TECHNICAL MEMORANDUM

DATE 16 November 2018 **Project No.** 1789310-206-TM-Rev0

TO Jamie Quesnel
Agnico Eagle Mines Limited

CC Michel Groleau, Valérie Bertrand

FROM Fernando Junqueira and Serge Ouellet **EMAIL** Fernando_Junqueira@golder.com; Serge_Ouellet@golder.com

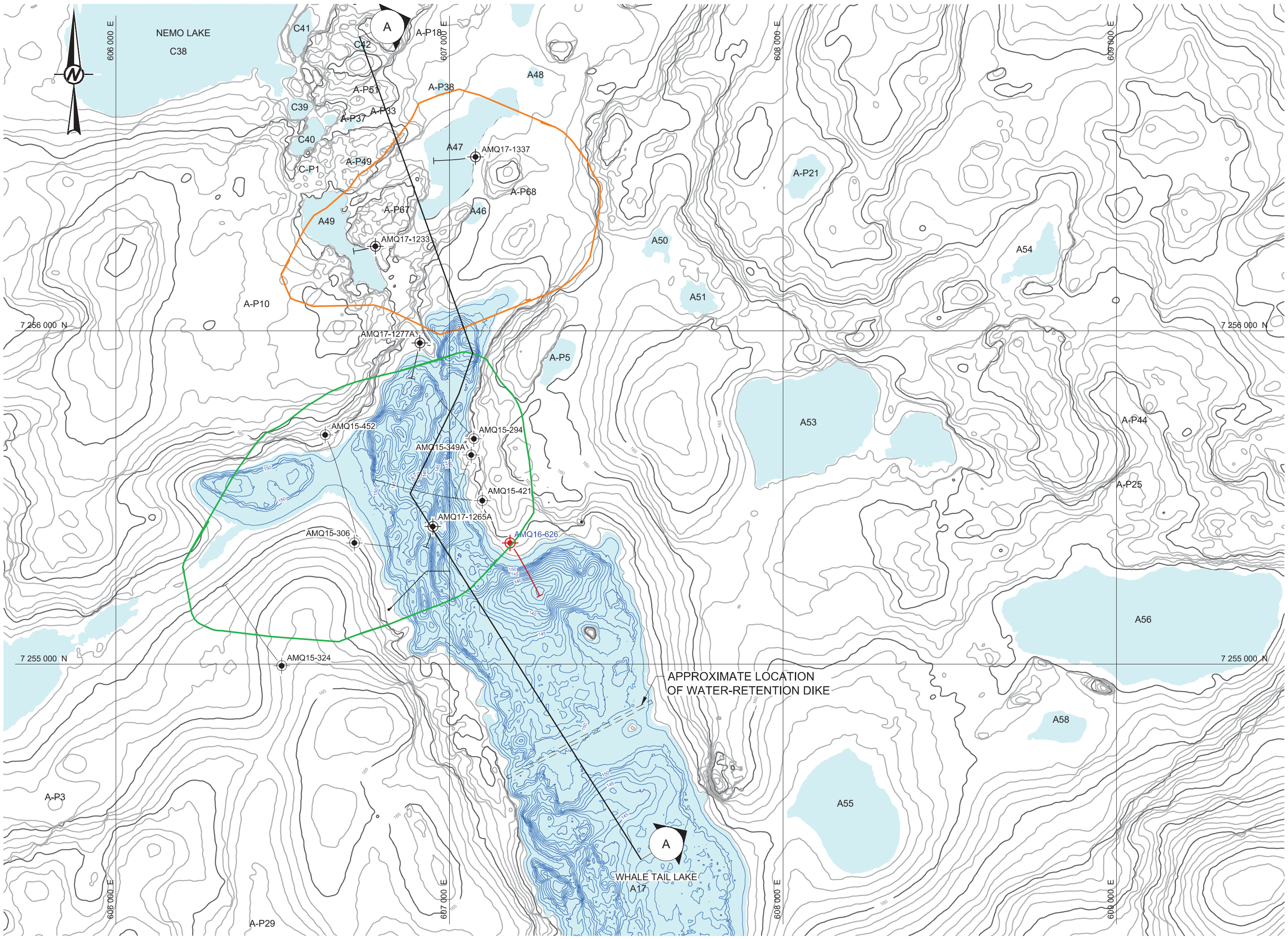
PIT LAKE THERMAL ASSESSMENT IN SUPPORT OF HYDROGEOLOGICAL POST-CLOSURE ANALYSIS WHALE TAIL PIT EXPANSION PROJECT

1.0 INTRODUCTION

Agnico Eagle Mines Limited (Agnico Eagle) is currently evaluating the potential development for mining the Whale Tail Pit Project (Project), a satellite deposit located on the Amaruq exploration property in Nunavut. The Amaruq property is a 408 km^2 site located in Inuit Owned Land approximately 150 km north of the hamlet of Baker Lake and approximately 50 km northwest of Agnico Eagle's operating Meadowbank Mine.

In support of post-closure hydrogeological modelling for the Whale Tail Pit, IVR Pit and Underground mine (Expansion Project), this technical memorandum presents a summary of the permafrost conditions based on the available thermistor data to October 2017, and thermal modelling results of predicted thermal conditions under the Whale Tail and IVR pit lakes post-closure. The two-dimensional (2D) thermal analysis was conducted to evaluate thawing progress of the permafrost below the Whale Tail and IVR pits following the formation of the IVR/Whale Tail Pit Lake during closure and post-closure. The locations of Whale Tail and IVR pits are presented on Figure 1.

This thermal assessment included a review of the original Whale Tail Lake talik estimation based on available thermistor data at the time of the FEIS (Agnico Eagle 2016); the previous assessment completed by Golder (2017a); and ground thermal conditions in the Whale Tail Lake area based on thermistor data to the end of October 2017, with modelling being initiated in December 2017, when this study commenced. The model predicts thermal changes during and after flooding the Whale Tail and IVR pits.



LEGEND

	EXISTING GROUND SURVEY
	EXISTING BATHYMETRY
	WATER BODY
	THERMISTOR
	WESTBAY SYSTEM
	PROPOSED WHALE TAIL PIT
	PROPOSED IVR PIT

NOTE(S)

1. ALL UNITS ARE IN METERS UNLESS NOTED OTHERWISE.
2. CONTOUR INTERVAL 1m MINOR AND 5m MAJOR.

REFERENCE

BASE PLAN AND BATHYMETRY DATA RECEIVED FROM AGNICO EAGLE MINES LTD. DATE RECEIVED NOVEMBER 25, 2016.
CAD FILE: COURBESZM_AMARUQ_GLOBAL_UTM14_20150929.DWG
CAD FILE: 1665858-2100B-CM-0002.DWG
CAD FILE: 61-000-142-001_R0BLOC.DWG

0 250 500
1:12,500 METRES

CLIENT

AGNICO EAGLE

AGNICO EAGLE MINES LIMITED

CONSULTANT

GOLDER

YYYY-MM-DD	2018-11-16
DESIGNED	CM
PREPARED	MSH
REVIEWED	FJ
APPROVED	SO

PROJECT
WHALE TALE PIT PROJECT
POST CLOSURE PIT LAKE THERMAL ANALYSIS
NUNAVUT

TITLE
SITE PLAN AND SECTION LOCATION

PROJECT NO.	PHASE/TASK/DOC#	REV.	FIGURE
1789310	2000/22030/206	0	1

2.0 BACKGROUND

The Project is located in the zone of continuous permafrost. The Project area is mostly within permafrost, except under the lake where water is too deep to freeze to the bottom during winter. Taliks (areas of unfrozen ground) are expected beneath a water body where the water depth is greater than the ice thickness. Closed talik formations consist of a depression in the permafrost table below relatively shallower and smaller lakes. Open talik formations that penetrate through the permafrost and connect the lake waterbody with the sub-permafrost hydrogeological regime are to be expected for relatively deeper and larger lakes.

A previous site investigation on permafrost conditions in the Project area was completed by Knight Piésold (Knight Piésold 2015) between June and October of 2015. It included the installation of six thermistors in the vicinity of the proposed development of Whale Tail Lake to collect ground temperature data.

A further review on site thermistor data was carried out by Golder, with a summary of the thermal conditions presented in Golder (2017a). Four additional thermistors were installed within the vicinity of Whale Tail Lake in 2017 by Golder.

Based on site investigation data, soils in the project area are typically medium to coarse grained glacial till and colluvium with high coarse fragment content overlying bedrock at shallow depths. The six thermistor boreholes drilled in 2015 indicated soil thicknesses varying from 6.1 to 12.4 m. Review of existing data indicates the soil thicknesses varying from about 1 m to 12 m in the proposed waste rock storage facility area located northwest of the proposed pits. Underlying the soil, bedrock in the area generally consists of a stratigraphic sequence of greywacke and komatiite ultramafic rocks.

A mean annual air temperature for the site is of -11.3 °C, based on climate data provided by Agnico Eagle (Golder 2016a, Agnico Eagle 2016). Climate normal for Baker Lake between 1981 and 2000 shows a mean annual air temperature of -11.2 °C (Golder 2017b). Table 1 presents a summary of average air temperature at the site and at the Baker Lake climate station. The mean monthly temperatures of the two sets of data are similar. Mean monthly temperatures from Meadowbank site from 1997 to 2003 is included in the table for comparison (Golder 2003). The Meadowbank data gives a similar annual average air temperature of -11.1 °C.

Table 1: Mean Monthly Air Temperatures

Month	Whale Tail Project (Golder 2016a, Agnico Eagle 2016)	Meadowbank Project (1997 - 2003) (Golder 2003)	Baker Lake Climate Normal (1981 to 2000)
Unit	°C		
January	-31.3	-31.6	-31.2
February	-31.1	-31.7	-31.0
March	-26.3	-25.5	-26.2
April	-17.0	-17.2	-17.0
May	-6.4	-5.6	-6.3
June	4.9	3.8	4.8
July	11.6	12.4	11.6
August	9.8	9.9	9.8
September	3.1	3.3	3.1
October	-6.5	-7.6	-6.4
November	-19.3	-18.0	-19.3
December	-26.8	-25.6	-26.5
Average	**-11.3**	**-11.1**	**-11.2**

3.0 SITE PERMAFROST CONDITIONS

The following sections present a summary of site-specific permafrost conditions based on the available thermistor data reviewed by Golder (2017a, 2018b).

3.1 Thermistor Installation

The locations of the existing thermistors are shown in Figure 1; Table 2 presents a summary of thermistor locations and installation data obtained to date.

Table 2: Thermistor Location and Installation Summary

Borehole	Collar Coordinates					Drilled Length (m)	Thermistor	Date of First Reading	Status[c]
	Northing	Easting	Elevation	Inclination (deg)	Azimuth (deg)		Depth Below Ground Surface (m)		
AMQ15-294	607,073.2	7,255,676.1	155.9	-45.18	322.7	220.5	144.4	September 2015	Functioning
AMQ15-306	606,714.8	7,255,363.8	154.9	-45.41	96.3	201.0	141.5	September 2015	Functioning[b]
AMQ15-324	606,496.8	7,254,995.2	161.8	-55.46	325.5	505.0	317.4	September 2015	Functioning
AMQ15-349A	607,064.9	7,255,627.5	155.3	-45.32	204.4	202.5	140.6	September 2015	Not functioning
AMQ15-421	607,098.3	7,255,490.8	155.1	-51.31	273.9	501.0	388.3	September 2015	Not functioning
AMQ15-452	606,627.2	7,255,687.9	156.2	-49.98	159.5	501.0	382.3	September 2015	Functioning
AMQ17-1265A	606,950.1	7,255,413.6	152.5	-80.0	196.0	425.0	349.6[a]	August 2017	Functioning
AMQ17-1233	606,777.7	7,256,253.8	161.9	-59.06	252.7	156.0	132.4	August 2017	Functioning
AMQ17-1337	607,078.4	7,256,522.0	155.2	-59.62	260.4	250.0	218.0	May 2017	Functioning
AMQ17-1277A	606,911.1	7,255,963.6	153.2	-60.17	193.1	250.0	217.4	May 2017	Functioning

Notes:

a) Depth below lake water (ice) level.

b) Only the top node is functioning.

c) Based on information provided by Agnico Eagle in April 2018

3.2 Thermistor Data Summary

Table 3 presents a summary of the permafrost information estimated from the ten thermistors on site. The parameters were estimated using average values from September 2015 to October 2017. Thermistor data used for modelling was assessed for stabilization, recorded temperatures used were stabilized or near to stabilization in October 2017.

Ground temperature plots for the thermistor data is presented in Attachment 1.

Based on the thermistor data, the findings on the permafrost characteristics in the project area remain similar to those presented in Golder (2017a, 2018b), and are summarized below:

- The depth of permafrost in the project site is estimated to be in the order of 427 m to 495 m for areas outside of Whale Tail Lake.
- The thermistor AMQ17-1265A installed within the Whale Tail Lake suggests the talik depth at this location is about 112 m below the lake water level of El.152.5 masl.
- The extrapolated mean annual ground surface temperatures estimated from thermistors range from -3.4 °C to -9.9 °C.
- The estimated depths of zero amplitude from the temperature profiles range from 18 m to 35 m.
- The temperatures at the depths of zero amplitude are in the range of -3.1 °C to -8.4 °C.
- The geothermal gradient is in the range of 0.005 °C/m to 0.025 °C/m.
- Based on the measured salinity concentration of 0.3% to 0.4% from the groundwater samples collected in 2016 at depths from 276 m to 392 m from a Westbay well system installed in borehole AMQ16-626, a freezing point depression of about 0.2 °C was calculated. This is estimated to reduce the frozen ground depth by approximately 20 m corresponding to the thickness of the basal cryopeg. No additional groundwater quality data was obtained since 2016 and therefore, no additional estimation of freezing point depression are provided for this assessment; these are assumed to remain unchanged since the last assessment (Golder 2016b).

Table 3: Summary of Permafrost Conditions from Site Thermistors

Hole ID	Approx. Collar Distance to Lake (m)	Thermistor Location	Zero Annual Amplitude		Mean Annual Ground Temperature (°C)[a]	Geothermal Gradient (°C/m)	Estimated Permafrost Depth (metres below ground or lake surface)
			Approximate Depth (m)	Approximate Temperature (°C)			
AMQ15-294	31	Beneath Whale Tail Lake	19	-3.0	-3.5	Insufficient depth	Insufficient depth
AMQ15-306	55	Beneath Whale Tail Lake	20	-7.4	-8.1	Insufficient depth	Insufficient depth
AMQ15-324	370	On land	35	-8.4	-9.9	0.025[b]	427
AMQ15-349A	40	Beneath Whale Tail Lake	18	-5.2	-5.2	Insufficient depth	Insufficient depth
AMQ15-421	40	Beneath Whale Tail Lake	24	-3.6	-3.9	0.005[c]	445
AMQ15-452	50	Beneath Whale Tail Lake	23	-3.6	-3.4	0.011[d]	468
AMQ17-1265A	0 (within Whale Tail Lake)	Beneath Whale Tail Lake	N/A	N/A	N/A	0.016[e]	343 (including 112 m lake talik)
AMQ17-1233	21	Beneath A49 Lake	Insufficient depth	Insufficient depth	Insufficient depth	Insufficient depth	Insufficient depth
AMQ17-1337	12	Beneath A47 Lake	Insufficient depth	Insufficient depth	-9.5	0.019[f]	495
AMQ17-1277A	29	Beneath Whale Tail Lake	Insufficient depth	Insufficient depth	Insufficient depth	Insufficient depth	Insufficient depth

Notes:

a) Estimated by projecting best fit line to surface.
b) Based on thermistor data from 105.1 to 282.1 m depth.
c) Based on thermistor data below 271.8 m depth.
d) Based on thermistor data below 248.4 m depth.
e) Based on thermistor data below 290.5 m depth.
f) Based on thermistor data below 166.2 m depth.

4.0 PIT LAKE THERMAL MODEL

Two-dimensional thermal modelling was carried out using the finite element program, TEMP/W, of GeoStudio 2007 (Ver. 7.23), developed by GEO-SLOPE International Ltd. This section presents the model scenarios, input parameters, and assumptions.

Golder previously conducted thermal modelling to evaluate the permafrost and talik conditions in the Whale Tail Lake and project area (Golder 2017a), conducted thermal modelling for the cover of the Whale Tail waste rock storage facility (Golder 2017b, 2018a), and completed a thermal assessment of the Approved Project which includes mining of Whale Tail Pit (Golder 2018b) only. A number of model parameters used in these assessments were adopted for this pit lake thermal modelling.

For the purpose of providing input to the pit hydrogeological modelling, section A shown in Figure 1 was selected for thermal modelling of the post-closure pit lakes. The modelling included the following steps.

- Evaluate the current condition of permafrost regime under Whale Tail Lake through review of the existing thermistor data at the time of the analysis and the 2017 Whale Tail Lake thermal assessment results (Golder 2017a).
- Estimate the ground thermal conditions at the time the Whale Tail and IVR pits are mined out, for use as the model initial condition.
- Run a transient thermal model with the pits being flooded based on the proposed flooding schedule, to estimate changes in the permafrost regime during flooding at closure.
- Run a subsequent transient model to evaluate long-term changes in the permafrost regime, after the water-retaining dike is breached and the Whale Tail Lake (South Basin) and the fully flooded Whale Tail and IVR pit lakes are merged.
- Run a steady-state thermal model for the pit lakes to estimate the ultimate permafrost regime.
- The thermal modelling did not consider any of the underground structures of the Whale Tail Pit. The flooding of the underground structures is expected to accelerate thawing of the permafrost in areas surrounding the underground workings in the short-term but would have limited effects on the overall site permafrost regime in the long-term.

4.1 Material Properties

Consistent with Golder (2017a, 2018b), for the purposes of this thermal assessment, each model assumed uniform thickness of 12 m of till overlying bedrock both on land and under the lake, except the pit lake. No lake bed sediment or weathered bedrock materials were included in the models. It is expected that the material properties of the bedrock will have a more significant effect on the thermal conditions than the soil due to the relatively small thickness of the soil compared to the bedrock. Material properties and depths used in the thermal models are summarized in Table 4. The material thermal properties were referenced from typical values presented in Andersland and Ladanyi (2004) and are consistent with Golder (2017a and b).

Table 4: Material Thermal Properties Used in the Models

Material	Assumed Volumetric Water Content	Thermal Conductivity (W/m-°C)		Volumetric Heat Capacity (MJ/m³-°C)		Assumed Depth Below Ground surface (m)
		Frozen	Unfrozen	Frozen	Unfrozen	
Till	30%	1.8	1.5	2.0	2.5	0 to 12
Bedrock	1%	3.0	3.0	2.0	2.0	>12

The thermal models were solved considering groundwater with a phase change temperature of 0 °C. The addition of salinity in the groundwater would result in a freezing point depression and could lower the phase change temperature to below 0 °C if salinity is high enough. The estimated freezing point depression of -0.2 °C is considered to have minor impact to the evolution of the thermal regime around the pit lake in the long-term.

4.2 Boundary Conditions

4.2.1 Ground Surface Temperature

A monthly ground surface temperature function was estimated through numerical modelling using daily climate data from Baker Lake, and review of existing thermistor data from the Whale Tail site (Golder 2017b). Ground surface temperatures are often observed to be warmer than the air temperatures in permafrost regions. Figure 2 shows the ground surface temperature function used in the model, as well as the Baker Lake normal air temperatures from 1981 to 2010. The ground surface temperature function with a mean annual ground temperature of -7.3 °C used in the model remains consistent with Golder (2017b and 2018b) and is considered to be reasonable for use in the transient models.

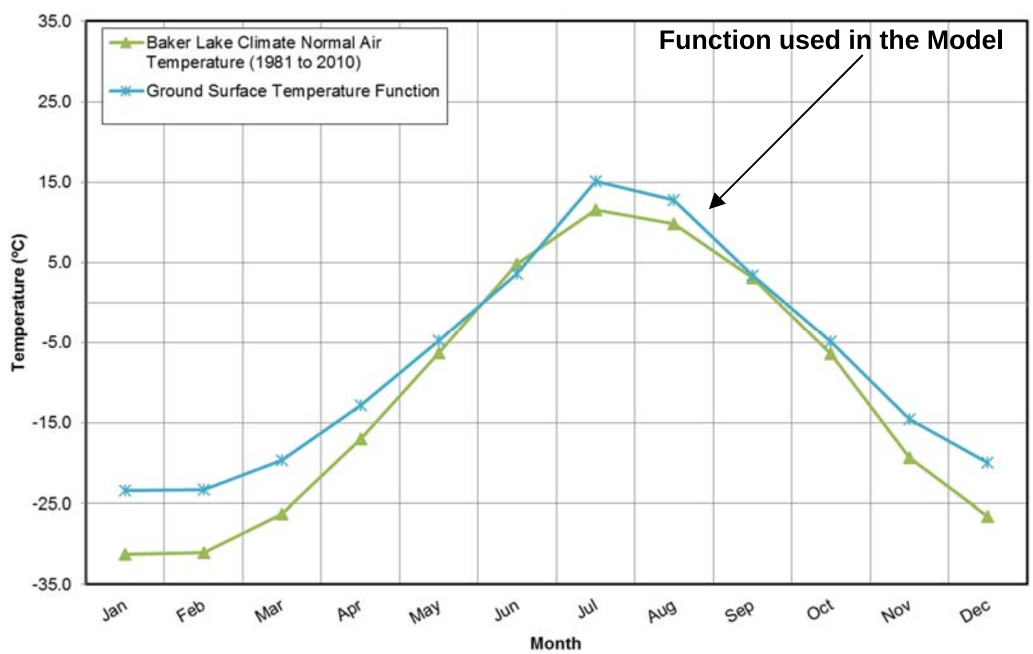


Figure 2: Monthly Air and Ground Surface Temperature Functions

4.2.2 Geothermal Gradient

A geothermal heat flux of 0.048 J/sec was applied to the models as the lower boundary condition based on the assumed bedrock thermal conductivity of 3.0 W/m-°C and a geothermal gradient of 0.016°C/m (Golder 2017a, 2018b). This thermal gradient is consistent with the one estimated during the Meadowbank Project baseline study (Golder 2003).

4.2.3 Pit Lake Bottom Temperature

Water temperature at the bottom of the pit lakes is a key boundary condition to the model. Differently from ground temperature, lake bottom temperature tends to be constant and will have strong influence on the process of permafrost melting under the lake.

Typically, a mean annual lake bottom temperature is related to water depth in a permafrost region: the deeper the lake, the higher the mean annual lake bottom temperature. Deep pit lake temperatures tend to stabilize near +4°C at which the maximum water density typically occurs for fresh water and low salinity water. An assessment of the variation of the pit lake temperature was not carried out at this stage. A review of measured pit lake bottom temperatures from Pieters and Lawrence (2014) and Crusius et al. (2002) indicates the following:

- +3.5°C at about 110 m depth for Zone 2 Pit Lake at Colomac Mine located 250 km north of Yellowknife, NWT
- +5°C at about 90 m depth for Faro Pit Lake at Faro Mine near Faro, Yukon
- +4.5°C at about 60 m depth for Grum Pit Lake at Faro Mine near Faro, Yukon
- +4.2°C at about 50 m depth for Vangorda Pit Lake at Faro Mine near Faro, Yukon

For the purpose of the modelling, the Whale Tail and IVR pit lakes were assumed to have a constant mean annual bottom temperature of +4°C in all models based on the above review. Due to the depth of the proposed pit lakes, meromictic conditions are expected to develop. When meromictic conditions are present, mixing of the surface and deep water is inhibited (stratification) which results in a stable bottom temperature.

For the relatively shallow lake area near the proposed water-retaining dike (Whale Tail Dike), a constant temperature of +2°C was assumed for the lake bottom.

4.3 Model Scenario and Assumptions

This thermal model was designed to provide reasonable assumptions for the closure and post-closure hydrogeological assessment. Pit flooding was adopted according to a preliminary pit refilling schedule provided by the site-wide water balance study (Figure 3). This schedule underwent some modifications during the fine tuning of the site-wide water balance, however, for the time scale of analysis being adopted and evaluated in the thermal analysis, these changes are not considered to significantly affect predictions on the evolution of the permafrost and talik conditions during post-closure for the purposes of the hydrogeological assessment.

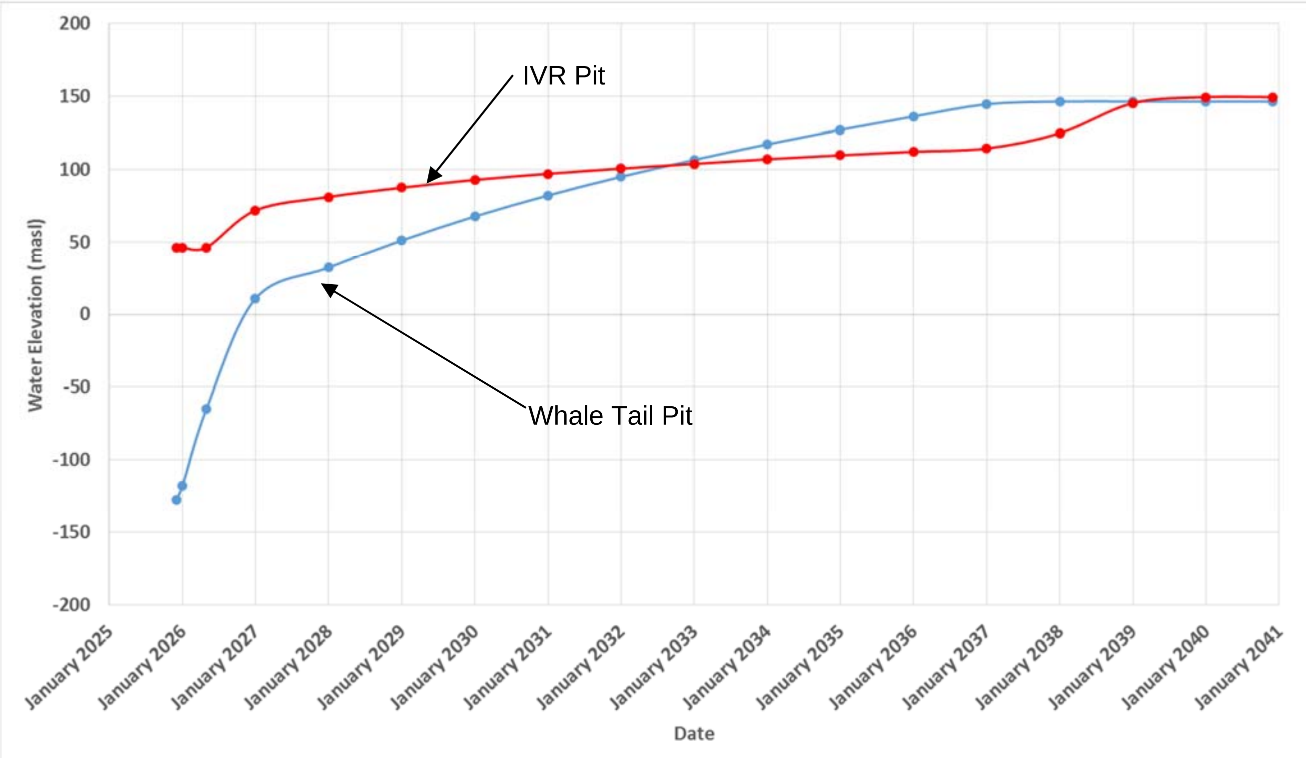


Figure 3: Whale Tail and IVR Pit Proposed Flooding Schedule

The modelling scenario was developed to simulate the proposed Whale Tail Pit flooding elevations from years 1 to 15 as presented in Table 5.

Table 5: Thermal Model Pit Lake Flooding Elevations

Year	Whale Tail Pit Lake Elevation (masl)	IVR Pit Lake Elevation (masl)
0	-127.6	46.3
1	-64.9	46.3
2	10.8	71.8
5	67.7	92.8
8	106.5	103.8
11	136.1	112
13	146.3	124.7
15	146.3	149.3

For post-closure conditions, the pit lake is assumed to maintain the baseline elevation of 152.5 masl.

The modelling was completed up to 10,000 years from start of flooding for the section through the centreline of the ultimate Whale Tail and IVR Pit configuration. The model used the ground surface temperature function and a daily time step without consideration to climate change up to 300 years and used a yearly timestep with a constant average ground surface temperature of -7.3 °C (based on ground surface temperature function shown on Figure 2) for years 300 to 10,000 to reduce the total number of time steps required to complete the model.

This hypothetical scenario assumed climatic conditions in 10,000 years remain similar to current site conditions (no global warming). Climate change impacts are typically considered for a post-closure period of up to 100 years as the current standard practice. A climate change scenario for the duration of 300 to 10,000 years cannot be defined with a minimal degree of certainty and would not bring any benefit to the model quality.

Steady-state conditions were compared to the results of the 10,000 year model for two cases: 1) where the ground between the two pits is flooded and 2) where it is not flooded (this would require the pit lake to be of a lower elevation than 152.5, or for ground to be built up between the two pits, both of which are not planned to occur). The purpose of this scenario was to assess the thermal conditions in the on-land areas where there is no flooding between the two pit lakes (above el.152 m).

4.4 Thermal Conditions Prior to Flooding

Section A is located within Whale Tail Lake in the longitudinal direction. Modelling the entire section was not deemed appropriate to estimate the initial thermal conditions before pit flooding, as the lateral thermal impacts from surrounding colder ground cannot be accounted for in two dimensions. Instead, the initial thermal regime along section A was interpolated by modelling a steady-state condition of the northern terrace at the proposed IVR Pit, the ground temperature data from thermistor AMQ17-1265A, and previous thermal analysis of the Whale Tail Lake completed by Golder (2017a). Based on the ground temperature profile from AMQ17-1265A, the extent of permafrost is expected to occur from El. 40.8 masl to -191 masl at the southeast side of Whale Tail Pit on Section A. The assumed initial conditions are presented on Figure 2-1 of Attachment 2.

For the purpose of this assessment, the majority of the thermal regime prior to mining was assumed to be the same as when the mining is complete due to the short duration of mining. Some freeze-back during the pit mining is expected and was estimated to form a part of the initial thermal condition for the post-closure period.

5.0 SUMMARY OF MODEL RESULTS FOR THE POST-CLOSURE PERIOD

The model results are presented in Figures 2-1 to 2-7 of Attachment 2 including:

- The assumed initial thermal conditions prior to pit flooding.
- Thermal conditions during the pit flooding in closure.
- Zero-degree isolines at selected years of post-closure, up to year 10,000.
- Steady-state thermal conditions for the post-closure pit lakes with and without flooding between each pit lake.

The following findings are based on the model results:

- During pit flooding, the warm pit lake temperature melts mostly the upper portion of the permafrost under the pit, and talik zones starts to occur around the pit wall and floor. A through talik starts to form around year 11 as seen on Figure 2-4.
- The permafrost under the Whale Tail Pit Lake continues to thaw post-closure, and the open talik expands from the lake (south) toward the land (north) as seen on Figure 2-6. The majority of the permafrost under the pit lake is thawed 300 years after closure.
- The permafrost under the IVR Pit Lake continues to thaw post-closure, and the open talik expands from the lake side (south) toward the land (north). The majority of the permafrost under the pit lake is thawed in approximately 1,000 years after closure.
- The steady-state models indicate the pit lakes will thaw the permafrost in the long-term, and eventually reduce the permafrost depth under the adjacent ground northwest of the IVR Pit. A significantly longer time (in the order of 10,000 years) is likely required for the pit lakes to reach the steady-state thermal conditions.
- The potentially colder temperatures at the narrow area between the Whale Tail and IVR pit lakes may reduce the upper ground temperatures but are not expected to significantly change the thawing progress of the deep permafrost below this area.

All the findings listed above are based on climate conditions in 10,000 years remaining similar to current conditions. This assumption is recognized to be unrealistic, but currently there is no scientific method that is known to produce a reliable forecast for climate change in such a long-term. The reader is therefore advised to make use of the model results with appropriate caution and perspective.

6.0 CLOSURE

The reader is referred to the Study Limitations, which follows the text and forms an integral part of this technical memorandum.

We trust this document satisfies you current requirements. If you have any questions or require further assistance, please do not hesitate to contact the undersigned.

Golder Associates Ltd.

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https://golderassociates.sharepoint.com/sites/19830g/2000_phase2expansion/22000_hydrogeology/thermal analysis/memo/rev 0/1789310-206-tm-rev0-expansionprojectwhaletailpit_post-closurethermal.docx

Attachments: Study Limitations
Attachment 1: Thermistor Readings
Attachment 2: Thermal Model Results

PERMIT TO PRACTICE
GOLDER ASSOCIATES LTD.
Signature
Date Nov 16, 2018
PERMIT NUMBER: P 049
NT/NU Association of Professional Engineers and Geoscientists

REFERENCES

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STUDY LIMITATIONS

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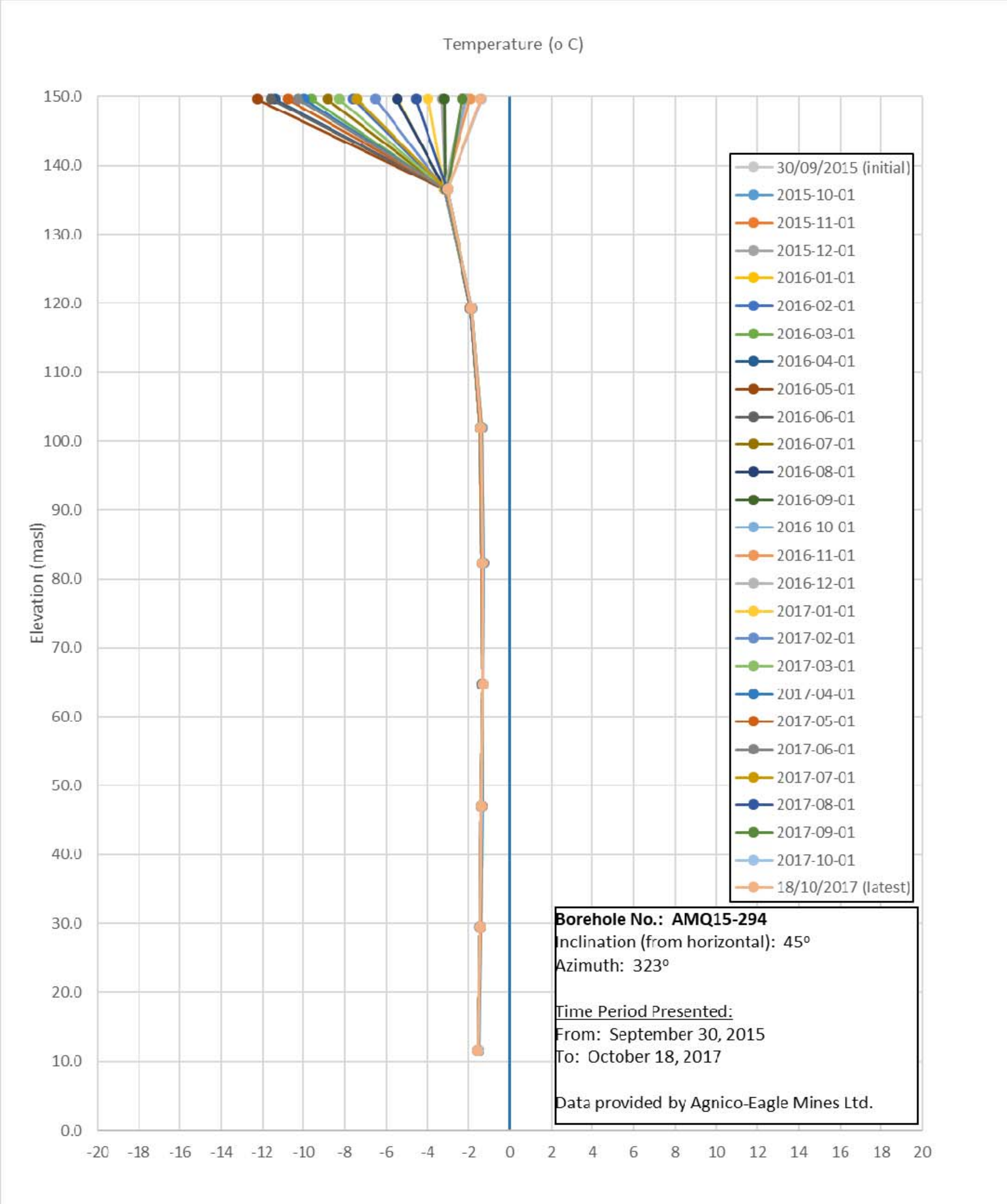
ATTACHMENT 1

Thermistor Readings



NOTE: Readings are shown once per month for clarity.

CLIENT
AGNICO EAGLE MINES LIMITED

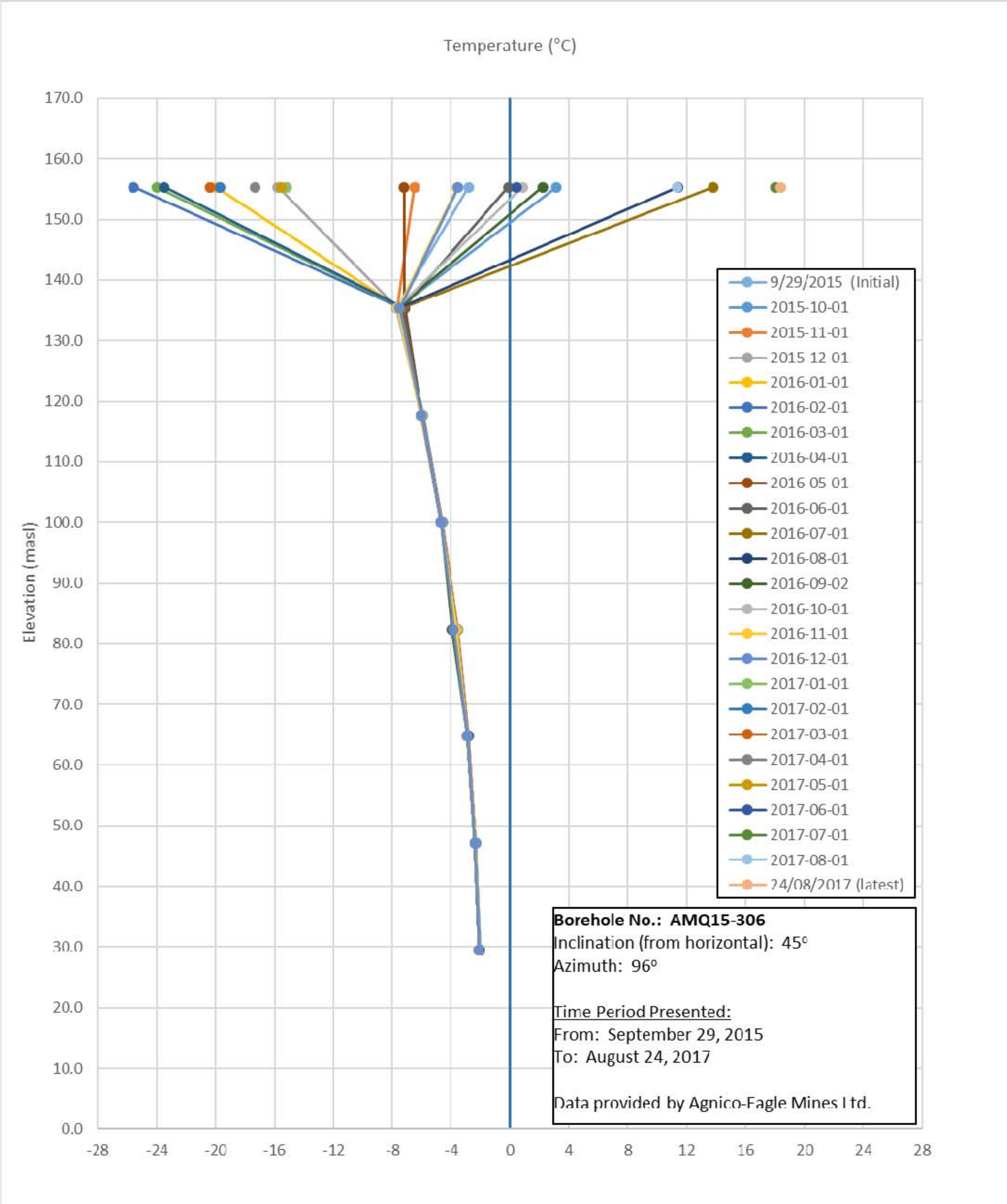
PROJECT
WHALE TAIL PIT PROJECT
POST CLOSURE PIT LAKE THERMAL ASSESSMENT
NUNAVUT

CONSULTANT
GOLDER

YYYY-MM-DD	2018-08-28
PREPARED	CTM
DESIGN	CTM
REVIEW	FJ
APPROVED	SO

TITLE
THERMISTOR AMQ15-294 2015/2017 READINGS

PROJECT No.	PHASE/TASK	Rev.	FIGURE
1789310	2000/22030	0	1-1



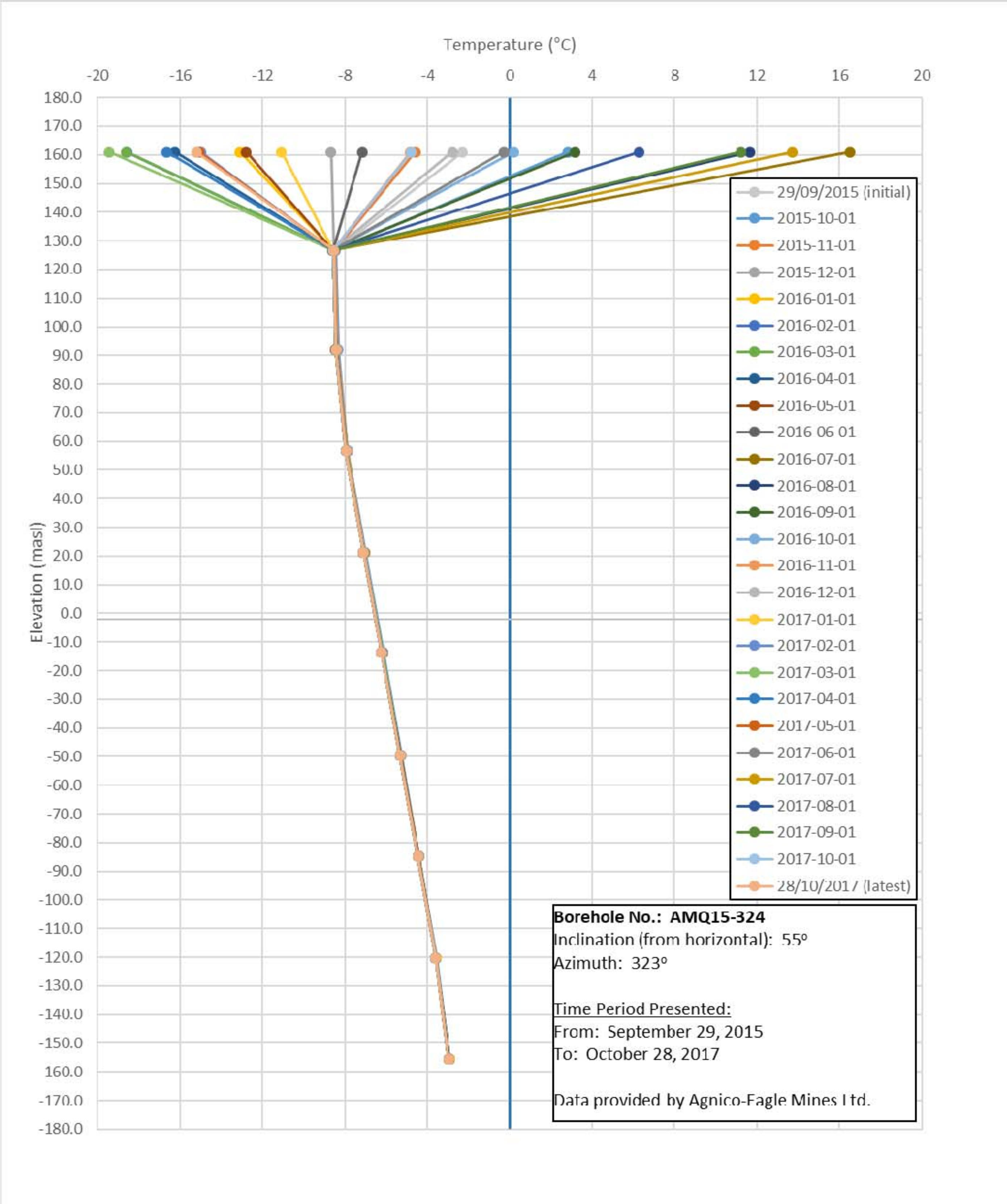
NOTE: Readings are shown once per month for clarity.

CLIENT		PROJECT
AGNICO EAGLE MINES LIMITED		WHALE TAIL PIT PROJECT POST CLOSURE PIT LAKE THERMAL ASSESSMENT NUNAVUT

CONSULTANT		
GOLDER	YYYY-MM-DD	2018-08-28
	PREPARED	CTM
	DESIGN	CTM
	REVIEW	FJ
	APPROVED	SO

TITLE
THERMISTOR AMQ15-306 2015/2017 READINGS

PROJECT No.	PHASE/TASK	Rev.	FIGURE
1789310	**2000/22030**	**0**	**1-2**

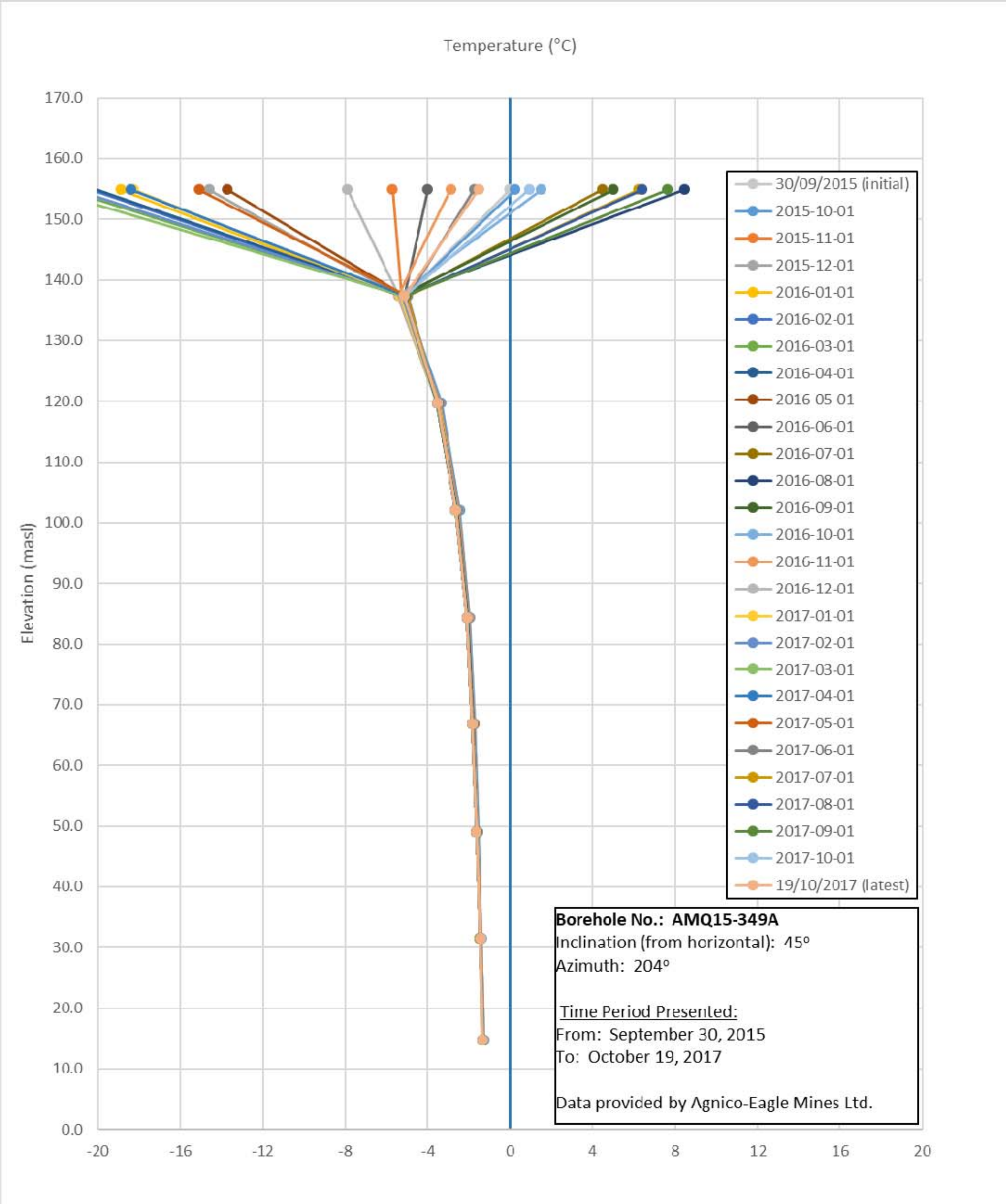


NOTE: Readings are shown once per month for clarity.

CLIENT AGNICO EAGLE MINES LIMITED	PROJECT WHALE TAIL PIT PROJECT POST CLOSURE PIT LAKE THERMAL ASSESSMENT NUNAVUT
CONSULTANT GOLDER	TITLE **THERMISTOR AMQ15-324 2015/2017 READINGS**

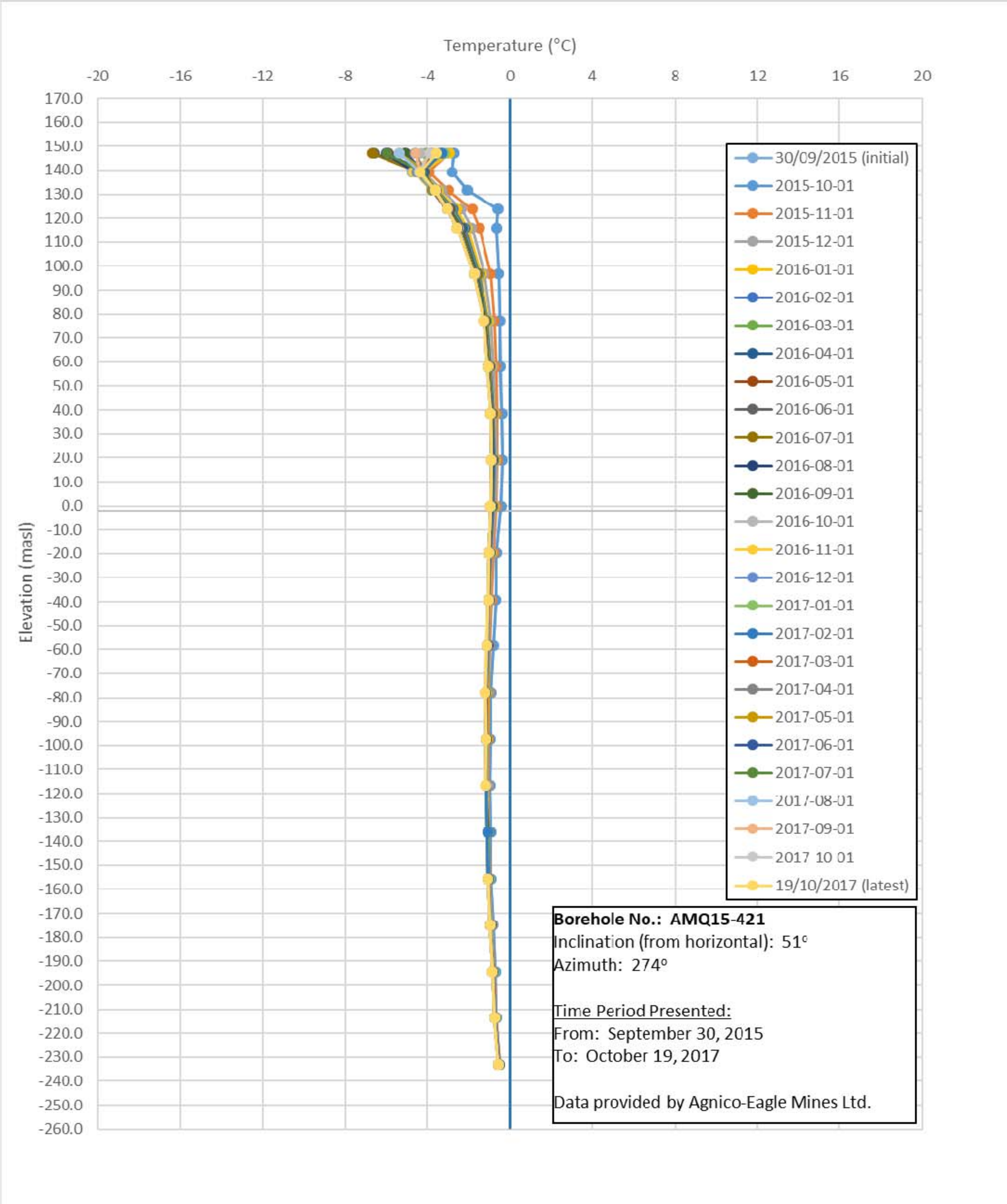
YYYY-MM-DD	2018-08-28
PREPARED	CTM
DESIGN	CTM
REVIEW	FJ
APPROVED	SO

PROJECT No.	PHASE/TASK	Rev.	FIGURE
1789310	**2000/22030**	**0**	**1-3**



NOTE: Readings are shown once per month for clarity.

CLIENT	AGNICO EAGLE MINES LIMITED	PROJECT	WHALE TAIL PIT PROJECT POST CLOSURE PIT LAKE THERMAL ASSESSMENT NUNAVUT
CONSULTANT GOLDER	YYYY-MM-DD: 2018-08-28 PREPARED: CTM DESIGN: CTM REVIEW: FJ APPROVED: SO	TITLE	**THERMISTOR AMQ15-349A 2015/2017 READINGS**
PROJECT No. 1789310	PHASE/TASK 2000/22030	Rev. 0	FIGURE 1-4



NOTE: Readings are shown once per month for clarity.

CLIENT
AGNICO EAGLE MINES LIMITED

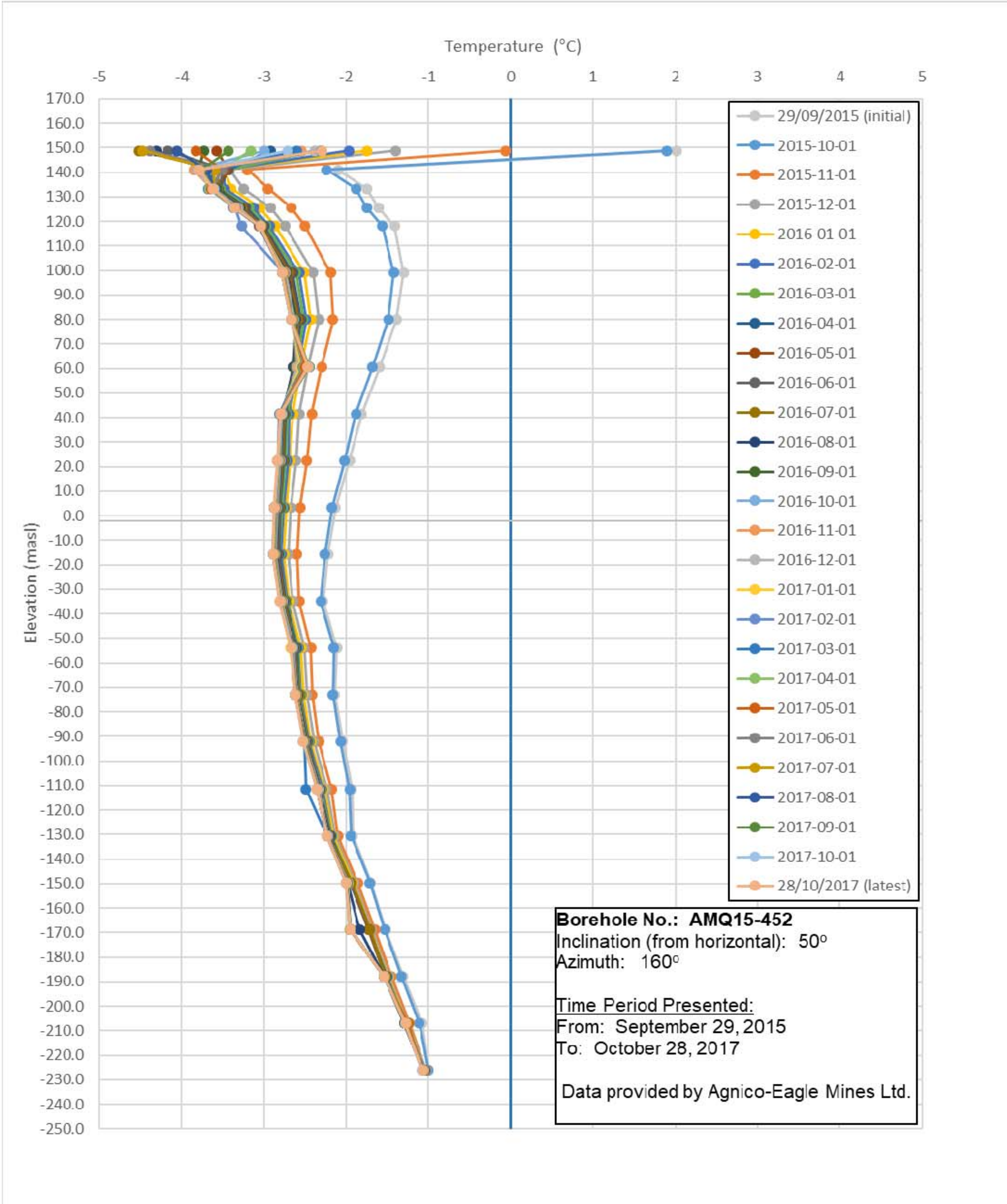
PROJECT
WHALE TAIL PIT PROJECT
POST CLOSURE PIT LAKE THERMAL ASSESSMENT
NUNAVUT

CONSULTANT
GOLDER

YYYY-MM-DD	2018-08-28
PREPARED	CTM
DESIGN	CTM
REVIEW	FJ
APPROVED	SO

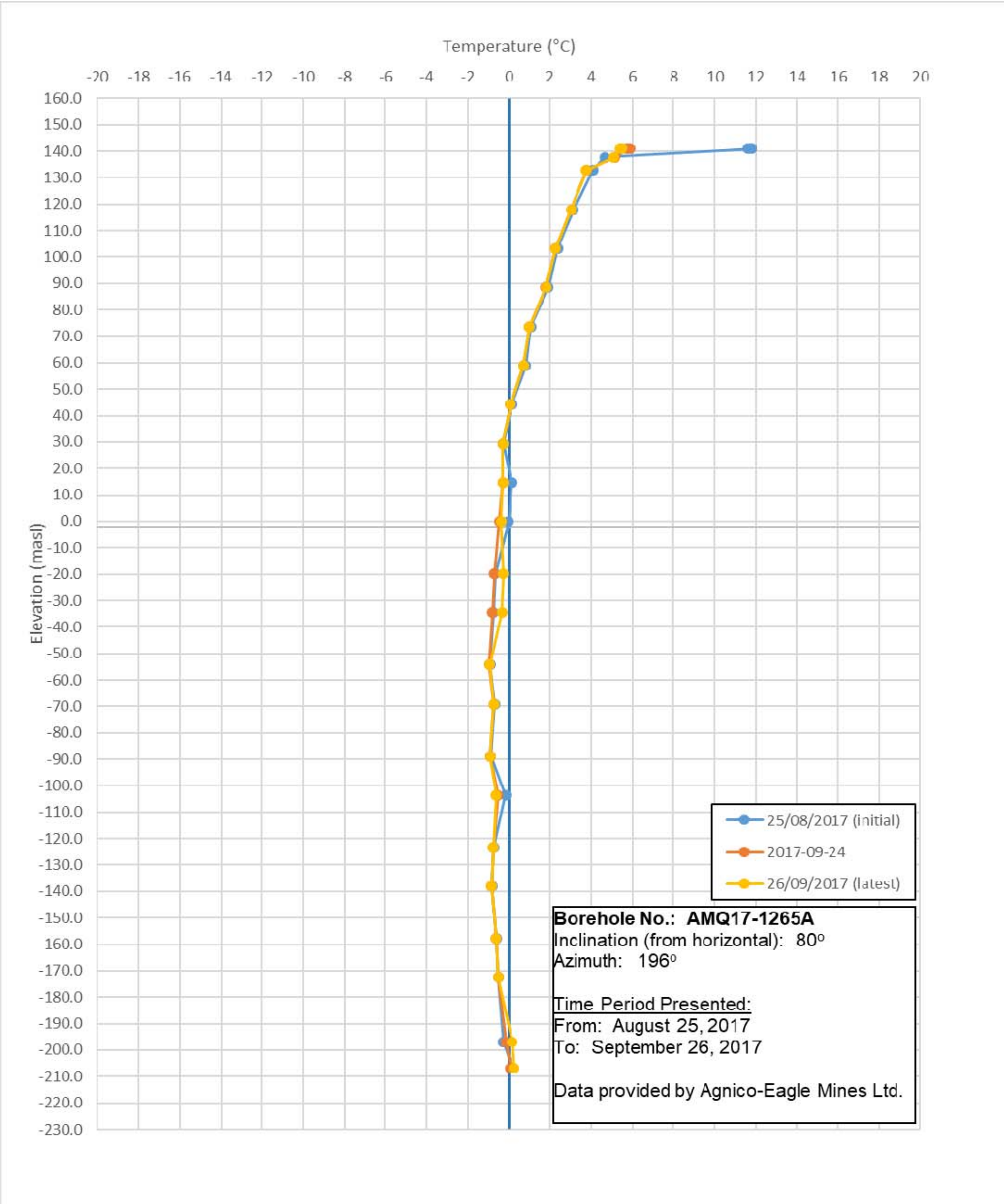
TITLE
THERMISTOR AMQ15-421 2015/2017 READINGS

PROJECT No.	PHASE/TASK	Rev.	FIGURE
1789310	**2000/22030**	**0**	**1-5**

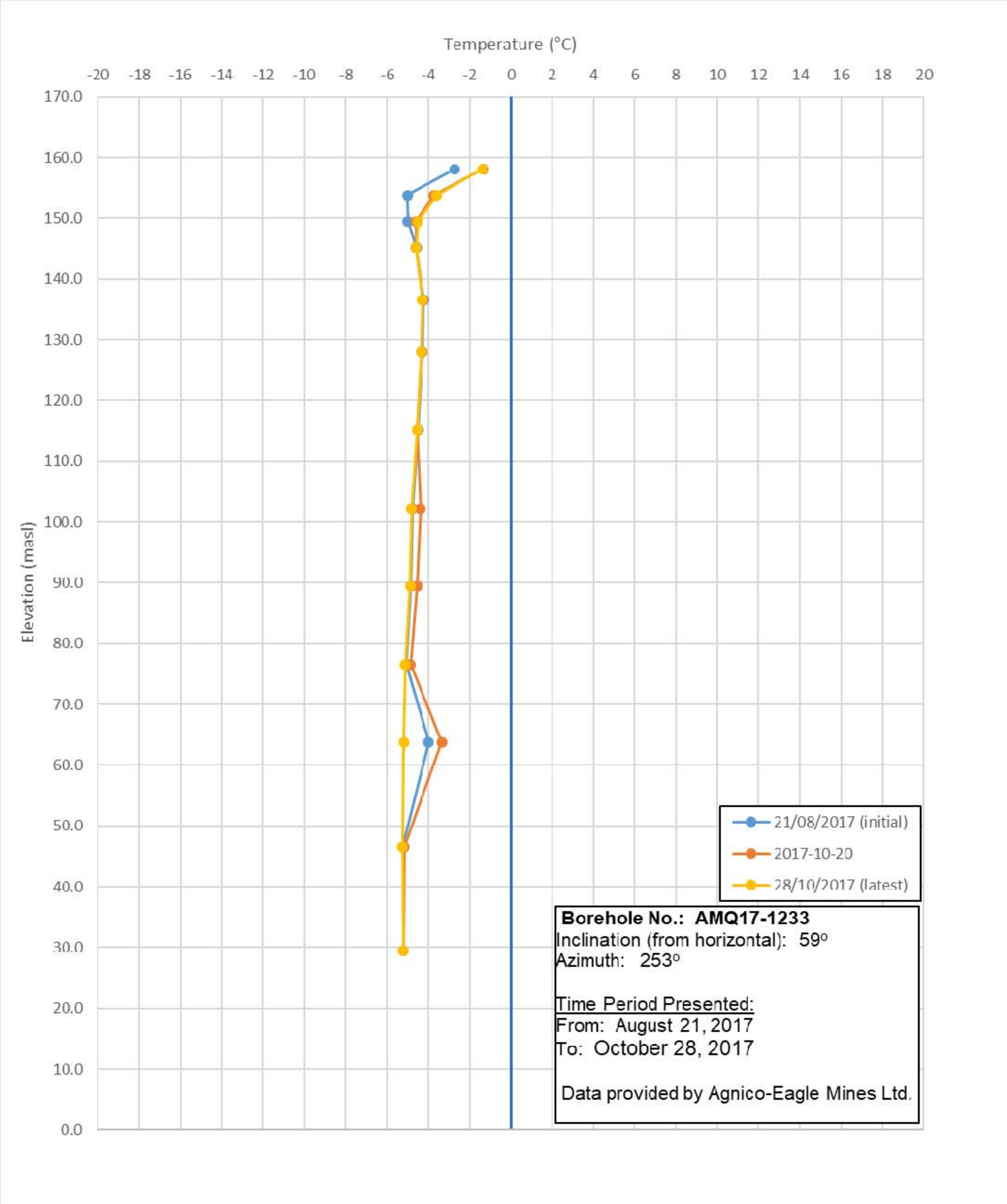


NOTE: Readings are shown once per month for clarity.

CLIENT AGNICO EAGLE MINES LIMITED		PROJECT WHALE TAIL PIT PROJECT POST CLOSURE PIT LAKE THERMAL ASSESSMENT NUNAVUT	
CONSULTANT	YYYY-MM-DD	2018-08-28	TITLE **THERMISTOR AMQ15-452 2015/2017 READINGS**
GOLDER	PREPARED	CTM	
	DESIGN	CTM	
	REVIEW	FJ	PROJECT No. **1789310** · PHASE/TASK **2000/22030** · Rev. **0** · FIGURE **1-6**
	APPROVED	SO	



CLIENT AGNICO EAGLE MINES LIMITED		PROJECT WHALE TAIL PIT PROJECT POST CLOSURE PIT LAKE THERMAL ASSESSMENT NUNAVUT	
CONSULTANT GOLDER	YYYY-MM-DD: 2018-08-28	TITLE **THERMISTOR AMQ17-1265A 2017 READINGS**	
	PREPARED: CTM		
	DESIGN: CTM		
	REVIEW: FJ	PROJECT No.: **1789310**	PHASE/TASK: **2000/22030**
	APPROVED: SO	Rev.: **0**	FIGURE: **1-7**



CLIENT
AGNICO EAGLE MINES LIMITED

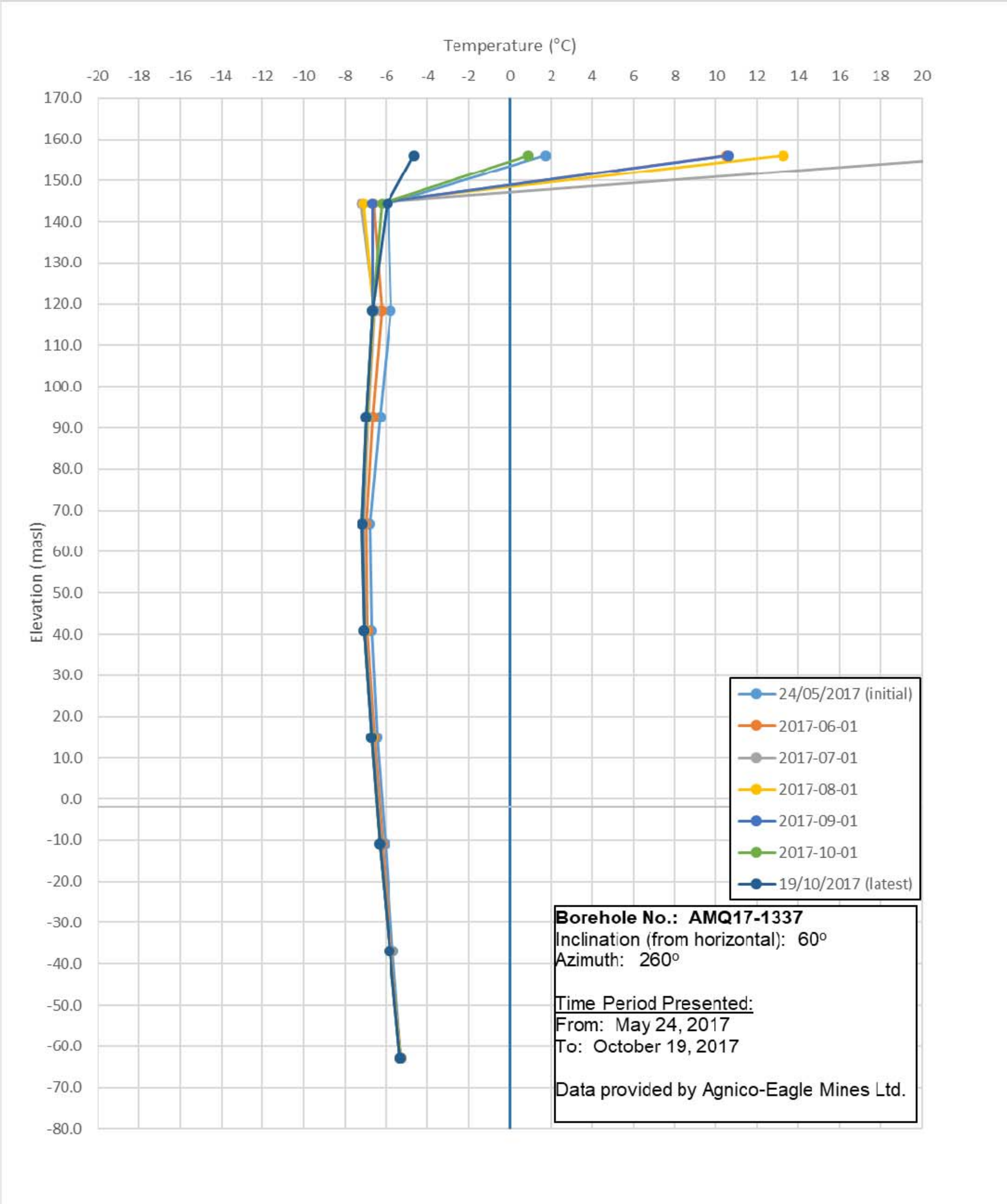
CONSULTANT
GOLDER

YYYY-MM-DD	2018-08-28
PREPARED	CTM
DESIGN	CTM
REVIEW	FJ
APPROVED	SO

PROJECT
WHALE TAIL PIT PROJECT
POST CLOSURE PIT LAKE THERMAL ASSESSMENT
NUNAVUT

TITLE
THERMISTOR AMQ17-1233 2017 READINGS

PROJECT No.	PHASE/TASK	Rev.	FIGURE
1789310	2000/22030	0	1-8

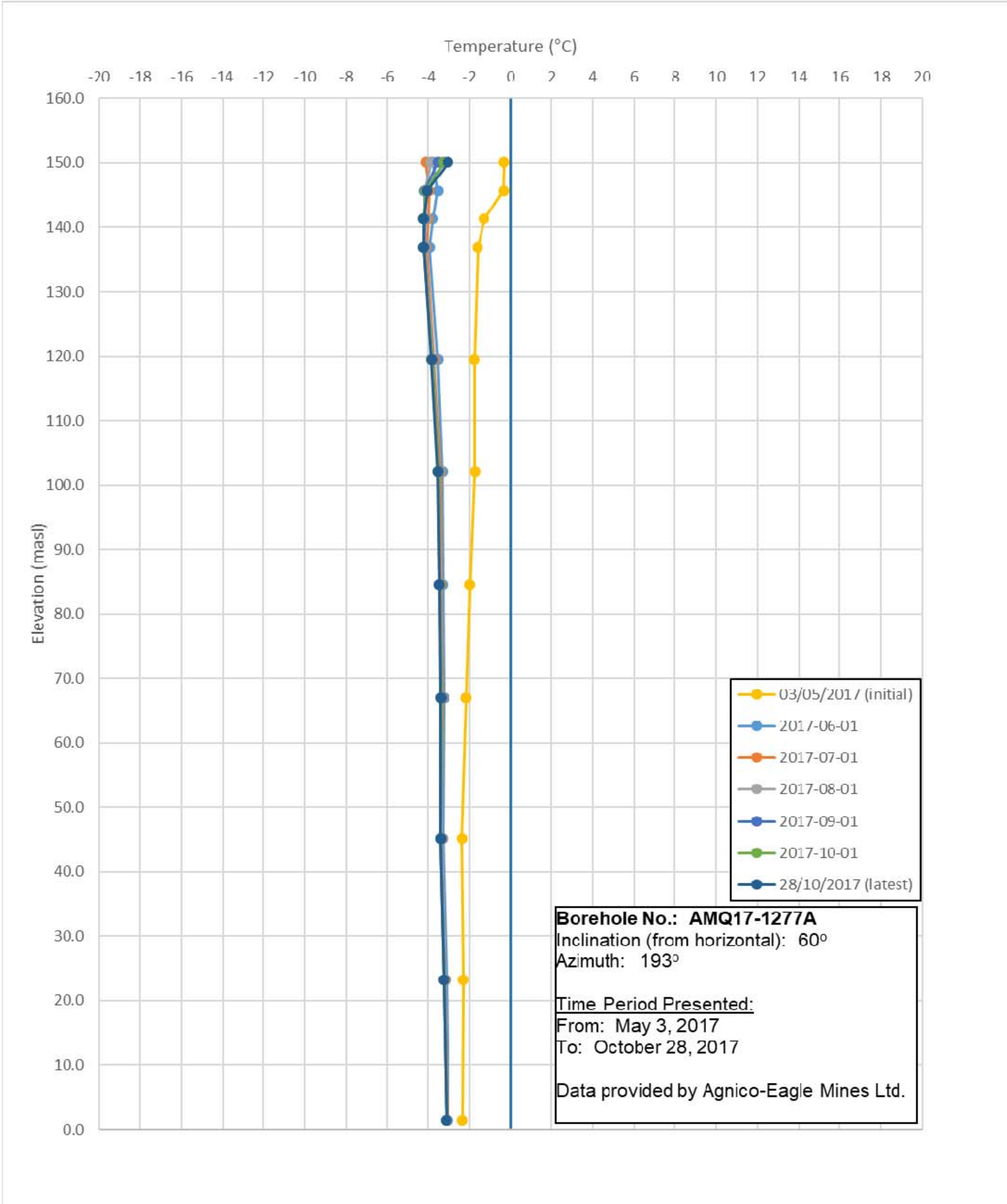


NOTE: Readings are shown once per month for clarity.

CLIENT AGNICO EAGLE MINES LIMITED	PROJECT WHALE TAIL PIT PROJECT POST CLOSURE PIT LAKE THERMAL ASSESSMENT NUNAVUT
CONSULTANT GOLDER	TITLE **THERMISTOR AMQ17-1337 2017 READINGS**

YYYY-MM-DD	2018-08-28
PREPARED	CTM
DESIGN	CTM
REVIEW	FJ
APPROVED	SO

PROJECT No.	PHASE/TASK	Rev.	FIGURE
1789310	**2000/22030**	**0**	**1-9**



NOTE: Readings are shown once per month for clarity.

CLIENT
AGNICO EAGLE MINES LIMITED

PROJECT
WHALE TAIL PIT PROJECT
POST CLOSURE PIT LAKE THERMAL ASSESSMENT
NUNAVUT

CONSULTANT
GOLDER

YYYY-MM-DD	2018-08-28
PREPARED	CTM
DESIGN	CTM
REVIEW	FJ
APPROVED	SO

TITLE
THERMISTOR AMQ17-1277A 2017 READINGS

PROJECT No.	PHASE/TASK	Rev.	FIGURE
1789310	2000/22030	0	1-10

ATTACHMENT 2

Thermal Model Results

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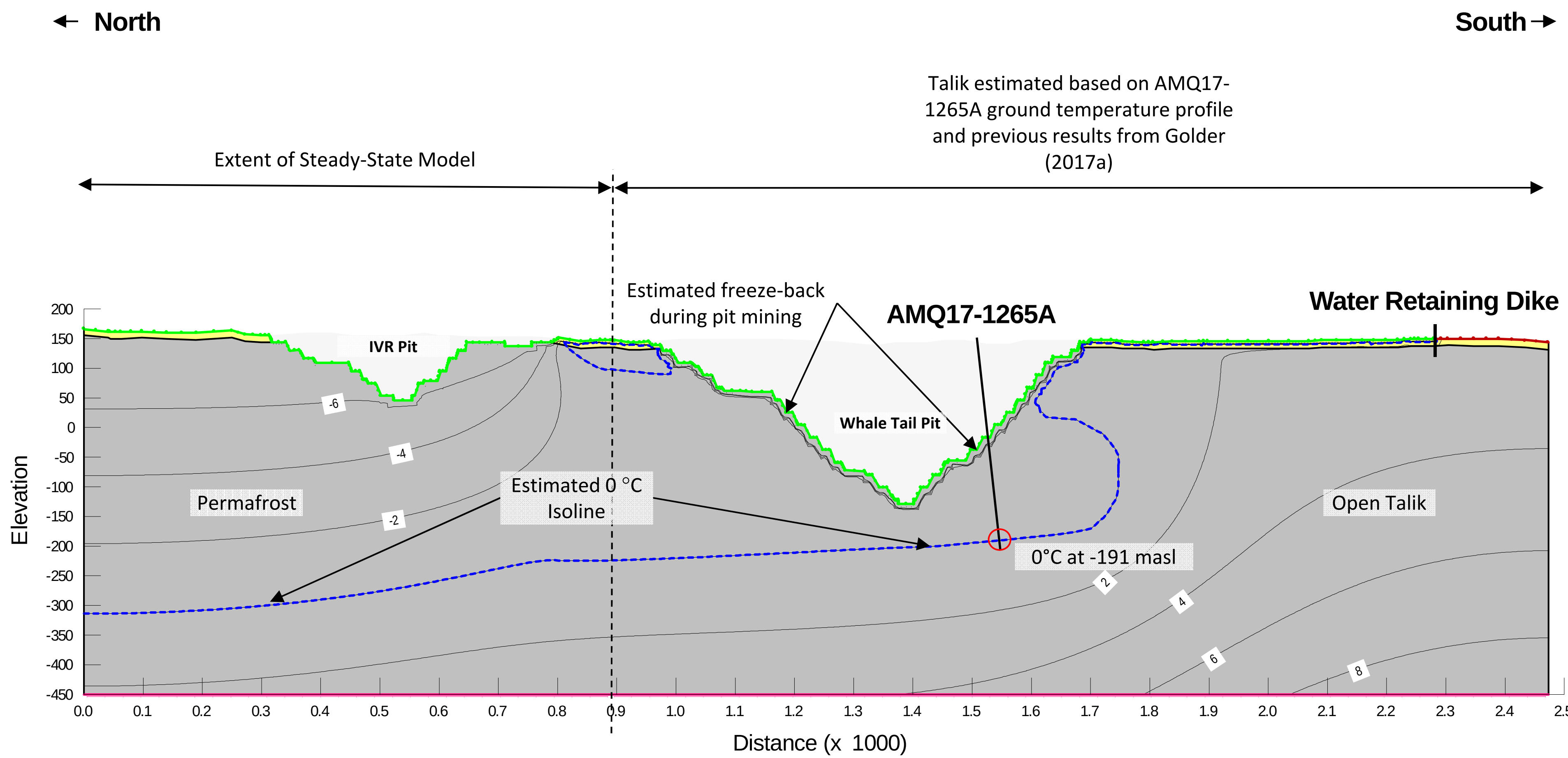

File Name: Section A_19FEB18_Operation

Notes

1. Location of thermistor AMQ17-1265A is approximate.
2. Temperature contour interval 2 °C.

CLIENT
AGNICO EAGLE MINES LIMITED

CONSULTANT
GOLDER

YYYY-MM-DD	2018-08-03
PREPARED	CTM
DESIGN	CTM
REVIEW	FJ
APPROVED	SO

PROJECT
WHALE TAIL PIT PROJECT
POST-CLOSURE PIT LAKE THERMAL ASSESSMENT
NUNAVUT

TITLE
TRANSIENT THERMAL MODELLING
ASSUMED INITIAL CONDITION
BEFORE PIT FLOODING

PROJECT No.	Phase./Task	Rev.	Figure
1789310	2000/22030	0	2-1

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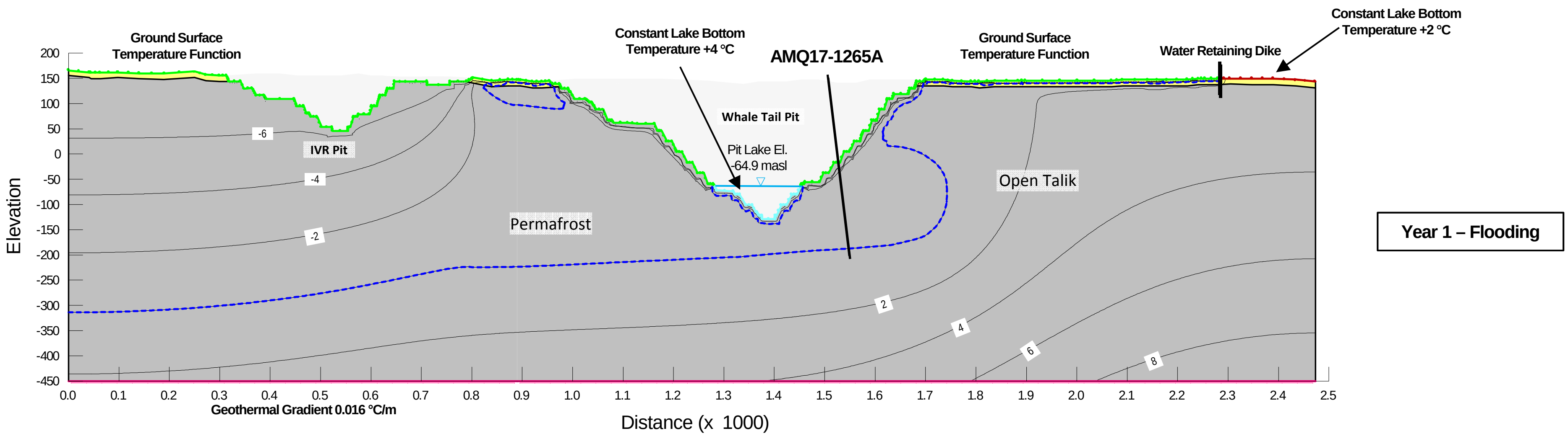
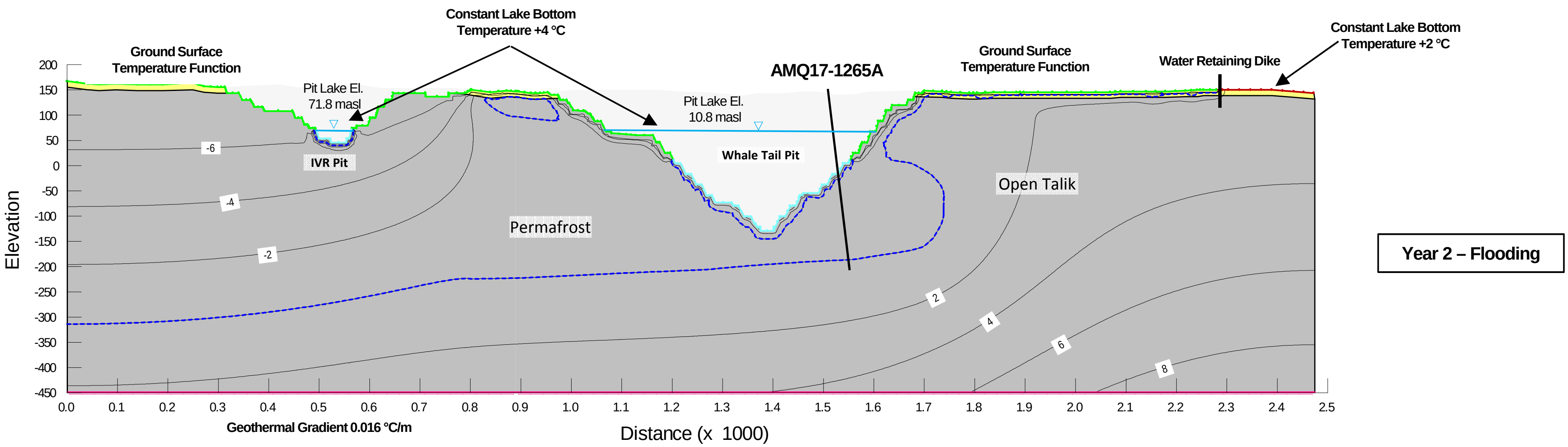




File Name: Section A_19FEB18_Operation

Notes

1. Location of thermistor AMQ17-1265A is approximate.
2. Temperature contour interval 2 °C.

CLIENT
AGNICO EAGLE MINES LIMITED

CONSULTANT
GOLDER

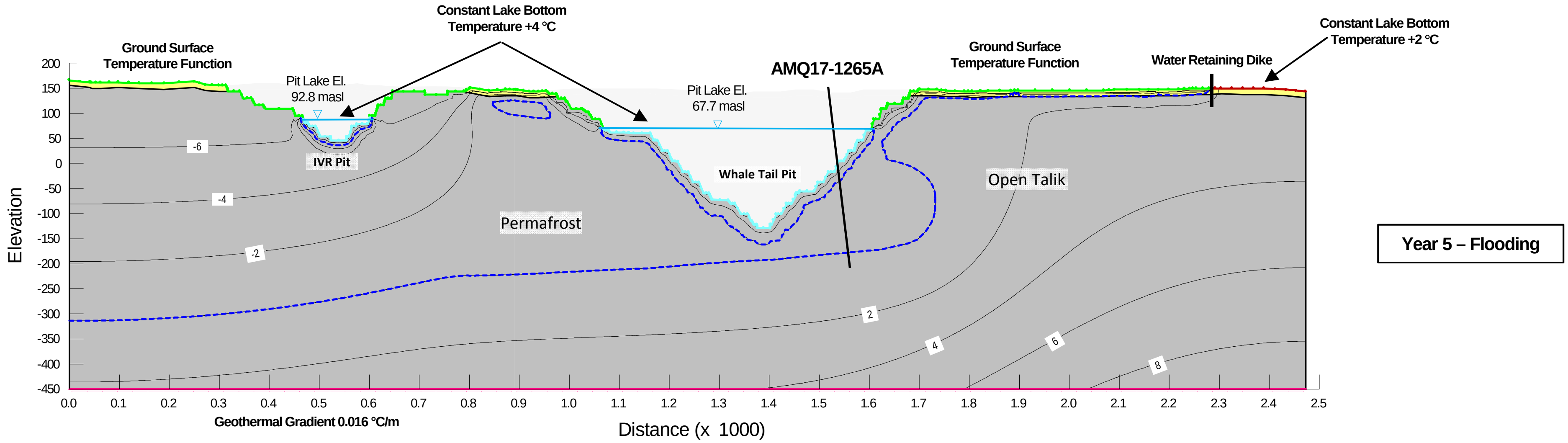
YYYY-MM-DD	2018-08-03
PREPARED	CTM
DESIGN	CTM
REVIEW	FJ
APPROVED	SO

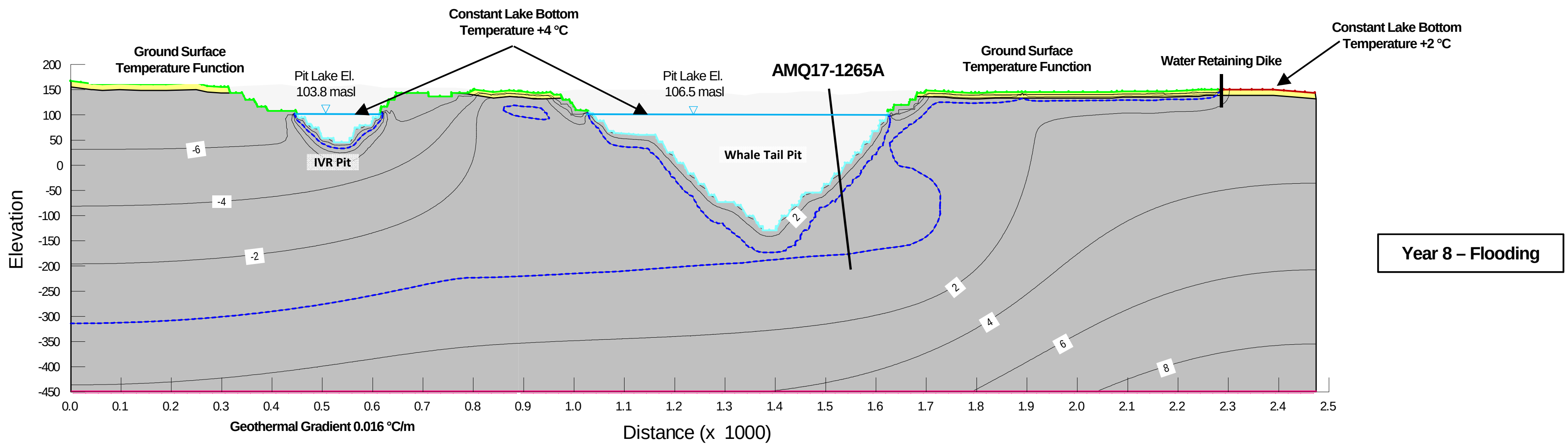
PROJECT
WHALE TAIL PIT PROJECT
POST-CLOSURE PIT LAKE THERMAL ASSESSMENT
NUNAVUT

TITLE
TRANSIENT THERMAL MODELLING
PIT FLOODING
YEARS 1 & 2

PROJECT No.	Phase./Task	Rev.	Figure
1789310	2000/22030	0	2-2

Path: O:\Active\2016\3 Proj\1665859 Agnico Eagle_Water Mgmt_Whale Tail\1789310_Thermal\Thermal Analysis





File Name: Section A_19FEB18_Operation

Notes

1. Location of thermistor AMQ17-1265A is approximate.
2. Temperature contour interval 2 °C.

CLIENT
AGNICO EAGLE MINES LIMITED

CONSULTANT
GOLDER

YYYY-MM-DD	2018-08-03
PREPARED	CTM
DESIGN	CTM
REVIEW	FJ
APPROVED	SO

PROJECT
WHALE TAIL PIT PROJECT
POST-CLOSURE PIT LAKE THERMAL ASSESSMENT
NUNAVUT

TITLE
TRANSIENT THERMAL MODELLING
PIT FLOODING
YEARS 5 & 8

PROJECT No.	Phase./Task	Rev.	Figure
1789310	2000/22030	0	2-3

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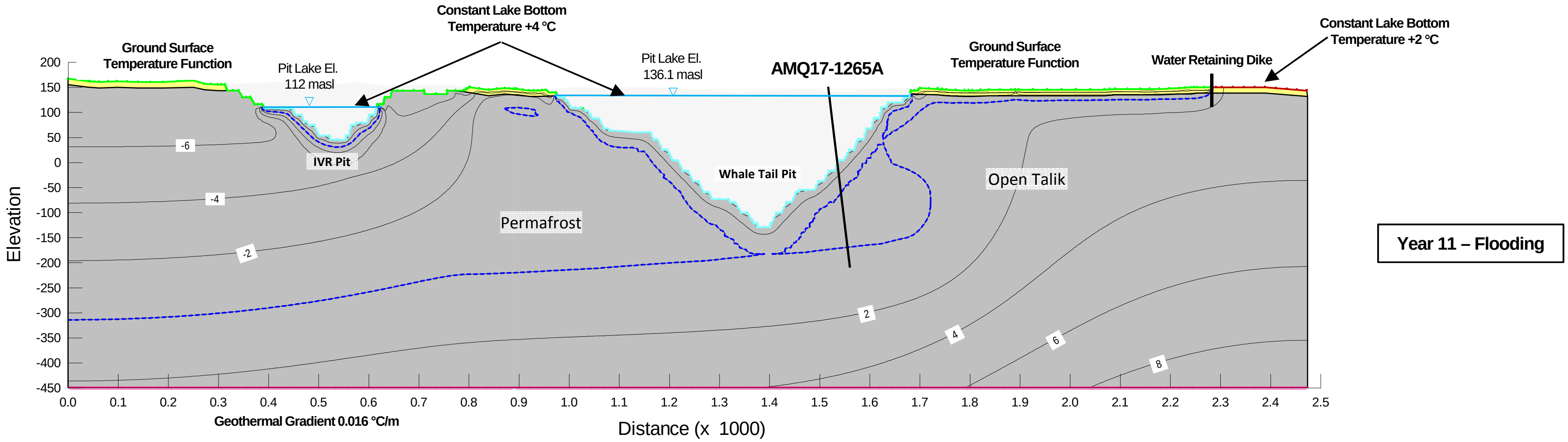
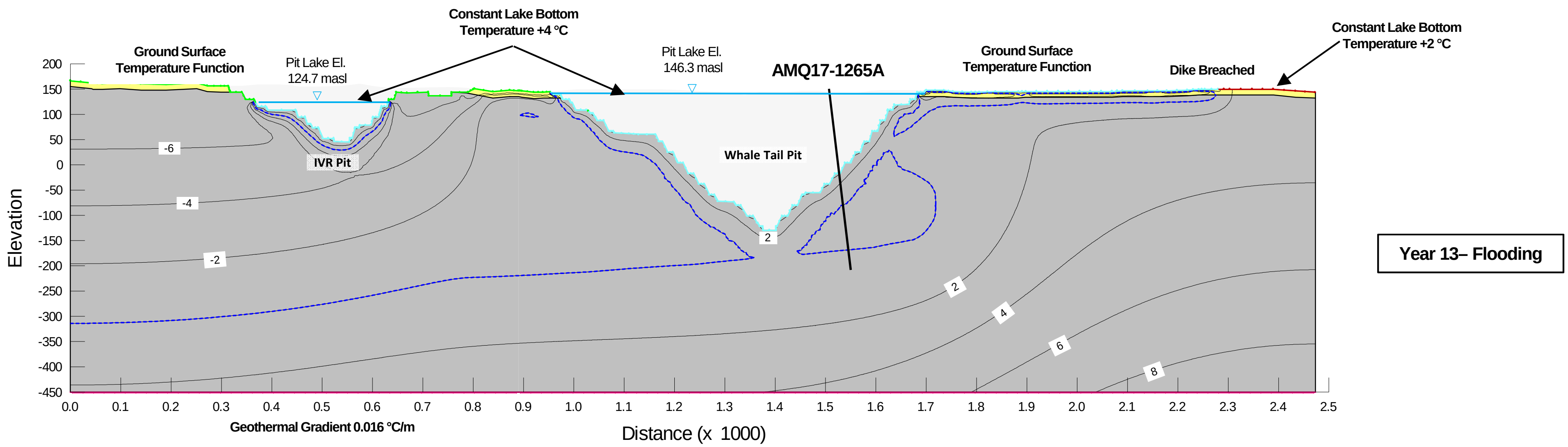




File Name: Section A_19FEB18_Operation

Notes

1. Location of thermistor AMQ17-1265A is approximate.
2. Temperature contour interval 2 °C.

CLIENT
AGNICO EAGLE MINES LIMITED

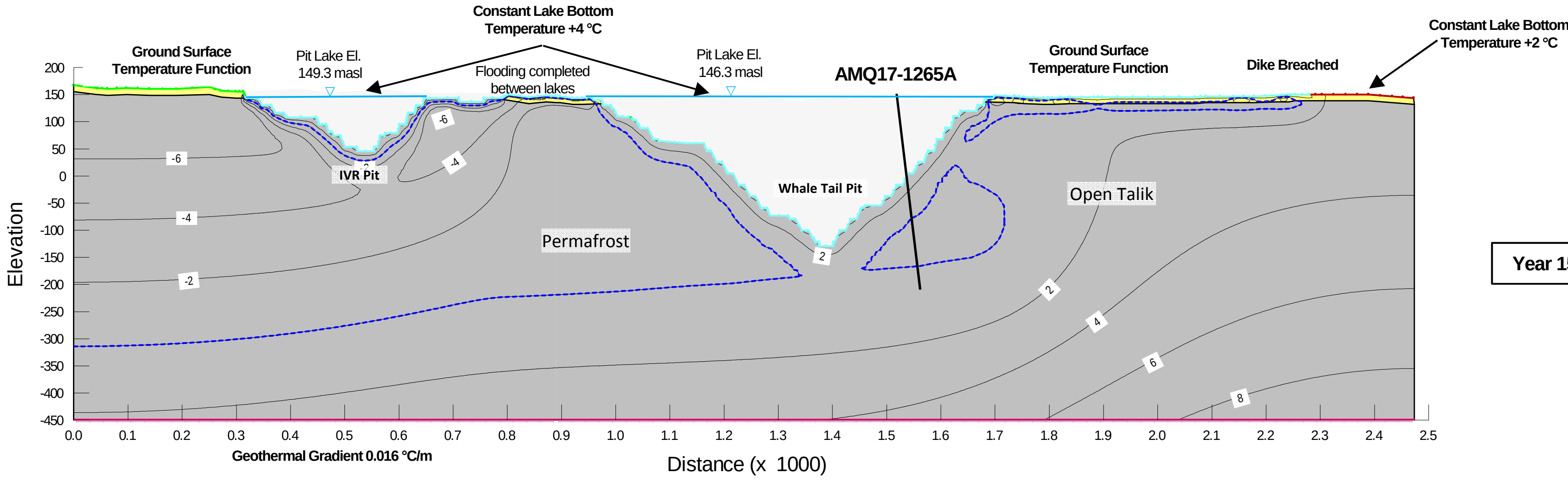
CONSULTANT
GOLDER

YYYY-MM-DD	2018-08-03
PREPARED	CTM
DESIGN	CTM
REVIEW	FJ
APPROVED	SO

PROJECT
WHALE TAIL PIT PROJECT
POST-CLOSURE PIT LAKE THERMAL ASSESSMENT
NUNAVUT

TITLE
TRANSIENT THERMAL MODELLING
PIT FLOODING
YEARS 11 & 13

PROJECT No.	Phase./Task	Rev.	Figure
1789310	2000/22030	0	2-4



Year 15 – Flooding

File Name: Section A_19FEB18_Operation

Notes

1. Location of thermistor AMQ17-1265A is approximate.
2. Temperature contour interval 2 °C.

CLIENT	AGNICO EAGLE MINES LIMITED
PROJECT	WHALE TAIL PIT PROJECT POST-CLOSURE PIT LAKE THERMAL ASSESSMENT NUNAVUT
CONSULTANT	GOLDER
YYYY-MM-DD	2018-08-03
PREPARED	CTM
DESIGN	CTM
REVIEW	FJ
APPROVED	SO
TITLE	**TRANSIENT THERMAL MODELLING PIT FLOODING YEAR 15**
PROJECT No.	1789310
Phase./Task	2000/22030
Rev.	0
Figure	2-5

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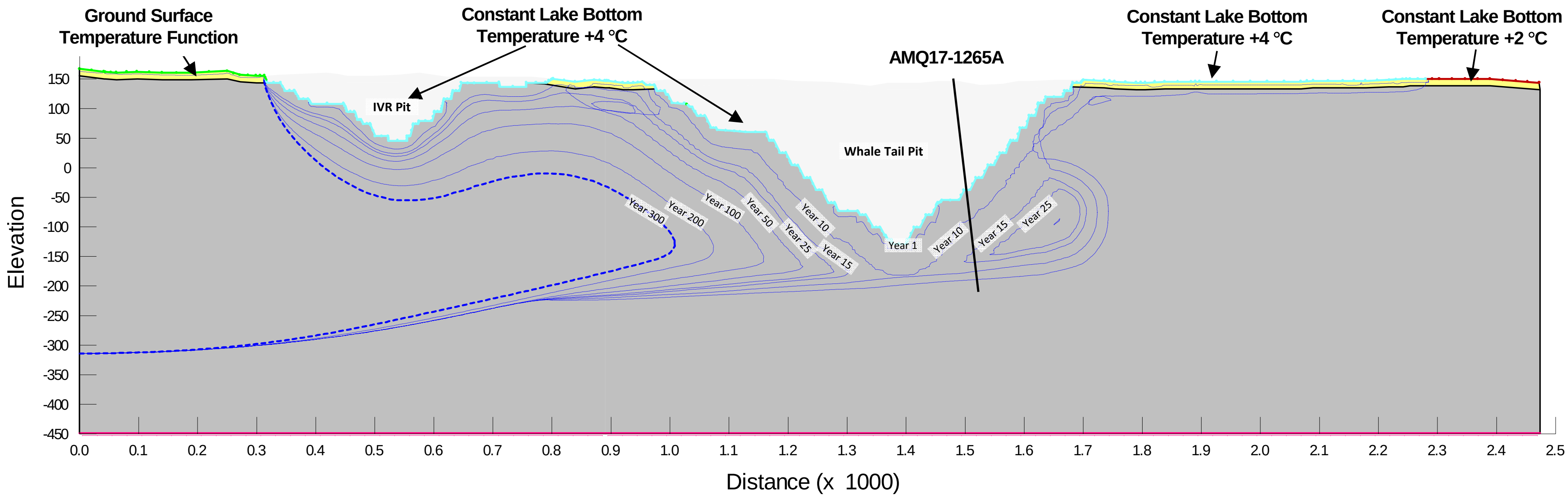
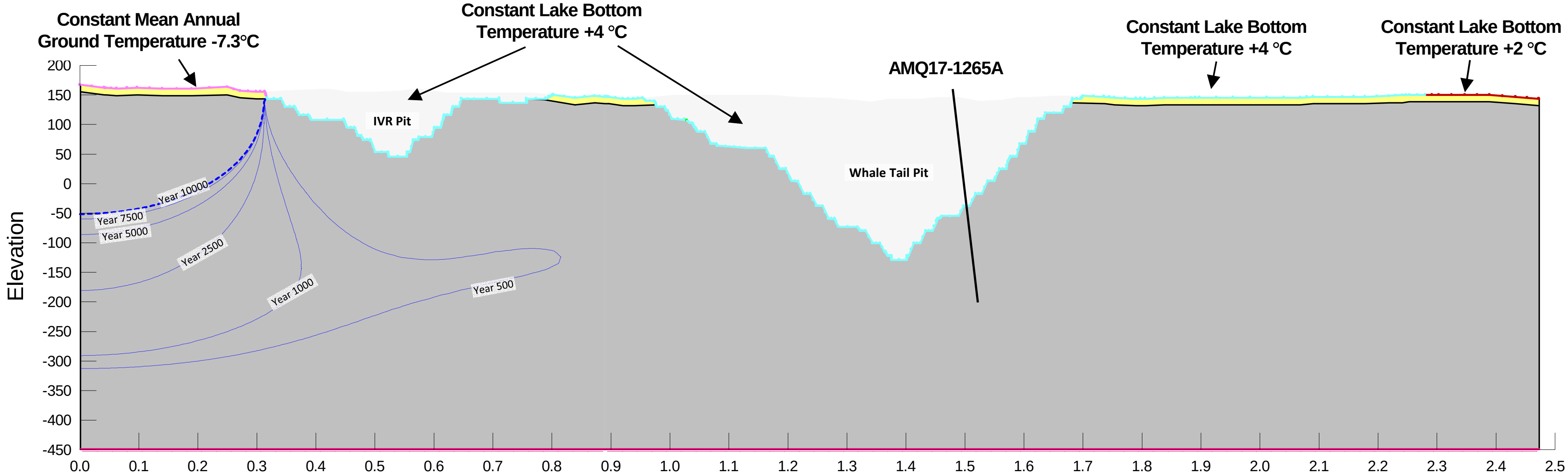




File Name: Section A_12JAN17 Long Term 1

Notes

1. Location of thermistor AMQ17-1265A is approximate.
2. Isotherms include the 15 years of back-flooding.

CLIENT
AGNICO EAGLE MINES LIMITED

CONSULTANT
GOLDER

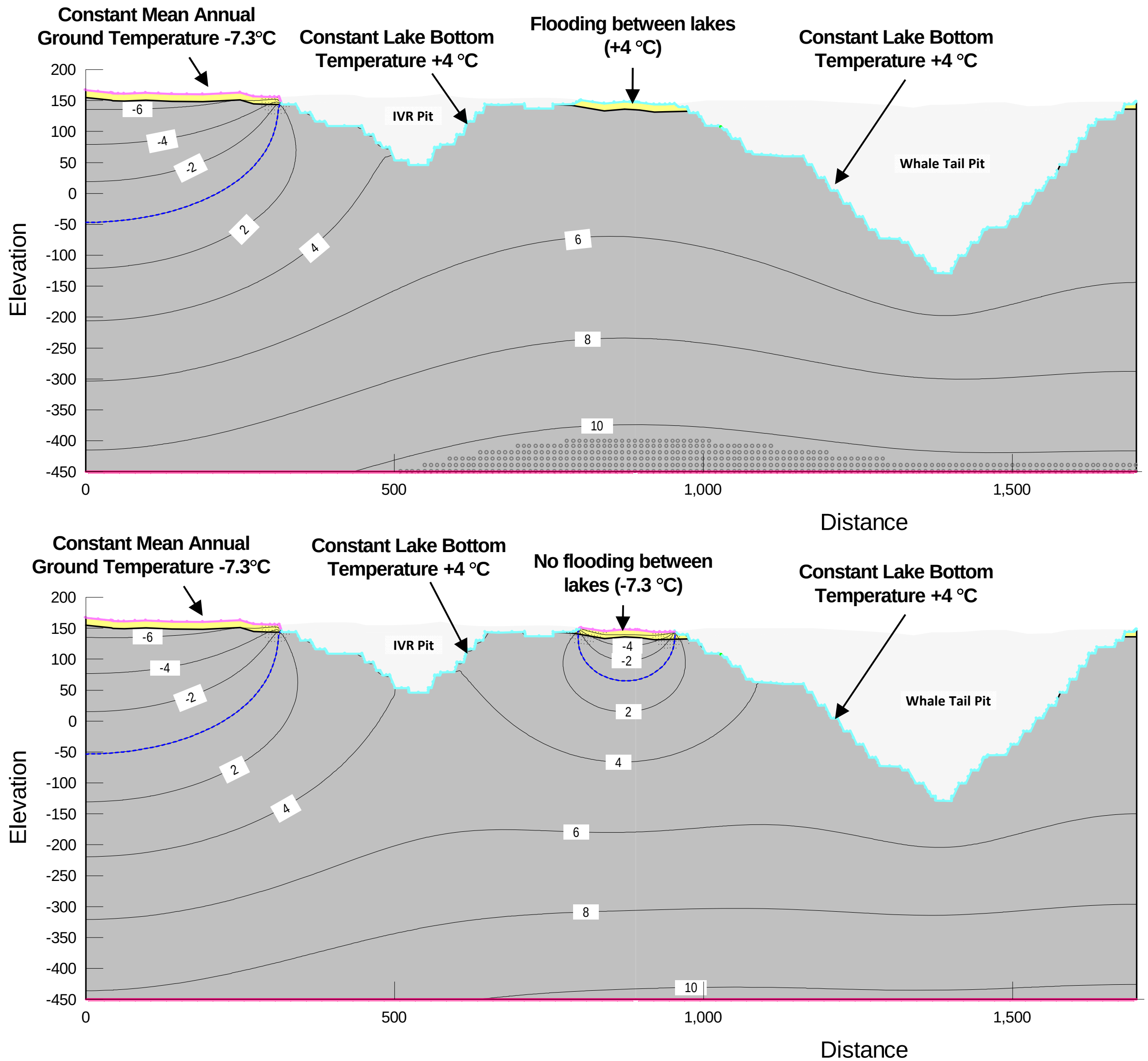
YYYY-MM-DD	2018-08-03
PREPARED	CTM
DESIGN	CTM
REVIEW	FJ
APPROVED	SO

PROJECT
WHALE TAIL PIT PROJECT
POST-CLOSURE PIT LAKE THERMAL ASSESSMENT
NUNAVUT

TITLE
TRANSIENT THERMAL MODELLING
POST-CLOSURE PIT LAKE
ZERO DEGREE ISOTHERMS AT SELECT YEARS

PROJECT No.	Phase./Task	Rev.	Figure
1789310	2000/22030	0	2-6

Path: O:\Active\2016\3 Proj\1665859 Agnico Eagle_Water Mgmt_Whale Tail\1789310_Thermal\Thermal Analysis



File Name: Section A_12JAN17 Long Term 1

Notes

1. Location of thermistor AMQ17-1265A is approximate.
2. Isotherms include the 15 years of back-flooding.

CLIENT	AGNICO EAGLE MINES LIMITED	PROJECT	WHALE TAIL PIT PROJECT POST-CLOSURE PIT LAKE THERMAL ASSESSMENT NUNAVUT
CONSULTANT	GOLDER	YYYY-MM-DD	2018-08-03
		PREPARED	CTM
		DESIGN	CTM
		REVIEW	FJ
		APPROVED	SO

TITLE
STEADY STATE THERMAL MODELLING
POST-CLOSURE PIT LAKES

PROJECT No.	Phase./Task	Rev.	Figure
1789310	2000/22030	0	2-7