPTEMBER 2024			

Figure A8

Color	Name	Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)
	Bedrock	Bedrock (Impenetrable)			
	Overburden	Mohr-Coulomb	17	0	28
	Rockfill	Mohr-Coulomb	20	0	42
	Rockfill (>15m)	Mohr-Coulomb	20	0	40
	Silt	Mohr-Coulomb	18	0	28
	Silt and Sand	Mohr-Coulomb	18	0	31



LEGEND

NOTES

Note: Long-term static loading after construction

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE

TETRA TECH

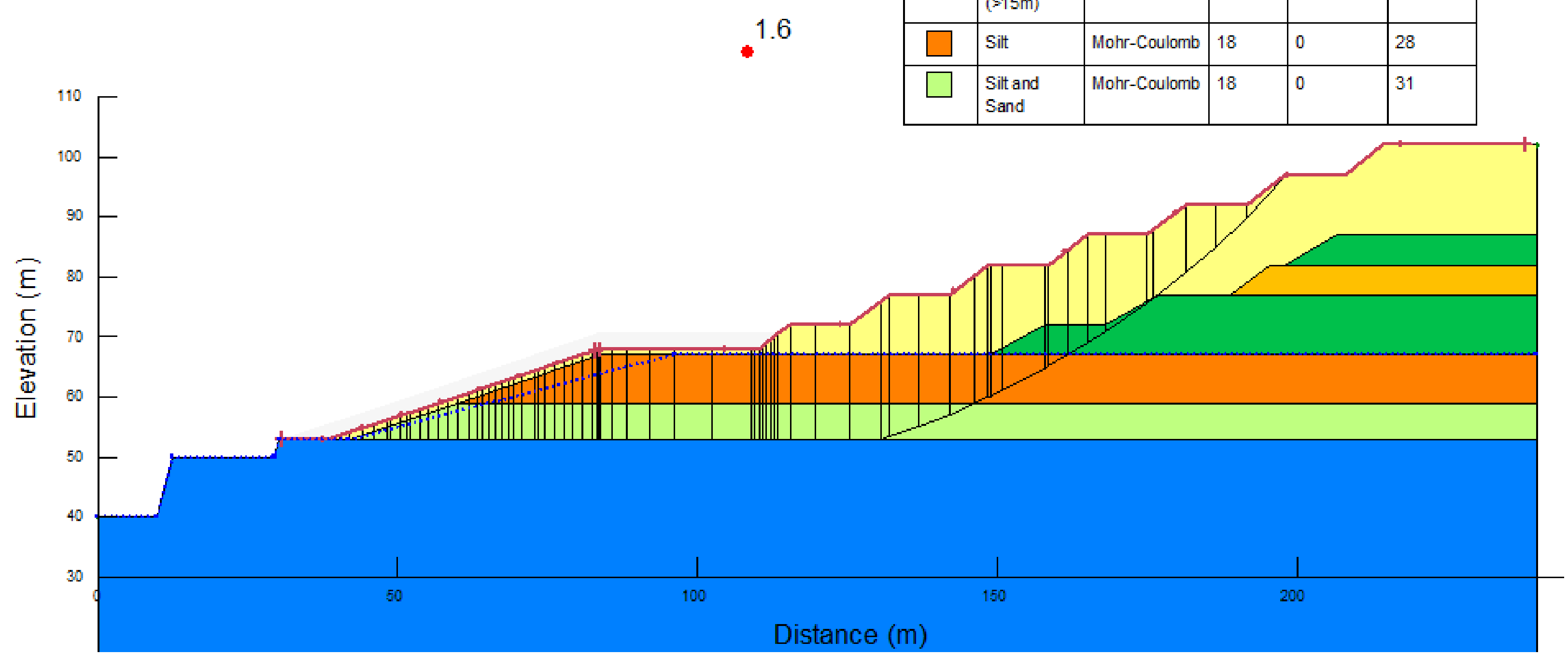
Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section A- Crest at 94 m Long-term Static Loading, Global Deep-Seated Slip, with 40 m offset from pit perimeter

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure A9



Color	Name	Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)
	Bedrock	Bedrock (Impenetrable)			
	Overburden	Mohr-Coulomb	17	0	28
	Rockfill	Mohr-Coulomb	20	0	42
	Rockfill (>15m)	Mohr-Coulomb	20	0	40
	Silt	Mohr-Coulomb	18	0	28
	Silt and Sand	Mohr-Coulomb	18	0	31

LEGEND

NOTES

Note: Pseudo-static loading after construction, PGA=0.0498g

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

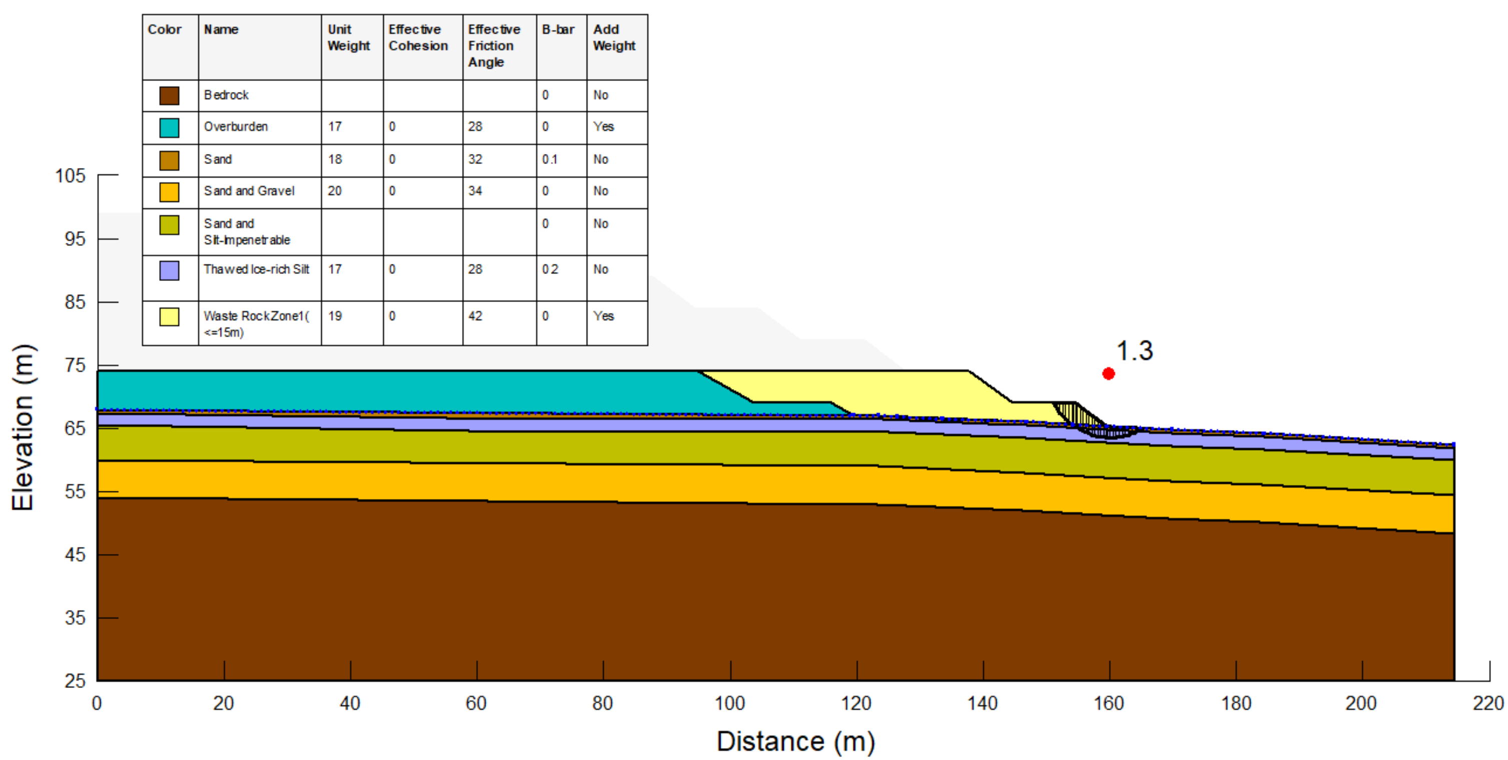
TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU
Section A- Crest at 94 m Long-term Pseudo-Static Loading, Global Deep-Seated Slip, with 40 m offset from pit perimeter

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure A10



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar	Add Weight
	Bedrock				0	No
	Overburden	17	0	28	0	Yes
	Sand	18	0	32	0.1	No
	Sand and Gravel	20	0	34	0	No
	Sand and Silt-Impenetrable				0	No
	Thawed Ice-rich Silt	17	0	28	0.2	No
	Waste RockZone1(<=15m)	19	0	42	0	Yes

LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

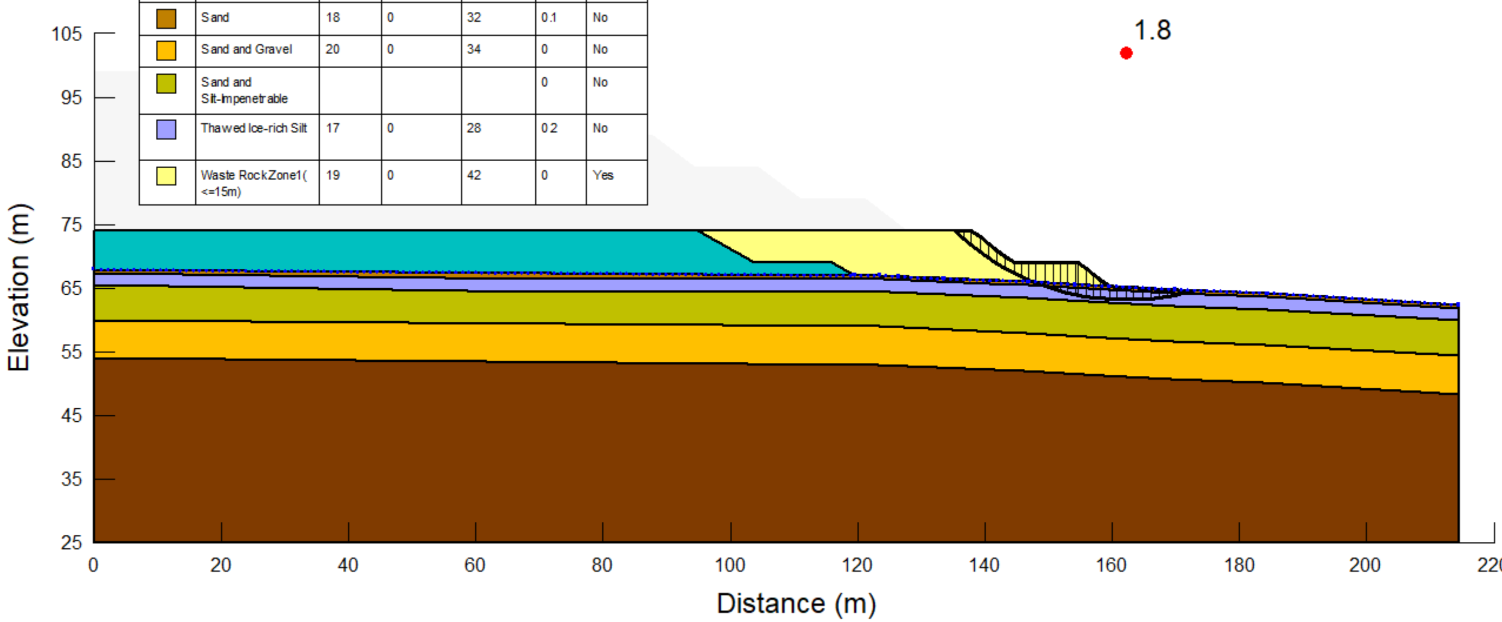
Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section B- Bench 74.0 m of Waste Rock and Overburden during Construction, Shallow Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure B1



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar	Add Weight
	Bedrock				0	No
	Overburden	17	0	28	0	Yes
	Sand	18	0	32	0.1	No
	Sand and Gravel	20	0	34	0	No
	Sand and Silt-Impenetrable				0	No
	Thawed Ice-rich Silt	17	0	28	0.2	No
	Waste RockZone1(<=15m)	19	0	42	0	Yes

LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT

AGNICO EAGLE

TETRA TECH

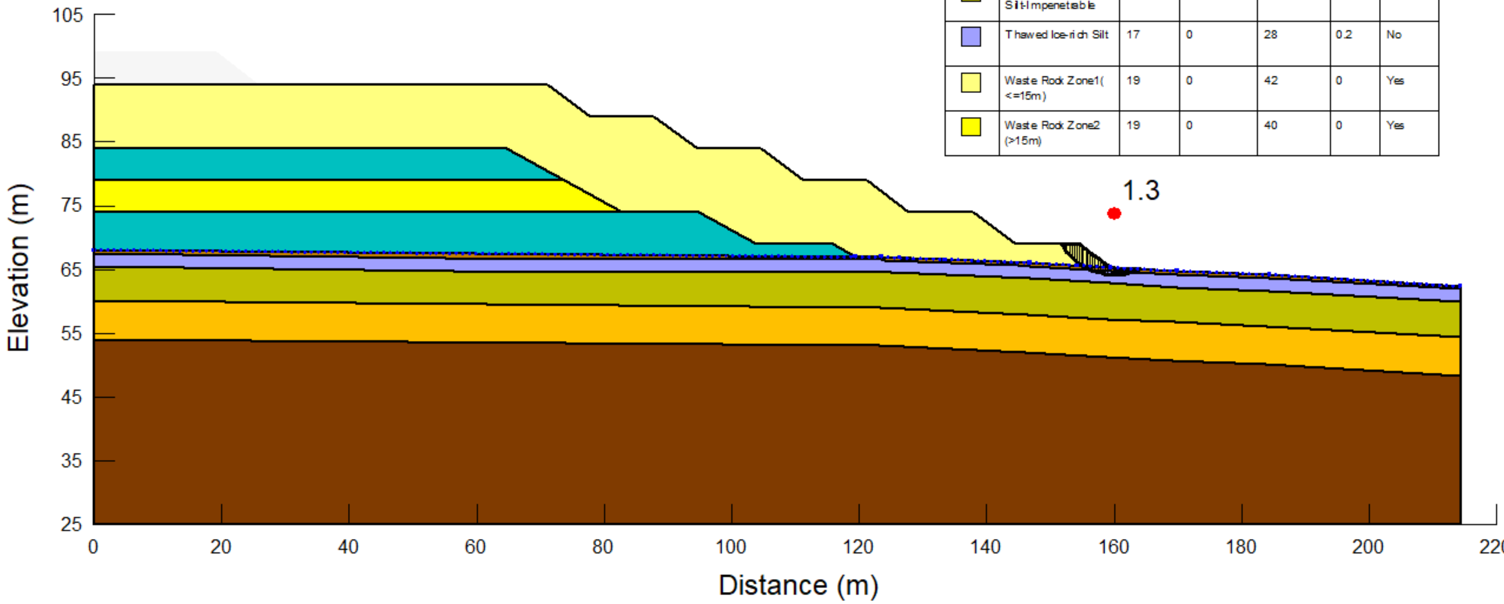
Stability Analysis of WRSF6 Meliadine Gold Mine, NU

Section B- Bench 74.0 m of Waste Rock and Overburden during Construction, Local Deep-Seated Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure B2



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar	Add Weight
	Bedrock				0	No
	Overburden	17	0	28	0	Yes
	Sand	18	0	32	0.1	No
	Sand and Gravel	20	0	34	0	No
	Sand and Silt-Impenetrable				0	No
	Thawed Ice-rich Silt	17	0	28	0.2	No
	Waste Rock Zone1(<=15m)	19	0	42	0	Yes
	Waste Rock Zone2 (>15m)	19	0	40	0	Yes

LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

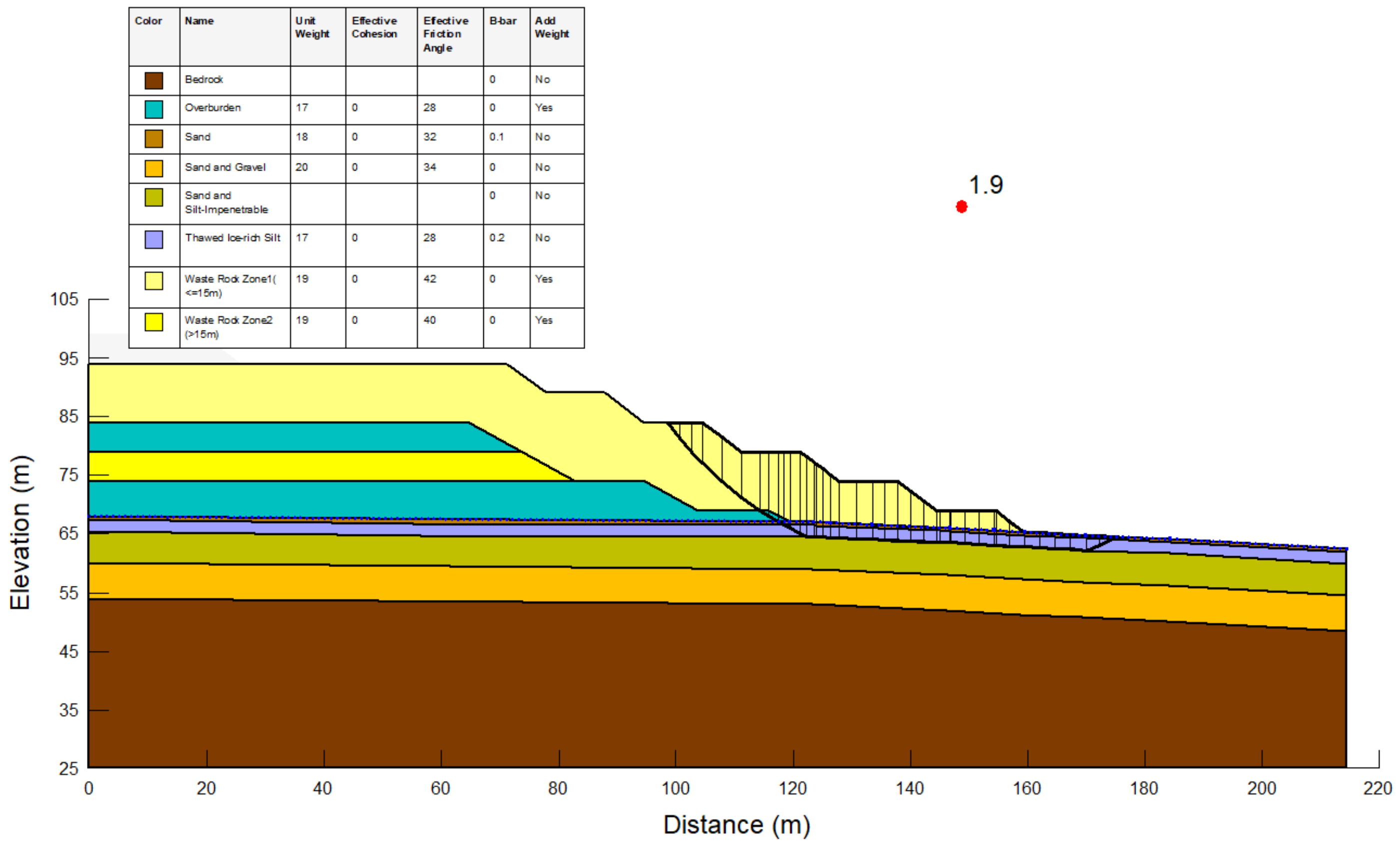
Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section B- Bench 94.0 m of Waste Rock and Overburden during Construction, Shallow Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure B3



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar	Add Weight
	Bedrock				0	No
	Overburden	17	0	28	0	Yes
	Sand	18	0	32	0.1	No
	Sand and Gravel	20	0	34	0	No
	Sand and Silt-Impenetrable				0	No
	Thawed Ice-rich Silt	17	0	28	0.2	No
	Waste Rock Zone1(<=15m)	19	0	42	0	Yes
	Waste Rock Zone2 (>15m)	19	0	40	0	Yes

LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU

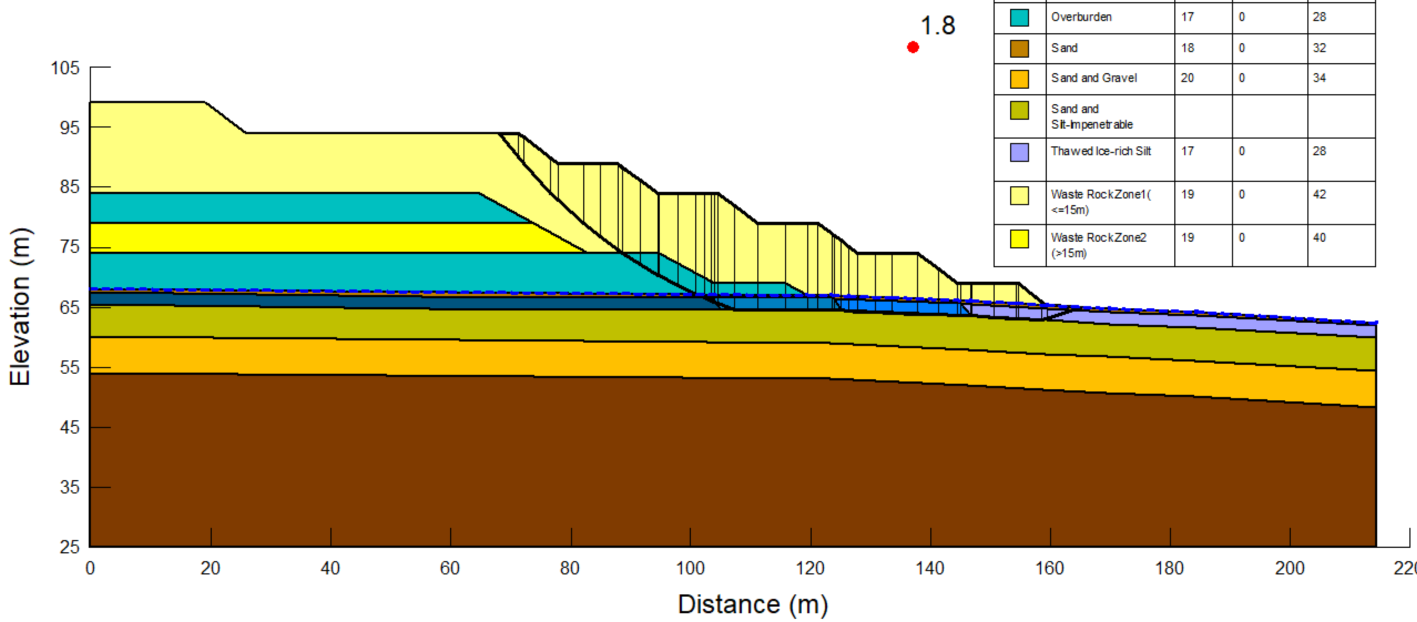
Section B- Bench 94.0 m of Waste Rock and Overburden during Construction, Local Deep-Seated Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure B4

Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle
	Bedrock			
	Ice-rich Silt (-0.5~-1)	16	60	0
	Ice-rich Silt (-1.5~-2)	16	120	0
	Ice-rich Silt (-1~-1.5)	16	100	0
	Overburden	17	0	28
	Sand	18	0	32
	Sand and Gravel	20	0	34
	Sand and Silt-Impenetrable			
	Thawed Ice-rich Silt	17	0	28
	Waste RockZone1(<=15m)	19	0	42
	Waste RockZone2 (>15m)	19	0	40



LEGEND

NOTES

Note: Long-term static loading after construction

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE

TETRA TECH

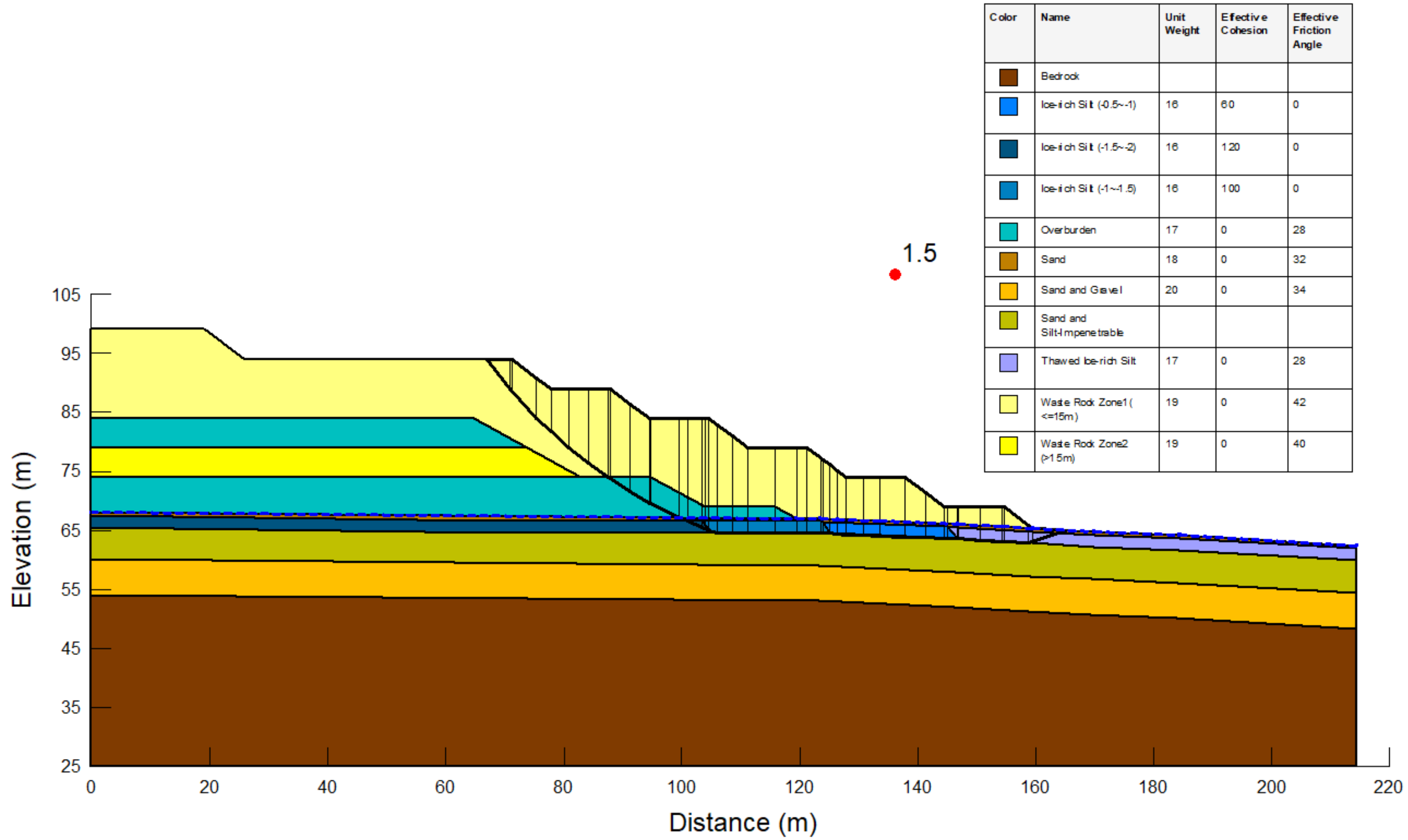
Stability Analysis of WRSF6 Meliadine Gold Mine, NU

Section B- Crest at 99 m Long-term Static Loading, Global Deep-Seated Slip, Base Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure B5



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle
	Bedrock			
	Ice-rich Silt (-0.5~-1)	16	60	0
	Ice-rich Silt (-1.5~-2)	16	120	0
	Ice-rich Silt (-1~-1.5)	16	100	0
	Overburden	17	0	28
	Sand	18	0	32
	Sand and Gravel	20	0	34
	Sand and Silt-Impenetrable			
	Thawed Ice-rich Silt	17	0	28
	Waste Rock Zone1 (<=15m)	19	0	42
	Waste Rock Zone2 (>15m)	19	0	40

LEGEND

NOTES

Note: Pseudo-static loading after construction
PGA=0.0498g

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

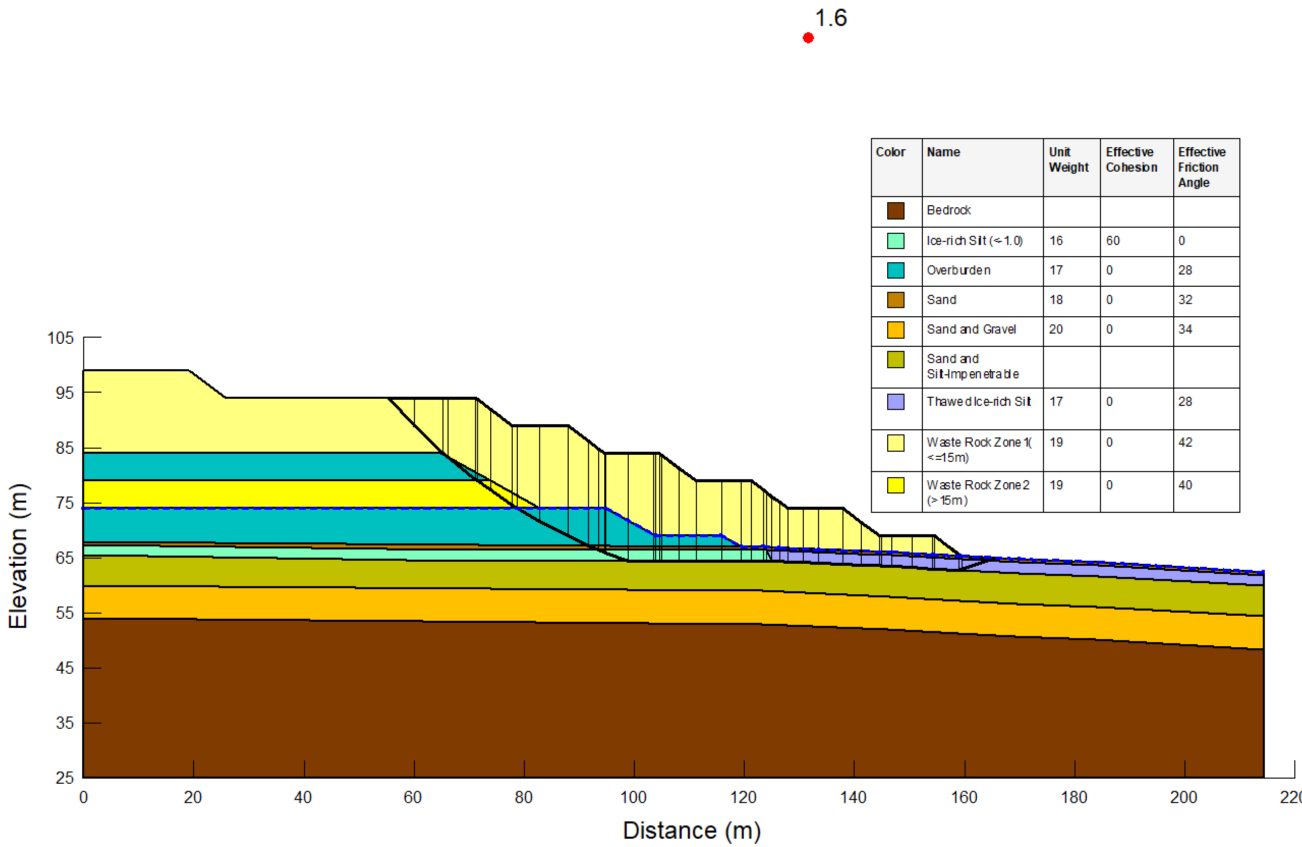
Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section B- Crest at 99 m Long-term Pseudo-Static Loading, Global Deep-Seated Slip, Base Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure B6



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle
	Bedrock			
	Ice-rich Silt (<1.0)	16	60	0
	Overburden	17	0	28
	Sand	18	0	32
	Sand and Gravel	20	0	34
	Sand and Silt-Impenetrable			
	Thawed Ice-rich Silt	17	0	28
	Waste Rock Zone 1(<=15m)	19	0	42
	Waste Rock Zone 2 (> 15m)	19	0	40

LEGEND

NOTES

Note: Long-term static loading after construction

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

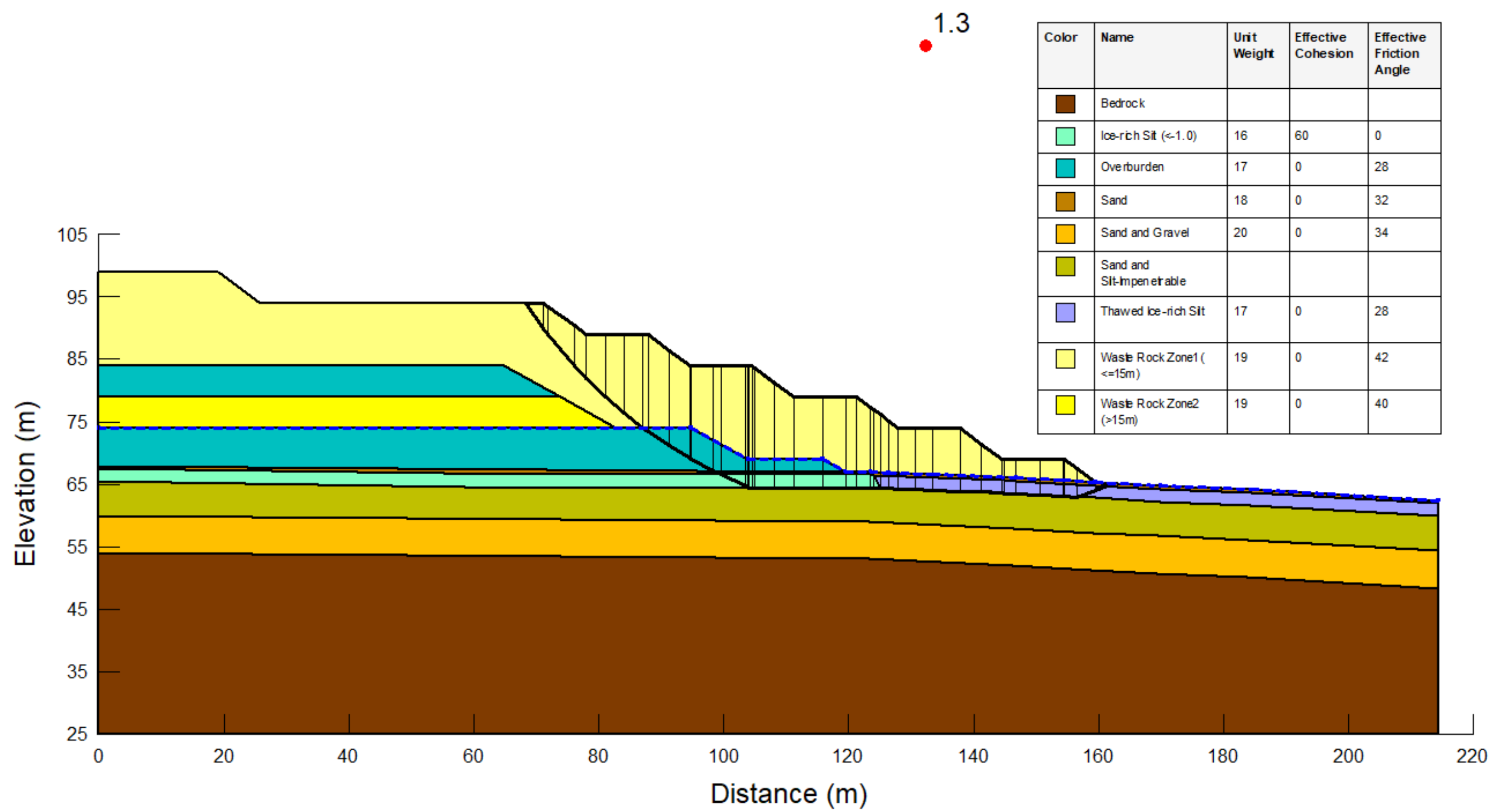
Stability Analysis of WRSF6 Meliadine Gold Mine, NU

Section B- Crest at 99 m Long-term Static Loading, Global Deep-Seated Slip, Sensitivity Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure B7



LEGEND

NOTES

Note: Pseudo-static loading after construction, PGA=0.0498g

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

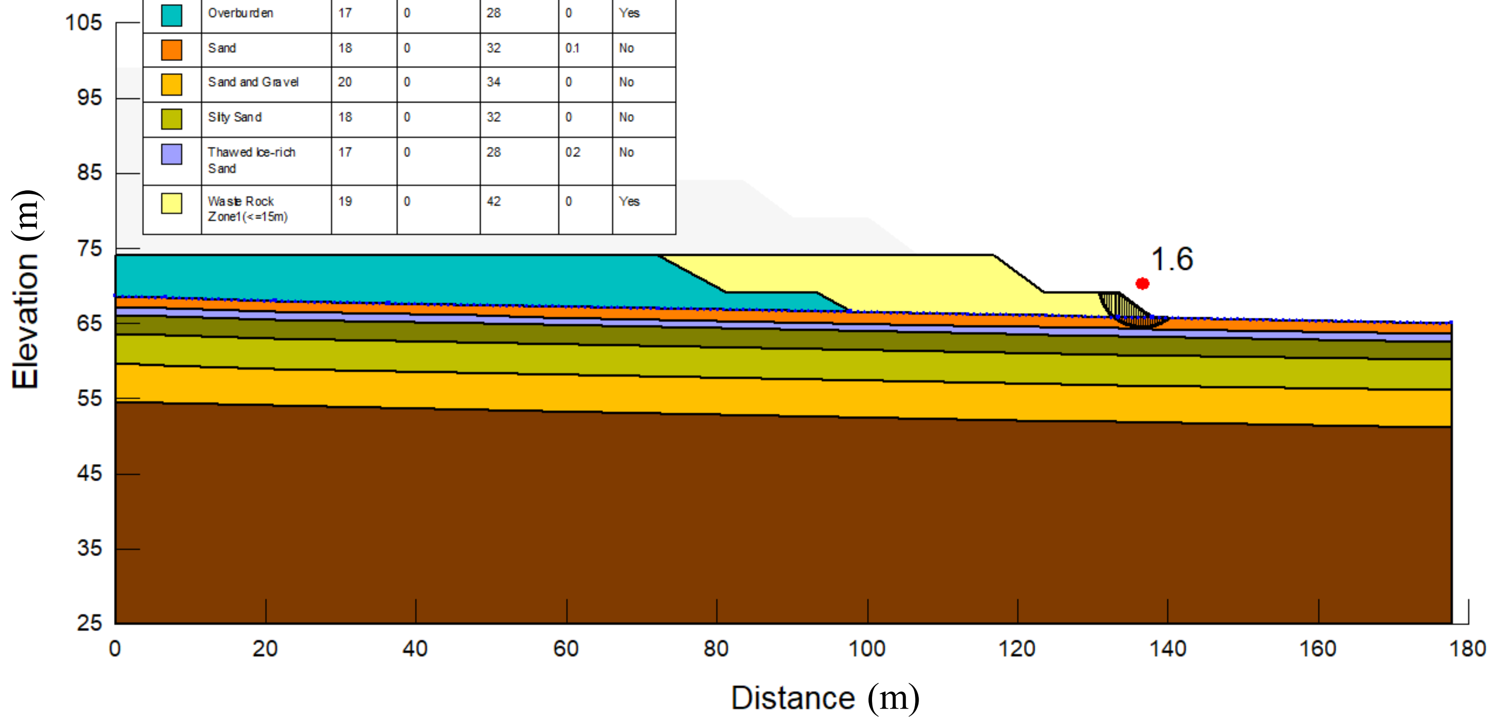
Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section B- Crest at 99 m Long-term Pseudo-Static Loading, Global Deep-Seated Slip, Sensitivity Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure B8



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar	Add Weight
	Bedrock				0	No
	Ice-poor Silt (Impenetrable)				0	No
	Overburden	17	0	28	0	Yes
	Sand	18	0	32	0.1	No
	Sand and Gravel	20	0	34	0	No
	Silty Sand	18	0	32	0	No
	Thawed Ice-rich Sand	17	0	28	0.2	No
	Waste Rock Zone1 (<=15m)	19	0	42	0	Yes

LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU

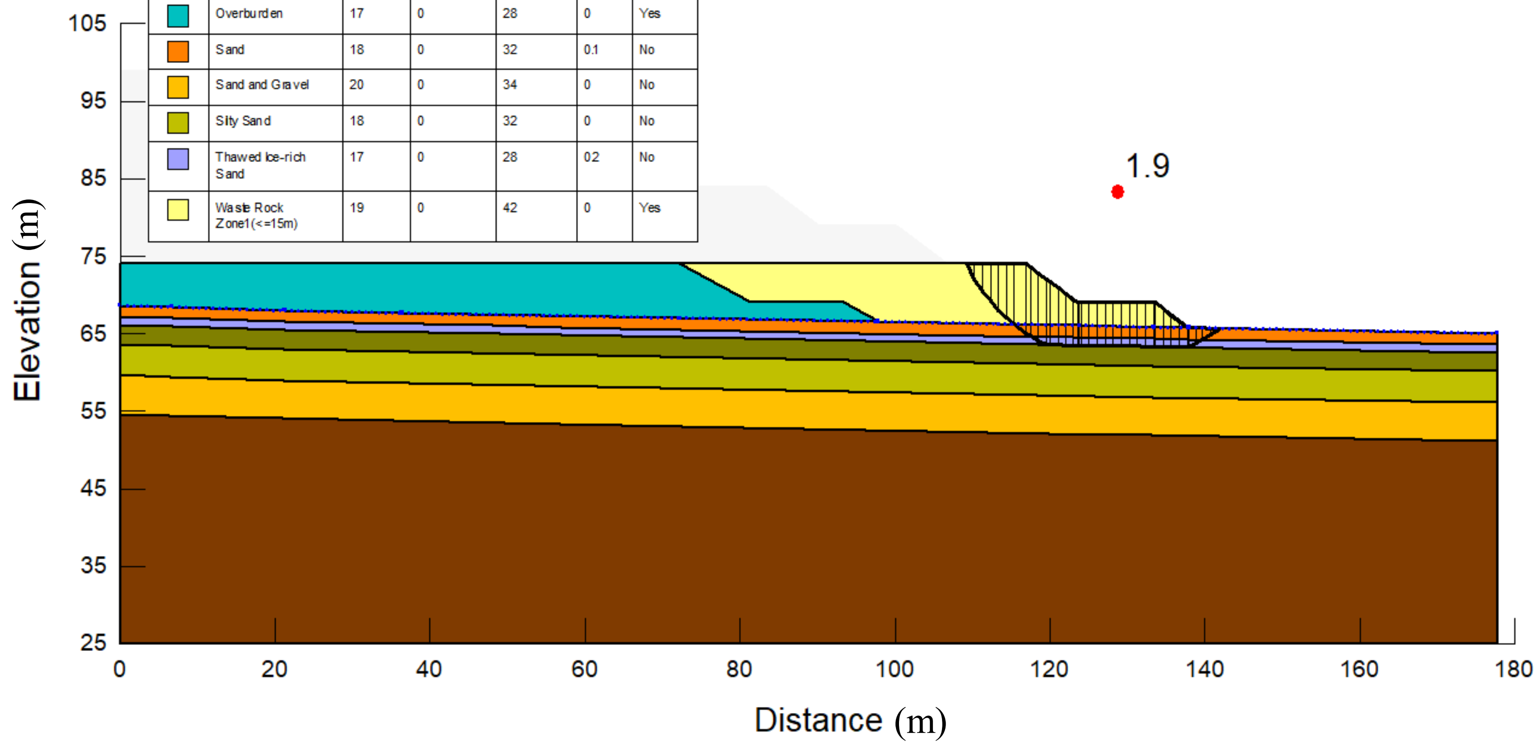
Section C- Bench 74.0 m of Waste Rock and Overburden during Construction, Shallow Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure C1

Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar	Add Weight
	Bedrock				0	No
	Ice-poor Silt (Impenetrable)				0	No
	Overburden	17	0	28	0	Yes
	Sand	18	0	32	0.1	No
	Sand and Gravel	20	0	34	0	No
	Silty Sand	18	0	32	0	No
	Thawed Ice-rich Sand	17	0	28	0.2	No
	Waste Rock Zone1 (<=15m)	19	0	42	0	Yes



LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

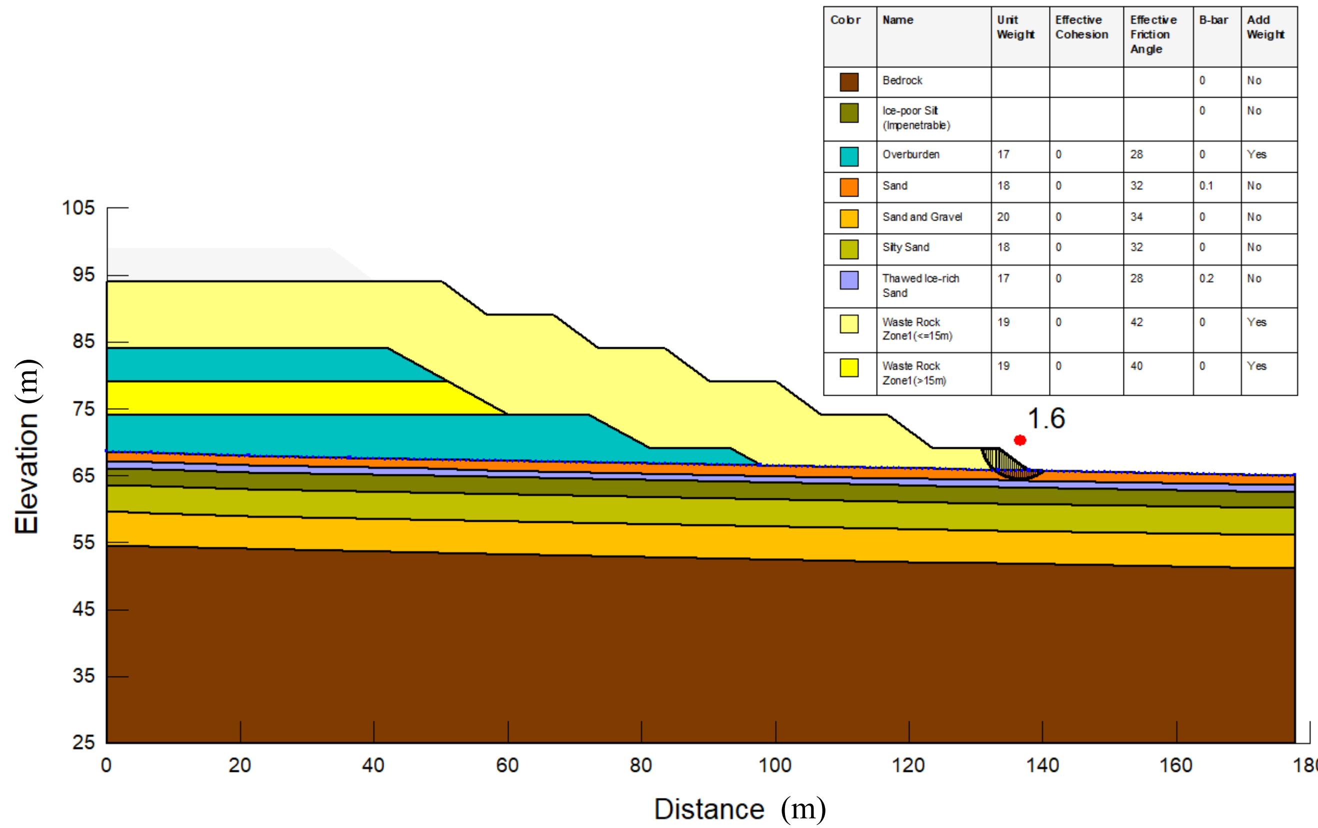
Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section C- Bench 74.0 m of Waste Rock and Overburden during Construction, Local Deep-Seated Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure C2



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar	Add Weight
	Bedrock				0	No
	Ice-poor Silt (Impenetrable)				0	No
	Overburden	17	0	28	0	Yes
	Sand	18	0	32	0.1	No
	Sand and Gravel	20	0	34	0	No
	Silty Sand	18	0	32	0	No
	Thawed Ice-rich Sand	17	0	28	0.2	No
	Waste Rock Zone1 (<=15m)	19	0	42	0	Yes
	Waste Rock Zone1 (>15m)	19	0	40	0	Yes

LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

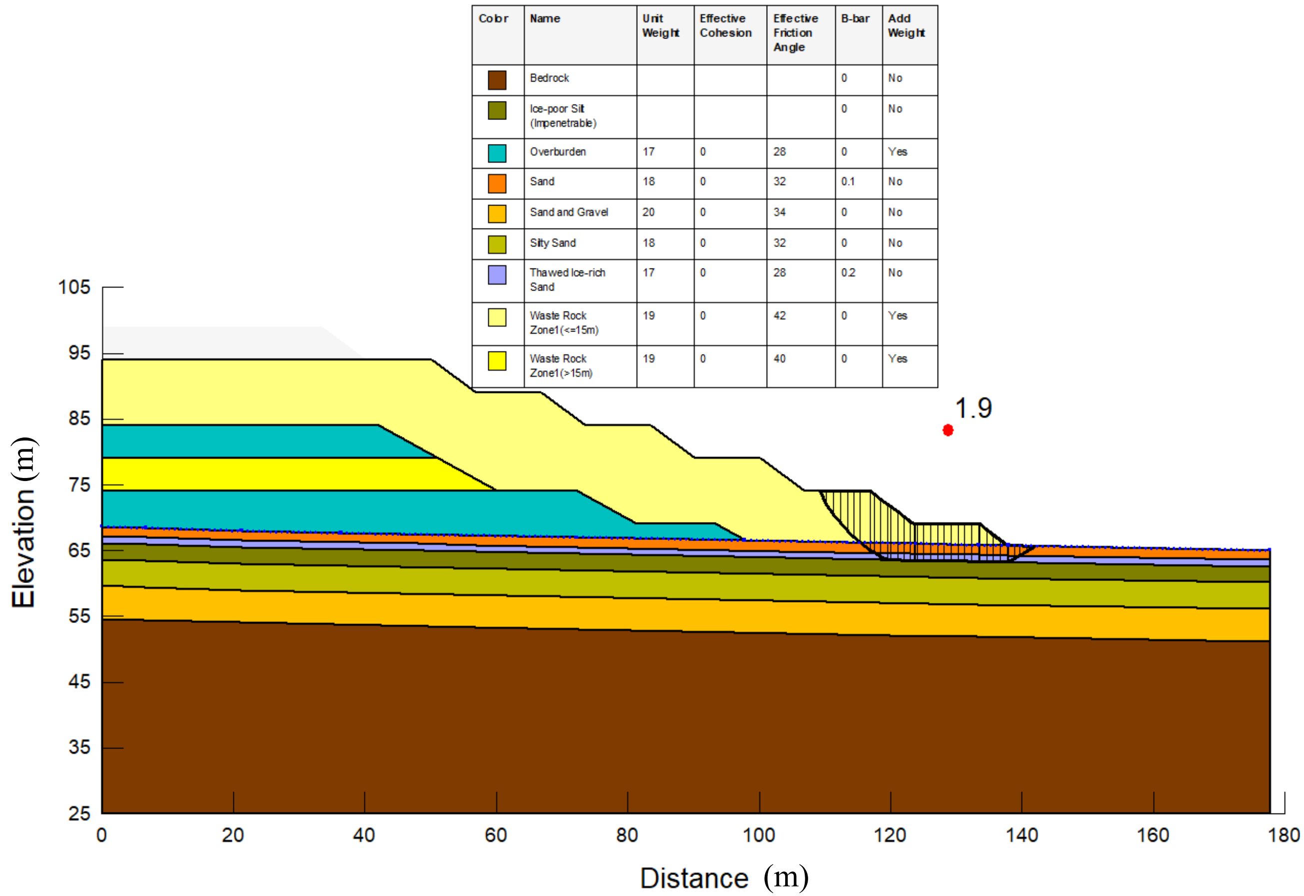
TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU
Section C Bench 94.0 m of Waste Rock and Overburden during Construction, Shallow Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure C3



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar	Add Weight
	Bedrock				0	No
	Ice-poor Silt (Impenetrable)				0	No
	Overburden	17	0	28	0	Yes
	Sand	18	0	32	0.1	No
	Sand and Gravel	20	0	34	0	No
	Silty Sand	18	0	32	0	No
	Thawed Ice-rich Sand	17	0	28	0.2	No
	Waste Rock Zone1 (<=15m)	19	0	42	0	Yes
	Waste Rock Zone1 (>15m)	19	0	40	0	Yes

LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

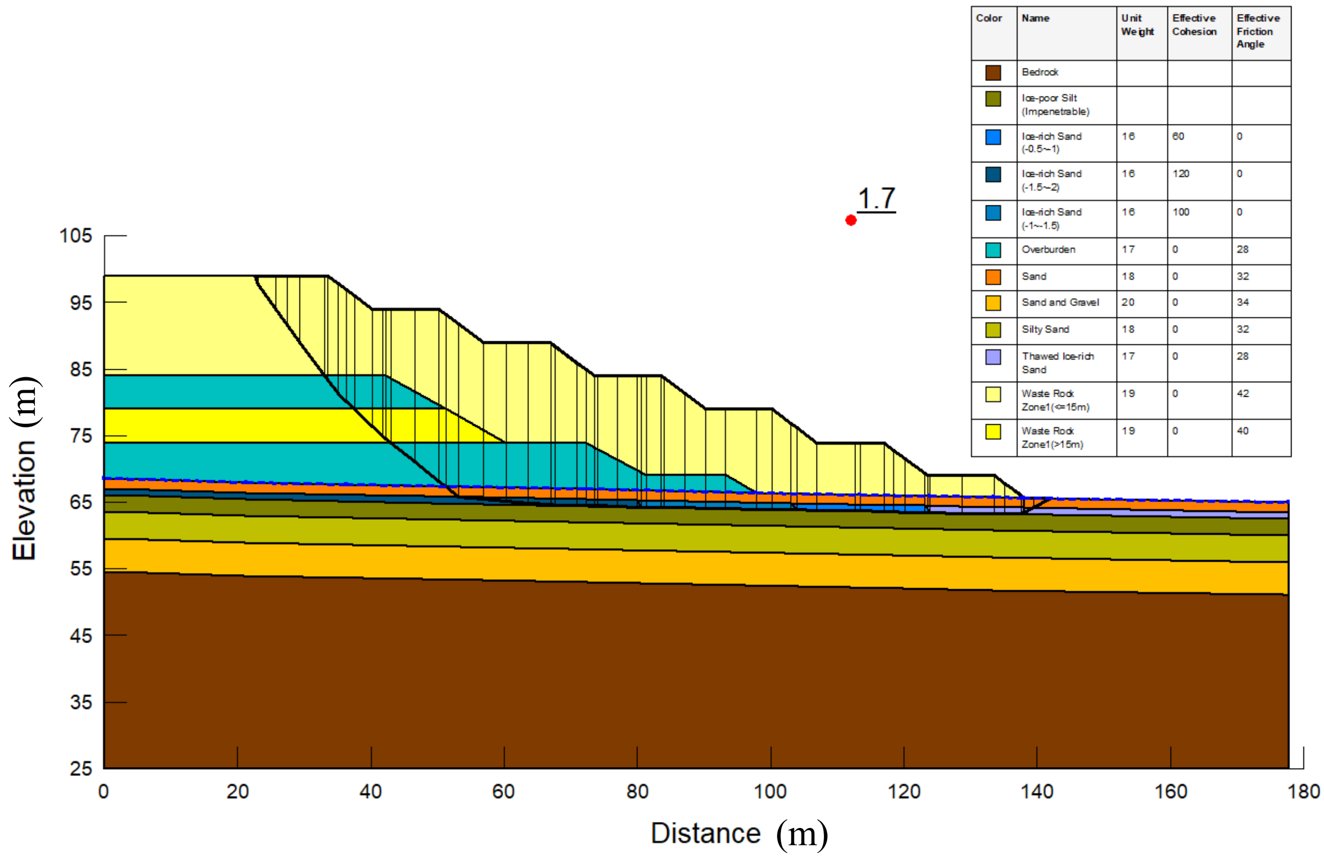
TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU
Section C- Bench 94.0 m of Waste Rock and Overburden during Construction, Local Deep-Seated Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure C4



LEGEND

NOTES

Note: Long-term static loading after construction

CLIENT

AGNICO EAGLE

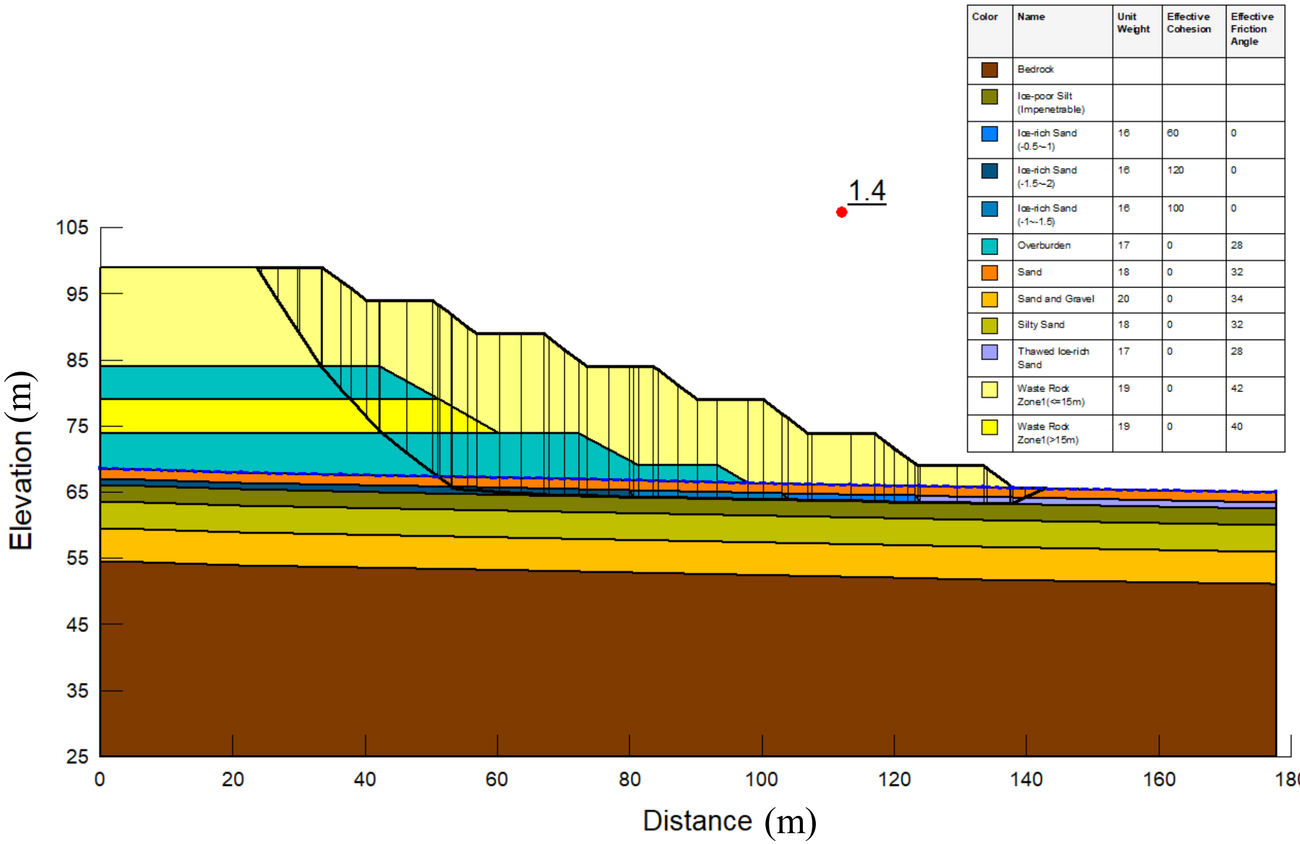
TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section C- Crest at 99 m Long-term Static Loading, Global Deep-Seated Slip, Base Case

PROJECT NO.	DWN	CKD	APVD	REV	
ENG.EARC03140-38	YL	HX	HX		**Figure C5**
OFFICE	DATE				
EDM	SEPTEMBER 2024				

STATUS
ISSUED FOR USE



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle
	Bedrock			
	Ice-poor Silt (Impenetrable)			
	Ice-rich Sand (-0.5~-1)	16	60	0
	Ice-rich Sand (-1.5~-2)	16	120	0
	Ice-rich Sand (-1~-1.5)	16	100	0
	Overburden	17	0	28
	Sand	18	0	32
	Sand and Gravel	20	0	34
	Silty Sand	18	0	32
	Thawed Ice-rich Sand	17	0	28
	Waste Rock Zone1(<=15m)	19	0	42
	Waste Rock Zone1(>15m)	19	0	40

LEGEND

NOTES

Note: Pseudo-static loading after construction
PGA=0.0498g

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

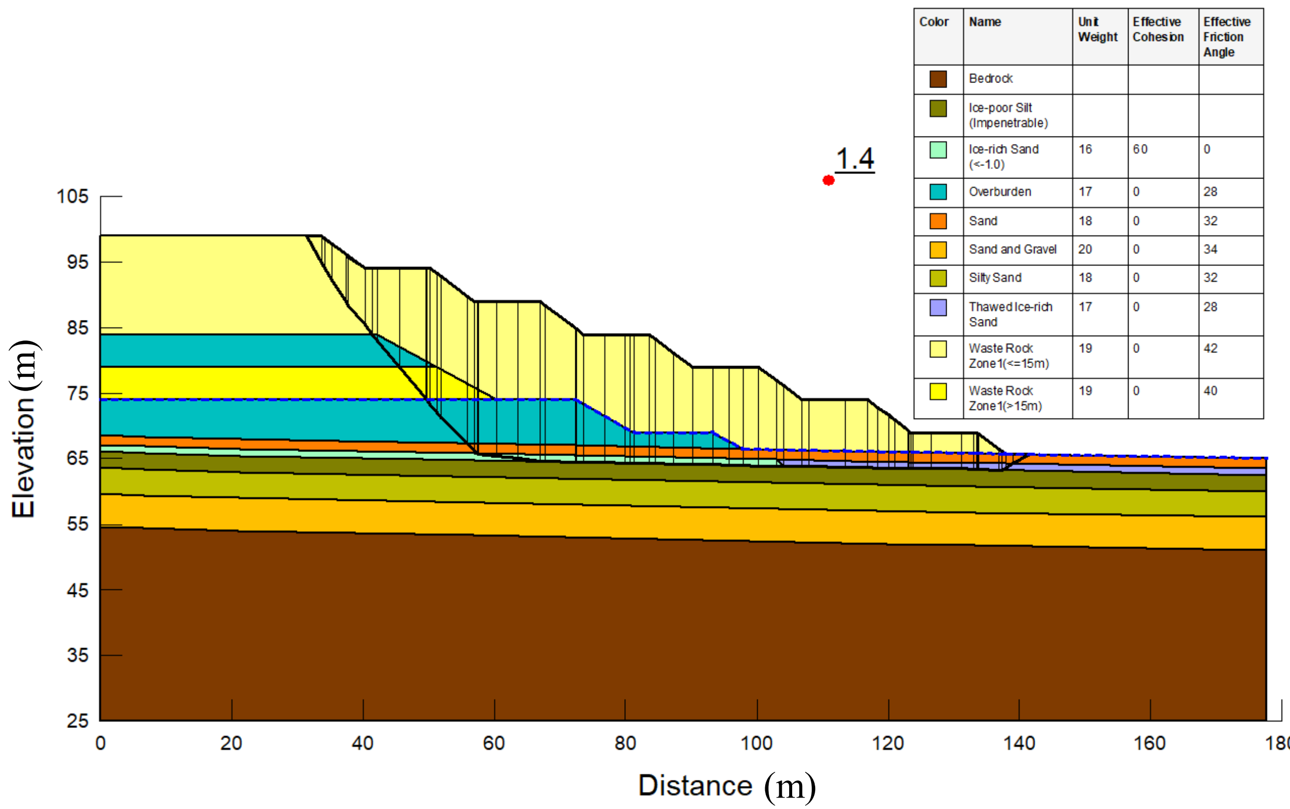
Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section B- Crest at 99 m Long-term Pseudo-Static Loading, Global Deep-Seated Slip, Base Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure C6



LEGEND

NOTES

Note: Long-term static loading after construction

CLIENT

AGNICO EAGLE

TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU

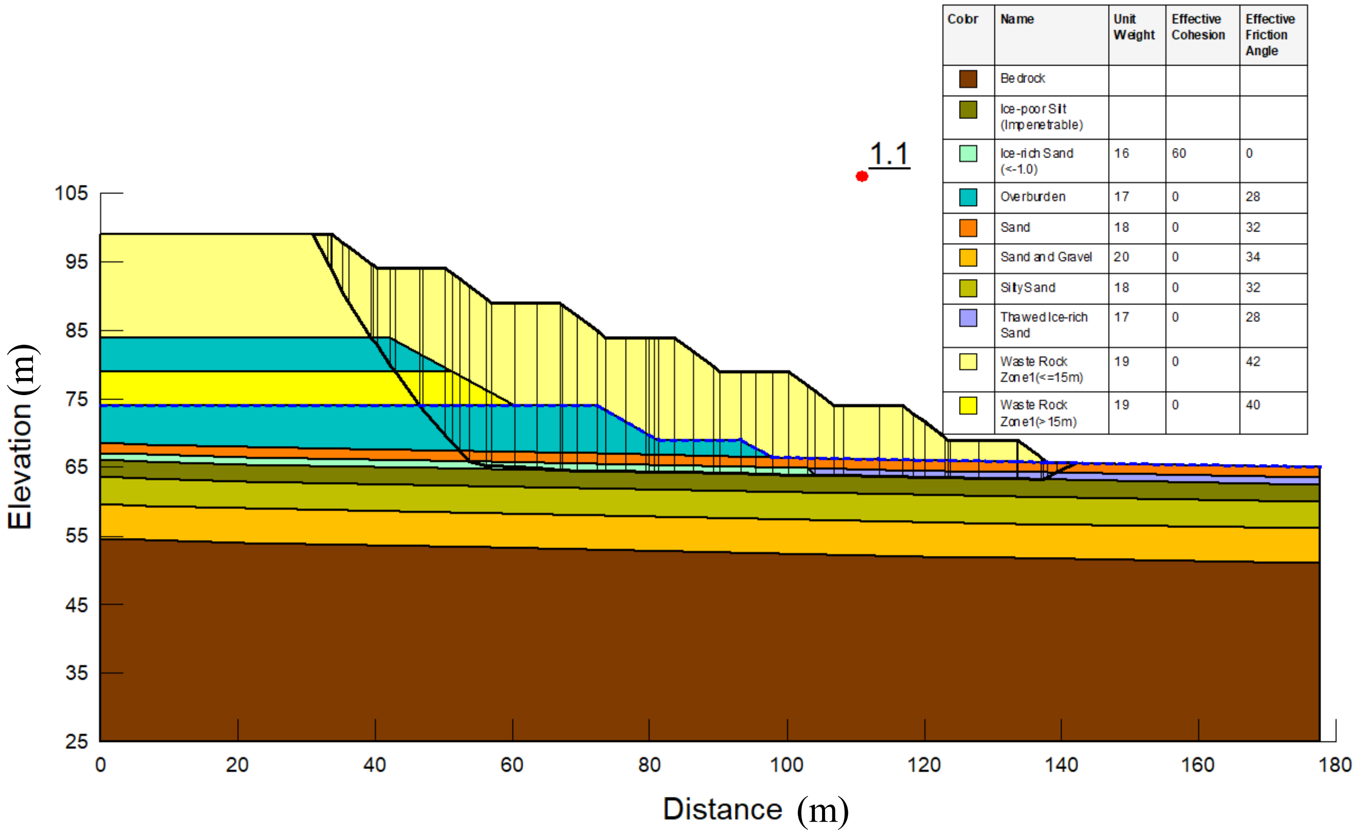
Section B- Crest at 99 m Long-term Static Loading, Global Deep-Seated Slip, Sensitivity Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	
OFFICE	DATE			
EDM	SEPTEMBER 2024			

Figure C7

STATUS

ISSUED FOR USE



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle
	Bedrock			
	Ice-poor Silt (Impenetrable)			
	Ice-rich Sand (<-1.0)	16	60	0
	Overburden	17	0	28
	Sand	18	0	32
	Sand and Gravel	20	0	34
	Silty Sand	18	0	32
	Thawed Ice-rich Sand	17	0	28
	Waste Rock Zone1(<=15m)	19	0	42
	Waste Rock Zone1(>15m)	19	0	40

LEGEND

NOTES

Note: Pseudo-static loading after construction, PGA=0.0498g

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU

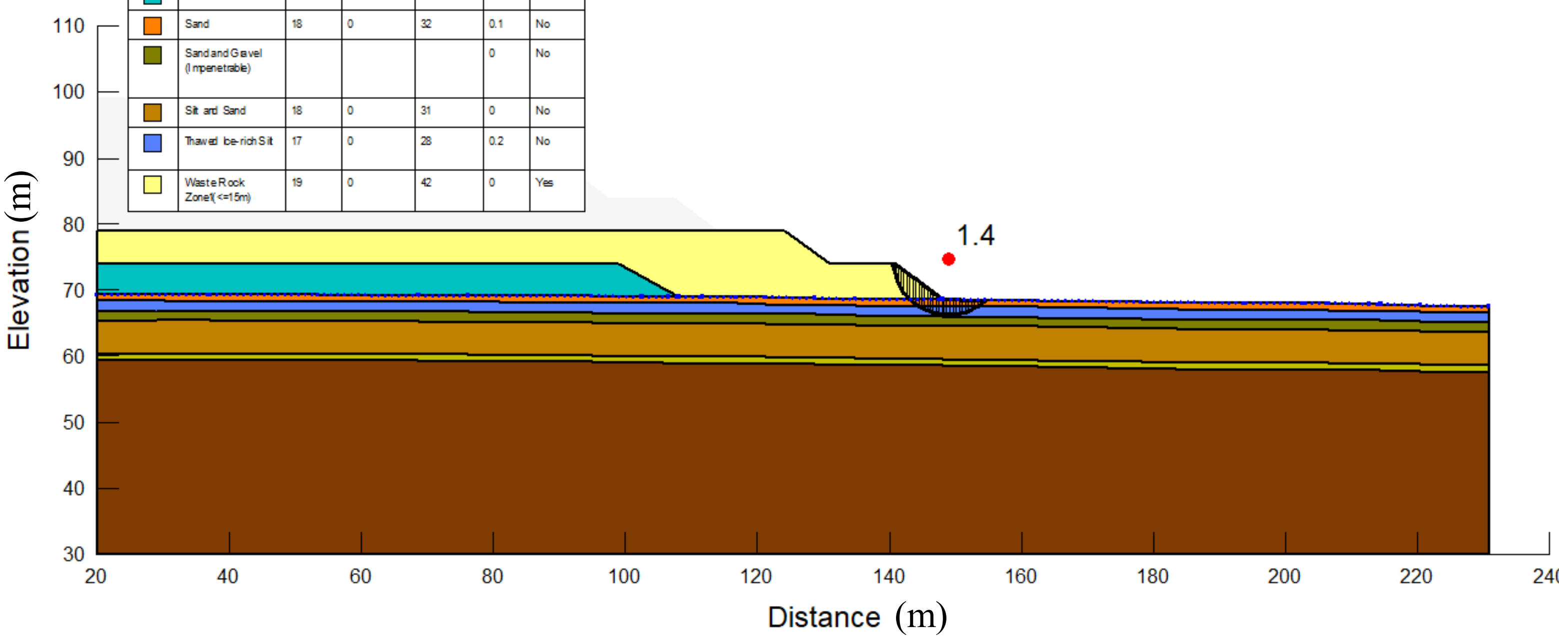
Section B- Crest at 99 m Long-term Pseudo-Static Loading, Global Deep-Seated Slip, Sensitivity Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure C8

Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar	Add Weight
	Bedrock				0	No
	Gravel	20	0	35	0	No
	Overburden	17	0	28	0	Yes
	Sand	18	0	32	0.1	No
	Sand and Gravel (Impenetrable)				0	No
	Silt and Sand	18	0	31	0	No
	Thawed Ice-rich Silt	17	0	28	0.2	No
	Waste Rock Zone1(<=15m)	19	0	42	0	Yes



LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT

AGNICO EAGLE

TETRA TECH

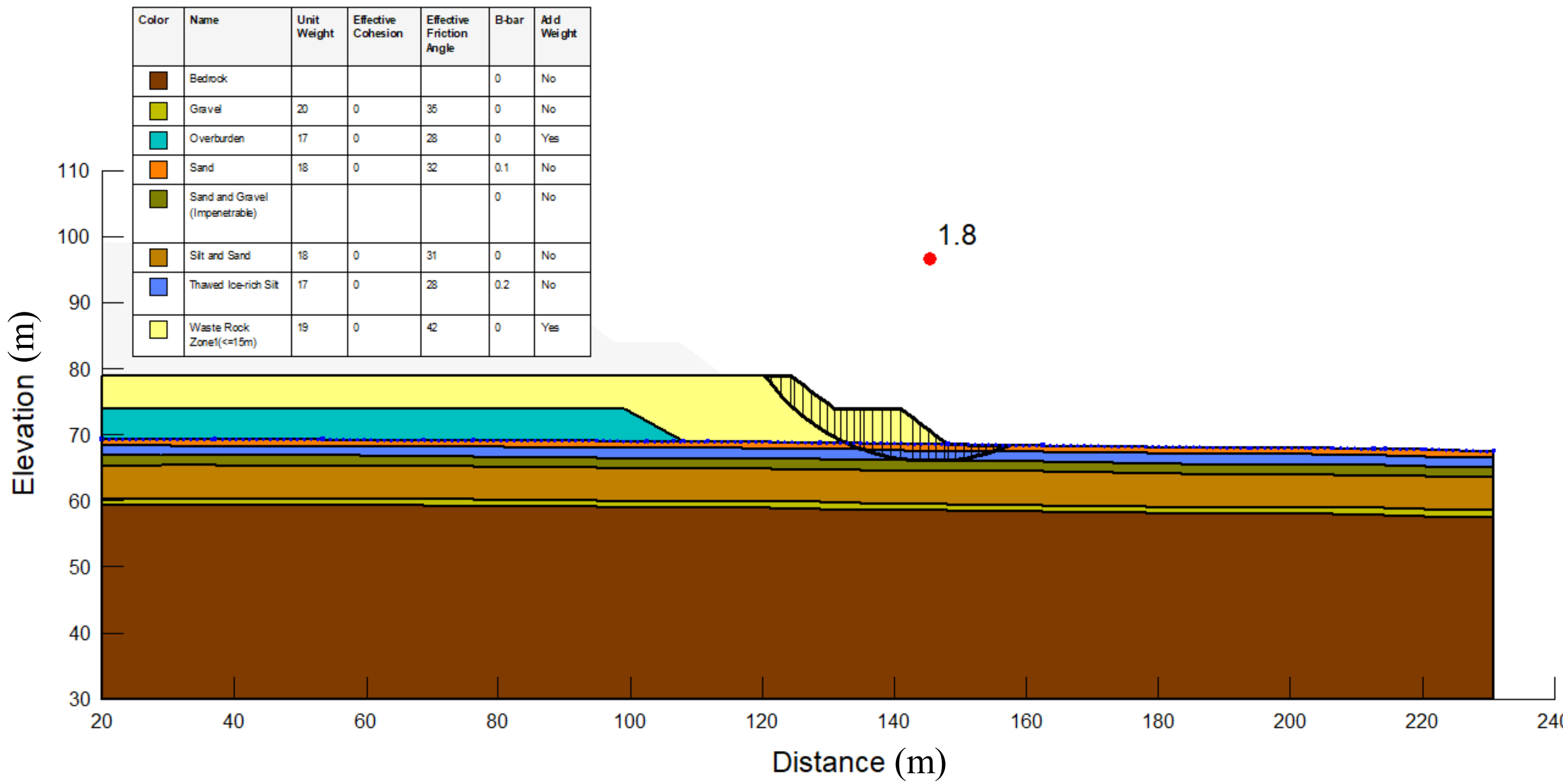
Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section D- Bench 79.0 m of Waste Rock and Overburden during Construction, Shallow Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure D1



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar	Add Weight
	Bedrock				0	No
	Gravel	20	0	35	0	No
	Overburden	17	0	28	0	Yes
	Sand	18	0	32	0.1	No
	Sand and Gravel (Impenetrable)				0	No
	Silt and Sand	18	0	31	0	No
	Thawed Ice-rich Silt	17	0	28	0.2	No
	Waste Rock Zone1(<=15m)	19	0	42	0	Yes

LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

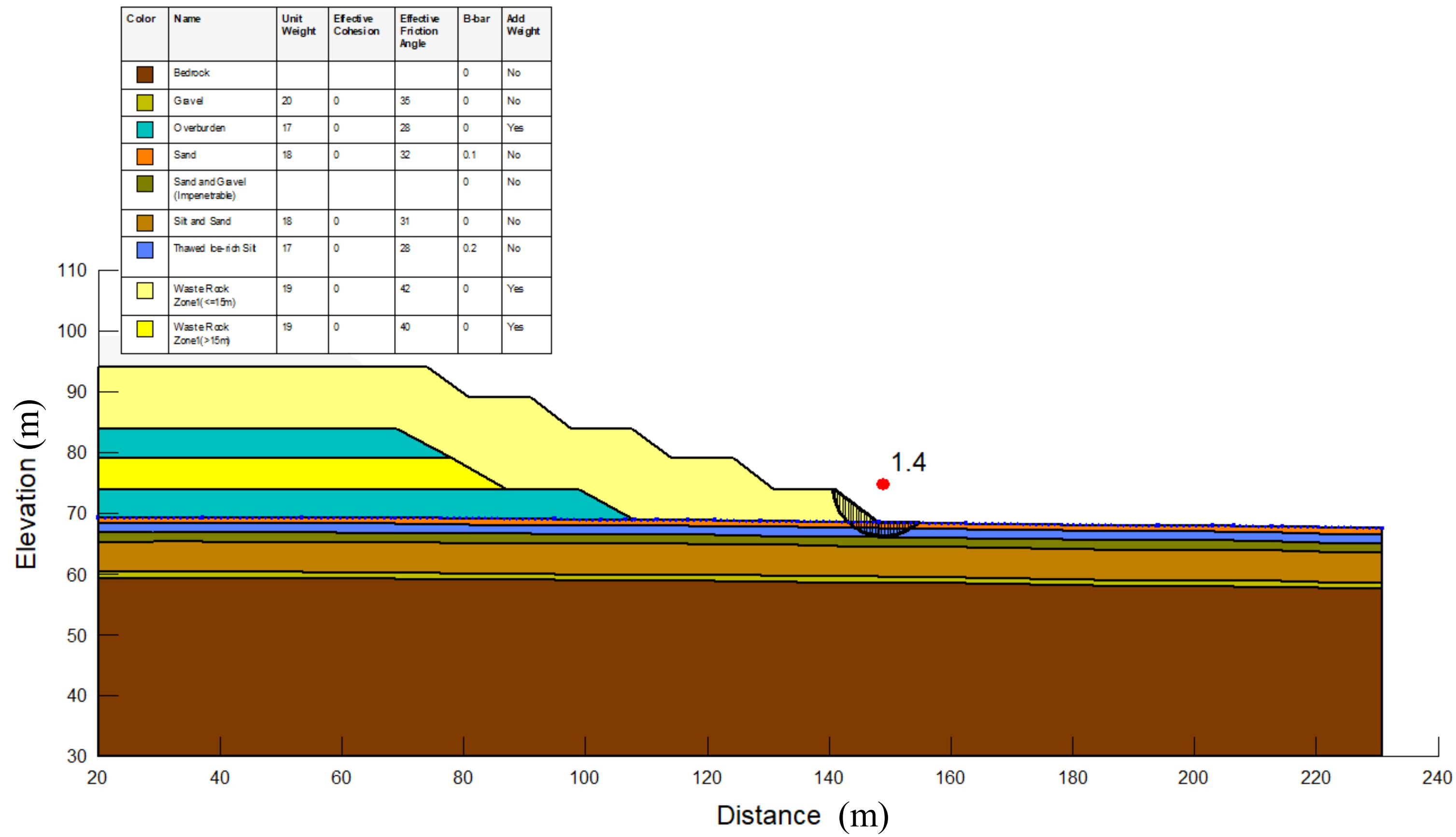
TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU
Section D- Bench 79.0 m of Waste Rock and Overburden during Construction, Local Deep-Seated Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure D2



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar	Add Weight
	Bedrock				0	No
	Gravel	20	0	35	0	No
	Overburden	17	0	28	0	Yes
	Sand	18	0	32	0.1	No
	Sand and Gravel (Impenetrable)				0	No
	Silt and Sand	18	0	31	0	No
	Thawed Ice-rich Silt	17	0	28	0.2	No
	Waste Rock Zone1(<=15m)	19	0	42	0	Yes
	Waste Rock Zone1(>15m)	19	0	40	0	Yes

LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

Stability Analysis of WRSF6 Meliadine Gold Mine, NU

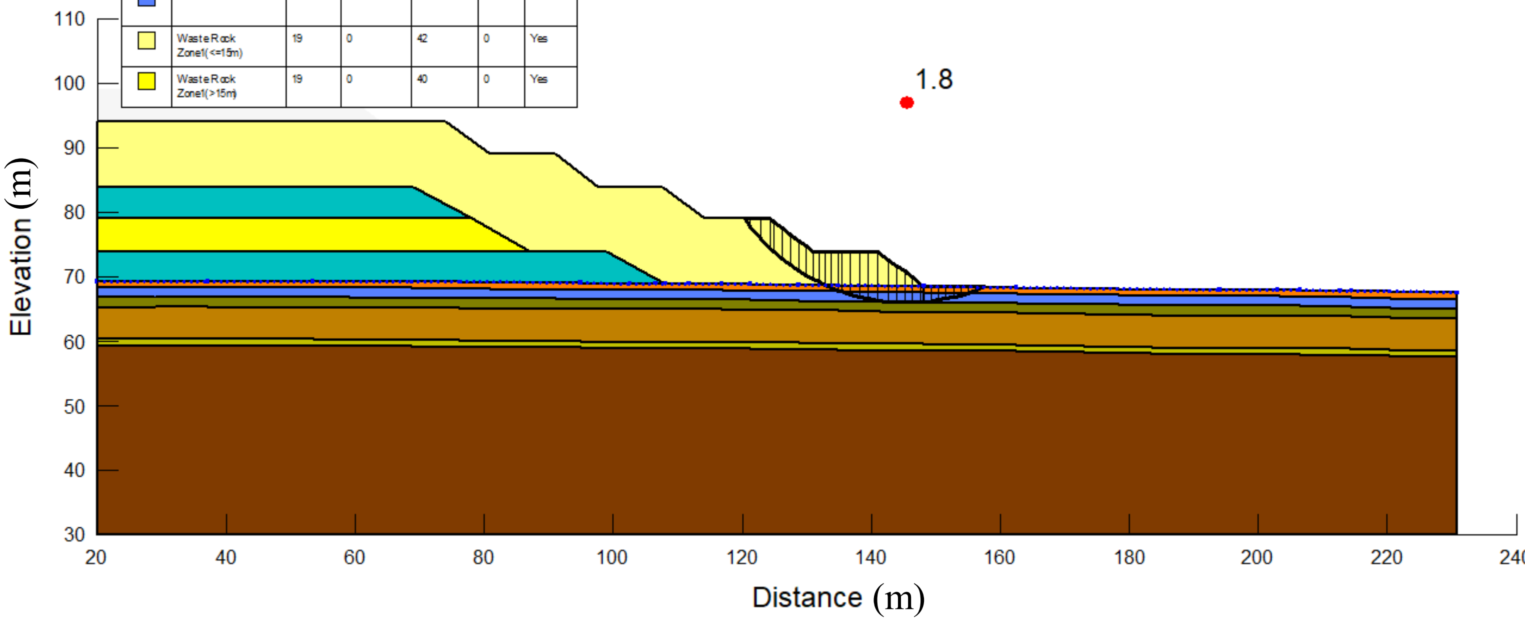
Section D Bench 94.0 m of Waste Rock and Overburden during Construction, Shallow Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure D3

Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar	Add Weight
	Bedrock				0	No
	Gravel	20	0	35	0	No
	Overburden	17	0	28	0	Yes
	Sand	18	0	32	0.1	No
	Sand and Gravel (Impenetrable)				0	No
	Silt and Sand	18	0	31	0	No
	Thawed Ice-rich Silt	17	0	28	0.2	No
	Waste Rock Zone1(<=15m)	19	0	42	0	Yes
	Waste Rock Zone1(>15m)	19	0	40	0	Yes



LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

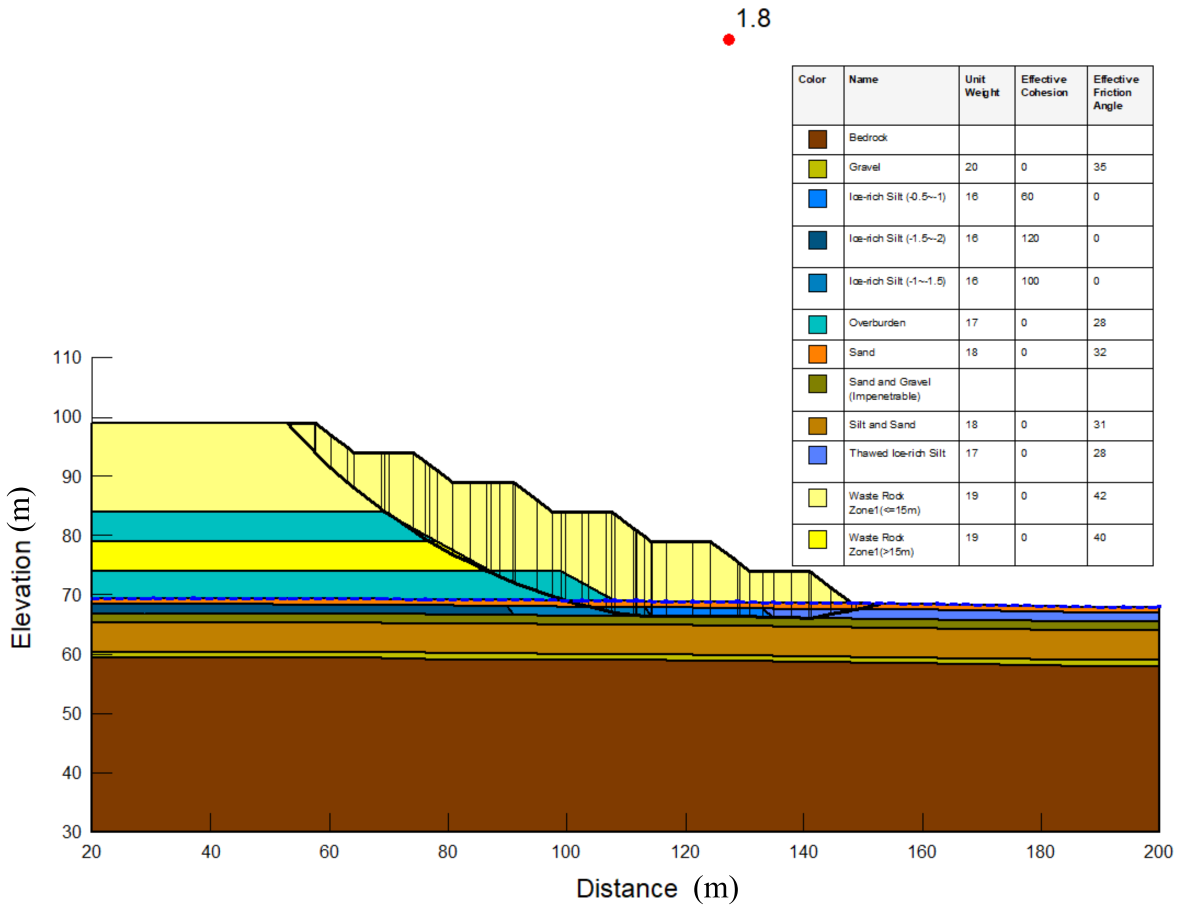
Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section D- Bench 94.0 m of Waste Rock and Overburden during Construction, Local Deep-Seated Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure D4



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle
	Bedrock			
	Gravel	20	0	35
	Ice-rich Silt (-0.5~-1)	16	60	0
	Ice-rich Silt (-1.5~-2)	16	120	0
	Ice-rich Silt (-1~-1.5)	16	100	0
	Overburden	17	0	28
	Sand	18	0	32
	Sand and Gravel (Impenetrable)			
	Silt and Sand	18	0	31
	Thawed Ice-rich Silt	17	0	28
	Waste Rock Zone1(<=15m)	19	0	42
	Waste Rock Zone1(>15m)	19	0	40

LEGEND

NOTES

Note: Long-term static loading after construction

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

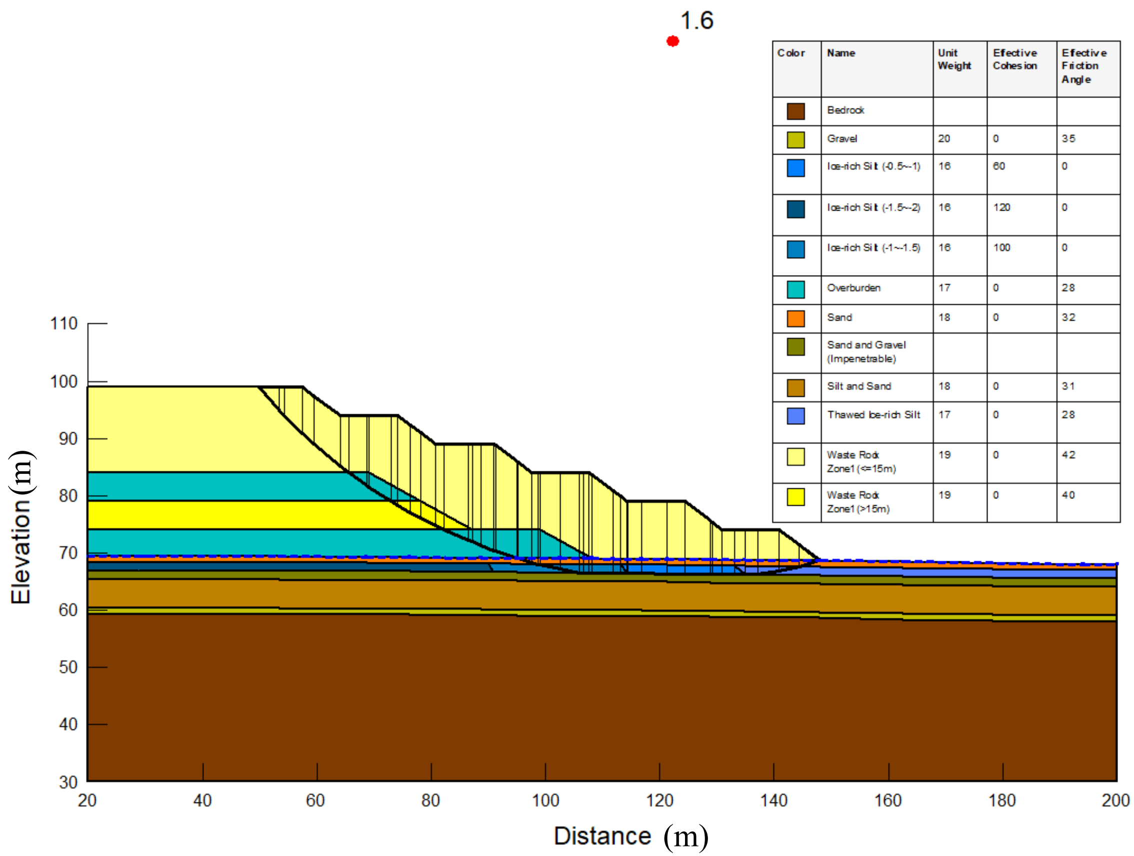
Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section D- Crest at 99 m Long-term Static Loading, Global Deep-Seated Slip, Base Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure D5



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle
	Bedrock			
	Gravel	20	0	35
	Ice-rich Silt (-0.5~-1)	16	60	0
	Ice-rich Silt (-1.5~-2)	16	120	0
	Ice-rich Silt (-1~-1.5)	16	100	0
	Overburden	17	0	28
	Sand	18	0	32
	Sand and Gravel (Impenetrable)			
	Silt and Sand	18	0	31
	Thawed Ice-rich Silt	17	0	28
	Waste Rock Zone1 (<=15m)	19	0	42
	Waste Rock Zone1 (>15m)	19	0	40

LEGEND

NOTES

Note: Pseudo-static loading after construction
PGA=0.0498g

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

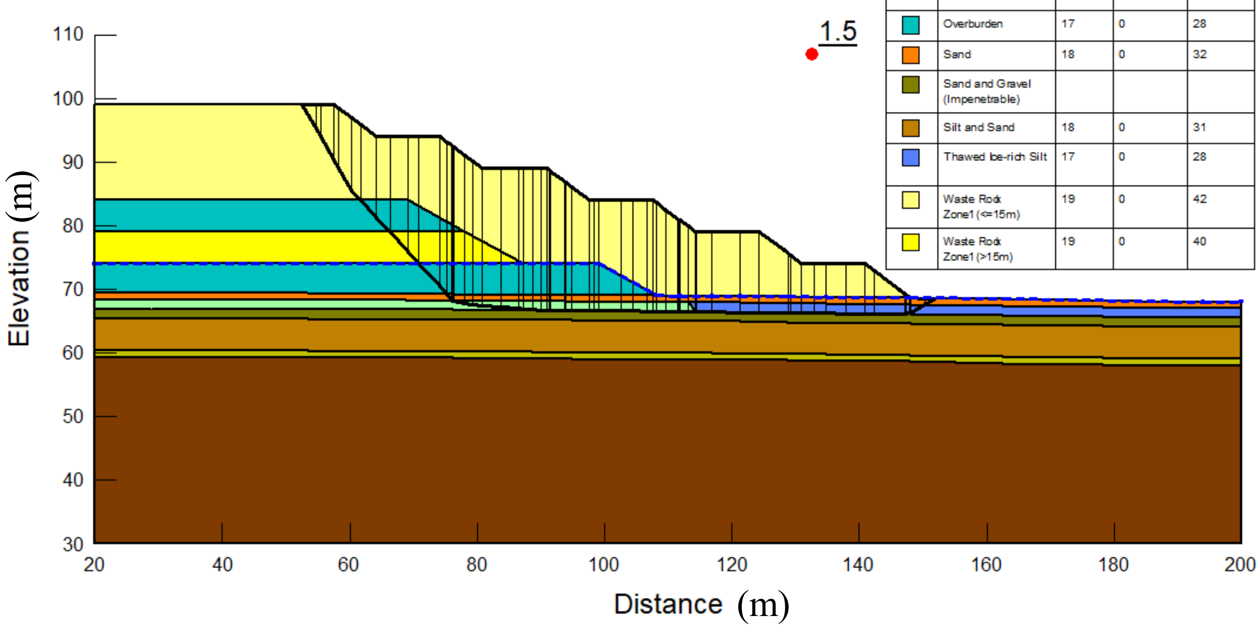
Stability Analysis of WRSF6 Meliadine Gold Mine, NU

Section D- Crest at 99 m Long-term Pseudo-Static Loading, Global Deep-Seated Slip, Base Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure D6



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle
	Bedrock			
	Gravel	20	0	35
	Ice-rich Silt (<1.0)	16	60	0
	Overburden	17	0	28
	Sand	18	0	32
	Sand and Gravel (Impenetrable)			
	Silt and Sand	18	0	31
	Thawed Ice-rich Silt	17	0	28
	Waste Rock Zone1 (<=15m)	19	0	42
	Waste Rock Zone1 (>15m)	19	0	40

LEGEND

NOTES

Note: Long-term static loading after construction

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

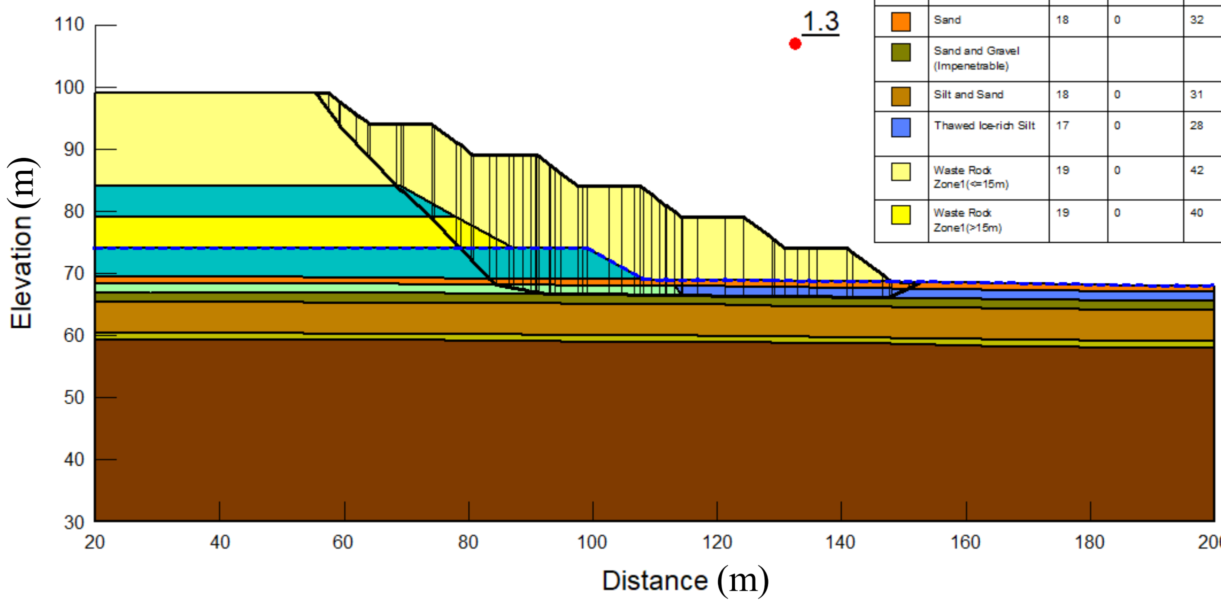
Stability Analysis of WRSF6
Meliadine Gold Mine, NU
Section D- Crest at 99 m Long-term Static Loading, Global Deep-Seated Slip, Sensitivity Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure D7

Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle
	Bedrock			
	Gravel	20	0	35
	Ice-rich Silt (<=1.0)	16	60	0
	Overburden	17	0	28
	Sand	18	0	32
	Sand and Gravel (Impenetrable)			
	Silt and Sand	18	0	31
	Thawed Ice-rich Silt	17	0	28
	Waste Rock Zone1(<=15m)	19	0	42
	Waste Rock Zone1(>15m)	19	0	40



LEGEND

NOTES

Note: Pseudo-static loading after construction, PGA=0.0498g

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

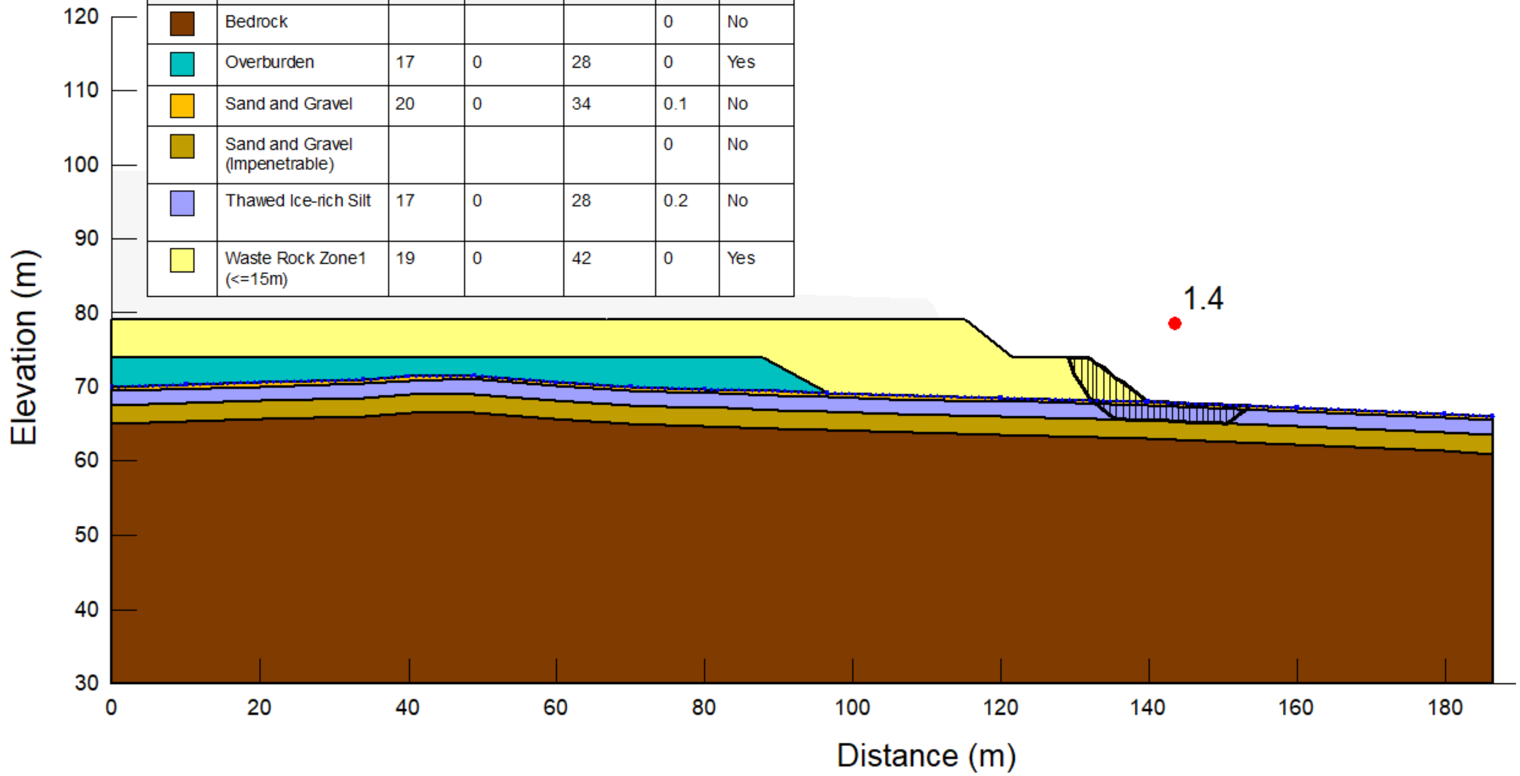
Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section D- Crest at 99 m Long-term Pseudo-Static Loading, Global Deep-Seated Slip, Sensitivity Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure D8



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar	Add Weight
	Bedrock				0	No
	Overburden	17	0	28	0	Yes
	Sand and Gravel	20	0	34	0.1	No
	Sand and Gravel (Impenetrable)				0	No
	Thawed Ice-rich Silt	17	0	28	0.2	No
	Waste Rock Zone1 (<=15m)	19	0	42	0	Yes

LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

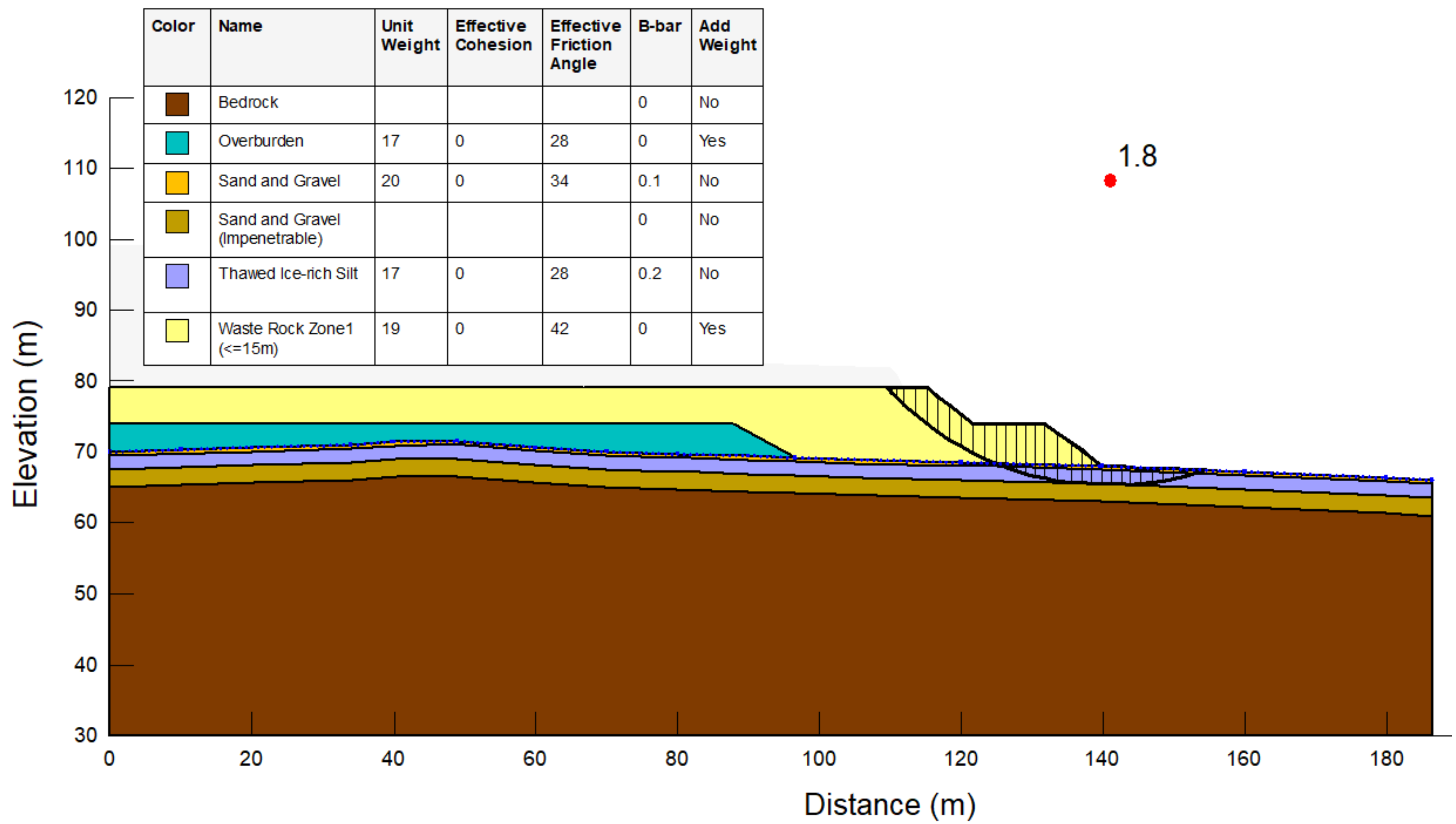
TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section E- Bench 79.0 m of Waste Rock and Overburden during Construction, Shallow Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	
OFFICE	DATE			
EDM	SEPTEMBER 2024			

Figure E1



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar	Add Weight
	Bedrock				0	No
	Overburden	17	0	28	0	Yes
	Sand and Gravel	20	0	34	0.1	No
	Sand and Gravel (Impenetrable)				0	No
	Thawed Ice-rich Silt	17	0	28	0.2	No
	Waste Rock Zone1 (<=15m)	19	0	42	0	Yes

LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

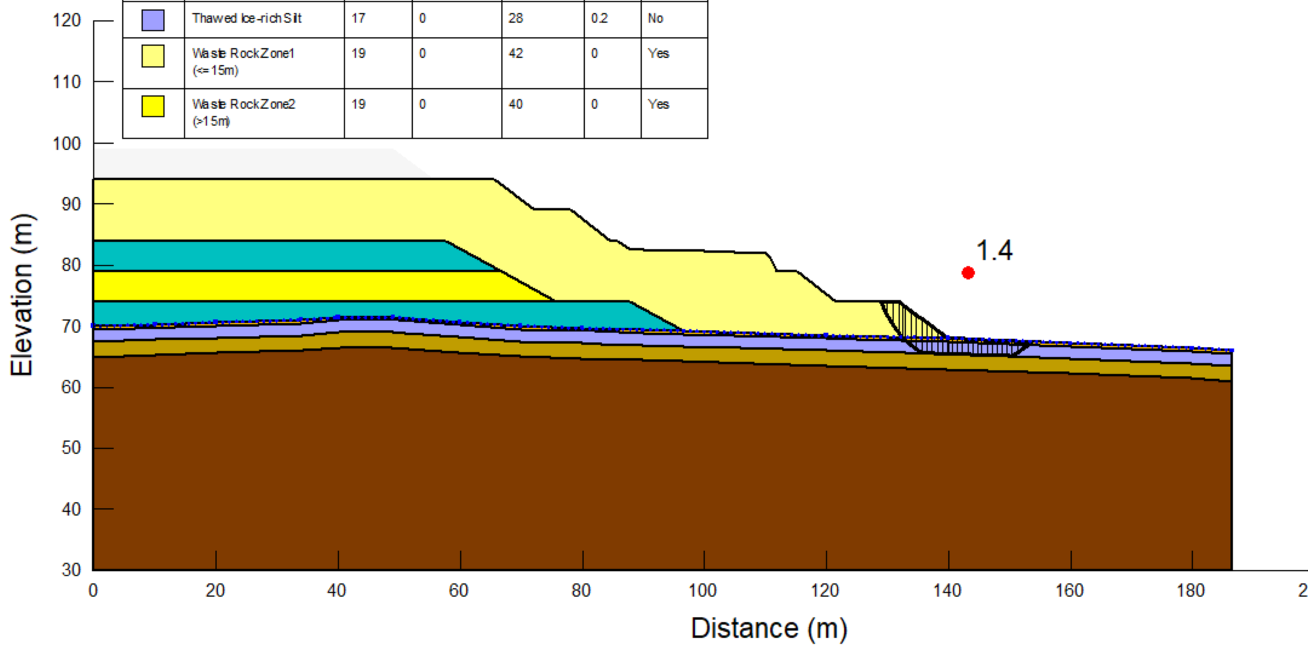
TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU
Section E- Bench 79.0 m of Waste Rock and Overburden during Construction, Local Deep-Seated Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure E2



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar	Add Weight
	Bedrock				0	No
	Overburden	17	0	28	0	Yes
	Sand and Gravel	20	0	34	0.1	No
	Sand and Gravel (Impenetrable)				0	No
	Thawed Ice-rich Silt	17	0	28	0.2	No
	Waste Rock Zone1 (<=15m)	19	0	42	0	Yes
	Waste Rock Zone2 (>15m)	19	0	40	0	Yes

LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU

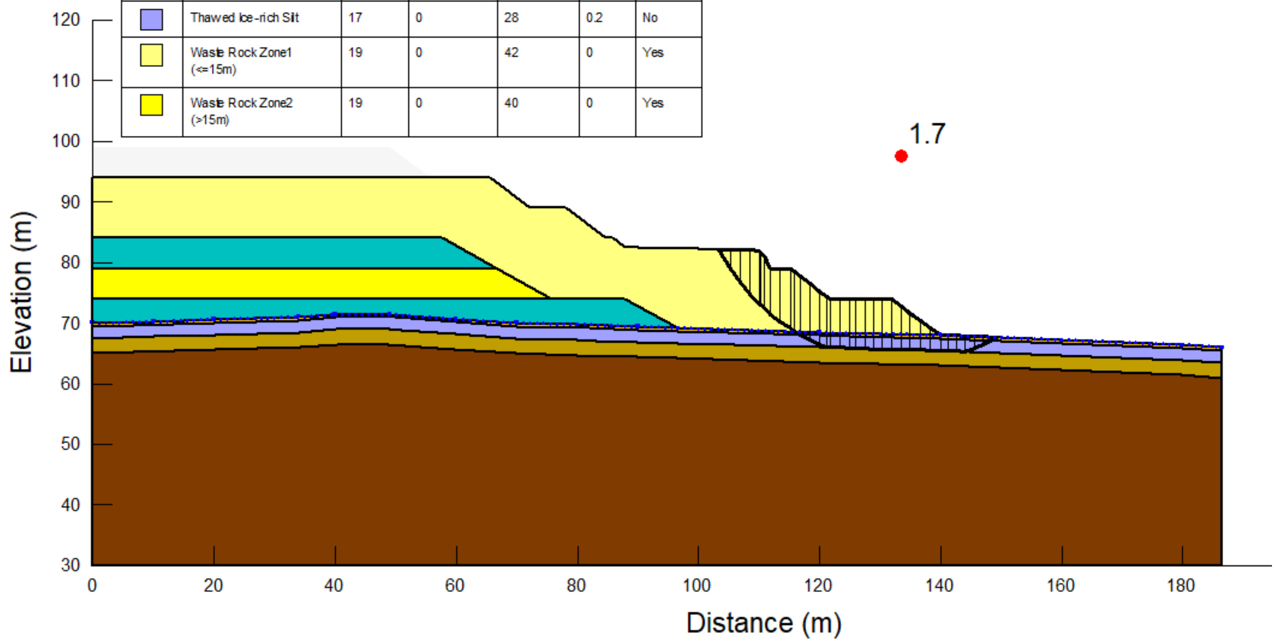
Section E Bench 94.0 m of Waste Rock and Overburden during Construction, Shallow Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure E3

Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar	Add Weight
	Bedrock				0	No
	Overburden	17	0	28	0	Yes
	Sand and Gravel	20	0	34	0.1	No
	Sand and Gravel (Impenetrable)				0	No
	Thawed Ice-rich Silt	17	0	28	0.2	No
	Waste Rock Zone1 (<=15m)	19	0	42	0	Yes
	Waste Rock Zone2 (>15m)	19	0	40	0	Yes



LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

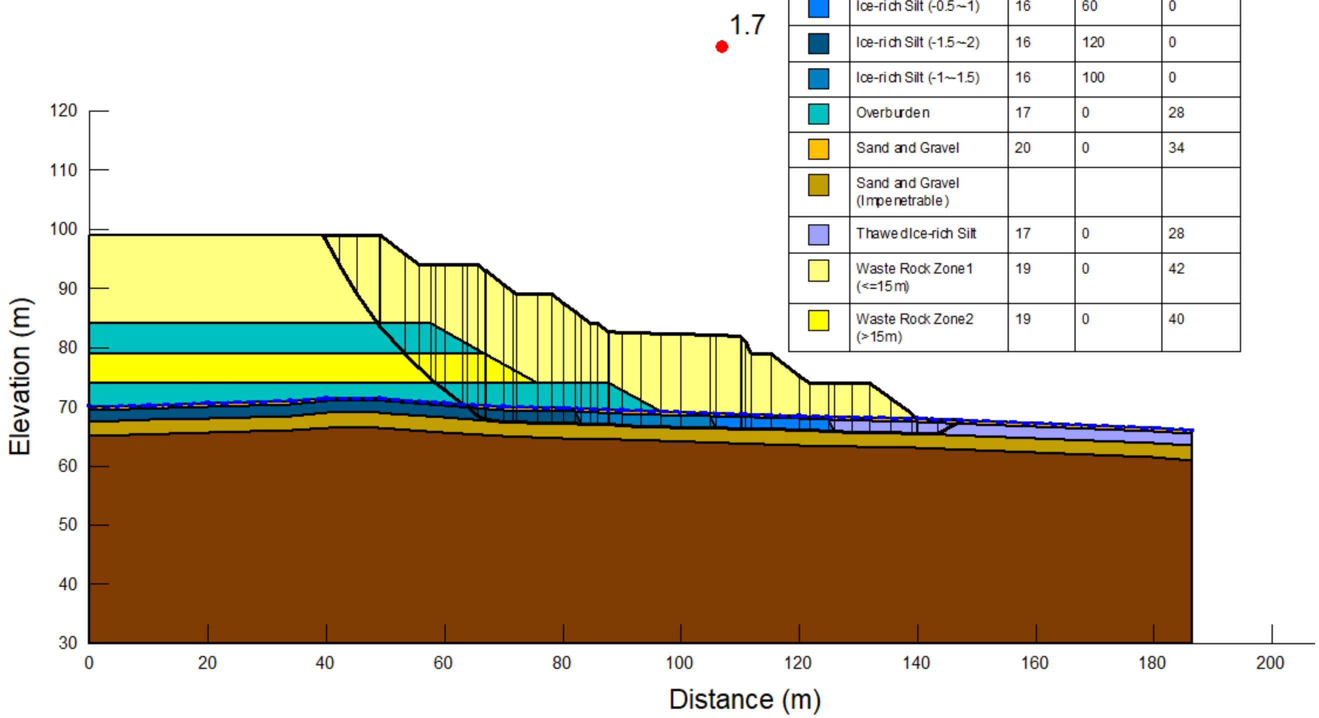
TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU
Section E- Bench 94.0 m of Waste Rock and Overburden during Construction, Local Deep-Seated Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure E4



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle
	Bedrock			
	Ice-rich Silt (-0.5~1)	16	60	0
	Ice-rich Silt (-1.5~2)	16	120	0
	Ice-rich Silt (-1~1.5)	16	100	0
	Overburden	17	0	28
	Sand and Gravel	20	0	34
	Sand and Gravel (Impenetrable)			
	Thawed Ice-rich Silt	17	0	28
	Waste Rock Zone1 (<=15m)	19	0	42
	Waste Rock Zone2 (>15m)	19	0	40

LEGEND

NOTES

Note: Long-term static loading after construction

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE

TETRA TECH

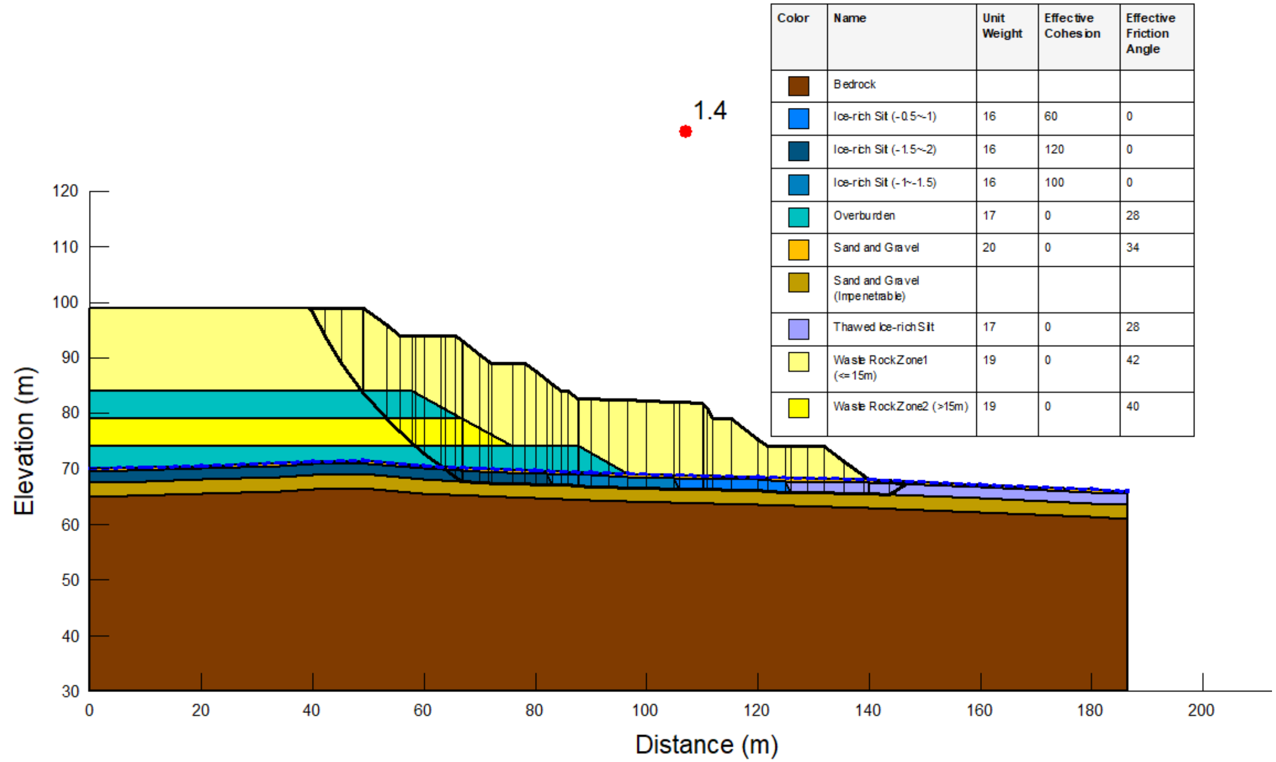
Stability Analysis of WRSF6 Meliadine Gold Mine, NU

Section E- Crest at 99 m Long-term Static Loading, Global Deep-Seated Slip, Base Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure E5



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle
	Bedrock			
	Ice-rich Silt (-0.5~-1)	16	60	0
	Ice-rich Silt (-1.5~-2)	16	120	0
	Ice-rich Silt (-1~-1.5)	16	100	0
	Overburden	17	0	28
	Sand and Gravel	20	0	34
	Sand and Gravel (Impenetrable)			
	Thawed Ice-rich Silt	17	0	28
	Waste Rock Zone1 (<=15m)	19	0	42
	Waste Rock Zone2 (>15m)	19	0	40

LEGEND

NOTES

Note: Pseudo-static loading after construction
PGA=0.0498g

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

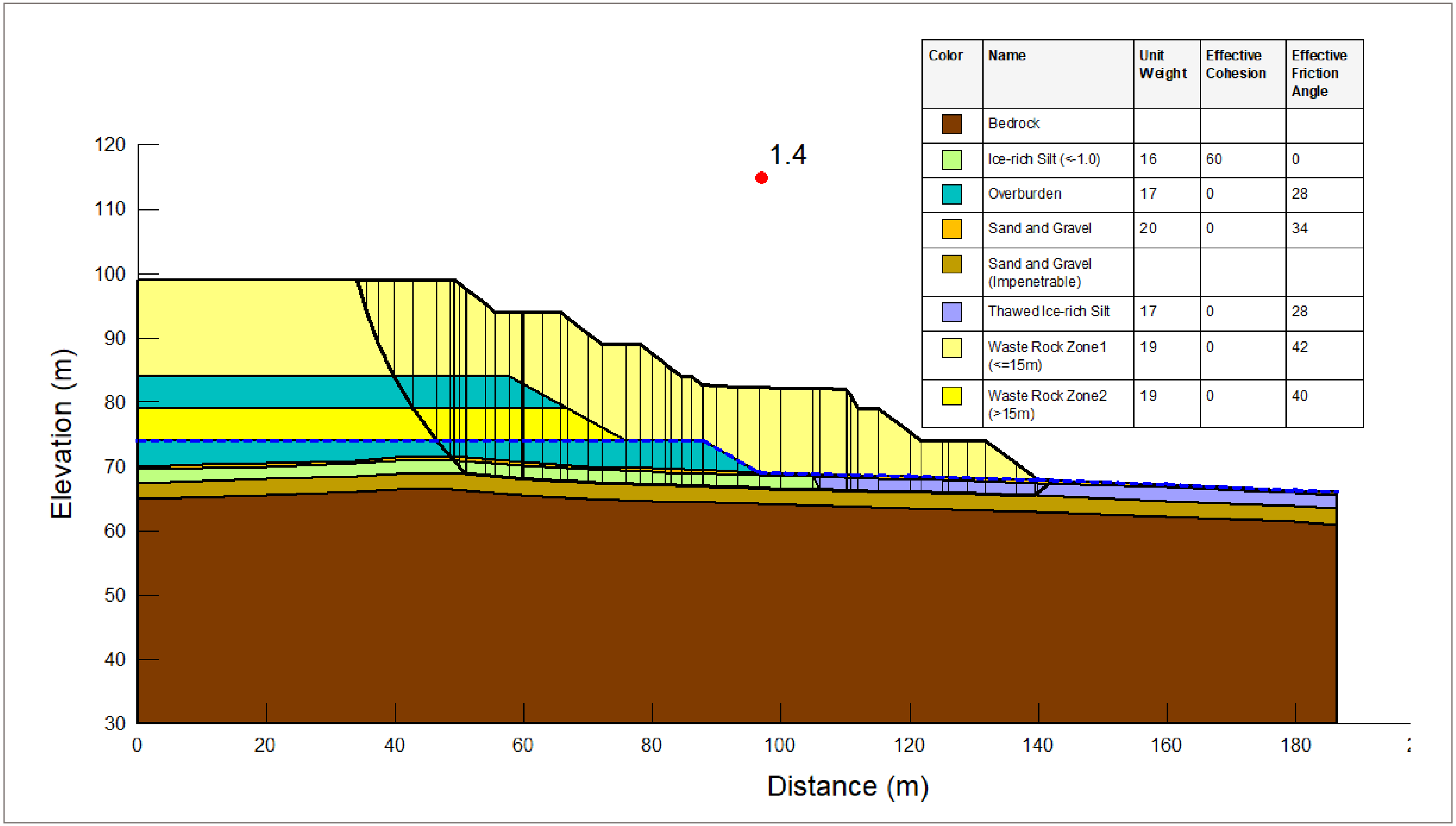
Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section E- Crest at 99 m Long-term Pseudo-Static Loading, Global Deep-Seated Slip, Base Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure E6



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle
	Bedrock			
	Ice-rich Silt (<-1.0)	16	60	0
	Overburden	17	0	28
	Sand and Gravel	20	0	34
	Sand and Gravel (Impenetrable)			
	Thawed Ice-rich Silt	17	0	28
	Waste Rock Zone1 (<=15m)	19	0	42
	Waste Rock Zone2 (>15m)	19	0	40

LEGEND

NOTES

Note: Long-term static loading after construction

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

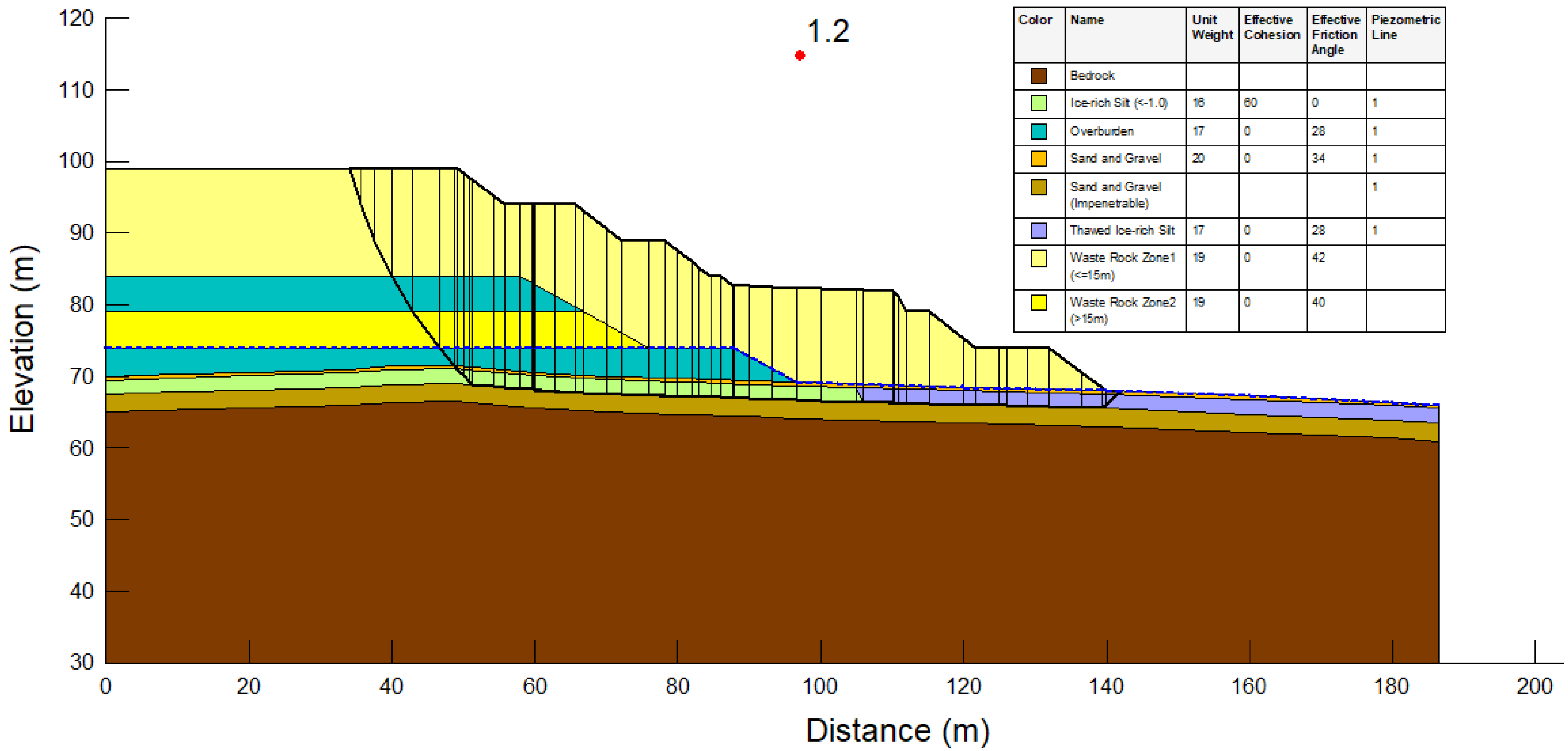
Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section E- Crest at 99 m Long-term Static Loading, Global Deep-Seated Slip, Sensitivity Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure E7



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	Piezometric Line
	Bedrock				
	Ice-rich Silt (<-1.0)	16	60	0	1
	Overburden	17	0	28	1
	Sand and Gravel	20	0	34	1
	Sand and Gravel (Impenetrable)				1
	Thawed Ice-rich Silt	17	0	28	1
	Waste Rock Zone1 (<=15m)	19	0	42	
	Waste Rock Zone2 (>15m)	19	0	40	

LEGEND

NOTES

Note: Pseudo-static loading after construction, PGA=0.0498g

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

Stability Analysis of WRSF6 Meliadine Gold Mine, NU

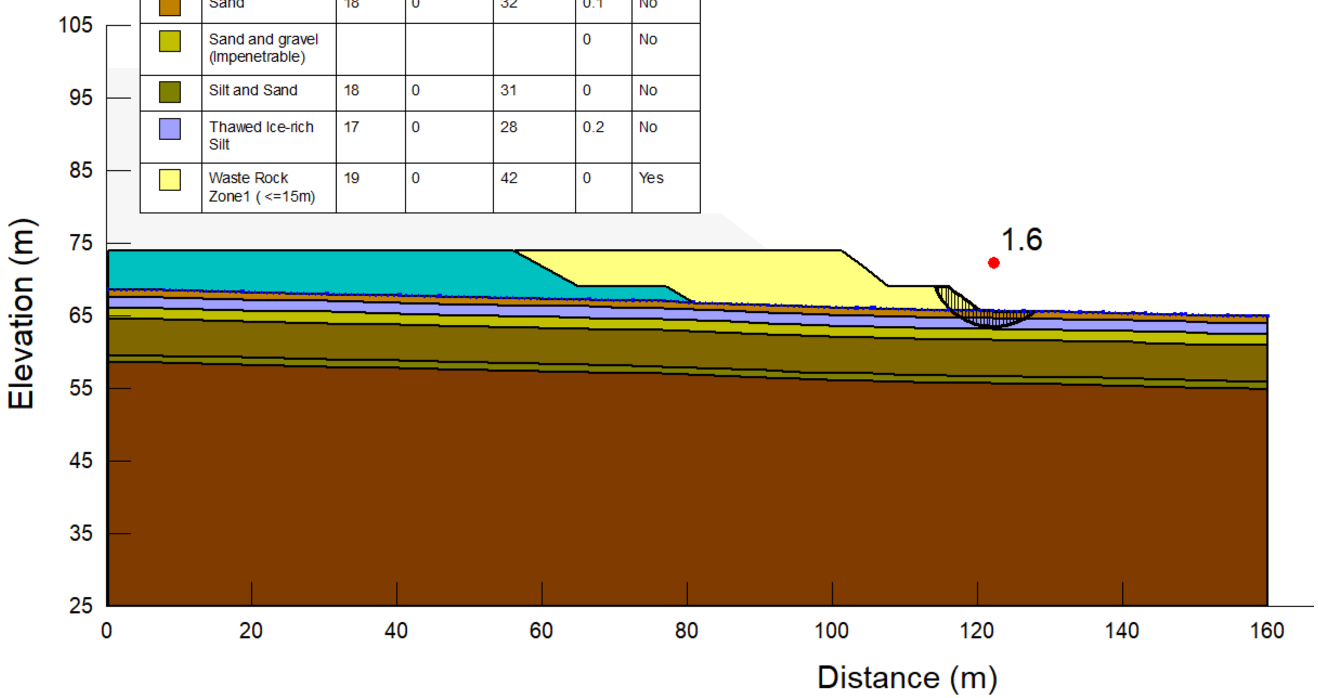
Section E- Crest at 99 m Long-term Pseudo-Static Loading, Global Deep-Seated Slip, Sensitivity Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure E8

Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar	Add Weight
	Bedrock				0	No
	Gravel	20	0	35	0	No
	Overburden	17	0	28	0	Yes
	Sand	18	0	32	0.1	No
	Sand and gravel (Impenetrable)				0	No
	Silt and Sand	18	0	31	0	No
	Thawed Ice-rich Silt	17	0	28	0.2	No
	Waste Rock Zone1 (<=15m)	19	0	42	0	Yes



LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

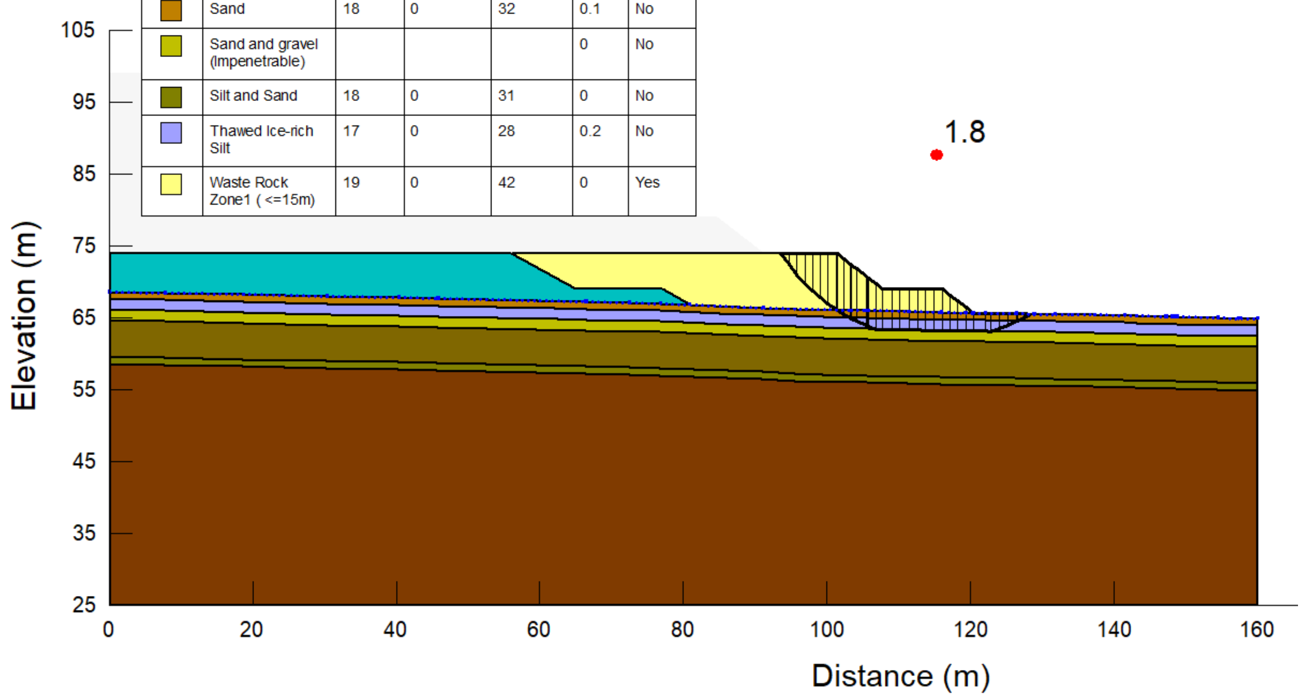
TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU
Section F- Bench 74.0 m of Waste Rock and Overburden during Construction, Shallow Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure F1



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar	Add Weight
	Bedrock				0	No
	Gravel	20	0	35	0	No
	Overburden	17	0	28	0	Yes
	Sand	18	0	32	0.1	No
	Sand and gravel (Impenetrable)				0	No
	Silt and Sand	18	0	31	0	No
	Thawed Ice-rich Silt	17	0	28	0.2	No
	Waste Rock Zone1 (<=15m)	19	0	42	0	Yes

LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

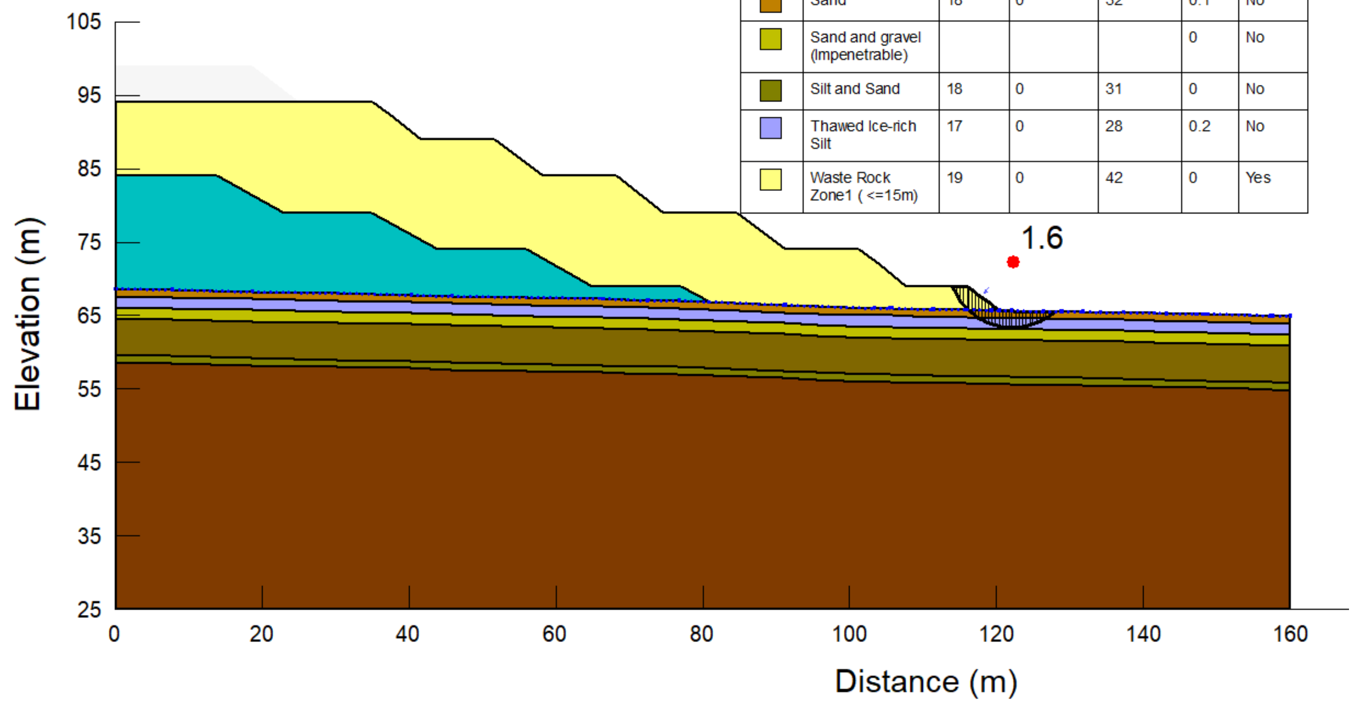
TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU
Section F- Bench 74.0 m of Waste Rock and Overburden during Construction, Local Deep-Seated Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure F2



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar	Add Weight
	Bedrock				0	No
	Gravel	20	0	35	0	No
	Overburden	17	0	28	0	Yes
	Sand	18	0	32	0.1	No
	Sand and gravel (Impenetrable)				0	No
	Silt and Sand	18	0	31	0	No
	Thawed Ice-rich Silt	17	0	28	0.2	No
	Waste Rock Zone1 (<=15m)	19	0	42	0	Yes

LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

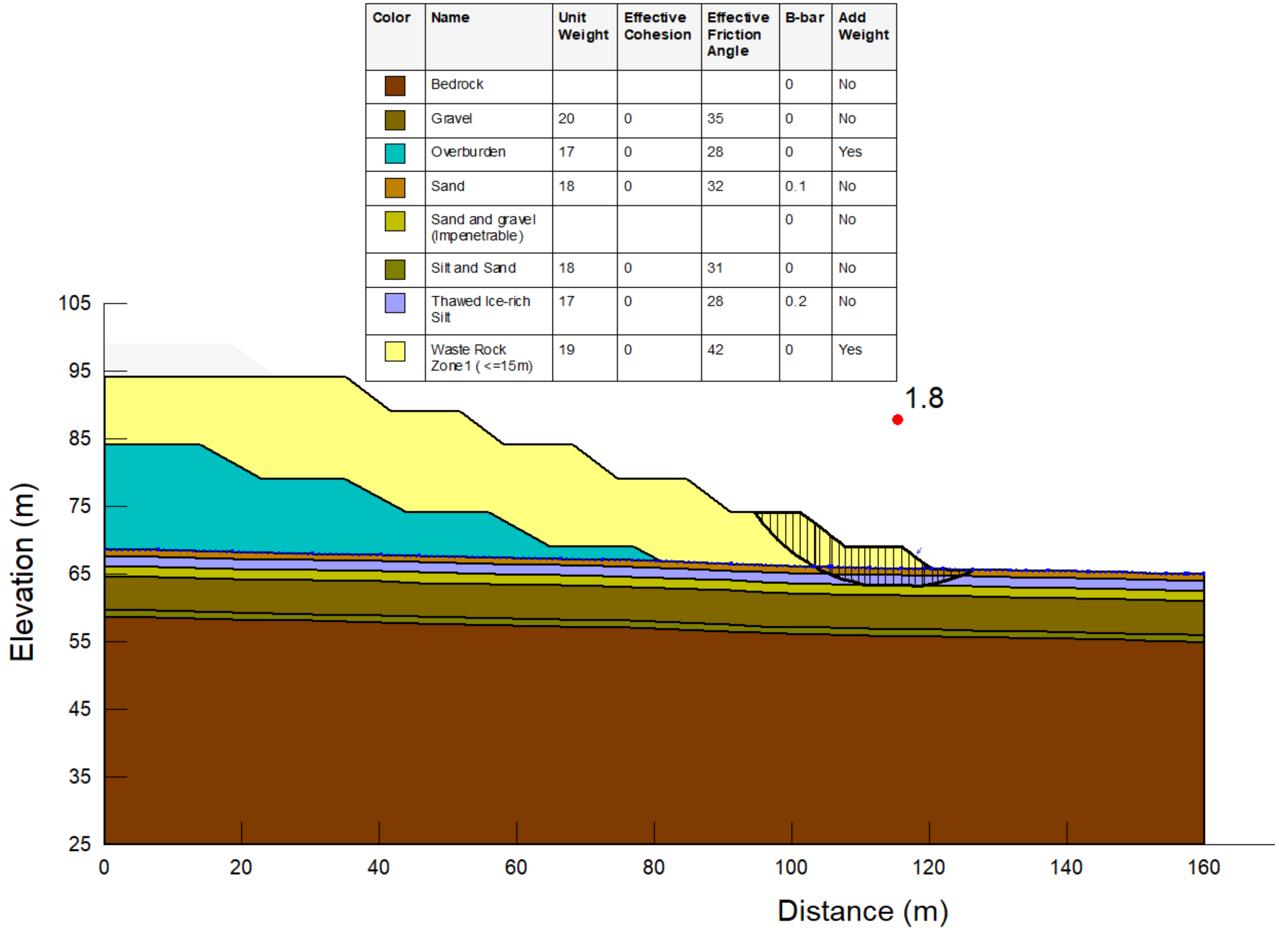
TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU
Section F- Bench 94.0 m of Waste Rock and Overburden during Construction, Shallow Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure F3



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar	Add Weight
	Bedrock				0	No
	Gravel	20	0	35	0	No
	Overburden	17	0	28	0	Yes
	Sand	18	0	32	0.1	No
	Sand and gravel (Impenetrable)				0	No
	Silt and Sand	18	0	31	0	No
	Thawed Ice-rich Silt	17	0	28	0.2	No
	Waste Rock Zone1 (<=15m)	19	0	42	0	Yes

LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

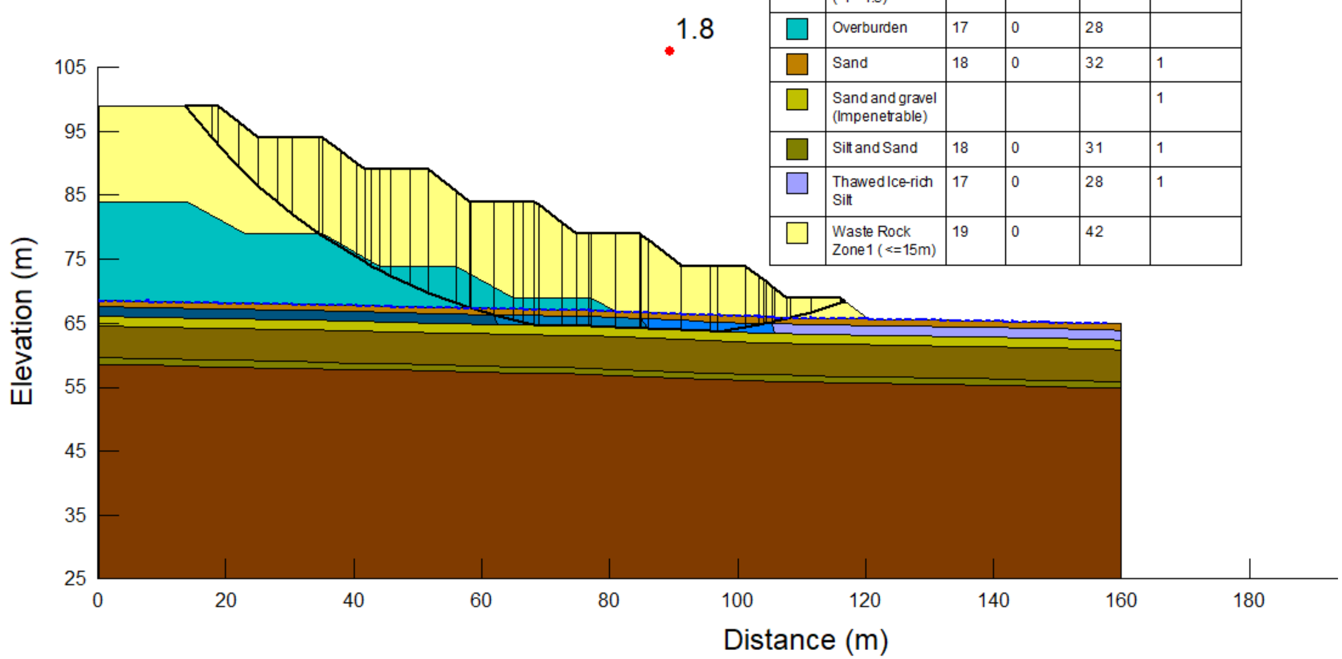
TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU
Section F- Bench 94.0 m of Waste Rock and Overburden during Construction, Local Deep-Seated Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure F4



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	Piezometric Line
	Bedrock				
	Gravel	20	0	35	1
	Ice-rich Silt (-0.5~-1)	16	60	0	1
	Ice-rich Silt (-1.5~-2)	16	120	0	1
	Ice-rich Silt (-1~-1.5)	16	100	0	1
	Overburden	17	0	28	
	Sand	18	0	32	1
	Sand and gravel (Impenetrable)				1
	Silt and Sand	18	0	31	1
	Thawed Ice-rich Silt	17	0	28	1
	Waste Rock Zone1 (<=15m)	19	0	42	

LEGEND

NOTES

Note: Long-term static loading after construction

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

Stability Analysis of WRSF6 Meliadine Gold Mine, NU

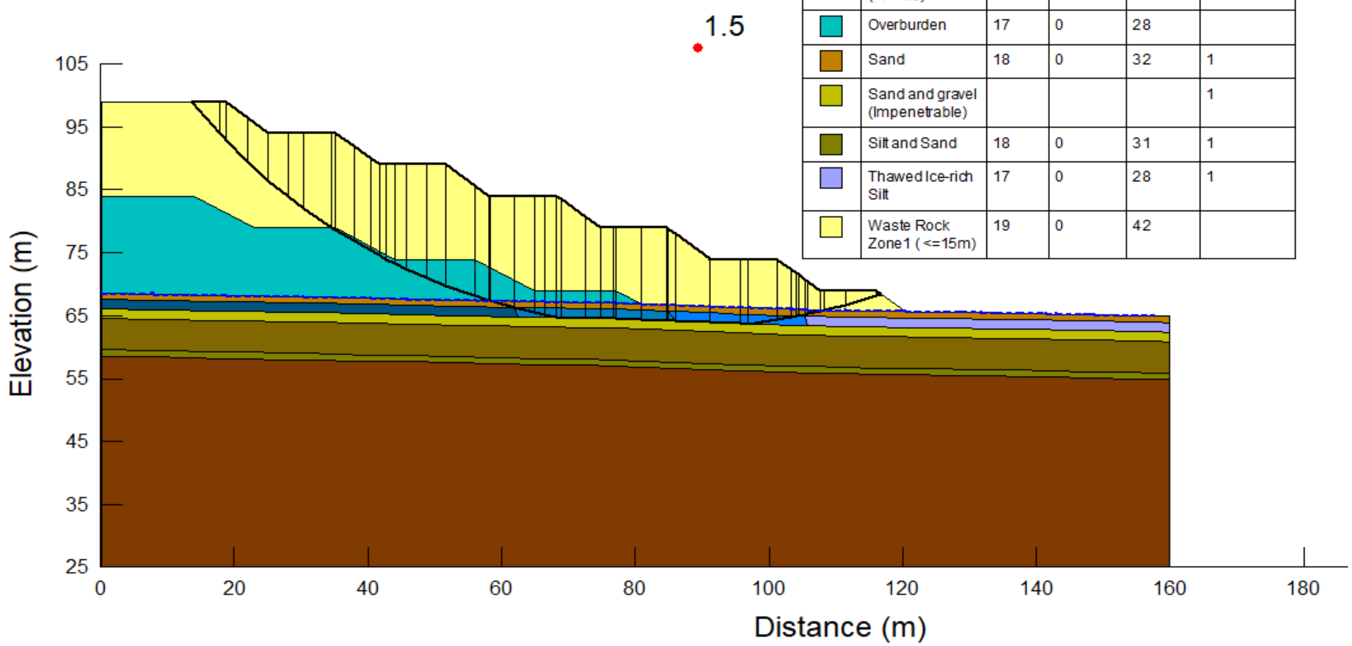
Section F- Crest at 99 m Long-term Static Loading, Global Deep-Seated Slip, Base Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure F5

Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	Piezometric Line
	Bedrock				
	Gravel	20	0	35	1
	Ice-rich Silt (-0.5~-1)	16	60	0	1
	Ice-rich Silt (-1.5~-2)	16	120	0	1
	Ice-rich Silt (-1~-1.5)	16	100	0	1
	Overburden	17	0	28	
	Sand	18	0	32	1
	Sand and gravel (Impenetrable)				1
	Silt and Sand	18	0	31	1
	Thawed Ice-rich Silt	17	0	28	1
	Waste Rock Zone1 (<=15m)	19	0	42	



LEGEND

NOTES

Note: Pseudo-static loading after construction
PGA=0.0498g

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

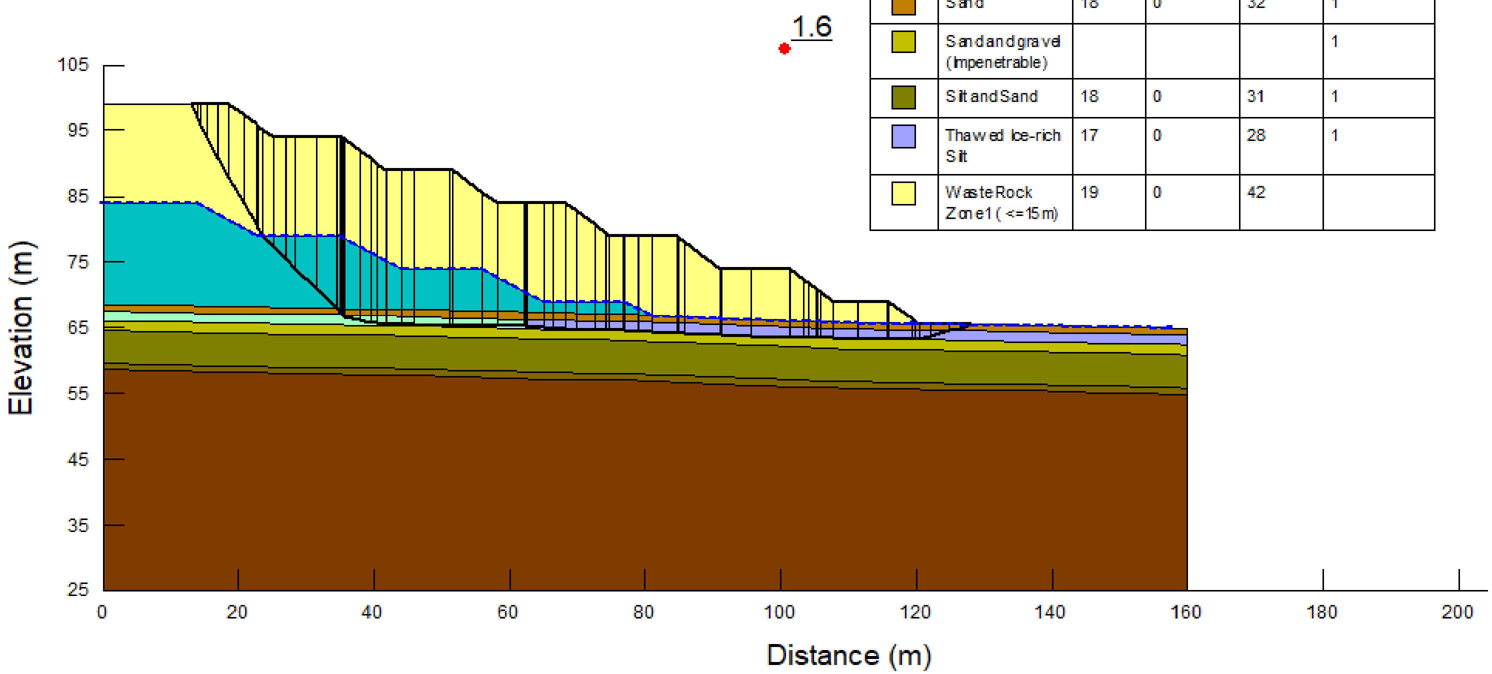
Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section F- Crest at 99 m Long-term Pseudo-Static Loading, Global Deep-Seated Slip, Base Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure F6



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	Piezometric Line
	Bedrock				
	Gravel	20	0	35	1
	Ice-rich Silt (<=1.0)	16	60	0	1
	Overburden	17	0	28	1
	Sand	18	0	32	1
	Sand and gravel (Impenetrable)				1
	Silt and Sand	18	0	31	1
	Thawed Ice-rich Silt	17	0	28	1
	Waste Rock Zone1 (<=15 m)	19	0	42	

LEGEND

NOTES

Note: Long-term static loading after construction

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE

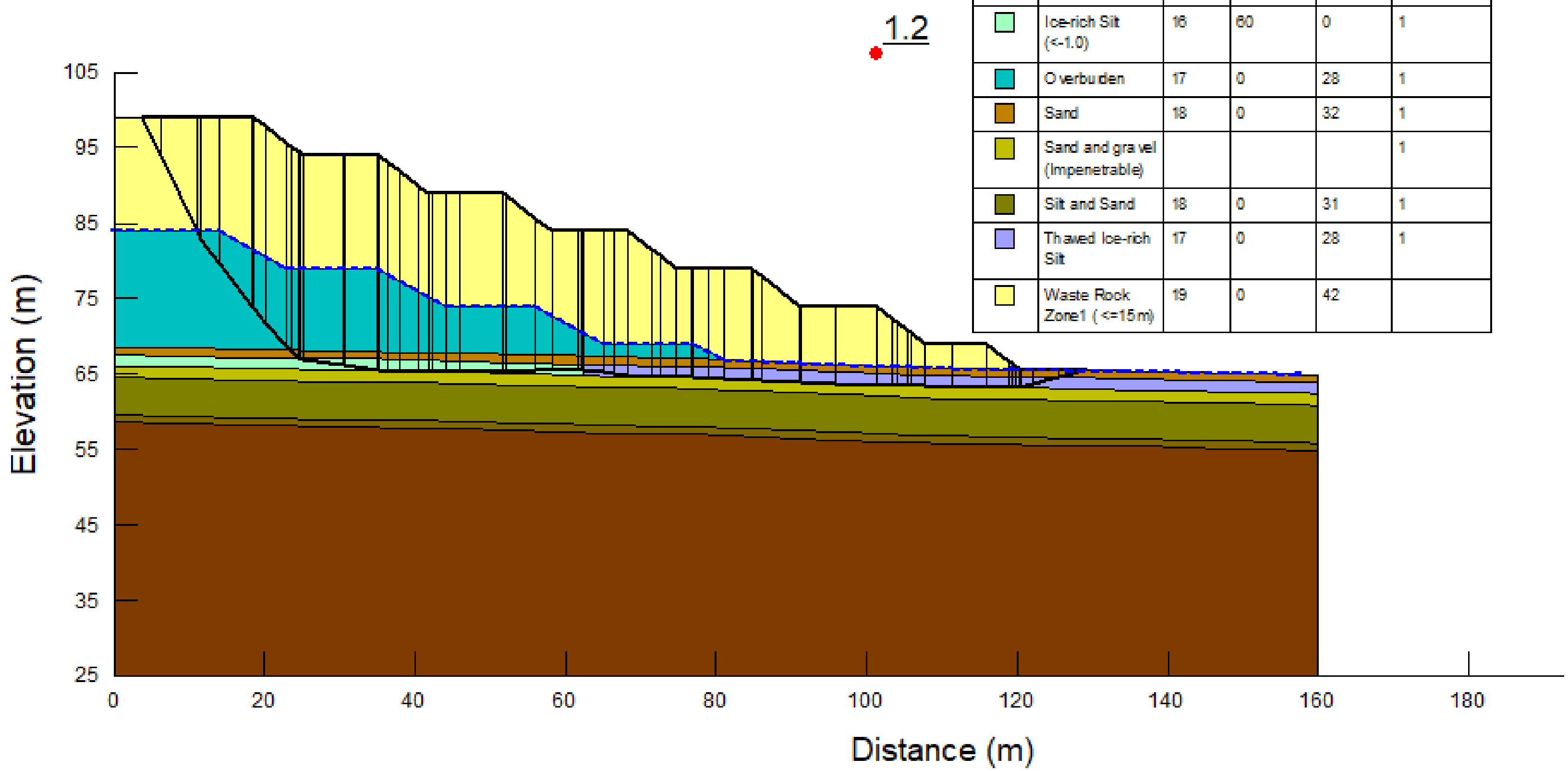
TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section F- Crest at 99 m Long-term Static Loading, Global Deep-Seated Slip, Sensitivity Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	
OFFICE	DATE			
EDM	SEPTEMBER 2024			

Figure F7



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	Piezometric Line
	Bedrock				
	Gavel	20	0	35	1
	Ice-rich Silt (<-1.0)	16	60	0	1
	Overburden	17	0	28	1
	Sand	18	0	32	1
	Sand and gravel (Impenetrable)				1
	Silt and Sand	18	0	31	1
	Thawed Ice-rich Silt	17	0	28	1
	Waste Rock Zone1 (<=15m)	19	0	42	

LEGEND

NOTES

Note: Pseudo-static loading after construction, PGA=0.0498g

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

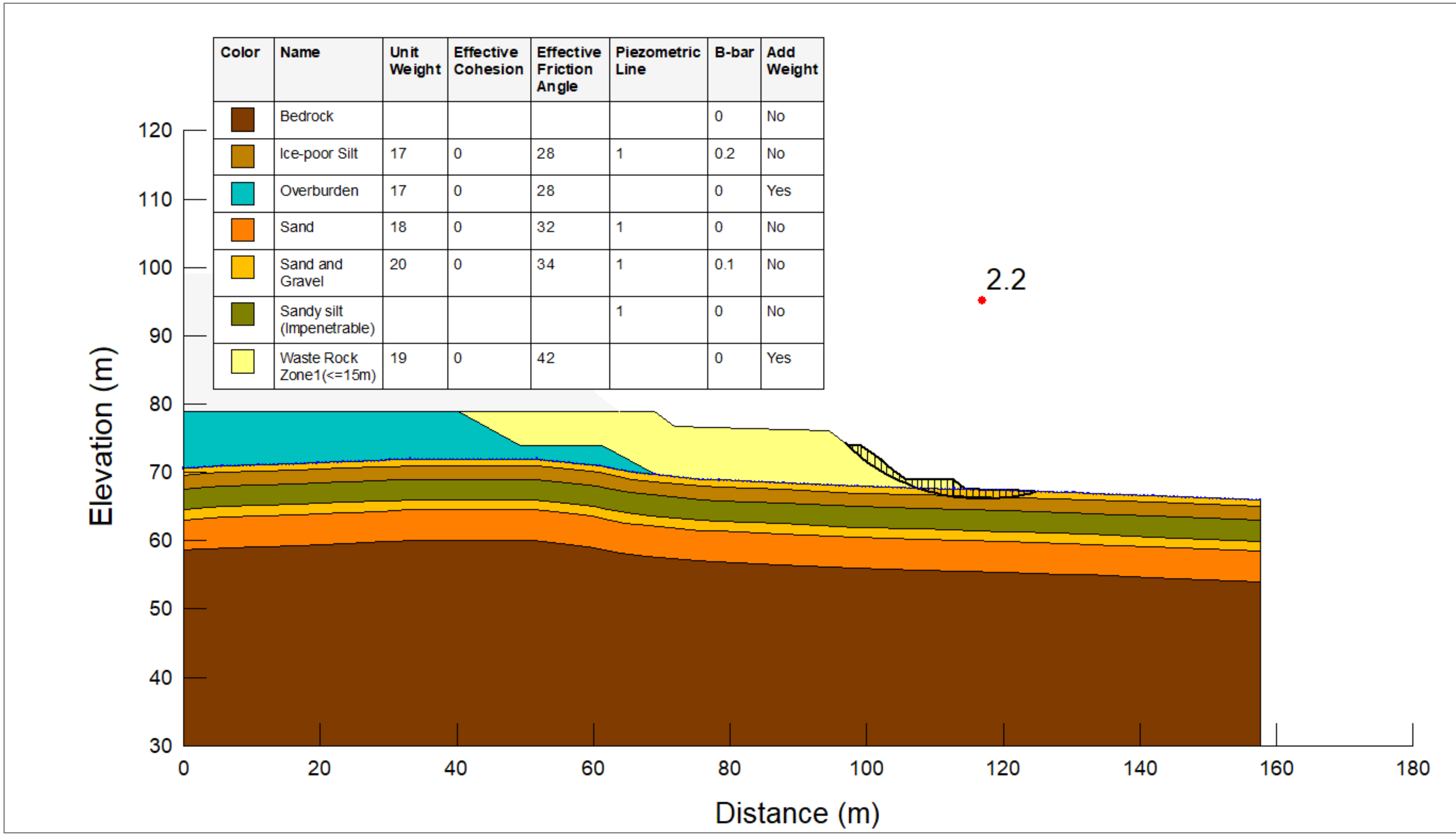
Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section E- Crest at 99 m Long-term Pseudo-Static Loading, Global Deep-Seated Slip, Sensitivity Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure F8



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	Piezometric Line	B-bar	Add Weight
	Bedrock					0	No
	Ice-poor Silt	17	0	28	1	0.2	No
	Overburden	17	0	28		0	Yes
	Sand	18	0	32	1	0	No
	Sand and Gravel	20	0	34	1	0.1	No
	Sandy silt (Impenetrable)				1	0	No
	Waste Rock Zone1(<=15m)	19	0	42		0	Yes

LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

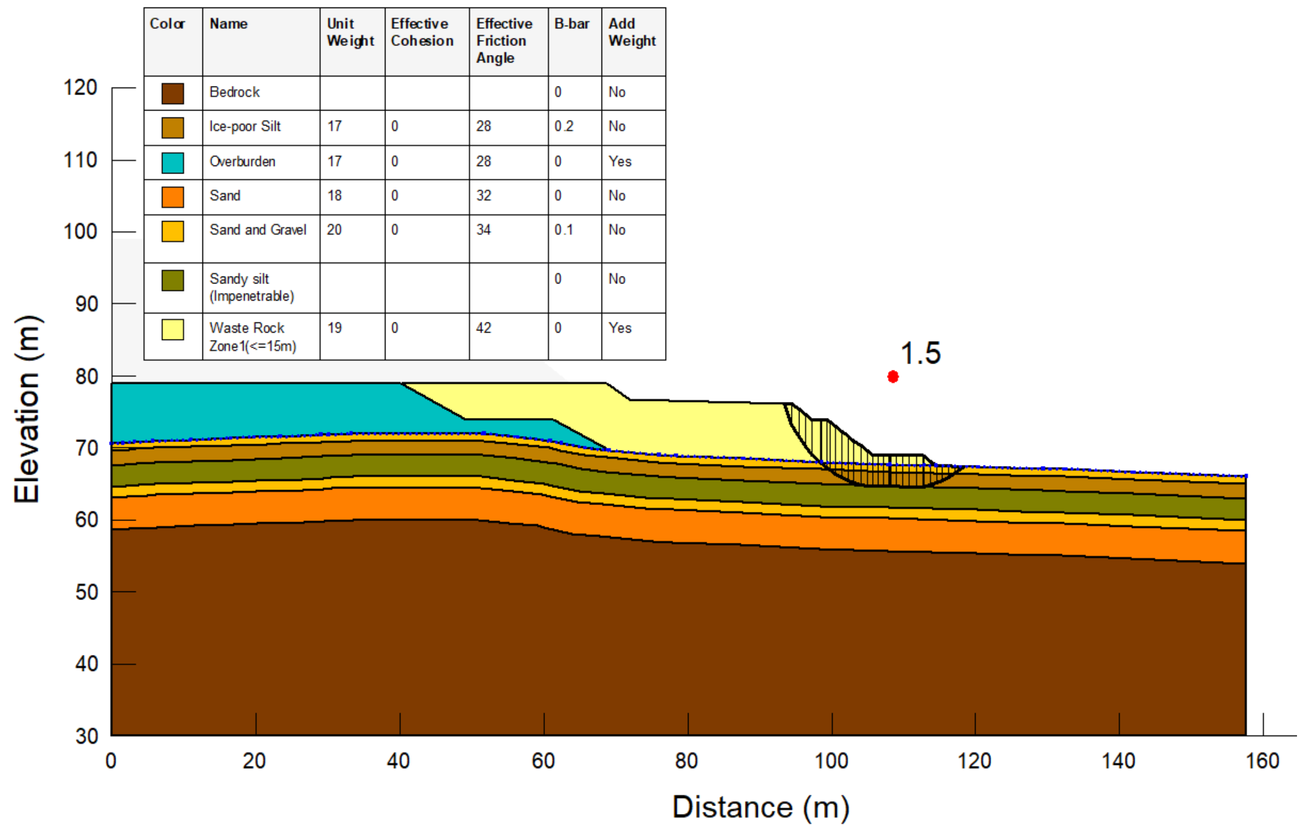
Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section G- Bench 79.0 m of Waste Rock and Overburden during Construction, Shallow Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure G1



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar	Add Weight
	Bedrock				0	No
	Ice-poor Silt	17	0	28	0.2	No
	Overburden	17	0	28	0	Yes
	Sand	18	0	32	0	No
	Sand and Gravel	20	0	34	0.1	No
	Sandy silt (Impenetrable)				0	No
	Waste Rock Zone1(<=15m)	19	0	42	0	Yes

LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

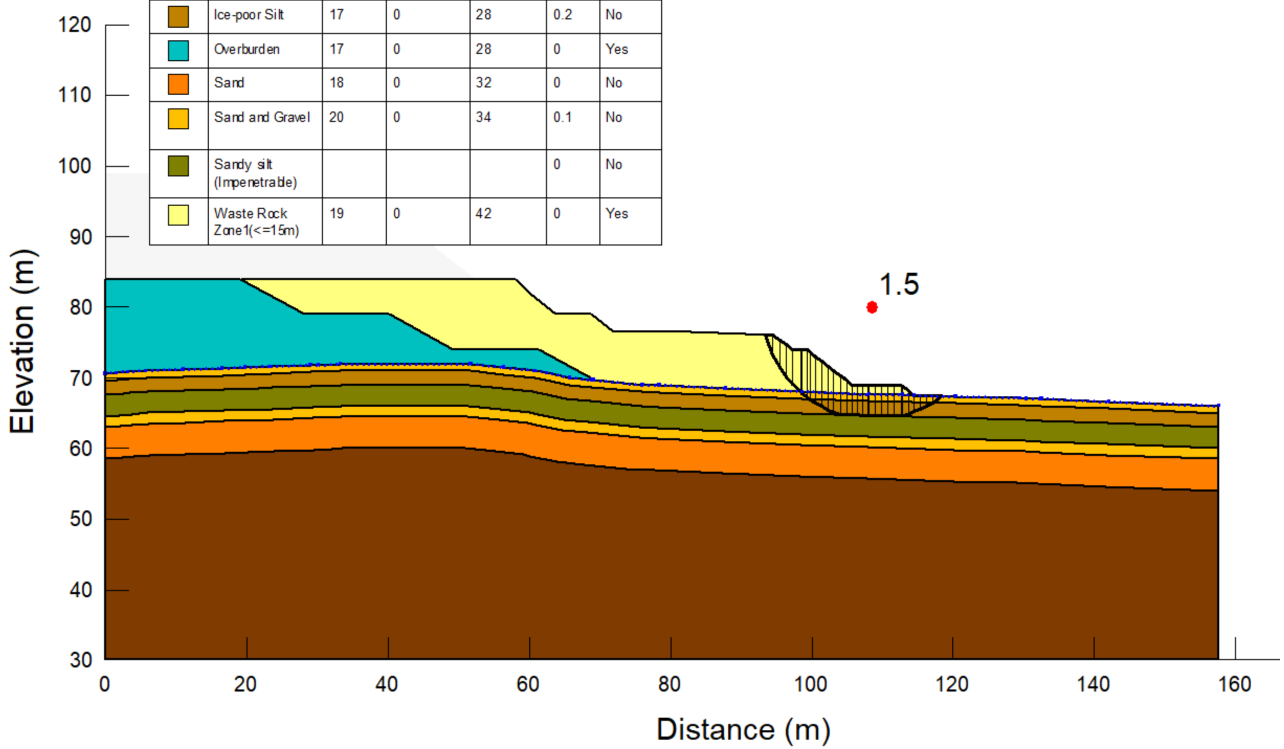
TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU
Section G- Bench 79.0 m of Waste Rock and Overburden during Construction, Local Deep-Seated Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure G2



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar	Add Weight
	Bedrock				0	No
	Ice-poor Silt	17	0	28	0.2	No
	Overburden	17	0	28	0	Yes
	Sand	18	0	32	0	No
	Sand and Gravel	20	0	34	0.1	No
	Sandy silt (Impenetrable)				0	No
	Waste Rock Zone1(<=15m)	19	0	42	0	Yes

LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

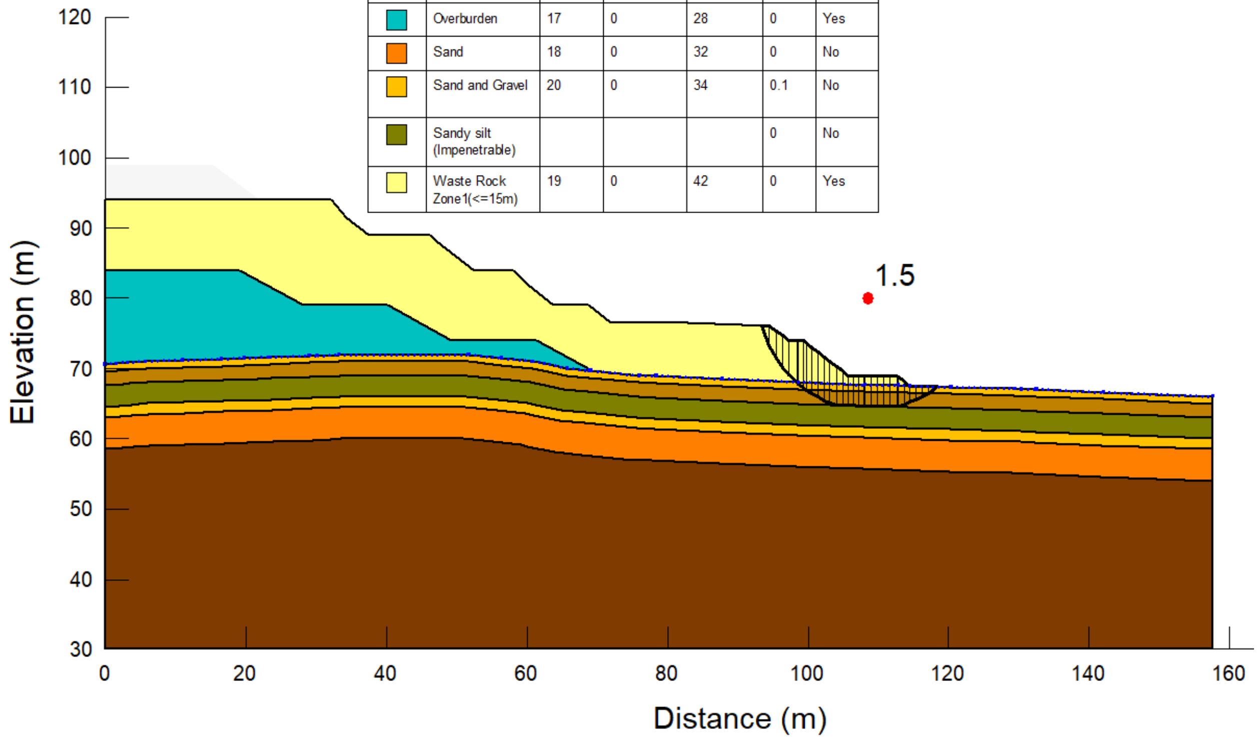
Stability Analysis of WRSF6
Meliadine Gold Mine, NU
Section G- Bench 84.0 m of Waste Rock and Overburden during Construction, Local Deep-Seated Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure G3

Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle	B-bar	Add Weight
	Bedrock				0	No
	Ice-poor Silt	17	0	28	0.2	No
	Overburden	17	0	28	0	Yes
	Sand	18	0	32	0	No
	Sand and Gravel	20	0	34	0.1	No
	Sandy silt (Impenetrable)				0	No
	Waste Rock Zone1(<=15m)	19	0	42	0	Yes



LEGEND

NOTES

Note: During construction, static-loading

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

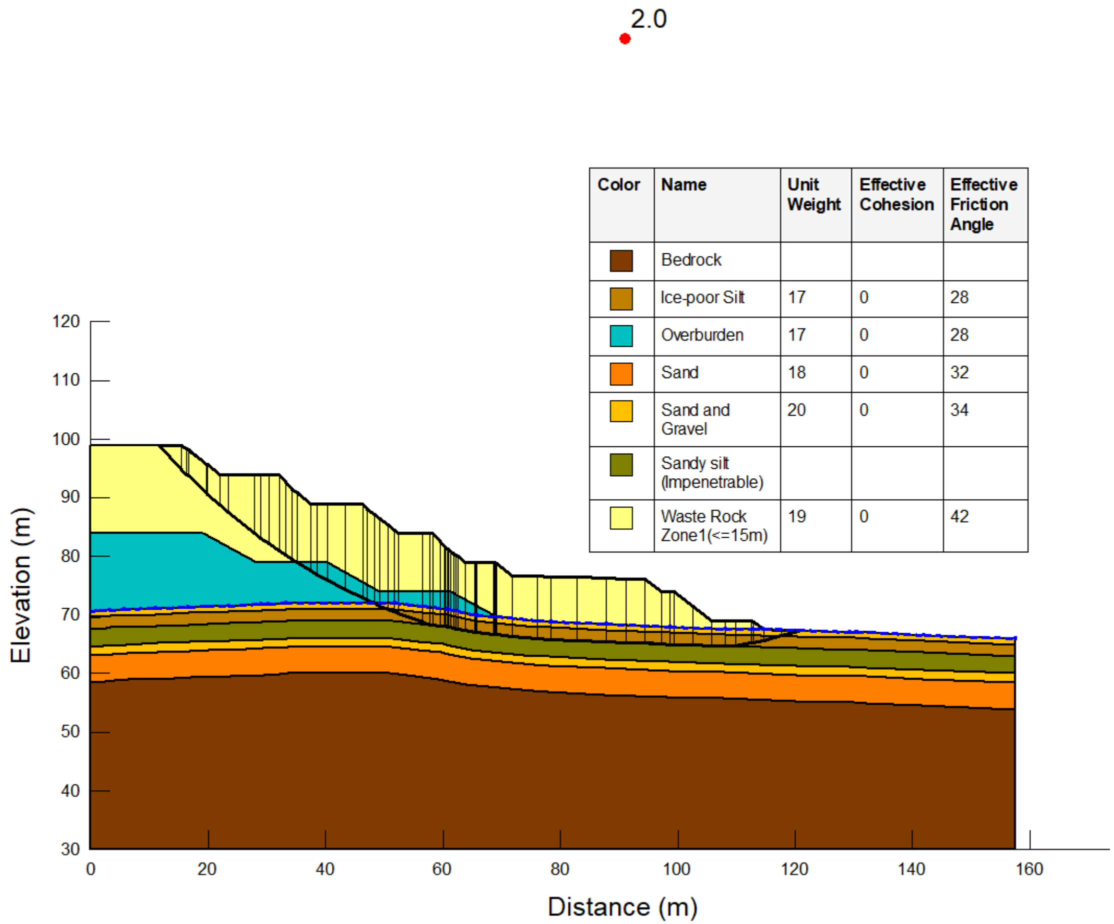
Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section G- Bench 94.0 m of Waste Rock and Overburden during Construction, Local Deep-Seated Slip

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure G4



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle
	Bedrock			
	Ice-poor Silt	17	0	28
	Overburden	17	0	28
	Sand	18	0	32
	Sand and Gravel	20	0	34
	Sandy silt (Impenetrable)			
	Waste Rock Zone1(<=15m)	19	0	42

LEGEND

NOTES

Note: Long-term static loading after construction

STATUS
ISSUED FOR USE

CLIENT

AGNICO EAGLE

TETRA TECH

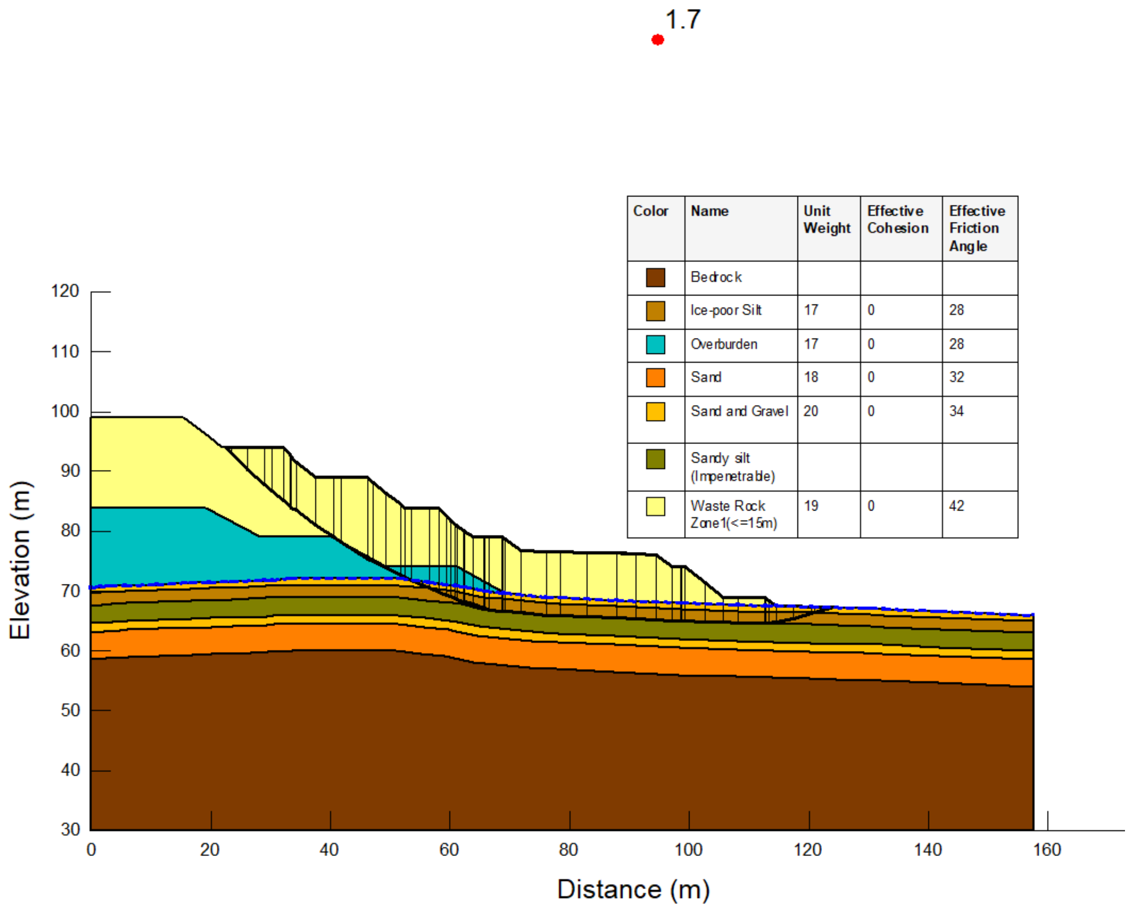
Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section G- Crest at 99 m Long-term Static Loading, Global Deep-Seated Slip, Base Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure G5



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle
	Bedrock			
	Ice-poor Silt	17	0	28
	Overburden	17	0	28
	Sand	18	0	32
	Sand and Gravel	20	0	34
	Sandy silt (Impenetrable)			
	Waste Rock Zone1(<=15m)	19	0	42

LEGEND

NOTES

Note: Pseudo-static loading after construction
PGA=0.0498g

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE

TETRA TECH

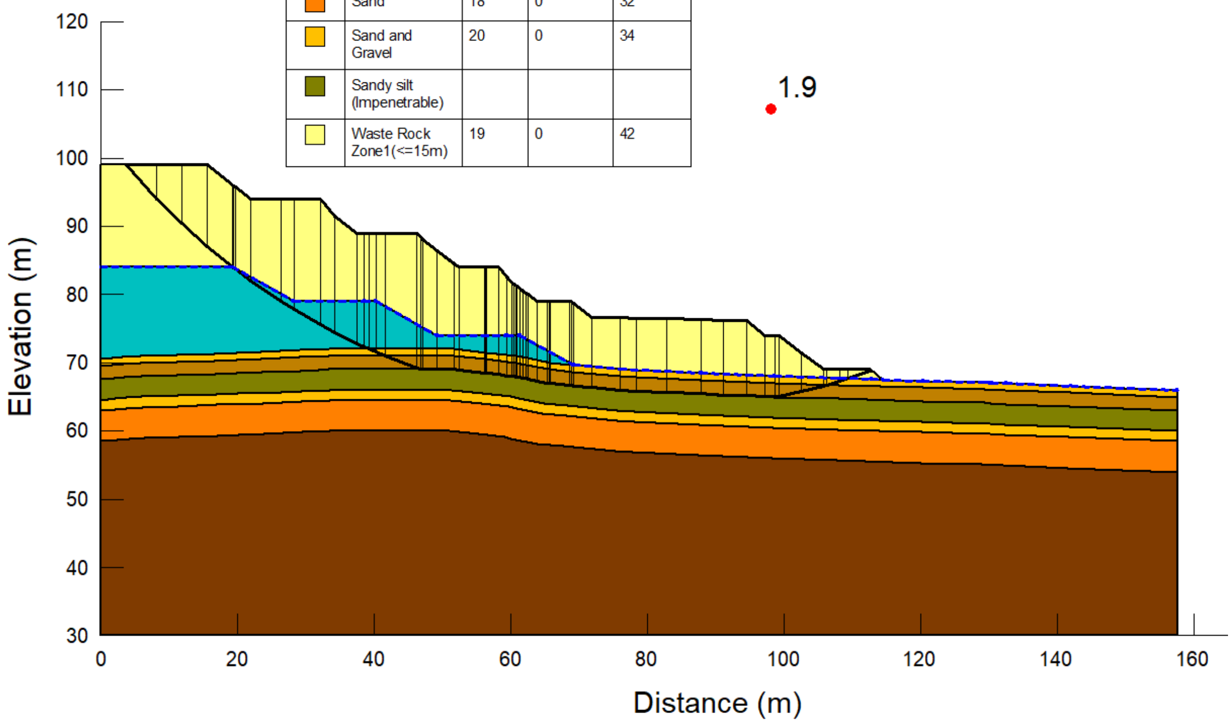
Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section G- Crest at 99 m Long-term Pseudo-Static Loading, Global Deep-Seated Slip, Base Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure G6



Color	Name	Unit Weight	Effective Cohesion	Effective Friction Angle
	Bedrock			
	Ice-poor Silt	17	0	28
	Overburden	17	0	28
	Sand	18	0	32
	Sand and Gravel	20	0	34
	Sandy silt (Impenetrable)			
	Waste Rock Zone1(<=15m)	19	0	42

LEGEND

NOTES

Note: Long-term static loading after construction

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE

TETRA TECH

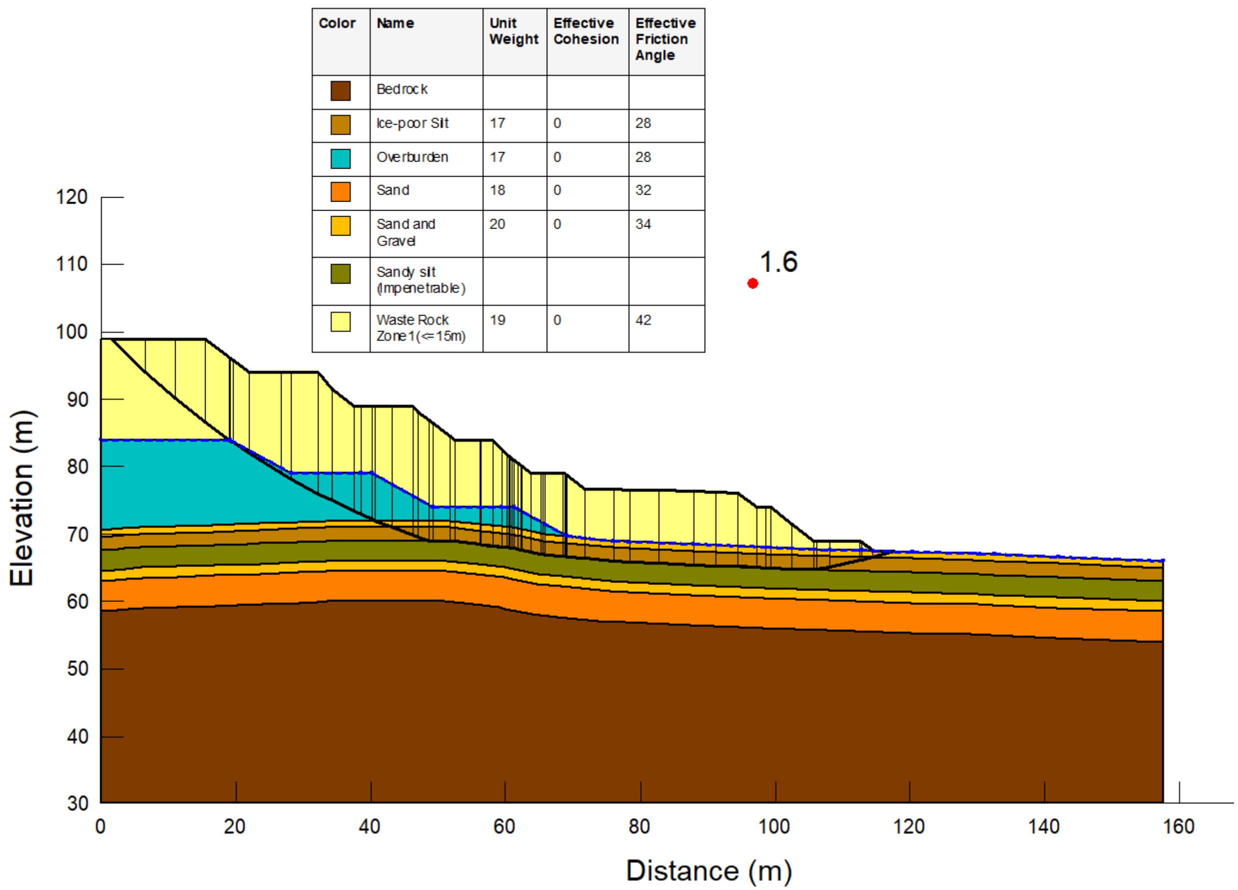
Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section G- Crest at 99 m Long-term Static Loading, Global Deep-Seated Slip, Sensitivity Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure G7



LEGEND

NOTES

Note: Pseudo-static loading after construction
PGA=0.0498g

STATUS
ISSUED FOR USE

CLIENT

AGNICO EAGLE

TETRA TECH

Stability Analysis of WRSF6
Meliadine Gold Mine, NU

Section G- Crest at 99 m Long-term Static Loading, Global Deep-Seated Slip, Sensitivity Case

PROJECT NO.	DWN	CKD	APVD	REV
ENG.EARC03140-38	YL	HX	HX	

OFFICE	DATE
EDM	SEPTEMBER 2024

Figure G8

APPENIDX B

TETRA TECH'S LIMITATIONS ON USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

GEOTECHNICAL

1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the “Professional Document”).

The Professional Document is intended for the sole use of TETRA TECH’s Client (the “Client”) as specifically identified in the TETRA TECH Services Agreement or other Contractual Agreement entered into with the Client (either of which is termed the “Contract” herein). TETRA TECH does not accept any responsibility for the accuracy of any of the data, analyses, recommendations or other contents of the Professional Document when it is used or relied upon by any party other than the Client, unless authorized in writing by TETRA TECH.

Any unauthorized use of the Professional Document is at the sole risk of the user. TETRA TECH accepts no responsibility whatsoever for any loss or damage where such loss or damage is alleged to be or, is in fact, caused by the unauthorized use of the Professional Document.

Where TETRA TECH has expressly authorized the use of the Professional Document by a third party (an “Authorized Party”), consideration for such authorization is the Authorized Party’s acceptance of these Limitations on Use of this Document as well as any limitations on liability contained in the Contract with the Client (all of which is collectively termed the “Limitations on Liability”). The Authorized Party should carefully review both these Limitations on Use of this Document and the Contract prior to making any use of the Professional Document. Any use made of the Professional Document by an Authorized Party constitutes the Authorized Party’s express acceptance of, and agreement to, the Limitations on Liability.

The Professional Document and any other form or type of data or documents generated by TETRA TECH during the performance of the work are TETRA TECH’s professional work product and shall remain the copyright property of TETRA TECH.

The Professional Document is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of TETRA TECH. Additional copies of the Document, if required, may be obtained upon request.

1.2 ALTERNATIVE DOCUMENT FORMAT

Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH’s “Instruments of Professional Service”), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH’s Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH’s Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

Electronic files submitted by TETRA TECH have been prepared and submitted using specific software and hardware systems. TETRA TECH makes no representation about the compatibility of these files with the Client’s current or future software and hardware systems.

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by persons other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this report, at or on the development proposed as of the date of the Professional Document requires a supplementary investigation and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, TETRA TECH has not been retained to investigate, address or consider and has not investigated, addressed or considered any environmental or regulatory issues associated with development on the subject site.

1.8 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems and methods employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. TETRA TECH does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

1.9 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

1.10 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historic environment. TETRA TECH does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional investigation and review may be necessary.

1.11 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

1.12 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

1.13 INFLUENCE OF CONSTRUCTION ACTIVITY

There is a direct correlation between construction activity and structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques are known.

1.14 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, as well as the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

1.15 DRAINAGE SYSTEMS

Where temporary or permanent drainage systems are installed within or around a structure, the systems which will be installed must protect the structure from loss of ground due to internal erosion and must be designed so as to assure continued performance of the drains. Specific design detail of such systems should be developed or reviewed by the geotechnical engineer. Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function.

1.16 BEARING CAPACITY

Design bearing capacities, loads and allowable stresses quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition assumed. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions assumed in this report in fact exist at the site.

1.17 SAMPLES

TETRA TECH will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the Client's expense upon written request, otherwise samples will be discarded.

APPENDIX E

TETRA TECH'S LIMITATIONS ON USE OF THIS DOCUMENT

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