Appendix 7

Meadowbank and Whale Tail 2018 Annual Geotechnical Inspection

REPORT

2018 Annual Geotechnical Inspection

Meadowbank Gold Mine, Nunavut

Submitted to:

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18101627-1583-R-Rev0

March 2019

Distribution List

1 electronic copy + 2 hard copies: Agnico-Eagle Mines Limited

1 copy: Golder Associates Ltd.

Executive Summary

Agnico-Eagle Mines Limited (AEM) mandated Golder Associés Ltée (Golder) to conduct the 2018 geotechnical inspection of the Meadowbank Complex to comply with the requirements of AEM's Water Licence Permit. The inspection was conducted from 27 August to 3 September 2018 and covered the geotechnical aspects and the review of the available instrumentation data for the dewatering dikes, the tailings storage facility (TSF) structures, the structures along the All-Weather Private Road (AWPR) located between the mine site and the town of Baker Lake, as well as Amaruq Road, the bulk fuel storage facility at the mine site, at the Amaruq site and at Baker Lake, as well as other site facilities such as site roads, the landfill, the landfarm, the Stormwater Management Pond, the RSF till plug, the diffusers, the erosion and sediment protection structure, and the airstrip.

At the time of the inspection, and based on the instrumentation data, the condition of the dewatering dikes appears stable. It is recommended to flag the piezometers that recorded data below 0°C in the past at East Dike and Bay-Goose Dike and be very careful when interpreting their data, as they might be broken. Once a piezometer has frozen, it cannot be totally relied upon even if it thaws.

It is recommended that the ultramafic waste rock stockpile continue to be kept at a distance from the downstream toe of South Camp Dike to allow for good visual observation of the downstream toe area. No geotechnical concerns were identified on Vault Dike.

The settlement and tension cracks observed in 2013 and 2014 on the upstream side within the thermal cap of Bay-Goose Dike were still visible but seem no longer active. The water pond at the downstream toe and the seepage downstream of Bay-Goose Dike and into Bay-Goose Pit should continue to be monitored. North Channel, Channel 1, and Channel 3 should be carefully monitored as the instrumentation or field observations seem to indicate that seepage could be occurring at these locations but is directly reported to the Pits instead of the downstream toe of the dike. Monitoring of the impact of Portage Pit mining on the performance of Bay-Goose Dike is underway as the North Channel piezometers react to E5 mining activity. The seepage from Central Channel should continue to be monitored.

At the time of the inspection and based on the instrumentation data, the TSF structures were generally in good condition. The tailings beach was adequate against the whole length of the structures, except on the downstream side of Stormwater Dike, the divider dike between the two cells of the facility. Having direct ponding water within Stormwater Dike foundation is geotechnically acceptable. For South Cell closure and environmental aspects, given that it is inferred that the SWD foundation presents some open windows of exposed fractured bedrock that may contribute to feeding the seepage at Central Dike, it is recommended that a beach be put in place along the SWD downstream slope to seal the foundation. AEM is closely monitoring the formation of a tailings beach against the peripheral structure of the TSF. Water was observed on the downstream side of Saddle Dam 2 ponding within the rockfill embankment, similar to the last three years, but the thermistor indicates that the foundation and upstream toe remain frozen.

In April 2018, several new tension cracks associated with movement were observed on the crest of Stormwater Dike between Sta. 10+740 and 11+000 approximatively. Cracks appear to be oblique tension fractures, extending over the entire width of the dike crest. Some cracks were up to 5 cm wide and most of them did not progress after they were first observed, with only a few new cracks in May 2018 before apparent movement stopped. The area affected by these cracks is consistent with the limits of the South Cell water ponding against Stormwater Dike,

which probably thawed the frozen soft soil foundation, similarly to the mechanism observed over the previous years. The cracks have been filled with bentonite. Given the deep intrusion of rockfill particles into the soft sediment observed during the 2016 investigation, a foundation failure was demonstrated, by use of stability analysis, unlikely. In the meantime, it is recommended to continue monitoring potential movement on Stormwater Dike and follow the emergency response plan if the situation deteriorates.

A water pond is accumulated on the downstream side of the Central Dike. This pond is fed by an underground seepage that is connected to some extend to the South Cell. During the inspection, water was observed ponding at the downstream toe of the dike between approximately Sta. 0+300 and the southern access road at Sta. 0+830. The water had an orange coloration with high turbidity, and AEM reported that this associated with rapid temperature variations were observed during most of the open water season in 2017 and 2018. This event, investigated by AEM, has been attributed to precipitation of iron oxide from bacterial processes. It is considered that the best mitigation measure to decrease the seepage rates and the stability risk is to focus on decreasing the hydraulic gradient of water beneath the dike foundation. The recommendation was to decrease the hydraulic head by lowering the water elevation within the TSF South Cell, deposit tailings over the entire basin floor to provide blankets over suspected seepage entry points, and direct the pond's maximum head of water to an area providing better control above the bedrock surface, where the maximum anticipated lakebed sediment and till thickness are present. The design basis of Central Dike has been thus amended: it does not serve to promote deposition of tailings in front of a containment structure only anymore, but rather also to provide blankets over suspected seepage entry points such as exposed bedrock surface along shoreline or beneath Stormwater Dike foundation. During the fall of 2017, the water level of the reclaim pond was temporarily lowered to reduce the hydraulic pressure on the seepage, and tailings deposition was done along Saddle 4 toward Saddle Dam 5. This strategy has been successful in reducing the seepage rate. At the time of the inspection, an average flow of approximately 263 m^3/hr was pumped back to the South Cell to maintain the downstream pond at El. 115 m.

No geotechnical issues were identified with the culverts along the AWPR. It is recommended to pay particular attention to culverts R-00A (2+550), PC-14 (4+260), the unnamed culvert at 5+700, and PC-16 (54+950). If insufficient capacity to handle the flows is observed at freshet, then it is recommended to clear the obstructions or repair the culverts. It is also recommended to monitor the progression of the erosion of culverts at freshet at PC-17A (8+830), PC-11 (39+552), R14 (67+840), R18-B (82+500), R-20 (85+490), R-23 (93+600) and R24 (98+100) as there are signs that water is flowing beneath the road at these locations. If the erosion condition continues to deteriorate at these culverts, it is recommended to repair them. The bridges along the AWPR were in good geotechnical condition. Signs of settlement were observed at Bridge 6, R15. The bridge was dipping toward the western side on both abutments. The bridge foundation did not show any signs of adverse conditions. No remediation work is recommended for the moment, but the situation should be monitored.

No geotechnical issues were identified with the culverts along Amaruq Road. It is recommended to pay particular attention to culverts #7 (2+013), #13 (4+615), two outlets of the set of culverts #47 (11+101 to 11+107), #61 (1+050), #63 (13+390), #83 (20+300), #86 (20+740), #97 (22+436), #98 (22+482), #111 (26+461), #117 (27+173), #278 (61+870). If insufficient capacity to handle the flows is observed at freshet, then it is recommended to clear the obstructions or repair the culverts. It is also recommended to monitor the progression of the erosion of culverts at freshet at culverts #167 (41+843) and #232 (53+928) as there are signs that water is flowing beneath the road at this location. Culvert erosion should be monitored at freshet. The bridges along Amaruq Road were in good geotechnical condition.

It has been observed that most quarries along the AWPR have been cleaned since 2015, although some walls need scaling if operations resume in those quarries. The presence of unstable blocks and loose rocks along steep walls was still observed in Quarries 3, 7, 9, 10, 16 and 23. It is recommended that workers be cautious in these quarries and be made aware of the potential hazards.

At the time of the inspection, all of the quarries and eskers along Amaruq Road were dry, except Esker #2 and Esker #5. Unstable loose rocks along steep walls and unstable soil slopes were observed in all eskers and quarries, except Esker #5. It is recommended that workers be cautious in these locations and are aware of the potential rockfall hazard or soil slope failure.

No geotechnical issues were observed with the Meadowbank Vault fuel tank and the Amaruq fuel tank farm. Water was observed ponding in several areas at the Baker Lake fuel tank farm and at the Meadowbank Main Camp fuel tank. Ongoing removal of fluids that accumulated within the secondary containment facilities should be managed to minimize the amount of water in contact with the tank bases. At the Baker Lake fuel tank farm, the granular fill protecting the geomembrane was eroded, thus exposing the geomembrane all along the south side of Tanks 3 and 4 and on the west side of Tank 1. A fold in the geomembrane was observed at the northwestern corner of Tank 2 and the northeastern corner of Tank 4. It is recommended to cover the exposed area with geotextile and fill material to re-establish the liner protection. Liner is exposed on the northern side of Tank 5. As this condition appears above the elevation of the southern berm, it is considered that the protection of the liner with granular material is not as important as in other areas; however, it remains a good practice and provides protection against animal damage. A hole in the exposed geomembrane was also observed at Baker Lake on the south southwestern corner of Tank 3 at the toe of the slope. The hole in the geomembrane should be repaired to ensure a good performance of the retention basin and to cover the exposed area with geotextile and fill material to re-establish the liner protection. Animal burrows were observed at Baker Lake near the southern corner of Tank 2. It is recommended to assess whether the geosynthetics have been damaged.

The geomembrane remains uncovered around the tanks of the twenty Jet A fuel tanks at Baker Lake. The bituminous geomembrane is damaged by the Jet A fuel (melting). It is recommended to remain vigilant during the freshet and throughout the year to manage water accumulated within the confined area. If the melting of bituminous continues to occur, the seepage barrier may be threatened in a way that contaminated water will seep to the environment.

It is recommended to monitor at freshet the performance of the five culverts installed on Vault Road. One set of two culverts is installed between the NP1 and NP2 lakes close to the Meadowbank site, and these culverts have been repaired since last year. Another set of three culverts is installed further on the road towards Vault Pit, and all three culverts are partially collapsed in the middle.

The Western and Eastern diversion ditches and their sediment control elements were in good conditions. It is important to inspect them during the next freshet season.

The diffuser at Wally Lake (Vault) is functioning normally. No geotechnical concerns were identified with the diffusers, landfill, Stormwater Management Pond, nor the airstrip. The landfarm lies over a natural steep slope covered by rockfill, which is considered at risk for high deformation to slope failure. The risk will increase as the water level in the South Cell raises. Signs of superficial slope failure were observed during the inspection near the edges of the landfarm berm along the South Cell. It is recommended to watch out for signs of instability and be prepared to close off the area if need be. Workers who access the area should be informed of the potential risk and be trained to recognize signs of instability.

Study Limitations

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Table of Contents

TABLES

TABLES (following text)

FIGURES

FIGURES (following text)

APPENDICES

APPENDIX A

APPENDIX A 1

APPENDIX A 2

South Camp Dike Photographic Log and Record of Inspection

APPENDIX A 3

Bay-Goose Dike Photographic Log and Record of Inspection

APPENDIX A 4

Vault Dike Photographic Log and Record of Inspection

APPENDIX B

Tailings Storage Facility

APPENDIX B 1

Tailings Facility Photographic Log

APPENDIX B 2

Saddle Dam 1 Photographic Log and Record of Inspection

APPENDIX B 3

Saddle Dam 2 Photographic Log and Record of Inspection

APPENDIX B 4

Stormwater Dike Photographic Log and Record of Inspection

APPENDIX B 5

Saddle Dam 3 Photographic Log and Record of Inspection

APPENDIX B6

Saddle Dam 4 Photographic Log and Record of Inspection

APPENDIX B7

Saddle Dam 4 Photographic Log and Record of Inspection

APPENDIX C

Geotechnical Instrumentation Data

APPENDIX C1

Dewatering Dikes Instrumentation Data

APPENDIX C2

TSF South Cell Instrumentation Data

APPENDIX G 3

Vault Tank Farm Photographic Log

APPENDIX G4

Amaruq Tank Farm Photographic Log

APPENDIX H

Other Facilities

APPENDIX H1

Vault Road Culverts Photographic Log

APPENDIX H2

Diversion Ditch and its Erosion and Sediment Protection Structure Photographic Log

APPENDIX H3

RSF Till Plug Photographic Log

APPENDIX H4

Diffusers Photographic Log

APPENDIX H5

Landfill Photographic Log

APPENDIX H6

Contaminated Soil Storage and Bioremedial Landfarm Facility Photographic Log

APPENDIX H7

Stormwater Pond Photographic Log

APPENDIX H8

Airstrip Photographic Log

1.0 INTRODUCTION

Agnico-Eagle Mines Limited's (AEM) Meadowbank Complex mandated Golder Associés Ltée (Golder) to conduct the 2018 annual geotechnical inspection, pursuant to the requirement of Type A Water Licence Permit No. 2AM-MEA0815 for the Meadowbank Complex, Nunavut.

Under Part I, Item 12 (pages 23 and 24), AEM is required to undertake an annual geotechnical inspection of its facilities between the months of July and September. The following structures were covered by the inspection:

- Dewatering dikes (East Dike, South Camp Dike, Bay-Goose Dike and Vault Dike);
- Tailings storage facilities (Stormwater Dike, Saddle Dam 1, Saddle Dam 2, Saddle Dam 3, Saddle Dam 4, Saddle Dam 5, Central Dike and the North Cell Internal Structure);
- South Cell pond and North Cell pond (reclaim ponds);
- Geotechnical instrumentation;
- All-Weather Private Access Road (AWPR), Amaruq Road and site roads (in particular culverts and bridges at water crossings);
- Quarries on site and along the AWPR and Amaruq Road;
- Landfill and contaminated soil storage and bioremedial landfarm facility;
- Bulk fuel storage facilities at the mine site, at the Amaruq site and in Baker Lake;
- Shoreline protection and diffusers;
- Sediment and erosion control structures;
- Other structures: sumps, airstrip, RSF till plug, Stormwater pond, diversion ditch.

The 2018 geotechnical inspection was conducted from 27 August to 3 September 2018 by Yves Boulianne, a professional geotechnical engineer from Golder. During the inspection, the weather was overcast to sunny with daily temperatures varying between 5°C and 15°C. The inspection was scheduled at the time of year when the seasonal depth of thaw (active layer) is expected at, or near its maximum. Surface water flow is generally low to moderate at this time of year. Peak water flows typically occur during the spring thaw (mid-June through mid-July).

This report describes the geotechnical aspects of the areas inspected and presents general observations and recommendations.

Figure 1 shows the main mine site area. At the time of the inspection, Central Dike and Saddle Dam 3 had been completed at El. 145 m, the North Cell Internal Structure was recently completed, and tailings deposition was ongoing in the North Cell of the Tailings storage facility from the north portion of the internal structure.

1.1 Scope Limitations

The scope of the inspection is limited to the geotechnical aspects of each of the facilities listed in Section 1.0 above. The inspection did not include other assessments such as structural, mechanical or environmental. For additional information related to the limitations of this scope, reference should be made to the Study Limitations provided at the beginning of this report.

2.0 PRIORITY LEVEL DEFINITIONS FOR RECOMMENDATIONS

In this report, each recommendation is assigned a priority level. The ranking system is used to help AEM determine the priorities of the recommendations. The priority levels and descriptions are based on those in the Health, Safety, and Reclamation Code for Mines in British Columbia (Ministry of Energy and Mines, 2017) and the associated Guidance Document.

The priority levels and descriptions presented in Table 1 are used in this document. It is recommended that the status of each recommendation be reported on in the next geotechnical safety system inspection for a follow-up and/or closeout, as appropriate. The recommendations are presented in each section below and summarized in Table 5 in the conclusion section. The term “structure” refers to any kind of geotechnical structure assessed during the geotechnical inspection, including dams, storage facilities, roads, bridges, and others.

Table 1: Priority Levels and Descriptions

Priority Level	Description
P-1	A high priority or actual structure safety issue considered immediately dangerous to life, health, or the environment; or a significant risk of regulatory enforcement.
P-2	If not corrected, could likely result in structure safety issues leading to injury, environmental impact, or significant regulatory enforcement; or a repetitive deficiency that demonstrates a systematic breakdown of procedures.
P-3	Single occurrences of deficiencies or non-conformance that alone would not be expected to result in structure safety issues.
P-4	Best Management Practice – further improvements are necessary to meet industry best practices or reduce potential risks.

3.0 DEWATERING DIKES

The dewatering dikes at Meadowbank include: East Dike, South Camp Dike, Bay-Goose Dike, and Vault Dike. East Dike has been in operation since the dewatering of the northwestern arm of Second Portage Lake was completed in 2009. Bay-Goose Dike and South Camp Dikes became operational in July 2012 when the dewatering of the Bay-Goose Basin was completed. Construction of Vault Dike was completed in March 2013 and phase 2 of the dewatering of Vault Lake was completed in 2014.

The most current version of the Operation, Maintenance and Surveillance (OMS) manual (AEM, 2018) is dated February 2018 for the dewatering dikes. The most current version of the overall Emergency Response Plan (ERP) for the mine (AEM, 2017) is dated January 2017. The Emergency Preparedness Plan (EPP) is included within the OMS. It is good practice to review these documents each year to keep the information up to date, particularly the 24-hour contact name and phone number.

A detailed visual inspection of the dewatering dikes is performed by AEM at least once a month. The monthly inspection reports were reviewed as part of the annual inspection. Most of the instruments on East Dike and Bay-Goose Dike are connected to a system that automatically collects and transmits data every three hours. Data for all instruments can be visualized on the software (VDV) and are checked daily by the mine engineering team. A review of the instrumentation data for the dewatering dikes is presented in Section 5.0 of this report.

Figure A1 shows a plan view of East Dike, Figure A2 shows a plan view of South Camp Dike and Bay-Goose Dike, and Figure A3 shows a plan view of Vault Dike. These figures indicate the location of the photos taken and observations noted during the inspection.

3.1 East Dike

East Dike is located on the east side of Portage Pit and isolates the northwestern arm of Second Portage Lake. Dewatering of the northwestern arm of Second Portage Lake allowed for the development of Portage Pit and the construction of the Tailings Storage Facility. At the time of the inspection, East Dike served as an access road to the northern portion of Bay-Goose Dike and had not been used as a haul road since 2011.

East Dike was constructed in the summer of 2008; grouting of the foundation and bedrock occurred in 2008 and during the first quarter of 2009. East Dike is approximately 800 m in length and was constructed within Second Portage Lake prior to dewatering. It consists of a wide rockfill shell, with downstream filters and a soil-bentonite cut-off wall that extends to bedrock up to 8 m below lake level.

Instrumentation has been installed within East Dike and includes piezometers, thermistors, inclinometers, and flow meters. Survey monuments were removed from East Dike in the past as they have never been used. The location of the instrumentation is indicated in Appendix C1. The inclinometer at Sta. 60+195 was destroyed in the past and has not been replaced. Replacement of this instrument is not considered necessary; however, monitoring of East Dike should continue and, if anomalous conditions are observed, then replacing this inclinometer should be re-evaluated. Refer to Section 5.1 for the analysis of the available East Dike instrumentation data.

At the time of the 2018 inspection, no signs of sloughing or settlement were observed on the structure (including the vicinity of the 2009 sinkhole near Sta. 60+472). A tension crack of approximately 3 m in length was observed around Sta. 60+480 m and no longer seems active.

Three seepage zones were identified in the past near the downstream toe of East Dike (at Sta.60+247, 60+498, and 60+575). The zones at about Sta. 60+247 and Sta. 60+498 each have a seepage collection sump with a pump connected to a year-round pumping system. At the time of the inspection, the seepage was being captured within these sumps. According to AEM, the zone at about Sta. 60+575 was practically dry all year, and only a little ponding water with no flow was observed during the inspection. No sign of new seepage on the ground surface or downstream was observed.

Seepage flow is measured by the flow meters installed in the two seepage collection sumps downstream of East Dike. The average flow measured during the year was around 500 m^3/day with peak activity averaging approximately 910 m^3/day in September 2017. The measured flow is slightly decreasing compared to values from the past years. During the year, the water quality in the sump was monitored by the environment department every week during freshet. According to the procedure in place, the water is pumped in Portage Pit instead of being sent to Second Portage Lake when the total suspended solids (TSS) criterion is exceeded. This was the case starting from 9 May to 29 October 2017 and from 3 June 2018. At the time of the inspection, the water pumped was still pumped into the pit.

From the visual inspection and based on the instrumentation data, the performance of East Dike is satisfactory, as:

- No visual signs of slope instability or erosion were observed on the upstream and downstream rockfill slopes.
- No visual signs of significant cracking or settlement were observed on the dike and along the cut-off wall alignment, besides one tension crack.
- Seepage rates, while higher than anticipated in the design, are stable and are controlled by the pumping system in place. The TSS criterion is low enough for the water to be released in Second Portage Lake, except during the freshet and summer of 2018.
- Freeboard is adequate.
- Instrumentation data: piezometric, thermal, seepage, and inclinometer data do not show deteriorating conditions (refer to Section 5.1).

A photographic log and the record of inspection form for East Dike is provided in Appendix A1.

3.2 South Camp Dike

South Camp Dike is located south of the plant site area and is used to connect the mainland to South Camp Island. South Camp Dike, in conjunction with Bay-Goose Dike, isolates a portion of Third Portage Lake (Bay-Goose Basin) that allowed the development of Goose Island Pit and the southern portion of Portage Pit. It covers a narrow channel, approximately 60 m wide, with shallow water depths ranging from 0.5 m to 1.0 m.

South Camp Dike was constructed between April and June of 2009. Additional thermal capping material and rockfill for the haul road was added to the dike in the winter of 2009-2010. South Camp Dike has a broad rockfill shell with a bituminous geomembrane liner installed on the upstream side. Compacted granular material mixed with bentonite was placed above the toe of the liner. The liner was installed on native frozen (permafrost) till material in a trench approximately 3 m to 5 m below the lakebed surface. At the time of the inspection, South Camp Dike was used as an access road to connect the southern part of Bay-Goose Dike, and the contractor's offices and equipment area with the mine facilities.

An ultramafic waste rock stockpile about 10 m high is located 20 m away from the downstream toe of the dike. The distance between South Camp dike and the waste rock dump is sufficient to allow a complete visual inspection of the downstream area of the dike. It is recommended to continue keeping the downstream toe of the dike clear to facilitate inspection. The downstream toe and slope area was in good condition.

Two thermistor strings are installed on the upstream side of the dike. The thermistor data indicate that the foundation of the dike remained frozen throughout the past summers (2009 to 2018). Refer to Section 5.2 for a detailed analysis of South Camp Dike instrumentation data.

No geotechnical issues or seepage were observed during the inspection.

A photographic log and record of inspection form for South Camp Dike is provided in Appendix A2.

3.3 Bay-Goose Dike

Bay-Goose Dike is located within Third Portage Lake on the southern side of Portage Pit and encompasses the Goose Island Pit. Bay-Goose Dike, in conjunction with South Camp Dike, isolates a portion of Third Portage Lake (Bay-Goose Basin).

Construction of Bay-Goose Dike started in the summer of 2009. The earthworks component for the northern portion of the dike was mostly completed by early October 2009 and by October 2010 for the southern portion. Grouting of the foundation and bedrock occurred between March 2010 and July 2011. Jet grouting occurred in selected portions of the dike between October 2010 and May 2011. The first phase of dewatering Bay-Goose Basin was completed by mid-November 2011 and the second phase was completed in August 2012.

Bay-Goose Dike is approximately 2,200 m long and consists of a wide rockfill shell, with downstream filters and a cut-off wall. For the majority of the dike, the cut-off wall extends to bedrock and consists of soil-bentonite (SB) and/or cement-soil bentonite (CSB). For portions of the dike where the cut-off wall was not constructed to bedrock, jet grouting of the soil between the base of the cut-off wall and the bedrock was performed, thereby extending the low permeability element of the dike to the bedrock surface. The water depth beneath the dike is up to 9 m, with a maximum depth to bedrock below lake elevation upwards of 20 m.

Instruments to monitor and assess the dike's performance are installed on Bay-Goose Dike. The instrumentation includes piezometers, flow meters (water collection pipe and a plastic bucket), thermistor strings, and inclinometers. Every blast in the vicinity of the dike is monitored for blast vibration. Survey monuments were removed from Bay-Goose Dike as they have never been used. Appendix C1 shows the location of the instrumentation on Bay-Goose Dike.

The tension cracks observed in 2013 and 2014 on the upstream side within the thermal cap (between Sta. 32+100 and 31+750 approximately) were still visible during the 2018 inspection but did not show signs of progression and were not active anymore. Settlement within the thermal cap and on the upstream side of the crest (from Sta. 32+100 to 31+950 approximately), ranging from 0.1 m to >1.0 m, was observed but did not show any significant sign of movement since previous years. These areas should continue to be closely monitored to make sure no aggravating conditions are developing.

Seepage channels and water accumulation were observed at the toe of the dike during the inspection (North Channel, Central Channel, Central Shallows and Channel 3). There is currently no downstream seepage collection system at the downstream toe of the dike as the amount of seepage reporting downstream is currently too small to require such a system. Part of the seepage seems to be reported to the pits. Flow from these channels is monitored by various stations. At the time of the inspections, stations 6, 7, 8 and 9 were active and no turbidity was observed in the water at the downstream toe. From July to September 2018, the total average flow due to seepage from the toe of the dike was measured at 10.7 m^3/day compared to 14.7 m^3/day in 2017, 24 m^3/day in 2016, 29 m^3/day in 2015, 132.2 m^3/day (1.5 L/s) in 2013, and 97.2 m^3/day (1.22 L/s) in 2012. The measured flow does not take into account the inflow of water from the pond at Central Channel as this value has not been measured since 2015 (61 m^3/day in 2013 and 2014). Overall seepage is less than anticipated and is thus currently not a concern. It is recommended to continue monitoring the evolution of the seepage at the toe of the dike and continue measuring the inflow of water from the pond at Central Channel.

Water was observed flowing in the North Channel during the inspection at Sta. 30+420 m. The flow was low and decreased since 2016. According to AEM, water was observed ponding at the toe during the year. Due to the topography, it is possible that water is ponding in this area from a nearby seepage channel (i.e., near the northern abutment). The flow is being monitored by stations 8 (30+420) and 9 (30+380) and has an average flow of 0.7 m^3/day compared to 4.9 m^3/day in 2017, 1.9 m^3/day in 2016, 17 m^3/day in 2015, 58 m^3/day in 2013 and 80.8 m^3/day in 2012. The piezometers of the North Channel have shown response to the unloading conditions that is part of the push back planned for extension of the pits E3 and E4 (see Section 4.3.1 for more details). The North Channel is closely monitored to ensure that blast vibrations from Pit E do not exceed the design limit of 50 mm/s. It is recommended to regularly inspect this area, monitor the flow of water, and be on the lookout for signs of seepage from the toe of the dike and in Pit E4.

Water flow was observed into the Central Shallow seepage channel during the inspection at Sta. 30+625 and 30+655. The flow was low and decreased since 2016. The flow is being monitored by station 7 and had an average flow of 4.5 m^3/day in 2018 compared to 5.6 m^3/day in 2017, 11.5 m^3/day in 2016, 12 m^3/day in 2015, 13.3 m^3/day in 2013 and 18.9 m^3/day in 2012. This is similar to historic trends.

A water pond formed by the Central Channel seepage was observed downstream at Sta. 31+125. The mine pumps this pond several times in the summer, and piezometers show a response to the pumping. The inflow has not been monitored in this area since 2015. It is recommended to keep measuring the water inflow when pumping the water pond formed at Central Channel.

Water flow was observed at Channel 3 during the inspection at about Sta. 31+500 m. The flow was low and decreased since 2016. A drainage channel is dug into the ring road nearby to allow water to flow freely in the pit. This area is monitored by station 6, which recorded an average of 2.6 m^3/day in 2018 compared to 4.2 m^3/day in 2017 and 9.3 m^3/day in 2016. According to AEM, water has been reported to the pit from this location during the year through a draining ditch.

A water pond was observed downstream at Sta. 31+750, between Channel 2 and Channel 1. This water pond is not considered seepage as its level never changes except at freshet and after rain events. It is recommended to visually inspect the pond periodically and, if the level changes, to monitor water flow.

Channels 1 and 2 were not active at the time of the inspection. An accumulation of water was observed further downstream against Goose Pit ring road. According to AEM, water is observed downstream in that area during freshet season and naturally drains to Goose Pit without reaching the dike toe. The instrumentation near Sta. 32+000 (Channel 1) indicates a potential seepage zone in that area. It is probable that seepage occurs at this location but reports directly to the pit. The instrumentation at this location needs to be closely monitored for changing trends.

During the inspection, it was observed that an inflow of water was still reported to Goose Pit and that some of the pit walls were wet. These observed water inflows were near Channels 1, 2, and 3 and are not being monitored because the pit is not accessible anymore.

From the visual inspection and based on the instrumentation data, the performance of Bay-Goose Dike is satisfactory, as:

- No visual signs of slope instability or erosion were observed on the upstream and downstream rockfill slopes;
- The settlement and sloughing observed in the thermal cap and in the upstream side of the crest are stable and are no longer active;
- Freeboard is adequate;

- Instrumentation data: piezometric, thermal, seepage, and inclinometer data do not show concerning deteriorating conditions, although the situation at the North Channel and Channels 1 and 2 must be monitored (refer to Section 5.3).

A photographic log and the record of inspection is provided in Appendix A2.

3.4 Vault Dike

Vault Dike is located across a shallow creek that connects Wally Lake and Vault Lake, at the Vault Pit area. Vault Dike was designed and constructed as a zoned rockfill dam with filter zones and an impervious upstream liner consisting of a bituminous membrane. The dike has an upstream key trench made of aggregate mixed with bentonite. The construction of Vault Dike was done in the winter of 2013 to keep its foundation frozen.

No geotechnical concerns were identified, and Vault Dike was in good condition.

Five thermistor strings are installed on Vault Dike and four are operational. One thermistor (TH-3, on the side of Vault Lake) had been damaged by sloughing in previous year and stopped working in October 2015. Data are collected every three days and show that the foundation of the dike is mostly frozen all year long. Given that the remaining instruments indicate a frozen state as expected, it is considered unnecessary to replace the broken instrument. Refer to Section 5.4 for a more detailed analysis of the instrumentation data on Vault Dike.

A photographic log and record of inspection form for Vault Dike is provided in Appendix A3.

4.0 TAILINGS STORAGE FACILITY

The tailings storage facility (TSF) is located within the dewatered portion of the northwestern arm of Second Portage Lake and consists of the North Cell and the South Cell. Progressive closure of the North Cell is under way in sections while other sectors are still used for tailings deposition from the North Cell Internal Structure. The North Cell is being progressively closed except for the North Cell Internal Structure which is in operation, The South Cell is operational and has been progressively constructed as additional capacity to store tailings is required. Stormwater Dike is an internal structure separating the North Cell from the South Cell. A plan view of the TSF is shown in Figure 1 after the text.

The TSF was commissioned in conjunction with the mill start-up in February 2010, with tailings being deposited within the North Cell of the facility. The North Cell and structures Saddle Dam 1, Saddle Dam 2 and Stormwater Dike were constructed to El. 150 m in two stages from 2009 to 2011.

The North Cell Internal Structure was built in 2018 to El. 152 m from Sta. 1+100 m to 1+660 m and from 2+750 m to 3+200 m, and to El. 154 m from Sta. 1+660 m to 2+750. This stage is an intermediate phase and the structure could be raised and lengthened to provide additional capacity if required. The tailings deposition from the North Cell Internal Structure started in August 2018.

Tailings deposition was transferred from the North Cell to the South Cell at the end of 2014. Tailings deposition occurred during the summer of 2015 within the North Cell and resumed in the South Cell in October 2015. Progressive closure of the North Cell started in the winter of 2015 with the construction of a non-acid generating rockfill capping over the tailings and continued in the winter of 2016. Capping continued in 2018 and tailings deposition resumed in the North Cell from August 2018. Water is transferred as needed from the North Cell to the South Cell to control the water elevation of the North Cell.

The construction of the South Cell started in 2012 with Central Dike, thereby closing the eastern portion of the South Cell. The beginning of the tailings deposition in the South Cell started at the end of 2014. From 2012 to 2018, Central Dike was raised to El. 145 m in six stages. To increase the capacity of the South Cell, additional peripheral structures (Saddle Dam 3, Saddle Dam 4 and Saddle Dam 5) were constructed to El. 145 m in three stages from 2015 to 2018. The South Cell is designed to be able to be raised to El. 150 m. The construction of subsequent portions of the South Cell will occur in the future if additional capacity is required.

A retention basin and a series of diversion ditches surround the catchment basin of the North Cell. These structures are designed to convey surface water runoff away from the TSF. Since 2014, the Western Diversion Ditch has been collected within a retention basin prior to being pumped within the North Cell. This is due to a turbidity problematic from the erosion of the side slope and the crest of the ditches. Three temporary retention basins and one ditch are constructed within the North Cell, at the downstream toe of the North Cell Internal Structure to collect seepage through and runoff from this structure. Refer to Section 10.2 for the inspection of these diversion structures.

In the summer of 2014, the mine constructed an engineered tailings barrier along RF1 and RF2 to mitigate migration of tailings through RF1 and RF2. Refer to Section 10.3 for the inspection of these structures.

The most current version of the OMS manual (AEM, 2018) is dated February 2018 for the South Cell dikes, and August 2018 for the North Cell Internal Structure. The most current version of the overall Emergency Response Plan (ERP) for the mine (AEM, 2017) is dated January 2017. The Emergency Preparedness Plan (EPP) is included in the OMS. It is good practice to review these documents each year to keep the information up to date, particularly the 24-hour contact name and phone number.

An inspection of the TSF is performed once a month by AEM. The instruments have been automatically read every three hours since 2017. The monthly inspection reports were reviewed as part of the annual inspection and provided satisfactory information about the evolution of the structures. A summary of the instrumentation data obtained from the TSF is presented in Sections 5.5, 5.6 and 5.7 and in Appendices C2 and C3.

Figure B1 shows a plan view that indicates the location of the pictures and general observations related to the North Cell and South Cell, as well as the North Cell Internal Structure. Figure B2 contains a plan view that shows the location of the photos and observations noted on Stormwater Dike. Figure B3 contains a plan view that shows the location of the photos and observations noted on Saddle Dam 1, Saddle Dam 2 and Saddle Dam 3. Figure B4 contains a plan view that shows the location of the photos and observations noted on Central Dike, Saddle Dam 5 and Saddle Dam 4.

4.1 General Observations of the Tailings Facility

Per the TSF design and the standard operating practices, captured in the OMS manual, a tailings beach must be present at all times against all peripheral structures.

At the time of the inspection, the pond of water in the North Cell was located towards the centre of the facility and there was a tailings beach against the peripheral structures to protect them from ice in the winter and to prevent the migration of water out of the TSF (see Figure 1 for an approximate location of the tailings beach). The tailings elevation in the North Cell was around El. 149.5 m and the pond elevation was at 147.3 m approximately. The tailings beaches against the structures of the North Cell were adequate. The North Cell Internal Structure is built partially on the North Cell tailings and partially on the rockfill cover placed over the last few years for closure operations. At the time of the inspection, tailings deposition was done from the north section of the North Cell Internal Structure.

At the time of the inspection, the pond elevation in the South Cell was at 140.93 m and the tailings elevation varied approximately between 142 and 132 m. Water in the South Cell was ponding against the entirety of the downstream toe of Stormwater Dike. A tailings beach was developed against the entire length of Central Dike and Saddle Dams 4 and 5. At the time of the inspection, no tailings deposition was done in the South Cell.

AEM is closely monitoring the formation of a tailings beach against the peripheral structures in both cells and is monitoring the compliance of the tailings deposition with the deposition plan.

A rockfill berm was constructed in 2016 at the toe of Stormwater Dike in the South Cell (from Sta. 10+300 to Sta. 10+750) to mitigate the crest and downstream slope movement observed in this sector at the end of August 2016. Following an investigation and instrumentation program, the movements observed are inferred to be caused by the soft sediment foundation thawing and settling due to the South Cell water pond reaching the dike foundation during the summer. Water ponding against Stormwater Dike is part of the tailings deposition plan and is acceptable, as Stormwater Dike is not a peripheral structure. Having direct ponding water within Stormwater Dike foundation is geotechnically acceptable. For South Cell closure and environmental aspects, given that it is inferred that the Stormwater Dike foundation presents some open windows of exposed fractured bedrock that may contribute to feeding the seepage at Central Dike, it is recommended that a beach be put in place along Stormwater Dike downstream slope to seal the foundation before the end of the deposition activities.

At the time of the inspection, Saddle Dams 3, 4 and 5 were operational, with water ponding against Saddle Dam 3 and tailings deposited against Saddle Dams 4 and 5. Permanent sumps have not yet been installed on the downstream side of Saddle Dam 4 and Saddle Dam 5, and water accumulation is pumped as required. A permanent sump is in operation on the downstream side of Saddle Dam 3. It is important that the water level on the downstream side not be allowed to rise higher than the granular layer of the upstream toe liner tie-in to prevent uplifting of the geomembrane.

A set of 1 to 2 m wide circular depressions scattered in a horseshoe-shaped area was visible in the tailings of the South Cell, off the north-western extremity of Saddle Dam 4 (see Figure 1). It is assumed that this pattern indicates a fracture zone on the bedrock floor from which the seepage under Central Dike may originate. The circular depressions are a sign of tailings migration through the TSF foundation.

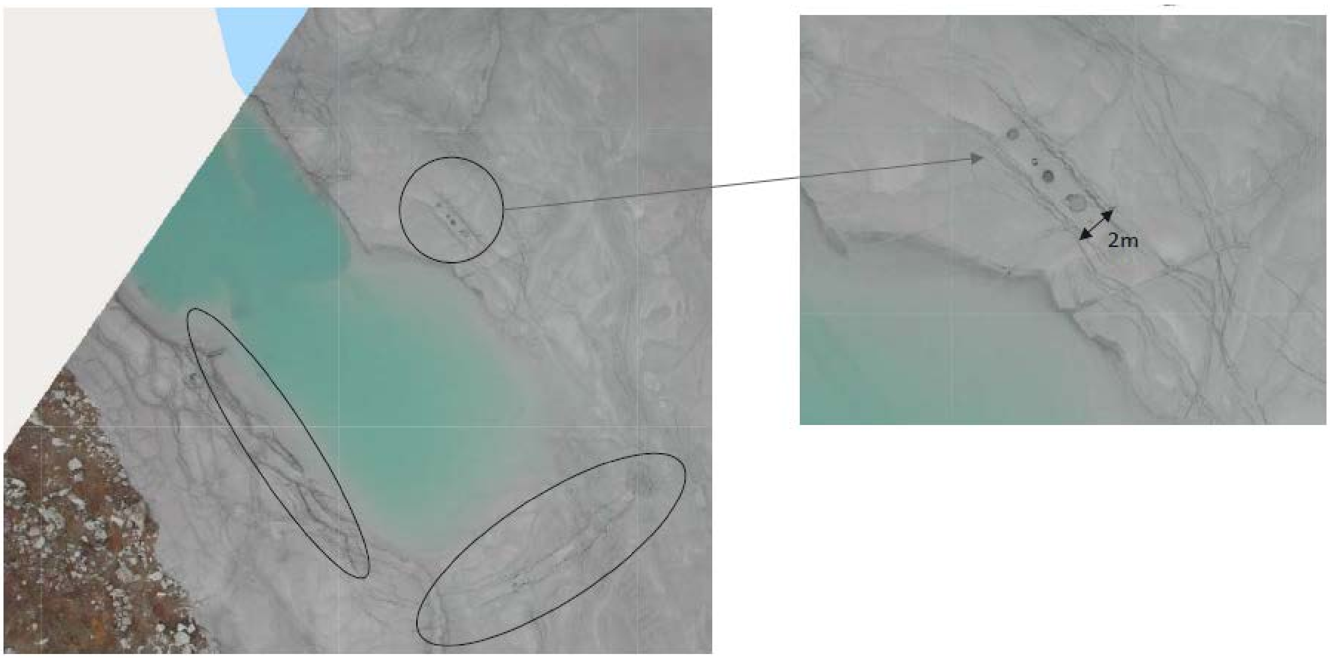

Figure 1: Aerial view of the depressions observed in the tailings (source: AEM)

A general photographic log of the TSF's North Cell and South Cell, as well as the North Cell Internal Structure is provided in Appendix B1.

4.2 Saddle Dam 1 – North Cell

Saddle Dam 1 is located in the northwestern corner of the TSF and forms one of the perimeter structures of the North Cell intended to retain tailings and supernatant fluid during the operation and the closure of the TSF. Saddle Dam 1 crosses a depression between the northwestern arm of Second Portage Lake and Third Portage Lake.

Saddle Dam 1 is a rockfill embankment with an 3H:1V upstream slope and a 1.3H:1V downstream slope. This structure has inverted base filters, upstream graded filters, and a linear low density polyethylene (LLDPE) geomembrane liner on the upstream dike face. The geomembrane liner is placed between an upper and lower non-woven geotextile layer for protection, and is covered by approximately 0.3 m of granular material up to El. 140 m. No granular layer was placed above El. 140 m and the liner is exposed above that elevation. According to the design, a tailings beach has to be maintained on the face of the structure to reduce the potential for ice damage to the liner. The abutments are founded on bedrock, while the central portion of the dike is founded on ice-poor soil. Till and/or crushed aggregate mixed with dry bentonite powder have been placed above the toe of the liner.

Stage 1 of Saddle Dam 1 was constructed in the fall of 2009 to a height of 10 m (crest elevation of 141 m) and a length of 250 m. Stage 2 was constructed in 2010 to an overall height of 20 m (final crest elevation of 150 m) and length of about 400 m.

Four thermistor strings are installed on Saddle Dam 1 and are automatically read every hours following the installation of dataloggers in 2017. Three thermistors (T1, T2, T3) are installed to monitor the thermal condition within the structure and its foundation; they were installed in 2009 and early 2010 as part of Stage 1. The fourth thermistor string (T4) was installed in 2009 and extended in 2010 along the upstream face of the dam to monitor the thermal condition of the tailings. The location of the instrumentation is shown in Appendix C3. Refer to Section 5.6.1 for the analysis of the instrumentation data.

During the inspection, it was observed that Saddle Dam 1 is performing well and does not show any geotechnical concern. An adequate tailings beach was observed along the upstream face of Saddle Dam 1. A stockpile of fine filter material has been present on the north part of the dike since 2011 and poses no geotechnical concern.

A permanent dewatering pump is installed downstream within a sea-can container. Water was observed ponding near the sump. Pumping was done during freshet, and as necessary during summer. The environment department is monitoring the water quality during the year and this information is shared with the engineering department. The water quality results indicate that the water is not seepage from the North Cell. During the MDRB in 2016, the Board members suggested to remove this pumping system and to backfill the toe drain trench to allow natural drainage of the water toward Third Portage Lake. Their opinion is that the foundation of Saddle Dam 1 is now frozen and therefore the weight of tailings will preclude any liner heave. Golder agreed with this and recommended that the monitoring of the instrumentation in this sector continue and that the situation be reassessed if needed. However, as this sump is a permanent feature, it is required that the water quality remains monitored and be reported; the sump therefore cannot be backfilled during operations in order to comply with legal requirements.

A photographic log and the record of inspection form for Saddle Dam 1 is provided in Appendix B2.

4.3 Saddle Dam 2 – North Cell

Saddle Dam 2 is located along the western side of the TSF and connects to the western corner of Stormwater Dike. Along with Saddle Dam 1, it forms one of the perimeter structures of the TSF's North Cell that retain tailings and supernatant fluid during the operation and closure of the TSF. Saddle Dam 2 crosses a depression between the northwestern arm of Second Portage Lake and Third Portage Lake.

Saddle Dam 2 was constructed in one stage in 2011 to a crest elevation of 150 m. Saddle Dam 2 has a maximum height of about 10 m and a crest length of 460 m.

The upstream foundation of the dike and abutments are primarily founded on bedrock; however, some portions of the structure, underneath the inverted filter, are founded on ice-poor soil. During construction, a thin layer of low permeability till was placed and compacted along the toe liner tie-in connection with bedrock. A thin layer of crushed aggregate (0-22 mm) mixed with dry bentonite powder was also placed under the thin layer of low permeability till in areas where open factures were observed within the bedrock. The toe liner tie-in was then covered with till.

Four thermistor strings (T1, T2, T3, and T4) have been installed at Saddle Dam 2 to monitor the thermal condition within the structure and its foundation. The location of the instrumentation is shown in Appendix C3. Refer to Section 5.6.2 for the analysis of the instrumentation data.

During the inspection, it was observed that Saddle Dam 2 is performing well and does not show any geotechnical concern. An adequate tailings beach was observed against the upstream side of the structure.

During the inspection, water was observed ponding on the downstream side within the rockfill embankment (between Sta. 20+275 to Sta. 20+475 approximately). This water has also been observed since the 2015 annual inspection and the instrumentation indicates that the foundation remains frozen. According to AEM, water has been ponding at that location for a long time. The water is probably run-off water but should be sampled for chemical testing to prove it.

A photographic log and the record of inspection form for Saddle Dam 2 is provided in Appendix B3.

4.4 North Cell Internal Structure – North Cell

The North Cell Internal Structure is located within the North Cell of the TSF, in its northern section. It is built over the existing tailings of the North Cell and the rockfill cover placed over the last years for closure operations.

The North Cell Internal Structure is designed and constructed as a permeable zoned rockfill dam with filter zones, built on the top surface dried tailings of the North Cell and on the existing rockfill cover. The bulk part of the North Cell Internal Structure consists of coarse rockfill material. The upstream face is designed at a 3H:1V slope and the downstream faces are designed at a 1.5H:1V slope. The upstream face of the North Cell Internal Structure comprises two granular filter zones. The filter zones are designed to prevent tailings migration and internal erosion, while allowing water to flow through the embankment. A system of ditches and sumps at the downstream toe of the structure is designed to collect seepage and runoff water.

Four vertical thermistor strings (NCIS-01 to NCIS-04) are installed in the North Cell Internal Structure to monitor the thermal condition within the structure and its foundation constituted of rockfill capping and/or tailings depending on the sections. Three instruments are located around a deposition point in the section where the structure is built at the El. 154 m entirely on exposed tailings, while the fourth instrument is located further north where the structure is built at the El. 154 m over the rockfill capping (see Figure 2 below).

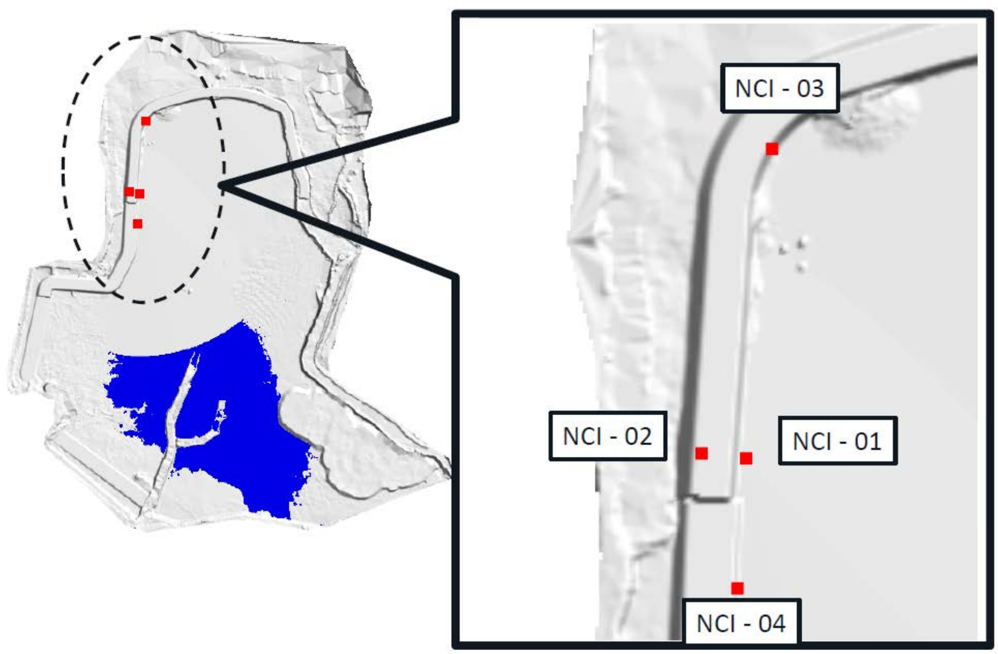

Figure 2: Locations of the thermistors installed in the North Cell Internal Structure (source: AEM)

Refer to Section 5.8 for the analysis of the instrumentation data.

This structure was built during the summer of 2018 and has only been in operation for a short time at the time of the inspection. The early stages of the deposition seem satisfactory. The water is flowing well toward the west side of Stormwater Dike, where water is transferred into the South Cell. There is no sign of erosion of the fine filter at the downstream toe of the dike near the active deposition point. The structure does not show any sign of instability or deformation.

The pumping stations on the downstream side of the dike are in place and working as needed. The capacity of the North Cell to store the inflow design flood must be ensured continuously during tailings deposition.

A photographic log and the record of inspection form for the North Cell Internal Structure is provided in Appendix B1.

4.5 Stormwater Dike

Stormwater Dike is an internal structure that subdivides the TSF into the North Cell and the South Cell within the dewatered northwestern arm of Second Portage Lake. Stormwater Dike cannot be considered anymore as a temporary structure as it is planned to not fill the South Cell to the same elevation as the North Cell. Therefore, there will remain an elevation difference between tailings elevations on both sides. For this reason, it is recommended to review the design basis criteria and assess whether the actual dike configuration and construction still meets the design criteria and will continue to behave in a satisfactory manner in post-closure conditions. The work could be carried out by the engineer-of-record (EoR), but should be revised be the original dike designer.

In this document, the North Cell side is taken as upstream and the South Cell side as downstream.

Stormwater Dike is a rockfill embankment structure. The upstream slope is approximately 3H:1V and the downstream slope is about 1.3H:1V. A bituminous geomembrane liner has been installed above the graded filters on the upstream face of the dike. Low permeability till was placed and compacted along the upstream toe of the dike as a tie-in of the liner.

Stormwater Dike was progressively constructed. Stage 1 was constructed in 2009 to a height of 10 m (crest elevation of 140 m) and a length of 860 m. Stage 2 was primarily constructed in 2010 to an overall height of 18 m (crest elevation of 148 m) and length of about 1,060 m. A horizontal bench is present along the upstream face of the structure due to the connection of the 2009 and 2010 portions of the structure. The junction between the bituminous liner of Stormwater Dike and the LLDPE liner of Saddle Dam 2 was completed in 2011. The crest of Stormwater Dike was raised to 150 m in 2013.

The majority of the dike is seated on dense till from the former lakebed within the talik while the abutments are generally founded on bedrock. The foundation preparation of Stage 2 was completed in winter conditions. It was generally done above water except in an area where water ponding was present (between Sta.10+500 and 10+750 approximately). This pond was located where the topography suggests that the soft lakebed sediment thickness may be greater than at other locations along the dike. Due to the presence of water, the ice crust was cracked with the excavator and only minimal foundation preparation was possible. As a result, most of the lakebed sediment probably remained in place in this area.

In August 2016, July 2017 and April 2018, AEM noticed tension cracks and signs of settlements on the crest of Stormwater Dike. After the cracks first appeared in 2016, an evaluation of the settlement mechanism and expected performance of the dike was conducted (Golder, 2017), based on a drilling and instrumentation campaign. This campaign showed that the most probable mechanism of the movement is settlement due to the thawing of soft sediments caused by the rise of ponding water in the South Cell through Stormwater dike's foundation. As a result, to mitigate against a possible foundation failure, a rockfill buttress support was constructed at the downstream toe of Stormwater Dike in the South Cell (from Sta. 10+300 to Sta. 10+700 approximatively). Cracks appear to be oblique tension fractures, extending over the entire width of the dike crest. Some cracks were up to 5 cm wide. The evolution of the area affected by these cracks in 2016 and after is consistent with the limits of the South Cell water ponding against Stormwater Dike, which is also consistent with the findings of the 2017 study. After the movement had stopped during each episode, the cracks were filled with bentonite. This is a good practice to limit water infiltration within the cracks.

During the annual inspection, the downstream toe of the dike was not visible as it has been entirely covered by the South Cell pond since July 2016, and partially covered before that.

Movement monitoring instruments are installed on the crest of the dike (total of 4 extensometers and 20 prisms). No significant movement was observed by the extensometers in 2018 after the discovery of the cracks.

A single deep thermistor (T147-1) and a piezometer string (VWP 13265) were installed at the downstream toe of Stormwater Dike (within the South Cell). These instruments were broken in September 2016 during the construction of the buttress at the toe of Stormwater Dike within the South Cell. Three new thermistors (SWD-01-16, SWD-02-16 and SWD-03-13) and two new piezometers (PZ-SWD-02 and PZ-SWD-03) were installed since then. Refer to Section 5.7 for the analysis of the instrumentation data at Stormwater Dike including movement monitoring.

A photographic log and the record of inspection form for Stormwater Dike is provided in Appendix B4.

4.6 Saddle Dam 3, Saddle Dam 4 and Saddle Dam 5 – South Cell

The South Cell of the TSF consists of four perimeter structures: Central Dike, Saddle Dam 3, Saddle Dam 4 and Saddle Dam 5. Saddle Dam 3 is located in the northwestern corner of the South Cell and is merged into Saddle Dam 2. Saddle Dam 4 is located in the southwestern corner of the South Cell and is merged into Saddle Dam 5, which merges with the southern end of Central Dike.

Saddle Dams 3, 4, and 5 are designed and constructed as zoned rockfill dams with filter zones, low permeability upstream liners, and upstream toe liner tie-in key trenches. Cross-sections of Saddle Dams 3, 4 and 5 consist of a rockfill embankment, constructed from run-of-mine waste rock, placed in lifts and compacted. The upstream faces are designed at a 3H:1V slope and the downstream faces are designed at a 1.5H:1V slope. The upstream faces of Saddle Dams 3, 4 and 5 are comprised of two granular filter zones and a polyethylene liner (LLDPE) extending along the upstream foundation. The filter zones are meant to keep the tailings inside the facility in a case of liner puncture, but mainly act as appropriate bedding for the liner. An upstream liner tie-in key trench excavated to bedrock and filled with compacted till is located along the upstream area of the structures. The bulk part of Saddle Dams 3, 4 and 5 consists of coarse rockfill material.

Stage 1 of Saddle Dam 3 and 4 was constructed in 2015. Stage 1 of Saddle Dam 5 was constructed in 2016. During Stage 1, Saddle Dam 3 and 4 were constructed to El. 140 m and Saddle Dam 5 to El. 137 m. Stage 2 of Saddle Dam 3, 4 and 5 was constructed to El. 143 m in 2016. Stage 3 of Saddle Dam 4 and 5 was constructed to

El. 145 m in 2017. Stage 3 of Saddle Dam 3 was constructed partially to El. 145 m in 2017, with the installation the geomembrane and the construction of the liner erosion protection cover completed in 2018. These structures are designed to be able to be raised to El. 150 m and the final crest elevation of these structures is subject to review by AEM. At the end of Stage 3, the decision was made by AEM to close the abutments of these structures, as no further raise was planned at the moment. If these structures are to be raised higher, it will be necessary to re-open the abutments. The completed crest length is approximately 245 m for Saddle Dam 3, 365 m for Saddle Dam 4, and 255 m for Saddle Dam 5.

At the time of the inspection, the 2018 construction was complete, and all dikes were operational. The water level of the South Cell had reached the upstream toe of Saddle Dam. No geotechnical issues were observed with these structures.

Thermistors are installed at Saddle Dam 3, Saddle Dam 4 and Saddle Dam 5. Refer to Sections 5.5.2 to 5.5.4 for the interpretation of the instrumentation data.

During the inspection, water was observed ponding in some areas of the downstream side of Saddle Dam 3 and Saddle Dam 4. As the downstream toe is higher than the South Cell pond along Saddle Dam 4, this water does not come from the TSF. On the downstream side of Saddle Dam 3, in the sump, water is ponding at a level below the South Cell elevation. It is important to maintain the water level on the downstream side lower than the level of the upstream toe liner tie-in granular material layer to prevent uplift of the geomembrane. As the elevation of the downstream side is lower than the elevation of the granular material, this should not be a problem if the downstream water level is managed.

A photographic log and the record of inspection forms for Saddle Dams 3 and 4 is provided in Appendices B5 and B6. A photographic log and the record of inspection form for Saddle Dam 5 is provided in Appendix B7.

4.7 Central Dike – South Cell

Central Dike is located along the eastern side of the TSF and crosses a depression within Second Portage Lake. Along with Saddle Dam 4 and Saddle Dam 5, Central Dike forms one of the perimeter structures of the South Cell.

Central Dike design includes a compacted rockfill embankment with an upstream seepage barrier, granular filters and a key trench along the centreline of the dike transitioning on the upstream toe near both abutments. The foundation soils include lakebed sediments and till overlying bedrock. Soft and ice-rich soils were removed from the Central Dike footprint during construction.

Construction of Central Dike started in 2012 (stage 1) at the El. 110 m with a key trench located underneath the centreline. In 2013 (Stage 2), the footprint of Central Dike was widened for a crest elevation of 150 m, the structure was raised to El. 115 m and the key trench was relocated at the upstream toe. In 2014 (Stage 3), the key trench was relocated at the upstream toe and constructed to El. 132 m. Central Dike was raised to El. 137 in 2015 (Stage 4), to El. 143 m in 2016 (Stage 5), and to El. 145 m in two steps in 2017 and 2018 (Stage 6). Central Dike is designed to be able to be raised to El. 150 m and the final crest elevation is subject to review by AEM. The completed crest length is approximately 900 m at El. 145 m.

During the inspection, water was observed ponding at the downstream toe of the dike between approximately Sta. 0+300 and the southern access road at Sta. 0+830. Seepage into the basin at the downstream toe of Central Dike has been observed since 2014 when tailings deposition was transferred from the North Cell of the TSF to the

South Cell. The rate of seepage started to increase proportionally to the rise of the pond level of the South Cell. Desktop studies were undertaken by Golder in 2015 to estimate the seepage flows and pore water pressures, verify the dike stability, and attempt to predict the eventual flow volume that would report to the downstream toe for higher pond elevation. The seepage pathway used in the Golder 2015 model was through a layer of fine material in the till layer of the foundation as it was deemed the most critical scenario for the structure stability. The main recommendation from this desktop study was to maintain beaches adjacent to Central Dike and to maintain a 'back pressure' on the downstream side of Central Dike in order to reduce the hydraulic gradient by holding the downstream pond at El. 115 m. Willowstick was also hired to carry out electromagnetic surveys to detect seepage paths. The geophysical campaign led to additional recommendations and identified possible seepage path locations. Following the geophysical campaign, an investigation was conducted by SNC-Lavalin (SNC) and AEM in December 2015 at station CD-595, and between CD-810 and CD-850. Highly altered and fractured bedrock was encountered, and high hydraulic conductivity was measured from Packer testing. Instrumentation of the four boreholes with piezometers and thermistors was done at the same time. A study has been completed in 2017 by Golder to update the seepage modelling with a seepage flow through the bedrock, and allowed for updating of the Emergency Preparedness Plan as well as the Operation, Maintenance, and Surveillance Manual. The summer 2017 investigation and instrumentation campaign shows that the seepage pathway was most probably mainly controlled by the bedrock. Review of coupled seepage-stability analysis indicates that the dike is physically stable and that decrease of South Cell water level and use of tailings to seal the bottom of the cell would improve the seepage and piezometric pressure beneath Central Dike.

Water inflow from this location is pumped back into the South Cell, with the exception of two periods from 29 August to 19 September and 3 to 7 October 2017 during which water was transferred to Goose Pit to reduce the hydraulic pressure on the seepage. This measure, combined with an adapted tailings deposition plan, effectively reduced the amplitude of the seepage. The inflow of water pumped back to the South Cell to maintain the downstream pond at El. 115 m decreased from 540 m^3/hr in 2017 to 263 m^3/hr at the time of the 2018 inspection. The historical maximum seepage was 946 m^3/hr in the summer of 2015. Golder recommends continuing: 1) maintaining a tailings beach against Central Dike; 2) promoting beach deposition to seal assumed fractured bedrock areas expected to control the seepage under Central Dike; 3) controlling the hydraulic gradient by proper management of South Cell water pond and dike downstream toe pond; 4) closely monitoring the water quality; and 5) inspecting the structure for changing conditions.

The water in the downstream pond had an orange coloration with high turbidity, and AEM reported that this associated with rapid temperature variations were observed during most of the open water season in 2017 and 2018. This event has been investigated by AEM and has been attributed to precipitation of iron oxide from bacterial processes.

At the time of the inspection, there was a tailings beach against the entire length of the structure. AEM is planning on maintaining an adequate tailings beach against the entire length of this structure during operation and closure per the design requirements.

There is angular granular material (fine filter) in direct contact with the LLDPE liner along the deposition points at Sta. 1+050 and 0+280 approximately. It is recommended to clean it before resuming the deposition activity within the South Cell in order to avoid pushing the angular material into the LLDPE, which could cause punctures. This operation is required several times a year and should be detailed in a procedure prepared by AEM. The procedure needs to be communicated to all concerned workers and added to the OMS manual.

The interpretation of the instrumentation data is provided in Section 5.5.1.

A photographic log and the record of inspection form for Central Dike and Saddle Dam 5 is provided in Appendix B7.

5.0 GEOTECHNICAL INSTRUMENTATION

As part of the 2018 geotechnical inspection, the dewatering dikes and TSF instrumentation data were reviewed. During the year, daily review of the instrumentation on the dewatering dikes is done by mine personnel and quarterly reports summarizing their observations are issued internally. Reports for structures with a yellow TARP level are issued on a monthly basis. The compilation of the instrumentation data was not part of the scope of this study, and the figures showing the data were provided by AEM. The information provided by AEM is presented as received in Appendix C. The data were sent as figures for the dewatering dikes and as PowerPoint and Excel files for the TSF structures. Continued monitoring and review of instrumentation data is recommended. In the case of a significant variation in the instrumentation data, the designer should be notified according to the OMS manual. A significant variation is defined by a change compared to usual seasonal trends and should be followed-up on to monitor the evolution of the event and identify its causes and consequences, as well as the appropriate actions to take.

5.1 East Dike

Instrumentation within East Dike was installed in the spring of 2009 to monitor the dike's performance following construction and during dewatering, operation, and into closure. Additional instrumentation was added in 2009 and 2010 to increase coverage across the dike. Since June 2012, all piezometers and thermistors on East Dike have been connected to an automatic data collection and transmission system (VDV database). The following subsections present a summary of the data collected between September 2017 and August 2018.

Previous annual geotechnical inspection reports contain additional information regarding instrumentation data collected prior to September 2017. The 2018 instrumentation data for East Dike are presented in Appendix C1.

5.1.1 Piezometers

Three arrays of multilevel vibrating wire piezometers (VWP) were installed within East Dike in mid-March 2009 as follows:

- South Channel (Sta. 60+190).
- North Channel (Sta. 60+490).
- North Shallows (Sta. 60+700).

At each location, multilevel VWPs were installed:

- Upstream side of the cut-off wall, approximately 2 m from the centreline.
- Immediately downstream of the cut-off wall, approximately 2 m from the centreline.
- Further downstream of the cut-off wall, approximately 10 m from the centreline.

Single VWPs were also installed downstream of the cut-off wall near the contact area (base of cut-off wall and top of bedrock surface) at Sta. 60+150, Sta. 60+200, Sta. 60+240, Sta. 60+400, Sta.60+420, Sta.60+440, Sta. 60+450, Sta. 60+460, Sta.60+470 60+472, Sta. 60+480, Sta. 60+500, Sta. 60+510, Sta. 60+550, Sta. 60+600, Sta. 60+650, and Sta. 60+750.

Some of the installed piezometers on East Dike are broken or malfunctioning, as indicated in Table 1. The piezometers located at Sta. 60+150, 60+470 and 60+750 are broken and do not produce any pore water pressure data. The piezometers located at Sta. 60+550C, 60+650C, 60+700P1B and 60+700P2C are giving erratic data and reported as frozen by AEM. Data analysis indicates that these piezometers are in fact frozen. Piezometers 60+600C, 60+490P2C, 60+700P1A, 60+700P1C are also frozen and are giving widely fluctuating data. A piezometer that has frozen at some point is unreliable. It is thus recommended to flag these piezometers and be very careful when interpreting their data.

Table 2: Malfunctioning Instruments on East Dike flagged by AEM

Name of Piezometer	Location	Possible Reasons for Malfunctioning	Malfunctioning Start Date
150-C	60+150	No reading, broken	November 2012
190-P2-C	60+190	Frozen	
470-C	60+470	Pore water pressure reading broken, temperature still working	November 2009
550-C	60+550	Frozen, still shows head and temperature (erratic data)	November 2014
650-C	60+550	Frozen, still shows head and temperature	May 2016
700-P1B, 700-P2C	60+700	Frozen, still shows head and temperature	November 2014
750-C	60+750	Pore water pressure reading broken, temperature still working	April 2013

The piezometers' data show that the pore water pressure is not increasing and is similar to the value recorded in the past with a long-term trend going towards a general decrease in the pore water pressure.

Specific observations have been made for the three piezometric arrays located at Sta. 60+190, Sta. 60+490, and Sta. 60+700, as follows.

Sta. 60+190

At Sta. 60+190, the observed levels are consistent with expectations for a functioning cut-off wall. There is a consistent drop in the hydraulic head across the cut-off wall and within the grouted bedrock in the downstream direction. Further downstream, the hydraulic head continues to decrease. There are spike increases in the hydraulic head in October 2017, April 2018, June 2018 and August 2018, similar to the previous years. These spikes are probably due to pumping interruption for maintenance or change of discharge from the lake to the pit. As observed in past years, no instruments froze in the winter and the temperature data indicate the presence of seepage. For example, the temperature reading at 190-P1-C increased to approximately 3.5°C in September 2017. Then, the temperature decreased between October 2017 and June 2018 to approximately 0.2°C despite extremely cold air temperatures. If the temperature fluctuations at 190-P1-C were caused by changes in air temperature at the ground surface, then thermal responses in both summer and winter would be expected. Since the latter is not the case, it is highly probable that seepage water from the upstream side of the dike is responsible for the thermal behaviour. The recorded piezometric pressure decreases towards the downstream side and with elevation, which seems to indicate that flow is occurring towards the pit. Given the hydraulic head response consistent with the expectations of a functioning cut-off wall, it is reasonable to assume that the seepage water is originating from a different part of the dike.

Sta. 60+490

At Sta. 60+490, flow through the dike is observed as the piezometric pressure is very similar before and after the cut-off wall (490-P3-B vs 490-P2-B in particular). There are spike increases in the hydraulic head in October 2017, April 2018, June 2018 and August 2018, similar to the previous years. These spikes are probably due to pumping interruption for maintenance or change of discharge from the lake to the pit. Signs of seepage are also observed in the thermal instrumentation data associated with this piezometric array. None of the instruments are frozen; there is a correlation between the lake temperature and the temperature recorded by the piezometric array at this location, and the temperature data follow the same trend with very little offset. These piezometric and thermal trends correspond to the seepage zone observed at Sta. 60+498. The recorded piezometric pressure decreases towards the downstream side and with elevation, which seems to indicate that flow is occurring towards the pit.

Sta. 60+700

At Sta. 60+700, the majority of the piezometers are frozen. The remaining instruments (upstream and downstream of the dike, close to the centreline) show that the observed levels are consistent with expectations for a functioning cut-off wall. An increase in hydraulic head is visible after June 2018. The temperature data are consistent with observations noted during the previous years and indicate mostly frozen conditions.

5.1.2 Thermistors

Five thermistor strings having 16 nodes at 1 m interval have been installed on East Dike (at Sta. 60+092, 60+185, 60+485, 60+695, and 60+842).

The instrumentation data for the September 2017 to August 2018 period are consistent with the historical trends.

Specific observations have been made for each instrument for the period analyzed, as follows.

Sta. 60+092 and Sta. 60+842

The thermistors installed at Sta. 60+092 and Sta. 60+842 are located on the southern and northern abutments. The upper 1 m of the dike of both abutments thawed in 2018 (active layer). From September 2017 to August 2018, there has been little to no change in the ground thermal regime. Below El. 134 m, the cut-off wall remained frozen for these two thermistors. The temperature within the dike varied from 10°C to -20°C within the active layer of the dike, from -1°C to -12.5°C in the till, and from -3.5°C to -9°C in the bedrock. Fewer temperature variations were generally observed with depth at each location.

Sta. 60+185

The thermistor string installed in the South Channel at Sta. 60+185 (bedrock about 6 m below water surface at El. 127 m) recorded the following temperature variations:

- The upper layer of the cap material (from El. 136 m to El. 131 m) was thawed in September 2018 and was frozen during the winter period (active layer). The active layer shows significant fluctuations in temperature, going from 4°C to -12°C.
- The cut-off wall above the lake level and in the till from El. 131 to 127 m remained frozen, but very slightly below 0°C, with the exception of the bead at El. 128 m which shows that temperature remained slightly over 0°C all year. Very little to no change in the ground thermal regime has been observed from the data. This result may seem surprising, as potential seepage is inferred from the thermal behaviour at 190-P1-C at Sta. 60+190. However, 190-P1-C is further downstream from the dike and the lag between maximum 190-P1-C, and the data seem to suggest that the water is originating from a different part of the dike structure closer to Sta. 60+490.
- The bedrock portion of the dike (below El. 127 m) remained thawed. The bedrock had a temperature variation between -0.2°C and 3.8°C increasing with depth.

Sta. 60+485

The thermistor string at Sta. 60+485, installed within the North Channel (bedrock at approximately El. 126 m, 7 m below lake level), indicated the following temperature variations:

- The upper portion of the cut-off wall located in the lake (from El. 136 m to El. 128 m) was in an active zone. Significant temperature fluctuations were recorded (12°C to -20°C).
- The cut-off wall below El. 128 m and the bedrock remained thawed during the year with significant variations in temperature (between 12°C and 0.5°C).

The thermal variation observed within the cut-off wall below El. 128 m and in the bedrock is significant, with fluctuations between 12°C and slightly above 0°C. From September 2017 to August 2018, there is good correlation between recorded temperatures and the upstream lake temperatures, indicating advective flow through the dike (i.e., recorded temperature changes are primarily a result of temperature changes in water flowing through this area). The delay between changes in the recorded temperatures within the lake and within the cut-off wall is minimal. The temperature responses recorded in the piezometers at Sta. 60+490 P2 (A,B,C) and 60+490 P1 (A,B,C) are also significant, as are the responses recorded within the piezometers at Sta. 60+190-P1-C, Sta. 60+450, Sta. 60+460, Sta. 60+472, Sta. 60+480, Sta. 60+490, and Sta. 60+500. Seepage is being observed downstream and is collected in the sump and removed via the pumping system.

Sta. 60+695

The thermistor string installed in the North Shallow at Sta. 60+695 (bedrock at El. 128.5 m approximately, 4.5 m below upstream lake level) recorded the following temperature variations:

- The thermistor beads from El. 136 m to 130 m indicate that the upper portion of the cut-off wall was thawed in September 2017 and frozen during the winter (active layer). The recorded temperature variations are between 8°C and -20°C.
- The thermistor beads from El. 130 m to 128 m indicate that the cut-off wall and the till between these elevations remained frozen throughout the monitoring period, with temperature fluctuations between 0°C and -9°C.
- The temperature recorded in the bedrock varied between 0°C and 2°C increasing with depth. The temperature recorded at each node in the bedrock varied by approximately 1.5°C during the year.

5.1.3 Inclinometers

Two inclinometers are installed on East Dike at Sta. 60+495 and 60+705. An inclinometer was installed at Sta. 60+195, but was destroyed in July 2010 and has not been replaced. The inclinometer displacements are referenced along Axis A and Axis B; Axis A is perpendicular to the cut-off wall alignment (positive displacements are towards the Pit side), while Axis B is parallel to the cut-off wall (positive displacements are towards the increasing chainage), perpendicular to Axis A.

Recorded displacements are small. The maximum cumulative displacements at the crest were observed in the inclinometer installed at Sta. 60+705. The cumulative displacement is about 100 mm perpendicular to the cut-off wall (Axis A), and 55 mm aligned to the cut-off wall (Axis B). From 2017 to 2018, no significant movements were observed for all inclinometers; they have all been relatively stable since 2014. The recorded displacements are well within the tolerable displacements for the structure and are not a concern.

5.1.4 Seismograph

No peak particles velocity measurements (measured by the peak vector sum or PVS) were taken in 2018 for East Dike as no blasts occurred in the vicinity of East Dike.

5.1.5 Flow Meters

The flow at the downstream toe in 2018 was measured by the flow meters installed in the two seepage collection sumps downstream of East Dike. The average flow measured during the year was around 500 m^3/day with peak activity averaging approximately 910 m^3/day in September 2017. The measured flow shows more variations than last year and has been on an upward trend since mid-June 2018. During the past year, the turbidity of the water in the sump meets the total suspended solids (TSS) criteria set for direct discharge into the Second Portage Lake, except for peaks of TSS during freshet between June to September 2018 when water was discharged into the pits instead.

5.2 South Camp Dike

Two thermistor strings are installed on the upstream side of South Camp Dike. SD-10 is located near the liner toe. SD-09-A is located approximately 20 m further upstream within Third Portage Lake. South Camp Dike thermistor data for September 2016 to September 2017 are presented in Appendix C1. Based on the thermistors data, no signs of seepage are evident, and the recorded value follows historical trends.

The following summarizes the observations regarding the thermal regime at these locations:

- The temperature profile at SD-09-A on the upstream side of the dike shows that the soils located beneath the dike foundation and liner have remained frozen (permafrost) below El. 128 m. An active layer is present between El. 133 m and 128 m.
- The temperature profile at SD-10 shows that the foundation of the dike below the thermal cap stayed frozen all year long.

5.3 Bay-Goose Dike

Instruments were installed on Bay-Goose Dike in the summer of 2011 to monitor the dike’s performance following construction, during dewatering and operation, and into closure. At the time of the inspection, all the piezometers and thermistors on Bay-Goose Dike had an automatic data collection and transmission system to the VDV database. The following subsections present a summary of the data collected between September 2017 and

August 2018. Data plots for the instrumentation sent by AEM are presented in Appendix C1. Additional boreholes have been drilled in the North Channel sector in 2017 to install TDR reflectometers and inclinometers in order to monitor the dike's reaction to nearby blasting in Pit E5. The data from theses instruments were not available to Golder to review.

5.3.1 Piezometers

Arrays of multilevel VWPs were installed within Bay-Goose Dike as follows:

- Sta. 30+158 (1P)
- Sta. 30+276.5 (2P)
- Sta. 30+378.5 (3P)
- Sta. 30+453.5 (4P)
- Sta. 30+645.5 (5P)
- Sta. 31+165 (23P)
- Sta. 31+600 (24P)
- Sta. 31+815 (25P)
- Sta. 31+885 (26P)
- Sta. 32+000 (27P)
- Sta. 32+065 (28P)
- Sta. 32+105 (29P)

At each location, multilevel VWPs were installed:

- Upstream side of the cut-off wall, approximately 2 m from the centreline;
- Immediately downstream of the cut-off wall, approximately 2 m from the centreline;
- Further downstream of the cut-off wall, approximately 10 m from the centreline.

In addition, single VWPs were installed immediately downstream of the cut-off wall near the contact area (base of cut-off wall and top of bedrock surface) at the following stations:

- Sta. 30+167 (6P2)
- Sta. 30+249.5 (7P2)
- Sta. 30+306.5 (8P2)
- Sta. 30+440 (9P2)
- Sta. 30+516.5 (10P2)
- Sta. 30+684.5 (11P2)
- Sta. 30+770 (12P2)
- Sta. 30+804.5 (13P2)
- Sta. 31+052 (14P2)
- Sta. 31+220 (15P2)
- Sta. 31+565 (16P2)
- Sta. 31+615 (17P2)
- Sta. 31+700 (18P2)
- Sta. 31+842 (22P2)
- Sta. 31+928 (19P2)
- Sta. 31+990 (20P2)
- Sta. 32+020 (21P2)

Some of the installed piezometers on Bay-Goose Dike are broken or malfunctioning, as flagged by AEM and shown in Table 3.

Table 3: Malfunctioning Instruments on Bay Goose Dike Flagged by AEM

Name of Piezometer	Location	Possible Reasons for Malfunctioning	Malfunctioning Start Date
1P1-C	30+158	Rapid freezing, piezometric head went off limits and broke the instrument (temperature still works)	22 February, 2013
1P1A, 1P1-B	30+158	Frozen, still shows head and temperature	19 March, 2014
1P2-C	30+158	Frozen, still shows head and temperature	1 March, 2015
2P1-A, 2P1-B,	30+276.5	Frozen, still shows head and temperature	4 January, 2014

Name of Piezometer	Location	Possible Reasons for Malfunctioning	Malfunctioning Start Date
4P1-C	30+453.5	Frozen	
5P1-A, 5P1-B, 5P1-C, 5P2-C	30+645.5	Frozen, still shows head and temperature	8 February 2014
6P2C	30+167	Frozen, still show head and temperature	1 March 2015
7P2	30+249.5	Frozen	
8P2	30+306.5	Frozen	
10P2C	30+516.5	Frozen, still show head and temperature	17 February 2015
11P2	30+684.5	Frozen, still shows head and temperature	27 February 2015
12P2	30+770	Frozen, still shows head and temperature	17 January 2013
13P2	30+804.5	Frozen, still shows head and temperature	20 December 2012
14P2	31+052	Rapid freezing, piezometric head went off limits and broke the instrument (temperature still works)	21 February 2012
15P2	31+220	Frozen, still shows head and temperature	4 February 3013
16P2	31+565	Frozen, still shows head and temperature	15 January 2013
17P2	31+615	Frozen, still shows head and temperature	2 February 2014
18P2	31+700	Frozen, still shows head and temperature	2 February 2014
29P1B2, 29P2B3, 29P3B3,29P2C	32+105	Frozen, still shows head and temperature	6 March 2014
29P1B3	32+105	Frozen, still shows head and temperature	4 March 2014

An analysis of the piezometer data indicates that the piezometers identified as frozen by AEM show temperatures below 0°C. The thermal data analysis for the piezometers also shows that piezometers 2P1-C, 7P2, 8P2, 23P1-C, 25-P1-B1, 25P1-B2, 27P1-B2, 29P1-B1 and 29P3-A1 might have frozen as they recorded data below 0°C. The piezometric reading of these piezometers fluctuates, while remaining within probable data range. This could be because the thermal calibration is slightly off, and the piezometer did not really freeze, or it could mean that the piezometer froze and is broken but that was not reflected in the data. A piezometer that has frozen once may not be relied upon even if it thawed. It is recommended to flag these piezometers and to be careful when interpreting their data while staying vigilant about any rapid piezometric variance. The first time a piezometric rapid increase associated to a frozen piezometer is observed, it is important to remain vigilant without overweighting the abnormal trend. For the instruments showing very high piezometric readings, it is recommended to compare the pressure recorded to the instrument limit, in order to identify if the variance could be due to factors other than mechanical problems such as seepage.

A cooling trend starting in July 2012 can be observed in all piezometers installed on Bay-Goose Dike. The instruments located farther on the downstream side generally record lower temperatures than the instrument closer to the dike and the lake. As a result, the instruments on the upstream side of the dike are generally the last ones to freeze and the ones farthest on the downstream side are the first to freeze. In some sectors, most of the piezometers are in frozen condition, while in some sectors almost none of the piezometers are in frozen condition. There seems to be a correlation between the sector in which seepage has been observed historically and the number of frozen instruments.

From 2012 to 2018, a generalized trend can be observed in the pore water pressure measurements of most non-frozen piezometers located along the dikes (upstream and downstream side). An increase in pore water pressure is observed during winter (November to May approximately). The pore water pressure tends to stabilize or decrease during freshet (May to September approximately). Historically, the rising trend has been attributed to ice build-up at the downstream toe of the dike and the decrease has been attributed to melting of this ice.

There is generally a drop in the hydraulic head across the cut-off wall and within the grouted bedrock in the downstream direction. In general, the data from the piezometers are similar to the historical trend, with the exception of the area around Sta. 31+885 m, where an unusual increase in pore water pressure has been observed.

In addition to the seasonal trend described above, specific observation trends can be observed for various areas of the dikes. These areas generally coincide with seepage channels as the majority of piezometers are frozen in non-seepage channel areas.

North Portion (Sta. 30+158 to 30+516.5)

The majority of the multilevel piezometers installed at 30+158 are in frozen conditions. The piezometer downstream of the dike froze in 2015 at the time Goose Pit reached its final elevation. The upstream piezometer froze in 2016.

More than half the multilevel piezometers installed near Sta. 30+276.5 are frozen. The piezometric level has been stable since 2015 with cyclical variation but has not recovered to the level before 2015. The unfrozen piezometers on the downstream side near the cut-off wall had a 0.4 to 0.8 m cyclical fluctuation from September 2017 to August 2018. Sharp increases and decreases in the recorded pore water pressure for all instruments are linked to drilling operations in Pit E5. A 0.4 m to 0.6 m increase in pore water pressure is observed for instruments on the downstream side from March to August 2018 and had not dissipated at the time of the inspection.

Large scale seasonal variations are seen in the pore water pressure recorded in all piezometers, with fluctuation more pronounced on the downstream side. Piezometers located near the North Channel from Sta. 30+378 to 30+453 have recorded an increasing trend in pore water pressure from September 2017 to April 2018. The piezometers installed downstream at Sta. 30+378.5 and 30+453 recorded a large pressure increase during the winter of 2018 (2.3 m to 3.5 m increase), which had not dropped at the time of the inspection. The timing of drilling and blasting operations in Pit E5 matches with the sharp increases in the recorded pore water pressure for all instruments

These variations in pore water pressure are happening in the zone associated with the North Channel seepage and monitored by seepage stations no. 8 and no. 9. In the past, the pressure typically increased in magnitude of the pore water pressure until freshet and then suddenly decreased as a result of mining activity and the depressurisation of the rock walls in Pit E5. However, the pressure did not drop over the summer of 2018 and remains high. The piezometers installed along the Pit E wall (PE5-17-1 to PE5-17-5) exhibit similar trends and their temperature sensors indicate that the area is partially unfrozen, with some instruments cooling down rapidly. According to AEM, the pit walls are freezing back in this area and remain frozen, which progressively prevents pressure from dissipating by drainage trough the wall face. AEM also indicated that the impact of the high water table on the stability of the pit wall (overburden and rock faces) was taken into account in the design study made by TetraTech and as such the raise in the water table is not a concern. The OMS manual provides procedures in the event of significant or rapid pore-water pressure raises which need to be followed.

The temperature recorded by the piezometers is stable after a change in the multiplexer in December 2017 that solved the issue of the large peak in temperature observed in 2017.

Central Shallows (Sta. 30+645.5 to 30+804)

The majority of the piezometers installed in this area are frozen and give erratic data. Seepage station no. 7, which was active during the summer of 2018, is near this area.

The unfrozen piezometers indicate stable pore water pressures in 2018.

Central Channel (Sta. 31+020 to 31+220)

There is a seepage zone with ponding water observed downstream associated with this channel. The majority of the piezometers in this area are not frozen.

From 2012 to 2018, the maximum and minimum recorded pore water pressures for the piezometers downstream have been constant. There is generally a pressure build-up from January to June followed by several pressure drops and increases from June to September or October. In 2018, a minimum value around 130.6 m was recorded during freshet and a maximum value around 133.6 m was recorded during winter, similarly to the previous years. The pore water pressure data tend to fluctuate more during freshet than during winter. This behaviour seems to be consistent with the explanation that the recorded pore water pressures are influenced by the pumping of the water pond located downstream.

Channel 3 (Sta. 31+565 to 31+700)

There is a seepage zone monitored by station no. 6 associated with this channel. There is a drainage channel dug into the ring road in the area to allow water to flow freely in the pit. The piezometric array in this area are frozen and a cooling trend can be observed in the recorded temperature since 2011.

From 2014 to 2018, the pore water pressure was generally stable in the piezometer located directly downstream (general decrease of 0.2 to 0.6 m while following seasonal trends). The piezometers located farther downstream have recorded a decrease of approximately 1.6 m since 2014 (while following seasonal trends). A 0.4 m increase in pore water pressure was measured in February 2018, in addition to the seasonal trends.

Channels 1 and 2 (Sta. 31+815 to 32+105)

No seepage has been observed at the toe of the dike in 2018, but there is a water pond in this location that naturally drains to Goose Pit. Most of the piezometers are not frozen in this area.

The recorded pore water pressure in the piezometers located in Channels 1 and 2 has generally been stable (0.2 to 0.6 m fluctuation from winter to freshet) from 2013 to 2017 for the piezometric arrays of Channels 1 and 2. However in 2018, a large (4.4 m) increase is visible in the piezometer at Sta. 31+885 directly downstream of the cut-off wall in the rockfill, starting from October 2017. Although the pressure is decreasing at freshet, this does not comply with the seasonal trend observed over the previous years. The piezometers further downstream and in the foundation do not exhibit such behaviour and indicate a stable pore water pressure. Piezometers at Sta. 31+815 show a similar raise of about 2 m during the same period. The temperatures show an unfrozen state of the piezometers during the winter. The piezometers at Sta. 32+000 show a less pronounced (1.5 m) increase in pore water pressure from November 2017 to May 2018.

The fact that the pore water pressure in the foundation remains stable indicates that the raise observed in the Sta. 31+885 piezometers within rockfill material of the dike and the instruments nearby is associated with shallow water table fluctuations. The highest value recorded corresponds to the elevation of the natural ground in this section (128.5 m). Further north, the elevation of the natural grounds decreases, suggesting that the water usually drains in this direction within the rockfill embankment. It is possible that the seepage way was frozen and as a result the water level increased around piezometer 31+885 until it drained above the natural ground surface towards the pit. As the foundation is not affected and as the presence of water is expected in this area due to the topography, the pressure increase is not considered a concern for the stability of the dike at the moment. However, the situation should be closely monitored, and the trend re-assessed over the next years. According to AEM, this trend has not been observed during the beginning of the winter of 2018, with pressures behaving similarly to the years before the unusual trend was observed.

The OMS manual provides procedures in the event of significant or rapid pore-water pressure raises which need to be followed. The designer needs to be advised in the event of observations such as the pressure increase observed in the instruments of this section.

The thermal data at Sta. 31+815 might indicate some sign of seepage as the thermal cooling is less pronounced and there is a wider fluctuation of temperature recorded at this location than in the other thermistor nearby.

5.3.2 Thermistor

Thirty-three thermistors (from T1 to T30 and T3’ to T5’) have been installed on Bay-Goose Dike. From September 2016 to August 2018, the following observations have been made.

Sta. 30+134 (T1), Sta. 30+827 (T14) and 32+140 (T30)

The three thermistors installed at Sta. 30+134 (T1), Sta. 30+827 (T14), and Sta. 32+140 (T30) are located on the northern abutment, Goose Island, and the western abutments. The first node of these thermistors is installed about 1 m below the dike crest. For this period, the dike and its foundation were entirely frozen on the northern abutment (T1), the Goose Island abutment (T14), and the western abutment (T30).

Sta. 30+185 (T2), Sta. 30+489.5 (T9), Sta. 30+553.25 (T10), Sta. 30+621.5 (T11), Sta. 30+650 (T12), Sta. 30+713 (T13), Sta. 31+080 (T15), Sta. 31+134.5 (T16), Sta. 31+170 (T17), Sta. 31+352 (T18), Sta. 31+752.5 (T21), Sta. 31+820 (T22)

Twelve thermistors were installed in the SB portion of the cut-off wall. All the thermistors except for T15 and T18 show a similar trend:

- The rockfill is frozen all year below El. 134 m.
- There is generally an active layer in the till and most of the bedrock is thawed all year with temperatures ranging from -1°C to 3.5°C.

T18 (31+352) indicates that the till and the bedrock remained frozen, while T15 (31+080) indicated that the till and the bedrock remained frozen above El. 123 m.

A general deeper frost penetration is observed this year compared to 2017 and is linked to a longer winter season.

Sta. 30+260 (T3), Sta. 30+261.5 (T3'), Sta. 30+272 (T4), Sta. 30+273.5 (T4'), Sta. 30+288.5 (T5), Sta. 30+290 (T5'), Sta. 30+330.5 (T6), Sta. 30+261.5 (T3'), Sta. 30+273.5 (T4'), Sta. 30+290 (T5')

This portion of the dike contains a cut-off wall where settlement could occur due to CSB, a rigid material, sitting on top of SB, a soft material. The designed thermistor nodes configuration for T3 (Sta. 30+260), T4 (Sta. 30+272), and T5 (Sta. 30+288.5) were modified to have nodes located very close together and were to be installed to monitor the interface between the CSB and SB materials as noted below. Thermistors T3, T4, and T5 were not installed to the designed depths, but instead have been installed below the interface and monitor the bedrock contact. These thermistors are recording temperatures above 0°C. T3' (30+261.5), T4' (Sta. 30+273.5), and T5' (Sta. 30+290) provide readings across the CSB/SB interface.

Thermistor T6 indicates that the ground is completely unfrozen below El. 132 m. Therefore, the till foundation was unfrozen from September 2017 to August 2018. From El. 132 to 133 m, the ground fluctuates above and below 0°C and from El. 133 to 135 m, and the dike remained frozen.

No seepage directly downstream of this portion of the dike was observed; however, based on the topography, it is anticipated that seepage from this area could report to a lower point within the North Channel (i.e., 30+360). These thermistors show that the till and bedrock were almost completely unfrozen from September 2017 to August 2018.

Sta. 30+386 (T7), Sta. 30+417.5 (T8), Sta. 31+595 (T19), Sta. 31+605 (T20), Sta. 31+850 (T23), Sta. 31+880 (T24), Sta. 31+960 (T25), Sta. 31+995+ (T26), Sta. 32+030 (T27), Sta. 32+060 (T28), Sta. 32+100 (T29)

Eleven thermistors were installed in areas where the bottom of the cut-off wall was jet grouted. These thermistors show that the maximum active layer depth was above 135 m between September 2017 and August 2018. The majority of the rockfill stayed frozen all year and the till and bedrock were unfrozen all year with an exception at T29.

At T29, a part of the till foundation outside of the jet grouted area (between El. 129 m and 133 m) remained frozen for the entire September 2017 to August 2018 period. The jet grouted area, however, did not remain frozen at T29. The temperature of the jet grouted area varied between 0°C and 2°C.

5.3.3 Inclinometers

Six inclinometers are installed at Bay-Goose Dike: Sta. 30+282, Sta. 30+390, Sta. 31+590, Sta. 31+815, Sta. 31+885, and Sta. 32+065. The inclinometer displacements are referenced along Axis A and Axis B. Axis A is perpendicular to the cut-off wall alignment (positive displacement towards the Pit side) while Axis B is perpendicular to Axis A, parallel to the cut-off wall (positive displacements towards the increasing stationing). The use of a new reel has slightly offset the measurements from the ones taken before. Cumulative displacement in Axis A varied from 0.1 mm to 35 mm. Cumulative displacement values for Axis B varied from 0.1 mm to about 25 mm. The larger settlement happened in the upper portion of the dike and in the thermal cap. Recorded displacements are mainly small and are within the tolerable displacements for the structure. In the summer of

2018, a slight lateral movement towards the upstream side (about 5 mm) was measured in the cut-off wall in inclinometers 30+390, 31+885 and 32+815. No other significant movement was observed for all other inclinometers from September 2017 to August 2018, whose measurements have remained relatively stable since 2014. Offsets in the measurement are linked to the replacement of the reel.

5.3.4 Seismograph

Seismograph monitoring of blast vibrations on the crest of Bay-Goose Dike has been done for every blast at Goose-Pit and Pit E4/E5. AEM analysed the monitored blast vibrations after each event. The maximum allowable PVS for all dikes is set at 50 mm/s per the designer's recommendations. The highest recorded PVS for Bay-Goose from September 2017 to August 2018 was 44.2 mm/s at station F, near pit E5. No estimated tensile and shear strains were calculated during the annual geotechnical inspection. The recorded PVSs were compared to the peak particle velocity values used in the previous Meadowbank Pit Blasting Effect Study, which considered the tensile and shear strains, indicating that the blast vibrations recorded are not a concern for the integrity of the dike.

5.3.5 Flow Meters

From July to September 2018, the total average flow of all active monitored seepage station no. 6, 7 8 and 9 due to seepage from the toe of the dike was measured at 10.7 m^3/day compared to 14.7 m^3/day in 2017, 24 m^3/day in 2016, 29 m^3/day in 2015, 132.2 m^3/day (1.5 L/s) in 2013, and 97.2 m^3/day (1.22 L/s) in 2012. The measured flow does not take into account the inflow of water from the pond at Central Channel, as this value has not been measured since 2015 (61 m^3/day in 2013 and 2014). Overall seepage is stable and less than anticipated and is thus currently not a concern.

It is recommended to continue monitoring the evolution of the seepage at the toe of the dike and to continue measuring the inflow of water from the pond at Central Channel.

5.4 Vault Dike

Five thermistor strings were installed on Vault Dike following its construction in the winter of 2013. TH3 is installed in the deepest channel downstream, TH5 is installed under the liner, TH6 is installed upstream of the liner, TH7 is installed east of the deepest channel, and TH8 is installed upstream in the deepest channel outside of the key trench. The Vault Dike thermistor data are presented in Appendix C1. The instrumentation is indicating that the structure is behaving as expected with data following historical trends.

The following thermal regime observation were made:

- The instrumentation shows that the entire foundation of Vault Dike (till and bedrock) is frozen.
- The active layer in the rockfill was up to 6 m thick in the summer of 2018.

5.5 TSF South Cell

5.5.1 Central Dike

Instruments were installed on Central Dike to monitor the dike's performance during its construction, operation, and closure. Nine boreholes were drilled on three rows corresponding to the central key trench (545-P1, 580-P1, 650-P1 and 750-P1), the final downstream toe (545-P2 and 650-P2) and the Portage Pit limit (465-P3, 650-P3, 875-P3 and WR-P3). Four additional boreholes were drilled and instrumented in 2016 during the seepage field investigation in the key trench alignment (595-P1, 810-P1, 825-P1 and 850-P1). Two thermistor strings were also installed on the upstream face to monitor the temperature within the tailings of the South Cell.

Seven additional boreholes were drilled and instrumented in 2017 (700-P1, 745-P3, 800-P2, 800-P3, 875-P2, 975-P3 and 1050-P3). The instrumentation on Central Dike consists in 2018 in a total of 69 piezometers and 20 thermistor strings installed in 20 boreholes.

The following presents a summary of the data collected until August 2018 for the piezometers and the thermistors. Data plots for the instrumentation sent by AEM are presented in Appendix C2.

5.5.1.1 Thermistors

The thermistors are showing similar trends as in the past. The following observations of the thermistor data can be made:

- The instruments installed along the central key trench (545-P1, 580-P1, 595-P1, 750-P1, 825-P1) show thawed conditions (between 0.5°C and 4°C) within the rockfill, the till and the bedrock (from El. 110 m to 65 m).
- Thermistor 825-P1 shows colder readings in 2018 than in 2017, with a temperature range similar to that observed in 2016 (1.8°C to 3.8°C), with less temperature variation over the year in the bedrock and till than last year. This year’s temperature pattern is similar to that observed in thermistor 850-P1 nearby.
- The instruments installed along the downstream toe of the Central Dike footprint for a final crest elevation of 150 m indicate that the till unit at 545-P2 stayed frozen in 2017-2018 but not at 650-P2, while the majority of the bedrock foundation did not freeze (between -0.1°C and 0.4°C below El. 92 m at 545-P2, and between 0.8°C and 1.2°C below El. 102.5 m at 650-P2).
- Throughout the year, temperature variations up to 1°C can be observed for each bead, except in rockfill near the surface (up to 10 m deep) where the amplitude is larger. The bedrock temperature from El. 105 to 55 m varies from -5.9°C to -4.2°C at 465-P3, from -7°C to -0.8°C at 650-P3 and from -0.3°C to 1.1°C at 875-P3. This seems to indicate that a permafrost condition has developed in part of the Portage Pit wall, while the part aligned with the south abutment of Central Dike did not freeze during the year.
- The thermistor installed in the West Road (745-P3) indicated that the rockfill stayed in frozen conditions below El. 124 m except for the bead at El. 120 m (-3.5°C to 0.8°C) and that the dense till stayed frozen all year. It marks the limit of the frozen section observed on the downstream toe of Central Dike.
- Thermistors 875-P3 and 975-P3 installed near portage Pit show that the bedrock remained unfrozen below El. 105 m approximately, with temperatures ranging from 0°C to 1.3°C.

These observations tend to confirm the visual observation of seepage downstream as the foundation of the dike (till and bedrock) on the downstream side are unfrozen all year. Till and bedrock temperature tend to decrease further from the downstream side and the piezometers near Portage Pit show permafrost condition.

5.5.1.2 Piezometers

The general piezometric trend is stable. Most instruments are correlated with the downstream pond elevation.

It can be observed that the piezometers located in boreholes between Sta. 595 and Sta. 875 are strongly reacting to the level of the water pond located downstream of Central Dike. In those boreholes, the 23 piezometers that are non-frozen and not in suction are recording piezometric elevation around El. 115 m; they have also strongly reacted to the pumping of the downstream pond in 2015. The piezometers between Sta. 595 and Sta. 875 located in the rockfill, till and bedrock are reacting similarly, which seems to indicate a hydraulic connection between the downstream pond, the till and the bedrock. The piezometric elevation recorded in the till and the bedrock between Sta. 0+595 and Sta. 0+875 is generally slightly higher than the elevation of the downstream pond, indicating excess pore water pressure. Piezometers 650-P2 and 875-P3 are the only instruments that seem to react to the South Cell level instead of the downstream pond level. Piezometer 650-P2-A has been on the rise since December 2015 and the measured piezometric elevation has now exceeded the South Cell pond elevation. Piezometer 875-P3-A fluctuates with the South Cell head, although piezometer 875-P3-B follows the downstream pond level and thus seems to be slowly rising as the South Cell pond elevation increases. Piezometers at 875-P3 are also the only instruments in the P3 zone that are recording an upward trend.

With the exception of 545-P1-D, the piezometers located between Sta. 465 and Sta. 580 are not reacting to the downstream pond water level or the elevation of the South Cell, and indicate much lower piezometric elevations. The exception to this observation is piezometer 545-P1-D, located in the till, which recorded a drastic increase in piezometric elevation when deposition started in the South Cell in 2014. This piezometer recorded another significant increase in piezometric elevation in the summer of 2015, which at the time was higher than the South Cell water level. Since October 2015, elevation in this piezometer has stabilized to El. 125 m before starting to slowly rise again in January 2017, now following the South Cell level trend. Piezometer 595-P1 shows an increase in the piezometric elevation in the till and the top of the bedrock in July 2017 (about 3 m) compared to November 2017 (about 6 m). The pressure since then has decreased back to the downstream pond level. Piezometer 700-P1 also exhibits a large increase in piezometric elevation since July 2017, rising from El. 107 m to 125 m after the installation of the instruments. The instrument now seems stabilized.

Generally, a downward hydraulic gradient in part of the bedrock and of the till can be interpreted in piezometers located in the same boreholes. Small upward gradients in the till or the upper bedrock can also be observed in some boreholes, such as 580-P1R, 750-P1 and 810 P-1. Significant upward pressure gradients in the bedrock can be observed in holes 545-P1, 545-P2, 700-P1, 825-P1 and 850-P1. It is not possible to observe a generalized upward hydraulic gradient trend that would indicate that pressurised bedrock is transmitting pore water pressure to the till. The piezometric elevation in the bedrock is often similar or smaller than recorded in some parts of the till layer. However, due to the topography, it is possible that water is reporting from bedrock located higher and induces excess pore water pressure on the foundation soil located lower below.

Like in previous years, it can be observed that some piezometers are recording negative pressure (suction). Negative pressure for unfrozen conditions was recorded in seven piezometers. Piezometers in suction are recording very few variations in measured pore water, while the other instruments are reacting to the downstream pond elevation. These instruments are generally located in the bedrock. Based on the available information, it is not possible to determine the exact cause of this suction. This could be due to a problem with the instruments or to a non-continuous geological environment in which the water table is located locally below the installation depth of some of the instruments. The instruments measuring suction are listed in Table 4. The results of these instruments must be interpreted with caution.

By comparing the piezometers' installation elevation to the thermistor readings, it is possible to observe that ten piezometers experienced temperatures below 0°C until the time of the inspection. Four of these piezometers also recorded suctions. The piezometers that were frozen generally showed piezometric readings that were stable except for 465-P3-A, 545-P2-A and 650-P3-A. A piezometer that has frozen once cannot be relied upon even if it thawed, as freezing generally breaks the piezometer or shifts its calibration curve. It is recommended to flag these piezometers and be careful when interpreting their data even if they seem probable. For example, 650-P3-A closely follows the water level fluctuations of the South Cell until 2015, but since it is frozen, the decrease in pore water pressure recorded might not be representative of actual field conditions. The instruments that could have frozen in the past are listed in Table 4.

Table 4: Observations on the Piezometer Readings of Central Dike

Name of Piezometer	Installation Unit	Observation
545-P1-A	Bedrock	Suction.
545-P1-D	Till	Starting in September 2014, the piezometric elevation started to increase rapidly and equilibrate with the South Cell water level. Another rapid increase in 2015. Slow increase since 2017 following the South Cell water level.
580-P1-(A to E)	Bedrock	Instruments stopped working in July 2016. Replaced in 2017 by 580-P1R.
580-P1R-A	Sand	Data available since June 2017. Piezometric elevation fluctuates with downstream pond level.
580-P1R-B	Bedrock	Data available since June 2017. Suction.
595-P1-(D and E)	Rockfill, till	Broken since August 2016 and June 2017.
650-P1-A	Bedrock	Suction. No reading since February 2017.
650-P1-B	Bedrock	Piezometric elevation fluctuates with downstream pond level. No reading since February 2017.
650-P1-(C,D)	Till	Piezometric elevation fluctuates with downstream pond level. No reading since February 2017.
650-P1 (B,D)	Bedrock and till	Broken since August 2016.
700-P1-(A,C)	Bedrock	Piezometric elevation fluctuates with downstream pond.
700-P1-D	Rockfill	Piezometric elevation fluctuates with downstream pond.
750-P1-(A,B,C)	Bedrock, till	Suction.
750-P1-D	Till	Piezometric elevation fluctuates with downstream pond.
750-P1-E	Rockfill	Piezometric elevation fluctuates with downstream pond.
810-P1-(A, B)	Bedrock	Broken since December 2017 and January 2017.
810-P1-D	Till	Frozen.
810-P1-C	Till	Piezometric elevation fluctuates with downstream pond.
825-P1-(A,B)	Bedrock	Piezometric elevation fluctuates with downstream pond.

Name of Piezometer	Installation Unit	Observation
825-P1-E	Till	Sharp increase in April 2017 and has followed the trend of the South Cell pond since then.
545-P2 B	Bedrock	Suction.
545-P2-C	Bedrock	Frozen, suction.
545-P2-D	Till	Frozen, suction.
650-P2-A	Bedrock	Piezometric elevation exceeds the South Cell pond level.
650-P2-B	Bedrock	Piezometric elevation fluctuates with downstream pond level.
650-P2-C	Bedrock	Piezometric elevation fluctuates with downstream pond level, frozen.
650-P2-D	Till	Suction. Frozen.
800-P2-(A,B,C)	Bedrock	Readings available since June 2017. Piezometric elevation fluctuates with downstream pond.
875-P2-(A,B,C)	Bedrock	Data available since June 2017. Piezometric elevation fluctuates with South Cell pond. Small glitch in the data when readings were automatized. PZ-C may be frozen.
875-P2-D	Till	Data available since June 2017. Piezometric elevation fluctuates with South Cell pond until December 2017, then decreases by about 4.5 m. May be frozen.
465-P3-A	Bedrock	Frozen.
465-P3-B	Bedrock	Frozen.
650-P3-A	Bedrock	Piezometric elevation fluctuates with downstream pond. Frozen.
650-P3-B	Bedrock	Suction. Frozen.
800-P3-(A,B)	Bedrock	Readings available since June 2017. Piezometric elevation fluctuates with downstream pond.
800-P3-C	Till	4 episodes of pressure drop followed by an increase back to normal, timed with deposition point change. The theory is that it is linked to the temporary drainage of a nearby fracture.
875-P3-A	Bedrock	Piezometric elevation fluctuates with South Cell pond.
875-P3-B	Bedrock	Piezometric elevation fluctuates with downstream pond but is impacted by the raise in the South cell pond level.

5.5.1.3 Flow Meters

At the time of the inspection an average flow of approximately 263 m^3/hr was pumped back to the South Cell to maintain the downstream pond at El. 115 m, compared to 540 m^3/hr in 2017. Water inflow from this location is pumped back into the South Cell, with the exception of two periods from 29 August to 19 September and 3 to 7 October 2017 during which water was transferred to Goose Pit to reduce the hydraulic pressure on the seepage. This measure combined with an adapted tailings deposition plan effectively reduced the amplitude of the seepage.

5.5.1.4 Seismograph

Seismograph monitoring of blast vibrations on the crest of Central Dike has occurred at four locations along the dike for every blast at Portage Pit. AEM analysed the monitored blast vibrations after each event. The maximum allowable PVS for all dikes is set at 50 mm/s per the designer's recommendations. The highest recorded PVS for Central Dike from September 2017 to August 2018 was 2.63 mm/s. The recorded PVSs were compared to the positive predictive values used in the previous Meadowbank Pit Blasting Effect Study, which considered the tensile and shear strains, indicating that the blast vibrations recorded are not a concern for the integrity of the dike.

5.5.1.5 Turbidity and Water Quality

The turbidity of water in the downstream pond was monitored from 2015 to 2018. The turbidity of the downstream pond increased with the pump speed. It can also be observed that between September 2017 and August 2018, the turbidity decreased in the freshet, then increased strongly during the summer, with a peak at 26.5 NTU. The turbidity levels are generally lower than 20 NTU and the water is usually clear in the downstream pond.

However, between July and August 2018, similarly to the summer of 2017, a change in the water coloration was observed in the downstream pond. The water turned orange and back to normal several times in the cycles. An orange sludge was observed on the surfaces below the water level. No change in pH was measured but turbidity increased during the summer. The available results from chemical analyses indicate that no tailings are present in the downstream pond and that the coloration is linked to natural bacterial processes.

5.5.2 Saddle Dam 3

Five thermistors are installed at Saddle Dam 3. Three of these thermistors are located along the axis of the faulted zone that was encountered during the construction of Saddle Dam 3 (around Sta. 20+650). Along this axis, two thermistors are installed on the crest (SD3-T3 around the centerline and SD3-T2 on the upstream edge), and the other (SD3-T4) is installed on the upstream toe liner tie-in. Another thermistor is installed at Sta. 20+720 within the upstream toe liner tie-in (SD3-T5). One thermistor (SD3-T6) was installed in 2018 on the crest towards the junction with Saddle Dam 2. These thermistors are mostly in permafrost condition, with the bedrock frozen all year long except at SD3-T3, where the upper 3 m of bedrock are part of the active layer. SD3-T6 was recently installed but seems to show a similar behaviour to SD3-T2. It will be important to keep following the performance of the structure now that Saddle Dam 3 is operational for containment of supernatant water.

5.5.3 Saddle Dam 4

Four thermistors are installed at Saddle Dam 4 near Sta. 40+300. One thermistor (SD4-T2) is installed on the upstream edge crest while another (SD4-T4) is installed in the upstream toe line tie-in, and another one (SD4-T1) is in the centre of the upstream face of the dike immediately on top of the geomembrane liner to monitor the thermal regime of the tailings in contact with the structure. One thermistor (SD4-T3) was installed on the middle of the crest in January 2018. These thermistors are mostly in permafrost condition. The beads in the bedrock for SD4-T4 (in the upstream toe liner tie-in) stopped transmitting data in January 2018 and should be repaired. It will be important to continue following the performance of the structure as Saddle Dam 4 is now operational and retaining tailings and water.

5.5.4 Saddle Dam 5

Three thermistors were installed at Saddle Dam 5 in 2018 near Sta. 40+680. One thermistor (SD5-T2) is installed on the downstream edge crest, one (SD5-T4) around the middle of the crest, and another (SD5-T3) is installed in the toe liner tie-in. The three instruments were recently installed and data from mid-August to the end of September 2018 were available for review. SD5-T4 shows frozen bedrock and rockfill up to El. 142 m, while SD5-T2 further downstream indicates that the bedrock and the rockfill are mostly frozen up to El. 141 m with three beads at the surface of the bedrock (El. 134 m to 136 m) showing temperatures between -0.1°C and 0.25°C. The higher temperature at the surface of the bedrock is likely due to run-off water flowing through the rockfill. The evolution of this zone should be monitored over the winter to follow-up on the water flow. SD5-T3 indicated that the bedrock and the compacted till of the tie-in are frozen up to El. 130.8 m. It will be important to continue following the performance of the structure, as this section has only been instrumented for a short period of time.

5.6 TSF North Cell

5.6.1 Saddle Dam 1

Thermistor data from within the structure indicate that the dike foundation remained frozen from September 2017 to August 2018. The foundation soil and bedrock remained in a frozen state with temperatures ranging from about -1.1°C to -5.2°C. At the upstream toe, below El. 132 m, the compacted till base material below the liner remained frozen. The majority of the rockfill shell remained frozen during the reported year as the active layer was 2 m. The instrumentation indicates that the structure is behaving as expected with data following historical trends.

No sign of seepage or thawing of the foundation soil can be observed from the instrumentation data. The structure is performing as expected.

Plots of the Saddle Dam 1 thermistor data are presented in Appendix C3.

The SD1-T1 thermistor string is installed in the centre of the upstream face of the dike immediately beneath the geomembrane liner to monitor temperatures within the deposited tailings. A thin layer of protective granular material exists above the geomembrane liner at this location. This thermistor indicates that the tailings are frozen below approximately El. 146.5 m, with temperatures ranging from -8°C to 0°C, and that there is an active zone in the tailings above El. 146.5 m.

The SD1-T2 thermistor string is installed vertically through the upstream Stage 1 crest in the centre of the dike at El. 140 m. The data show that the dike foundation remained frozen during the past year with temperatures fluctuating between -1.3 C and -4.2°C, which is consistent with historical data. Temperatures between -0.5°C and -1.3°C were recorded in the rockfill of the dike, which remained frozen all year long below El. 140 m. No active layer has been observed below El. 140 m since 2015.

The SD1-T3 thermistor string is installed vertically through the upstream Stage 2 crest in the centre of the dike at El. 150 m. It can be observed that the dike foundation and dike rockfill remained frozen during the past year with temperatures between -4.5 C and -5°C. An active layer in the rockfill can be observed above El. 146 m. The remaining of the rockfill stayed in frozen conditions. The trends observed are consistent with the data from the past years.

The SD1-T4 thermistor string is installed vertically through the upstream toe of the dike near the centre of the dike. It indicates that the dike foundation on the upstream toe, including the liner tie-in till plug, remained totally frozen since 2011, with temperatures ranging from -3.4°C to -1.5°C from September 2017 to August 2018.

5.6.2 Saddle Dam 2

Thermistor data from within the structure indicates that the dike foundation remained frozen from September 2017 to August 2018 with temperatures ranging from -4°C to -7.7°C. At the upstream toe of the dike, the semi-pervious backfill remained frozen during the year. The rockfill mostly stayed in frozen condition with an active layer above El. 148 m. The instrumentation indicates that the structure is behaving as expected with data following historical trends.

No signs of seepage or thawing of the foundation soil were observed. The structure is performing as expected.

Plots of the Saddle Dam 2 thermistors data are presented in Appendix C3.

The SD2-T1 thermistor string is installed in the centre of the upstream face of the dike immediately on top of the geomembrane liner to monitor the thermal regime of the tailings in contact with the structure. This thermistor indicates that the tailings are frozen all year below El. 146.5 m approximatively (temperature between 0°C and -15°C) and that there is an active layer above that elevation.

The SD2-T2 thermistor string is installed vertically through the upstream crest in the centre of the dike at El. 140 m. It shows that the dike foundation remained frozen for the past year (temperature varying from -3.5°C to -7.3°C).

The SD2-T3 thermistor string is installed vertically through the upstream liner tie-in trench near the centre of the dike at about El. 144 m. It shows that the dike foundation and the semi-pervious backfill placed on top of the compacted till remained frozen during the past year (temperature between -3.3°C and -13°C).

The SD2-T4 thermistor string is installed vertically through the upstream toe about mid-way between the centre of the dike and the northwestern abutment. It shows that the dike foundation remained frozen during the past year along with the compacted till base material below the geomembrane liner in this area. The semi-pervious backfill placed on top of the compacted till also remained frozen during the summer of 2018. The temperature varied between -4°C and -8.8°C.

5.6.3 RF1-RF2

Four thermistors were installed in 2012 to monitor the temperature of RF1 and RF2 (which delineates the northeastern side of the TSF North Cell). Plots of their data are presented in Appendix C3.

Three thermistors are installed on RF1 (T121-1, T73-6, and RF1-3). Thermistor T121-1 shows frozen conditions all year long with temperatures varying from -0.4°C to -5.2°C. Thermistor T73-6 shows sub-zero temperatures below El. 149.5 m and the presence of an active layer above that elevation. RF1-3 shows frozen conditions all year long with temperatures varying between 0°C and -9°C.

One thermistor is installed on RF2 (T122-1) and shows temperatures that vary from -1.9°C to -6.4°C, indicating that the RF2 foundation is in a permafrost state.

5.6.4 North Cell Tailings

Five thermistors are installed in the tailings of the North Cell of the TSF (SWD-1, SD2-1, 90-1, NC-TH-1 and NC-TH-2). These thermistors were installed from 2012 to 2016. Nine additional thermistors were installed in 2017 (SWD-01, NC17-01, NC-17-02, NC-17-03, NC-17-04, NC-17-05, NC-17-06, NC-17-07, NC-17-08). Plots of their data are presented in Appendix C3. They indicate that the tailings in the North Cell are not entirely frozen, including in the talik area where the reclaim pond was kept during operation.

Thermistors SD2-1 and SWD-1 were installed in April 2014 in the tailings of the North Cell near SD2 and Stormwater Dike. Data for these instruments were available only from April 2014 to October 2014.

Thermistor 90-1 was installed in 2012 in the tailings of the North Cell near Saddle Dam 1. From September 2017 to September 2018, the tailings at that location from El. 143 m to El. 130 m were frozen all year.

Thermistor NC-T1 and NC-T2 were installed in April 2016 in the tailings of the North Cell in the location of the former reclaim pond. NC-T1 show tailings temperature between 0°C and 3.2°C below El. 144 m and frozen tailings above that elevation. NC-T2 no longer transmits data.

Thermistor NC-17-01 to NC-17-08 were installed in February 2017 in the tailings of the North Cell.

NC-17-01 shows in 2018 an active layer in the tailing and the upper bedrock between El. 130 and 135 m, frozen tailings above that El. 135 m, and frozen bedrock below El. 130 m, with temperatures ranging between 0°C and -2°C.

NC-17-02 shows that the tailings and the bedrock did not freeze in 2018 below El. 139 m, with temperatures ranging between 0°C and 2.3°C. The unfrozen conditions are attributed to the presence of the supernatant water pond near the Saddle Dams close to the instrument.

NC-17-03 shows that the tailings and the bedrock did not freeze in 2018 below El. 140 m, with temperatures ranging between 0°C and 2°C. The unfrozen conditions are attributed to the presence of the supernatant water pond between RF1 and RF2 close to the instrument.

NC-17-04 shows that the tailings and the bedrock remained in 2018 below El. 135 m, with temperatures ranging between 0°C and -3.5°C. Another zone located in the tailings between El. 142 and 148 m did remain frozen, with temperatures ranging between 0°C and -10°C. Between El. 135 and 142 m, the tailings did not freeze and indicate the presence of a talik, consistent with the observations made when the reclaim water pond was present at this location during operations. An active layer is observed in the tailings above El. 148 m.

NC-17-05 shows that the tailings remained frozen in 2018. No active layer is observed in the tailings and the bedrock between September 2017 and August 2018.

NC-17-06 shows that the tailings and the bedrock remained frozen in 2018 below El. 145 m, with temperatures ranging between -9°C and 0°C. An active layer is observed in the tailings above El. 145 m.

NC-17-07 shows that the tailings and the bedrock remained frozen in 2018 below El. 145 m, with temperatures ranging between -10°C and 0°C. An active layer is observed in the tailings above El. 145 m.

NC-17-08 shows that the tailings and the bedrock did not freeze in 2018 below El. 140 m, with temperatures ranging between 0°C and 3.5°C. The unfrozen conditions are attributed to the location of the instrument directly within the supernatant water pond.

The temperature profile measured in thermistor SWD-01 is discussed in the next section.

5.7 Stormwater Dike

On 25 August 2016 two wireline extensometers, four crack monitoring stations and three prisms were installed on the crest of Stormwater Dike in the area showing movements (between Sta. 10+500 and 10+750 approximately). Following the MDRB recommendations, AEM installed additional instruments in 2017 to monitor the response of Stormwater Dike during tailings deposition in the South Cell. In 2018, an additional prism and 3 crackmeters were added, leading to a total of 3 piezometers, 3 thermistors, 4 extensometers, 3 crackmeters and 20 prisms installed on Stormwater Dike.

From September 2017 to August 2018, the prisms measured movement mainly in the vertical direction (up to 49 cm cumulative displacement). Limited lateral displacement (millimetres) was measured towards the South Cell (downstream side). Most of the movement happened during freshet, after cracks appeared on the crest, then it slowed down towards stabilization. The maximum cumulative displacement recorded for the summer period is around 10 cm. The 3D velocity measured decreased from 3 mm/day on average during freshet (with a peak of 15 mm/day in May 2018) to 1 mm/day in summer.

In 2017, three new thermistors (SWD-01, SWD-02 and SWD-03) and two new piezometers were installed in investigation boreholes (PZ-SWD-02, and PZ-SWD-03).

SWD-01 is installed on the upstream side of Stormwater Dike within the North Cell tailings. This thermistor shows that the tailings and the bedrock did not freeze between September 2017 and August 2018 below El. 132 m with temperatures ranging between 0°C and 2.5°C. The unfrozen conditions are attributed to the presence of the supernatant water pond close to the instrument. The temperature readings indicate that the tailings between El. 132 m and 147 m stay frozen throughout the year, and that an active layer is present above El. 147 m.

SWD-02 is installed on the downstream side of Stormwater Dike (approx. Sta. 10+650 m) within the stabilization buttress and is covered by the South Cell reclaim pond. No data is available below El. 115 m. This thermistor shows that the till remained frozen between El. 115 and 123 m, with temperatures ranging between -0.7°C and 0°C. Above El. 123 m, the measurements show that the overlaying till, lakebed sediments, and rockfill did not freeze.

SWD-03 is installed on the downstream side of Stormwater Dike (approx. Sta. 10+690 m) within the stabilization buttress and is covered by the South Cell reclaim pond. This thermistor shows that the till and the bedrock remained frozen between September 2017 and August 2018 below El. 121.5 m, with temperatures ranging between -0.8°C and 0°C. Above El. 121.5 m, the measurements show that the overlaying till, lakebed sediments, and rockfill did not freeze.

The piezometers installed in 2017 show a trend in pore water pressure that follows the evolution of the water level in the South Cell reclaim pond. PZ-SWD-03-B installed in the till shows that the hydraulic head overlaps almost exactly with the measured water level in the South Cell, with a variable offset (up to 2 m below) starting in October 2017. PZ-SWD-02-A and PZ-SWD-03-A are installed within the bedrock and follow a similar trend, with an offset. PZ-SWD-02-A appears to be in continuity with the last measurements of the broken VWP 13265 instrument.

Plots of Stormwater Dike thermistor and piezometer data are presented in Appendix C3. The movement monitoring data can also be found at the end of this appendix.

5.8 North Cell Internal Structure

Four vertical thermistor strings were installed on the crest of the North Cell Internal Structure in August 2018 (NCIS-01, NCIS-02, NCIS-03 and NCIS-04), as detailed in Figure 2 in Section 4.4. NCIS-01, NCIS-02 and NCIS-04 are installed on the upstream side of the dike whereas NCIS-02 is installed on the downstream side.. At the time of the inspection, the instruments had just been installed and the data reviewed by Golder included early August to the end of September 2018.NCIS-01, NCIS-02 and NCIS-03 show frozen tailings and an active layer within the entire layer of rockfill, while NCIS-04 indicates that the active layer extends into the first 0.5 m of the tailings.. It will be important to continue following the performance of the structure as the North Cell Internal Structure is now operational and retaining tailings and has only been recently built.

Plots of the North Cell Internal Structure thermistor data are presented in Appendix C3.

6.0 ALL-WEATHER PRIVATE ROAD

The All-Weather Private Road (AWPR), formerly referred to as the All-Weather Private Access Road (AWPAR), was built in 2007-2008 to connect the hamlet of Baker Lake to the Meadowbank Mine site (Figures 2A, 2B, and 2C). The road is approximately 107 km long with nine bridge crossings and culverts installed at a total of thirty-eight locations. Each structure along the AWPR, their designated name, their approximate location, and the observations noted during the inspection is provided in Table 6, after the text.

The road design is based on a general rockfill sub-base and crushed granular rockfill surfacing with a combined minimum thickness of 1 m over thawed stable soil and 1.2 m over thawed susceptible soil.

No sign of thermal degradation of the permafrost was observed on the road during the inspection. It should be noted that signs of thermal degradation may not necessarily be observed due to the regular road maintenance performed by AEM. During the inspection, water levels and flow velocities at the crossings were normal for the time of year.

Fill material that comprises the majority of the road provides no significant barrier to low gradient water flow due to its coarse nature. During higher flow and runoff periods, water may flow through portions of the road fill. Water was observed flowing through the rockfill near four culverts during the inspection, and signs that water flowed beneath the road were observed at some other locations during the inspection. This could also be due to the inlet or the outlet of some culverts having been installed too high or too low, which did not promote the flow of water through the culvert until a certain water level had been reached.

During the year, AEM conducts regular and event-based visual inspections of the fish-bearing water crossing locations along the access road. This data should continue to be compiled by AEM to confirm the hydraulic function of the crossings, the adequacy of the crossing locations with respect to the watercourses, and minimal impact to fish habitat.

It is understood that AEM's monitoring program includes an assessment of sedimentation and potential erosion issues at the major bridge crossings. Consideration should be given to expanding AEM's monitoring program to include all culverts and bridges along the road to assess whether they are providing adequate capacity during the freshet and following large precipitation events.

6.1 Culverts

The culverts were generally in good condition at the time of the inspection. No significant degradation of culvert conditions has been observed when compared to the 2017 inspection. Most culverts were unobstructed with no signs of erosion and no signs of damage to the culverts.

A photographic log of the inspected culverts is provided in Appendix D1. Culverts in the following discussion, and in the photographic log, have been identified by name (e.g., R-24) to be consistent with those indicated on the as-built drawings provided by AEM. Some of the additional culverts installed in 2010 and 2011 are not shown on these figures. Each culvert is also identified by its approximate kilometre location (e.g., km 98+250) along the road alignment.

Signs indicating that minor erosion has occurred were observed at the inlet of PC-17A (8+830), and at the outlet of R14 (km 67+840) and R24 (km 98+100). No action is recommended for the culverts showing sign of erosion as the situation seems stable. Culvert erosion progression should be monitored at freshet.

During the inspection, signs of water flowing beneath the road were observed at some locations. This is generally due to the inlet or the outlet of the culvert having been installed too high or too low, which did not promote the flow of water through the culvert until water reached a certain level. This condition can promote erosion and risk of washout beneath the road and should be monitored. This situation has been observed in the past and seems to be stable as no signs of deteriorating conditions were observed. This condition was observed at PC-17A (8+830), PC-11 (39+552), R-18B (82+500), R-20 (85+490), and R-23 (93+600). PC-11, PC-17A, R-20 and R-23 showed a flow of water during the inspection. The progression of the situation should be monitored at freshet.

Obstructed and damaged culverts were observed at some locations during the inspection. In many cases, the obstructions are related to inlets and/or outlets becoming partially or completely obstructed by accumulated rockfill and road material. There was no substantial increase in the number of significantly damaged culverts observed during the 2018 inspection when compared to last year. The following culverts were too damaged and obstructed to function properly: R-00A (2+550), PC-14 (4+260), unnamed culvert at 5+700, and PC-16 (54+950). If insufficient capacity to handle the flow is observed at locations where culverts are obstructed or damaged, it is recommended to clear the obstructions or repair the culvert.

The observations and descriptions for each culvert at the time of the inspection as well as recommendations can be found in Table 6, after the text. For example, for some culverts, it is recommended to monitor the water level upstream and the flow through the culvert during high flow events (e.g., freshet season).

6.2 Bridges

Nine bridges are located along the AWPR: four Acrow Panel bridges and five Rapid Span bridges. A structural and/or mechanical assessment of the bridges was not conducted and is beyond the scope of this geotechnical inspection. A description of the observations of the bridges made during the inspection is presented in Table 6 after the text. A photographic log of the bridges is included in Appendix D2.

The bridges have been identified in sequence, increasing in number along the road from Baker Lake to Meadowbank (e.g., from Bridge 1 to Bridge 9). The name of each bridge (e.g., R02) is consistent with the as-built drawings of the AWPR provided by AEM. Each bridge is also identified by its approximate kilometre location (e.g., km 8+750).

Due to the low-lying terrain between Baker Lake and Meadowbank, water flow typically occurs in broad areas and not in well-defined channels. The majority of water crossings spanned by bridges have increased channelization of flow due to the embankment fill at the crossing location. No significant signs of embankment erosion were observed at the time of the inspection as they are generally constructed with coarse rockfill.

The bridges and their embankments were in good geotechnical condition at the time of the inspection. Signs of settlement were observed at Bridge R-15 and this condition should continue to be monitored. The following observations were made for each bridge during the inspection:

- **Bridge 1, R02 at about km 8+750**: Normal flow was observed at the time of the inspection. No signs of erosion or turbidity were noted. In 2011, two additional culverts of 1,800 mm in diameter were installed nearby to increase the drainage capacity during high flow events and prevent the road and the bridge from washing out. It is understood that AEM removes snow and ice at this location and other bridges before the freshet and will continue this practice in the future.
- **Bridge 2, R05 at about km 17+600**: Minor damage to the bin wall of both abutments was observed; it is likely a result of past snow removal activities. No reparation is required yet. No evidence of erosion was observed, and the foundation was in good condition. The streambed consists primarily of cobbles, gravel, and a few boulders towards the perimeter of the channel.
- **Bridge 3, R06 at about km 23+100**: Construction of the bridge has concentrated flow in this area. No signs of erosion or turbidity were observed, and the bridge was in good condition at the time of the inspection.
- **Bridge 4, R09 at approximately km 48+500**: Construction of the bridge has concentrated flow in this area. No signs of turbidity or erosion were observed at the time of the inspection and the bridge was in good condition.
- **Bridge 5, R13 at about km 62+060**: At the time of the inspection, the bridge was in good general condition. No signs of turbidity or erosion were observed. The side of the north abutment seems inclined; it is thus advised to be on the lookout for possible reparation.
- **Bridge 6, R15 at about km 69+200**: Signs of settlement were observed as the bridge was dipping toward the western side on both abutments. The bridge foundation did not show any signs of adverse conditions but is slowly settling. No remediation work is recommended for the moment, but the situation should be monitored. Minor damage to the bin wall of both abutments was also observed and is likely a result of past snow removal activities. No evidence of erosion or turbidity was observed.
- **Bridge 7, R16 at about km 73+800**: No signs of erosion or turbidity noted. Construction of the bridge has concentrated the flow in this area.
- **Bridge 8, R18 at about km 79+500**: The bridge was in good condition. A boulder field is located beneath the bridge and no flow was observed at the time of the inspection.
- **Bridge 9, R19 at about km 83+150**: Steel plates with pipe anchors are installed along both embankments of the bridge. Some damage (bending) to the steel containment plates was observed, which may be associated with snow removal activities. The damage is minor and does not impact the geotechnical integrity of the bridge or of the embankment as the surrounding pipes seem to hold the metal sheet in place (protecting the abutment backfill). No turbidity or erosion was observed at the time of the inspection.

7.0 AMARUQ ROAD

Amaruq Road was built in 2016-2017 to connect the Meadowbank Mine site to the Amaruq site under development. The road is 64 km long with eight bridge crossings and culverts installed at a total of 290 locations. Each structure along Amaruq Road, their designated name, their approximate location and the observations noted during the inspection is provided in Table 7, after the text.

The road design is based on a general rockfill from quarries or sand and gravel from esker burrow pit sub-base and crushed granular rockfill surfacing with a combined minimum thickness of 1 m over thawed stable soil and 1.2 m over thawed susceptible soil.

No sign of thermal degradation of the permafrost was observed on the road during the inspection. It should be noted that as with the AWPR, signs of thermal degradation may not necessarily be observed in the future due to the regular road maintenance performed by AEM. During the inspection, water levels and flow velocities at the crossings were normal for the time of year.

Fill material that comprises the majority of the road provides no significant barrier to low gradient water flow due to its coarse nature. During higher flow and runoff periods, water may flow through portions of the road fill. Water was observed flowing through the rockfill near one culvert during the inspection, but signs that water flowed beneath the road were observed at some locations during the inspection. This could also be due to the inlet or the outlet of some culverts having been installed too high or too low, which did not promote the flow of water through the culvert until a certain water level had been reached.

At the time of the inspection, widening of Amaruq Road was being completed. As with the AWPR, AEM plans on conducting regular and event-based visual inspections during the year of the fish-bearing water crossing locations along the access road. This data will be compiled by AEM to confirm the hydraulic function of the crossings, the adequacy of the crossing locations with respect to the watercourses, and minimal impact to fish habitat.

It is understood that AEM’s monitoring program includes an assessment of sedimentation and potential erosion issues at the major bridge crossings. Consideration should be given to expanding AEM’s monitoring program to include all culverts and bridges along the road to assess if they are providing adequate capacity during the freshet and following large precipitation events.

It is recommended to be on the watch for signs of erosion along the high sandy side slopes along the road and to backfill potential erosion at the toe of bridges as soon as it is noticed.

7.1 Culverts

All culverts with a diameter larger than 900 mm were thoroughly inspected. Smaller diameters culverts were checked from the road surface. Culverts not observed should be considered possibly buried.

The culverts were generally in good condition at the time of the inspection. Most culverts were unobstructed with no signs of erosion and no signs of damage to the culverts.

Many culverts seem to have been installed rather high, depending on the permeability of the road to freshet flow, thus possibly posing a risk of road washout. The worst condition would be a continuous boulder field under the sand and gravel road foundation without a rockfill layer at the base of the road.

A photographic log of the inspected culverts is provided in Appendix E1. Given that culverts are newly installed and almost all in good condition, only locations where important observations were made are documented in the photographic log. Culverts in the following discussion, and in the photographic log, have been identified by their identification number to be consistent with those indicated on the list provided by AEM. Each culvert is also identified by its approximate kilometre location (e.g., km 16+324) along the road alignment, starting at Vault Pit.

No signs of erosion were observed during the inspection. It must be noted that the culverts are newly installed and locations where erosion could occur may not be identified yet. At culvert #194, the lack of rockfill layer may pose a risk of washout in the future. Culvert erosion progression should be monitored at freshet.

During the inspection, signs of water flowing beneath the road were observed at two locations, culvert #167 (41+843) and #232 (53+928). This is generally due to the inlet and the outlet of the culvert having been installed too high, which does not promote the flow of water through the culvert until a certain water level has been reached. This condition can promote erosion and risk of washout beneath the road and should be monitored. The progression of the situation should be monitored at freshet.

Obstructed and damaged culverts were observed at some locations during the inspection. In many cases, the obstructions are related to inlets and/or outlets becoming partially or completely obstructed by accumulated rockfill and road material or blocks. The following culverts were completely obstructed at a least one of the extremities: #7 (2+013), #13 (4+615), two outlets of the set of culverts #47 (11+101 to 11+107), #61 (1+050), #63 (13+390), #83 (20+300), #86 (20+740), #97 (22+436), #98 (22+482), #111 (26+461), #117 (27+173), and #278 (61+870). If insufficient capacity to handle the flow is observed at locations where culverts are obstructed or damaged, it is recommended to clear the obstructions or repair the culvert.

The observations and descriptions for each culvert at the time of the inspection as well as recommendations are provided after the text in Table 7. For example, for some culverts it is recommended to monitor the water level upstream and the flow through the culverts during high flow events (e.g., freshet season).

7.2 Bridges

Eight bridges are located along Amaruq Road. A structural and/or mechanical assessment of the bridges was not conducted and is beyond the scope of this geotechnical inspection. A description of the observations of the bridges made during the inspection is presented in Table 7, after the text. A photographic log of the bridges is included in Appendix E2.

The bridges have been identified by their approximate kilometre location (e.g., km 16+000) along the road alignment, starting at Vault Pit.

Due to the low-lying terrain between Meadowbank and the Amaruq site, water flow typically occurs in broad areas and not in well-defined channels. The majority of water crossings spanned by bridges have increased channelization of flow due to the embankment fill at the crossing location. No significant signs of embankment erosion were observed at the time of the inspection as they are generally constructed with coarse rockfill.

The bridges and their embankments were in good geotechnical condition at the time of the inspection. No signs of erosion or turbidity were observed.

8.0 QUARRIES AND ESKERS

8.1 Quarries along the All-Weather Private Road

Twenty-two quarries were developed in the past along the AWPR to provide material for its construction. An additional quarry was developed near the airstrip at Meadowbank to provide further construction materials. All quarries were inspected as part of the geotechnical inspection, and a photographic log is presented in Appendix F1. A summary of the observations and recommendations made during the 2018 inspection for the structures along the AWPR road including the quarries is provided in Table 7, after the text. In accordance with the as-built drawings, the quarries have been numbered sequentially from 1 to 22 starting near Baker Lake and increasing towards Meadowbank. The airstrip quarry is referred to as Quarry 23 and is used to store miscellaneous items such as drill core on racks, diamond drill contractor drill rigs, sea-can containers, pipes, and culverts.

The closure and reclamation plan require that all quarries and borrow sources developed during the construction of the AWPR be reclaimed following their use. The closure plan further requires that all quarry slopes be left at an angle of 45 to 50 degrees. During the inspection, it was observed that slope remediation was in progress but none of them were totally reclaimed. Most quarries are clean although some walls need scaling. Loose blocks and granular material were also removed from most quarry walls. Loose blocks and granular material had been placed at the toe of the walls. At the time of the inspection, the majority of the quarries were dry.

During the inspection, it was observed that Quarries 4 and 14 were flooded. These quarries have been flooded for a couple of years and it is understood that AEM is evaluating how to eliminate the ponding of water within these quarries. Quarries 5 and 15 contained minor accumulations of water. Quarries that contain significant amounts of ponded water should be monitored to assess if ponding persists and, if necessary, whether ditches should be developed to facilitate the drainage of water.

Unstable blocks and loose rocks along steep walls remain in Quarries 3, 7, 9, 10, 16 and 23. The west wall of Quarry 3 also contains a falcon nest that prevents its maintenance. It is recommended that workers be cautious in these quarries, be aware of the potential hazard, and stay at a minimum 20 m distance of the walls.

8.2 Eskers and quarries along Amaruq Road

Six eskers and two rock quarries were developed in the past along Amaruq Road to provide material for its construction. All of them except Eskers #2D, #4 (A to D) and #5A are still active. All eskers and quarries were inspected as part of the geotechnical inspection and a photographic log is presented in Appendix F2. A summary of the observations and recommendations made during the 2018 inspection for the structures along Amaruq Road, including the eskers and quarries is presented in Table 7. In accordance with the as-built drawings, eskers have been numbered sequentially from 1 to 6 starting at Meadowbank and increasing towards the Amaruq site. The quarries are not numbered and were identified for the inspection by their approximate location along Amaruq Road.

The closure and reclamation plan require that all quarries and borrow sources developed during the construction of Amaruq Road be reclaimed following their use. The closure plan further requires that all quarry slopes be left at an angle of 45 to 50 degrees. At the time of the inspection, all of the quarries and eskers were dry, except esker #2, which contained a small accumulation of water.

Esker #3 was only inspected from the entrance. The north access ramp is built on a steep slope that seems undercut at its toe. It is recommended to change the access, as this poses an important geotechnical risk.

For esker #5, the soil was stripped to the limit of the permafrost.

Unstable loose rocks along steep walls and unstable soil slopes were observed in all eskers and quarries, except Esker #5. It is recommended that workers be cautious in these locations and are aware of the potential rockfall hazard.

9.0 BULK FUEL STORAGE FACILITIES

This section contains the observations made during the 2018 annual inspection of the Baker Lake, Meadowbank and Amaruq tank farm facilities (Main Camp and Vault).

9.1 Baker Lake Tank Farm

The Baker Lake tank farm consists of six large-capacity tanks (10 million litres each) and twenty Jet A fuel tanks (100,000 litres each) that were constructed within four bermed areas (containment cells). Tanks 1 and 2 are located within the first containment area, which is located on the western side of the fuelling area. Tanks 3 and 4 are located within a second containment area adjacent to the first. A central berm is located between the two containment areas. Tanks 5 and 6 are within the third containment area located north and upslope of Tanks 3 and 4. Tanks 5 and 6 are situated within an entirely separate containment cell subexcavated into the hill slope above the initial tank farm area. Twenty Jet A Fuel tanks were installed in 2013 in a containment area located northwest of Tanks 5 and 6 lying over a 0.5 m-thick granular base fill material.

Each containment area has been lined with a 1.5-mm high density polyethylene (HDPE) geomembrane to provide secondary containment.

Visual inspection of the majority of the liner in the containment areas for Tanks 1 to 6 was not possible as it is covered with granular fill material to provide protection. The granular fill material protecting the geomembrane was eroded due to wave actions in some areas, exposing the geomembrane. This condition was observed all along the south side of Tanks 3 and 4 and on the west side of Tank 1. A section of exposed geomembrane with a fold was observed at the northwestern corner of Tank 2 and the northeastern corner of Tank 4. A hole in the exposed geomembrane (300 mm diameter hole) was observed on the south southwestern corner of Tank 3 at the toe of the slope. The hole in the geomembrane should be repaired to ensure a good performance of the retention basin. It is also recommended to cover the exposed area with geotextile and fill material to re-establish the liner protection. Liner is exposed on the northern side of Tank 5. As this condition appears above the elevation of the southern berm, it is considered that the protection of the liner with granular material is not as important as in other areas; however, it remains a good practice and provides protection against animal damage.

Animal burrows were observed near the southern corner of Tank 2. It is recommended to assess whether the geosynthetics have been damaged.

Ponded water was observed on the southern side of the second and third containment areas. Presence of water on the southern side of the containment areas was reported in the 2011 to 2017 geotechnical inspections. No sump or pump was visible during the site visit. It is recommended to keep the water accumulation at a minimum near the tank foundation.

The geomembrane of the containment cell of the 20 Jet A fuel tanks remains uncovered around the tanks. The bituminous geomembrane is damaged by the Jet A fuel (melting). Water was observed ponding within the eastern and southern sides of that containment cell. It is recommended to remove that accumulation of water before it freezes to avoid damaging the geomembrane of the containment cell by ice accumulation. If melting of the bitumen continues, then the liner may be damaged in such a way that contaminated water would seep into the environment. It is recommended that AEM sample the liner for performance testing by a geosynthetics laboratory and take appropriate measures to protect the environment.

The embankments around the first and second tank farm containment areas were stable. Tension cracks observed in the past on the upper bench north of Tanks 3 and 4 and south of Tanks 5 and 6 are disappearing. The northern slope of the containment area of Tanks 5 and 6 are steep and the sand and gravel cover may be prone to erosion.

The fuelling station on the western side of the tank farm consists of two containers and a pumping system. The fuelling area is covered by granular road base material. The fuelling station was in good geotechnical condition.

A photographic log of the Baker Lake tank farm and a plan view that shows the location of the photos and observations are included in Appendix G1.

9.2 Meadowbank Tank Farm (Main Camp)

The Meadowbank Main Camp tank farm consists of a single large-capacity tank (5.6 million litres) constructed within an area that has been subexcavated to provide secondary containment. The area has been lined with a 1.5-mm HDPE geomembrane.

At the time of the inspection, the tank backfill foundation pad was in good condition. The liner was well covered with granular fill material for protection, except in the eastern corner of the containment area where a portion of liner is exposed. The granular protection layer over this section should be repaired.

Water (approximately 50 mm) was observed ponding within the eastern corner, as in 2017. Signs of high water levels being present in this area in the past were noted during the inspection. Pumping of ponded water is considered a good practice and should resume.

A fuelling station is located on the northern side of the tank farm. The fuelling area is covered by granular road base material and a geomembrane liner is installed below the refuelling area.

As the tank farm area has been subexcavated, runoff from the tank farm is not anticipated to occur. The side slopes in the tank area are shallow and appear stable.

A photographic log and a plan view that shows the location of the photos and observations noted at the Meadowbank tank farm is provided in Appendix G2

9.3 Meadowbank Tank Farm (Vault Pit Area)

The Vault tank farm consists of five tanks and was built in 2014. The retention basin is installed below the rockfill pad and is made of a geosynthetic clay liner. No geotechnical issues were noted with this structure.

A photographic log and a plan view that shows the location of the photos and observations is provided in Appendix G3.

9.4 Amaruq Tank Farm

The Amaruq tank farm was under construction at the time of the inspection. At the time of the inspection, the temporary tank backfill foundation pad was in good condition. No geotechnical issues were noted with this structure.

A photographic log is contained in Appendix G4.

10.0 OTHER MEADOWBANK FACILITIES

This section contains the observations made for the other Meadowbank facilities visited during the 2018 geotechnical inspection such as site roads, the diversion ditch and erosion protection structure, the RSF till plug, the diffusers, the landfill, the contaminated soil storage and bioremedial landfarm facility, the Stormwater Management Pond, and the airstrip. Figure H1 shows the location of the photos taken during the inspection for the other Meadowbank facilities.

10.1 Site Roads

The following roads were inspected:

- East Road – Former haul road between North Portage Pit and East Dike.
- West Road – Haul road between North Portage Pit and the plant.
- Vault Road – Haul road between North Portage Pit and the Vault deposit.
- RF1 – Starts near the northern abutment of Stormwater Dike and follows the eastern perimeter of the TSF's North Cell and the southwestern side of the Portage Rock Storage Facility.
- RF2 – Starts at the end of RF1 and follows the western side of the Portage Rock Storage Facility.

These roads were of adequate width and had appropriate berms at the time of the inspection. The haul road from Goose Pit to the plant was not inspected during this investigation. No geotechnical concerns were identified with East Road, West Road, RF1, and RF2.

Three culverts are installed beneath Vault Road at coordinates 640 964 E / 7 217 466 N. They were slightly collapsed in the middle and showed signs of erosion at the inlet. This condition was observed from 2012 to 2017. No action is required as their condition is stable. These culverts need to be monitored during freshet to ensure that they provide sufficient capacity and that erosion is not occurring. Two other culverts are located at 639 214 E / 7 216 189 N on Vault Road. These culverts were repaired last year and are now in good condition. It is recommended to observe this area at freshet and to clear the obstructions if insufficient capacity to handle the flow is observed.

Temporary roads developed for construction purposes were not inspected.

Photographs of the Vault Road culverts are provided in Appendix H1.

10.2 Diversion Ditches and Sediment and Erosion Protection Structure

A retention basin and a series of diversion ditches (Western and Eastern) surround the catchment basin of the North Cell. These structures are designed to convey surface water runoff away from the TSF.

Since 2014, the Western Diversion Ditch has been directing the water to a retention basin, which is then pumped to the North Cell due to a turbidity problem caused by the erosion of the ditches. Rehabilitation work was done in 2016 to address the situation. The Eastern Diversion Ditch discharges to lake NP-2, then lake NP-1 and then to Dog Leg Lake. Sediment barriers and erosion protection structures are installed at the outlet of the diversion ditch in Lake NP-1, Lake NP-2 and Third Portage Lake (Dog Leg Lake).

During the inspection, it was observed that the diversion ditches around the TSF western and eastern extensions were in good condition. The erosion protection structure and sediment barriers were also in good condition at the time of the inspection. It is important that they be inspected prior to the freshet season. The Western Diversion Ditch will need to be amended for closure in order to drain the accumulation of water in its northern part.

Photographs of the diversion ditch and its sediment and erosion protection structure are provided in Appendix H2.

10.3 RSF Till Plug

The RSF till plug (till plug) is located on the upstream side of the Diversion ditches access road between the Waste Rock Storage Facility (RSF) and lake NP2. The till plug is a zoned low permeability earth fill structure intended to prevent seepage from the RSF to reach lake NP2 and to facilitate seepage collection on the upstream side.

The till plug was constructed in the summer of 2013. Its construction consisted in profiling the upstream slope and placing a 0.5 m thick layer of compacted crusher reject, and then installing a geotextile membrane covered by 0.5 m of fine ultramafic rockfill and material reject from till sieving. Both granular layers were compacted with an excavator bucket.

No sign of erosion or geotechnical issues were identified with this structure during the inspection. A pump equipped with an automatic switch was installed within the pond contained by the plug to redirect the water to the North Cell. As the chemical monitoring in NP2 has not shown any signs of contamination for the last two years, the performance of the till plug is considered adequate.

Appendix H3 contains photographs of the till plug.

10.4 Diffusers

The objective of the diffuser is to return the water to the environment without eroding the shoreline. There is a diffuser at Vault (within Wally Lake), and there has not been a diffuser at Portage Lake since 2015.

The diffuser at Vault is functioning normally and no sign of erosion or disturbance was noted along the shore.

Photographs of the diffuser are provided in Appendix H4.

10.5 Landfill

The Meadowbank landfill is located on the northeastern side of the TSF, within the Portage RSF area. It is being progressively constructed and filled. Waste material is being dumped within a bermed area on a pad built using waste rock from the open pit. The waste is then covered with a thin layer of rockfill to reduce windblown debris. No geotechnical concerns were identified with the landfill. Photographs of the landfill are provided in Appendix H5.

10.6 Contaminated Soil Storage and Bioremedial Landfarm Facility

The Meadowbank Contaminated Soil Storage and Bioremedial Landfarm Facility was initially located on the downstream side of Stormwater Dike within the TSF South Cell close to the Water Treatment Plant (WTP). This area is now completely covered by water. During the summer of 2016, this structure was relocated north of Central Dike, within the South Cell, to prevent it from being flooded by the South Cell water pond. A 1 m thick till pad has been placed for the landfarm foundation. A berm surrounds the landfarm to contain the fluid/runoff and stops it from moving laterally. Contaminated soils are stored within this cell to promote biodegradation until the soil meets environmental criteria before being disposed within the Portage Rock Storage Facility.

The active area lies over a natural steep slope covered by rockfill as a pad made to operate the landfarm. The west slope of the rockfill pad is at its angle of repose (seemingly 1.1 to 1.3H:1V). This rockfill was probably placed without neither lifts nor compaction and extends into the South Cell pond. The slope is considered at risk for high deformation to slope failure. The risk will increase as the water level in the South Cell raises. Signs of superficial slope failure were observed during the inspection. It is recommended to watch out for signs of instability and be prepared to close off the area if need be. Workers who access the area should be informed of the potential risk and be trained to recognize signs of instability.

Photographs of the Contaminated Soil Storage and Bioremedial Landfarm Facility are provided in Appendix H6.

10.7 Stormwater Management Pond

The Stormwater Management Pond is located near the main camp and is being used to store various site waters and sewage. No runoff from the pond was observed at the time of the inspection. No geotechnical concerns were identified with Stormwater Management Pond and the nearby crusher ramp. Due to the proximity of the crusher ramp to the pond, it is recommended that regular geotechnical inspections of the crusher ramp be conducted. The surface of the ramp was not inspected on safety grounds.

No geotechnical concerns were identified with this structure. A photographic log of the Stormwater Management Pond is provided in Appendix H7.

10.8 Airstrip

There are several small channels dug adjacent to the airstrip to divert water into small excavations or “ponds.” The channels and ponds are unlined, and the ponds have no designed outlet structure. In general, these ponds serve to collect water and allow suspended sediments to settle out before the water overflows into other vegetated areas and/or infiltrates them, depending on the thermal state of the soils.

The runway was extended in the winter of 2013 at both ends to allow a Boeing 737-200 to land at the Meadowbank site. The northwestern boundary of the airstrip extends approximately 20 m within the lake and was constructed in two phases. Rockfill was placed 1.0 m above water during Phase 1 and the rockfill was constructed to its final elevation during Phase 2. The rockfill slopes for Phase 2 have a side slope of 1.5H:1.0V. The rockfill of Phase 2 is surrounded by a 17.0 m wide bench going from the toe of Phase 2 to the edge of the crest of Phase 1. The Phase 1 rockfill surface and visible side slope were built with coarse boulders to protect the embankment against waves and ice action. The airstrip construction within the lake is considered appropriate.

The slopes were re-profiled along a portion of the airstrip in 2017 to a 3H:1V slope to prevent settlement.

No geotechnical concerns were identified with this structure during the inspection. A photographic log of the airstrip is provided in Appendix H8.

11.0 SUMMARY AND RECOMMENDATIONS

The following presents a summary of the key findings and recommendations of the 2018 geotechnical inspection.

11.1 Dewatering Dikes

- The condition of the dewatering dikes is regularly inspected by the mine and this practice should continue.
- The most current version of the OMS manual (AEM, 2018) is dated February 2018 for the dewatering dikes. The most current version of the overall Emergency Response Plan (ERP) for the mine (AEM, 2017) is dated January 2017. It is a good practice to keep these documents updated. The OMS manual should be updated in 2019 according to the Mining Association of Canada most recent guidelines. The roles and responsibilities could then be modified so that the EoR is notified in the event of significant variations in the instrumentation data instead of the designer.
- Regular monitoring and assessment of the monitoring data in the dikes (piezometric, flow, thermal, inclinometer, and seismograph including monitoring to control the reaction to blasting around Pit E5) should continue. It is recommended to flag the piezometers that recorded data below 0°C in the past and be very careful when interpreting their data as they might be broken. Once a piezometer has frozen, it cannot be relied upon even if it thaws.

East Dike

- East Dike was in good condition and no geotechnical concerns were identified. Instrumentation data indicate no anomaly.

South Camp Dike

- South Camp Dike was in good condition and no geotechnical concerns were identified. Instrumentation data indicate no anomaly.
- It is recommended to continue keeping the downstream toe of the dike clear to facilitate inspection. The nearby ultramafic rock dump should not obstruct the toe of the dike.

Bay-Goose Dike

- At the time of the site inspection, and based on the instrumentation data collected up to that time, the condition of Bay-Goose Dike seems stable but the situations at the North Channel and Channels 1 and 2 require to be monitored with a special focus on the evolution of the trends.
- The tension cracks observed in 2013 and 2014 on the upstream side within the thermal cap were still visible but are no longer active. The settlement within the thermal cap was observed but did not show significant sign of movement since 2013. The area should continue to be monitored to make sure there are no aggravating conditions developing.
- Water ponds were observed at the downstream toe during the inspection, like for the previous inspection. It is recommended to pump them periodically to allow for good visual inspection of the downstream toe if

visibility is impaired by the presence of the pond. The pond flow formed by seepage should be monitored and recorded.

- Overall seepage is less than anticipated and is not a concern for now.
- Limited evidence of seepage is observed at the downstream toe of the North Channel, Channel 1 and Channel 3. The instrumentation data and field observations seem to indicate that seepage occurs at these locations but reports directly to the Pits instead of the downstream toe area. A 4 m rise in pore water pressure was observed in the vicinity of Channels 1 and 2 and this area need to be closely monitored in the following years. The designer must be advised in the event of significant variations in accordance with the OMS manual.
- The piezometers in the North Channel show a pressure build-up with the drilling operations associated with the freezing of the nearby pit wall, which needs to be closely monitored to verify the interpretation of the freeze-back. The designer must be advised in the event of significant variations in accordance with the OMS manual.

Vault Dike

- Vault Dike was in good condition at the time of the inspection. Instrumentation data indicate no anomaly.

11.2 Tailings Storage Facilities

- The most current version of the OMS manual (AEM, 2018) is dated February 2018 for the TSF and August 2018 for the North Cell Internal Structure. The most current version of the overall Emergency Response Plan (ERP) for the mine (AEM, 2017) is dated January 2017. It is a good practice to keep these documents updated.
- At the time of the inspection, the peripheral and internal structures of the TSF North Cell had an adequate tailings beach against them. An adequate tailings beach was observed against Central Dike, Saddle Dam 4 and Saddle Dam 5. Saddle Dam 3 was retaining water as planned.
- Regular visual inspection as well as collection and regular review of instrument data should continue for all structures within the TSF.

Saddle Dam 1

- No visual signs of slope instability, erosion or tension cracks were observed. Instrumentation data indicate no anomaly.

Saddle Dam 2

- No visual signs of slope instability, erosion or tension cracks were observed. Instrumentation data indicate no anomaly.
- Water was observed on the downstream side ponding within the rockfill embankment between Sta. 20+275 and Sta. 20+475 and should be monitored. The water is probably run-off water but should be sampled for chemical testing to prove it.

Stormwater Dike

- In April 2018, oblique tension cracks (up to 5 cm wide) were observed similar to the previous years. The cracks have been filled with bentonite after stabilization in the summer of 2018. The evolution of the zone should be monitored. In case of new cracks, measures indicated in the OMS manual should be implemented.
- Piezometric and thermal data follow the same trends as in the previous years. Limited lateral displacement (millimetres) was measured towards the South Cell (downstream side), mostly during freshet, after cracks appeared on the crest, then it slowed down towards stabilization. The maximum cumulative displacement recorded for the summer period is around 10 cm. The 3D velocity measured decreased from 3 mm/day on average during freshet (with a peak of 15 mm/day in May 2018) to 1 mm/day in summer.
- An assessment should be conducted as to whether the design criteria will still be met with a different final tailings elevation on both sides of the dike. This can be done by the EoR but needs to be reviewed by the designer engineer.

North Cell Internal Structure

- This structure was built during the summer of 2018 and has only been in operation for a short time at the time of the inspection.
- There is no sign of erosion of the fine filter at the downstream toe of the dike near the active deposition point. The structure does not show any sign of instability or deformation and the peripheral ditch and sumps are functional.
- The water is flowing well toward the west side of Stormwater Dike, where water is transferred into the South Cell. The early stages of the deposition seem satisfactory. The pumping stations on the downstream side of the dike are in place and working as needed. The capacity to store the inflow design flood must be verified during tailings deposition when updating the deposition plan.

Central Dike

- This structure was in good geotechnical condition. Instrumentation data follow the same trends as in the previous years.
- Seepage from the South Cell is ponding on the downstream side of Central Dike. The water had an orange coloration with high turbidity, and AEM reported that these associated with rapid temperature variations were observed during most of the open water season in 2017 and 2018.

  The water level of the reclaim pond was temporarily lowered in autumn 2017 to reduce the hydraulic pressure on the seepage, and tailings deposition was amended to better cover the area between Saddle Dams 4 and 5. The mitigation measures resulted in decreasing the average flow to 263 m^3/hr in August 2018. It is recommended to continue:

  1. Maintaining a tailings beach against Central Dike;
  2. Promote beach deposition to seal assumed fractured bedrock areas expected to control the seepage under Central Dike

3. Controlling the hydraulic gradient by proper management of South Cell water pond and dike downstream toe pond;
4. Closely monitoring the water quality;
5. Inspecting the structure for changing conditions.

- It is recommended to clean the angular granular material in direct contact with the LLDPE liner along the deposition points at Sta. 1+050 and 0+280 approximately before resuming the deposition activity within the South Cell, in order to avoid pushing the angular material into the LLDPE which could cause punctures. A procedure should be prepared communicated to all concerned workers and added to the OMS manual.

Saddle Dams 3, 4 and 5

- These structures are in good geotechnical condition.
- During the inspection, water was observed ponding on the downstream side of Saddle Dam 3 and Saddle Dam 4. As the downstream toe is higher than the South Cell pond, this water does not come from the TSF. It is important to maintain the water level on the downstream side lower than the granular layer of the upstream toe liner tie-in granular material to prevent uplift of the geomembrane. As the elevation of the downstream side is lower than the elevation of the granular material, this should not be a problem if the downstream water level is managed. The management of this water could be simplified by the construction of a sump, as indicated in the construction drawings, to direct the water in a low point. This is the case for Saddle Dam 3.

All Weather Private Road (AWPR)

- No geotechnical issues were identified with the AWPR at the time of the inspection that were related to thermal degradation of the permafrost, thaw settlement, erosion of the road materials, or sediment migration from the road into adjacent watercourses.
- Regular inspections and maintenance of the road by AEM should continue. Consideration should be given to expand AEM's monitoring program to include all culverts and bridges along the road in order to assess if they are providing adequate capacity during the freshet and following large precipitation events.
- AEM has been conducting regular and event-based inspections of the fish-bearing water crossing locations along the road, and these should continue in order to confirm the hydraulic function of the crossings, adequacy of crossing locations with respect to the watercourses, and minimal impact to fish habitat.
- The erosion of the culverts is stable. The progression of the erosion of culverts PC-17A (8+830), PC-11 (39+552), R14 (67+840), R18-B (82+500), R-20 (85+490), R-23 (93+600) and R24 (98+100) should be monitored at freshet for any signs of progression or washout, as signs of water flowing beneath the road were observed at these locations.
- For some culvert locations, monitoring is recommended to see if flow occurs through the culvert (i.e., during the freshet). If insufficient capacity to handle the flows is observed, or water circulates under the road, then it is recommended to clear the obstructions or repair the culverts. Particular attention should be paid to R-00A (2+550), PC-14 (4+260), the unnamed culvert at 5+700, and PC-16 (54+950).

Amaruq Road

- The culverts were generally in good condition at the time of the inspection. Most culverts were unobstructed with no signs of erosion and no signs of damage to the culverts. Many culverts seem to have been installed rather high.
- The inspected bridges and their embankments were in good geotechnical condition.
- No signs of erosion were observed during the inspection. It must be noted that the culverts are newly installed and locations where erosion could occur may not be identified yet. Signs of water flowing beneath the road were observed at culverts #167 (41+843) and #232 (53+928). The progression of culvert erosion should be monitored at freshet.

Quarries and Eskers

- Most quarries have been cleaned since 2015. Loose blocks and granular material have also been removed from the quarry walls. Slope remediation is in progress, but none of them were totally reclaimed. It is understood that AEM is developing a plan to progressively close some of the quarries along the AWPR while maintaining others to produce and store material supplies for ongoing road maintenance.
- Presence of unstable blocks and loose rocks along steep walls and unstable slopes was observed in Quarries 3, 7, 9, 10, 12, 16, and 23, as well as all eskers and quarries along the Amaruq road except Esker #5. It is recommended that workers be cautious in these quarries and are aware of the potential hazard.
- The north access of Esker #3 is built on a steep slope that seems undercut at its toe. It is recommended to change the access, as this poses an important geotechnical risk.

Bulk Fuel Facilities

- No geotechnical issues were noted with the Meadowbank Vault tank farm.
- No geotechnical issues were noted with the Amaruq tank farm.
- Ponded water within the secondary containment cell was observed at Baker Lake and the Meadowbank main camp fuel tank farm. Removal of water should be managed to keep the water accumulation at a minimum near the tank foundation.
- The granular fill material protecting the geomembrane was eroded at Baker Lake due to wave actions in some areas, exposing the geomembrane. This condition was observed all along the south side of Tanks 3 and 4 and on the west side of Tank 1. A section of exposed geomembrane with a fold was observed at the northwestern corner of Tank 2 and the northeastern corner of Tank 4. It is recommended to cover the exposed area with geotextile and fill material to re-establish the liner protection. Liner is exposed on the northern side of Tank 5. As this condition appears above the elevation of the southern berm, it is considered that the protection of the liner with granular material is not as important as in other areas; however, it remains a good practice and provides protection against animal damage. At the Meadowbank main camp fuel tank farm, a portion of liner is exposed in the eastern corner of the containment area. The granular protection layer over this section should be repaired.
- A hole in the exposed geomembrane (300 mm diameter hole) was observed at Baker Lake on the south southwestern corner of Tank 3 at the toe of the slope. The hole in the geomembrane should be repaired to

ensure a good performance of the retention basin. It is also recommended to cover the exposed area with geotextile and fill material to re-establish the liner protection.

- Animal burrows were observed at Baker Lake near the southern corner of Tank 2. It is recommended to assess whether the geosynthetics have been damaged under the granular cover.
- The embankments around the Baker Lake tank farm containment areas were stable. Tension cracks observed in the past on the upper bench north of Tanks 3 and 4 and south of Tanks 5 and 6 are disappearing. There were signs of water flow in this area.
- The bituminous geomembrane around the tanks of the 20 Jet A fuel tanks at Baker Lake is damaged by the Jet A fuel (melting). It is recommended to remain vigilant during the freshet and throughout the year to manage water accumulated within the bermed area. It is recommended that AEM sample the liner for performance testing by a geosynthetics laboratory and take appropriates measures to protect the environment.

Meadowbank Site Roads

- Haul roads currently in operation are of adequate width and have appropriate berms.
- Three culverts were installed on Vault Road (coordinates 640 964 E / 7 217 466 N). As previously observed in past annual inspections, these three culverts were partially collapsed in the middle and showed signs of erosion at the inlet. This is currently not a significant issue, but it is recommended to monitor these culverts at freshet to ensure that they provide sufficient capacity and that erosion is not occurring.
- The two culverts installed on Vault Road (coordinates 639 214 E / 7 216 189 N) have been repaired and are now in good condition.

Diversion Ditch and Sediment and Erosion Protection Structure

- No geotechnical concerns were observed with this structure.
- It is important that the erosion protection structure and sediment barriers be inspected during freshet season.

RSF Till Plug

- No geotechnical issues were observed with the RSF till plug.

Diffuser

- The diffuser at Wally Lake (Vault) is functioning normally.

Landfill and Contaminated Soil Storage and Bioremedial Landfarm Facility

- No geotechnical concerns related to the landfill were identified at the time of the inspection.
- The active Landfarm Facility is now located north of Central Dike, within the South Cell. This structure was developed in 2017.
- The landfarm lies over a natural steep slope covered by rockfill as a pad made to operate the landfarm. The slope is considered at risk for high deformation to slope failure. The risk will increase as the water level in the South Cell raises. Signs of superficial slope failure were observed during the inspection. It is recommended

to watch out for signs of instability and be prepared to close off the area if need be. Workers who access the area should be informed of the potential risk and be trained to recognize signs of instability.

Stormwater Management Pond

- No geotechnical concerns were identified regarding the Stormwater Management Pond, or the crusher ramp located nearby.
- The geotechnical stability of the crusher ramp should be regularly inspected by AEM due to its proximity with Stormwater management pond.

Airstrip

- No geotechnical concerns were identified with the airstrip.

A summary of the recommendations requiring a follow-up and their level of priority is presented in Table 5.

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Table 5: Summary of Recommendations and Priority Levels from the 2018 Geotechnical Inspection

Year of Recommendation	Priority Level[(1)]	Recommended Action	Follow up the years after
Dewatering dikes			
2018	P-4	■ The condition of the dewatering dikes is regularly inspected by the mine and this practice should continue.	
2018	P-4	■ The most current version of the OMS manual (AEM, 2018) is dated February 2018 for the dewatering dikes. The most current version of the overall Emergency Response Plan (ERP) for the mine (AEM, 2017) is dated January 2017. It is a good practice to keep these documents updated.	
2018	P-4	■ Regular monitoring and assessment of the monitoring data in the dikes (piezometric, flow, thermal, inclinometer, and seismograph including monitoring to control the reaction to blasting around Pit E5) should continue. It is recommended to flag the piezometers that recorded data below 0°C in the past and be very careful when interpreting their data as they might be broken. Once a piezometer has frozen, it cannot be relied upon even if it thaws.	
Bay-Goose Dike			
2018	P-4	■ Water ponds were observed at the downstream toe during the inspection, like for the previous inspection. It is recommended to pump them periodically to allow for good visual inspection of the downstream toe if visibility is impaired by the presence of the pond. The pond flow formed by seepage should be monitored and recorded.	

Year of Recommendation	Priority Level(1)	Recommended Action	Follow up the years after
2018	P-2	■ Limited evidence of seepage is observed at the downstream toe of the North Channel, Channel 1 and Channel 3. The instrumentation data and field observations seem to indicate that seepage occurs at these locations but reports directly to the Pits instead of the downstream toe area. A 4 m rise in pore water pressure was observed in the vicinity of Channels 1 and 2 and this area need to be closely monitored in the following years. The designer must be advised in the event of significant variations in accordance with the OMS manual.	
2018	P-2	■ The piezometers in the North Channel show a pressure build-up with the drilling operations associated with the freezing of the nearby pit wall, which needs to be closely monitored to verify the interpretation of the freeze-back. The designer must be advised in the event of significant variations in accordance with the OMS manual.	
Tailings storage facilities			
Saddle Dam 2			
2018	P-4	■ Water was observed on the downstream side ponding within the rockfill embankment between Sta. 20+275 and Sta. 20+475 and should be monitored. The water is probably run-off water but should be sampled for chemical testing to prove it.	

Year of Recommendation	Priority Level(1)	Recommended Action	Follow up the years after
Stormwater Dike			
2018	P-4	■ In April 2018, oblique tension cracks (up to 5 cm wide) were observed similar to the previous years. The cracks have been filled with bentonite after stabilization in the summer of 2018. The evolution of the zone should be monitored. In case of new cracks, measures indicated in the OMS manual should be implemented.	
2018	P-4	■ An assessment should be conducted as to whether the design criteria will still be met with a different final tailings elevation on both sides of the dike. This can be done by the EoR but needs to be reviewed by the designer engineer.	
North Cell Internal Structure			
2018	P-4	■ The water is flowing well toward the west side of Stormwater Dike, where water is transferred into the South Cell. The early stages of the deposition seem satisfactory. The pumping stations on the downstream side of the dike are in place and working as needed. The capacity to store the inflow design flood must be verified during tailings deposition when updating the deposition plan.	

Year of Recommendation	Priority Level(1)	Recommended Action	Follow up the years after
Central Dike			
2018	P-3	■ Seepage from the South Cell is ponding on the downstream side of Central Dike. The water had an orange coloration with high turbidity, and AEM reported that these associated with rapid temperature variations were observed during most of the open water season in 2017 and 2018. The water level of the reclaim pond was temporarily lowered in autumn 2017 to reduce the hydraulic pressure on the seepage, and tailings deposition was amended to better cover the area between Saddle Dams 4 and 5. The mitigation measures resulted in decreasing the average flow to 263 m^3/hr in August 2018. It is recommended to continue: 1. Maintaining a tailings beach against Central Dike; 2. Promote beach deposition to seal assumed fractured bedrock areas expected to control the seepage under Central Dike 3. Controlling the hydraulic gradient by proper management of South Cell water pond and dike downstream toe pond; 4. Closely monitoring the water quality; 5. Inspecting the structure for changing conditions.	

Year of Recommendation	Priority Level(1)	Recommended Action	Follow up the years after
2018	P-2	■ It is recommended to clean the angular granular material in direct contact with the LLDPE liner along the deposition points at Sta. 1+050 and 0+280 approximately before resuming the deposition activity within the South Cell, in order to avoid pushing the angular material into the LLDPE which could cause punctures. A procedure should be prepared communicated to all concerned workers and added to the OMS manual.	
Saddle Dams 3, 4 and 5			
2018	P-4	■ During the inspection, water was observed ponding on the downstream side of Saddle Dam 3 and Saddle Dam 4. As the downstream toe is higher than the South Cell pond, this water does not come from the TSF. It is important to maintain the water level on the downstream side lower than the granular layer of the upstream toe liner tie-in granular material to prevent uplift of the geomembrane. As the elevation of the downstream side is lower than the elevation of the granular material, this should not be a problem if the downstream water level is managed. The management of this water could be simplified by the construction of a sump, as indicated in the construction drawings, to direct the water in a low point. This is the case for Saddle Dam 3.	

Year of Recommendation	Priority Level(1)	Recommended Action	Follow up the years after
All-Weather Private Road (AWPR)			
2018	P-4	■ The erosion of the culverts is stable. The progression of the erosion of culverts PC-17A (8+830), PC-11 (39+552), R14 (67+840), R18-B (82+500), R-20 (85+490), R-23 (93+600) and R24 (98+100) should be monitored at freshet for any signs of progression or washout, as signs of water flowing beneath the road were observed at these locations.	
2018	P-4	■ For some culvert locations, monitoring is recommended to see if flow occurs through the culvert (i.e., during the freshet). If insufficient capacity to handle the flows is observed, or water circulates under the road, then it is recommended to clear the obstructions or repair the culverts. Particular attention should be paid to R-00A (2+550), PC-14 (4+260), the unnamed culvert at 5+700, and PC-16 (54+950).	
Amaruq Road			
2018	P-3	■ Obstructed and damaged culverts were observed at some locations: two outlets of the set of culverts #7 (2+013), #13 (4+615), two outlets of the set of culverts #47 (11+101 to 11+107), #61 (1+050), #63 (13+390), #83 (20+300), #86 (20+740), #97 (22+436), #98 (22+482), #111 (26+461), #117 (27+173), #278 (61+870). If insufficient capacity to handle the flow is observed at locations where culverts are obstructed or damaged, it is recommended to clear the obstructions or repair the culvert.	

Year of Recommendation	Priority Level[1]	Recommended Action	Follow up the years after
Quarries and Eskers			
2018	P-4	■ Presence of unstable blocks and loose rocks along steep walls and unstable slopes was observed in Quarries 3, 7, 9, 10, 12, 16, and 23, as well as all eskers and quarries along the Amaruq road except Esker #5. It is recommended that workers be cautious in these quarries and are aware of the potential hazard.	
2018	P-2	■ The north access of Esker #3 is built on a steep slope that seems undercut at its toe. It is recommended to change the access, as this poses an important geotechnical risk.	
Bulk Fuel Facilities			
2018	P-4	■ Ponded water within the secondary containment cell was observed at Baker Lake and the Meadowbank main camp fuel tank farm. Removal of water should be managed to keep the water accumulation at a minimum near the tank foundation.	
2018	P-3	■ The granular fill material protecting the geomembrane was eroded at Baker Lake due to wave actions in some areas, exposing the geomembrane. This condition was observed all along the south side of Tanks 3 and 4 and on the west side of Tank 1. A section of exposed geomembrane with a fold was observed at the northwestern corner of Tank 2 and the northeastern corner of Tank 4. It is recommended to cover the exposed area with geotextile and fill material to re-establish the liner protection. Liner is exposed on the northern side of Tank 5. As this condition appears above the elevation of the southern berm, it is considered that the	

Year of Recommendation	Priority Level(1)	Recommended Action	Follow up the years after
		protection of the liner with granular material is not as important as in other areas; however, it remains a good practice and provides protection against animal damage. At the Meadowbank main camp fuel tank farm, a portion of liner is exposed in the eastern corner of the containment area. The granular protection layer over this section should be repaired.	
2018	P-2	■ A hole in the exposed geomembrane (300 mm diameter hole) was observed at Baker Lake on the south southwestern corner of Tank 3 at the toe of the slope. The hole in the geomembrane should be repaired to ensure a good performance of the retention basin. It is also recommended to cover the exposed area with geotextile and fill material to re-establish the liner protection.	
2018	P-3	■ Animal burrows were observed at Baker Lake near the southern corner of Tank 2. It is recommended to assess whether the geosynthetics have been damaged under the granular cover.	
2018	P-4	■ The embankments around the Baker Lake tank farm containment areas were stable. Tension cracks observed in the past on the upper bench north of Tanks 3 and 4 and south of Tanks 5 and 6 are disappearing. There were signs of water flow in this area.	

Year of Recommendation	Priority Level(1)	Recommended Action	Follow up the years after
2018	P-2	■ The bituminous geomembrane around the tanks of the 20 Jet A fuel tanks at Baker Lake is damaged by the Jet A fuel (melting). It is recommended to remain vigilant during the freshet and throughout the year to manage water accumulated within the bermed area. It is recommended that AEM sample the liner for performance testing by a geosynthetics laboratory and take appropriates measures to protect the environment.	
Meadowbank Site Roads			
2018	P-4	■ Three culverts were installed on Vault Road (coordinates 640 964 E / 7 217 466 N). As previously observed in past annual inspections, these three culverts were partially collapsed in the middle and showed signs of erosion at the inlet. This is currently not a significant issue, but it is recommended to monitor these culverts at freshet to ensure that they provide sufficient capacity and that erosion is not occurring.	
Landfill and Contaminated Soil Storage and Bioremedial Landfarm Facility			
2018	P-2	■ The landfarm lies over a natural steep slope covered by rockfill as a pad made to operate the landfarm. The slope is considered at risk for high deformation to slope failure. The risk will increase as the water level in the South Cell raises. Signs of superficial slope failure were observed during the inspection. It is recommended to watch out for signs of instability and be prepared to close off the area if need be. Workers who access the area should be informed of the potential risk and be trained to recognize signs of instability.	

Note: (1) Priority Level Descriptions

P-1: A high priority or actual structure safety issues considered immediately dangerous to life, health, or the environment, or a significant risk of regulatory enforcement.

P-2: If not corrected could likely result in structure safety issues leading to injury, environmental impact, or significant regulatory enforcement; or, a repetitive deficiency that demonstrates a systematic breakdown of procedures.

P-3: Single occurrences of deficiencies or non-conformance that alone would not be expected to result in structure safety issues.

P-4: Best Management Practice – further improvements are necessary to meet industry best practices or reduce potential risks.

12.0 CLOSURE

This report was prepared to summarize the findings from the 2018 geotechnical inspection conducted by Golder between 27 August and 3 September 2018 to comply with the requirements of AEM's Type A Water Licence Permit No. 2AM-MEA0815, Part I, Item 12. The inspection of the pit walls is not included in the present study.

We trust the above information is sufficient for your current needs. Should you require additional information or further clarification, please contact us.

13.0 SIGNATURES

Golder Associés Ltée

REGISTERED PROFESSIONAL ENGINEER
Y. BOULIANNE
LICENSEE
March 2019
NT/NU

Marion Habersetzer
Mine Waste Group

Yves Boulianne, P.Eng.
Associate, Senior Geotechnical Engineer

MH/YB/jlm/kl

PERMIT TO PRACTICE
GOLDER ASSOCIATES LTD.
Signature
Date March 2019
PERMIT NUMBER: P 049
NT/NU Association of Professional Engineers and Geoscientists

https://golderassociates.sharepoint.com/sites/26772g/deliverables/18101627-1583-r-rev0 2018 geotechnical inspection/rev0/18101627-1583-r-rev0 2018 geotechnical inspection.docx

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Table 6: Inspection of the Facilities along the All-Weather Private Road

Station	Name	Structure Description	Comments
0+430	PRC1	1x600 mm CSP	Culvert owned by the town and not AEM. Minor damage to outlet. Minor obstruction of the outlet. Still in good condition. No action required.
0+470	PRC2	2x600 mm CSP	Culvert owned by the town and not AEM. Good condition.
1+380	PRC3	1x600 mm CSP	Culvert owned by the town and not AEM. Good condition.
2+550	R-00A	1x600 mm CSP	No sign of any flow. Inlet partially collapsed, outlet entirely collapsed with signs of obstruction from road material, one hole in the culvert visible from the crest of the road.
4+260	PC-14	2x600 mm CSP	These 2 culverts are too damaged to function any longer. If needed, a new culvert should be installed further north.
5+200	Quarry 1		Slope remediation in progress. Rocks walls are generally clean and stable.
~5+700	unnamed	1x600 mm CSP	The inlet is partially buried in gravel. The outlet is in good condition.
8+750	R02 Centre Bridge	30m Acrow Panel Bridge	In good condition.
8+830	PC-17A	2X1800 mm CSP	Signs of erosion beneath the inlet and flow of water occurring beneath the culvert. The 1800 CSP were installed too high. While conditions are not perfect, they have proven stable over the past years. No signs of degradation from last year on both the inlet and outlet sides. Flow observed beneath the culvert.
8+850	PC-17	2x1200 mm CSP	In good condition.
9+952	PC-1	1x600 mm CSP	In good condition.
10+580	R-03	1x600 mm CSP	In good condition.

Station	Name	Structure Description	Comments
12+050	R-04	1x1200 mm CSP	In good condition.
12+745	PC-13	1x600 mm CSP	In good condition.
13+250	Quarry 2		Slope remediation in progress. The wall is mostly clean. One steep area is unstable and would require cleaning if operations resume.
13+405	PC-2	1x600 mm CSP	In good condition.
13+685	PC-3	1x600 mm CSP	In good condition.
13+950	unnamed	1x600 mm CSP	In good condition.
14+910	PC-4	1x600 mm CSP	In good condition.
15+745	R-05A	1x1200 mm CSP	In good condition.
17+600	R05 Center Bridge	30m Acrow Panel Bridge	In good condition. Minor damage to the bin wall of both abutments as a result of past snow removal activities. No repairs required yet.
18+280	PC-5	1x600 mm CSP	In good condition.
18+900	PC-6	1x600 mm CSP	In good condition.
20+240	PC-7A	2x600 mm CSP	Generally in good condition. The outlet of the northern culvert is damaged.
20+250	PC-7	1x600 mm CSP	The outlet of the culvert is damaged and to be cleaned.

Station	Name	Structure Description	Comments
23+100	R06 Center Bridge	30 m Acrow Panel Bridge	In good condition.
23+700	Quarry 3		A crusher is installed in this quarry. The west wall is in good and stable condition, but would need additional cleaning locally. AEM did not clean it due to the presence of a falcon nest.
25+900	R-07	1x1200 mm CSP	In good condition.
29+420	PC-8	1x600 mm CSP	In good condition.
31+300	Quarry 4		Quarry flooded. In good condition.
34+650	Quarry 5		Slope remediation in progress. Rock walls are in good and stable condition, except for a small portion on the east side.
35+690	PC-9	1x600 mm CSP	In good condition.
36+470	Quarry 6		Slope remediation in progress. The remaining rock walls are clean and stable.
36+865	PC-10	1x600 mm CSP	In good condition.
39+552	PC-11	1x600 mm CSP	In good condition. The inlet is too high and water is flowing underneath it.
39+800	Quarry 7		The quarry walls are in unstable condition. Scaling is recommended before resuming activities.
41+300	PC-12	1x600 mm CSP	In good condition, almost submerged.
42+950	Quarry 8		Crushing activities occurred in 2017.
44+600	Quarry 9		Presence of unstable loose rocks and boulders along the steepest and highest wall section. Slope remediation in progress. There is a sign of activity (loader and stockpile). Workers should be aware of the unstable slope and stay away from it.

Station	Name	Structure Description	Comments
48+500	R09 Center Bridge	12m Rapid Span Bridge	In good condition.
48+900	Quarry 10		Slope remediation in progress. The steep west rock wall is unstable.
53+500	Quarry 11		Slope remediation in progress. Rock walls are clean and stable.
54+950	PC-16	1x600 mm CSP	Outlet is buried and needs to be cleaned.
58+300	Quarry 12		Slope remediation in progress. Generally in good condition.
62+060	R13 Center Bridge	12 m Rapid Span Bridge	Generally in good condition. The east side of the north abutment seems inclined, to be monitored for possible required reparation.
62+350	Quarry 13		Slope remediation is in progress. Loose blocks were observed in some portions of the rock wall.
65+700	Quarry 14		Quarry flooded, slope remediation in progress. Loose blocks were observed in some portions of the rock wall.
67+600	Quarry 15		Slope remediation in progress. Steep rock wall in relatively stable condition
67+840	R-14	3x1200 mm CSP	Middle and northern culverts show small sign of erosion at the outlet and have been damaged (collapsed) inside, below the road, but it is anticipated that they will continue to perform well. All of them were installed too high but function well. No action required.
69+200	R15 Centre Bridge	30 m Acrow Panel Bridge	Bin wall of both abutments were observed to be damaged but they are holding well. The bridge is dipping toward the west side on both north and south abutments. The foundation does not show signs of failure but is slowly settling. Its condition should be monitored.

Station	Name	Structure Description	Comments
70+400	Quarry 16		Slope remediation in progress. Presence of unstable loose rocks and boulders. A good safety berm was placed along the top of the pit crest.
72+800	Quarry 17		Slope remediation in progress. Steep rock wall in stable conditions.
73+800	R16 Centre Bridge	12m Rapid Span Bridge	In good condition.
77+440	R-17	1x1200 mm CSP	In good condition.
79+500	R18 Centre Bridge	12 m Rapid Span Bridge	In good condition.
80+200	Quarry 18		Slope remediation in progress. Steep walls are in good condition.
80+950	R-18A	3x1200 mm CSP	In good condition.
82+500	R-18B	1X600 mm CSP	In good condition, installed above ground surface (water can flow below culvert).
83+150	R19 Centre	12m Rapid Span Bridge	Some damage to the steel containment plates and to one pile was observed, which may be associated with snow removal activity. The damage is minor and does not affect the geotechnical integrity of the bridge.
84+300	Quarry 19		Slope remediation has begun. Walls are in good condition.
85+490	R-20	1x1200 mm CSP	Outlet of the culvert is slightly twisted. The middle of the culvert is slightly collapsed. The inlet is installed above the ground surface and water is able to flow beneath the culvert. No follow-up required, in stable condition.

Station	Name	Structure Description	Comments
87+300	R-21	2x1200 mm CSP	Both culverts are slightly collapsed in the middle. Should have been installed lower to avoid erosion issue. In stable condition.
89+550	Quarry 20		Slope remediation in progress. Quarry walls are in good condition.
93+400	Quarry 21		Slope remediation in progress. Quarry walls are in good condition.
93+600	R-23	1x1200 mm CSP	Minor damage near the top, but still in good condition. The culvert is installed too high and as a result there is a low flow of water through the road rockfill. The situation has been under control over the past years.
98+100	R-24	2x1200 mm CSP	Both outlets are installed too high. The outlet of the southern culvert still shows small signs of erosion, but this has been under control over the past years. Both culverts show deformation in the upper part.
99+200	Quarry 22		Slope remediation in progress. The walls are steep but in good condition.
101+950	R-25	2x600 mm CSP	One culvert is angling up toward the downstream end and natural drainage by gravity does not occur. A second culvert alongside is well installed and should drain water for the remainder of the season. No sign of erosion observed during the inspection.
104+400	R-26	3x1200 mm CSP	In good condition.
	Quarry 23		This is an active quarry used to store rock cores and other things. Because of the presence of loose rocks on top of steep wall, the workers who need access to the quarry should be aware of potential rockfall and stay at a minimum of 20 m away from the wall.

Table 7: Inspection of the Facilities along Amaruq Road

Station	Name	Structure Description	Comments
0+449	#1	450 mm	Vault pad to be removed.
0+675	#2	300 mm	
1+133	#3	900 mm	In good condition.
1+137	#3-2	900 mm	
1+325	#4	800 mm	Not observed.
1+525	#5	600 mm	In good condition.
1+799	#6	600 mm	Not observed.
2+013	#7	900 mm	Inlet in good condition, outlet totally buried.
2+016	#7-2	900 mm	
2+125	#8	900 mm	In good condition.
2+127	#8-2	900 mm	
2+659	#9	600 mm	Inlet in good condition, outlet damaged and pinched.
3+400	Bridge 3.4		In good condition.
3+264	#10	600 mm	Inlet in good condition, outlet damaged and pinched.
3+850	#11	300 mm	In good condition.

Station	Name	Structure Description	Comments
4+183	#12	900 mm	In good condition.
4+181	#12-2	900 mm	
4+179	#12-3	900 mm	
4+184	#12-4	900 mm	
4+186	#12-5	900 mm	
4+615	#13	300 mm	Inlet in good condition, outlet not observed as it is buried.
4+756	#14	600 mm	In good condition.
4+850	#15	900 mm	In good condition.
5+050	#16	300 mm	Not observed.
5+161	#17	800 mm	In good condition, outlet damaged.
5+330	#18	700 mm	In good condition.
5+574	#19	900 mm	In good condition.
5+931	#20	900 mm	In good condition.
5+929	#20-2	900 mm	
6+310	#21	300 mm	Not observed.
6+423	#22	600 mm	In good condition.
6+442	#23	600 mm	In good condition.

Station	Name	Structure Description	Comments
6+493	#24	600 mm	In good condition.
6+530	#25	600 mm	In good condition.
7+216	#26	800 mm	In good condition.
7+218	#26-2	800 mm	
7+275	#27	600 mm	In good condition.
7+300	#27-2	600 mm	
7+325	#27-3	600 mm	In good condition.
7+349	#28	600 mm	In good condition.
7+375	#28-2	600 mm	In good condition.
7+779	#29	900 mm	Not observed.
7+781	#29-2	900 mm	Not observed.
7+968	#30	900 mm	In good condition.
7+970	#30-2	900 mm	
8+005	#31	900 mm	In good condition.
8+383	#32	900 mm	In good condition.
8+405	#33	900 mm	In good condition.

Station	Name	Structure Description	Comments
8+426	#34	900 mm	In good condition.
8+428	#34-2	900 mm	
8+581	#35	700 mm	In good condition.
9+000	#36	700 mm	In good condition.
9+035	#37	900 mm	In good condition.
9+049	#38	900 mm	In good condition.
9+193	#39	900 mm	In good condition.
9+195	#39-2	900 mm	
9+291	#40	900 mm	In good condition.
9+388	#41	600 mm	In good condition.
9+416	#42	600 mm	In good condition.
9+460	#43	600 mm	In good condition.
9+490	#44	300 mm	In good condition.
9+710	#45	600 mm	In good condition.
10+500	Quarry 10.5		Unstable wall, loose rocks. Workers should stay away from the wall.
10+700	Bridge 10.7	600 mm	In good condition.
11+020	#46	900 mm	In good condition.

Station	Name	Structure Description	Comments
11+101	#47	900 mm	2 of the 5 outlets are completely buried.
11+103	#47-2	900 mm	
11+105	#47-3	900 mm	
11+107	#47-4	900 mm	
11+203	#48	900 mm	The inlet is totally buried.
11+411	#49	450 mm	Not observed.
11+748	#50	600 mm	In good condition.
11+905	#51	300 mm	Not observed.
12+195	#52	700 mm	In good condition.
12+240	#53	700 mm	In good condition, the outlet is half buried.
12+388	#54	600 mm	In good condition.
12+440	#55	600 mm	In good condition.
12+485	#56	600 mm	In good condition.
12+635	#57	450 mm	In good condition, the outlet is half buried.
12+740	#58	900 mm	In good condition.
12+760	#59	900 mm	In good condition. Presence of fish.
12+775	#60	900 mm	In good condition.

Station	Name	Structure Description	Comments
13+050	#61	600 mm	Inlet in good condition but outlet completely buried.
13+265	#62	600 mm	In good condition.
13+390	#63	300 mm	In good condition, the inlet is buried.
13+920	#64	600 mm	In good condition.
14+924	#65	800 mm	In good condition.
16+000	Bridge 16		In good condition.
16+324	#66	600 mm	The inlet is half buried.
16+689	#67	600 mm	In good condition.
16+750	#68	600 mm	In good condition.
17+000	Esker #1		Active (gravel and rock). Presence of loose rock on the steep wall, risk of sloughing.
17+250	#68-A	600 mm	In good condition.
17+500	#68-B	600 mm	Not observed.
17+784	#69	600 mm	Not observed.
17+837	#70	600 mm	In good condition.
18+580	#73	1200 mm	In good condition.
18+559	#74	900 mm	In good condition. Presence of fish.
18+61	#74-2	900 mm	

Station	Name	Structure Description	Comments
18+861	#75	600 mm	In good condition.
18+916	#76	450 mm	In good condition.
18+998	#77	450 mm	In good condition.
19+092	#78	300 mm	In good condition.
19+092	#78-2	300 mm	
19+495	#79	700 mm	In good condition.
19+659	#80	450 mm	In good condition.
19+841	#81	600 mm	In good condition.
20+000	Bridge 20		In good condition.
20+143	#82	300 mm	In good condition.
20+300	#83	600 mm	Inlet totally buried.
20+527	#84	700 mm	In good condition.
20+671	#85	600 mm	In good condition.
20+740	#86	600 mm	In good condition but outlet buried.
20+810	#87	600 mm	In good condition.
20+881	#88	300 mm	In good condition, the outlet is almost completely blocked.
21+180	#89	450 mm	In good condition, the outlet is high above ground.

Station	Name	Structure Description	Comments
21+295	#90	800 mm	In good condition.
21+297	#90-2	800 mm	
21+770	#91	600 mm	In good condition.
22+040	#92	600 mm	In good condition.
22+100	#93	450 mm	In good condition.
22+147	#94	900 mm	In good condition.
22+149	#94-2	900 mm	Installed below the ground. Water is flowing well, presence of fish.
22+150	#94-3	900 mm	In good condition.
22+161	#95	900 mm	In good condition.
22+162	#95-2	900 mm	In good condition.
22+353	#96	600 mm	In good condition.
22+436	#97	600 mm	In good condition, the inlet is buried by rockfill.
22+482	#98	600 mm	In good condition, the inlet is buried by rockfill.
22+830	#99	600 mm	In good condition.
22+936	#100	600 mm	In good condition.
23+025	#101	600 mm	In good condition.
23+265	#102	600 mm	In good condition.

Station	Name	Structure Description	Comments
23+562	#103	600 mm	In good condition.
23+595	#104	600 mm	In good condition.
23+900	Bridge 23.9		In good condition.
24+555	#105	600 mm	In good condition.
24+700	#106	600 mm	In good condition.
24+961	#107	900 mm	In good condition.
24+982	#107-2	900 mm	
24+984	#107-3	900 mm	
25+000	Esker #2		Active. Generally, in good condition, but the small walls are steep and in loose conditions. Risk of rockfall near the walls.
25+551	#108	600 mm	In good condition.
25+905	#109	800 mm	In good condition.
26+100	Bridge 26.1		In good condition.
26+350	#110	450 mm	In good condition.
26+461	#111	300 mm	Outlet in good condition, the inlet is buried.
26+630	#112	300 mm	In good condition.
26+736	#113	450 mm	In good condition.
26+810	#114	450 mm	In good condition.

Station	Name	Structure Description	Comments
26+865	#115	300 mm	In good condition, but outlet half buried.
26+940	#116	450 mm	Not observed.
27+173	#117	700 mm	Not observed.
27+433	#118	450 mm	Not observed.
27+777	#119	300 mm	Not observed.
28+125	#120	300 mm	In good condition.
28+300	#121	900 mm	In good condition.
28+302	#121-2	900 mm	
28+304	#121-3	900 mm	
28+414	#122	900 mm	In good condition.
28+416	#122-2	900 mm	
28+418	#122-3	900 mm	
28+575	#123	800 mm	In good condition.
28+710	#124	300 mm	In good condition.
29+040	#125	800 mm	In good condition.
29+240	#126	800 mm	Installed oblique to the road, but in good condition.
30+409	#129	1200 mm	Installed above ground level.

Station	Name	Structure Description	Comments
30+180	Quarry 30.5		In operation. Most walls are in unstable condition.
30+812	#130	600 mm	In good condition.
31+041	#131	600 mm	In good condition.
31+540	#132	600 mm	In good condition.
32+141	#133	300 mm	Not observed.
32+300	Bridge 32.3		In good condition.
32+389	#134	300 mm	In good condition.
32+567	#135	300 mm	In good condition.
32+905	#136	300 mm	In good condition.
32+940	#137	300 mm	In good condition.
33+000	#138	300 mm	In good condition.
33+214	#139	900 mm	In good condition.
33+216	#139-2	900 mm	
33+218	#139-3	900 mm	
33+256	#140	900 mm	In good condition.
33+258	#140-2	900 mm	
33+260	#140-3	900 mm	

Station	Name	Structure Description	Comments
33+727	#141	900 mm	In good condition.
33+728	#141-2	900 mm	
33+730	#141-3	900 mm	
33+732	#141-4	900 mm	
33+734	#141-5	900 mm	
34+160	#142	450 mm	In good condition.
34+291	#143	600 mm	In good condition.
34+319	#144	1000 mm	In good condition.
34+395	#145	300 mm	In good condition.
34+660	#146	1200 mm	In good condition.
34+855	#147	600 mm	In good condition.
35+173	#148	600 mm	In good condition.
35+000	Rock quarry 35		Active. Blasted in the morning of the inspection.
35+670	#149	900 mm	In good condition.

Station	Name	Structure Description	Comments
36+171	#150	900 mm	In good condition.
36+173	#150-2	900 mm	
36+175	#150-3	900 mm	
36+177	#150-4	900 mm	
36+179	#150-5	900 mm	
36+562	#151	600 mm	In good condition.
36+933	#152	900 mm	In good condition.
37+027	#153	600 mm	In good condition.
37+028	#153-2	600 mm	
37+030	#153-3	600 mm	
37+032	#153-4	600 mm	
37+033	#153-5	600 mm	
37+261	#154	450 mm	In good condition.
37+470	#155	600 mm	In good condition.
37+506	#156	450 mm	In good condition.
38+028	#157	600 mm	In good condition.

Station	Name	Structure Description	Comments
38+490	#158	900 mm	In good condition.
38+491	#158-2	900 mm	
38+493	#158-3	900 mm	
39+768	#159	700 mm	Not observed.
39+966	#160	600 mm	In good condition.
40+051	#161	600 mm	In good condition.
40+238	#162	600 mm	In good condition.
40+474	#163	300 mm	In good condition.
40+790	#164	300 mm	In good condition.
40+964	#165	600 mm	In good condition.
41+610	#166	900 mm	In good condition.
41+843	#167	900 mm	In good condition.
42+342	#168	600 mm	In good condition.
42+765	#169	300 mm	In good condition.
43+340	#170	800 mm	In good condition.
43+500	Bridge 43.5		In good condition.

Station	Name	Structure Description	Comments
43+568	#170-A	900 mm	In good condition.
43+577	#170-B	900 mm	
43+587	#170-C	900 mm	
43+815	#171	600 mm	In good condition.
44+431	#173	1000 mm	In good condition. The 2 southern culverts are installed below ground surface and water is flowing.
44+433	#173-2	1000 mm	
44+435	#173-3	1000 mm	
44+470	#174	600 mm	In good condition.
44+640	#175	450 mm	In good condition.
44+800	Bridge 44.8		In good condition.
45+055	#176	600 mm	Not observed.
45+065	#177	600 mm	In good condition.
45+170	#178	600 mm	In good condition.
45+485	#179	700 mm	In good condition.
45+803	#180	600 mm	In good condition.
45+935	#181	600 mm	In good condition.

Station	Name	Structure Description	Comments
46+000	Esker #3		Active. Only the entrance was seen, as there is no further access. The photo shows the left (north) access ramp along a steep slope that seems to be undercut at it toe. It is recommended to change the access.
46+126	#182	800 mm	In good condition.
46+185	#183	800 mm	In good condition.
46+187	#183-2	800 mm	In good condition.
46+230	#184	600 mm	In good condition.
46+404	#185	300 mm	In good condition.
46+541	#186	450 mm	In good condition.
46+570	#187	600 mm	In good condition.
46+595	#188	600 mm	In good condition.
46+870	#189	700 mm	In good condition.
46+985	#190	900 mm	In good condition.
47+046	#191	300 mm	Not observed.
47+190	#192	600 mm	In good condition.
47+360	#193	600 mm	In good condition.
47+660	#194	600 mm	In good condition.
47+808	#195	700 mm	In good condition.

Station	Name	Structure Description	Comments
47+961	#196	300 mm	In good condition.
48+120	#197	600 mm	In good condition.
48+222	#198	450 mm	In good condition.
48+383	#199	900 mm	In good condition.
48+385	#199-2	900 mm	
48+387	#199-3	900 mm	
48+389	#199-4	900 mm	
48+457	#201	900 mm	Installed below the ground level.
48+800	#203	600 mm	In good condition.
48+840	#204	600 mm	In good condition.
49+108	#206	450 mm	In good condition.
49+310	#207	600 mm	In good condition.
49+431	#208	900 mm	In good condition.
49+433	#209	900 mm	In good condition.
49+435	#210	900 mm	In good condition.
49+550	#211	450 mm	In good condition.
49+640	#212	600 mm	In good condition.

Station	Name	Structure Description	Comments
49+795	#213	300 mm	In good condition.
49+915	#214	800 mm	In good condition, but the inlet is high over the ground.
50+135	#215	300 mm	In good condition.
50+510	#216	600 mm	Not observed.
50+790	#217	450 mm	In good condition.
51+233	#218	900 mm	In good condition.
51+235	#218-2	900 mm	
51+237	#218-3	900 mm	
51+239	#218-4	900 mm	
51+460	#219	300 mm	In good condition.
51+883	#221	900 mm	In good condition.
51+885	#221-2	900 mm	
51+887	#221-3	900 mm	
52+000	Rock quarry 52		Active. In good and clean condition. The northern wall may pose a rockfall hazard (loose blocks and cobbles) which workers need to be aware of.
52+315	#222	600 mm	In good condition.
52+650	#223	600 mm	In good condition.

Station	Name	Structure Description	Comments
52+705	#224	600 mm	In good condition.
52+715	#225	450 mm	In good condition.
52+935	#226	700 mm	Not observed.
52+937	#226-2	450 mm	
52+970	#227	600 mm	In good condition.
52+995	#228	700 mm	In good condition.
53+245	#229	300 mm	Not observed.
53+363	#230	700 mm	In good condition.
53+659	#231	300 mm	In good condition.
53+928	#232	300 mm	In good condition. Flow of about 20 L/min under the culvert.
54+240	#233	450 mm	In good condition.
54+385	#234	450 mm	In good condition.
54+500	#235	600 mm	In good condition but inlet partially buried.
54+625	#236	450 mm	In good condition.
54+655	#237	600 mm	In good condition.
54+850	#238	600 mm	In good condition.
55+060	#239	600 mm	In good condition.

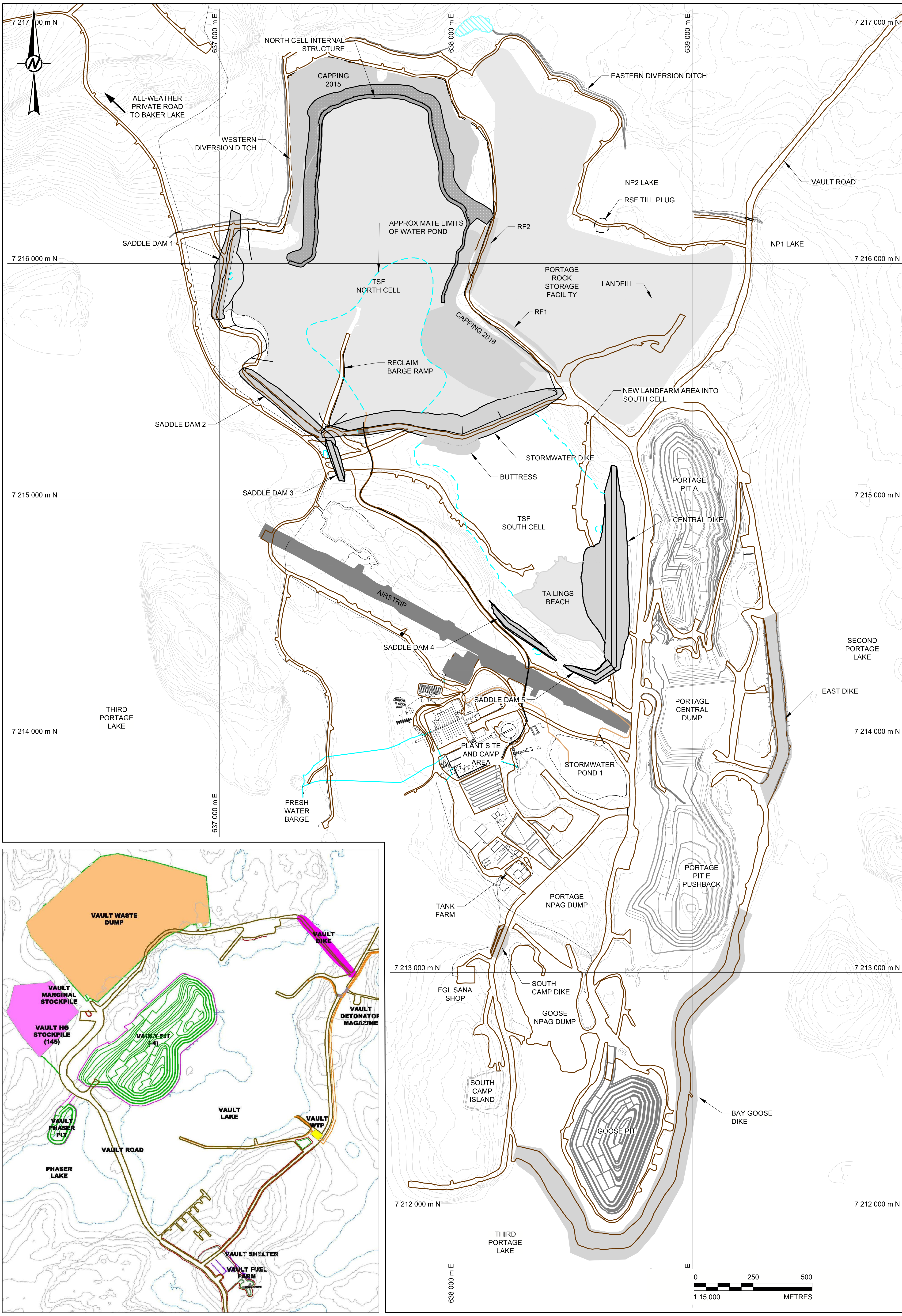
Station	Name	Structure Description	Comments
55+164	#240	600 mm	In good condition.
55+235	#241	600 mm	In good condition.
55+329	#242	600 mm	In good condition.
55+593	#243	600 mm	In good condition.
55+625	#244	450 mm	In good condition.
55+735	#245	600 mm	Not observed.
56+005	#246	600 mm	In good condition.
56+065	#247	700 mm	In good condition.
65+220	#248	700 mm	In good condition.
56+435	#249	600 mm	In good condition.
56+610	#250	800 mm	In good condition.
56+745	#251	300 mm	In good condition.
56+900	#252	900 mm	In good condition.
56+965	#253	900 mm	In good condition.
56+967	#253-2	900 mm	In good condition.
56+969	#253-3	900 mm	In good condition.
57+125	#254	600 mm	In good condition.

Station	Name	Structure Description	Comments
57+195	#255	600 mm	In good condition.
57+350	#256	600 mm	In good condition.
57+525	#257	600 mm	Not observed.
57+875	#258	600 mm	Not observed.
57+985	#259	900 mm	Not observed.
58+185	#260	300 mm	In good condition.
58+350	#261	450 mm	In good condition.
58+410	#262	450 mm	In good condition.
58+885	#263	450 mm	Outlet is damaged, not blocking the flow.
58+922	#264	600 mm	In good condition.
58+967	#265	450 mm	In good condition.
59+024	#266	300 mm	In good condition.
59+720	Esker #5		Active (gravel). In good condition. The soil was stripped to the limit of permafrost. The surface is thawing, and water is flowing into the environment (to be checked for turbidity).
59+720	#267	900 mm	In good condition.
59+774	#268	600 mm	In good condition.
59+860	#269	600 mm	In good condition.

Station	Name	Structure Description	Comments
60+000	#270	600 mm	In good condition.
60+050	#271	600 mm	In good condition.
60+087	#272	600 mm	In good condition.
60+649	#273	300 mm	In good condition.
60+815	#274	600 mm	In good condition.
61+022	#275	600 mm	In good condition.
61+282	#276	600 mm	In good condition.
61+622	#277	450 mm	In good condition.
61+870	#278	1200 mm	Inlet below ground level and outlet obstructed. Should be cleaned before spring.
62+307	#279	300 mm	Not observed.
62+416	#280	900 mm	Not observed.
62+350	#281	600 mm	Not observed.
62+500	Esker #6		In good condition, except for the north borrow pit: 2 m high steep slope with potential instability.
62+965	#283	450 mm	In good condition.
63+070	#284	900 mm	
63+072	#284-2	900 mm	In good condition.
63+074	#284-3	900 mm	

Station	Name	Structure Description	Comments
63+429	#287	600 mm	Not observed.
63+530	#288	600 mm	Not observed.
63+733	#289	600 mm	Not observed.
63+900	unnamed		Set of 4 culverts, 2 are heated by hot water. All are installed below ground level for fish. Water is flowing in the 2 middle culverts.
63+975	#290	600 mm	In good condition.

Path: \\golder.gds\gal\Montreal\SIG\CAD\PROJETS\AGNICO-EAGLE\MEADOWBANK\PRODUCTION\18101627\5000\ | File Name: 18101627-5000-01.DWG



LEGEND

TOPOGRAPHIC CONTOUR

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

REFERENCE

DRAWING BASE PROVIDED BY AEM LTD., MEADOWBANK DIVISION IN "MBK Site map updated JULY 2014.dwg" DATED JULY 8, 2014.

CLIENT

AGNICO EAGLE

CONSULTANT

GOLDER

YYYY-MM-DD	2018-09-27
PREPARED	M. Habersetzer
DESIGN	A. Annoual
REVIEW	M. Habersetzer
APPROVED	Y. Boulianne

PROJECT

2018 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

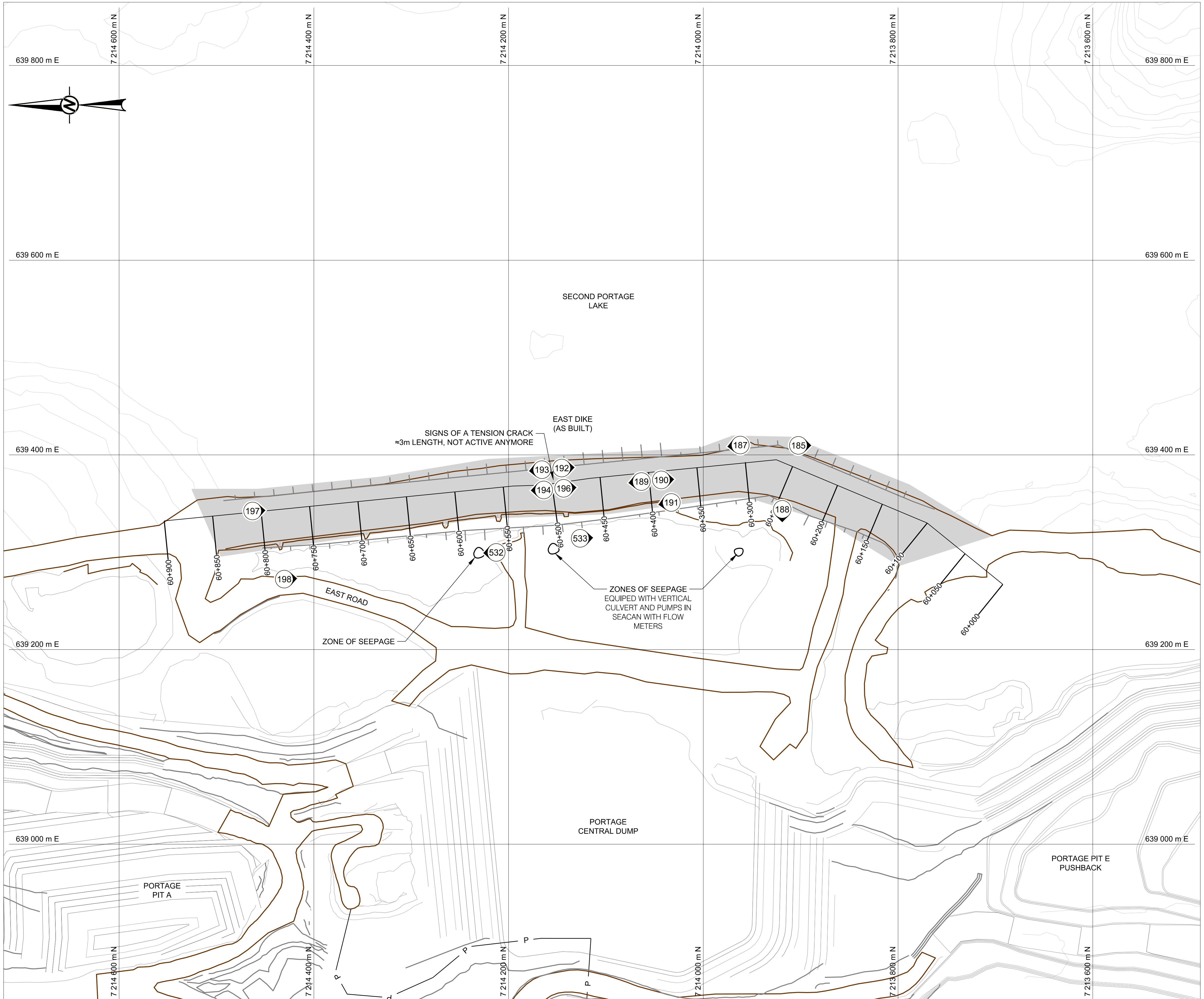
TITLE

MEADOWBANK MINE SITE DURING THE ANNUAL INSPECTION OF 2018

PROJECT No.	PHASE	Rev.	FIGURE
18101627	5000	0	1

25 mm

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



LEGEND

TOPOGRAPHIC CONTOUR

1 IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2018

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

REFERENCE

DRAWING BASE PROVIDED BY AEM LTD., MEADOWBANK DIVISION IN "MBK Site map updated JULY 2014.dwg" DATED JULY 8, 2014.

0 100 200

1:4 000 METRES

CLIENT

AGNICO EAGLE

PROJECT

2018 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

EAST DIKE DURING THE ANNUAL INSPECTION OF 2018

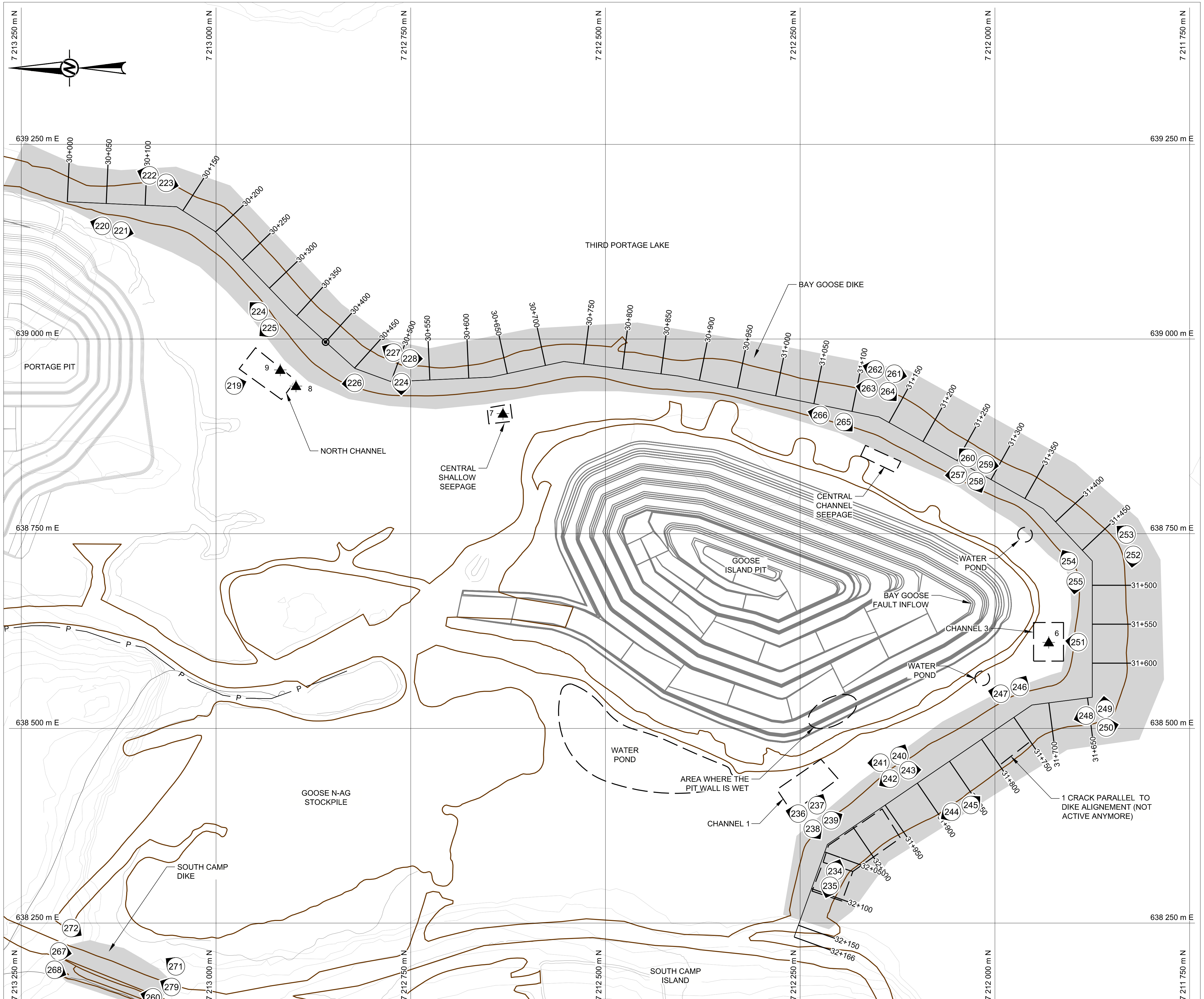
CONSULTANT

GOLDER

YYYY-MM-DD	2019-02-25
PREPARED	M. Habersetzer
DESIGN	A. Annoual
REVIEW	M. Habersetzer
APPROVED	Y. Boulianne

PROJECT No.	PHASE	Rev.	FIGURE
18101627	5000	0	A1

25 mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



LEGEND

TOPOGRAPHIC CONTOUR

IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2018

MANUAL MONITORING FLOW STATION

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

REFERENCE

DRAWING BASE PROVIDED BY AEM LTD., MEADOWBANK DIVISION IN "MBK Site map updated JULY 2014.dwg" DATED JULY 8, 2014.

0 100 200

1:5 000 METRES

CLIENT

AGNICO EAGLE

PROJECT

2018 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

BAY-GOOSE AND SOUTH CAMP DIKES DURING THE ANNUAL INSPECTION OF 2018

CONSULTANT

GOLDER

YYYY-MM-DD	2019-02-25
PREPARED	M. Habersetzer
DESIGN	A. Annoual
REVIEW	M. Habersetzer
APPROVED	Y. Boulianne

PROJECT No.	PHASE	Rev.	FIGURE
18101627	5000	0	A2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

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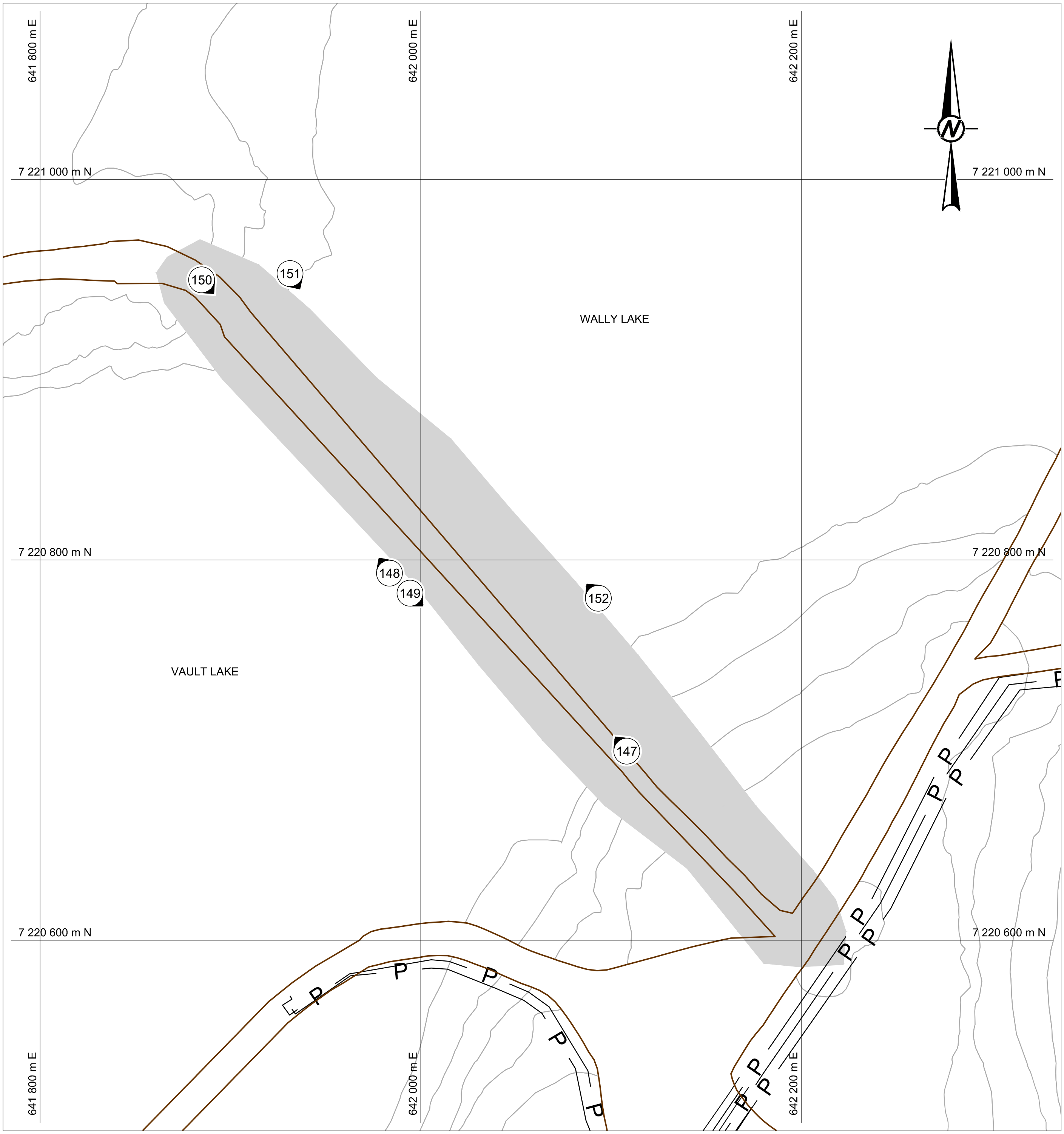


LEGEND

TOPOGRAPHIC CONTOUR

IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2018

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

REFERENCE

DRAWING BASE PROVIDED BY AEM LTD., MEADOWBANK DIVISION IN "MBK Site map updated JULY 2014.dwg" DATED JULY 8, 2014.

0 12.5 25

1:750 METRES

CLIENT

AGNICO EAGLE

CONSULTANT

GOLDER

YYYY-MM-DD	2019-02-25
PREPARED	M. Habersetzer
DESIGN	A. Annoual
REVIEW	M. Habersetzer
APPROVED	Y. Boulianne

PROJECT

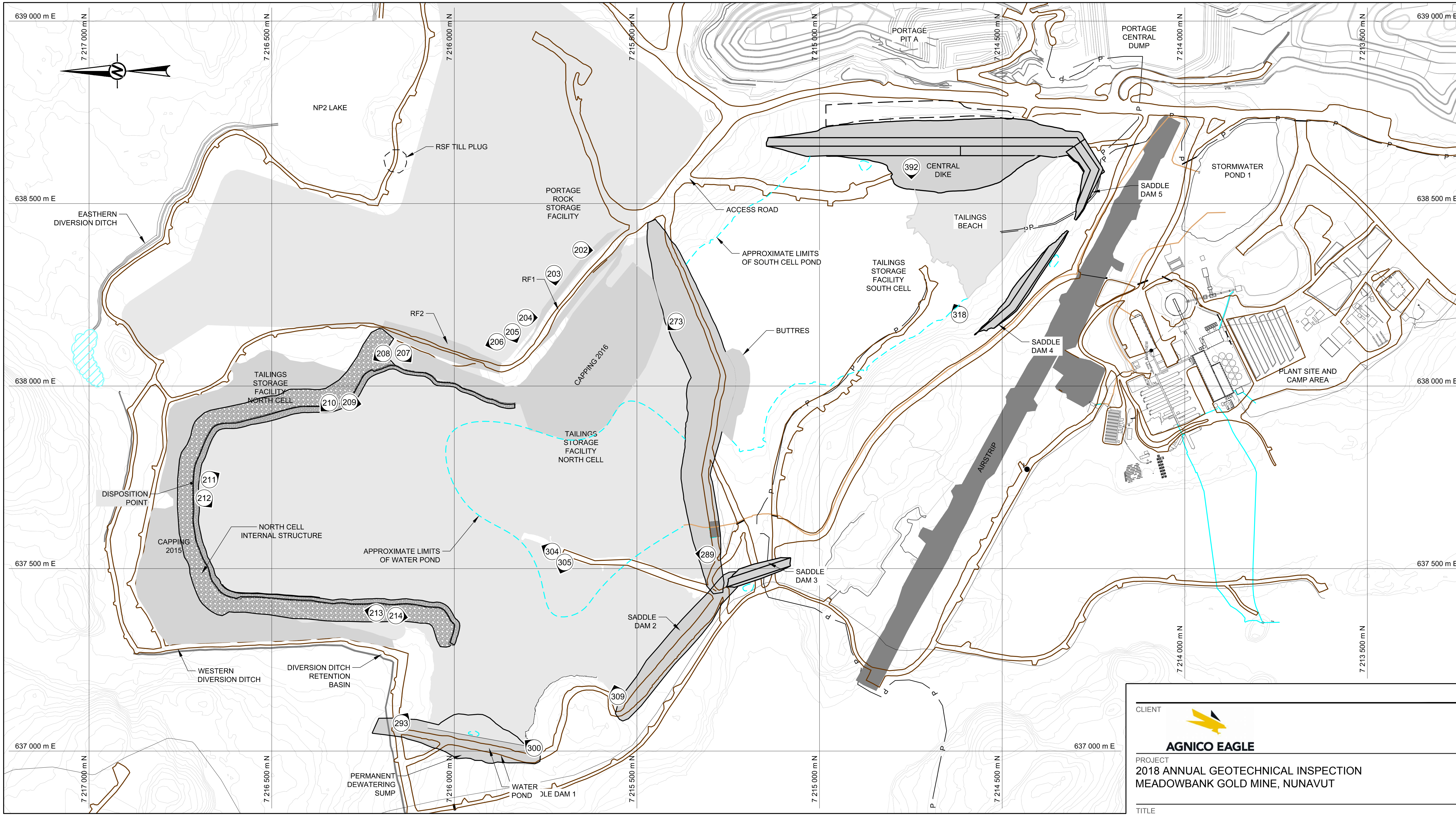
2018 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

VAULT DIKE DURING THE ANNUAL INSPECTION OF 2018

PROJECT No.	PHASE	Rev.	FIGURE
18101627	5000	0	A3

25 mm



LEGEND

TOPOGRAPHIC CONTOUR

1 IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2018

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

REFERENCE

DRAWING BASE PROVIDED BY AEM LTD., MEADOWBANK DIVISION IN "MBK Site map updated JULY 2014.dwg" DATED JULY 8, 2014.

0 250 500

1:10 000 METRES

CLIENT

AGNICO EAGLE

PROJECT

2018 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

GENERAL VIEW OF TAILINGS STORAGE FACILITY DURING THE ANNUAL INSPECTION OF 2018

CONSULTANT

GOLDER

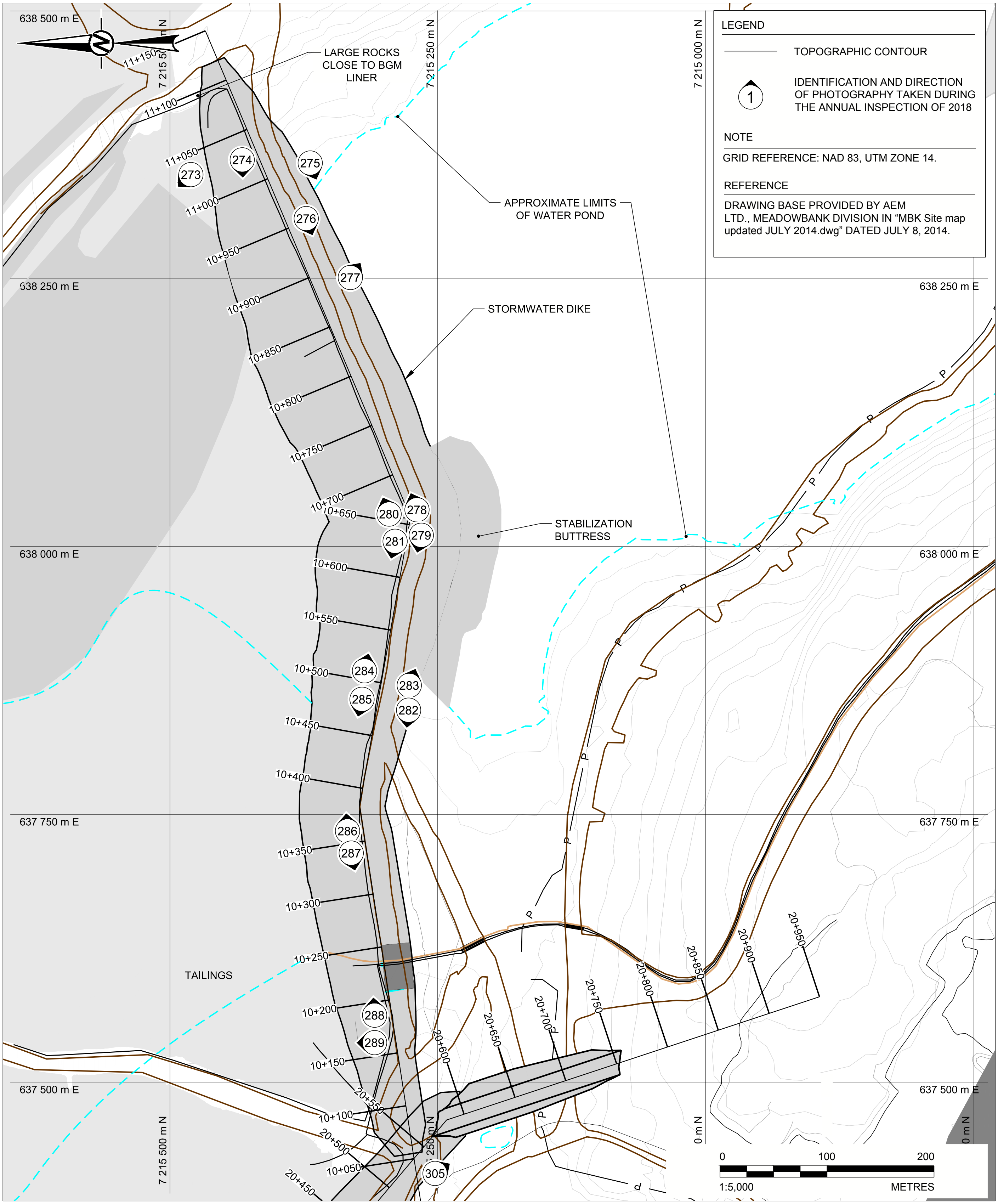
YYYY-MM-DD	2019-02-25
PREPARED	M. Habersetzer
DESIGN	A. Annoual
REVIEW	M. Habersetzer
APPROVED	Y. Boulianne

PROJECT No.	PHASE	Rev.	FIGURE
18101627	5000	0	B1

Path: C:\Autodesk\Temp-Dwg\AcPublish_16088\ | File Name: 18101627-5000-01.DWG

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm



CLIENT

AGNICO EAGLE

CONSULTANT

GOLDER

YYYY-MM-DD	2019-02-25
PREPARED	M. Habersetzer
DESIGN	A. Annoual
REVIEW	M. Habersetzer
APPROVED	Y. Boulianne

PROJECT

2018 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

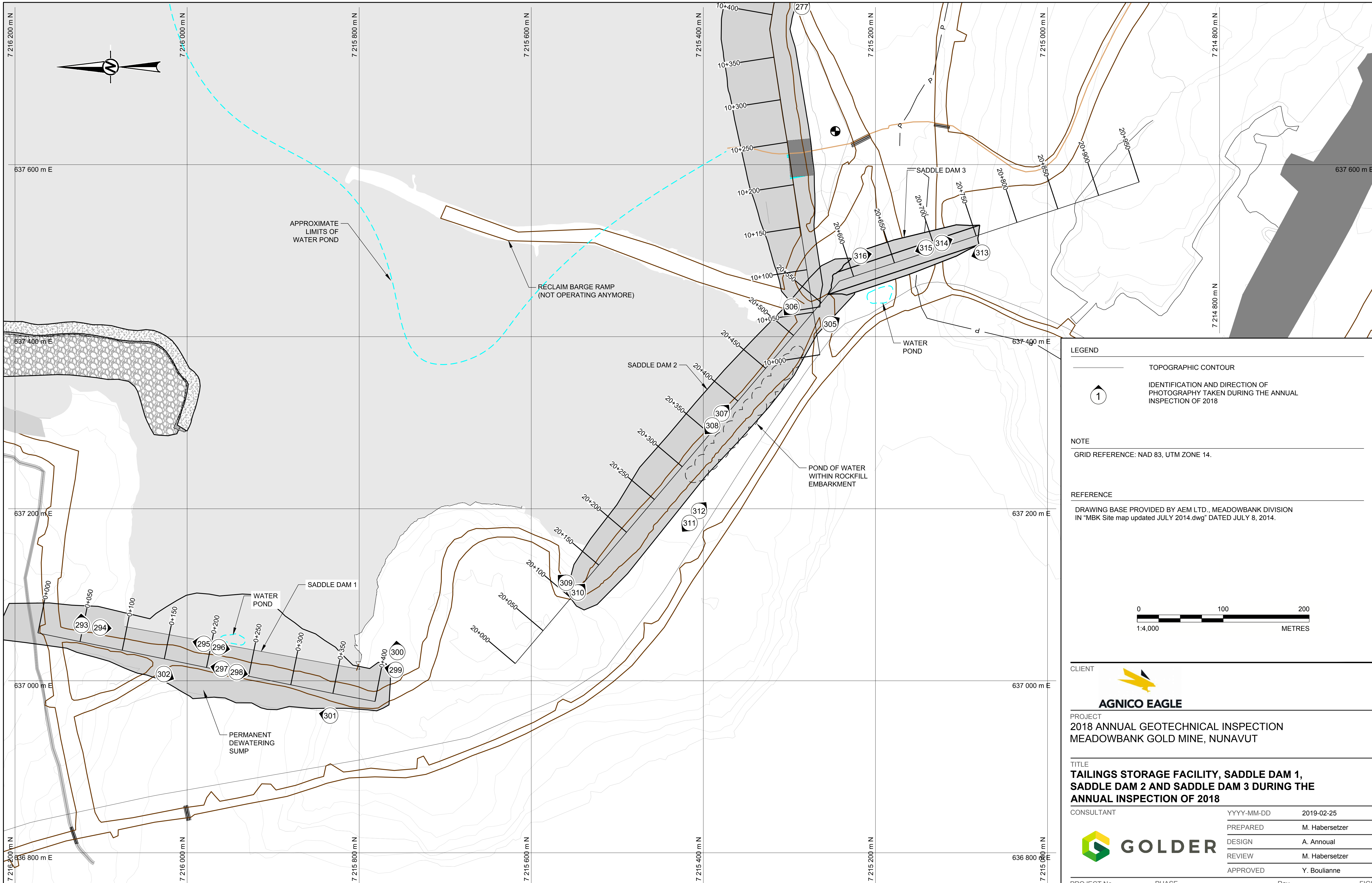
STORMWATER DIKE DURING THE ANNUAL INSPECTION OF 2018

PROJECT No.	PHASE	Rev.	FIGURE
18101627	5000	0	B2

Path: C:\Autodesk\Temp-Dwg\AcPublish_16088\ | File Name: 18101627-5000-01.DWG

25 mm

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A



LEGEND

TOPOGRAPHIC CONTOUR

IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2018

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

REFERENCE

DRAWING BASE PROVIDED BY AEM LTD., MEADOWBANK DIVISION IN "MBK Site map updated JULY 2014.dwg" DATED JULY 8, 2014.

0 100 200

1:4,000 METRES

CLIENT

AGNICO EAGLE

PROJECT

2018 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

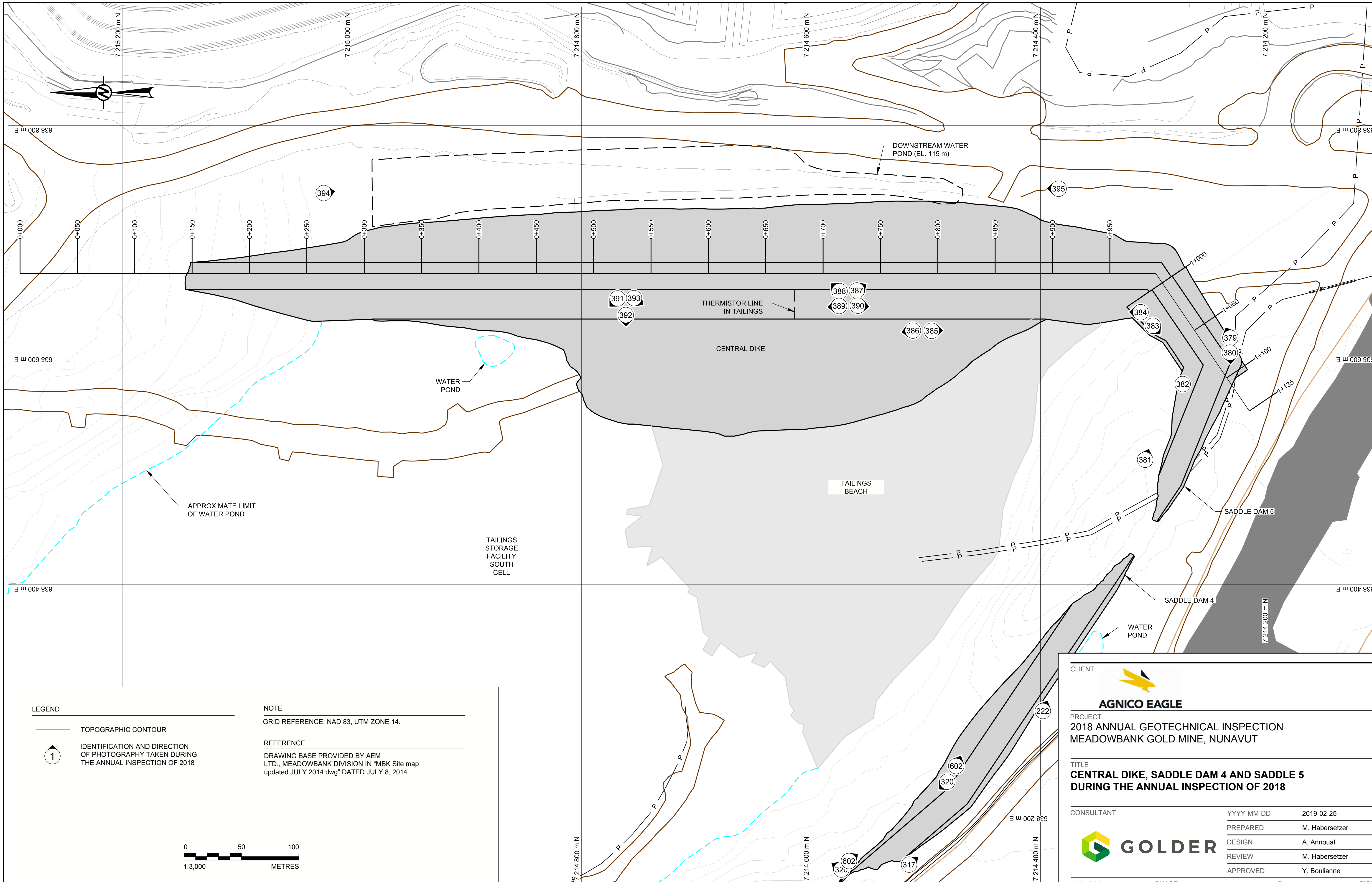
TAILINGS STORAGE FACILITY, SADDLE DAM 1, SADDLE DAM 2 AND SADDLE DAM 3 DURING THE ANNUAL INSPECTION OF 2018

CONSULTANT

GOLDER

YYYY-MM-DD	2019-02-25
PREPARED	M. Habersetzer
DESIGN	A. Annoual
REVIEW	M. Habersetzer
APPROVED	Y. Boulianne

PROJECT No.	PHASE	Rev.	FIGURE
18101627	5000	0	B3



LEGEND

TOPOGRAPHIC CONTOUR

IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2018

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

REFERENCE

DRAWING BASE PROVIDED BY AEM LTD., MEADOWBANK DIVISION IN "MBK Site map updated JULY 2014.dwg" DATED JULY 8, 2014.

0 50 100

1:3,000 METRES

CLIENT

AGNICO EAGLE

PROJECT

2018 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

CENTRAL DIKE, SADDLE DAM 4 AND SADDLE 5 DURING THE ANNUAL INSPECTION OF 2018

CONSULTANT

GOLDER

YYYY-MM-DD	2019-02-25
PREPARED	M. Habersetzer
DESIGN	A. Annoual
REVIEW	M. Habersetzer
APPROVED	Y. Boulianne

PROJECT No.	PHASE	Rev.	FIGURE
18101627	5000	0	B4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

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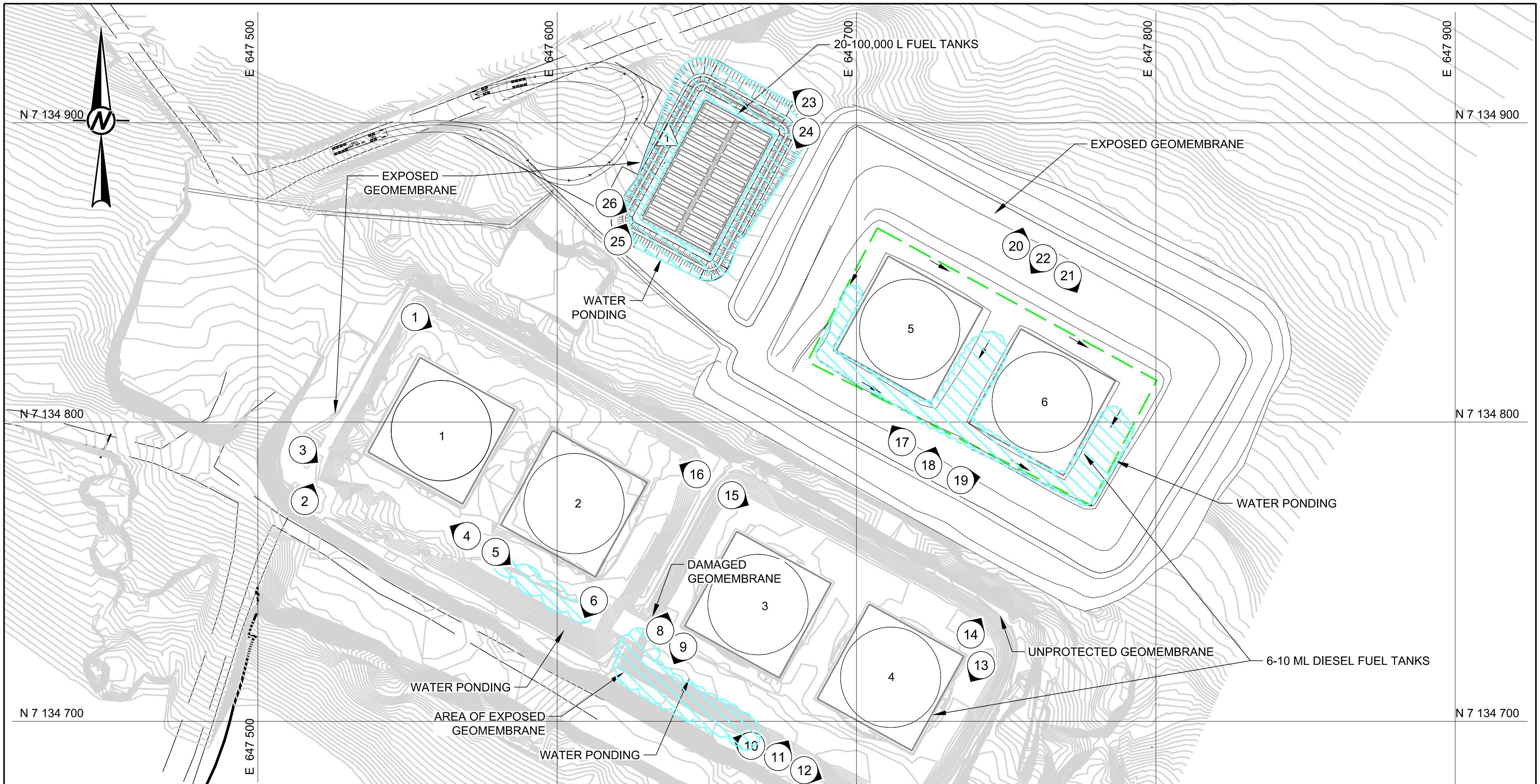


LEGEND

IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2018

MELTING BITUMINOUS GEOMEMBRANE

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

REFERENCE

BASE PLAN PROVIDED BY AEM LTD. IN “PORTAGE_GOOSE_VAULT_END2018_LOM2013_V4D-WITH LABEL.dwg, RECEIVED OCTOBER 7, 2013

CLIENT

AGNICO EAGLE

CONSULTANT

GOLDER

YYYY-MM-DD	2019-02-25
PREPARED	M. Habersetzer
DESIGN	A. Annoual
REVIEW	M. Habersetzer
APPROVED	Y. Boulianne

PROJECT

2018 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

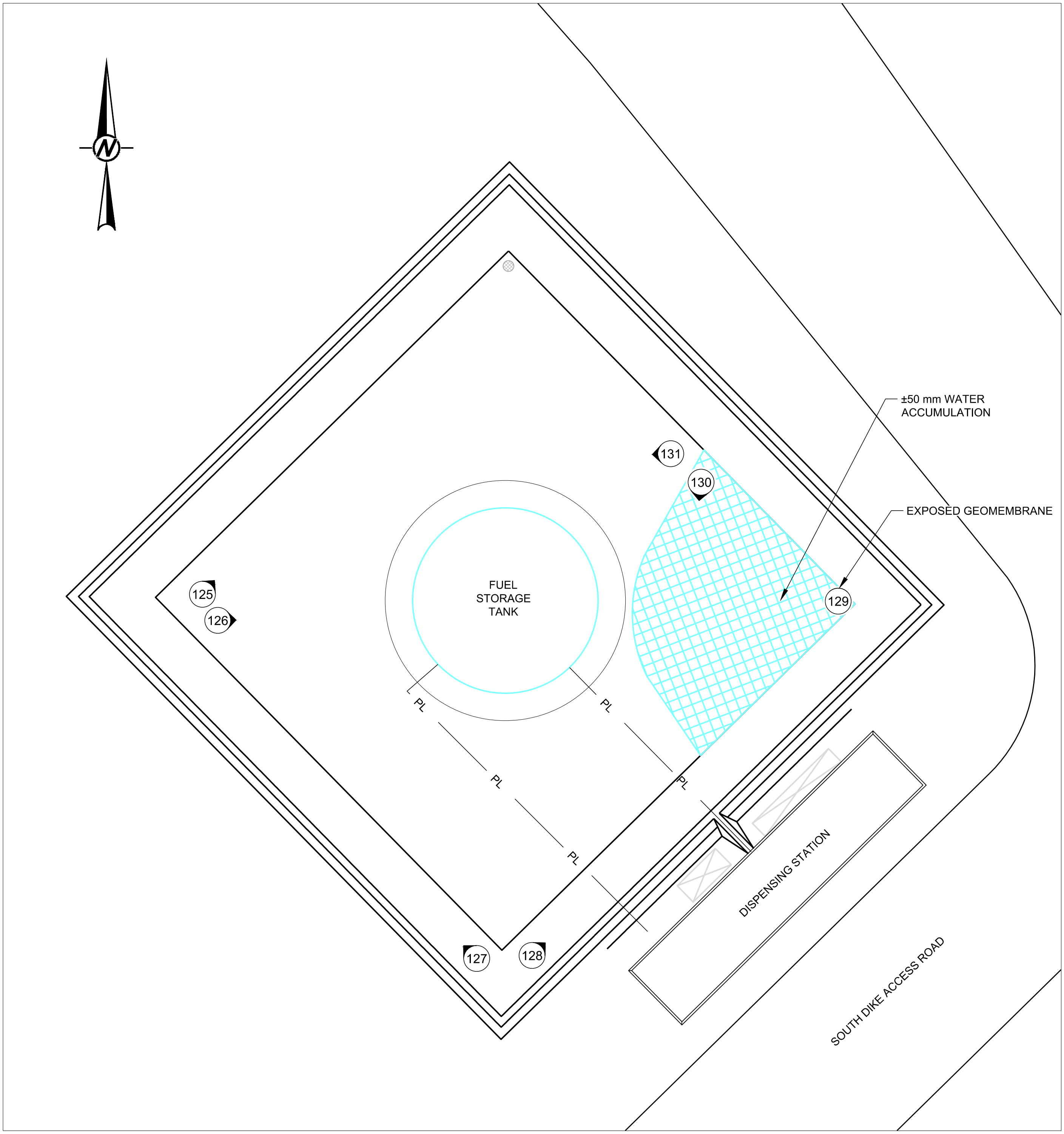
TITLE

TANK FARM BAKER LAKE DURING THE ANNUAL INSPECTION OF 2018

PROJECT No.	PHASE	Rev.	FIGURE
18101627	5000	0	G1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

25 mm



LEGEND

IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2018

REFERENCE

BASE PLAN INFORMATIONS IS PROVIDED BY CUMBERLAND DATED FEBRUARY 03, 2008

0 12.5 25

1:750 METRES

CLIENT

PROJECT

2018 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

CONSULTANT

GOLDER

YYYY-MM-DD	2019-02-25
PREPARED	M. Habersetzer
DESIGN	A. Annoual
REVIEW	M. Habersetzer
APPROVED	Y. Boulianne

TITLE

TANK FARM MEADOWBANK DURING THE ANNUAL INSPECTION OF 2018

PROJECT No.	PHASE	Rev.	FIGURE
18101627	5000	0	G2

25 mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

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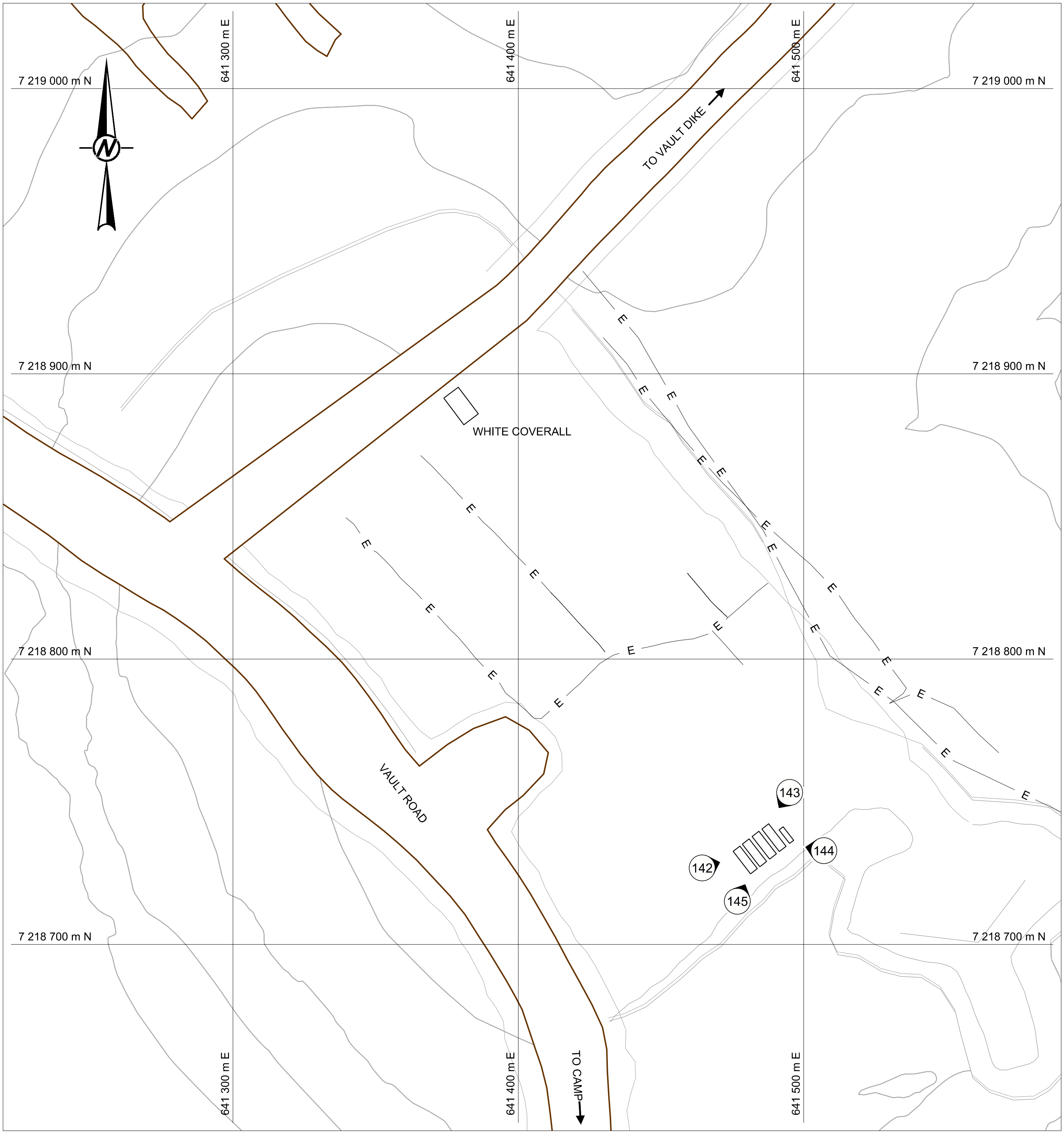


LEGEND

1 IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2018

REFERENCE

BASE PLAN INFORMATIONS IS PROVIDED BY CUMBERLAND DATED FEBRUARY 03, 2008

0 50 100

1:2,000 METRES

CLIENT

PROJECT

2018 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

CONSULTANT

GOLDER

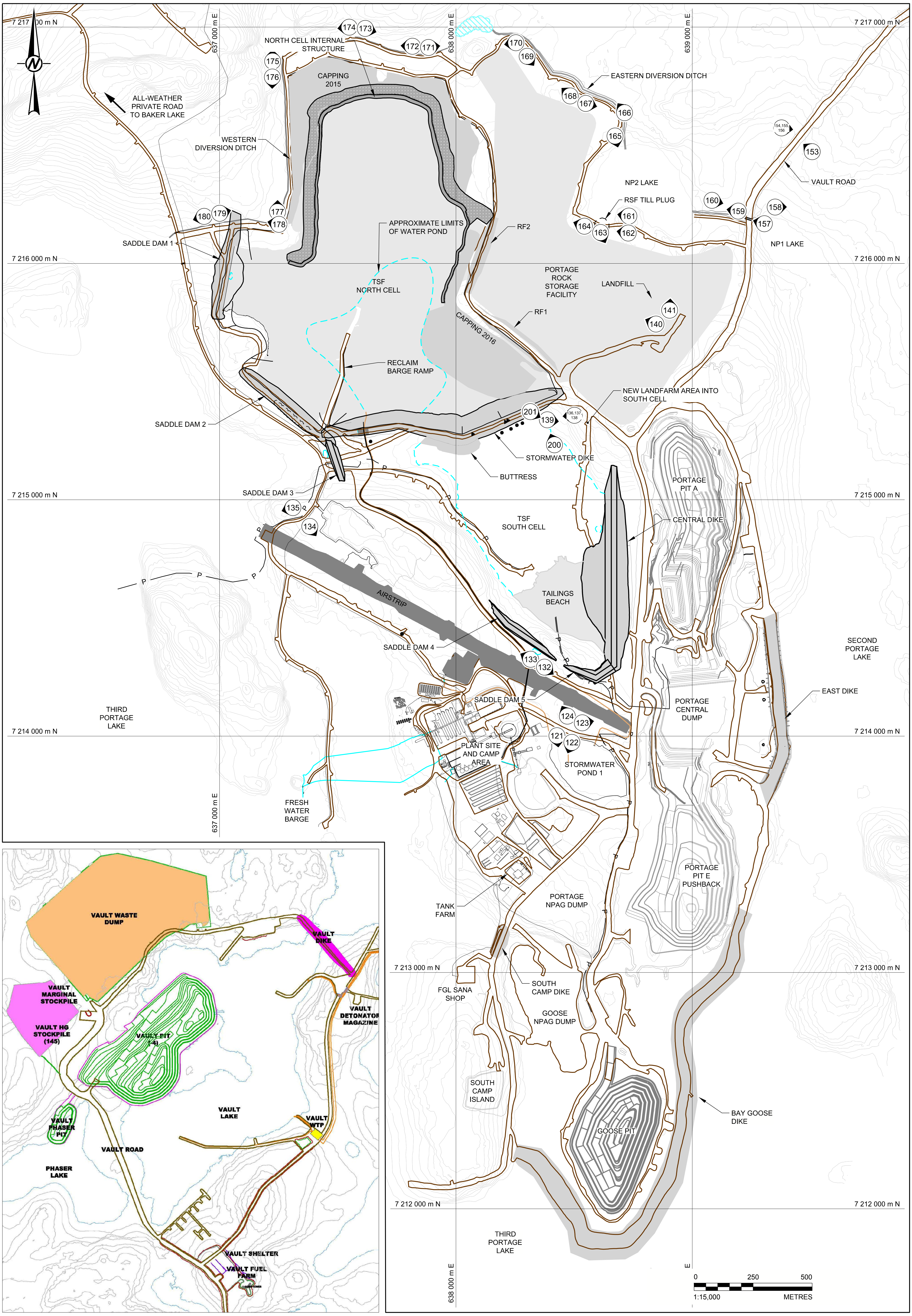
YYYY-MM-DD	2019-02-25
PREPARED	M. Habersetzer
DESIGN	A. Annoual
REVIEW	M. Habersetzer
APPROVED	Y. Boulianne

TITLE

VAULT TANK FARM DURING THE ANNUAL INSPECTION OF 2018

PROJECT No.	PHASE	Rev.	FIGURE
18101627	5000	0	G3

Path: C:\Autodesk\Temp-Dwg\AcPublish_16088\ | File Name: 18101627-5000-01.DWG



IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

LEGEND

TOPOGRAPHIC CONTOUR

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

REFERENCE

DRAWING BASE PROVIDED BY AEM LTD., MEADOWBANK DIVISION IN "MBK Site map updated JULY 2014.dwg" DATED JULY 8, 2014.

CLIENT

AGNICO EAGLE

CONSULTANT

GOLDER

YYYY-MM-DD	2019-02-25
PREPARED	M. Habersetzer
DESIGN	A. Annoual
REVIEW	M. Habersetzer
APPROVED	Y. Boulianne

PROJECT

2018 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

MEADOWBANK MINE SITE DURING THE ANNUAL INSPECTION OF 2018

PROJECT No.	PHASE	Rev.	FIGURE
18101627	5000	0	H1

APPENDIX A

Dewatering Dikes

APPENDIX A1

East Dike Photographic Log and Record of Inspection

Photograph A1-1 East Dike

Date: August 29, 2018 **Photo Number**: 190

Description: From approximately Sta. 60+375, looking south at the crest.

Photograph A1-2 East Dike

Date: August 29, 2018 **Photo Number**: 189

Description: From approximately Sta. 60+410, looking north at the crest.

Photograph A1-3 East Dike

Date: August 29, 2018 **Photo Number**: 194

Description: From approximately Sta. 60+560, looking north at the crest.

Photograph A1-4 East Dike

Date: August 29, 2018 **Photo Number**: 196

Description: From approximately Sta. 60+540, looking south at the crest.

Photograph A1-5 East Dike

Date: August 29, 2018 **Photo Number**: 192

Description: From approximately Sta. 60+540 upstream, looking south at the crest and the upstream slope.

Photograph A1-6 East Dike

Date: August 29, 2018 **Photo Number**: 193

Description: From approximately Sta. 60+560 upstream, looking north at the crest and the upstream slope.

Photograph A1-7 East Dike

Date: August 29, 2018 **Photo Number**: 197

Description: From approximately Sta. 60+810, looking south at the crest.

Photograph A1-8 East Dike

Date: August 29, 2018 **Photo Number**: 187

Description: From Sta. 60+300 upstream, looking north along the upstream slope.

Photograph A1-9 East Dike

Date: August 29, 2018 **Photo Number**: 186

Description: From approximately Sta. 60+250 upstream, looking south at the crest and the upstream slope.

Photograph A1-10 East Dike

Date: August 29, 2018 **Photo Number**: 188

Description: From approximately Sta. 60+250, looking west at the downstream side and toe.

Photograph A1-11 East Dike

Date: August 29, 2018 **Photo Number**: 191

Description: From approximately Sta. 60+380, looking north at the downstream side.

Photograph A1-12 East Dike

Date: August 29, 2018 **Photo Number**: 198

Description: From approximately Sta. 60+770, looking south at the downstream toe.

Client:	AEM	**By:**	Yves Boulianne
Project:	Meadowbank	**Date:**	August 29, 2018
Location:	East Dike	**Reviewed:**	Yves Boulianne

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with a soil bentonite cut-off wall and downstream filters		
Weather Conditions:	Sunny	**Temperature:**	14°C

INSPECTION ITEM	**OBSERVATIONS DATA**	**PHOTO**	**COMMENTS & OTHER DATA**
1. DAM CREST		185, 187, 190, 189, 192, 193, 194, 196, 197	
1.1 Crest elevation	136.5 m Cut-off 136.1m		Design thermal cap crest revised in 2011 to El. 136.5 m (Golder 2011a)
1.2 Reservoir level	133.86 m U/S		
Current freeboard	2.6 m		Design 2 m.
1.3 Distance to tailings pond (if applicable)	Not applicable		
1.4 Surface cracking	Tension crack (approx. 3 m in length) around Sta. 60+480 m, no longer active		
1.5 Unexpected settlement	None		
1.6 Lateral movement	Not apparent		
1.7 Other unusual conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2. UPSTREAM SLOPE		185, 187, 192, 193	
2.1 Slope angle	Approx. 1.6H:1V		
2.2 Signs of erosion	Stable		
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Not applicable		
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE		188, 191, 198	
3.1 Slope angle	Approx.1.6H:1V		
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or wet areas	Not apparent		
3.6 Vegetation growth	None observed		
3.7 Other unusual conditions	None		
4. DOWNSTREAM TOE AREA		188, 191, 198	

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4.1 Seepage from dam	Yes, presence of 3 zones		Zone of seepage downstream near Sta. 60+247. A sump is installed (pumping system located in container on the photo). No additional seepage observed at the surface of the ground. Pumping collection system started on April 4, 2012. Flow is being monitored since July 2013.
			Zone of seepage downstream near Sta. 60+498. A sump is installed (pumping system located in container on the photo). Ponded water nearby. No additional seepage observed at the surface of the ground during the inspection. Pumping collection system started on April 4, 2012. Flow is being monitored since July 2013.
			Seepage zone near Sta. 60+575. According to AEM, this zone was practically dry all year. Water ponding was observed during inspection but no flow was noticed.
4.2 Signs of erosion	Not observed		
4.3 Signs of turbidity in seepage water	Not observed		Based on AEM's monthly report: TSS criteria were not exceeded in 2018.
4.4 Discoloration/staining	No		
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions	None		
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		
6. RESERVOIR			
6.1 Stability of slopes	Stable		Low relief region, stable upstream and downstream of dike. Portage Pit is on the downstream side of the dike.
6.2 Distance to nearest slide (if applicable)	None observed		
6.3 Estimate of slide volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other unusual conditions	None		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE			
7.1 Surface condition	No spillway or outlet structure exists, only dewatering pump		
7.2 Signs of erosion			
7.3 Signs of movement (deformation)			
7.4 Cracks			
7.5 Settlement			

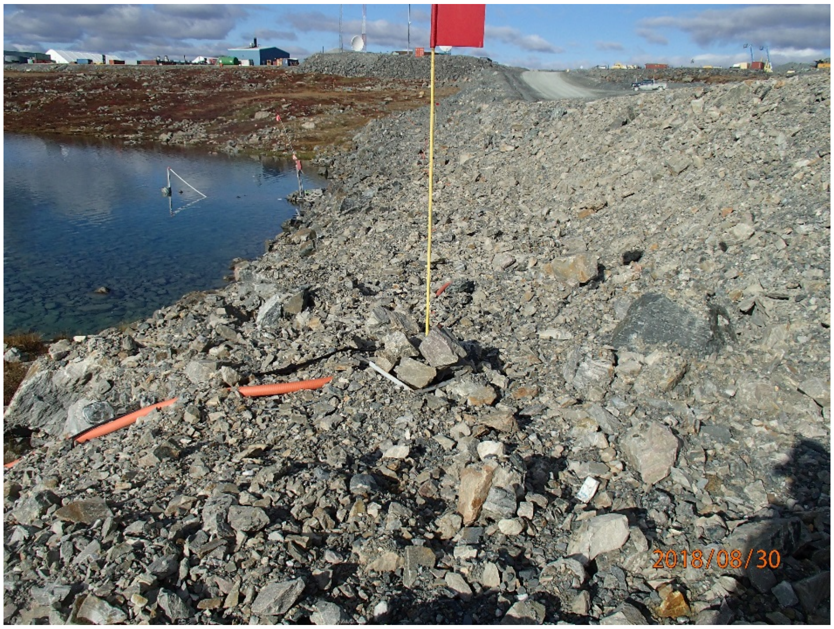
INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
7.6 Presence of debris or blockage			
7.7 Closure mechanism operational			
7.8 Slope protection			
7.9 Instability of side slopes			
7.10 Other unusual conditions	No		
8. Instrumentation			
8.1 Piezometers	Yes		See Section 4.0 of the report.
8.2 Settlement cells	No		
8.3 Thermistors	Yes		No data after June 2016. See Section 4.0 of the report.
8.4 Settlement monuments	Not anymore		They have been removed in the past.
8.5 Seismograph	Periodic		See Section 4.0 of the report.
8.6 Inclinometer	Yes		See Section 4.0 of the report
8.7 Weirs and flow monitors	Yes		Flow meters are installed for the two pumping systems downstream. The flow of the seepage zone at Sta. 60+575 is measured using a pipe.
8.8 Data logger(s)	Yes		The piezometers and thermistors on East Dike have automatic data collection since June 2012 (data transmitted every 3 hours).
8.9 Other			
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	February 2018		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		Included within OMS and ERP plan
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	January 2017		
10. NOTES			

Inspector's Signature	Yves Boulianne	**Date:**	August 29, 2018

APPENDIX A2

South Camp Dike Photographic Log and Record of Inspection



Photograph A2-1 South Camp Dike

Date: August 30, 2018 **Photo Number**: 269

Description: From the south abutment, looking north at the upstream slope and the thermistors instrumentation set-up.

Photograph A2-2 South Camp Dike

Date: August 30, 2018 **Photo Number**: 268

Description: From the north abutment, looking south at the upstream slope and thermistors instrumentation set-up.

Photograph A2-3 South Camp Dike

Date: August 30, 2018 **Photo Number**: 270

Description: From the south abutment, looking north at the crest.

Photograph A2-4 South Camp Dike

Date: August 30, 2018 **Photo Number**: 267

Description: From the north abutment, looking south at the crest.

Photograph A2-5 South Camp Dike

Date: August 30, 2018 **Photo Number**: 272

Description: From the north abutment, looking south at the downstream slope.

Photograph A2-6 South Camp Dike

Date: August 30, 2018 **Photo Number**: 271

Description: From the south abutment, looking north at the downstream slope.

Client:	AEM	**By:**	Yves Boulianne
Project:	Meadowbank	**Date:**	August 30, 2018
Location:	South Camp Dike	**Reviewed:**	Yves Boulianne

GENERAL INFORMATION			
Dam Type:	Rockfill shell with upstream filter, a bituminous geomembrane liner and protective cover.		
Weather Conditions:	Sunny	**Temperature:**	12°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		260, 279, 267	
1.1 Crest elevation	El. 136.6 m (rockfill) El. 134.7 m (liner)		
1.2 Reservoir level	U/S El.132.93 m D/S		No water observed at downstream toe since 2011.
Current freeboard	3,67 m (rockfill crest) 1.77 m (liner crest)		
1.3 Distance to tailings pond (if applicable)	Not applicable		
1.4 Surface cracking	None at the time of inspection		
1.5 Unexpected settlement	None at the time of inspection		
1.6 Lateral movement	Not apparent		
1.7 Other unusual conditions	None		
2. UPSTREAM SLOPE		260, 268	
2.1 Slope angle	Approx. 1.3V: 1H		Adequate

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2.2 Signs of erosion	None observed		
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Liner not visible at the time of the inspection		Bituminous geomembrane liner. Compacted granular material mixed with bentonite was placed above the liner, followed by a thermal cap layer covering the entire liner face.
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE		271, 272	
3.1 Slope angle	Approx. 1.4V:1H		Adequate
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or wet areas	Not apparent		
3.6 Vegetation growth	No		
3.7 Other unusual conditions	None		
4. DOWNSTREAM TOE AREA		271, 272	
4.1 Seepage from dam	None observed		
4.2 Signs of erosion	None observed		
4.3 Signs of turbidity in seepage water	None		
4.4 Discoloration/staining	No		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions	None		
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		
6. RESERVOIR			
6.1 Stability of slopes	Stable		
6.2 Distance to nearest slide (if applicable)	Not applicable		
6.3 Estimate of slide volume (if applicable)	None observed		
6.4 Floating debris	None		
6.5 Other unusual conditions	None		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE			
7.1 Surface condition	No spillway or outlet structure exists		
7.2 Signs of erosion			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
7.3 Signs of movement (deformation)			
7.4 Cracks			
7.5 Settlement			
7.6 Presence of debris or blockage			
7.7 Closure mechanism operational			
7.8 Slope protection			
7.9 Instability of side slopes			
7.10 Other unusual conditions			
8. INSTRUMENTATION			
8.1 Piezometers	No		
8.2 Settlement cells	No		
8.3 Thermistors	Yes		Section 4.0 of the report describes the thermal condition.
8.4 Settlement monuments	No		
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and flow monitors	No		
8.8 Data logger(s)	No		
8.9 Other	No		
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	February 2018		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		Included within the OMS and ERP
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	January 2017		
10. NOTES			
Inspector's Signature	Yves Boulianne	**Date:**	August 30, 2018

APPENDIX A3

Bay-Goose Dike Photographic Log and Record of Inspection

Photograph A3-1 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 223

Description: From approximately Sta. 30+142 (north abutment) looking southwest at the crest.

Photograph A3-2 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 222

Description: From approximately Sta. 30+130 (north abutment), looking north at the crest.

Photograph A3-3 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 220

Description: From approximately Sta. 30+075 (north abutment), looking north at the downstream toe.

Photograph A3-4 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 221

Description: From approximately Sta. 30+075 (north abutment), looking south at the downstream toe.

Photograph A3-5 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 224

Description: From approximately Sta. 30+340 on the crest, looking northeast at the dam crest and downstream slope

Photograph A3-6 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 225

Description: From approximately Sta. 30+340, looking northwest at the north seepage channel.

Photograph A3-7 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 219

Description: From approximately Sta. 30+350 downstream, looking south at the north seepage channel.

Photograph A3-8 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 226

Description: From approximately Sta. 30+450, looking north at the crest and the downstream slope.

Photograph A3-9 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 227

Description: From Sta. 30+500, looking northeast at the crest and the upstream slope.

Photograph A3-10 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 228

Description: From Sta. 30+500, looking south at the crest and the upstream slope.

Photograph A3-11 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 229

Description: From Sta. 30+500, looking west at the downstream slope.

Photograph A3-12 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 233

Description: From Sta. 30+700, looking south at the crest and the upstream slope.

Photograph A3-13 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 232

Description: From approximately Sta. 30+680, looking north at the crest and the upstream slope.

Photograph A3-14 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 230

Description: From approximately Sta. 30+680 on the crest, looking north at the downstream slope and toe.

Photograph A3-15 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 231

Description: From approximately Sta. 30+680 on the crest, looking south at the downstream slope and toe.

Photograph A3-16 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 261

Description: From approximately Sta. 31+130, looking south at the crest and upstream slope.

Photograph A3-17 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 262

Description: From approximately Sta. 31+130, looking north at the crest and upstream slope.

Photograph A3-18 Bay Goose Dike

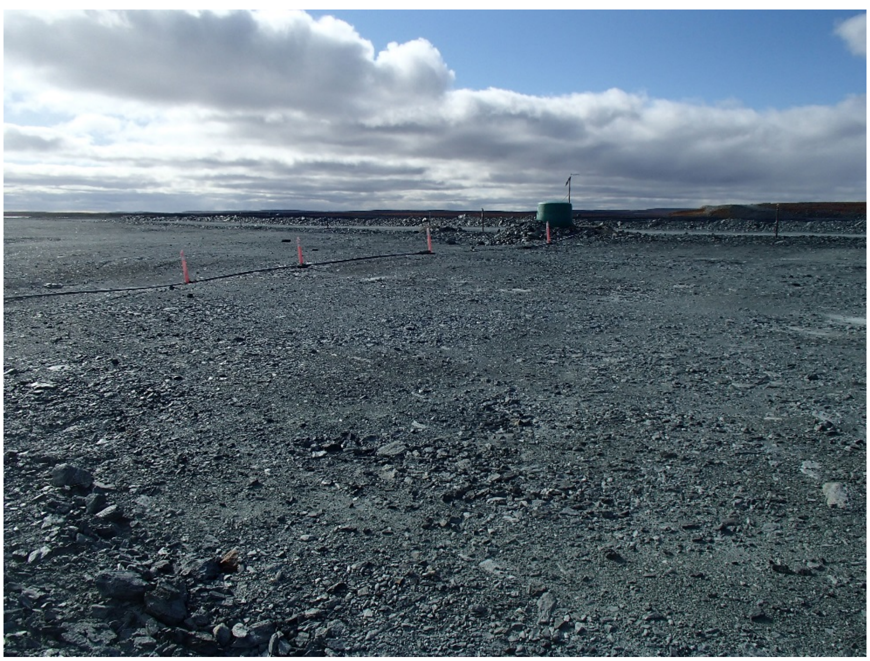
Date: August 30, 2018 **Photo Number**: 266

Description: From approximately Sta. 31+080 on the crest, looking north at the downstream slope and toe.

Photograph A3-19 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 265

Description: From approximately Sta. 31+080 on the crest, looking southwest at the pond of water at Central Channel seepage at Sta. 31+165.



Photograph A3-20 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 264

Description: From approximately Sta. 31+130, looking southwest at the crest.

Photograph A3-21 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 263

Description: From approximately Sta. 31+130, looking north at the crest.

Photograph A3-22 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 257

Description: From approximately Sta. 31+280 on the crest, looking north at the downstream slope and toe area.

Photograph A3-23 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 258

Description: From approximately Sta. 31+280 on the crest, looking southwest at the downstream slope and the water pond at the downstream toe at Sta. 31+350.

Photograph A3-24 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 259

Description: From approximately Sta. 31+280, looking south at the crest.

Photograph A3-25 Bay Goose Dike

<u>Date</u>: August 30, 2018 **<u>Photo Number</u>**: 260

<u>Description</u>: From approximately Sta. 31+280, looking northeast at the crest.

Photograph A3-26 Bay Goose Dike

<u>Date</u>: August 30, 2018 **<u>Photo Number</u>**: 254

<u>Description</u>: From approximately Sta. 31+490, looking northeast at the downstream toe and slope.

Photograph A3-27 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 255

Description: From approximately Sta. 31+490, looking west toward Channel 3.

Photograph A3-28 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 252

Description: From approximately Sta. 31+475, looking west at the crest and the upstream slope.

Photograph A3-29 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 253

Description: From approximately Sta. 31+475, looking northeast at the crest and the upstream slope.

Photograph A3-30 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 251

Description: From approximately Sta. 31+570, looking north toward Channel 3.

Photograph A3-31 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 249

Description: From approximately Sta. 31+645, looking east at the crest centreline.

Photograph A3-32 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 248

Description: From approximately Sta. 31+645, looking northwest at the crest and the upstream slope.

Photograph A3-33 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 250

Description: From approximately Sta. 31+640, looking southeast at the upstream slope.

Photograph A3-34 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 246

Description: From the crest at approximately Sta. 31+740. Looking southeast downstream toward Channel 3.

Photograph A3-35 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 247

Description: From the crest at approximately Sta. 31+740, looking north downstream at the water pond at Sta. 31+750.

Photograph A3-36 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 244

Description: From approximately Sta. 31+870, looking northwest at the crest and upstream slope.

Photograph A3-37 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 245

Description: From approximately Sta. 31+870, looking southeast at the crest and upstream slope.

Photograph A3-38 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 243

Description: From approximately Sta. 31+920, looking south at the crest.

Photograph A3-39 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 242

Description: From approximately Sta. 31+920, looking northwest at the crest.

Photograph A3-40 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 240

Description: From approximately Sta. 31+920 on the crest, looking southeast at the downstream slope.

Photograph A3-41 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 241

Description: From about Sta. 31+920 on the crest, looking northwest toward Channel 1 monitoring station.

Photograph A3-42 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 239

Description: From approximately Sta. 32+030 looking southeast at the crest.

Photograph A3-43 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 238

Description: From approximately Sta. 32+030 looking southwest at the crest.

Photograph A3-44 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 236

Description: From approximately Sta. 32+030 downstream, looking north at the downstream slope.

Photograph A3-45 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 237

Description: From approximately Sta. 32+030 downstream, looking southeast at the downstream slope.

Photograph A3-46 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 234

Description: From approximately Sta. 32+025 (south abutment) looking east at the crest. Zone of high magnitude settlement in the ultramafic cap. The tension cracks seem no longer active.

Photograph A3-47 Bay Goose Dike

Date: August 30, 2018 **Photo Number**: 235

Description: From approximately Sta. 32+025 (south abutment) looking west at the crest. Zone of high magnitude settlement in the ultramafic cap. The tension cracks seem no longer active.

Client:	AEM	**By:**	Yves Boulianne
Project:	Meadowbank	**Date:**	August 30, 2018
Location:	Bay-Goose Dike	**Reviewed:**	Yves Boulianne

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with a cut-off wall (soil-bentonite, cement-soil-bentonite and jet grouting columns) and downstream filters		
Weather Conditions:	Foggy to sunny	**Temperature:**	12°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		235, 234, 238, 239, 242, 243, 244, 245, 248, 249, 250, 252, 253, 259, 260, 257, 258, 261, 262, 263, 264, 266, 233, 232, 230, 227, 228, 229, 224, 223, 222	
1.1 Crest elevation	+/-138 cut-off 136.1m		Thermal cap completed in May 2013.
1.2 Reservoir level	132.93 m upstream		Downstream side dewatered since mid-November 2011.
Current freeboard	5 m		Design 2.0 m.
1.3 Distance to tailings pond (if applicable)	Not applicable		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1.4 Surface cracking	Yes		The tension cracks observed in 2013 on the upstream side within the thermal cap placed during winter 2013 are still visible but are no longer active.
1.5 Unexpected settlement	Yes		The rockfill cap added over the cut-off in the winter of 2013 is showing settlement all along the upstream side of the dike and over the cut-off. Settlement varies from 0.1 m to > 1 m. No longer active.
1.6 Lateral movement	Not apparent		
1.7 Other unusual conditions	Yes		
2. UPSTREAM SLOPE		244, 245, 248, 250, 252, 253, 261, 262, 233, 232, 227	
2.1 Slope angle	Approx. 1.6H:1.0V		Rockfill
2.2 Signs of erosion	Stable		
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Not applicable		
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE		237, 236, 242, 240, 241, 246, 247, 251, 255, 254, 257, 258, 266, 265, 230, 231, 226, 225, 224, 220, 221	

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
3.1 Slope angle	Approx.1.6H:1V		
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or wet areas	Not apparent		
3.6 Vegetation growth	None observed		
3.7 Other unusual conditions	None		
4. DOWNSTREAM TOE AREA		237, 236, 242, 240, 241, 246, 247, 251, 255, 254, 257, 258, 266, 265, 230, 231, 228, 226, 225, 224, 219, 220, 221	
4.1 Seepage from dike	Yes		Seepage zone observed as well as water pond. The seepage is being monitored by the mine and does not show signs of aggravation.
	North Channel	225, 219	Monitored by stations 8 (30+420) and 9 (30+380). Water flowing was observed during the inspection.
	Central Shallow	230	Presence of 2 seepage channels at 30+650 and 30+625. Flow was observed during inspection at 30+650. Monitored by station 7.
	Central Channel	265	Presence of a seepage channel at Sta. 31+165. Water ponding was observed at the time of the inspection. It was pumped once after freshet only.

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
	Channel 3	246, 251, 255	Light flow observed during inspection. Monitored by station 6.
	Channel 1	237, 236	This seepage channel was not flowing at the time of the inspection.
	Water Ponds	247	Presence of water pond with no sign of seepage. Located at 31+750. Water was observed downstream of Channel 1 ponding against the ring road of Goose Pit.
4.2 Signs of erosion	None observed		
4.3 Signs of turbidity in seepage water	No.		
4.4 Discoloration/staining	No		
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions	Yes		Inflow of water on pit wall. Probably due to the Bay-Goose fault and rock quality. In the vicinity of Channels 1, 2 and 3. Not monitored anymore.
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
6. RESERVOIR			
6.1 Stability of slopes	Stable		
6.2 Distance to nearest slide (if applicable)	None observed		
6.3 Estimate of slide volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other unusual conditions	None		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE			
7.1 Surface condition	No spillway or outlet structure exists, only dewatering pump.		
7.2 Signs of erosion			
7.3 Signs of movement (deformation)			
7.4 Cracks			
7.5 Settlement			
7.6 Presence of debris or blockage			
7.7 Closure mechanism operational			
7.8 Slope protection			
7.9 Instability of side slopes			
7.10 Other unusual conditions			
8. INSTRUMENTATION			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
8.1 Piezometers	Yes		See Section 4.0 of the report.
8.2 Settlement cells	No		
8.3 Thermistors	Yes		See Section 4.0 of the report.
8.4 Settlement monuments	No		Survey monuments removed in the past.
8.5 Seismograph	Periodic		See Section 4.0 of the report.
8.6 Inclinometer	Yes		See Section 4.0 of the report.
8.7 Weirs and flow monitors	Yes		Seepage monitoring system installed at seepage channel to monitor flow.
8.8 Data logger(s)	Yes		The piezometers and the thermistors have automatic data transmission (every 3 hours).
8.9 Other			
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	February 2018		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		Included within the OMS and ERP.
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	January 2017		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
10. NOTES			

Inspector's Signature	Yves Boulianne	**Date:**	August 30, 2018

APPENDIX A4

Vault Dike Photographic Log and Record of Inspection

Photograph A4-1 Vault Dike

Date: August 29, 2018 **Photo Number**: 147

Description: From the east abutment, looking northwest at the crest.

Photograph A4-2 Vault Dike

Date: August 29, 2018 **Photo Number**: 149

Description: From downstream, looking southeast at the downstream toe.

Photograph A4-3 Vault Dike

Date: August 29, 2018 **Photo Number**: 148

Description: From downstream, looking northwest at the downstream toe.

Photograph A4-4 Vault Dike

Date: August 29, 2018 Photo Number: 150

Description: From the west abutment, looking southeast at the crest.

Photograph A4-5 Vault Dike

Date: August 29, 2018 **Photo Number**: 151

Description: From the upstream side, looking southeast at the upstream slope.

Photograph A4-6 Vault Dike

Date: August 29, 2018 **Photo Number**: 152

Description: From the upstream side, looking northwest at the upstream slope.

Client:	AEM	**By:**	Yves Boulianne
Project:	Meadowbank	**Date:**	August 29, 2018
Location:	Vault Dike	**Reviewed:**	Yves Boulianne

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with filter zones, impervious upstream liner (bituminous membrane) and an upstream key trench (aggregate mixed with bentonite)		
Weather Conditions:	Overcast	**Temperature:**	14°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		147, 150, 151, 152	
1.1 Crest elevation	142.4 m		
1.2 Reservoir level	139.55 m U/S		
Current freeboard	2.85 m		
1.3 Distance to tailings pond (if applicable)	Not applicable		
1.4 Surface cracking	No		
1.5 Unexpected settlement	No		
1.6 Lateral movement	Not apparent		
1.7 Other unusual conditions	No		
2. UPSTREAM SLOPE		151, 152	
2.1 Slope angle	Approx. 1.5H:1V		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2.2 Signs of erosion	Stable		
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	No		
2.5 Face liner condition (if applicable)	Not applicable		
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE		149, 149	
3.1 Slope angle	Approx.1.5H:1V		
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	No		
3.4 Cracks	None observed		
3.5 Seepage or wet areas	Not apparent		
3.6 Vegetation growth	None observed		
3.7 Other unusual conditions	None		
4. DOWNSTREAM TOE AREA			
4.1 Seepage from dam	None		
4.2 Signs of erosion	Not observed		
4.3 Signs of turbidity in seepage water	No		
4.4 Discoloration/staining	No		
4.5 Outlet operating problem (if applicable)	Not applicable		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4.6 Other unusual conditions	None		
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		
6. RESERVOIR			
6.1 Stability of slopes	Good conditions		
6.2 Distance to nearest slide (if applicable)	None observed		
6.3 Estimate of slide volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other unusual conditions	None		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	No spillway or outlet structure exists, only dewatering pump.		
7.1 Surface condition			
7.2 Signs of erosion			
7.3 Signs of movement (deformation)			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
7.4 Cracks			
7.5 Settlement			
7.6 Presence of debris or blockage			
7.7 Closure mechanism operational			
7.8 Slope protection			
7.9 Instability of side slopes			
7.10 Other unusual conditions	No		
8. Instrumentation			
8.1 Piezometers	No		
8.2 Settlement cells	No		
8.3 Thermistors	Yes		See Section 4.0 of the report.
8.4 Settlement monuments	No		
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and flow monitors	No		
8.8 Data logger(s)	No		
8.9 Other			
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
9.1.3 Date of last revision	February 2018		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		Included within OMS and ERP plan
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	January 2017		
10. NOTES			
Inspector’s Signature	Yves Boulianne	**Date:**	August 29, 2018

APPENDIX B

Tailings Storage Facility

APPENDIX B1

Tailings Facility Photographic Log and Record of Inspection

Photograph B1-1 Tailings Storage Facility

<u>Date</u>: August 31, 2018 **<u>Photo Number</u>**: 300

<u>Description</u>: From Saddle Dam 1 (approximately Sta. 0+410) looking northeast at the North Cell tailings pond. Adequate tailings beach against SD1.

Photograph B1-2 Tailings Storage Facility

<u>Date</u>: August 31, 2018 **<u>Photo Number</u>**: 293

Description: From Saddle Dam 1 (approximately Sta. 0+070) looking east at the North Cell tailings pond. Adequate tailings beach against SD1.

Photograph B1-3 Tailings Storage Facility

Date: August 31, 2018 **Photo Number**: 309

Description: From The northwestern extremity of Saddle Dam 2, looking northeast at the North Cell.

Photograph B1-4 Tailings Storage Facility

Date: August 31, 2018 **Photo Number**: 289

Description: From Stormwater Dike, looking north at the North Cell tailings pond. Adequate tailings beach against Stormwater Dike.

Photograph B1-5 Tailings Storage Facility

Date: August 29, 2018 **Photo Number**: 213

Description: From the North Cell Internal Structure, looking northeast toward the upstream slope and the North Cell.

Photograph B1-6 Tailings Storage Facility

Date: August 29, 2018 **Photo Number**: 214

Description: From the North Cell Internal Structure, looking northeast toward the upstream slope and the North Cell.

Photograph B1-7 Tailings Storage Facility

Date: August 29, 2018 **Photo Number**: 210

Description: From the North Cell Internal Structure, looking northwest toward the upstream slope.

Photograph B1-8 Tailings Storage Facility

Date: August 29, 2018 **Photo Number**: 209

Description: From the North Cell Internal Structure, looking south toward the upstream slope.

Photograph B1-9 Tailings Storage Facility

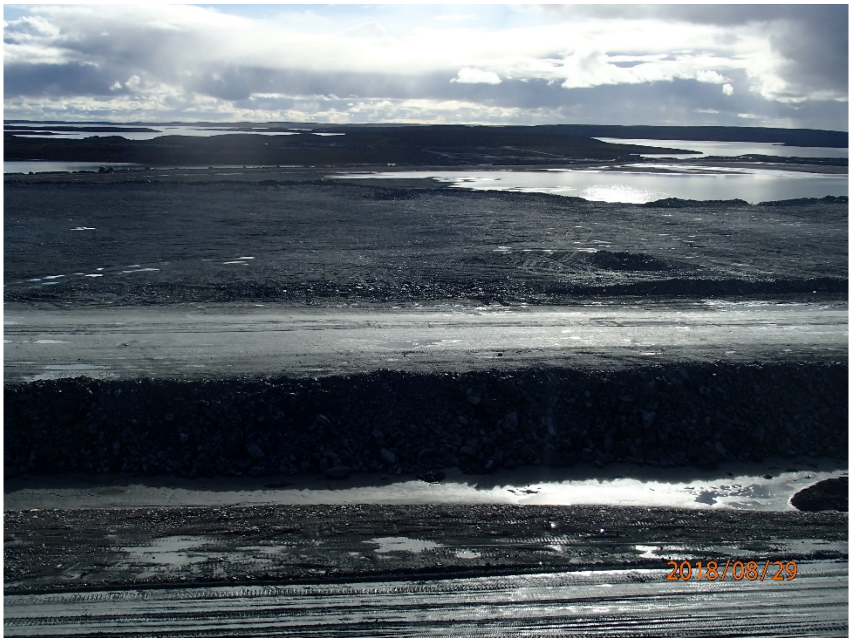
Date: August 31, 2018 **Photo Number**: 303

Description: From the North Cell reclaim barge, looking northwest toward the North Cell.

Photograph B1-10 Tailings Storage Facility

Date: August 31, 2018 **Photo Number**: 304

Description: From the North Cell reclaim barge, looking northeast toward the North Cell.



Photograph B1-11 Tailings Storage Facility

Date: August 29, 2018 **Photo Number**: 202

Description: From the RSF looking south at RF1 at the North Cell and South Cell. View of the 2018 North Cell capping.

Photograph B1-12 Tailings Storage Facility

Date: August 29, 2018 **Photo Number**: 203

Description: From the RSF looking west at RF1 and the North Cell toward Saddle Dam 2. View of the 2018 North Cell capping.

Photograph B1-13 Tailings Storage Facility

Date: August 29, 2018 **Photo Number**: 204

Description: From the RSF looking south at RF1 and the North Cell. View of the 2018 North Cell capping.

Photograph B1-14 Tailings Storage Facility

Date: August 29, 2018 **Photo Number**: 205

Description: From the RSF looking southwest at RF1 and the North Cell.

Photograph B1-15 Tailings Storage Facility

Date: August 29, 2018 **Photo Number**: 206

Description: From the RSF looking northwest at RF1 and the North Cell. View of the 2016 capping.

Photograph B1-16 Tailings Storage Facility

Date: August 31, 2018 **Photo Number**: 273

Description: From Stormwater Dike, looking Northwest at the upstream slope and the 2018 capping. Large rocks are present near the liner.

Photograph B1-17 Tailings Storage Facility

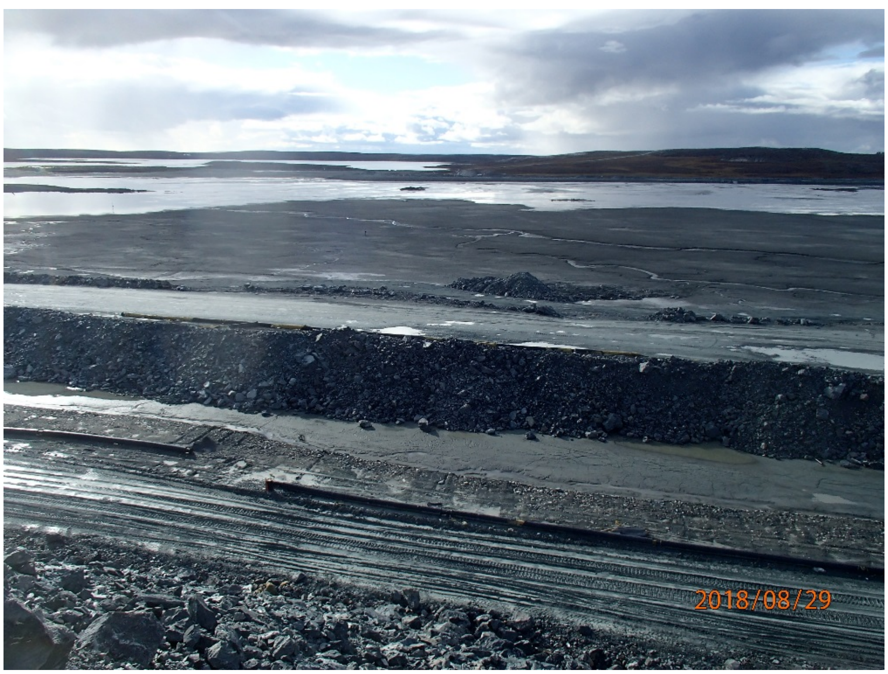
Date: August 29, 2018 **Photo Number**: 211

Description: From the North Cell Internal Structure on a deposition point, looking southeast at the North Cell.

Photograph B1-18 Tailings Storage Facility

Date: August 29, 2018 **Photo Number**: 212

Description: From the North Cell Internal Structure on a deposition point, looking southwest at the North Cell.



Photograph B1-19 Tailings Storage Facility

Date: August 29, 2018 **Photo Number**: 207

Description: From RF2, looking southwest at the North Cell Internal Structure and the North Cell.

Photograph B1-20 Tailings Storage Facility

Date: August 29, 2018 **Photo Number**: 208

Description: From RF2, looking northwest at the North Cell Internal Structure and the North Cell.

Photograph B1-21 Tailings Storage Facility

Date: September 2, 2018 **Photo Number**: 392

Description: From Central Dike looking west at the South Cell. A shallow pond is present in the tailings against the dike.

Photograph B1-22 Tailings Storage Facility

Date: August 31, 2018 **Photo Number**: 318

Description: From Saddle Dam 4 looking northeast at the South Cell.

Client:	AEM	**By:**	Yves Boulianne
Project:	Meadowbank	**Date:**	August 29 to 31, 2018
Location:	North Cell Internal Structure	**Reviewed:**	Yves Boulianne

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with upstream filters built inside the existing North Cell		
Weather Conditions:	Sunny	**Temperature:**	12°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		205, 206, 207, 208, 213	
1.1 Crest elevation	152 to 154 m		Design 154 m
1.2 Reservoir level	149.5 m - tailings		Deposition started in August 2018
Current freeboard	2.5 m to 4.5 -tailings		Design 2 m water, 0.5 m tailings
1.3 Distance to tailings pond (if applicable)	>300 m		Tailings beach all along the NCIS
1.4 Surface cracking	None at time of inspection		
1.5 Unexpected settlement	None observed		
1.6 Lateral movement	Not apparent		
1.7 Other unusual conditions	None		
2. UPSTREAM SLOPE		209, 210, 213, 214, 290, 292	
2.1 Slope angle	Approx. 3H:1V		Rockfill

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2.2 Signs of erosion	None observed		
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	In good condition		
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE		206, 208	
3.1 Slope angle	Approx.1.2H or 1.3 H:1V variable		Rockfill
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or wet areas	None observed		
3.6 Vegetation growth	None observed		
3.7 Other unusual conditions	None		
4. DOWNSTREAM TOE AREA		206, 208	
4.1 Seepage from dam	Yes		Pumping stations are in place downstream of the structure and in operation as needed.
4.2 Signs of erosion	None observed		
4.3 Signs of turbidity in seepage water	Not applicable		
4.4 Discoloration/staining	No		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions			
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		
6. RESERVOIR		209, 210, 211, 212, 213, 214, 290, 291, 292	
6.1 Stability of slopes	Stable		
6.2 Distance to nearest slide	None observed		
6.3 Estimate of slide volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other unusual conditions	No		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
7.1 Surface condition	No spillway or outlet structure exists, only dewatering pump.		
7.2 Signs of erosion			
7.3 Signs of movement (deformation)			
7.4 Cracks			
7.5 Settlement			
7.6 Presence of debris or blockage			
7.7 Closure mechanism operational			
7.8 Slope protection			
7.9 Instability of side slopes			
7.10 Other unusual conditions			
8. INSTRUMENTATION			
8.1 Piezometers	No		
8.2 Settlement cells	No		
8.3 Thermistors	Yes		Thermistors were installed in August 2018.
8.4 Settlement monuments	No		Prisms are under installation.
8.5 Seismograph	No		
8.6 Inclinometer	No		Prisms are under installation.
8.7 Weirs and flow monitors	No		A temporary seepage collection and pump back system is built and will be completed at a later time according to the design.
8.8 Data logger(s)	No		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
8.9 Other			
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	August 2018		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		Included within the OMS and ERP plan.
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	Janvier 2017		
10. NOTES :			
Inspector's Signature	Yves Boulianne	**Date:**	August 31, 2018

APPENDIX B2

Saddle Dam 1 Photographic Log and Record of Inspection

Photograph B2-1 Saddle Dam 1

Date: August 31, 2018 **Photo Number**: 301

Description: From the south abutment (Sta. 0+350) looking north at the downstream face. Notice the sea-can container where a sump is installed.

Photograph B2-2 Saddle Dam 1

Date: August 31, 2018 **Photo Number**: 302

Description: From Sta. 0+150 looking south at the downstream face. Notice the sea-can container where a sump is installed.

Photograph B2-3 Saddle Dam 1

Date: August 31, 2018 **Photo Number**: 297

Description: From approximately Sta. 0+225, looking north at the crest.

Photograph B2-4 Saddle Dam 1

Date: August 31, 2018 **Photo Number**: 298

Description: From approximately Sta. 0+225, looking south at the crest.

Photograph B2-5 Saddle Dam 1

Date: August 31, 2018 **Photo Number**: 294

Description: From approximately Sta. 0+055, looking south at the crest and upstream slope.

Photograph B2-6 Saddle Dam 1

Date: August 31, 2018 **Photo Number**: 296

Description: From approximately Sta. 0+195 upstream, looking south at the upstream slope. Adequate tailings beach against SD1. A small pond of water is present at the surface of the tailings and is not a concern.

Photograph B2-7 Saddle Dam 1

Date: August 31, 2018 **Photo Number**: 295

Description: From approximately Sta. 0+195 upstream, looking north at the upstream slope. Adequate tailings beach against SD1.

Photograph B2-8 Saddle Dam 1

Date: August 31, 2018 **Photo Number**: 299

Description: From the south abutment looking north at the upstream slope. Adequate tailings beach against SD1.

Photograph B2-9 Saddle Dam 1

Date: August 31, 2018 **Photo Number**: 300

Description: From the south abutment looking east at the North Cell.

Photograph B2-10 Saddle Dam 1

Date: August 31, 2018 **Photo Number**: 293

Description: From approximately Sta. 0+050 upstream, looking east at the North Cell.

Client:	AEM	**By:**	Yves Boulianne
Project:	Meadowbank	**Date:**	August 31, 2018
Location:	Saddle Dam 1	**Reviewed:**	Yves Boulianne

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with inverted filter on base, upstream filters, a geomembrane liner tied in a toe till plug and protective cover.		
Weather Conditions:	Sunny	**Temperature:**	13°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		294, 297, 298	
1.1 Crest elevation	150 m		Design 150 m
1.2 Reservoir level	149.5 m - tailings		
Current freeboard	0.5 m -tailings		Design 2 m water, 0.5 m tailings
1.3 Distance to tailings pond (if applicable)	>300 m		Tailings beach all along SD1
1.4 Surface cracking	None at time of inspection		
1.5 Unexpected settlement	None observed		
1.6 Lateral movement	Not apparent		
1.7 Other unusual conditions	None		
2. UPSTREAM SLOPE		293, 294, 295, 296, 299	
2.1 Slope angle	Approx. 3H:1V		Rockfill

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2.2 Signs of erosion	None observed		
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	In good condition		
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE		301, 302	
3.1 Slope angle	Approx.1.2H or 1.3 H:1V variable		Rockfill
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or wet areas	None observed		
3.6 Vegetation growth	None observed		
3.7 Other unusual conditions	None		
4. DOWNSTREAM TOE AREA		301, 302	
4.1 Seepage from dam	Uncertain		A dewatering sump is installed downstream. Water was observed ponding in that area.
4.2 Signs of erosion	None observed		
4.3 Signs of turbidity in seepage water	Not applicable		
4.4 Discoloration/staining	No		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions			
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		
6. RESERVOIR			
6.1 Stability of slopes	Stable		
6.2 Distance to nearest slide	None observed		
6.3 Estimate of slide volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other unusual conditions	No		A small pond of water was observed in the tailings and is not a concern.
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE			
7.1 Surface condition	No spillway or outlet structure exists, only dewatering pump.		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
7.2 Signs of erosion			
7.3 Signs of movement (deformation)			
7.4 Cracks			
7.5 Settlement			
7.6 Presence of debris or blockage			
7.7 Closure mechanism operational			
7.8 Slope protection			
7.9 Instability of side slopes			
7.10 Other unusual conditions			
8. INSTRUMENTATION			
8.1 Piezometers	No		
8.2 Settlement cells	No		
8.3 Thermistors	Yes		See Section 4.0 of the report.
8.4 Settlement monuments	No		Construction drawings show settlement monuments to be installed on Stage 2 crest.
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and flow monitors	No		Per the design, a seepage collection and pump back system is built.
8.8 Data logger(s)	No		
8.9 Other			
9. DOCUMENTATION			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	February 2018		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		Included within the OMS and ERP plan.
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	January 2017		
10. NOTES :			
Inspector's Signature	Yves Boulianne	**Date:**	August 31, 2018

APPENDIX B3

Saddle Dam 2 Photographic Log and Record of Inspection

Photograph B3-1 Saddle Dam 2

Date: August 31, 2018 **Photo Number**: 310

Description: From Saddle Dam 2 (approximately Sta. 20+110) looking southeast at the crest and upstream slope of Saddle Dam 2. The tailings beach against SD2 is adequate.

Photograph B3-2 Saddle Dam 2

Date: August 31, 2018 **Photo Number**: 307

Description: From approximately Sta. 20+370 looking southeast at the crest and upstream slope.

Photograph B3-3 Saddle Dam 2

Date: August 31, 2018 **Photo Number**: 308

Description: From approximately Sta. 20+370 looking northwest at the crest and upstream slope.

Photograph B3-4 Saddle Dam 2

Date: August 31, 2018 **Photo Number**: 311

Description: From approximately Sta. 20+250 downstream, looking northwest at the downstream toe.

Photograph B3-5 Saddle Dam 2

<u>Date</u>: August 31, 2018 **<u>Photo Number</u>**: 312

<u>Description</u>: From approximately Sta. 20+250 downstream, looking southeast at the downstream toe.

Photograph B3-6 Saddle Dam 2

<u>Date</u>: August 31, 2018 **<u>Photo Number</u>**: 306

<u>Description</u>: From approximately Sta. 20+525, looking northwest at the crest.

Photograph B3-7 Saddle Dam 2

Date: August 31, 2018 **Photo Number**: 309

Description: From Saddle Dam 2 (approximately Sta. 20+110) upstream, looking southeast at the crest and upstream slope of Saddle Dam 2. The tailings beach against SD2 is adequate.

Client:	AEM	**By:**	Yves Boulianne
Project:	Meadowbank	**Date:**	August 31, 2018
Location:	Saddle Dam 2	**Reviewed:**	Yves Boulianne

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with inverted filter on base, upstream filters, a geomembrane liner tied in a toe till plug and upstream till blanket.		
Weather Conditions:	Sunny	**Temperature:**	13°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		310, 308, 307, 306	
1.1 Crest elevation	150 m		Design 150 m
1.2 Reservoir level	149.5 m - tailings		
Current freeboard	0.5 m - tailings		Design 2 m water, 0.5 m tailings
1.3 Distance to tailings pond (if applicable)	>200 m		Adequate tailings beach
1.4 Surface cracking	None at time of inspection		
1.5 Unexpected settlement	None observed		
1.6 Lateral movement	Not apparent		
1.7 Other unusual conditions	None		
2. UPSTREAM SLOPE		309, 310, 308, 307, 306	
2.1 Slope angle	Approx. 3H:1V		Rockfill
2.2 Signs of erosion	None observed		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Good		
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE		311, 312	
3.1 Slope angle	Approx.1.2H or 1.3H:1V variable		Rockfill
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or wet areas	None observed on slope		
3.6 Vegetation growth	None observed		
3.7 Other unusual conditions	None		
4. DOWNSTREAM TOE AREA		311, 312	
4.1 Seepage from dam	No		
4.2 Signs of erosion	None observed		
4.3 Signs of turbidity in seepage water	Not applicable		
4.4 Discoloration/staining	No		
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions	Yes		Water is still ponding within the rockfill embankment between 20+275 to 20+475 approximately.

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		
6. RESERVOIR		307, 308, 309	
6.1 Stability of slopes	Stable		
6.2 Distance to nearest slide (if applicable)	None observed		
6.3 Estimate of slide volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other unusual conditions	No		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE			
7.1 Surface condition	No spillway or outlet structure exists, only dewatering pump.		
7.2 Signs of erosion			
7.3 Signs of movement (deformation)			
7.4 Cracks			
7.5 Settlement			
7.6 Presence of debris or blockage			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
7.7 Closure mechanism operational			
7.8 Slope protection			
7.9 Instability of side slopes			
7.10 Other unusual conditions			
8. INSTRUMENTATION			
8.1 Piezometers	No		
8.2 Settlement cells	No		
8.3 Thermistors	Yes		See Section 4.0 of the report.
8.4 Settlement monuments	No		Construction drawings show displacement monitoring on Stage 2 crest.
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and flow monitors	No		
8.8 Data logger(s)	No		
8.9 Other			
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	February 2018		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		Included within the OMS and ERP plan.

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	January 2017		
10. NOTES :			
Inspector's Signature	Yves Boulianne	**Date:**	August 31, 2018

APPENDIX B4

Stormwater Dike Photographic Log and Record of Inspection

Photograph B4-1 Stormwater Dike

Date: August 31, 2018 **Photo Number**: 274

Description: From the east abutment (11+100 approximately), looking west at the upstream face and the rockfill cover of the North Cell. Shallow water ponding against portion of the dike (less than 30 cm deep). Large rocks are present near the liner.

Photograph B4-2 Stormwater Dike

Date: August 31, 2018 **Photo Number**: 273

Description: From the east abutment (11+100 approximately), looking northwest at the North Cell and the rockfill cover. Large rocks are present near the liner.

Photograph B4-3 Stormwater Dike

Date: August 31, 2018 **Photo Number**: 280

Description: From Sta. 10+650 looking east at the crest.

Photograph B4-4 Stormwater Dike

Date: August 31, 2018 **Photo Number**: 281

Description: From Sta. 10+650 looking west at the crest. Shallow water against portion of Stormwater Dike.

Photograph B4-5 Stormwater Dike

Date: August 31, 2018 **Photo Number**: 279

Description: From approximately Sta. 10+650 looking west at the downstream slope.

Photograph B4-6 Stormwater Dike

Date: August 31, 2018 **Photo Number**: 278

Description: From approximately Sta. 10+650 looking east at the downstream slope.

Photograph B4-7 Stormwater Dike

Date: August 31, 2018 **Photo Number**: 275

Description: From approximately Sta. 11+000, looking southwest at the downstream slope.

Photograph B4-8 Stormwater Dike

Date: August 31, 2018 **Photo Number**: 277

Description: From approximately Sta. 10+875, looking southeast at the South Cell.

Photograph B4-9 Stormwater Dike

Date: August 31, 2018 **Photo Number**: 278

Description: From Sta.10+650, looking east at the crest and the downstream slope.

Photograph B4-10 Stormwater Dike

Date: August 31, 2018 **Photo Number**: 279

Description: From Sta.10+650, looking west at the crest and the downstream slope.

Photograph B4-11 Stormwater Dike

Date: August 31, 2018 **Photo Number**: 288

Description: From Sta.10+175, looking east at the upstream slope. The tailings beach is adequate.

Photograph B4-12 Stormwater Dike

Date: August 31, 2018 **Photo Number**: 289

Description: From Sta.10+175, looking north at the upstream slope and the North Cell. The tailings beach is adequate.

Photograph B4-13 Stormwater Dike

Date: August 31, 2018 **Photo Number**: 282

Description: From Sta.10+500, looking west at the downstream slope.

Photograph B4-14 Stormwater Dike

Date: August 31, 2018 **Photo Number**: 283

Description: From Sta.10+500, looking east at the downstream slope.

Photograph B4-15 Stormwater Dike

Date: August 31, 2018 **Photo Number**: 284

Description: From Sta.10+500, looking east at the upstream slope.

Photograph B4-16 Stormwater Dike

Date: August 31, 2018 **Photo Number**: 285

Description: From Sta.10+500, looking west at the upstream slope.

Photograph B4-17 Stormwater Dike

Date: August 31, 2018 **Photo Number**: 276

Description: From Sta.10+975, looking southwest at the crest. View of the crackmeters and wire extensometers installed in the previous settlement zone active in the spring.

Client:	AEM	**By:**	Yves Boulianne
Project:	Meadowbank	**Date:**	August 31, 2018
Location:	Stormwater Dike	**Reviewed:**	Yves Boulianne

GENERAL INFORMATION			
Dam Type:	Rockfill embankment, upstream filters and a bituminous geomembrane liner. Compacted till placed above liner at toe, prior to tailings deposition.		
Weather Conditions:	Sunny	**Temperature:**	13°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		276, 281, 280, 284, 285 286, 287	
1.1 Crest elevation	150 m		Design 150 m
1.2 Reservoir level	140.93 – water (South Cell) 149.5 m tailings (North Cell)		
Current freeboard	9.07 m – water (South Cell) 0.5 m – tailings (North Cell)		Design 2 m in operation and 1 m at closure for water and 0.5 m for tailings.
1.3 Distance to tailings pond (if applicable)	Adequate (North Cell)		Adequate beach in place all along the dike on North Cell. Some shallow water ponding against dike in some places (from 10+550 to 10+950 approximately). Water has reached the toe of the structure in the South Cell.
1.4 Surface cracking	Yes	276	

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1.5 Unexpected settlement	No		Tension cracks and unexpected movement were observed (oblique tension cracks extending side to side). They are concentrated from 10+700 to 11+000 and appeared in May before the freshet. They have since been filled with bentonite. No movement has been observed in the zone where a buttress was constructed at the toe in the South Cell. The buttress is covered by the pond.
1.6 Lateral movement	Yes		
1.7 Other unusual conditions			
2. UPSTREAM SLOPE		274, 288, 286, 287, 284, 285, 280, 281	
2.1 Slope angle	Approx. 3H:1V		Rockfill
2.2 Signs of erosion	None observed		
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Good conditions.		
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE		282, 283, 279, 278, 277, 275	
3.1 Slope angle	Approx.1.2H or 1.5 H:1V variable		Rockfill
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	None observed		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
3.5 Seepage or wet areas	None observed on slope		
3.6 Vegetation growth	None observed		
3.7 Other unusual conditions	None		
4. DOWNSTREAM TOE AREA	Not visible		Downstream toe and berm is submerged by the South Cell pond. The berm was constructed at the downstream toe to stabilise the movement and cracks observed in 2016.
4.1 Seepage from dam	Not visible		
4.2 Signs of erosion	Not visible		
4.3 Signs of turbidity in seepage water	Not visible		
4.4 Discoloration/staining	Not visible		
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions	Not visible		
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
6. RESERVOIR		289, 287, 286, 280, 281, 284, 285, 273, 274	
6.1 Stability of slopes	Stable		
6.2 Distance to nearest slide (if applicable)	None observed		
6.3 Estimate of slide volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other unusual conditions	No		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	No spillway or outlet structure exists, only dewatering pump		
7.1 Surface condition			
7.2 Signs of erosion			
7.3 Signs of movement (deformation)			
7.4 Cracks			
7.5 Settlement			
7.6 Presence of debris or blockage			
7.7 Closure mechanism operational			
7.8 Slope protection			
7.9 Instability of side slopes			
7.10 Other unusual conditions			
8. INSTRUMENTATION			
8.1 Piezometers	Yes		See Section 4.0

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
8.2 Settlement cells	No		
8.3 Thermistors	Yes		See Section 4.0
8.4 Settlement monuments	Yes		See Section 4.0
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and flow monitors	No		
8.8 Data logger(s)	No		
8.9 Other	None		
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	February 2018		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		Included within OMS and ERP.
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	January 2017		
10. NOTES :			
Inspector's Signature	Yves Boulianne	**Date:**	August 31, 2018

APPENDIX B5

Saddle Dam 3 Photographic Log and Record of Inspection

Photograph B5-1 Saddle Dam 3

Date: August 31, 2018 **Photo Number**: 305

Description: From approximately Sta. 20+550 looking southeast at the downstream slope.

Photograph B5-2 Saddle Dam 3

Date: August 31, 2018 **Photo Number**: 313

Description: From Sta. 20+750, looking northwest at the downstream slope and toe.

Photograph B5-3 Saddle Dam 3

Date: August 31, 2018 **Photo Number**: 314

Description: From Sta. 20+700, looking southeast at the crest and the upstream slope.

Photograph B5-4 Saddle Dam 3

Date: August 31, 2018 **Photo Number**: 315

Description: From Sta. 20+700, looking northwest at the crest and the upstream slope.

Photograph B5-5 Saddle Dam 3

Date: August 31, 2018 **Photo Number**: 316

Description: From Sta. 20+610, looking south at the upstream slope.

Client:	AEM	**By:**	Yves Boulianne
Project:	Meadowbank	**Date:**	August 31, 2018
Location:	Saddle Dam 3	**Reviewed:**	Yves Boulianne

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with inverted filter on base, upstream filters, a geomembrane liner tied in a toe till plug and upstream till blanket.		
Weather Conditions:	Sunny	**Temperature:**	13°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		314, 315	
1.1 Crest elevation	145 m		Designed to be able to be raised up to El. 150 m
1.2 Reservoir Level	140.93 m - water 132 m – tailings (West extremity of the South Cell)		
Current Freeboard	4.1 (water)		Water now reaches the structure.
1.3 Distance To Tailings Pond (if applicable)	NA		Water now reaches the structure but no tailings are planned to be in contact with the structure.
1.4 Surface Cracking	None at time of inspection		
1.5 Unexpected Settlement	None observed		
1.6 Lateral Movement	Not apparent		
1.7 Other Unusual Conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2. UPSTREAM SLOPE		316, 314, 315	
2.1 Slope angle	3H:1V		
2.2 Signs of Erosion	None observed		
2.3 Signs of Movement (Deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Good		
2.6 Other Unusual Conditions	None		
3. DOWNSTREAM SLOPE		313, 305	
3.1 Slope angle	1.5H:1V		
3.2 Signs of Erosion	None observed		
3.3 Signs of Movement (Deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or Wet Areas	None observed on slope		
3.6 Vegetation Growth	None observed		
3.7 Other Unusual Conditions	None		
4. DOWNSTREAM TOE AREA		313, 305	
4.1 Seepage from Dam	No		
4.2 Signs of Erosion	None observed		
4.3 Signs of Turbidity in Seepage Water	Not applicable		
4.4 Discoloration/staining	No		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other Conditions	Yes		A sump was constructed on the downstream side to collect the ponding water, so its level does not exceed the elevation of the granular layer of the upstream toe liner tie-in.
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of Erosion	None observed		
5.3 Excessive Vegetation	No		
5.4 Presence of Rodent Burrows	None observed		
5.5 Other Unusual Conditions	None		
6. RESERVOIR			
6.1 Stability of Slopes	Stable		
6.2 Distance to Nearest Slide (if applicable)	None observed		
6.3 Estimate of Slide Volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other Unusual Conditions	No		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	No spillway or outlet structure exists, only dewatering pump.		
7.1 Surface Condition	.		
7.2 Signs of Erosion			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
7.3 Signs of Movement (Deformation)			
7.4 Cracks			
7.5 Settlement			
7.6 Presence of Debris or Blockage			
7.7 Closure mechanism operational			
7.8 Slope Protection			
7.9 Instability of Side Slopes			
7.10 Other Unusual Conditions			
8. INSTRUMENTATION			
8.1 Piezometers	No		
8.2 Settlement Cells	No		
8.3 Thermistors	Yes		See Section 4.0 of the report.
8.4 Settlement Monuments	No		
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and Flow Monitors	No		
8.8 Data logger(s)	No		
8.9 Other			
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
9.1.3 Date of last revision	February 2018		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		Included within the OMS and ERP plan.
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	January 2017		
10. NOTES :			

Inspector's Signature	Yves Boulianne	**Date:**	August 31, 2018

APPENDIX B6

Saddle Dam 4 Photographic Log and Record of Inspection

Photograph B6-1 Saddle Dam 4

Date: August 31, 2018 **Photo Number**: 317

Description: From 40+150 approximately, looking southeast at the crest and the downstream slope.

Photograph B6-2 Saddle Dam 4

Date: August 31, 2018 **Photo Number**: 320

Description: From 40+250 approximately, looking northwest at the crest and the upstream slope.

Photograph B6-3 Saddle Dam 4

Date: August 31, 2018 **Photo Number**: 321

Description: From 40+250 approximately, looking southeast at the crest and the upstream slope.

Photograph B6-4 Saddle Dam 4

Date: August 31, 2018 **Photo Number**: 322

Description: From 40+400 approximately, looking southeast at the crest and the downstream slope.

Photograph B6-5 Saddle Dam 4

Date: August 31, 2018 **Photo Number**: 318

Description: From 40+100 approximately, looking northeast at the downstream toe and the South Cell.

Photograph B6-6 Saddle Dam 4

Date: August 31, 2018 **Photo Number**: 319

Description: From 40+100 approximately, looking southeast at the downstream slope and the downstream toe.

Client:	AEM	**By:**	Yves Boulianne
Project:	Meadowbank	**Date:**	August 31, 2018
Location:	Saddle Dam 4	**Reviewed:**	Yves Boulianne

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with inverted filter on base, upstream filters, a geomembrane liner tied in a toe till plug and upstream till blanket.		
Weather Conditions:	Sunny	**Temperature:**	13°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		317, 320, 321, 322	
1.1 Crest elevation	145 m		Designed to be able to be raised to El. 150 m
1.2 Reservoir Level	140.93 m - water 142 m - tailings		
Current Freeboard	4.07 m (water) 3 m (tailings)		
1.3 Distance To Tailings Pond (if applicable)	Approx. 10 m		
1.4 Surface Cracking	None at time of inspection		
1.5 Unexpected Settlement	None observed		
1.6 Lateral Movement	Not apparent		
1.7 Other Unusual Conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2. UPSTREAM SLOPE		318, 319, 320, 321	
2.1 Slope angle	3H:1V		
2.2 Signs of Erosion	None observed		
2.3 Signs of Movement (Deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Good		
2.6 Other Unusual Conditions	None		
3. DOWNSTREAM SLOPE		317, 322	
3.1 Slope angle	1.5H:1V		
3.2 Signs of Erosion	None observed		
3.3 Signs of Movement (Deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or Wet Areas	None observed on slope		
3.6 Vegetation Growth	None observed		
3.7 Other Unusual Conditions	None		
4. DOWNSTREAM TOE AREA		317, 322	
4.1 Seepage from Dam	No		
4.2 Signs of Erosion	None observed		
4.3 Signs of Turbidity in Seepage Water	Not applicable		
4.4 Discoloration/staining	No		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other Conditions	Yes		Runoff water accumulate at the downstream side of the structure. It is pumped out so that the water level does not exceed the elevation of the granular layer of the upstream toe liner tie-in.
5. ABUTMENTS		318	
5.1 Seepage at contact zone (abutment/embankment)	None observed		Highly fractured bedrock observed at the western abutment.
5.2 Signs of Erosion	None observed		
5.3 Excessive Vegetation	No		
5.4 Presence of Rodent Burrows	None observed		
5.5 Other Unusual Conditions	None		
6. RESERVOIR		318, 319, 320, 321	
6.1 Stability of Slopes	Stable		
6.2 Distance to Nearest Slide (if applicable)	None observed		
6.3 Estimate of Slide Volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other Unusual Conditions	None		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	No spillway or outlet structure exists, only dewatering pump.		
7.1 Surface Condition			
7.2 Signs of Erosion			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
7.3 Signs of Movement (Deformation)			
7.4 Cracks			
7.5 Settlement			
7.6 Presence of Debris or Blockage			
7.7 Closure mechanism operational			
7.8 Slope Protection			
7.9 Instability of Side Slopes			
7.10 Other Unusual Conditions			
8. INSTRUMENTATION			
8.1 Piezometers	No		
8.2 Settlement Cells	No		
8.3 Thermistors	Yes		See Section 4.0 of the report
8.4 Settlement Monuments	No		
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and Flow Monitors	No		Construction drawings indicate a seepage collection system is to be constructed.
8.8 Data logger(s)	No		
8.9 Other			
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	February 2018		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		Included within the OMS and ERP plan.
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	January 2017		
10. NOTES :			
Inspector's Signature	Yves Boulianne	**Date:**	August 31, 2018

APPENDIX B7

Central Dike and Saddle Dam 5 Photographic Log and Record of Inspection

Photograph B7-1 Central Dike and Saddle Dam 5

Date: September 2, 2018 **Photo Number**: 394

Description: From approximately Sta. 0+250 downstream, looking south at the downstream pond.

Photograph B7-2 Central Dike and Saddle Dam 5

Date: September 2, 2018 **Photo Number**: 391

Description: From approximately Sta. 0+525 looking northwest at the upstream slope. Adequate tailings beach against the south section of the structure.

Photograph B7-3 Central Dike and Saddle Dam 5

Date: September 2, 2018 **Photo Number**: 393

Description: From approximately Sta. 0+525 looking southwest at the upstream slope. Adequate tailings beach against the south section of the structure.

Photograph B7-4 Central Dike and Saddle Dam 5

Date: September 2, 2018 **Photo Number**: 392

Description: From approximately Sta. 0+525 looking at the deposition finger. The LLDPE liner is well protected and the tailing beach against the structure is adequate.

Photograph B7-5 Central Dike and Saddle Dam 5

Date: September 2, 2018 **Photo Number**: 387

Description: From approximately Sta. 0+720 looking southeast at the downstream slope and toe. View of the downstream pond and pumping system.

Photograph B7-6 Central Dike and Saddle Dam 5

Date: September 2, 2018 **Photo Number**: 388

Description: From approximately Sta. 0+720 looking northeast at the downstream slope and toe. View of the downstream pond and pumping system.

Photograph B7-7 Central Dike and Saddle Dam 5

Date: September 2, 2018 **Photo Number**: 390

Description: From approximately Sta. 0+720 looking south at the crest.

Photograph B7-8 Central Dike and Saddle Dam 5

Date: September 2, 2018 **Photo Number**: 389

Description: From approximately Sta. 0+720 looking north at the crest.

Photograph B7-9 Central Dike and Saddle Dam 5

<u>Date</u>: September 2, 2018 **<u>Photo Number</u>**: 386

<u>Description</u>: From approximately Sta. 0+800 on the crest, looking north at the upstream slope.

Photograph B7-10 Central Dike and Saddle Dam 5

<u>Date</u>: September 2, 2018 **<u>Photo Number</u>**: 385

<u>Description</u>: From approximately Sta. 0+800 on the crest, looking south at the upstream slope and a tailings deposition finger

Photograph B7-11 Central Dike and Saddle Dam 5

Date: September 2, 2018 **Photo Number**: 382

Description: From approximately Sta. 1+075 upstream. Presence of gravel on the LLDPE liner.

Photograph B7-12 Central Dike and Saddle Dam 5

Date: September 2, 2018 **Photo Number**: 395

Description: From approximately Sta. 0+900 downstream, looking north at the downstream pond.

Photograph B7-13 Central Dike and Saddle Dam 5

Date: September 2, 2018 **Photo Number**: 384

Description: From approximately Sta. 1+000 looking north at the upstream slope of Central Dike and SD5.

Photograph B7-14 Central Dike and Saddle Dam 5

Date: September 2, 2018 **Photo Number**: 383

Description: From approximately Sta. 1+000 looking southwest at the upstream slope of SD5.

Photograph B7-15 Central Dike and Saddle Dam 5

Date: September 2, 2018 **Photo Number**: 379

Description: From approximately Sta. 1+075 looking east at the upstream slope of SD5.

Photograph B7-16 Central Dike and Saddle Dam 5

Date: September 2, 2018 **Photo Number**: 380

Description: From approximately Sta. 1+075 looking west at the upstream slope of SD5.

Photograph B7-17 Central Dike and Saddle Dam 5

Date: September 2, 2018 **Photo Number**: 322

Description: From 40+400 approximately on Saddle Dam 4, looking southeast at the crest and the downstream slope.

Photograph B7-18 Central Dike and Saddle Dam 5

Date: September 2, 2018 **Photo Number**: 381

Description: From 40+620 upstream, looking southeast at the upstream toe area.

Client:	AEM	**By:**	Yves Boulianne
Project:	Meadowbank	**Date:**	September 2, 2018
Location:	Central Dike and Saddle Dam 5	**Reviewed:**	Yves Boulianne

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with inverted filter on base, key trench, upstream filters, a geomembrane liner tied in a toe till plug and protective cover.		
Weather Conditions:	Overcast	**Temperature:**	14°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		384, 386, 387, 388, 389, 390, 391, 393	
1.1 Crest Elevation	Cofferdam Crest = 110 m Rockfill crest = 145 m		
1.2 Reservoir Level	140.93 m - water 142 m - tailings		
Current Freeboard	3 m from the crest		
1.3 Distance To Tailings Pond (if applicable)	Variable		Adequate tailings beach against the whole length of the Central Dike and SD5.
1.4 Surface Cracking	None at time of inspection		
1.5 Unexpected Settlement	None observed		
1.6 Lateral Movement	Not apparent		
1.7 Other Unusual Conditions			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2. UPSTREAM SLOPE		382, 383, 384, 385, 386, 391, 392, 393	
2.1 Slope angle	3:1V up to El. 130 m and 2H:1V above		
2.2 Signs of Erosion	None observed		
2.3 Signs of Movement (Deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)		382	Liner covered by a granular protection layer up to El. 128 m and well protected underneath deposition fingers. Presence of gravel on the liner on the sides of the deposition points.
2.6 Other Unusual Conditions	None		
3. DOWNSTREAM SLOPE		387, 388, 389, 390	
3.1 Slope angle	1.5H		
3.2 Signs of Erosion	None observed		
3.3 Signs of Movement (Deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or Wet Areas			
3.6 Vegetation Growth	None observed		
3.7 Other Unusual Conditions	None		
4. DOWNSTREAM TOE AREA		394, 395	

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4.1 Seepage from Dam	Yes		Presence of a water pond formed by seepage on the downstream side between the downstream toe and West Road (0+300 to 0+830 approximately). The pond is pumped back to the South Cell and maintained at El. 115 m. The pumping rate was 263 m^3/hr at the time of the inspection.
4.2 Signs of Erosion	None observed		
4.3 Signs of Turbidity in Seepage Water	Yes		High turbidity events observed in the pond and an orange coloration was observed periodically.
4.4 Discoloration/staining	No		
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other Unusual Conditions			
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of Erosion	None observed		
5.3 Excessive Vegetation	No		
5.4 Presence of Rodent Burrows	None observed		
5.5 Other Unusual Conditions	None		
6. RESERVOIR		383, 384, 385, 386, 391, 392, 393	

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
6.1 Stability of Slopes	Stable		
6.2 Distance to Nearest Slide	None observed		
6.3 Estimate of Slide Volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other Unusual Conditions	None		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	No spillway or outlet structure exists, only dewatering pump.		
7.1 Surface Condition			
7.2 Signs of Erosion			
7.3 Signs of Movement (Deformation)			
7.4 Cracks			
7.5 Settlement			
7.6 Presence of Debris or Blockage			
7.7 Closure mechanism operational			
7.8 Slope Protection			
7.9 Instability of Side Slopes			
7.10 Other Unusual Conditions			
8. INSTRUMENTATION			
8.1 Piezometers	Yes		See section 4.0

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
8.2 Settlement Cells	No		
8.3 Thermistors	Yes		See section 4.0
8.4 Settlement Monuments	No		
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and Flow Monitors	No		
8.8 Data logger(s)	No		
8.9 Other			
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	February 2018		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		Included within the OMS and ERP plan.
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	January 2017		
10. NOTES :			

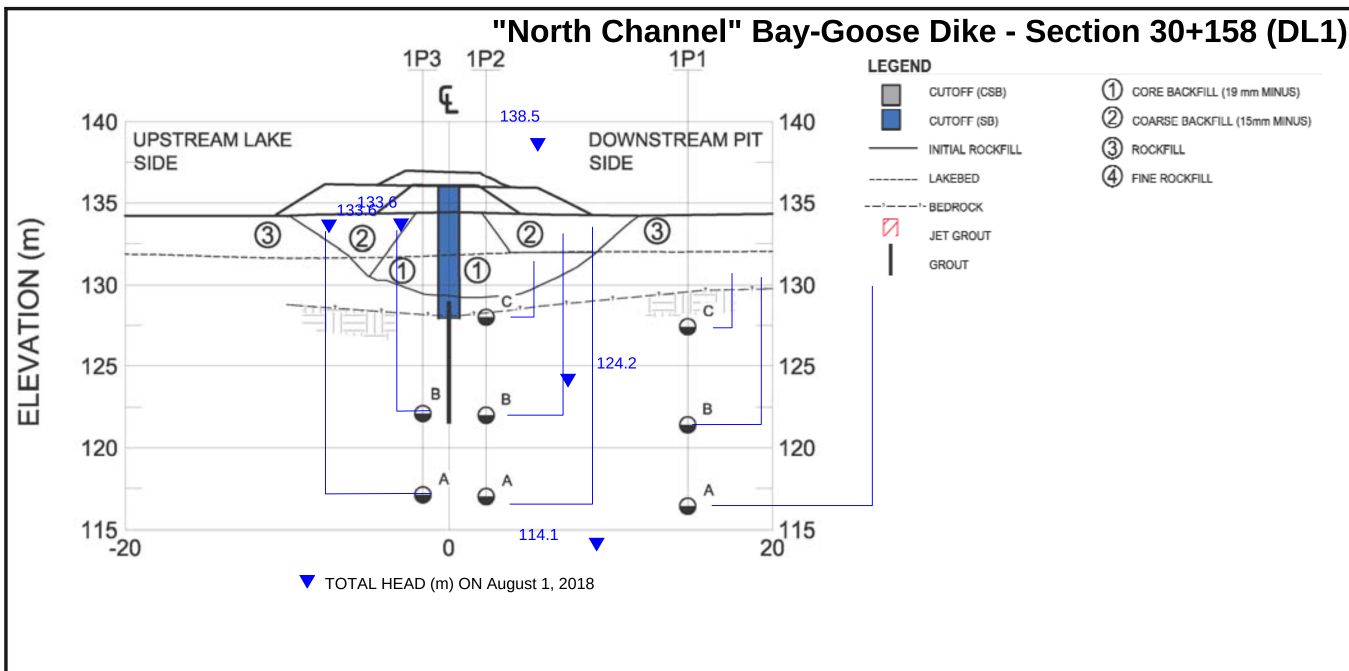
INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
Inspector's Signature	Yves Boulianne	**Date:**	September 2, 2018

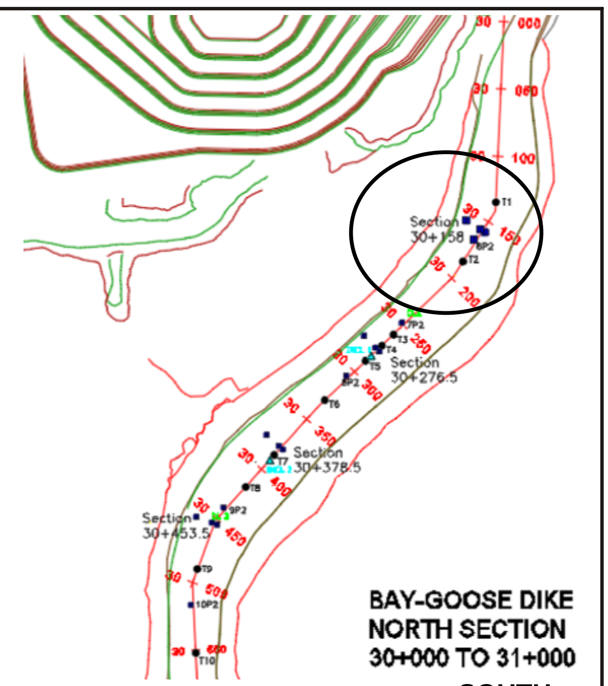
APPENDIX C

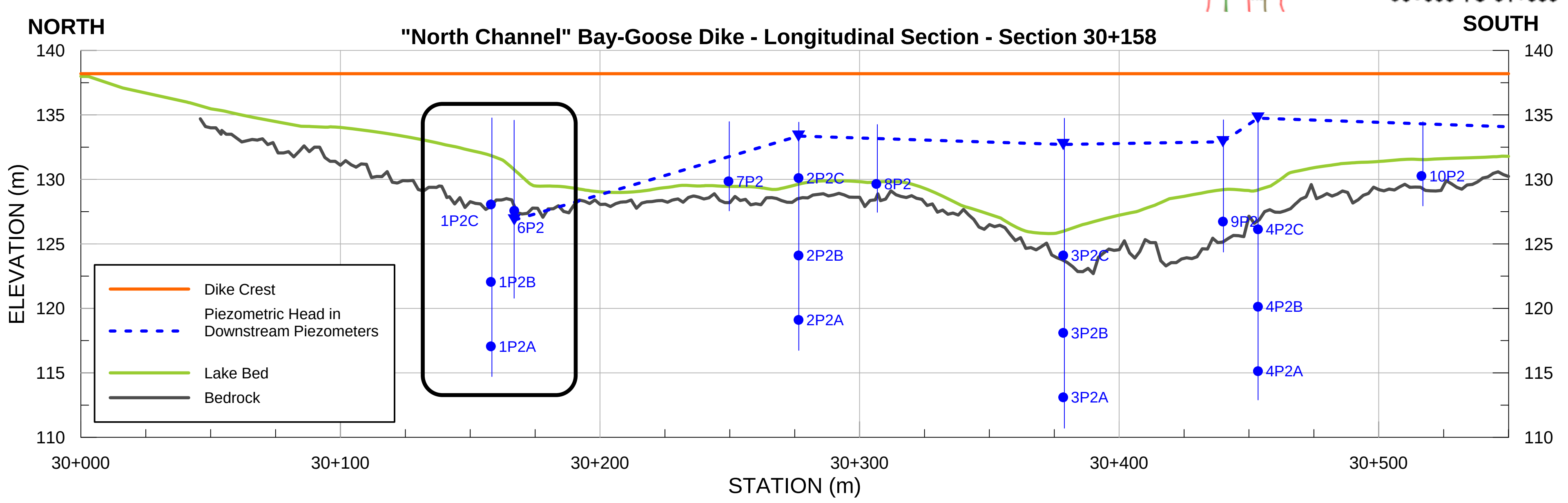
Geotechnical Instrumentation Data

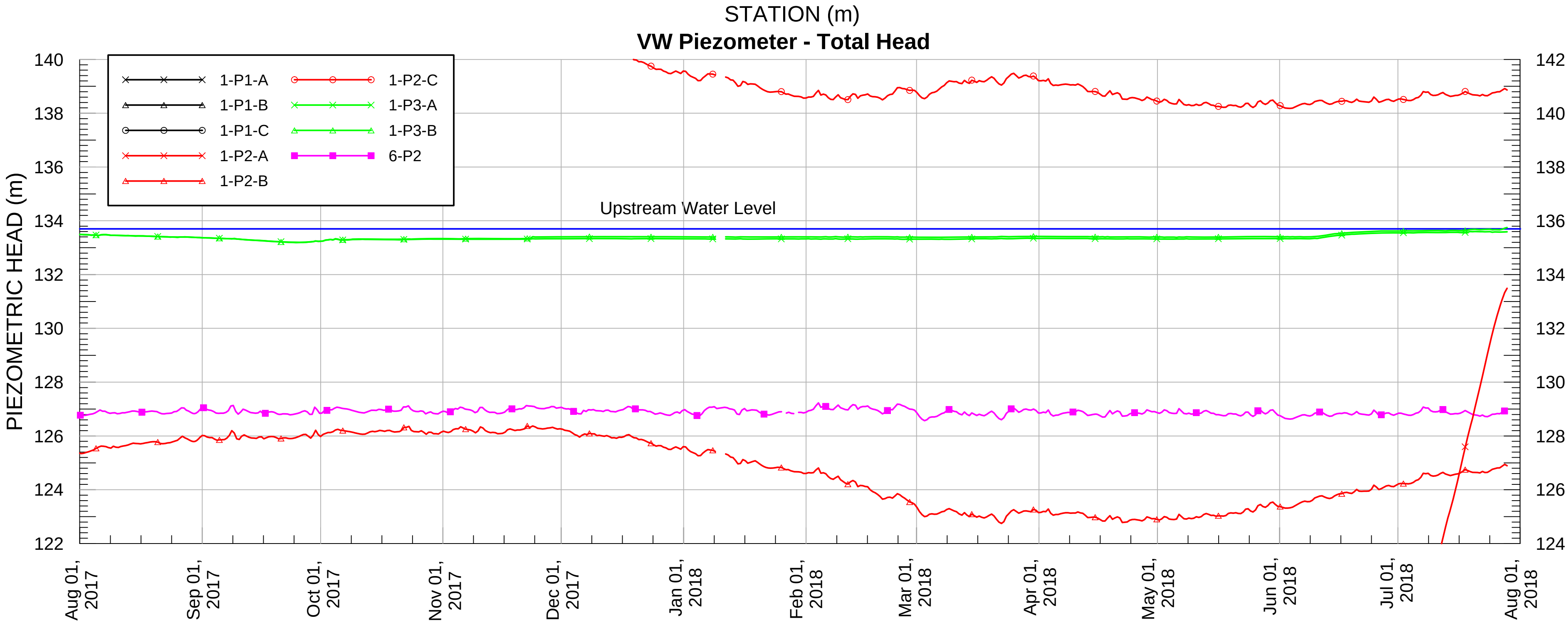
APPENDIX C1

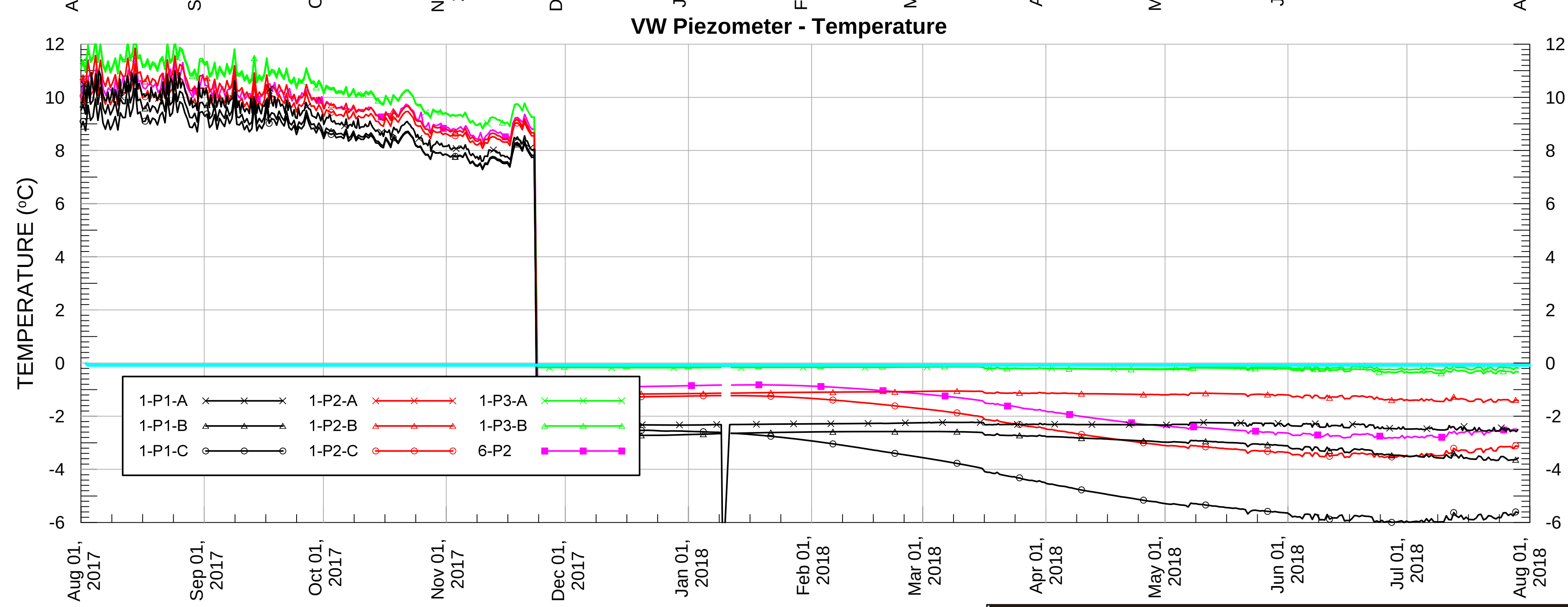
Dewatering Dikes Instrumentation Data











NOTES:

1. 1-P1-A, 1-P2-B,1-P1-C, 1-P2-A and 6P2 are assumed to been frozen and not giving good data. The PWP not reliable.
2. GKM investigated the large jump in the temperature and changed the multiplexer as this turned out to be the issue. Old one is being fixed to have spare. Readings have since stabilized.

PROJECT

AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

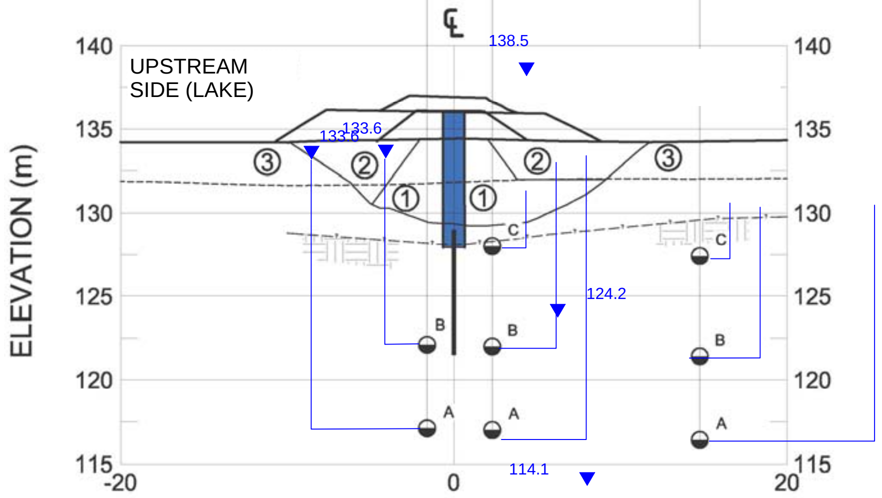
TITLE

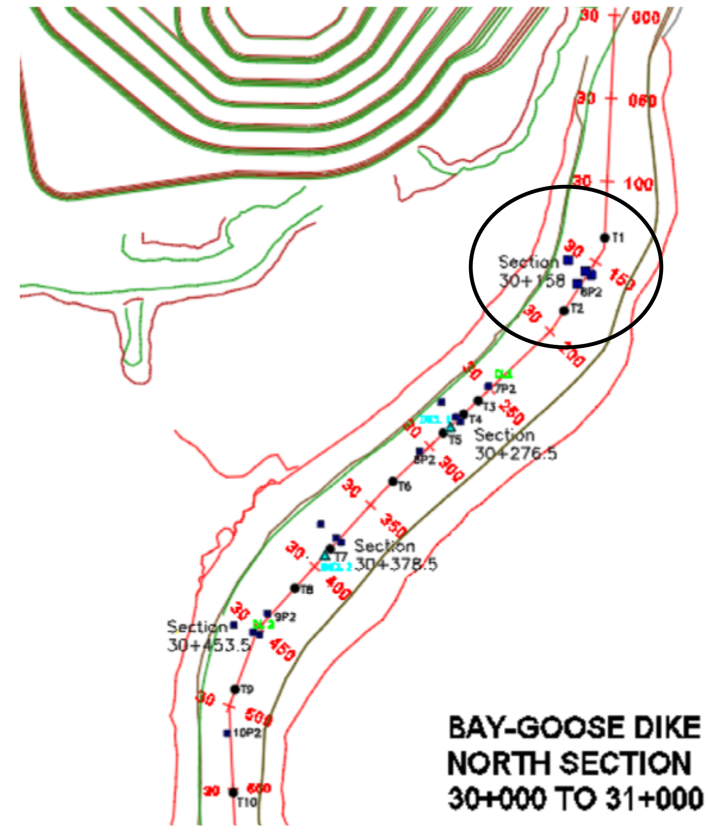
BAYGOOSE DIKE
Section 30+158 - PIEZOMETRIC DATA
(Aug 1/17 to Aug 1/18)

AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.
DESIGN	TD	30/8/14	SCALE AS SHOWN REV.
CADD	TD	30/8/14	**FIGURE 1**
CHECK	PG	31/8/14	
REVIEW			

STATION 30+158



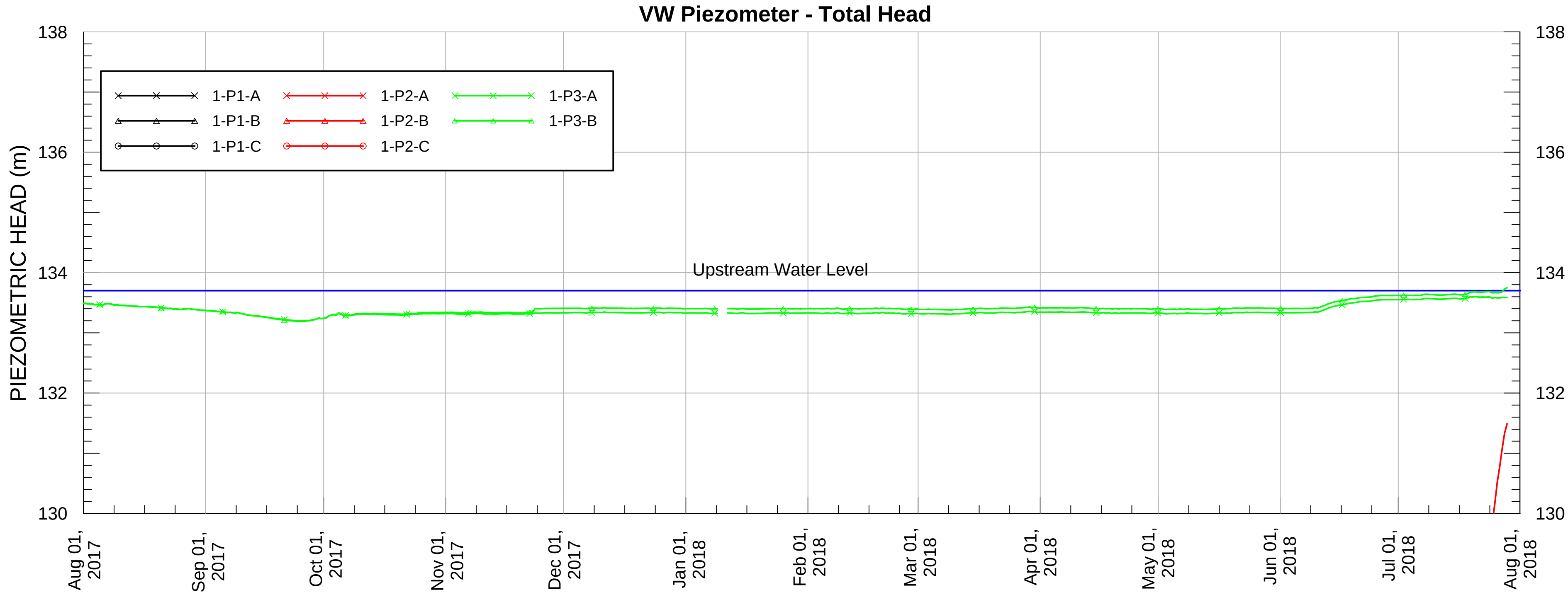


LEGEND

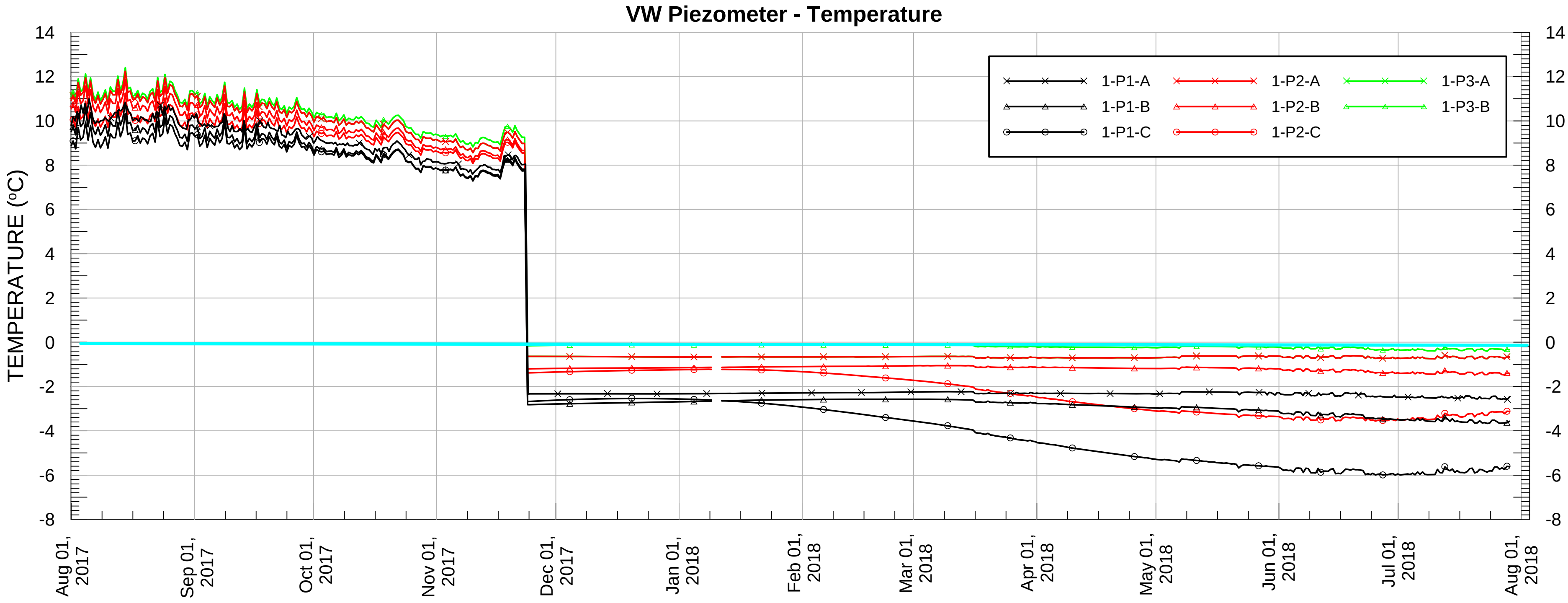
- CUTOFF (CSB)
- CUTOFF (SB)
- INITIAL ROCKFILL
- LAKEBED
- BEDROCK
- JET GROUT
- GROUT
- ① CORE BACKFILL (19 mm MINUS)
- ② COARSE BACKFILL (15mm MINUS)
- ③ ROCKFILL
- ④ FINE ROCKFILL

▼ TOTAL HEAD (m) ON ON August 1,2018

VW Piezometer - Total Head



VW Piezometer - Temperature



NOTES:

1. 1-P1-A, 1-P2-B,1-P1-C, 1-P2-A and 6P2 are assumed to been frozen and not giving good data. The PWP not reliable.
2. GKM investigated the large jump in the temperature and changed the multiplexer as this turned out to be the issue. Old one is being fixed to have spare. Readings have since stabilized.
3. Gap in data in January is due to low battery. Battery was changed the following day.

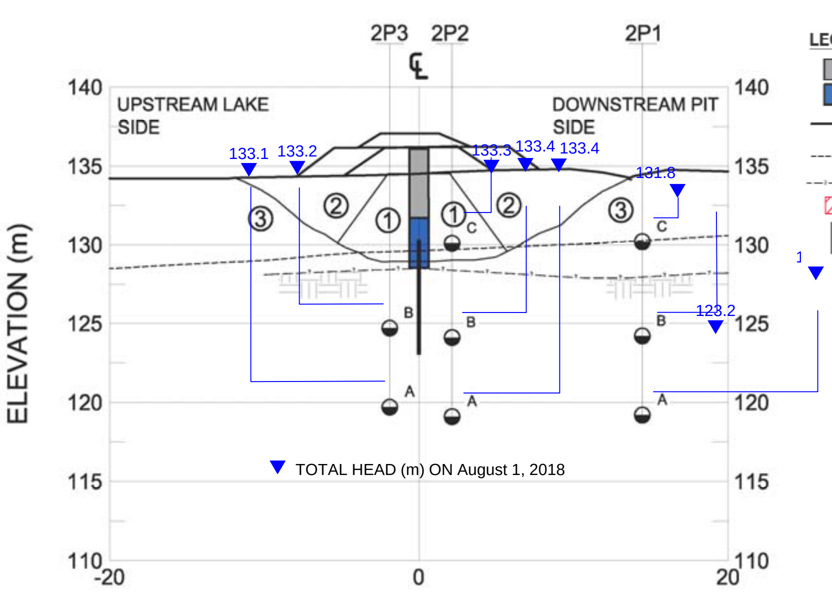
PROJECT **AGNICO EAGLE MINES LIMITED**
MEADOWBANK GOLD PROJECT
NUNAVUT

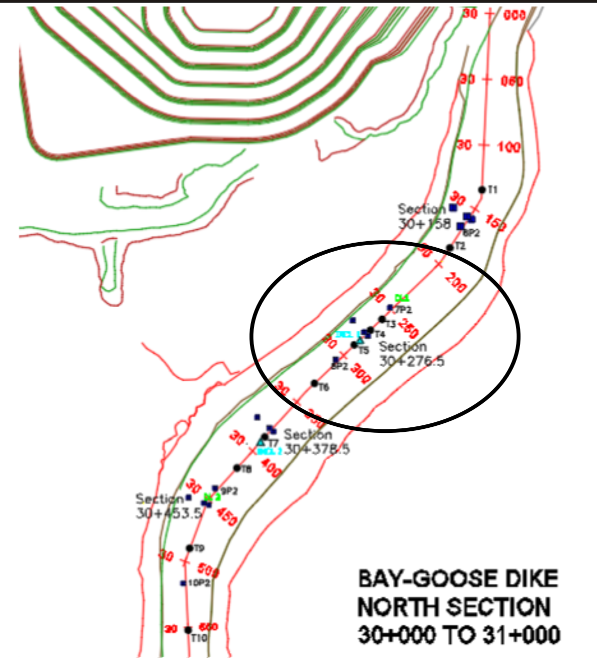
TITLE **BAYGOOSE DIKE - SECTION 30+158**
PIEZOMETRIC DATA
(Aug 1/17 to Aug 1/18)

AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	31AUG14	SCALE AS SHOWN	REV.
CADD	TD	31AUG14	**FIGURE 2**	
CHECK	PG	28AUG14		
REVIEW				

"North Channel" Bay-Goose Dike - Section 30+276.5 (DL1)

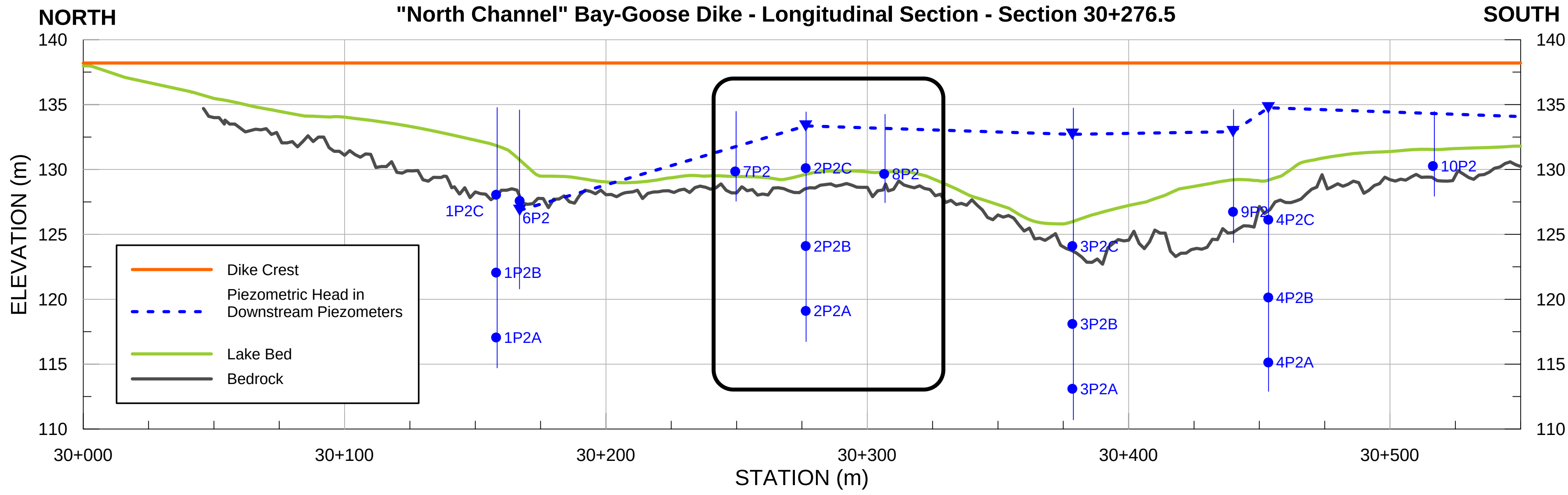




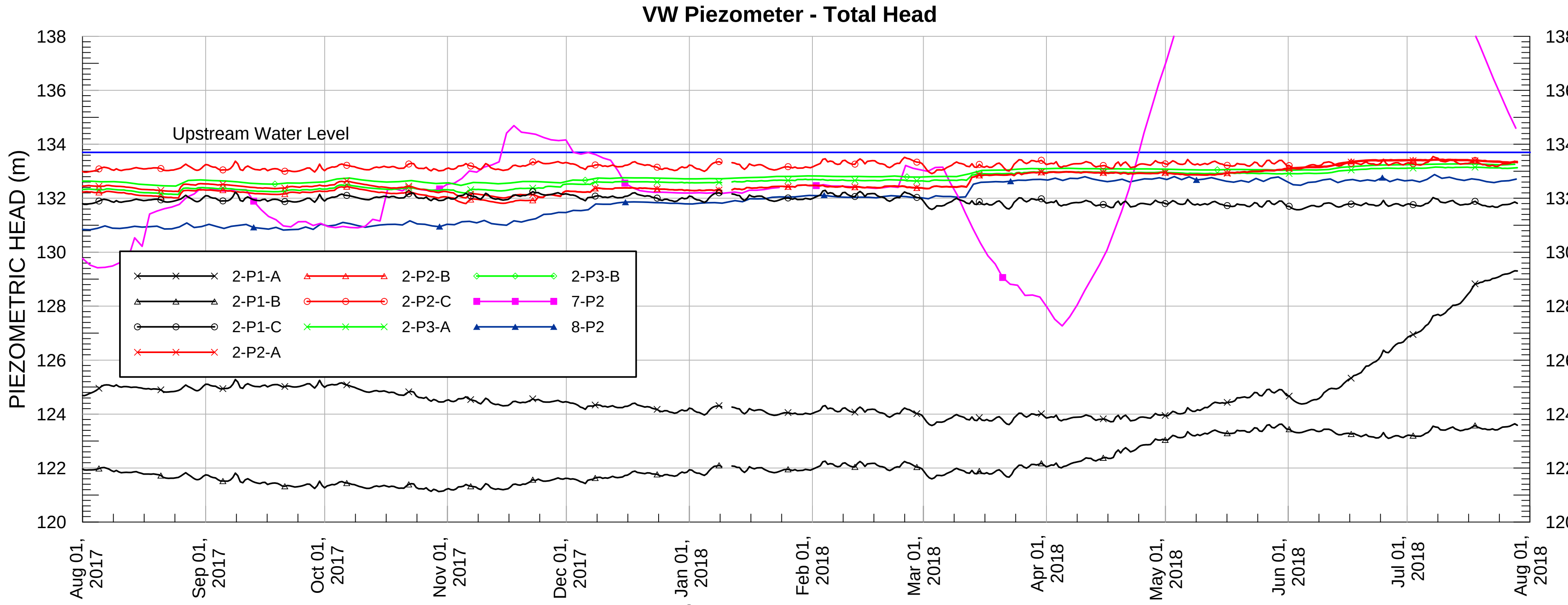
NORTH

"North Channel" Bay-Goose Dike - Longitudinal Section - Section 30+276.5

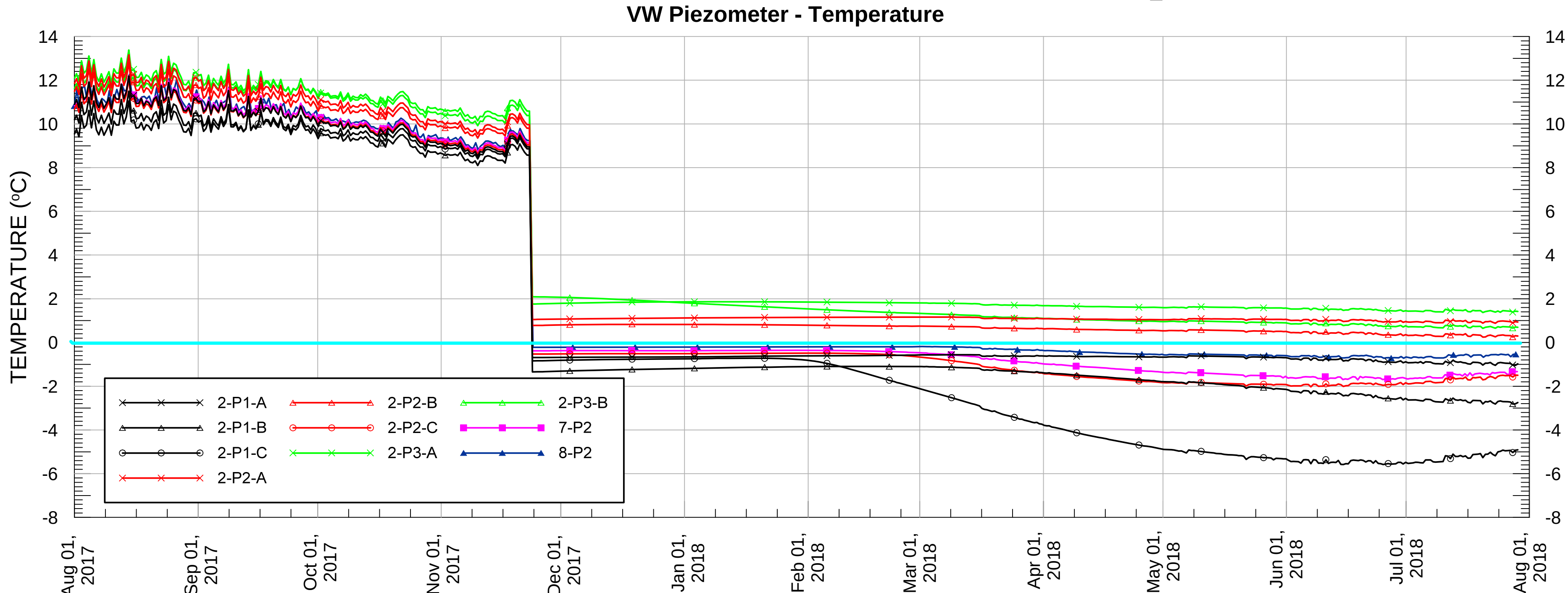
SOUTH



VW Piezometer - Total Head



VW Piezometer - Temperature



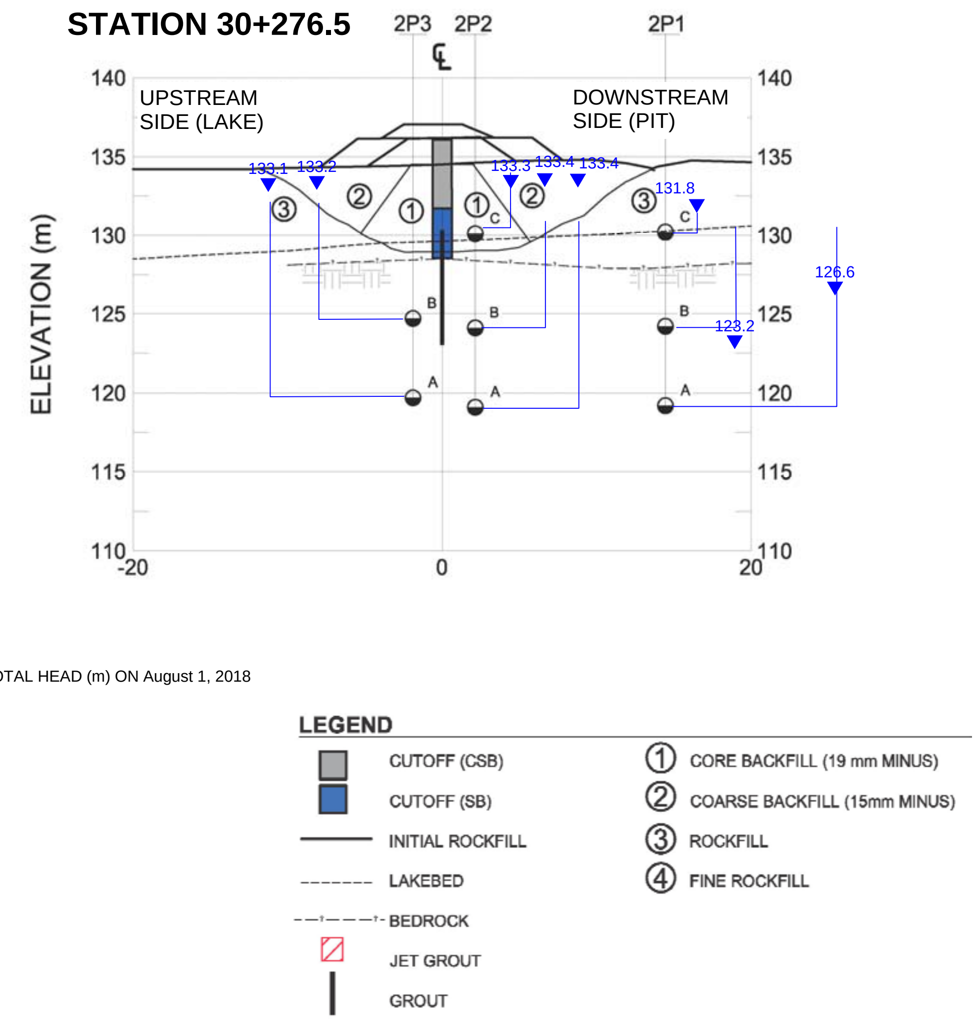
NOTES:

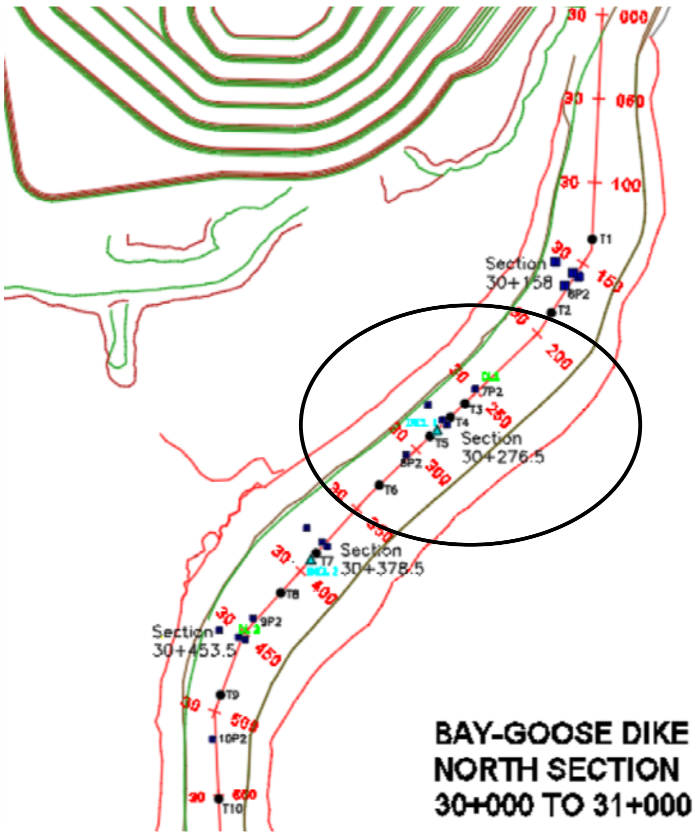
1: 2P1A, 2P1B and 2P2C are assumed to be frozen. 7P2 is also frozen therefore the data is considered not feasible as the previous trend shows.

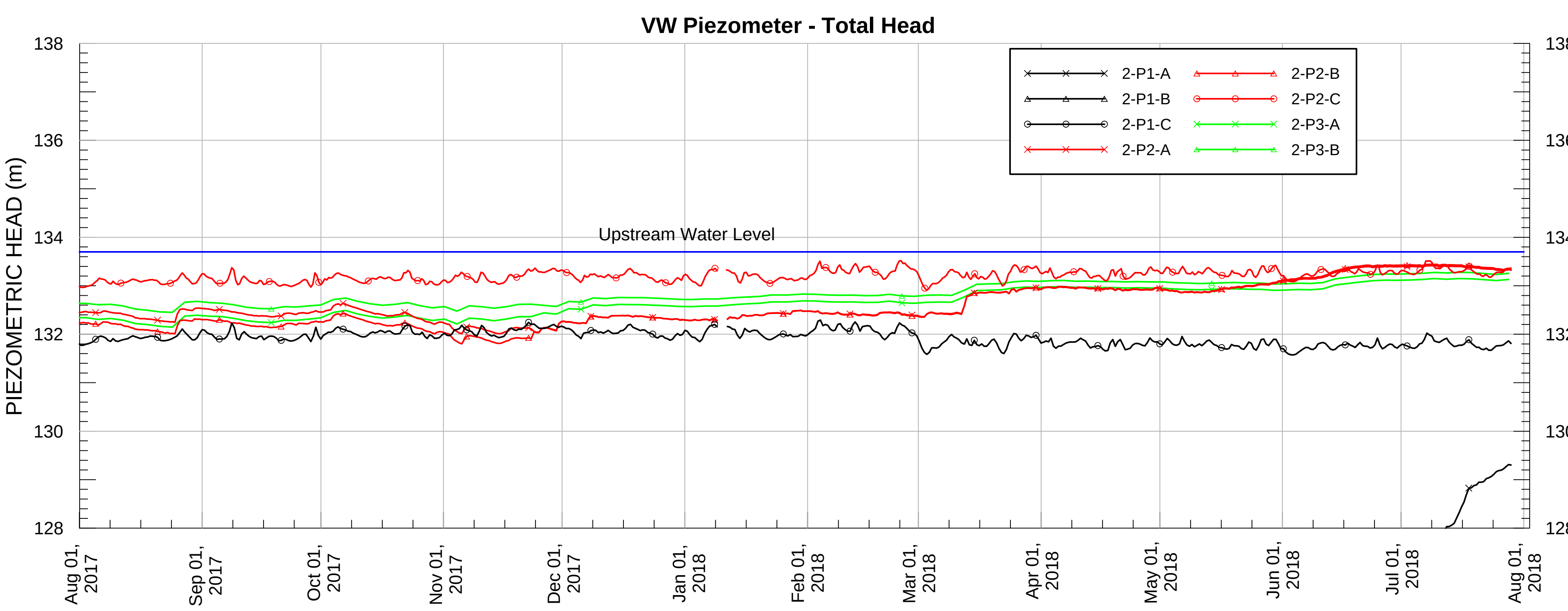
2. GKM investigated the large jump in the temperature and changed the multiplexer as this turned out to be the issue. Readings have since stabilized.

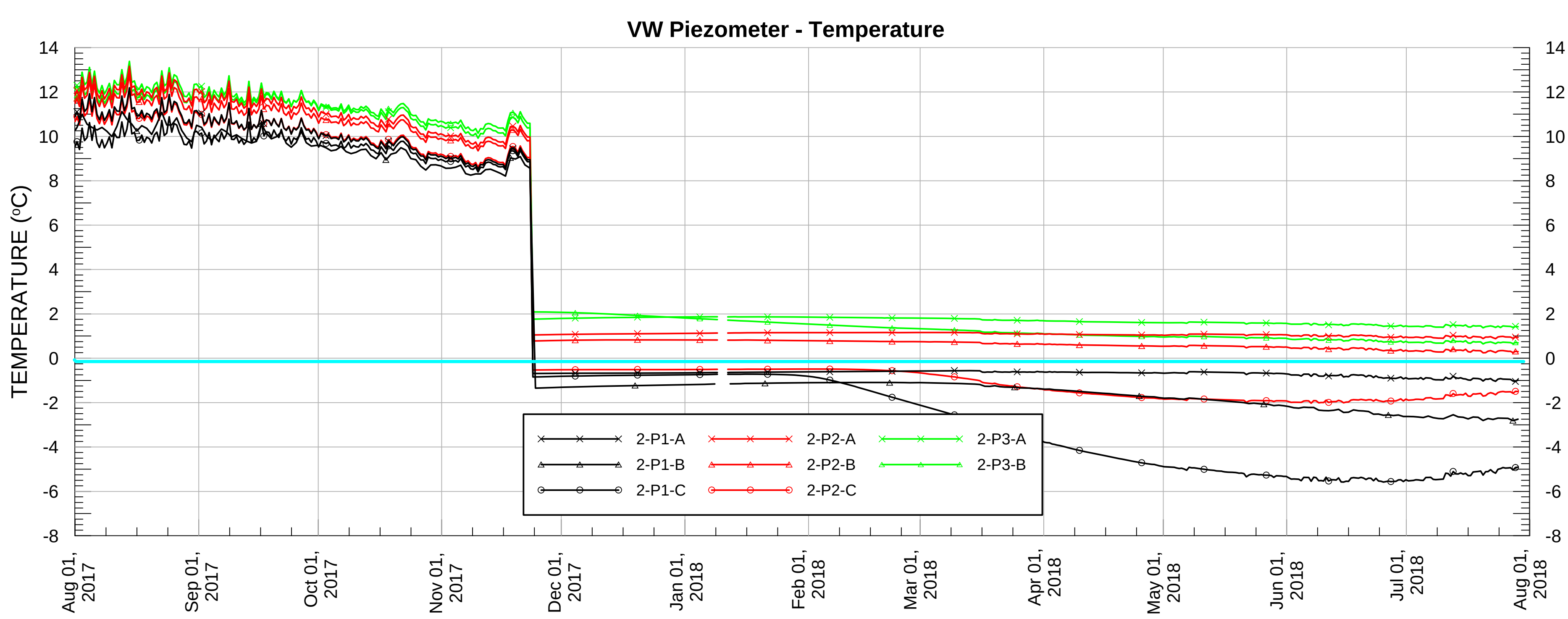
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE Section 30+276.5 - PIEZOMETRIC DATA (Aug 1/17 to Aug 1/18)

	PROJECT No.			PHASE No.
AGNICO EAGLE MEADOWBANK	DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
	CADD	TD	28AUG14	FIGURE 3
	CHECK	PG	28AUG14	
	REVIEW			









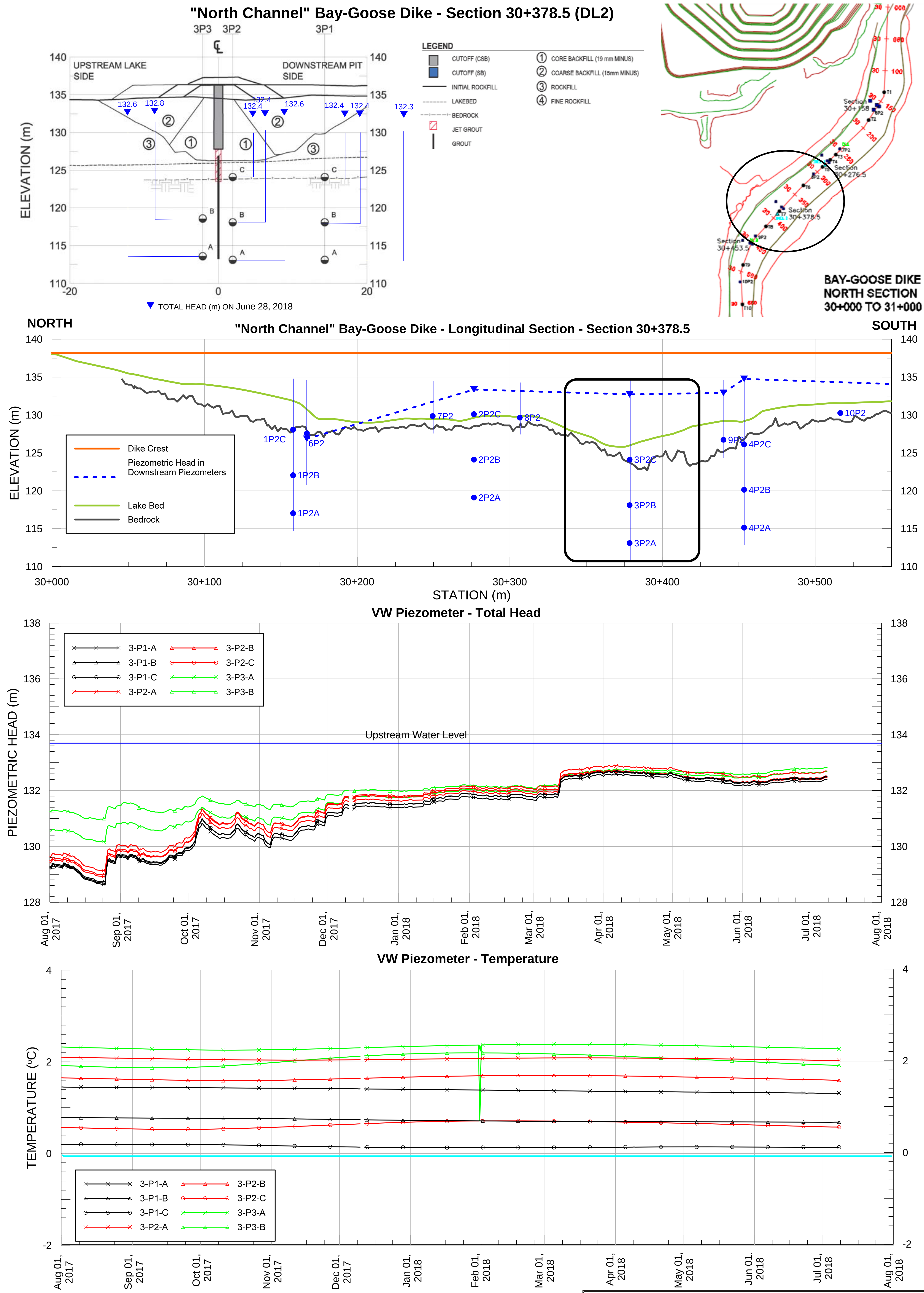
NOTES:

1: 2P1A, 2P1B and 2P2C are assumed to be frozen. 7P2 is also frozen therefore the data is considered not feasible as the previous trend shows.
2. GKM investigated the large jump in the temperature and changed the multiplexer as this turned out to be the issue. Readings have since stabilized.
3. Gap in data in January is due to low battery. Battery was changed the following day.

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAY GOOSE DIKE - SECTION 30+276.5 PIEZOMETRIC DATA (Aug 1/17 to Aug 1/18)

AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.		
DESIGN	TD	28AUG14	SCALE	AS SHOWN	REV.
CADD	TD	28AUG14	Figure 4		
CHECK	PG	28AUG14			
REVIEW					



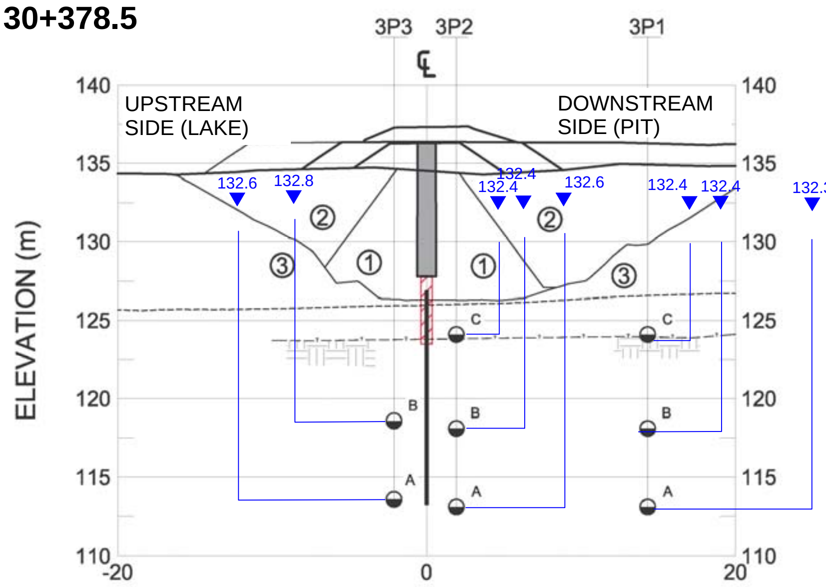
NOTES:
1. The gap in data from Dec. 10 to Dec. 11 was due to low battery. Battery was changed the following day.
2. Changes in PWP pressure are directly related to the drill and blasting that is currently ongoing in Portage Pit E5. Ice buildup is also a factor.

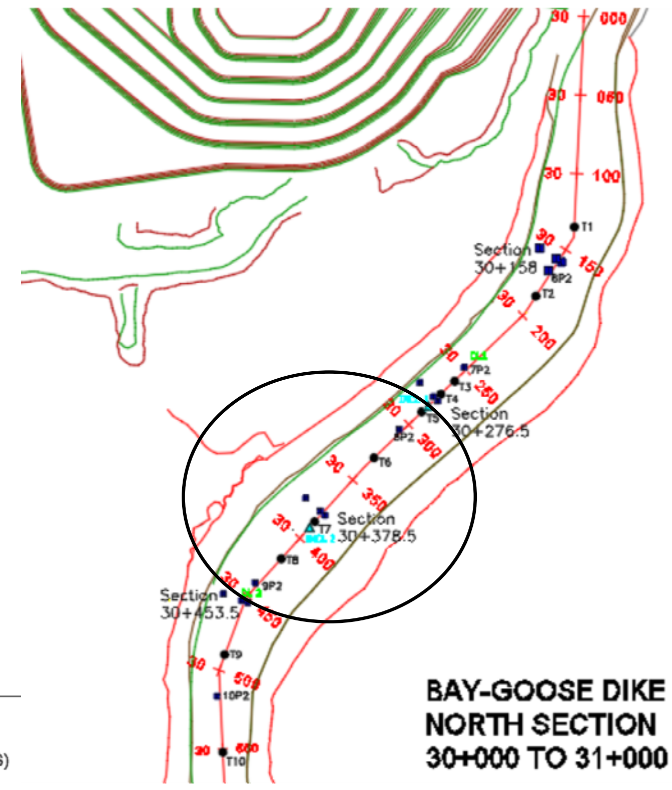
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE Section 30+378.5 - PIEZOMETRIC DATA (Aug 1/17 to Aug 1/18)

AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14		
CHECK	PG	28AUG14	FIGURE 5	
REVIEW				

STATION 30+378.5

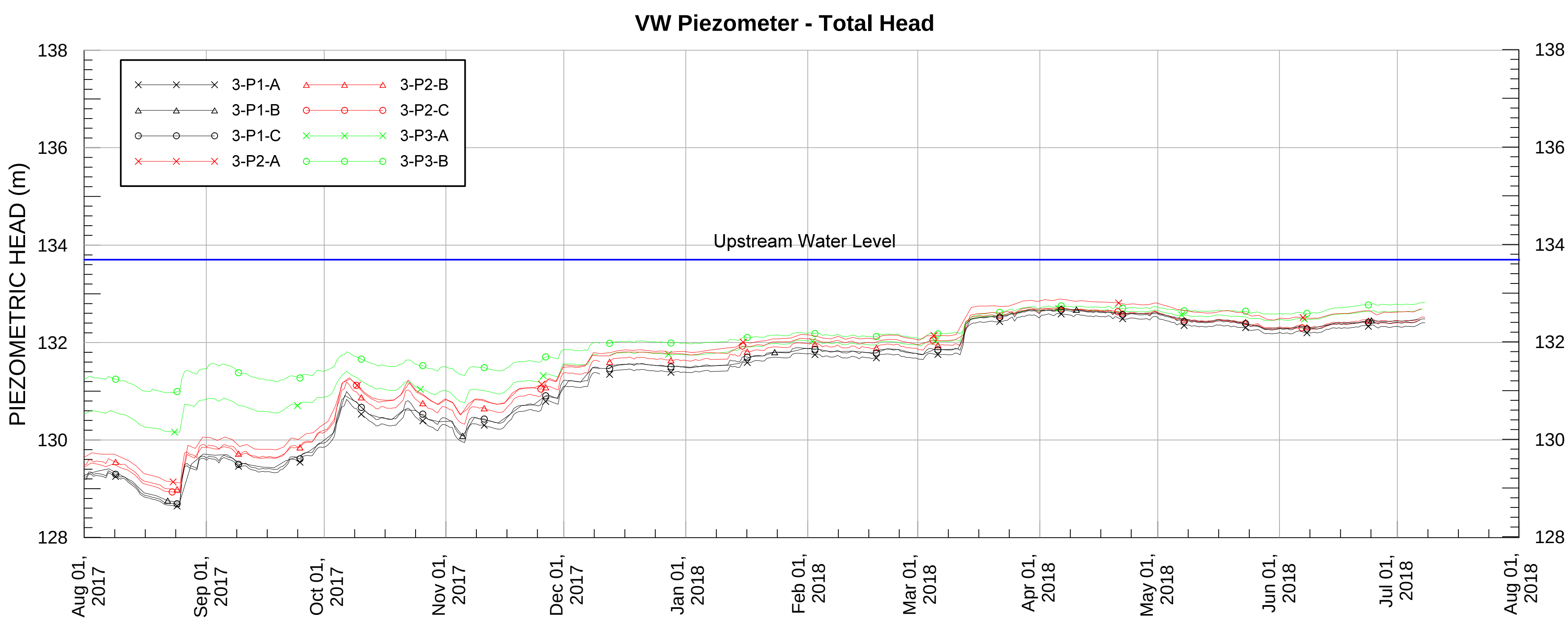


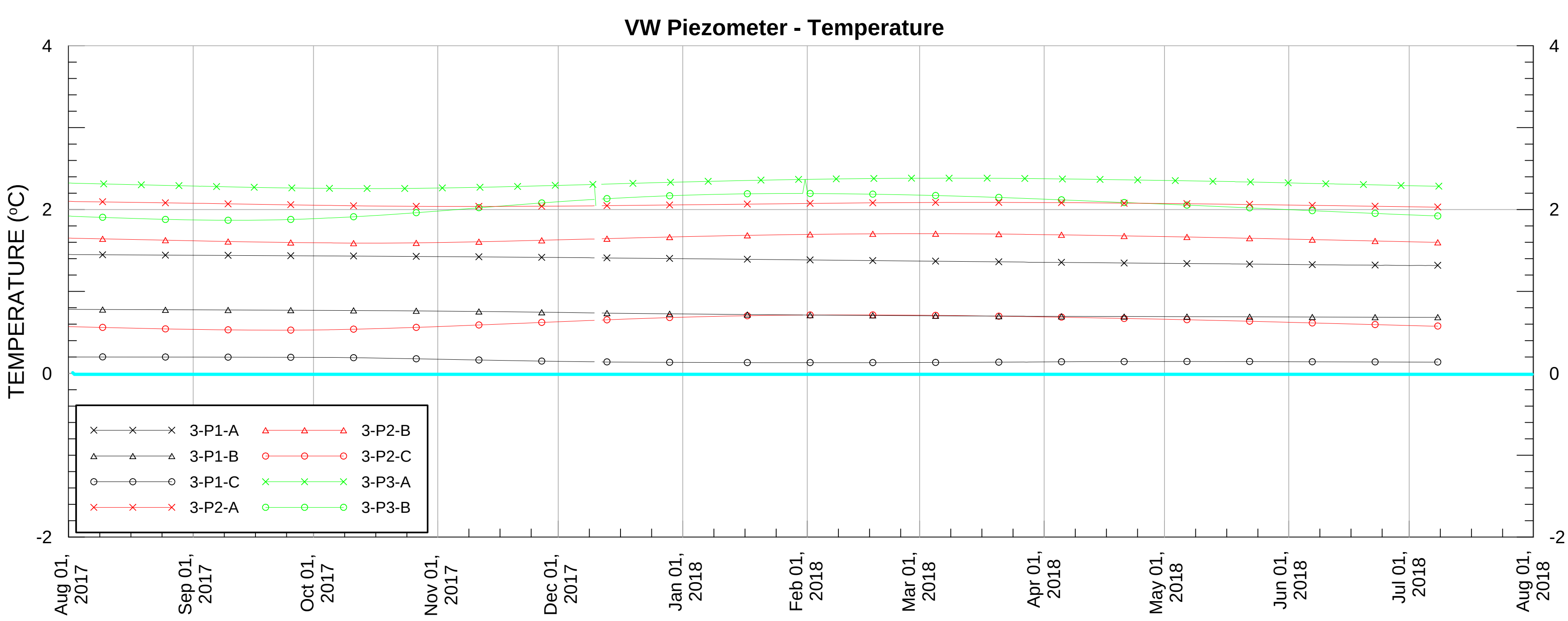


▼ TOTAL HEAD (m) ON August 1,2018

LEGEND

	CUTOFF (CSB)	1	CORE BACKFILL (19 mm MINUS)
	CUTOFF (SB)	2	COARSE BACKFILL (15mm MINUS)
	INITIAL ROCKFILL	3	ROCKFILL
	LAKEBED	4	FINE ROCKFILL
	BEDROCK		
	JET GROUT		
	GROUT		





NOTES:

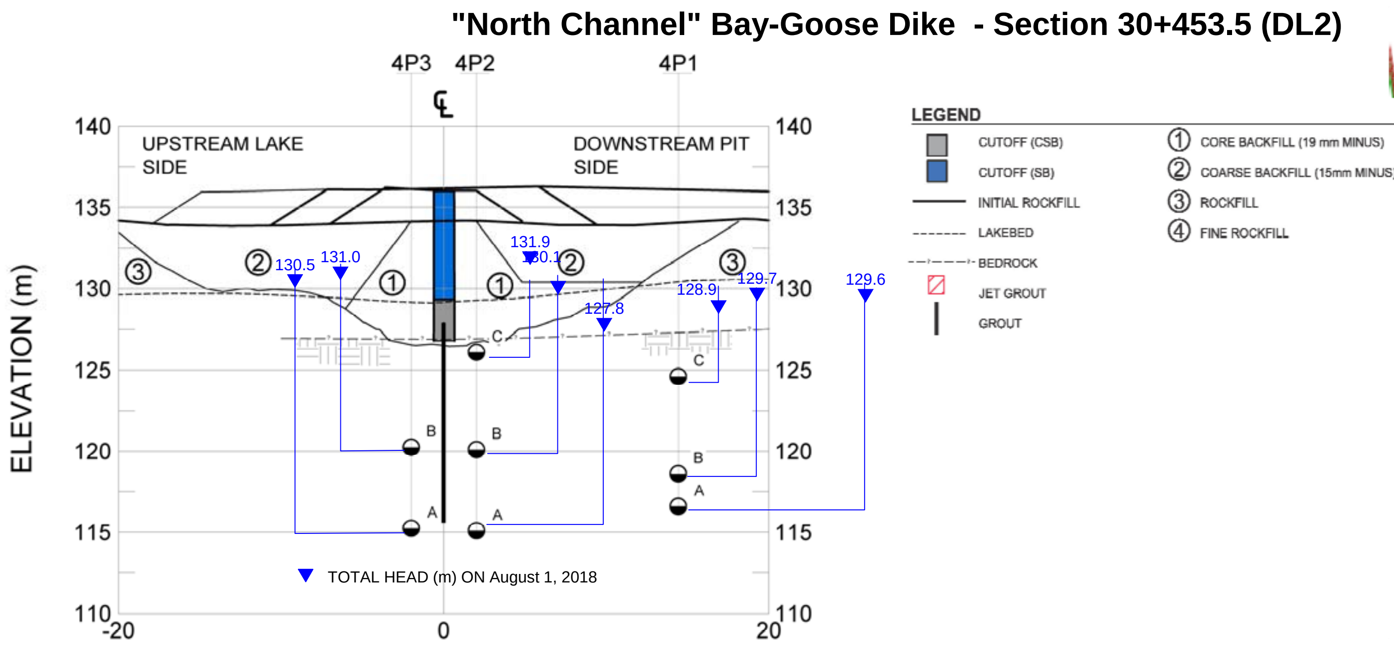
1. The gap in data from Dec. 10 to Dec. 11 was due to low battery. Battery was changed the following day.
2. Changes in PWP pressure are directly related to the drill and blasting that is currently ongoing in Portage Pit E5. Ice buildup is also a factor.

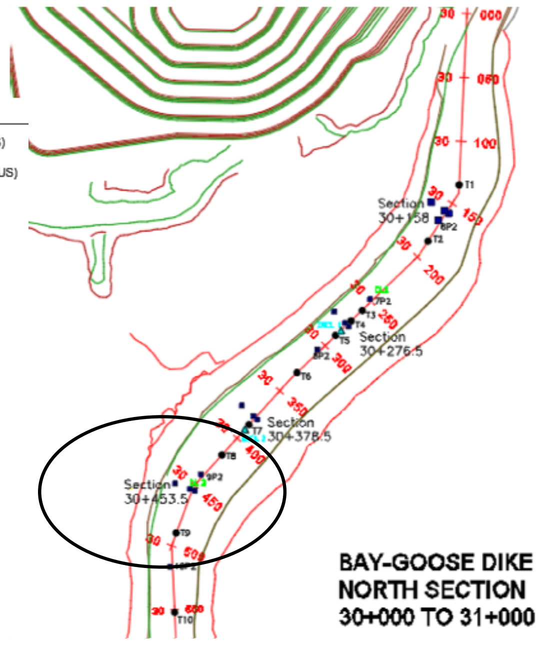
PROJECT **AGNICO EAGLE MINES LIMITED**
MEADOWBANK GOLD PROJECT
NUNAVUT

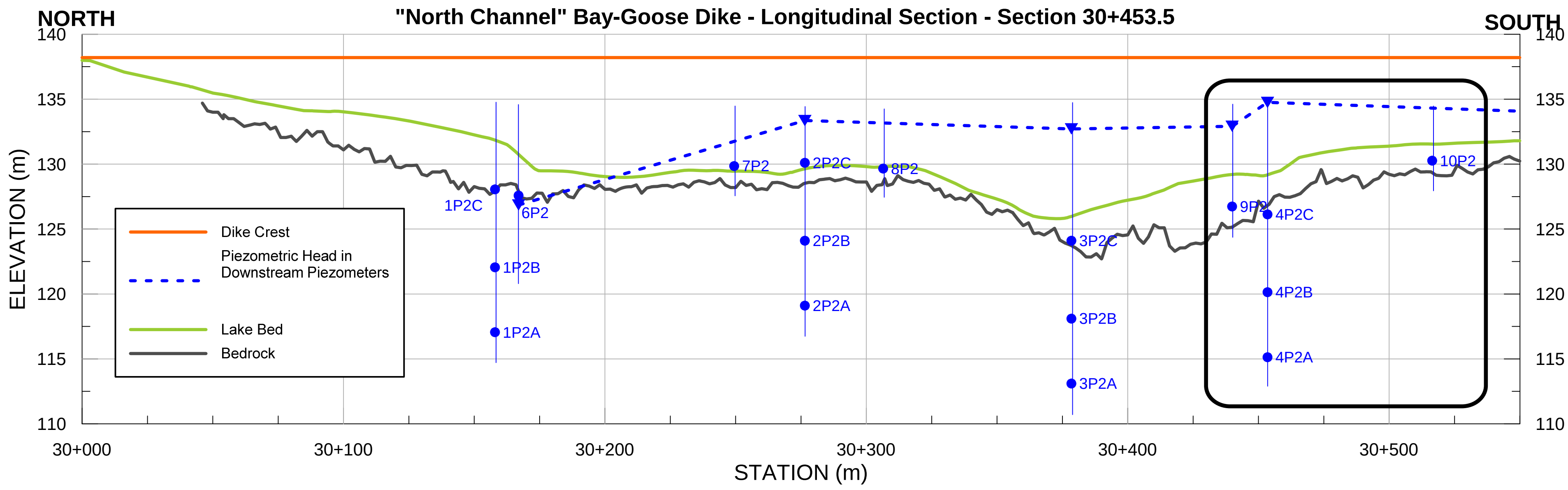
TITLE **BAYGOOSE DIKE - SECTION 30+378.5**
PIEZOMETRIC DATA
(Aug 1/17 to Aug 1/18)

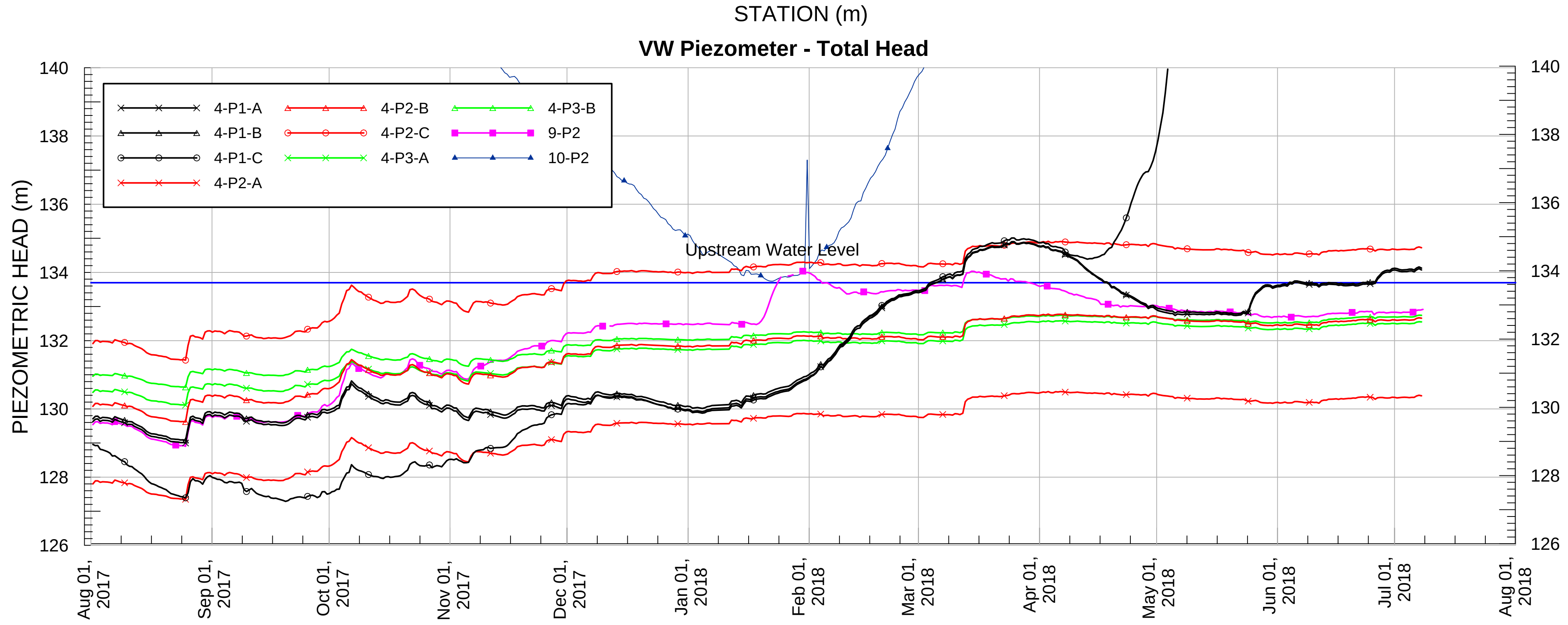
AGNICO EAGLE MEADOWBANK

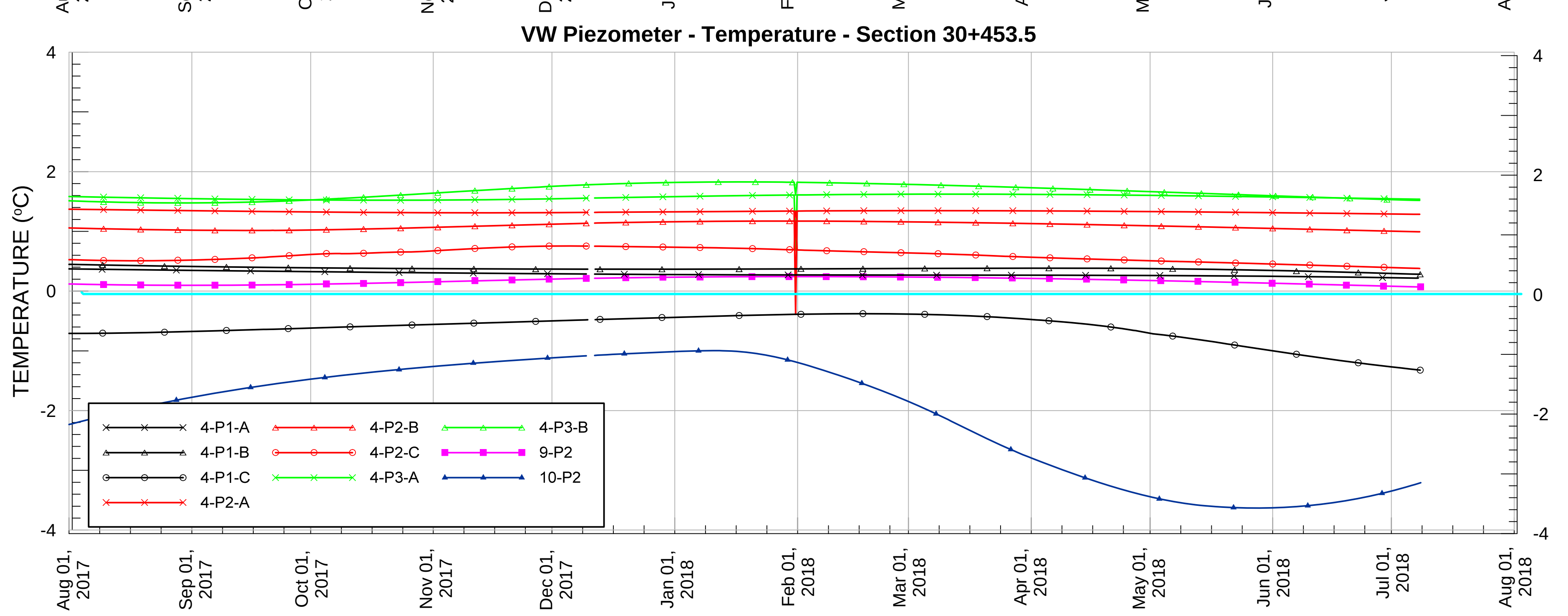
PROJECT No.			PHASE No.	
DESIGN			SCALE	REV.
CADD	TD	28AUG1	AS SHOWN	
CHECK	TD	28AUG1		
REVIEW	PG	28AUG1	**FIGURE 6**	











NOTES:

1. All 4P1, 4P2C and 10P2 is given unstable readings and since the temperature either shows a negative reading or is close to a negative reading it is assumed to be frozen.
2. Pressure changes are attributed to the drill and blast in Portage Pit E5 along with ice buildup that occurs.
3. Some of the PWP that are over the Upstream Water Level can be attributed to having a negative temperature and assumed frozen.
4. Gap in data in December is due to a low battery. Battery was changed the following day.

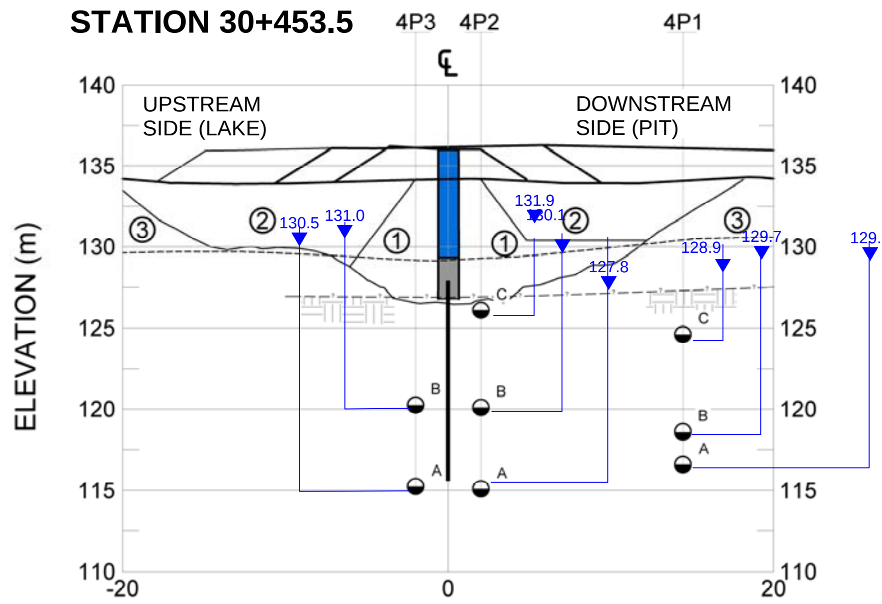
PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

TITLE
BAYGOOSE DIKE
Section 30+453.5 - PIEZOMETRIC DATA
(Aug 1/17 to Aug 1/18)

AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	**FIGURE 7**	
CHECK	PG	28AUG14		
REVIEW				

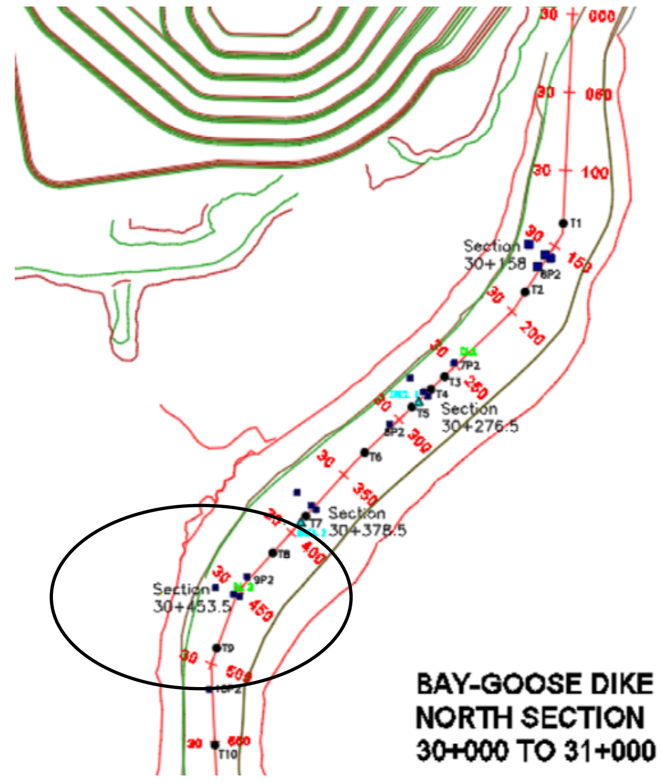
STATION 30+453.5

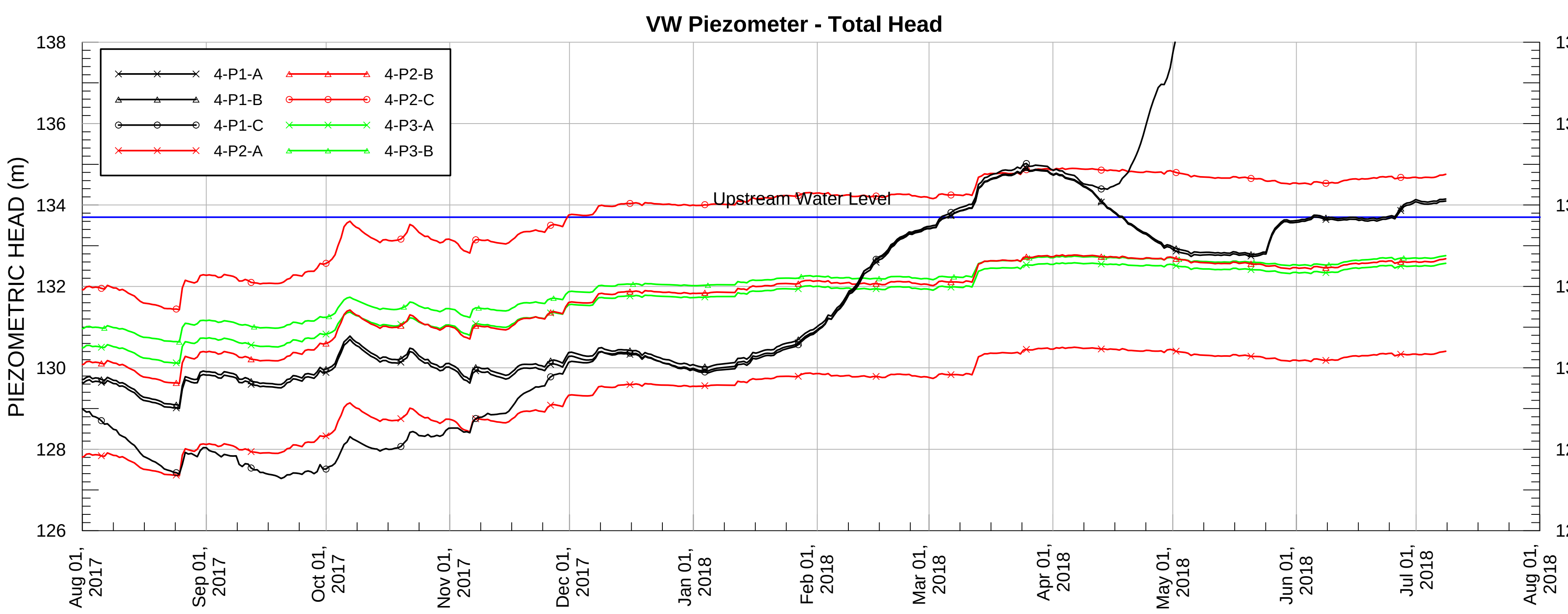


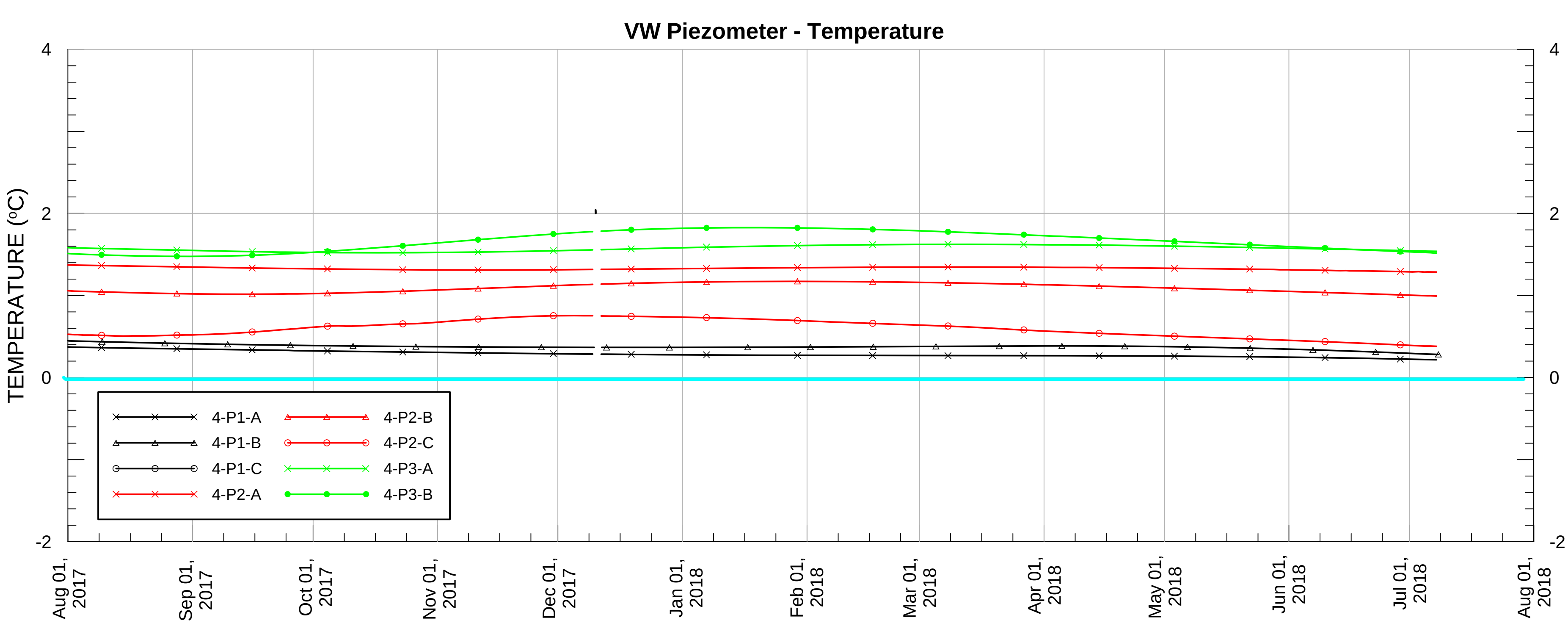
▼ TOTAL HEAD (m) ON aUGUST 1,2018

LEGEND

- CUTOFF (CSB)
- CUTOFF (SB)
- INITIAL ROCKFILL
- LAKEBED
- BEDROCK
- JET GROUT
- GROUT
- ① CORE BACKFILL (19 mm MINUS)
- ② COARSE BACKFILL (15mm MINUS)
- ③ ROCKFILL
- ④ FINE ROCKFILL





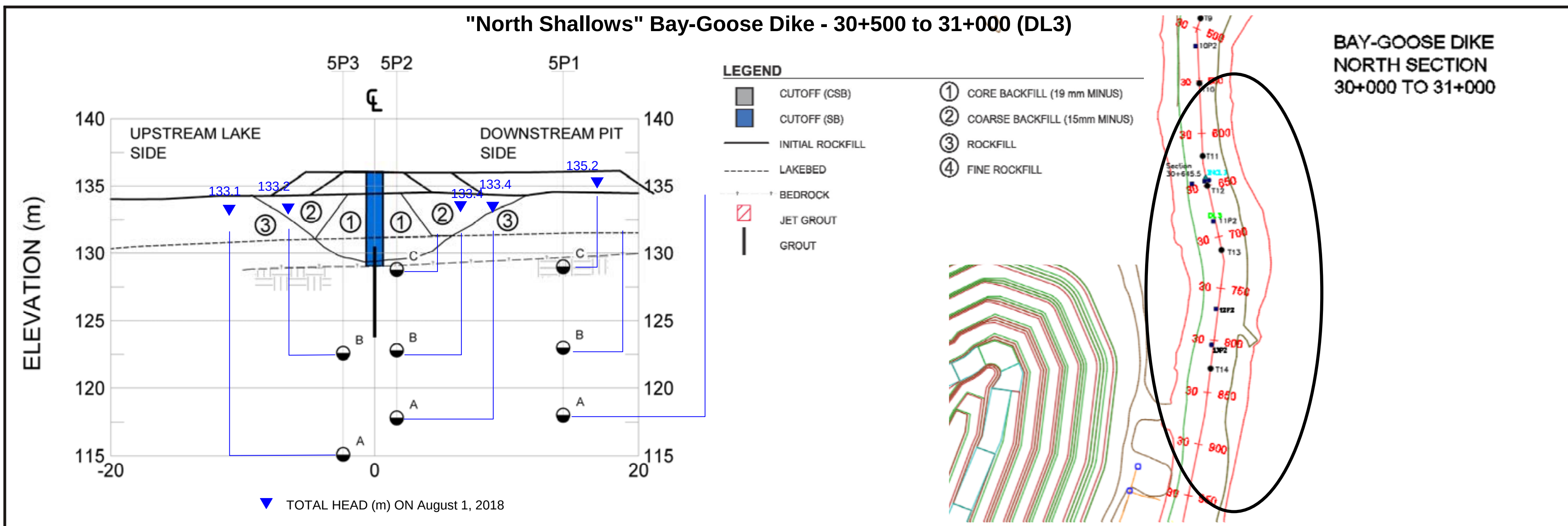


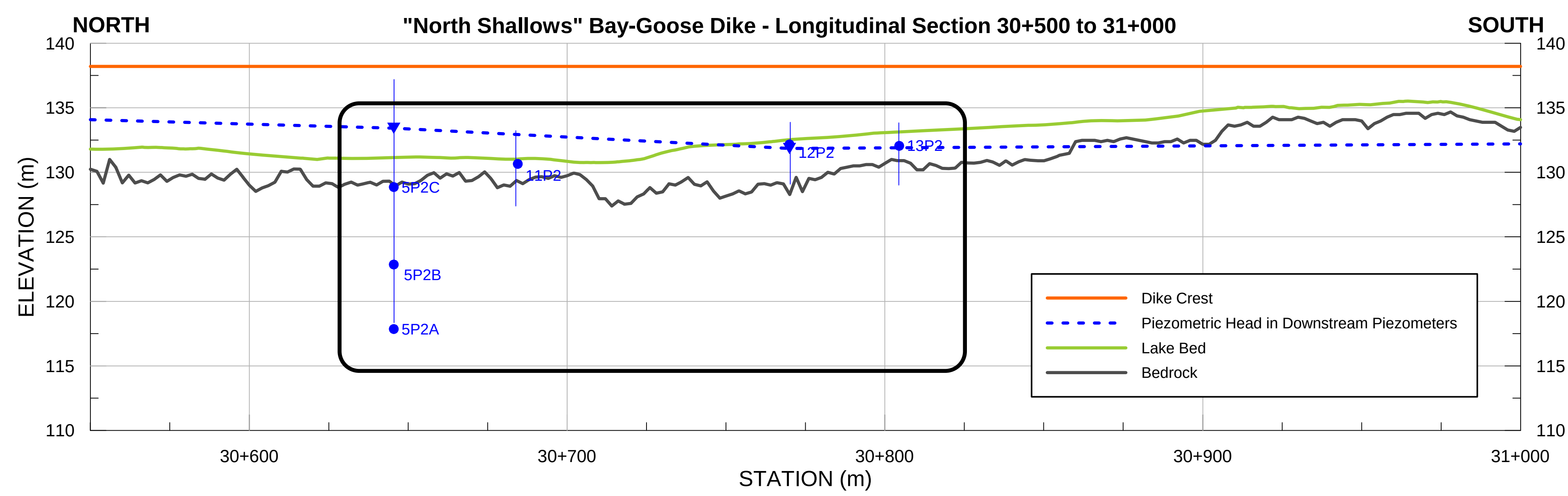
NOTES:
1. 4P1 and 4P2CPWP is given unstable readings and since the temperature is close to a freezing temperature it is assumed to be frozen.
2. Pressure changes are attributed to the drill and blast in Portage Pit E5 along with ice buildup that occurs.
3. Some of the PWP that are over the Upstream Water Level can be attributed to having a negative temperature and assumed frozen.
4. Data gap in December is due to low battery. Battery was changed the following day.

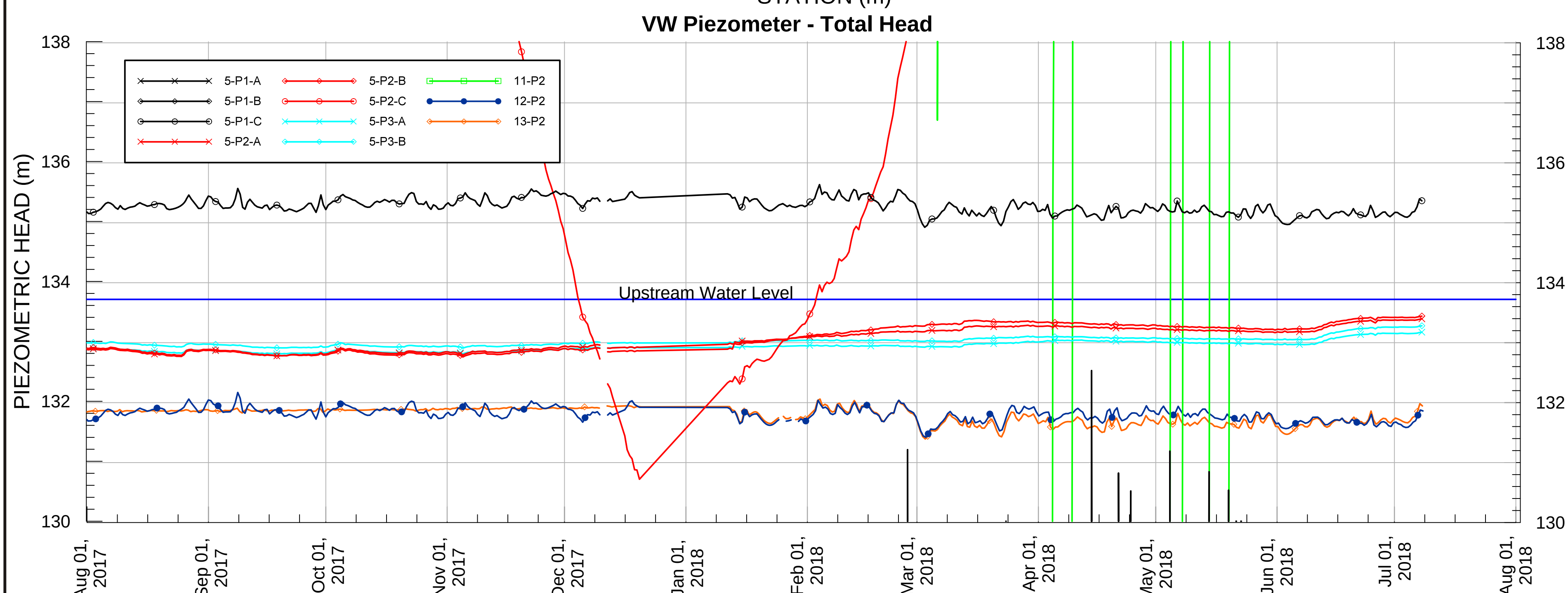
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE - SECTION 30+453.5 PIEZOMETRIC DATA (Aug 1/17 to Aug 1/18)

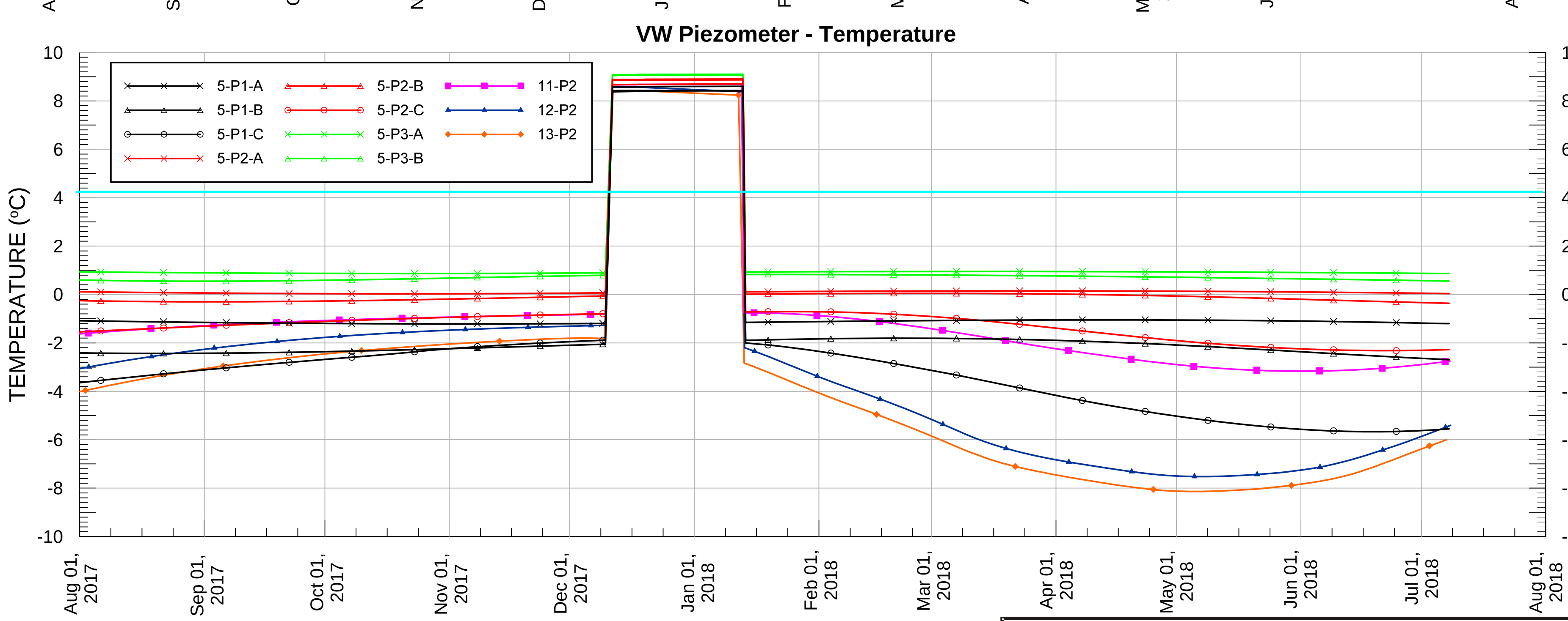
AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	FIGURE 8	
CHECK	PG	28AUG14		
REVIEW				









NOTES:

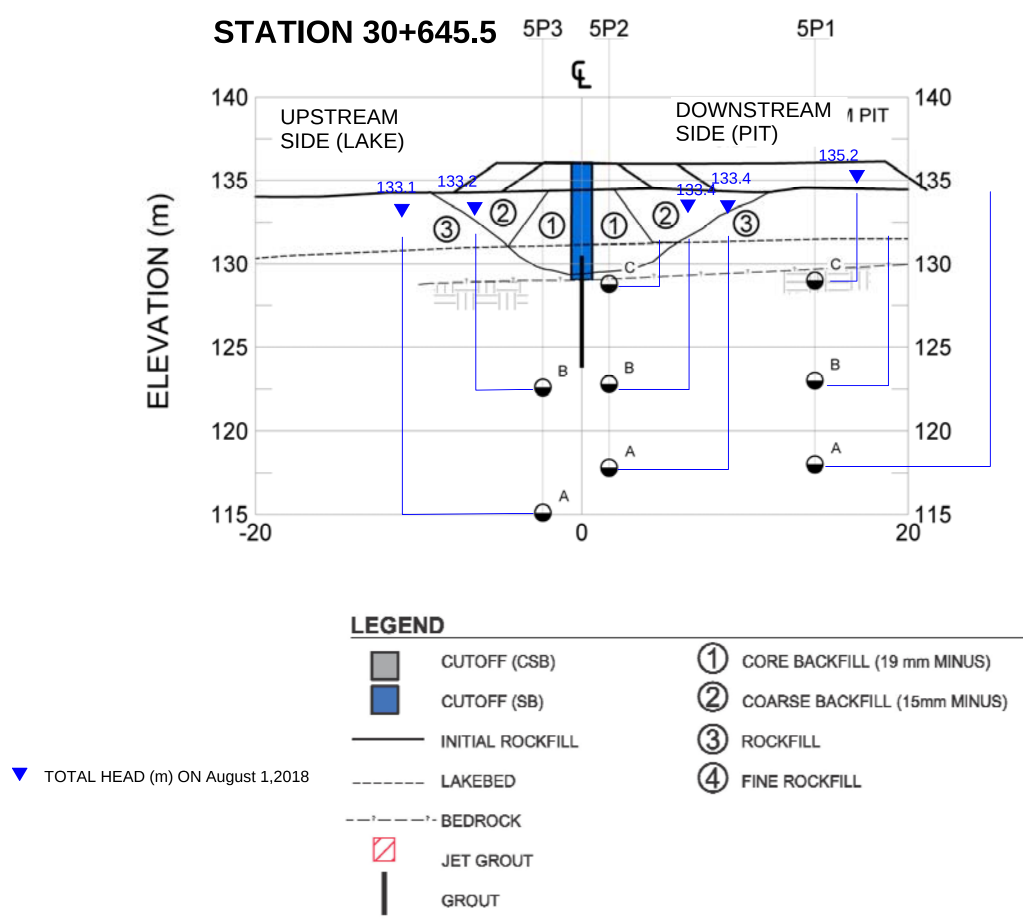
1. 5P1A, 5P1B, 5P1C, 5P2C and 11P2 are giving unstable readings and since the temperature shows a negative reading it is assumed to be frozen.
2. A spike in temperature also has been corrected and stabilized due to a faulty MUX board.
3. Gap in data in December was due to a low battery. Battery was changed the following day.

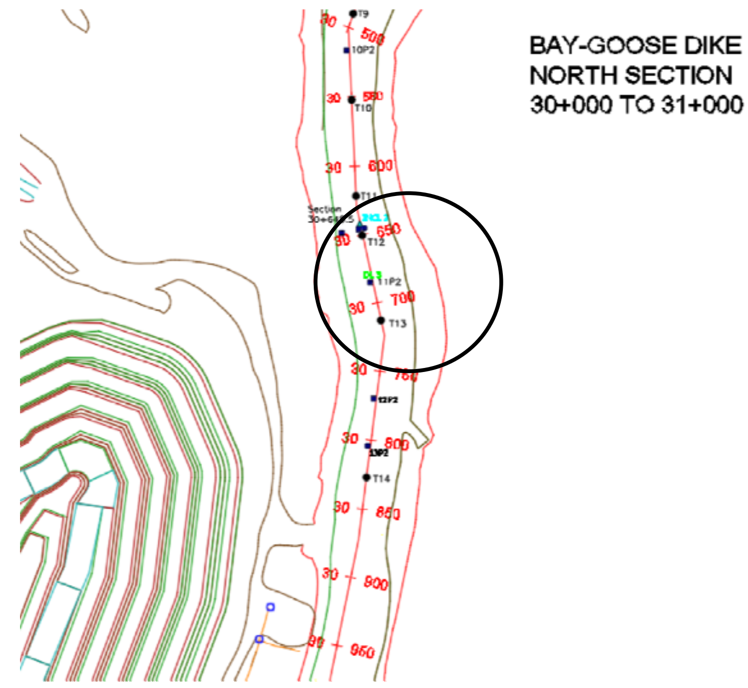
PROJECT **AGNICO EAGLE MINES LIMITED**
MEADOWBANK GOLD PROJECT
NUNAVUT

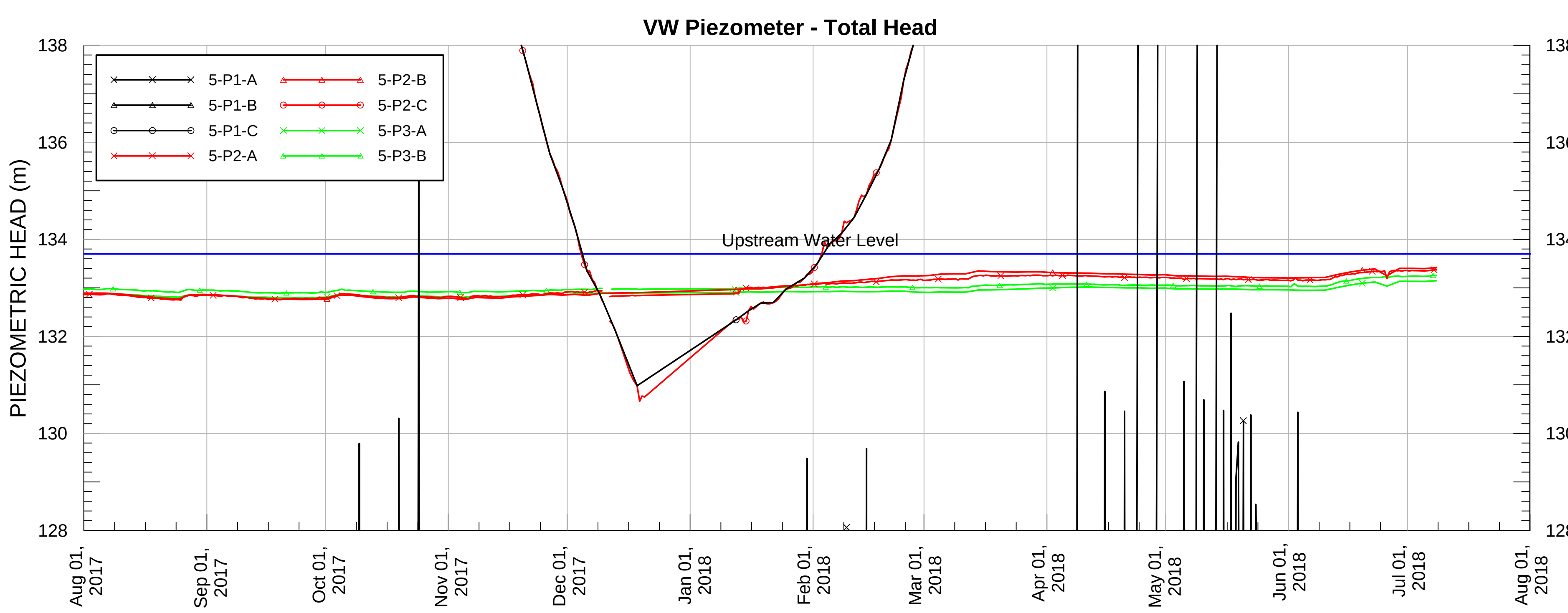
TITLE **BAYGOOSE DIKE**
30+550 to 31+000 - PIEZOMETRIC DATA
(Aug 1/17 to Aug 1/18)

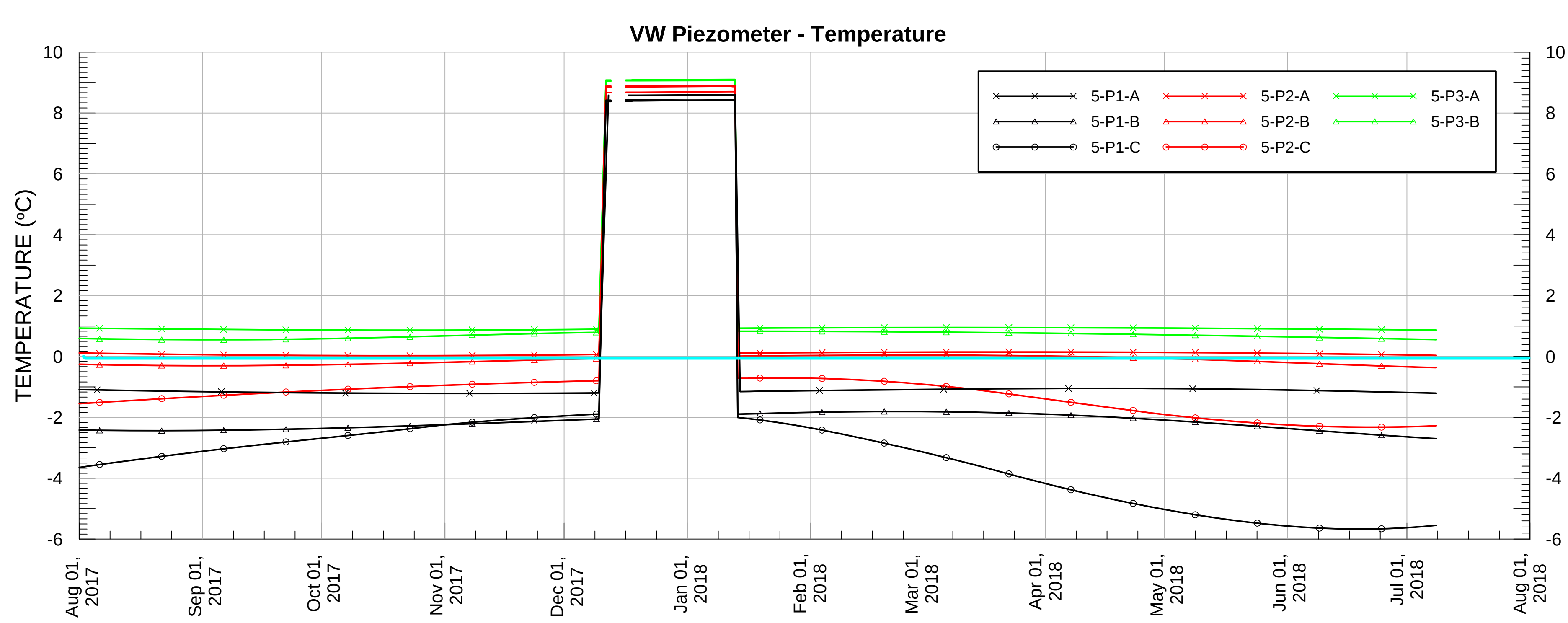
AGNICO EAGLE MEADOWBANK

PROJECT No. 09-1428-5007			PHASE No. 4000
DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
CADD	TD	28AUG14	
CHECK	PG	28AUG14	**FIGURE 9**
REVIEW			









NOTES:

1. 5P1A, 5P1B, 5P1C, 5P2C are giving unstable readings and since the temperature shows a negative reading it is assumed to be frozen.
2. A spike in temperature also has been corrected and stabilized due to a faulty MUX board.
3. Gap in data in December was due to a low battery. Battery was changed the following day.

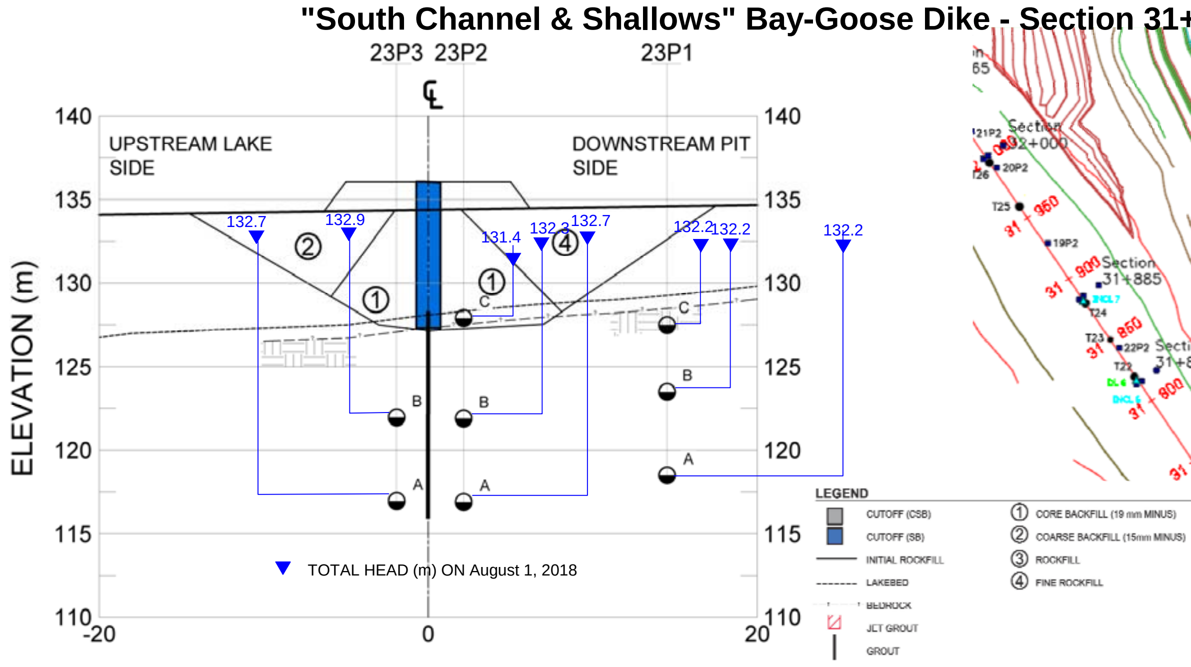
PROJECT **AGNICO EAGLE MINES LIMITED**
MEADOWBANK GOLD PROJECT
NUNAVUT

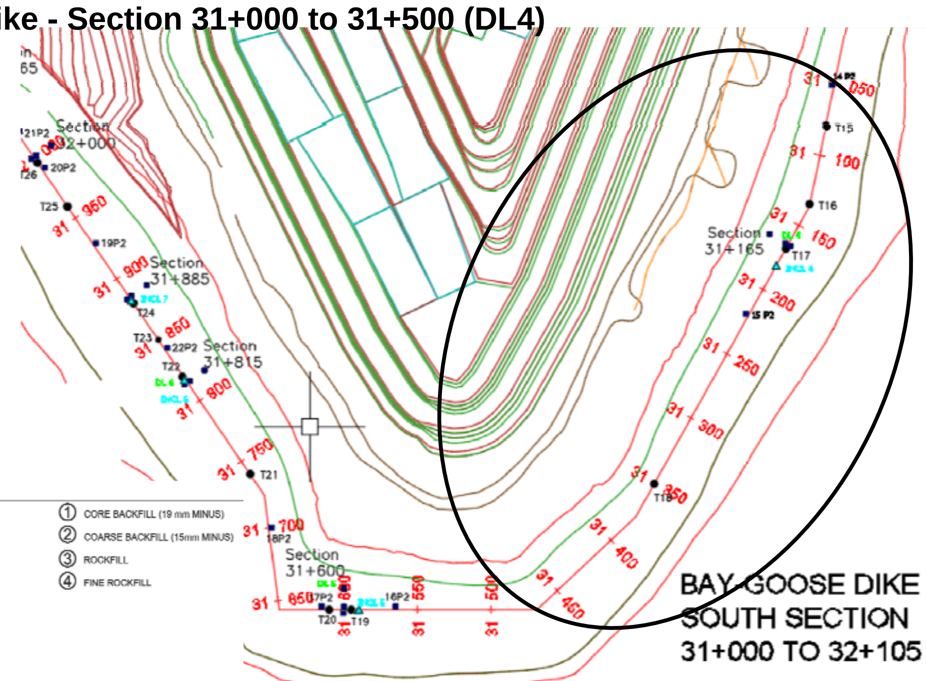
TITLE **BAYGOOSE DIKE - SECTION 30+645.5**
PIEZOMETRIC DATA
(Aug 1/17 to Aug 1/18)

AGNICO EAGLE
MEADOWBANK

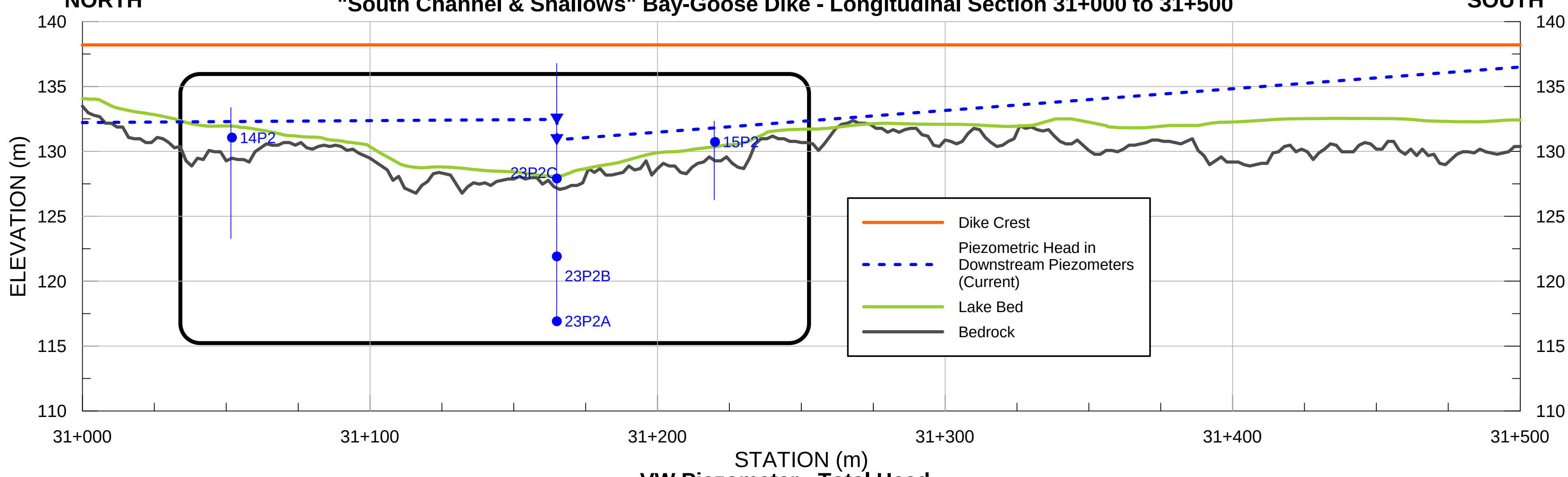
PROJECT No.			PHASE No.
DESIGN	TD	17JAN14	SCALE AS SHOWN REV.
CADD	TD	17JAN14	
CHECK			**FIGURE 10**
REVIEW			

"South Channel & Shallows" Bay-Goose Dike - Section 31+000 to 31+500 (DL4)

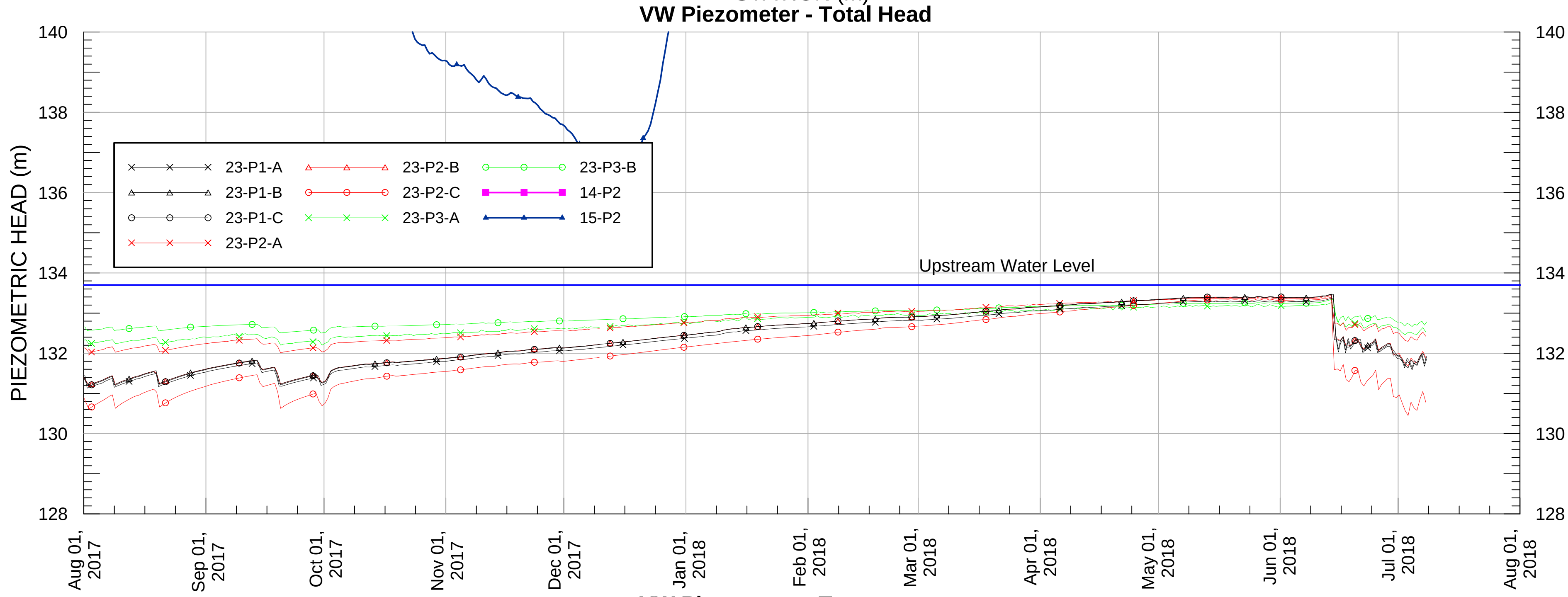




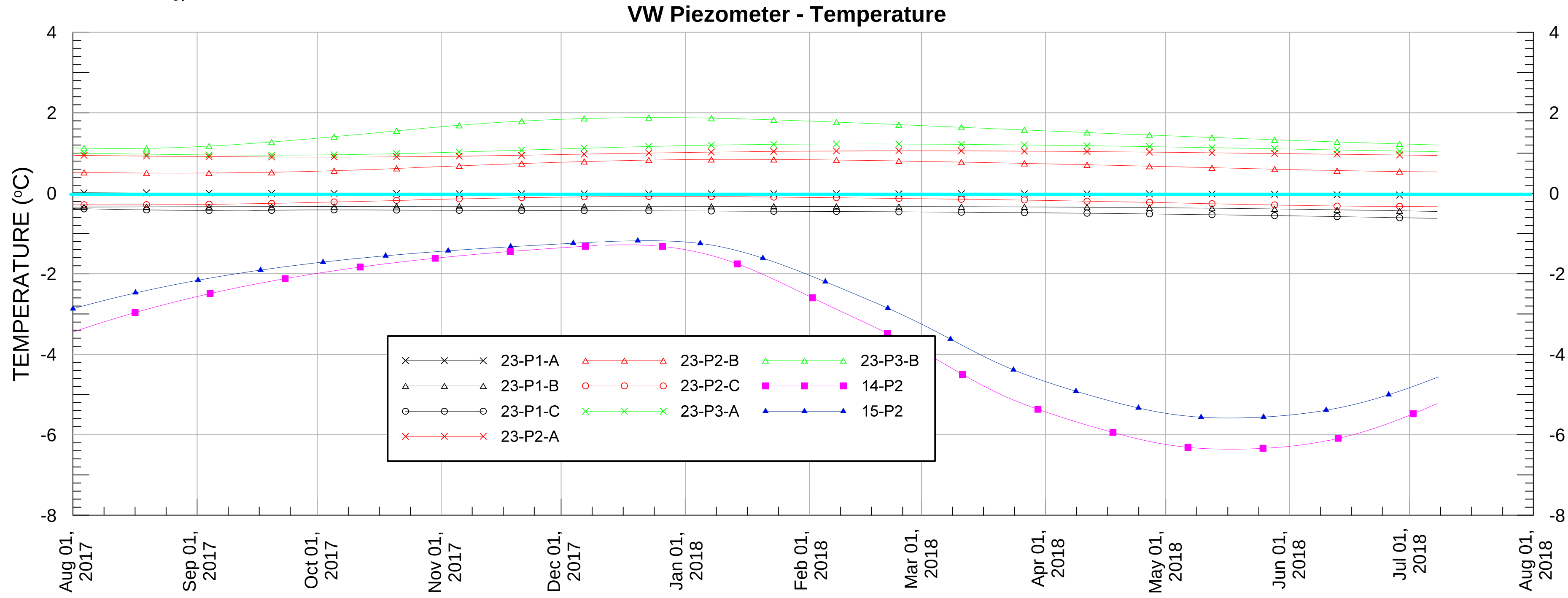
NORTH "South Channel & Shallows" Bay-Goose Dike - Longitudinal Section 31+000 to 31+500 SOUTH



VW Piezometer - Total Head



VW Piezometer - Temperature



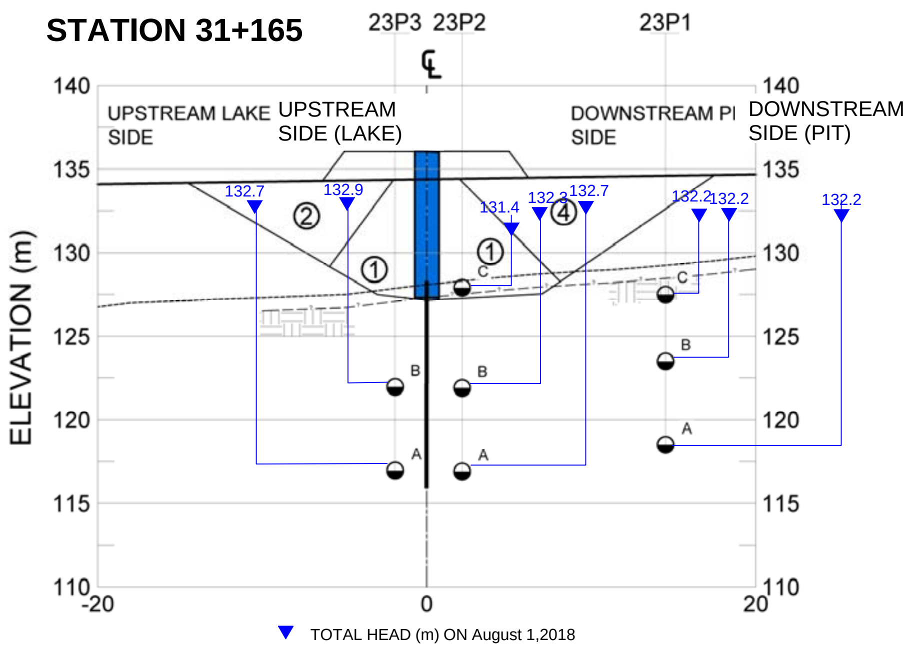
NOTES:
1. 14P2 and 15P2are given unstable readings and since the temperature shows a negative reading it is assumed to be frozen.
2. PWP rises and falls due to ponding in the area and continous pumping, and allowing the ponding to raise. The steady increase is when the ponding area freezes, and no pumping is done till the thawing of the area.
3. Gap in data in December is due to low battery. Battery was changed the following day.

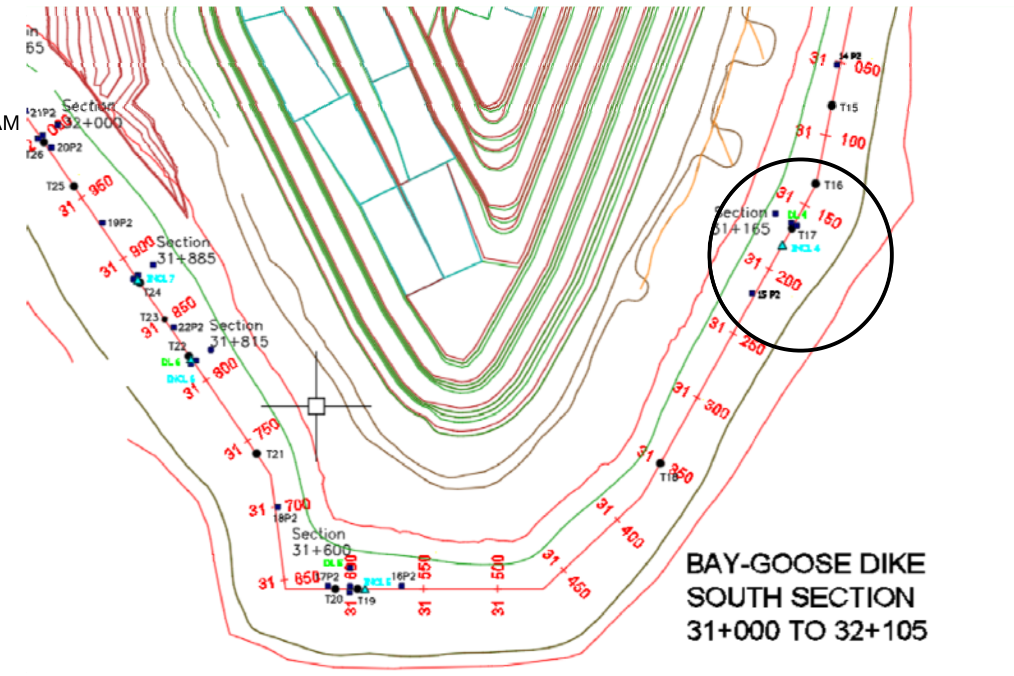
PROJECT: **AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT**

TITLE: **BAYGOOSE DIKE 31+000 to 31+500 - PIEZOMETRIC DATA (Aug 1/17 to Aug 1/18)**

AGNICO EAGLE MEADOWBANK

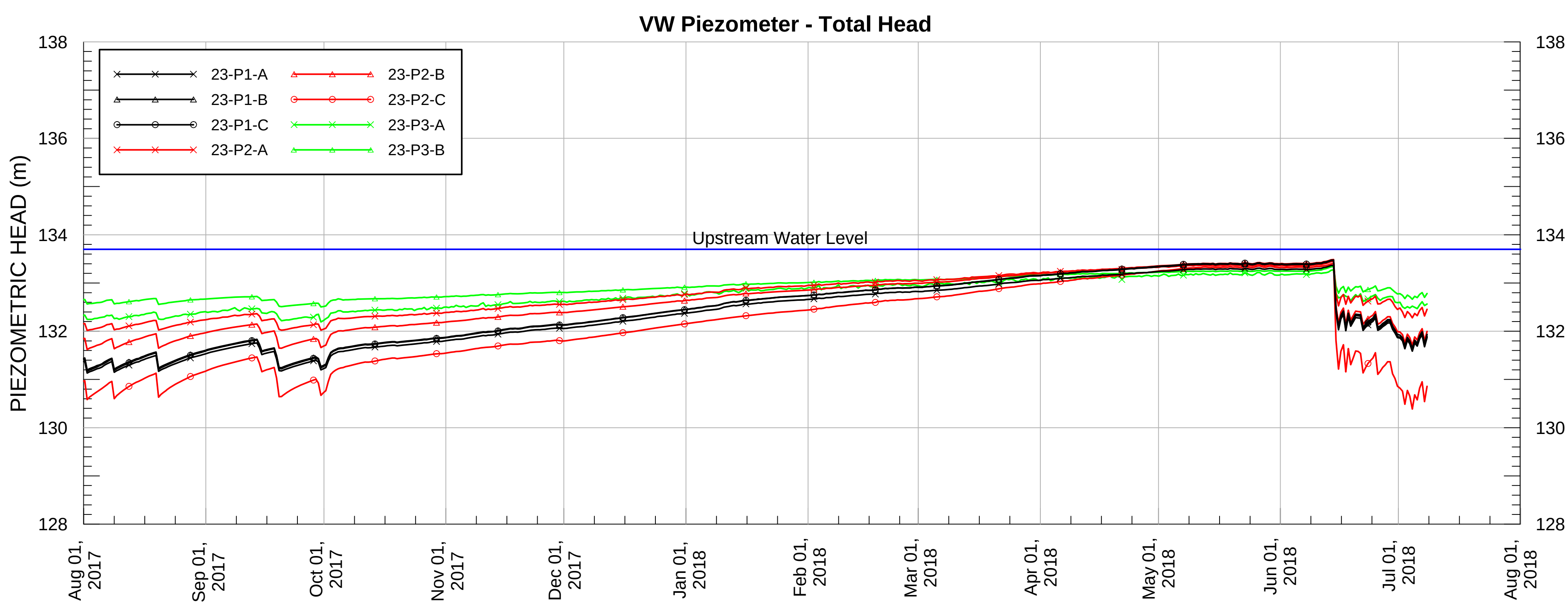
PROJECT No.			PHASE No.
DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
CADD	TD	28AUG14	**FIGURE 11**
CHECK	PG	28AUG14	
REVIEW			

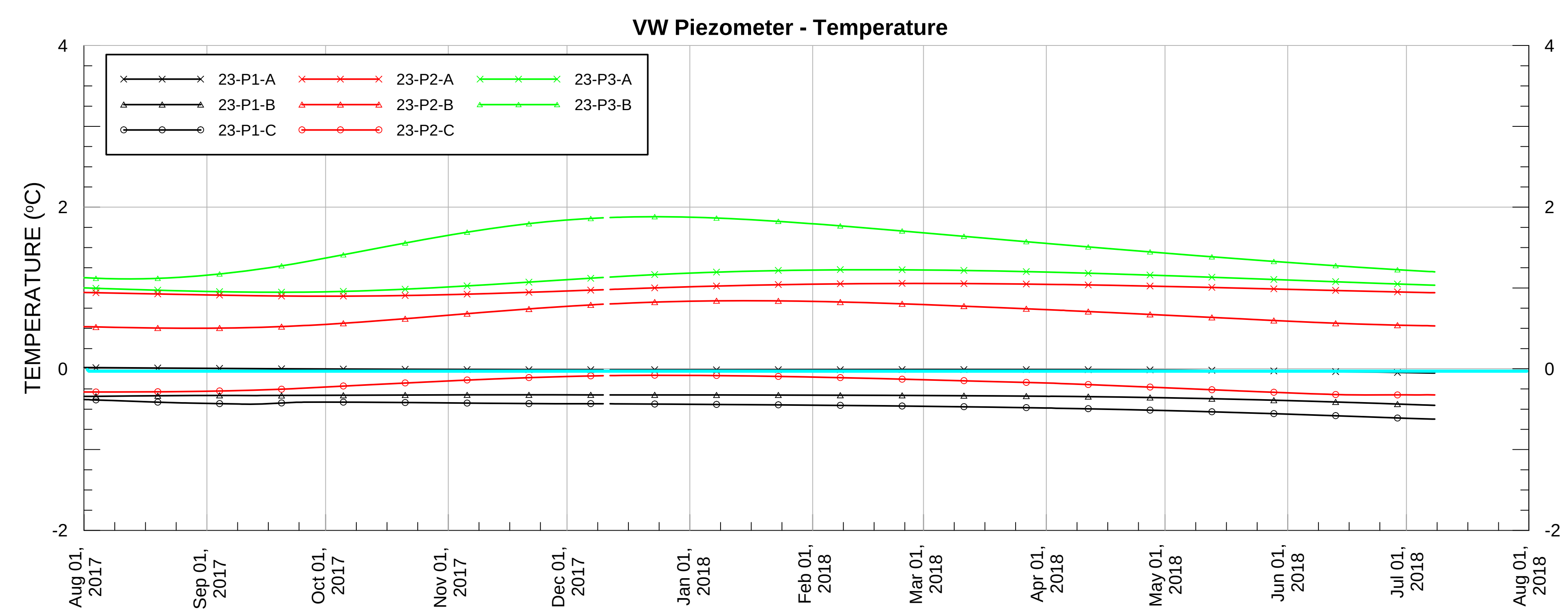




LEGEND

- CUTOFF (CSB)
- CUTOFF (SB)
- INITIAL ROCKFILL
- LAKEBED
- BEDROCK
- JET GROUT
- GROUT
- ① CORE BACKFILL (19 mm MINUS)
- ② COARSE BACKFILL (15mm MINUS)
- ③ ROCKFILL
- ④ FINE ROCKFILL





NOTES:

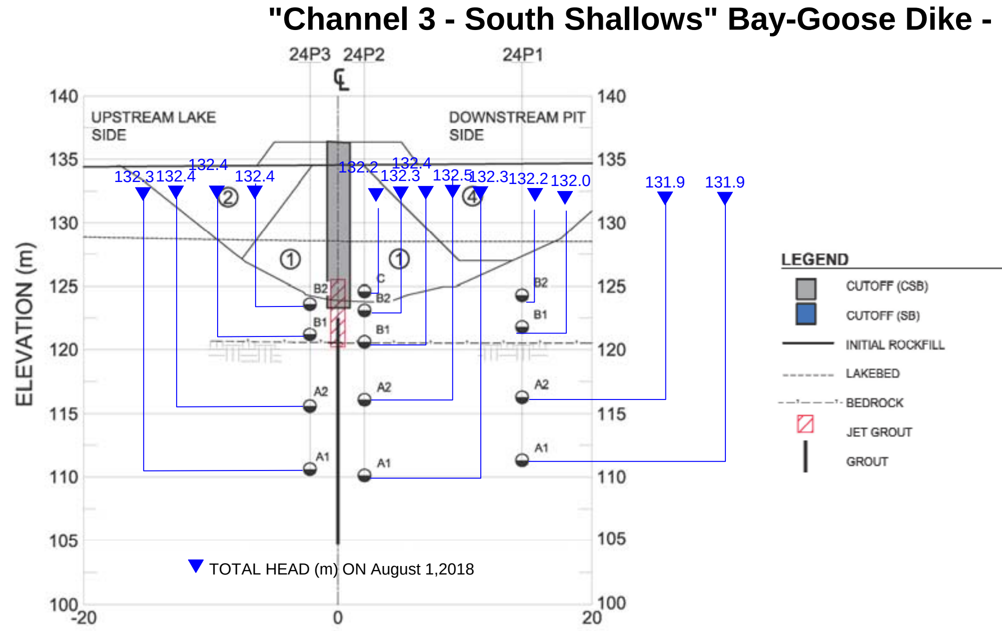
1. PWP rises and falls due to ponding in the area and continous pumping, and allowing the ponding to raise. The steady increase is when the ponding area freezes, and no pumping is done till the thawing of the area.
2. Gap in data in December is due to low battery. Battery was changed he following day.

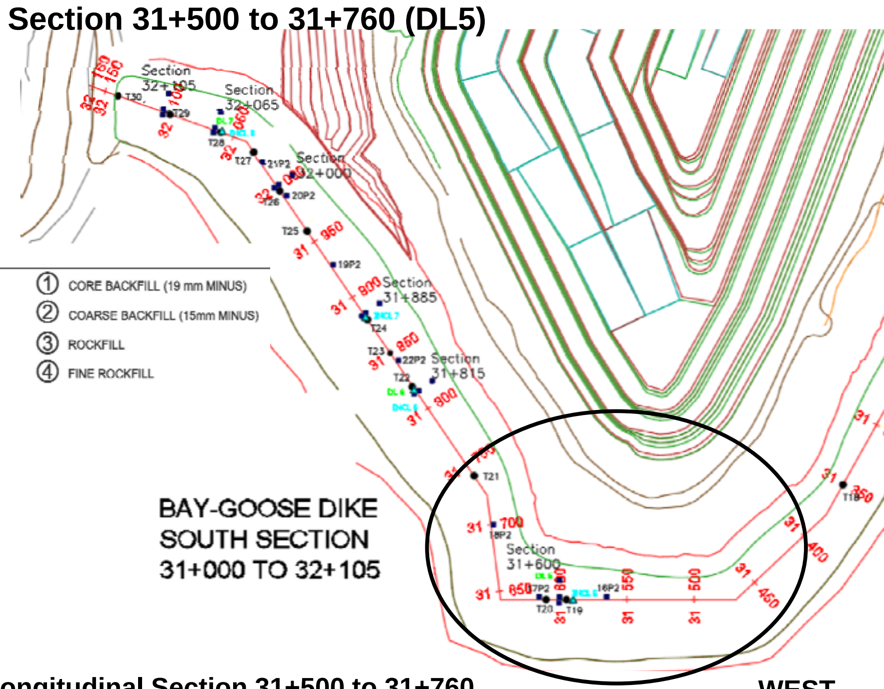
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE - SECTION 31+165 PIEZOMETRIC DATA (Aug 1/17 to Aug 1/18)

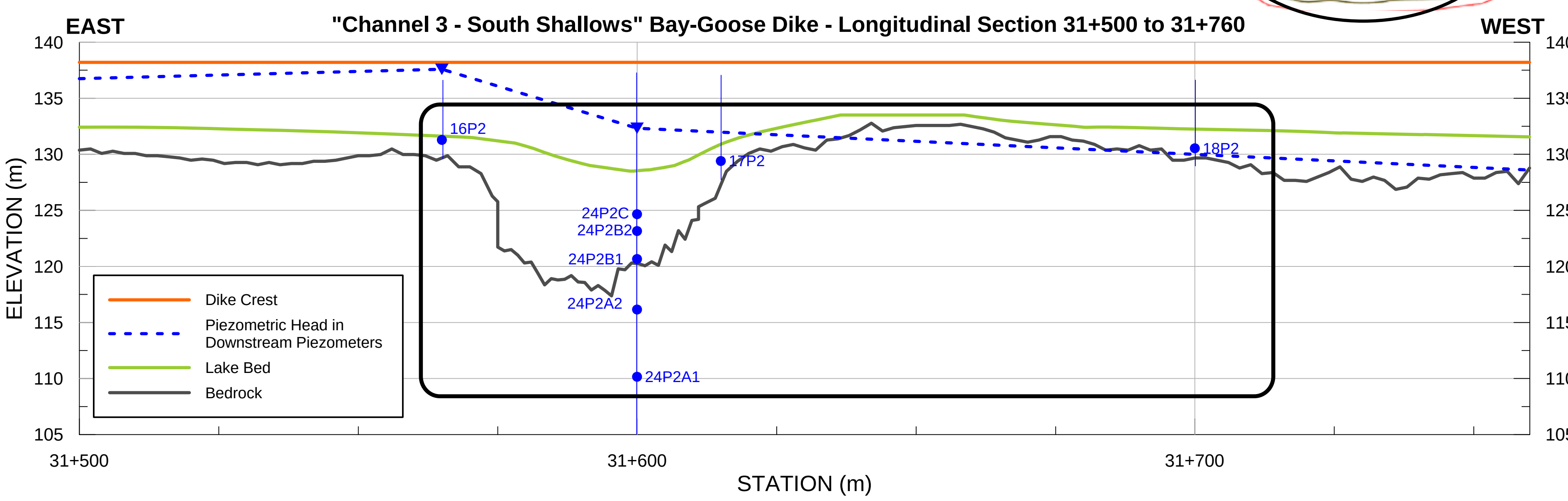
AGNICO EAGLE
MEADOWBANK

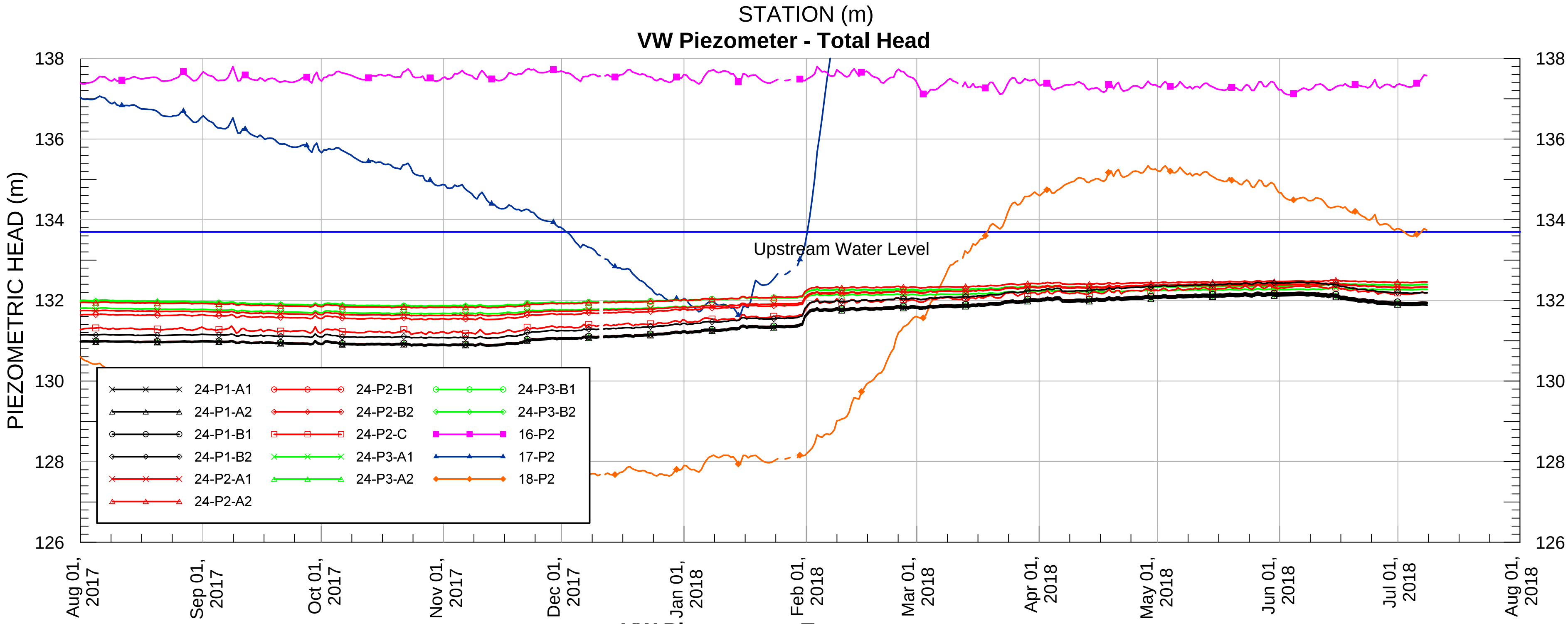
PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	FIGURE 12	
CHECK	PG	28AUG14		
REVIEW				

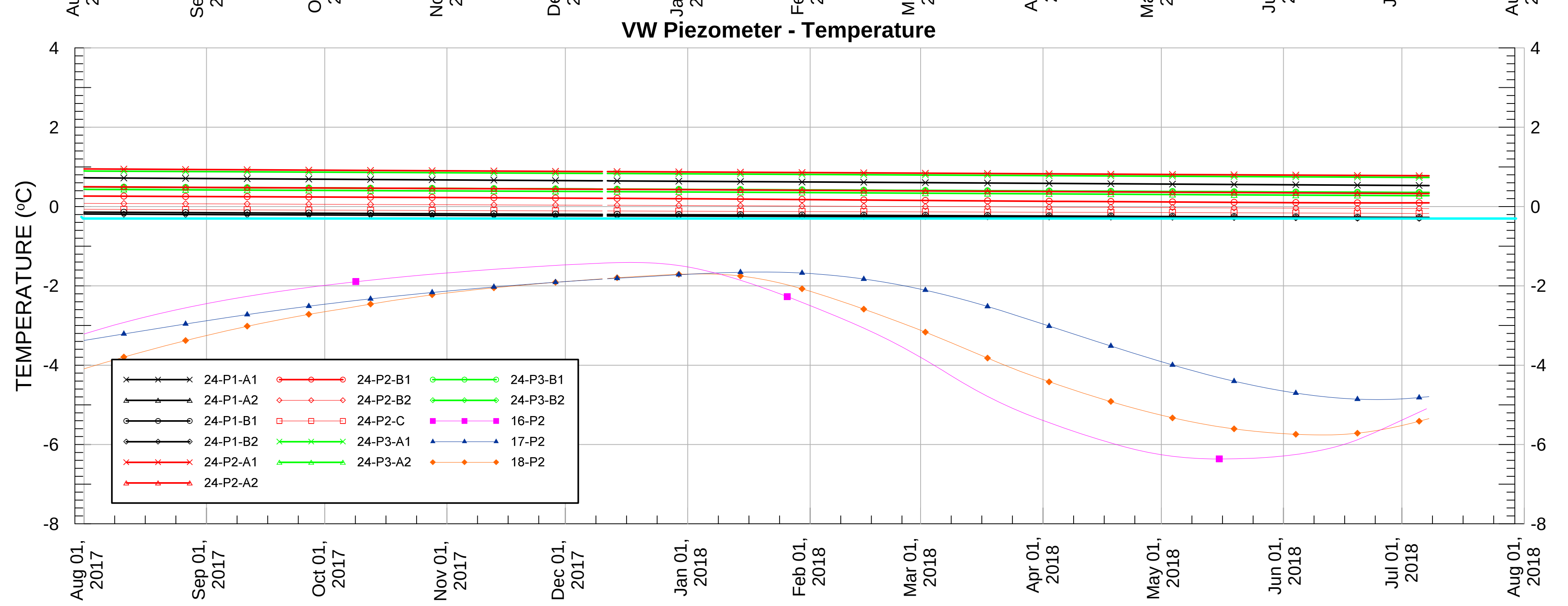
"Channel 3 - South Shallows" Bay-Goose Dike - Section 31+500 to 31+760 (DL5)









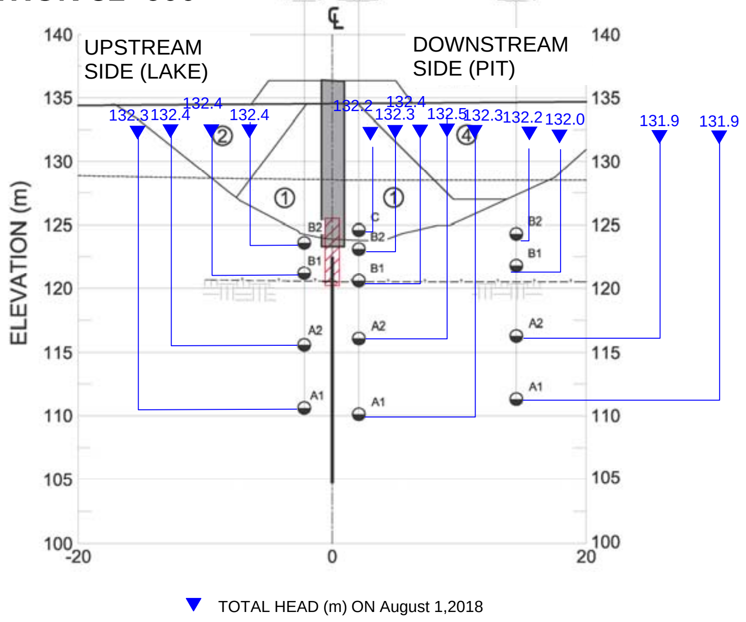


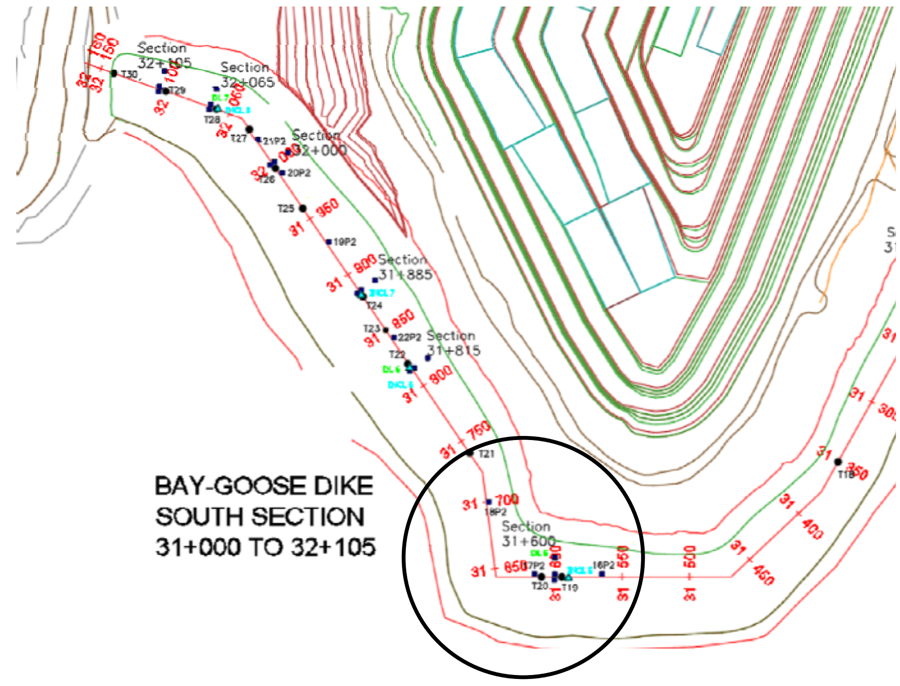
NOTES:

1. 16P2, 17P2 and 18P2 are given unstable readings and since the temperature shows a negative reading it is assumed to be frozen.
2. PWP is following same trend as previous years. When ice builds the pressure increases and when it melts in summer the pressure decreases
3. Gap in datain December is due to low battery. Battery was changed the following day.

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT				
TITLE	BAYGOOSE DIKE 31+500 to 31+760 - PIEZOMETRIC DATA (Aug 1/17 to Aug 1/18)				
AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.	
	DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
	CADD	TD	28AUG14	FIGURE 13	
	CHECK	PG	28AUG14		
	REVIEW				

STATION 31+600

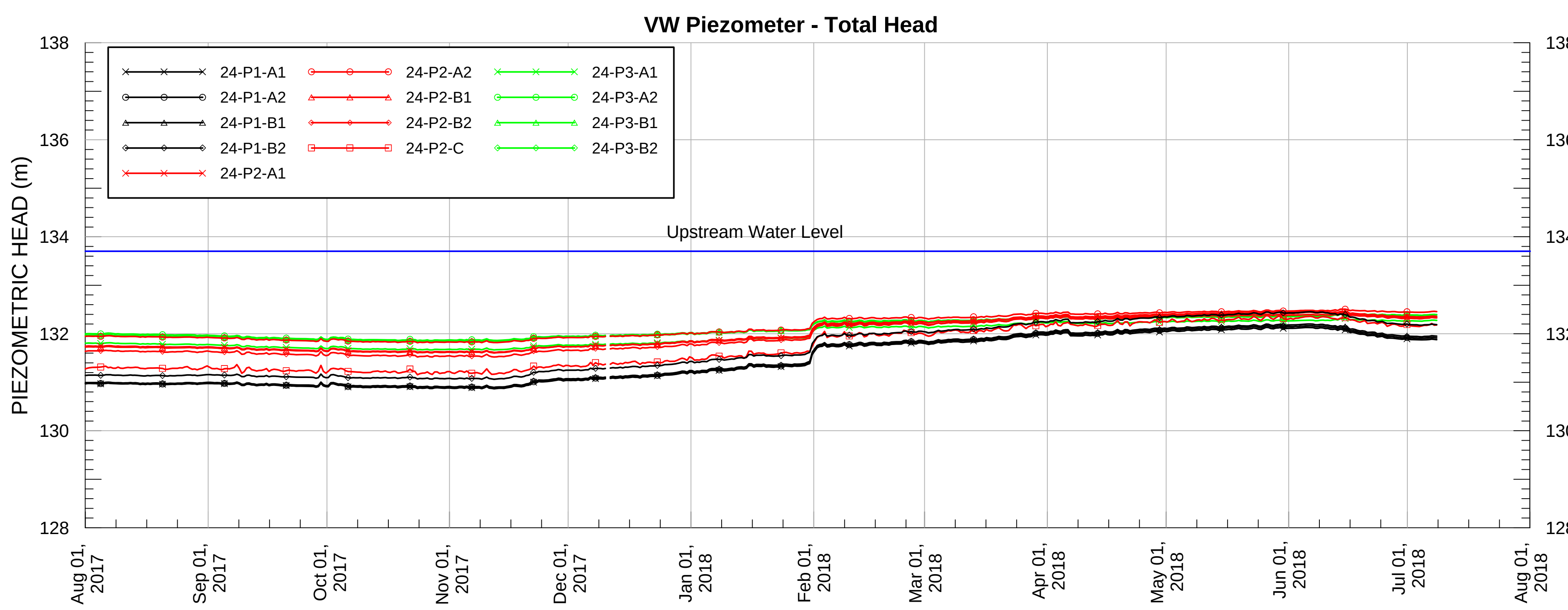




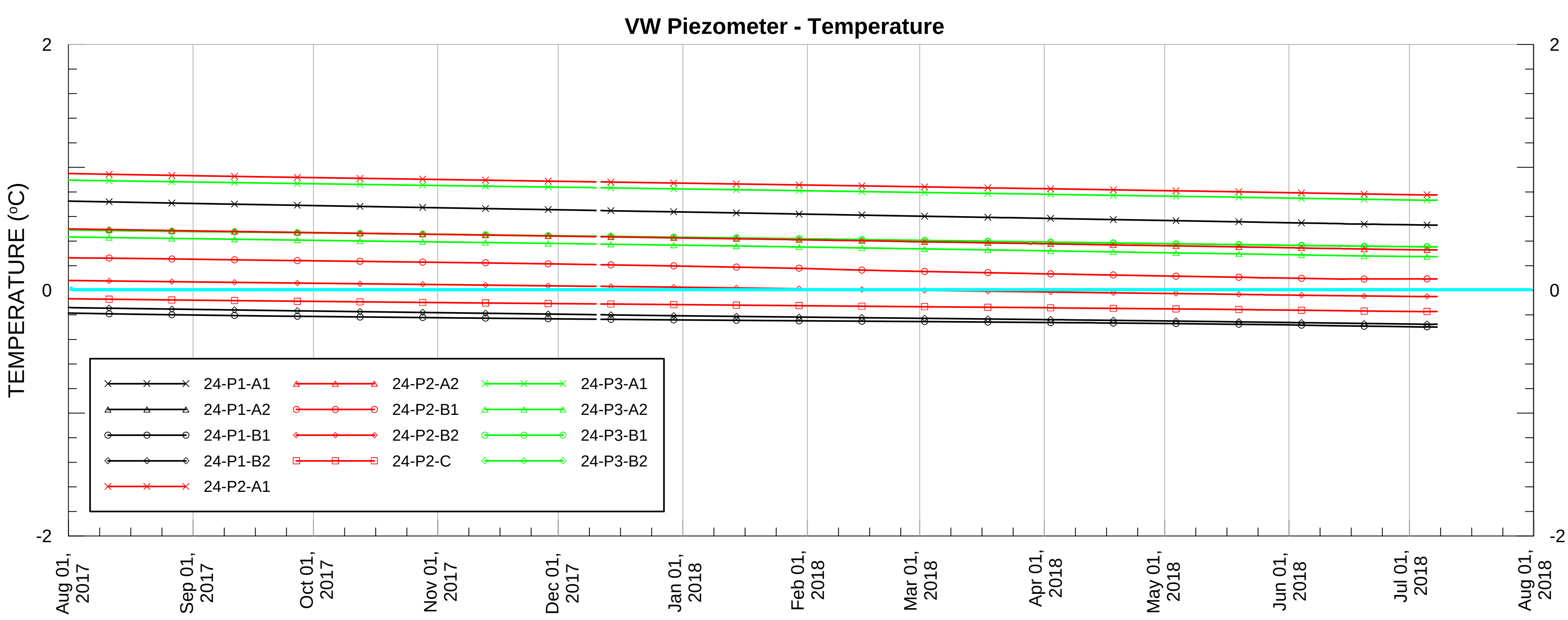
LEGEND

	CUTOFF (CSB)	1	CORE BACKFILL (19 mm MINUS)
	CUTOFF (SB)	2	COARSE BACKFILL (15mm MINUS)
	INITIAL ROCKFILL	3	ROCKFILL
	LAKEBED	4	FINE ROCKFILL
	BEDROCK		
	JET GROUT		
	GROUT		

VW Piezometer - Total Head



VW Piezometer - Temperature



NOTES:

1. PWP is following same trend as previous years. When ice builds the pressure increases and when it melts in summer the pressure decreases
2. Gap in data in December was due to a low battery. Battery was changed the following day.

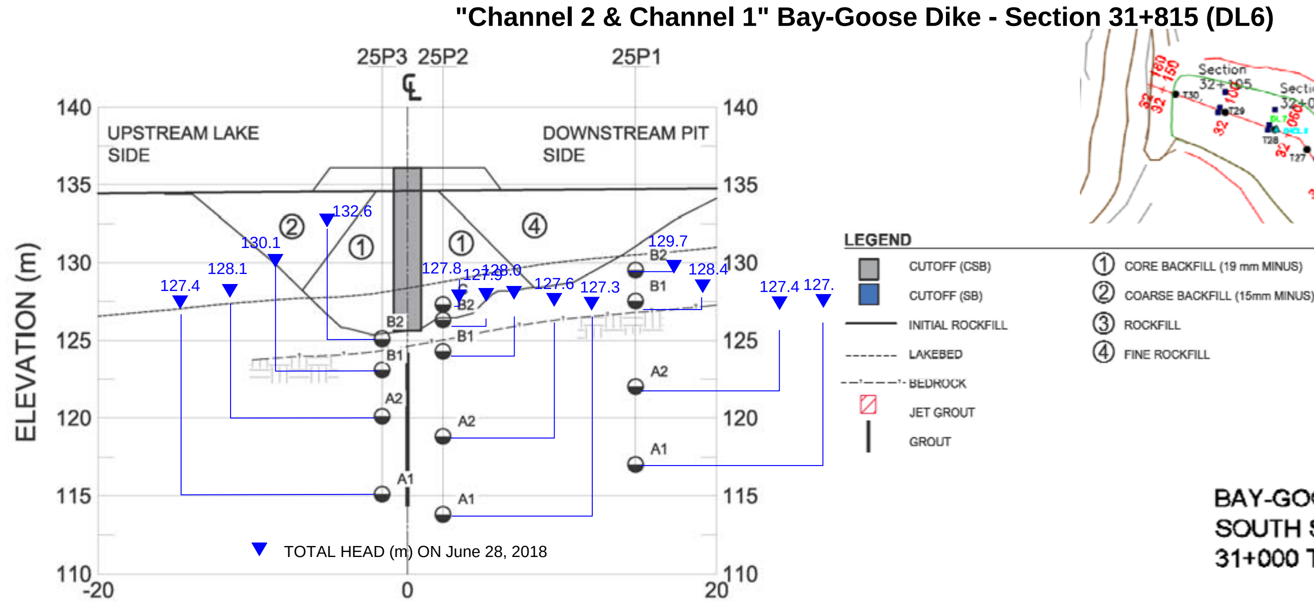
PROJECT: **AGNICO EAGLE MINES LIMITED**
MEADOWBANK GOLD PROJECT
NUNAVUT

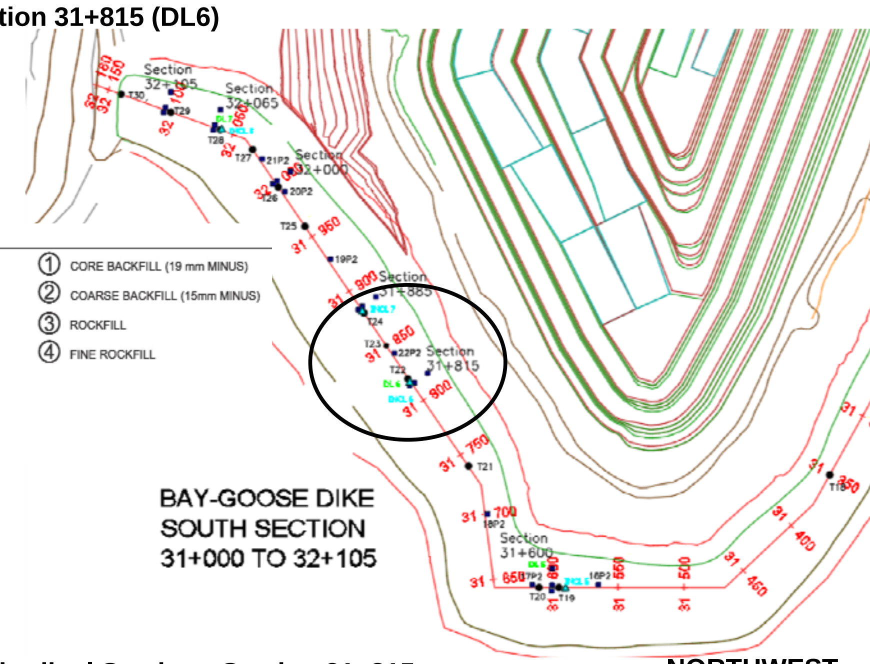
TITLE: **BAYGOOSE DIKE - SECTION 31+600**
PIEZOMETRIC DATA
(Aug 1/17 to Aug 1/18)

AGNICO EAGLE
MEADOWBANK

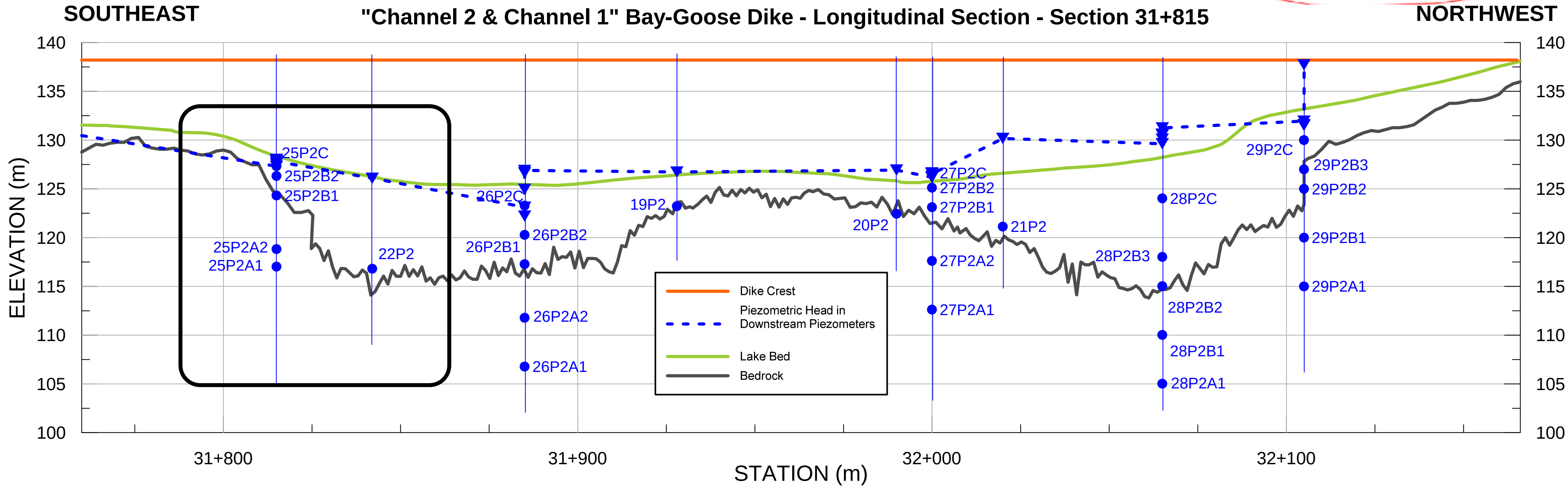
PROJECT No.			PHASE No.
DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
CADD	TD	28AUG14	**FIGURE 14**
CHECK	PG	28AUG14	
REVIEW			

"Channel 2 & Channel 1" Bay-Goose Dike - Section 31+815 (DL6)

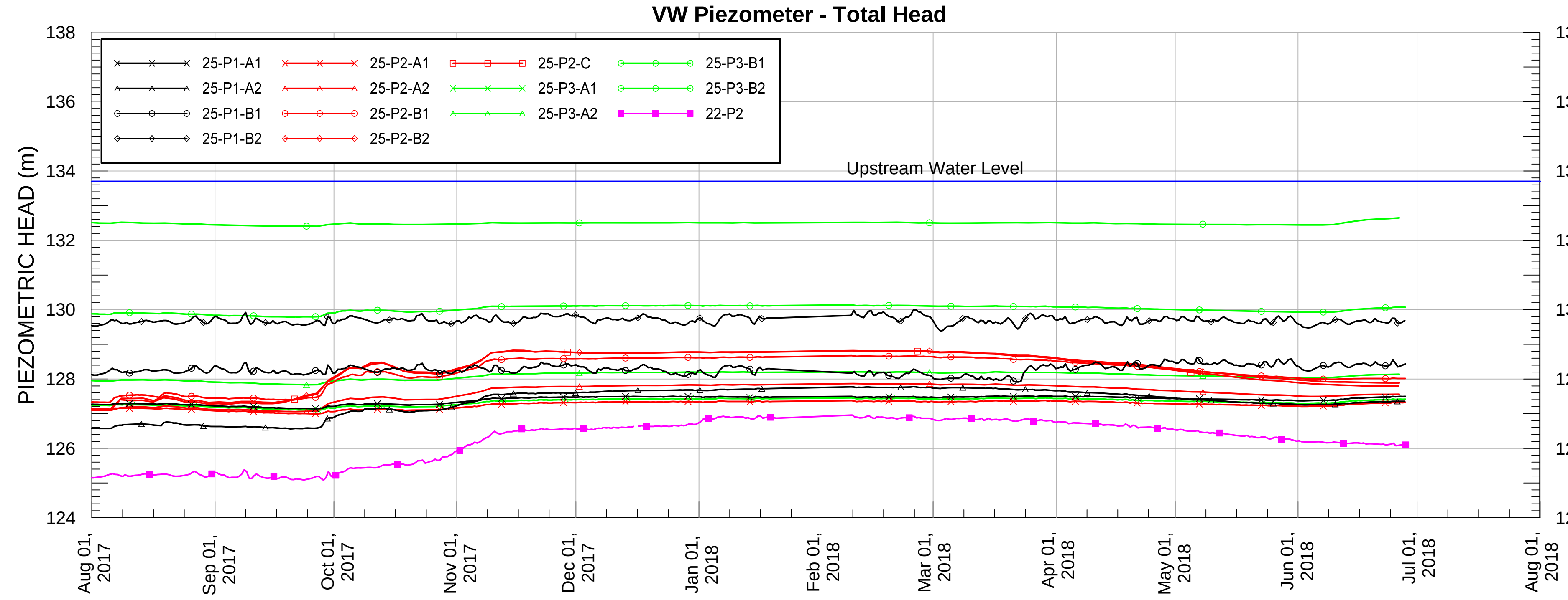




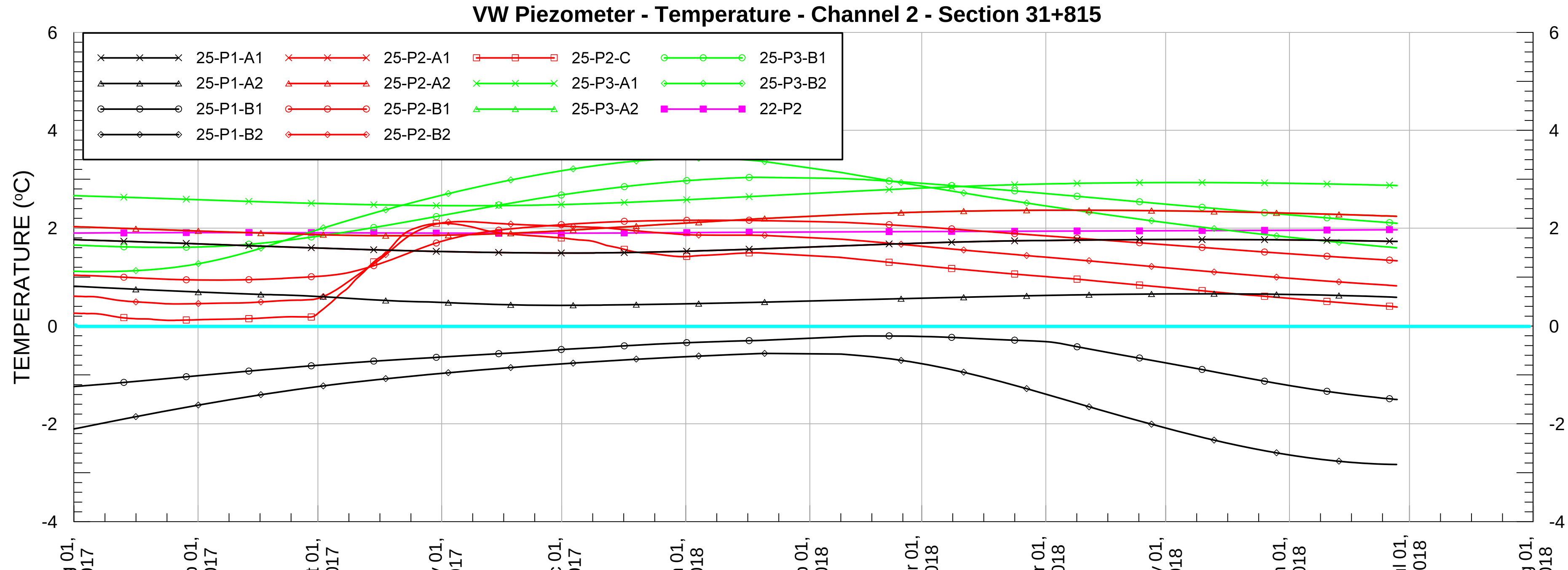
SOUTHEAST "Channel 2 & Channel 1" Bay-Goose Dike - Longitudinal Section - Section 31+815 NORTHWEST



VW Piezometer - Total Head



VW Piezometer - Temperature - Channel 2 - Section 31+815



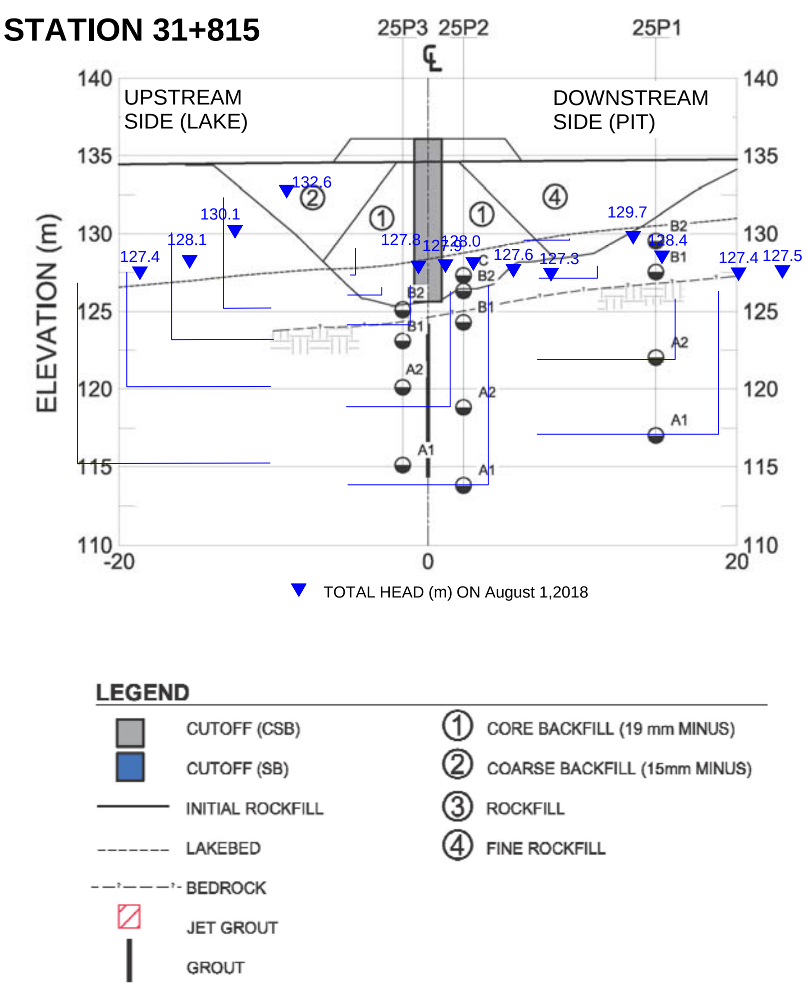
NOTES:

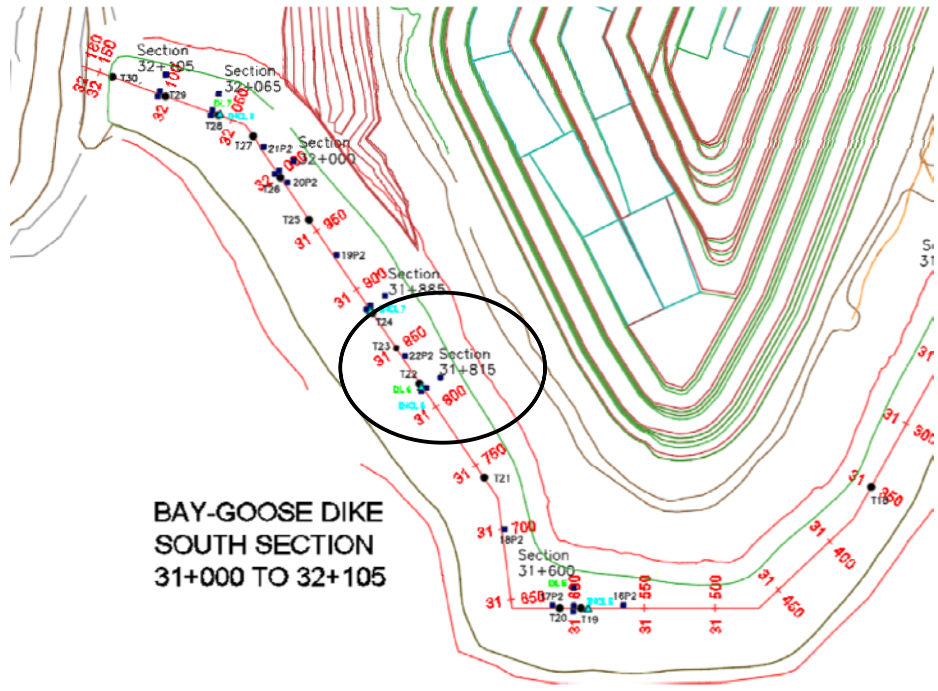
1. The rise in temperature and PWP was interpreted as the permafrost at the toe of the dike blocking the seepage path which led to this events. Will continue to monitor in the field and the instruments. Since the snow melt the blockage is not longer there and the PWP is on a downtrend.
2. There is a signal loss since March 7/18 which is due to the snow accumulating on the Goose Waste Dump pile. Since the snow melt signal is back.

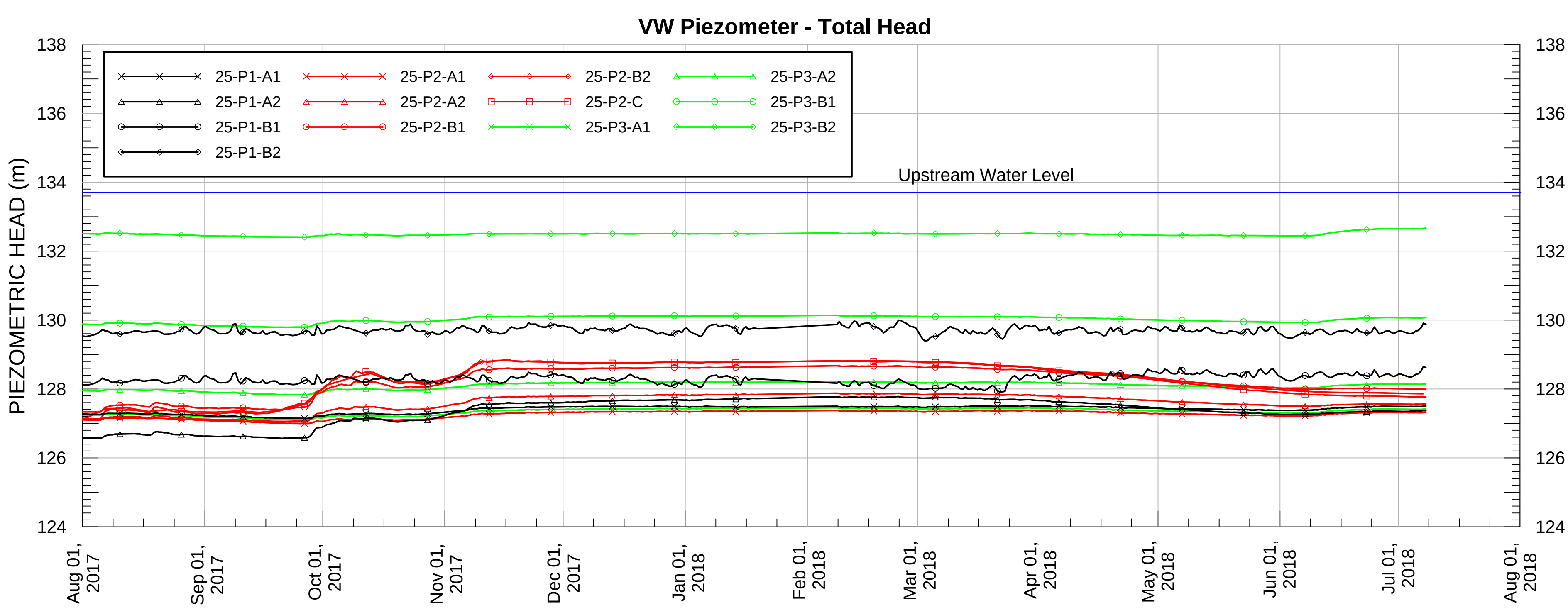
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE Section 31+815 - CHANNEL 2, PIEZOMETRIC DATA (Aug 1/17 to Aug 1/18)

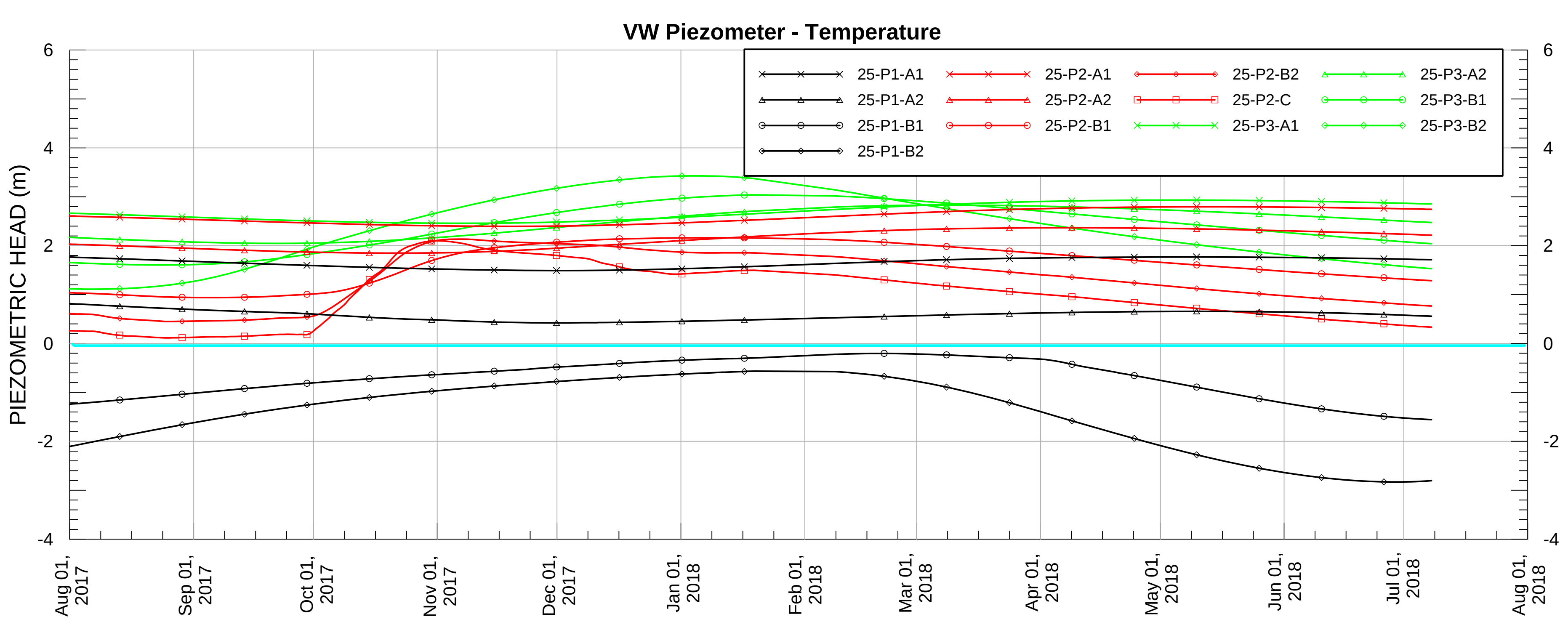
AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.
DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
CADD	TD	28AUG14	FIGURE 15
CHECK	PG	28AUG14	
REVIEW			









NOTES:

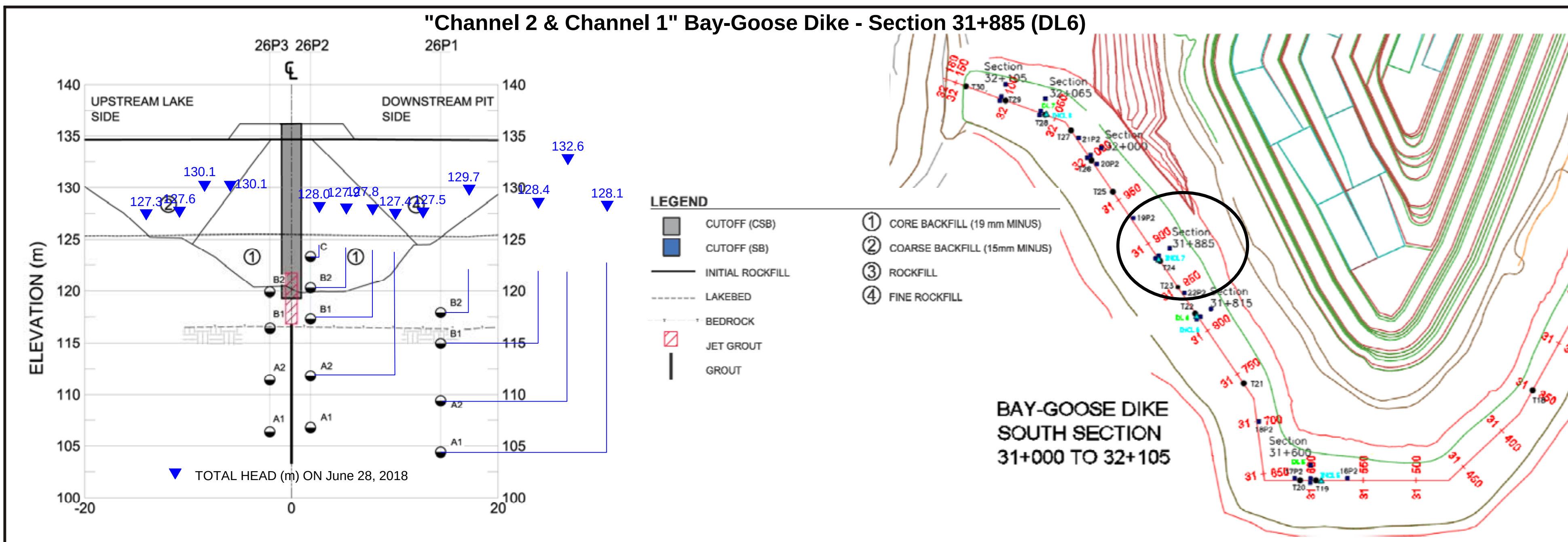
1. The rise in temperature and PWP was interpreted as the permafrost at the toe of the dike blocking the seepage path which led to this events. Will continue to monitor in the field and the instruments. Since the snow melt the blockage is no longer there and the PWP is on a downtrend.
2. There is a signal loss since March 7/18 which is due to the snow accumulating on the Goose Waste Dump pile. Since the snow melt signal is back.

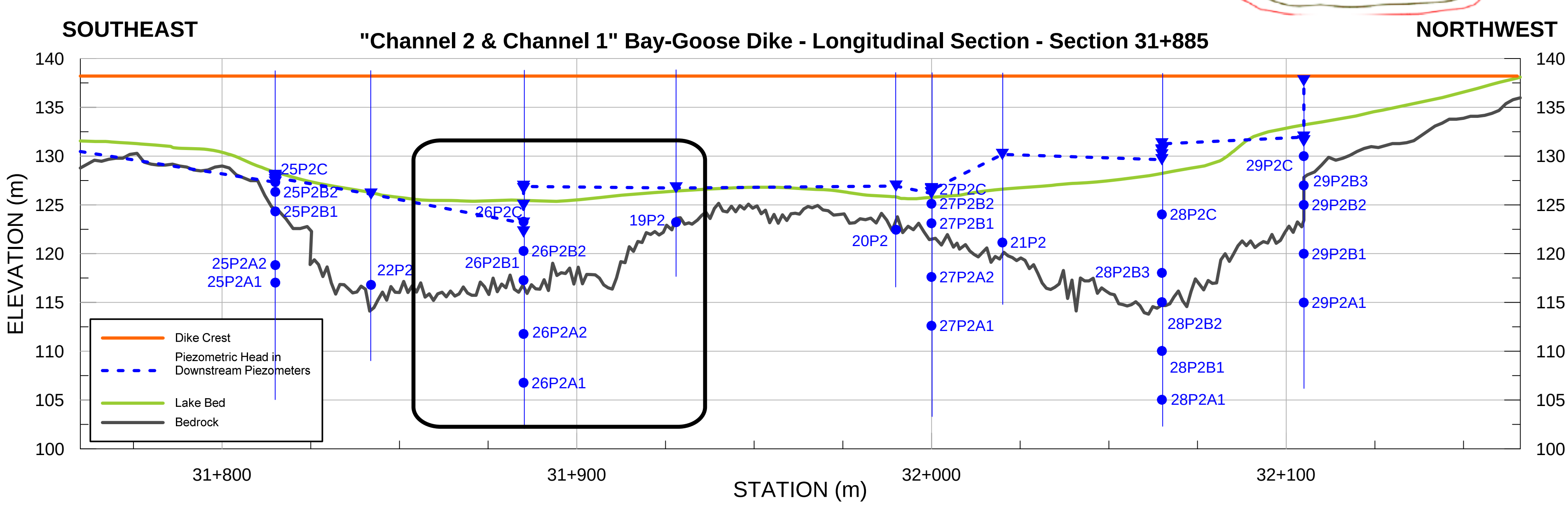
PROJECT: AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

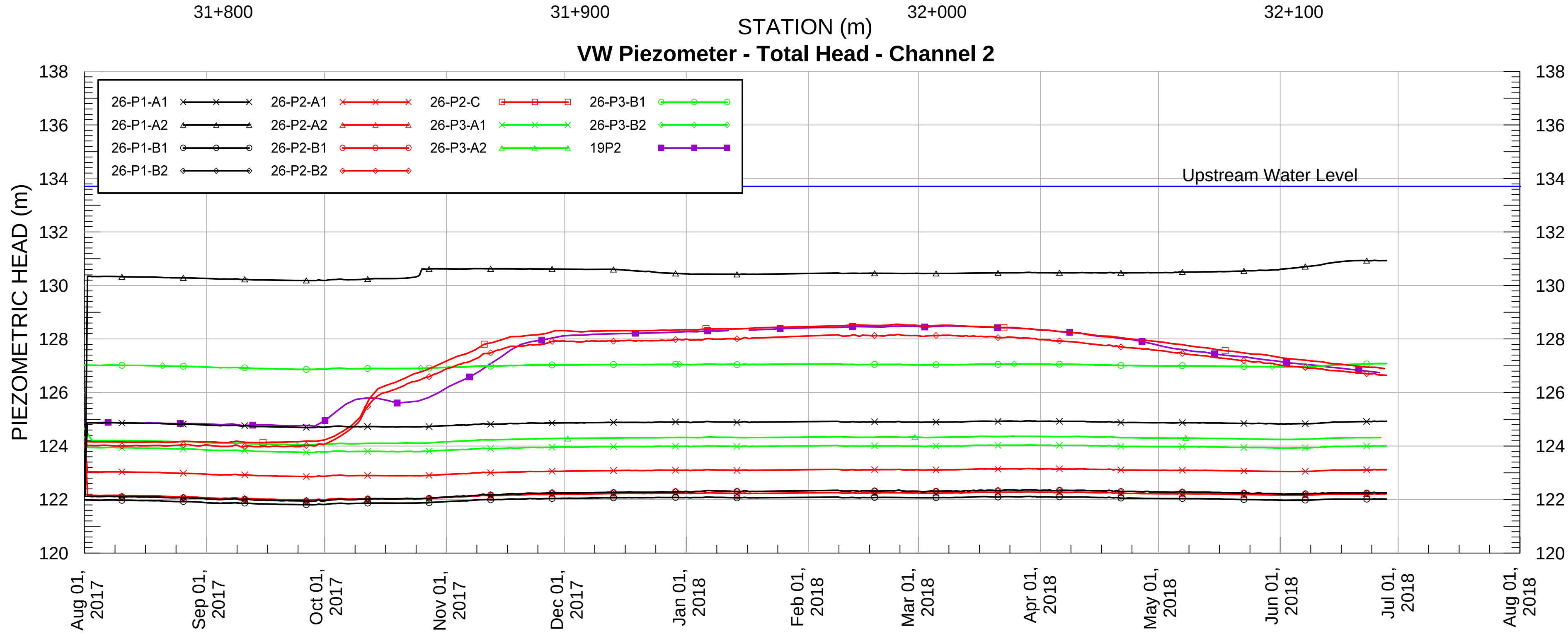
TITLE: BAY-GOOSE DIKE - SECTION 31+815
PIEZOMETRIC DATA
(Aug 1/17 to Aug 1/18)

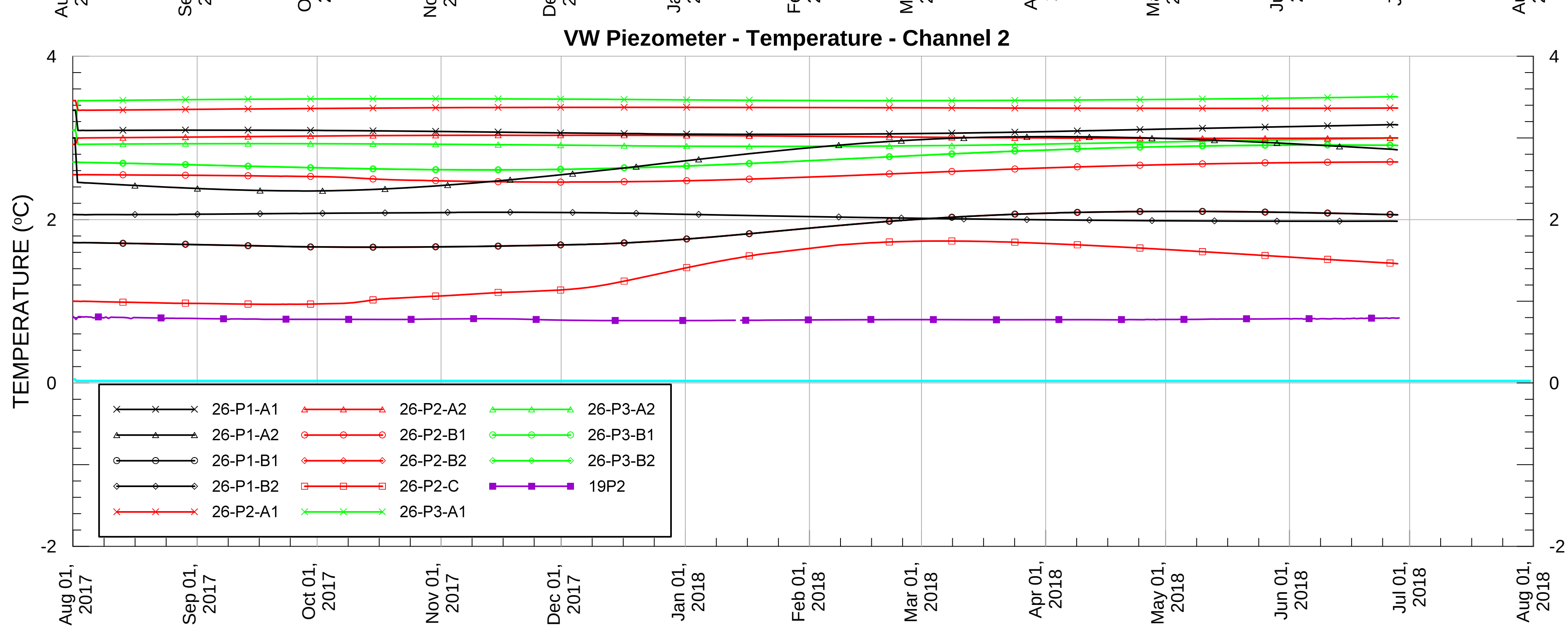
AGNICO EAGLE
MEADOWBANK

PROJECT No.	09-1428-5007		PHASE No.	4000
DESIGN	TD	28AUG14	SCALE	AS SHOWN
CADD	TD	28AUG14	REV.	
CHECK	PG	28AUG14	FIGURE 16	
REVIEW				









NOTES:

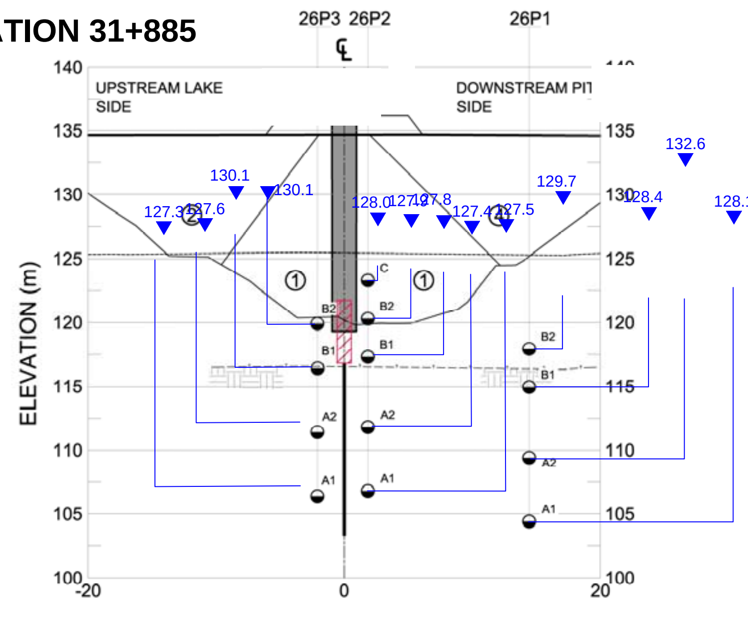
1. The rise in temperature and PWP was interpreted as the permafrost at the toe of the dike blocking the seepage path which led to this events. Will continue to monitor in the field and the instruments. Now that ice has melted the PWP has decreased as the seepage path is no longer blocked.
2. There is a signal loss since March 7/18 which is due to the snow accumulating on the Goose Waste Dump pile. Signal since snow melt has resumed.

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE Section 31+885 - CHANNEL 2, PIEZOMETRIC DATA (Aug 1/17 to Aug 1/18)

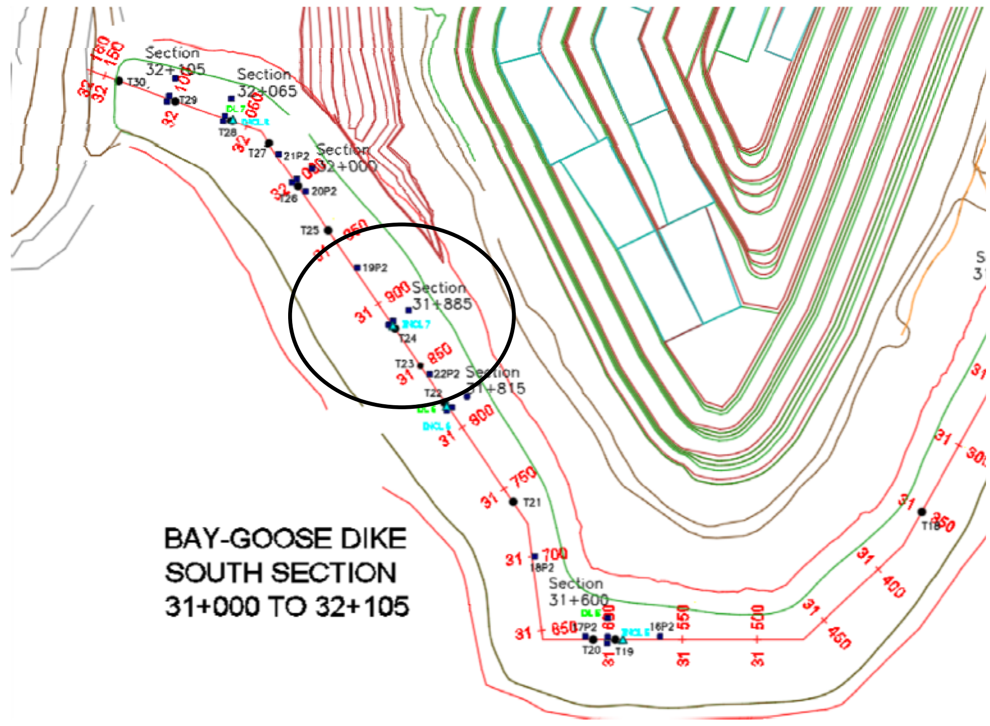
AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	FIGURE 17	
CHECK	PG	28AUG14		
REVIEW				

STATION 31+885



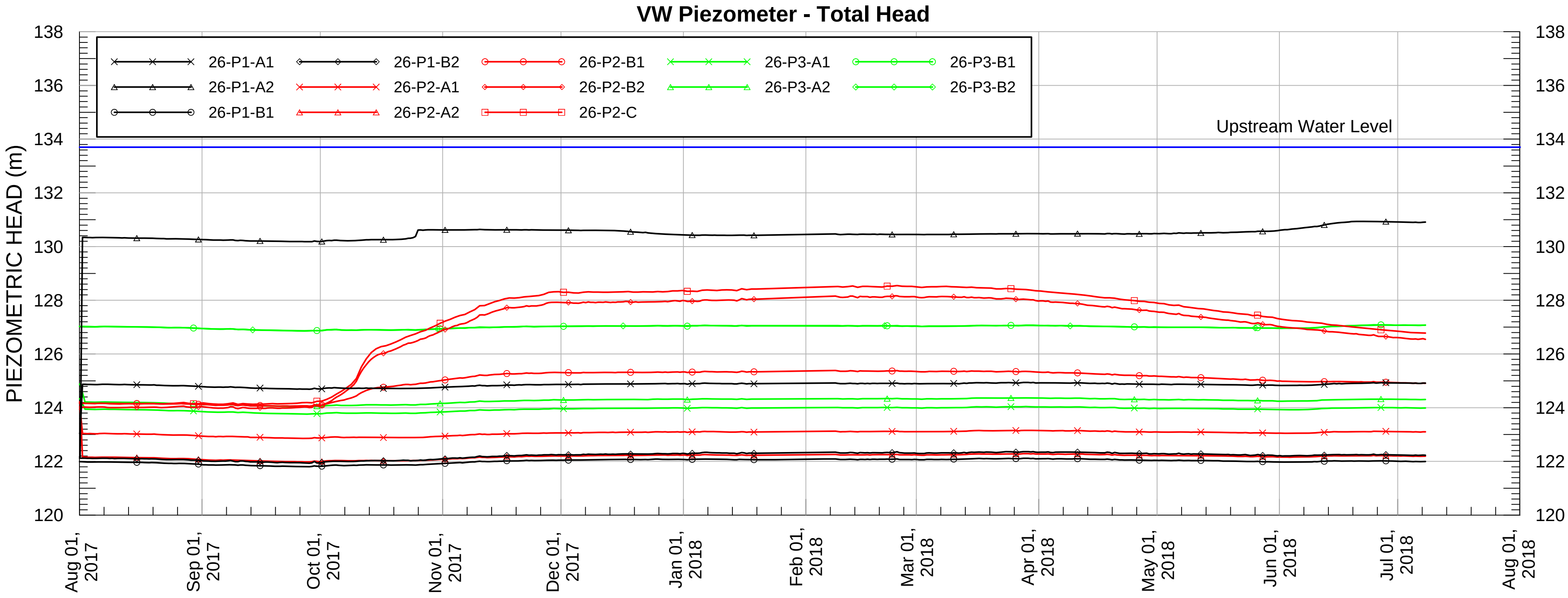
▼ TOTAL HEAD (m) ON August 1,2018



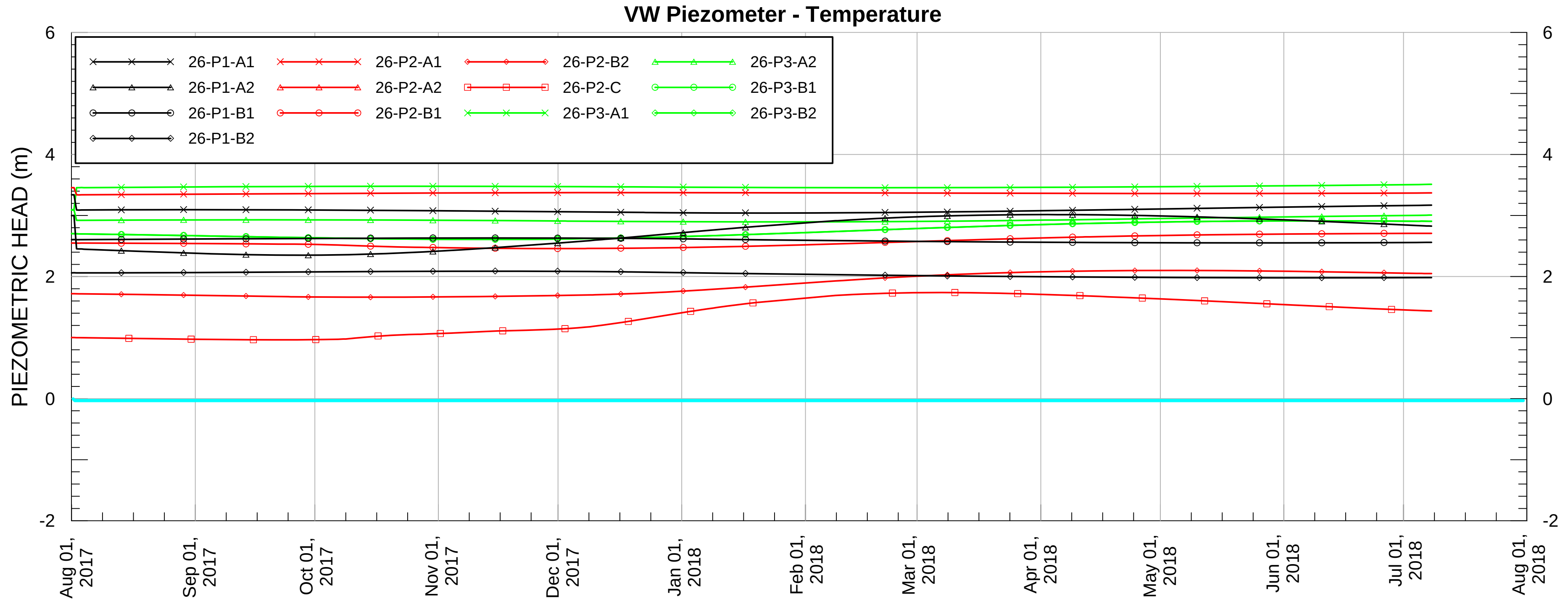
LEGEND

- CUTOFF (CSB)
- CUTOFF (SB)
- INITIAL ROCKFILL
- LAKEBED
- BEDROCK
- JET GROUT
- GROUT
- ① CORE BACKFILL (19 mm MINUS)
- ② COARSE BACKFILL (15mm MINUS)
- ③ ROCKFILL
- ④ FINE ROCKFILL

VW Piezometer - Total Head



VW Piezometer - Temperature



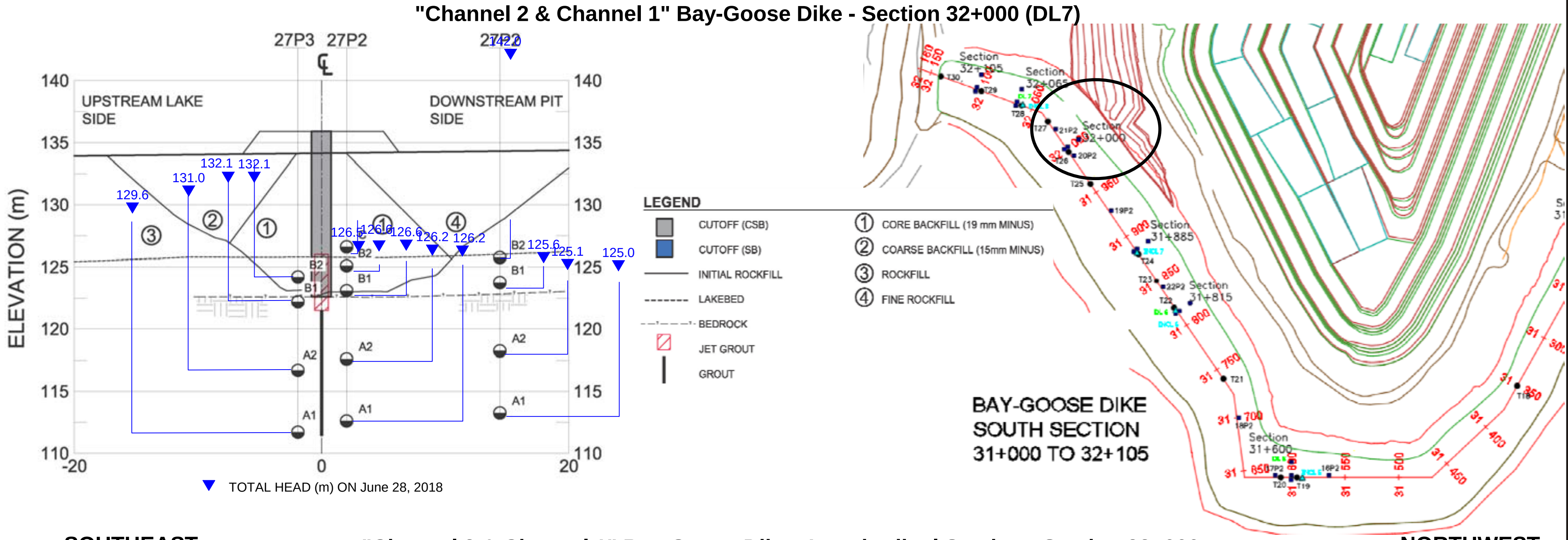
NOTES:

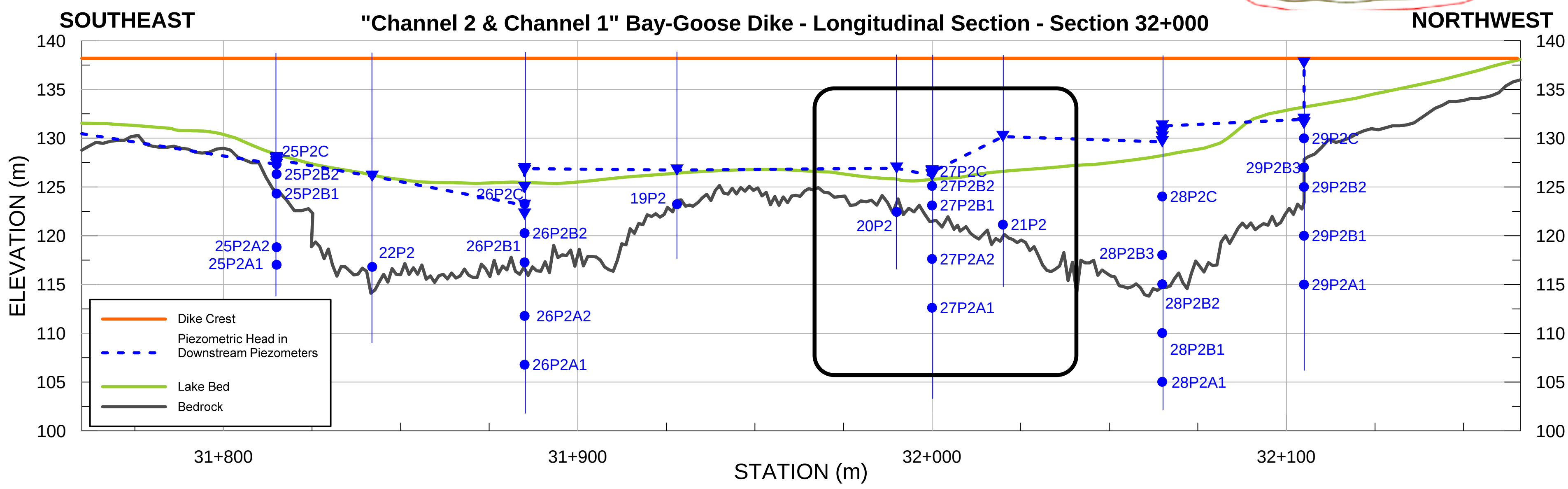
1. The rise in temperature and PWP was interpreted as the permafrost at the toe of the dike blocking the seepage path which led to this events. Will continue to monitor in the field and the instruments. Now that ice has melted the PWP has decreased as the seepage path is no longer blocked.
2. There is a signal loss since March 7/18 which is due to the snow accumulating on the Goose Waste Dump pile. Signal since snow melt has resumed.

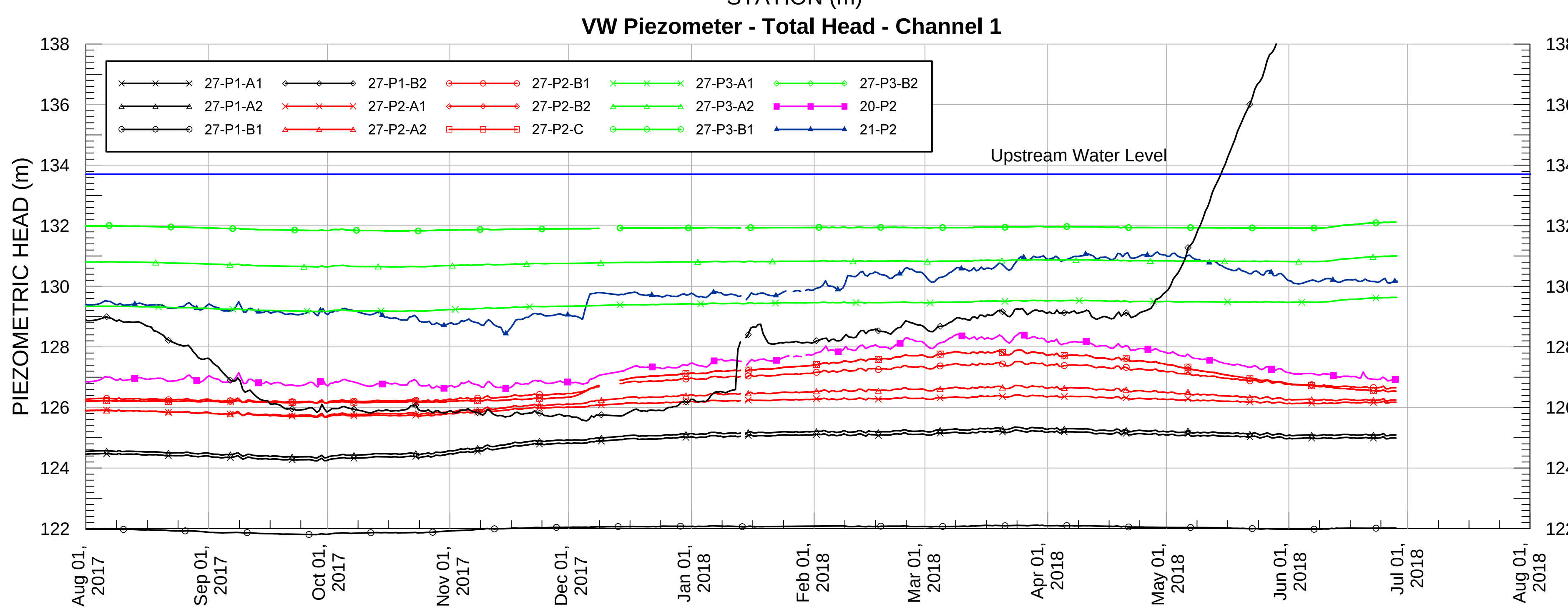
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	**BAYGOOSE DIKE - SECTION 31+885 PIEZOMETRIC DATA (Aug 1/17 to Aug 1/18)**

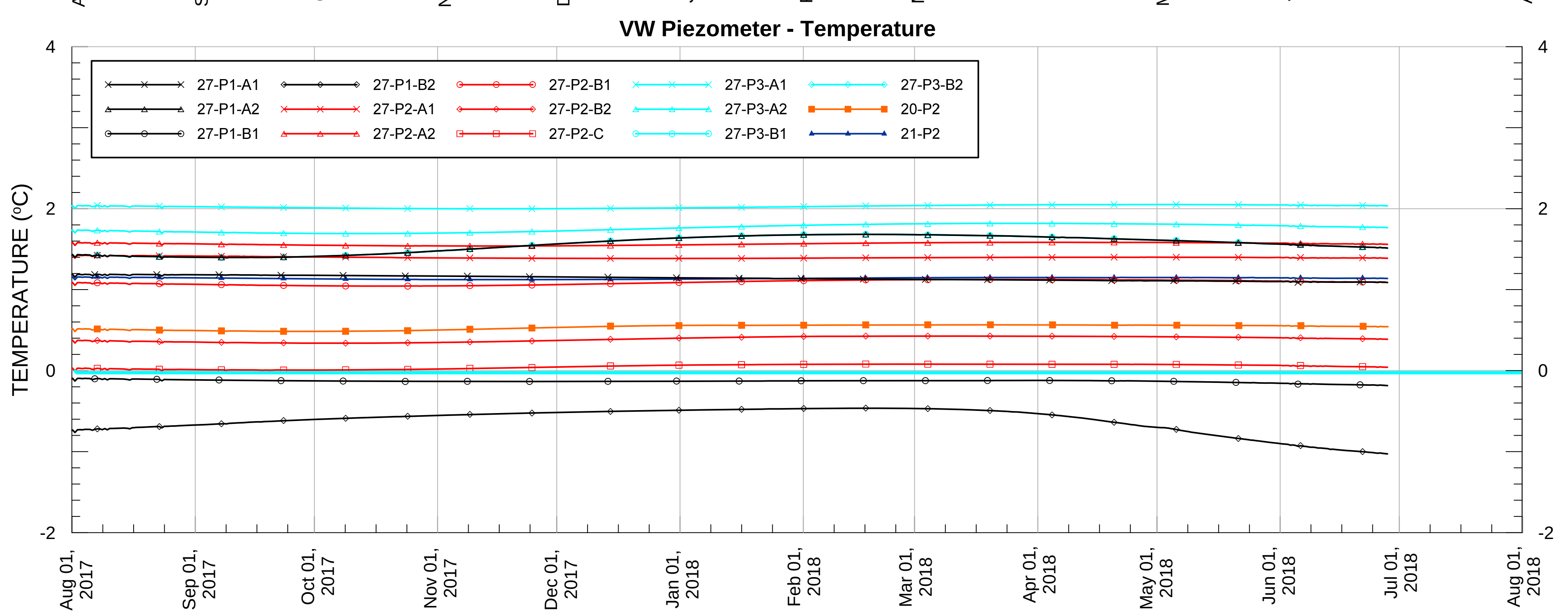
AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	**FIGURE 18**	
CHECK	PG	28AUG14		
REVIEW				









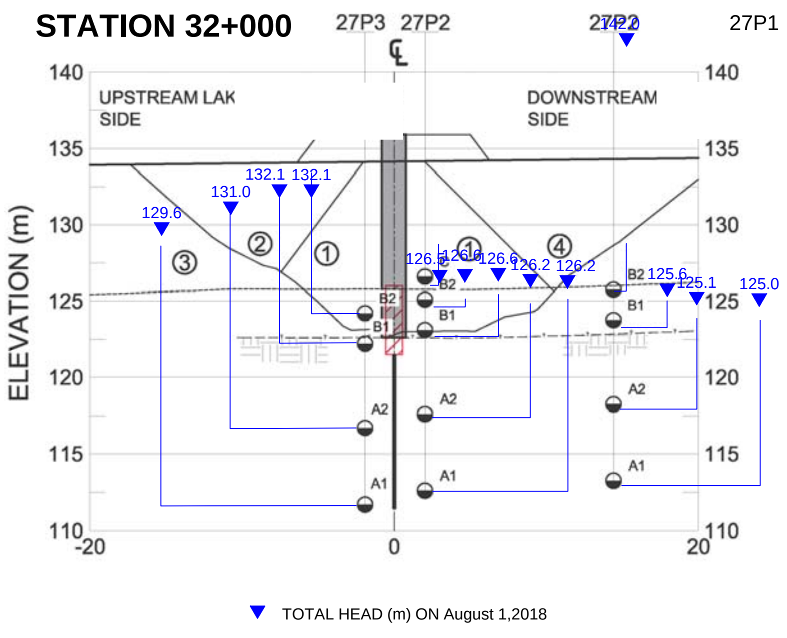
NOTES:

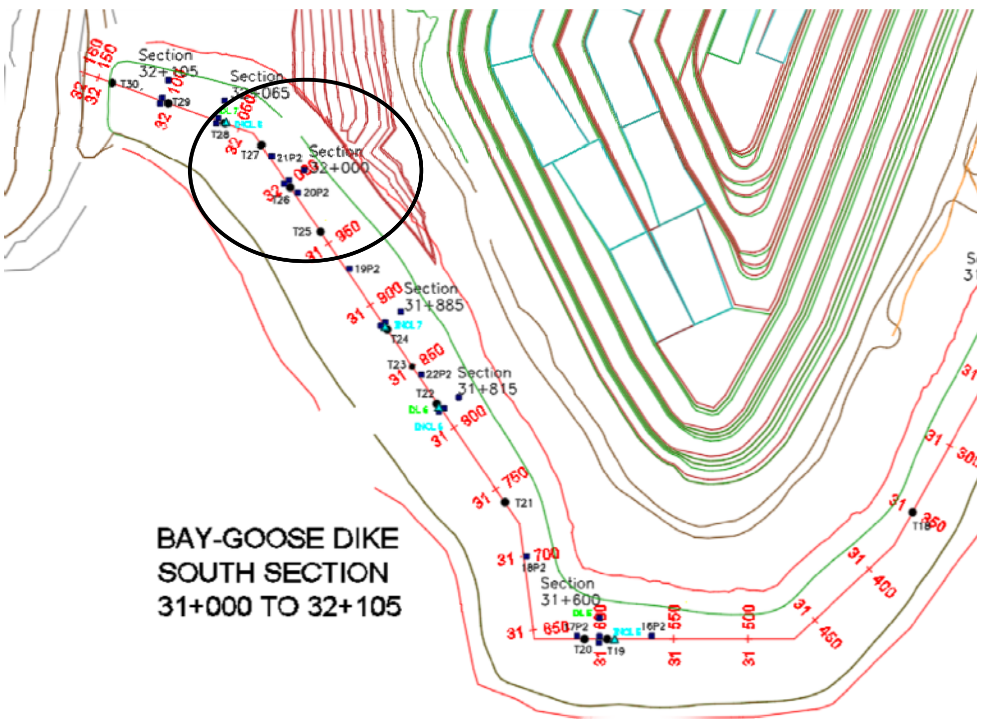
1. There is a signal loss since March 7/18 which is due to the snow accumulating on the Goose Waste Dump pile. Since the snow melt the signal has returned. Data is still collected in the instrument.
2. With the spike PWP pressure in 27-P1-B2 it is assumed that this instrument is not functioning anymore as the PWP pressure is higher than the lake elevation.

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE CHANNEL 1, PIEZOMETRIC DATA SECTION 32+000 (Aug 1/17 to Aug 1/18)

AGNICO EAGLE
MEADOWBANK

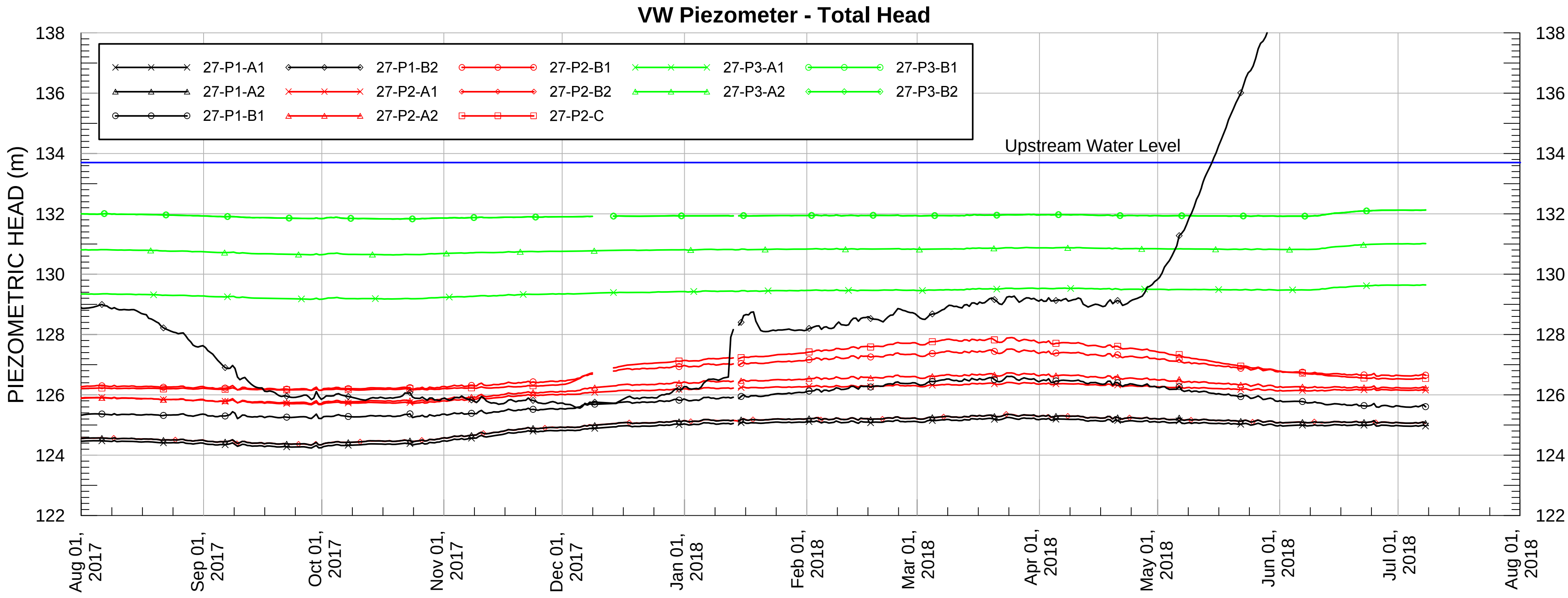
PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	FIGURE 19	
CHECK	PG	28AUG14		
REVIEW				

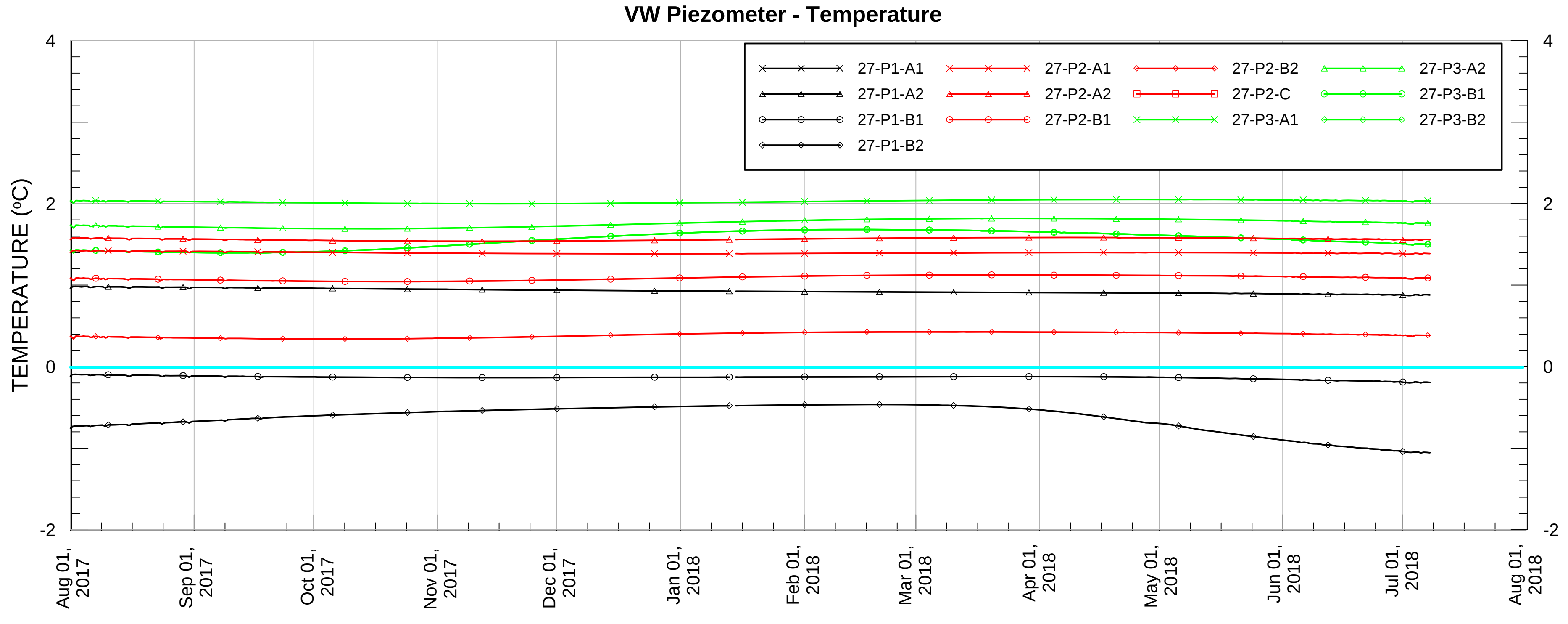




LEGEND

	CUTOFF (CSB)	1	CORE BACKFILL (19 mm MINUS)
	CUTOFF (SB)	2	COARSE BACKFILL (15mm MINUS)
	INITIAL ROCKFILL	3	ROCKFILL
	LAKEBED	4	FINE ROCKFILL
	BEDROCK		
	JET GROUT		
	GROUT		



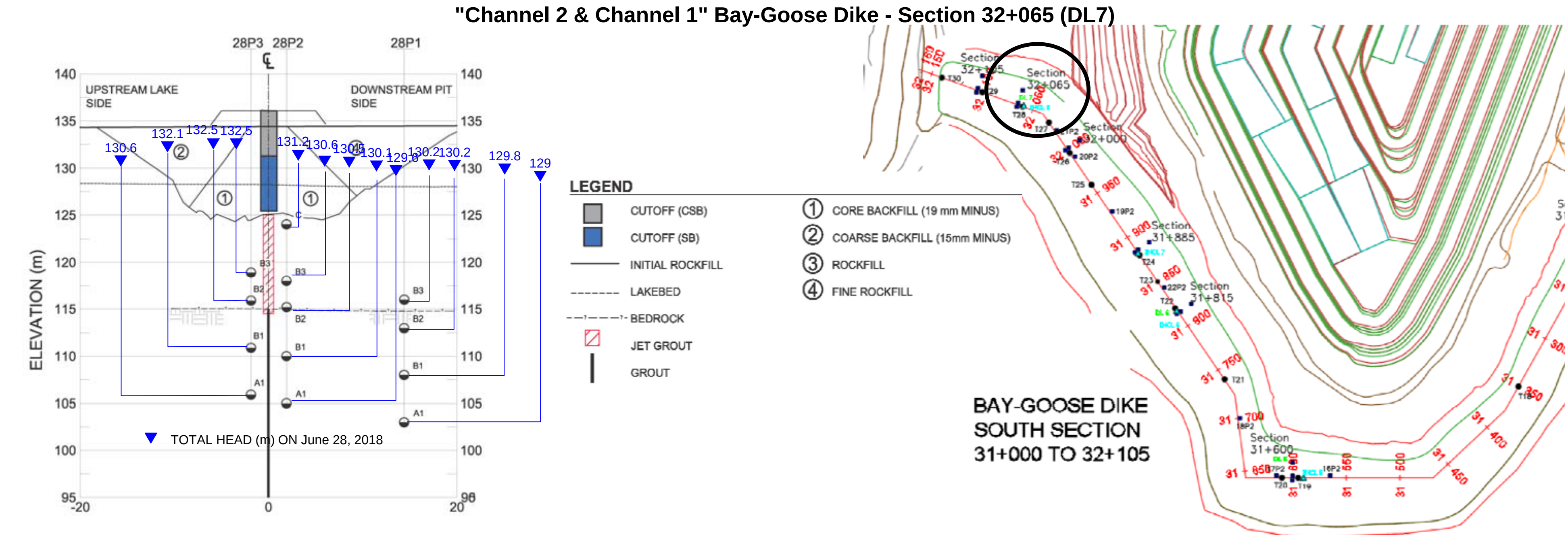


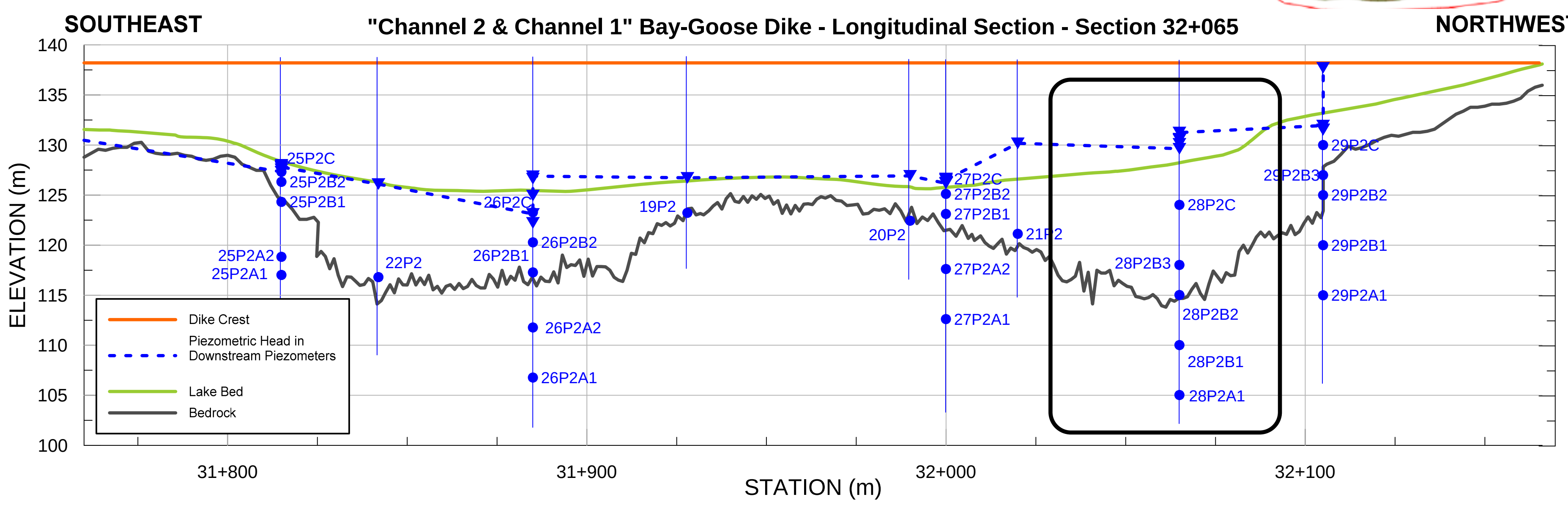
NOTES:

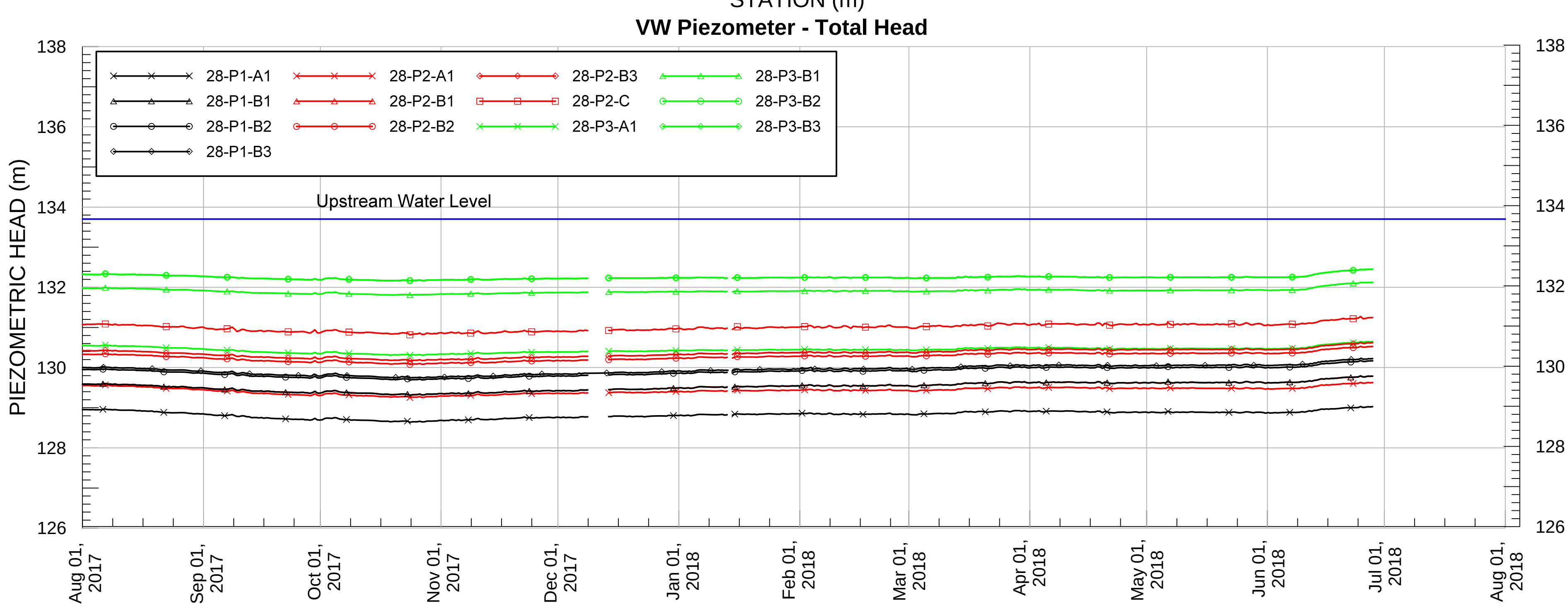
1. There is a signal loss since March 7/18 which is due to the snow accumulating on the Goose Waste Dump pile. Since the snow melt the signal has returned.
2. With the spike PWP pressure in 27-P1-B2 it is assumed that this instrument is not functioning anymore as the PWP pressure is higher than the lake elevation.

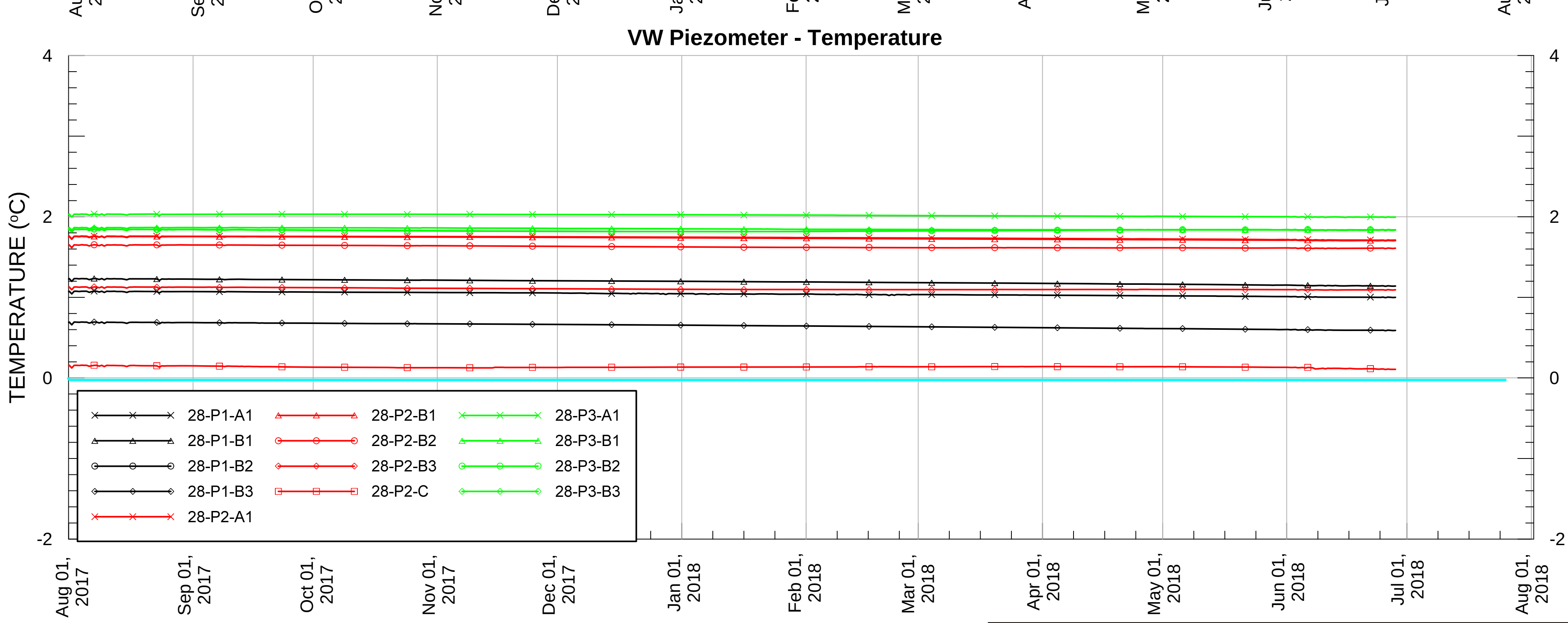
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAY OOSE DIKE - SECTION 32+000 PIEZOMETRIC DATA (Aug 1/17 to Aug 1/18)

AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.
	DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
	CADD	TD	28AUG14	
	CHECK	PG	28AUG14	FIGURE 20
	REVIEW			





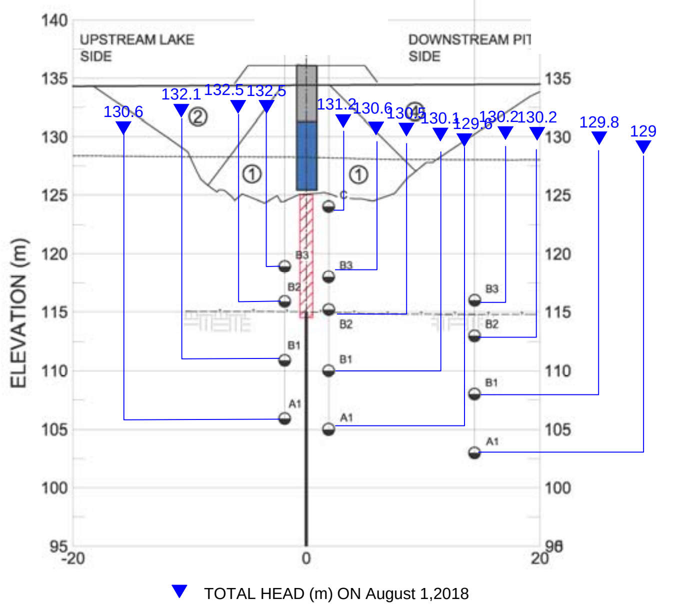


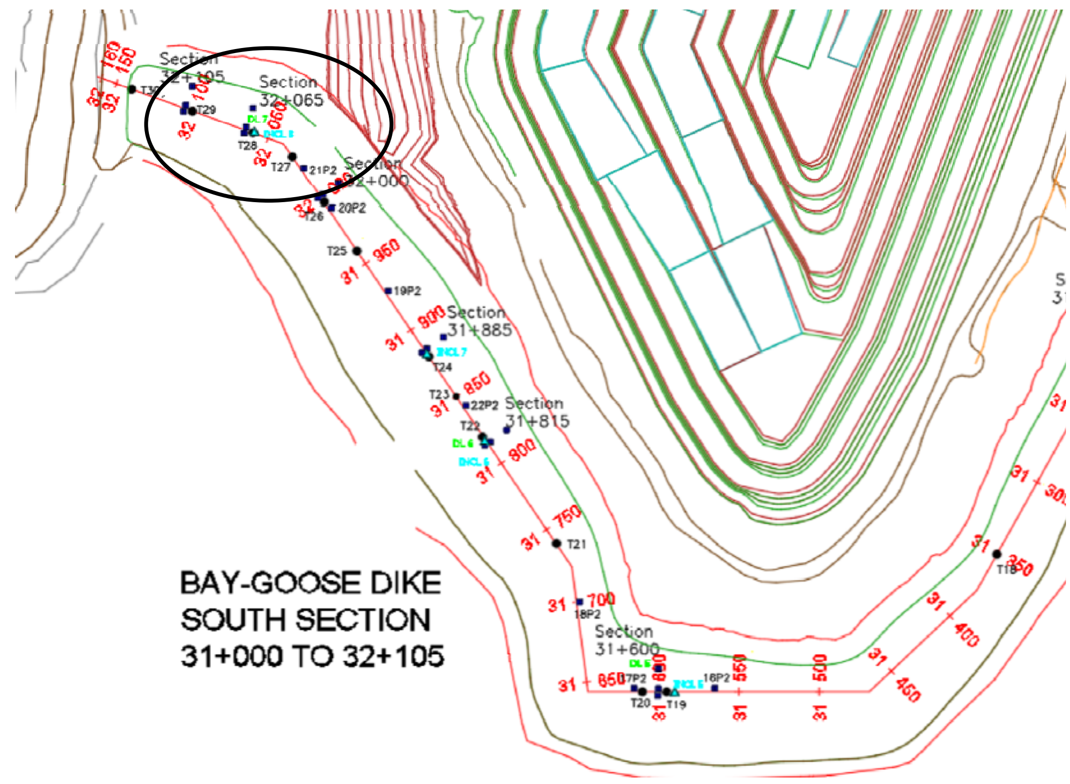


NOTES:
1. There are some anomoly readings from Dec. 10 to Dec. 11 which is due to low battery, which was changed.
2. There is a signal loss since March 7/18 which is due to the snow accumulating on the Goose Waste Dump pile. Since the snow melt the signal has returned.
3. Gap in data in December and January is due to low battery. Battery was changed the following day after.

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT				
TITLE	BAYGOOSE DIKE Section 32+065 - CHANNEL 1, PIEZOMETRIC DATA (Aug 1/17 to Aug 1/18)				
AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.	
	DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
	CADD	TD	28AUG14	FIGURE 21	
	CHECK	PG	28AUG14		
	REVIEW				

STATION 32+065

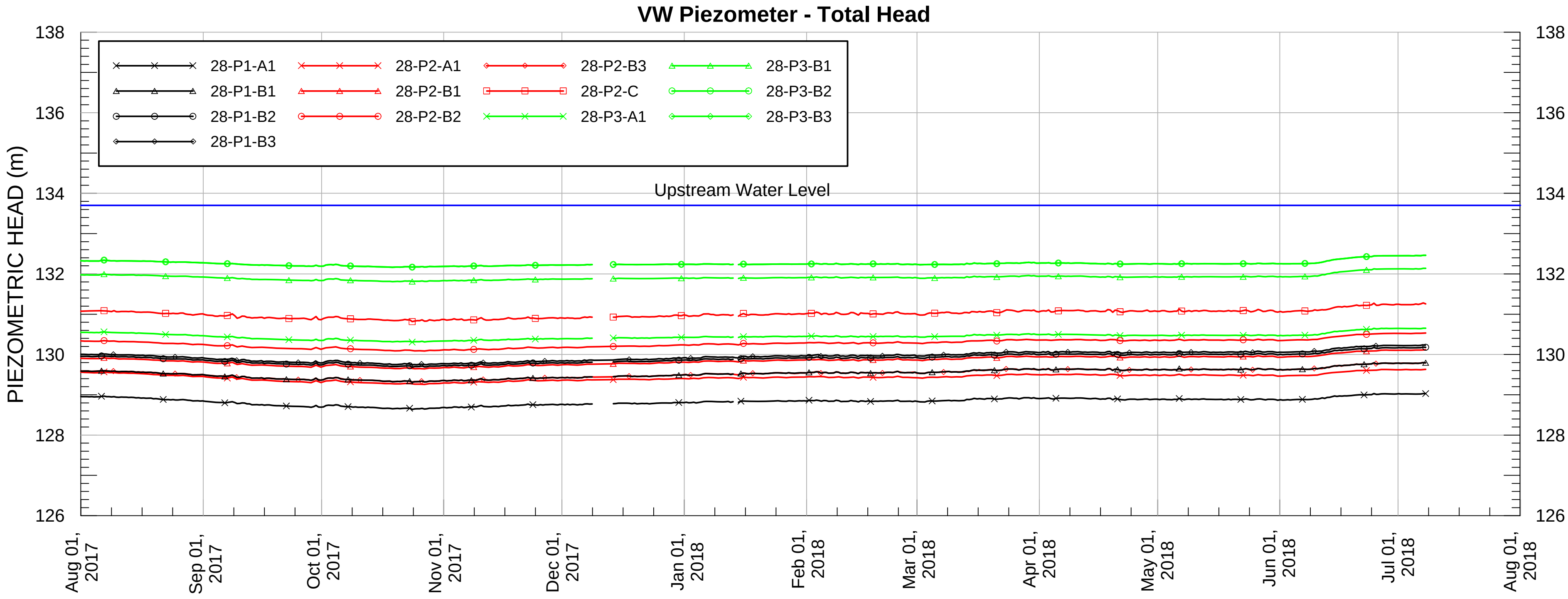




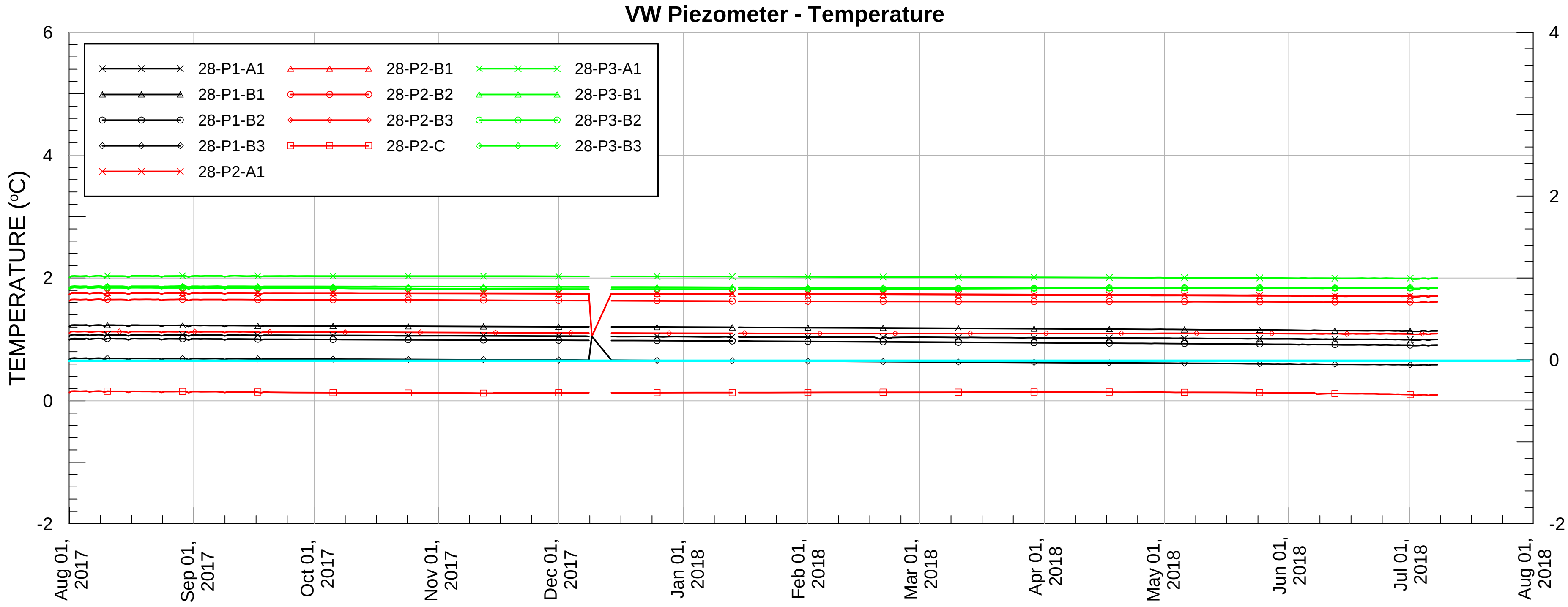
LEGEND

CUTOFF (CSB)	① CORE BACKFILL (19 mm MINUS)
CUTOFF (SB)	② COARSE BACKFILL (15mm MINUS)
INITIAL ROCKFILL	③ ROCKFILL
LAKEBED	④ FINE ROCKFILL
BEDROCK	
JET GROUT	
GROUT	

VW Piezometer - Total Head



VW Piezometer - Temperature



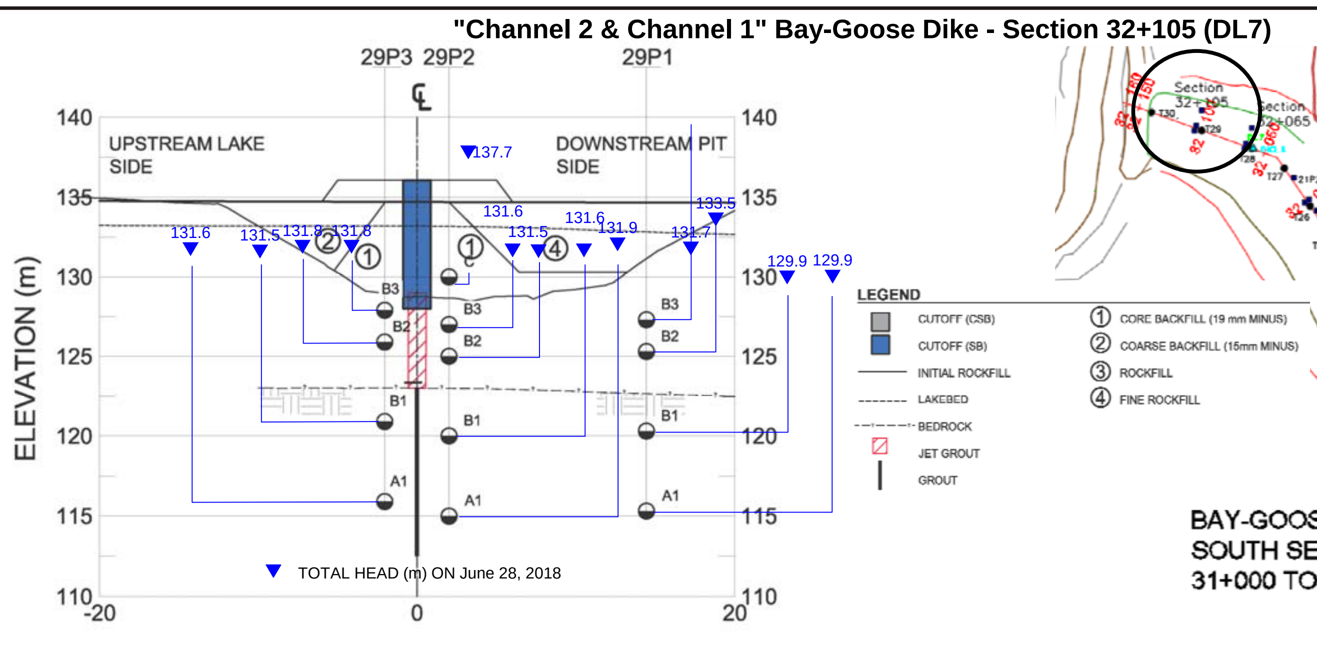
NOTES:

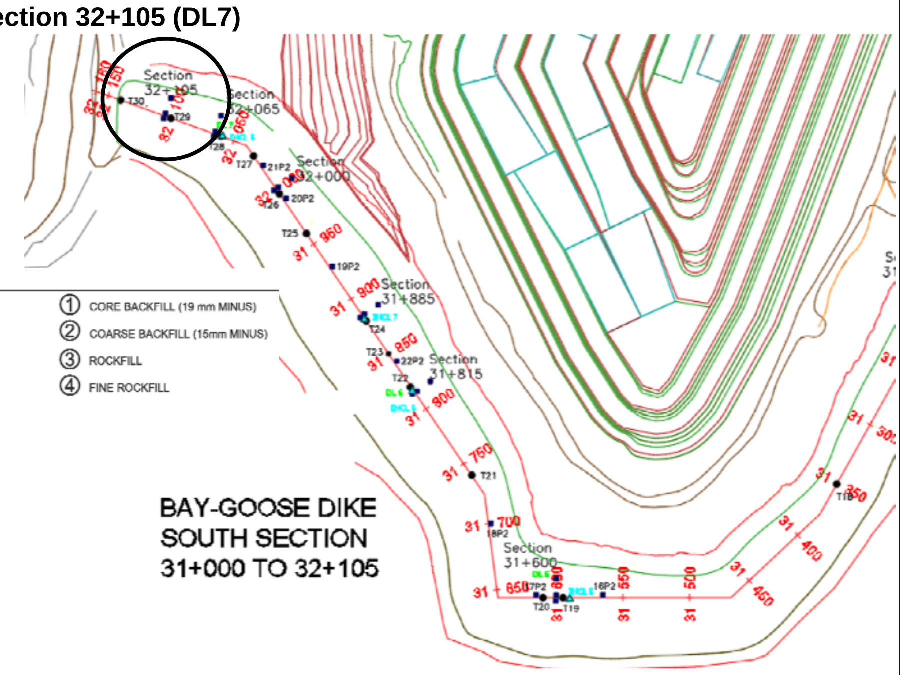
1. There is a signal loss since March 7/18 which is due to the snow accumulating on the Goose Waste Dump pile. Since the snow melt the signal has returned.
2. With the spike PWP pressure in 27-P3-A2 it is assumed that this instrument is not functioning anymore as the PWP pressure is higher than the lake elevation.
3. Gap in data in December and January is due to low battery. Battery was changed the following day after.

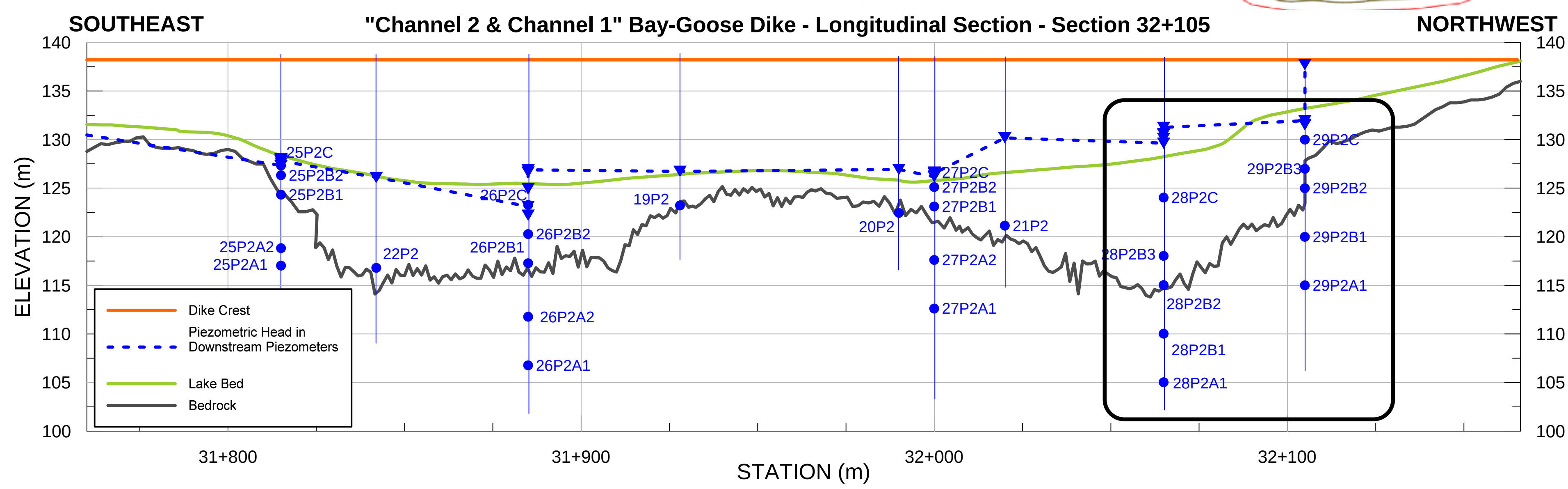
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE - SECTION 32+065 PIEZOMETRIC DATA (Aug 1/17 to Aug 1/18)

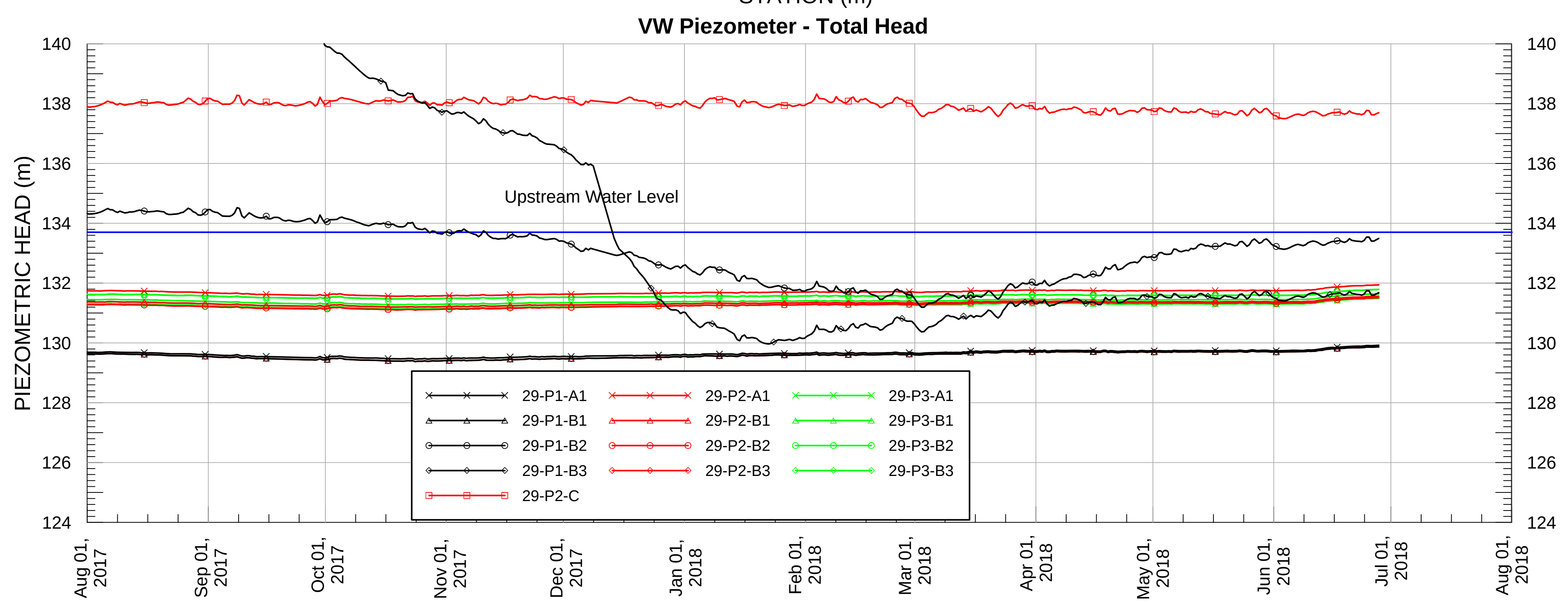
AGNICO EAGLE
MEADOWBANK

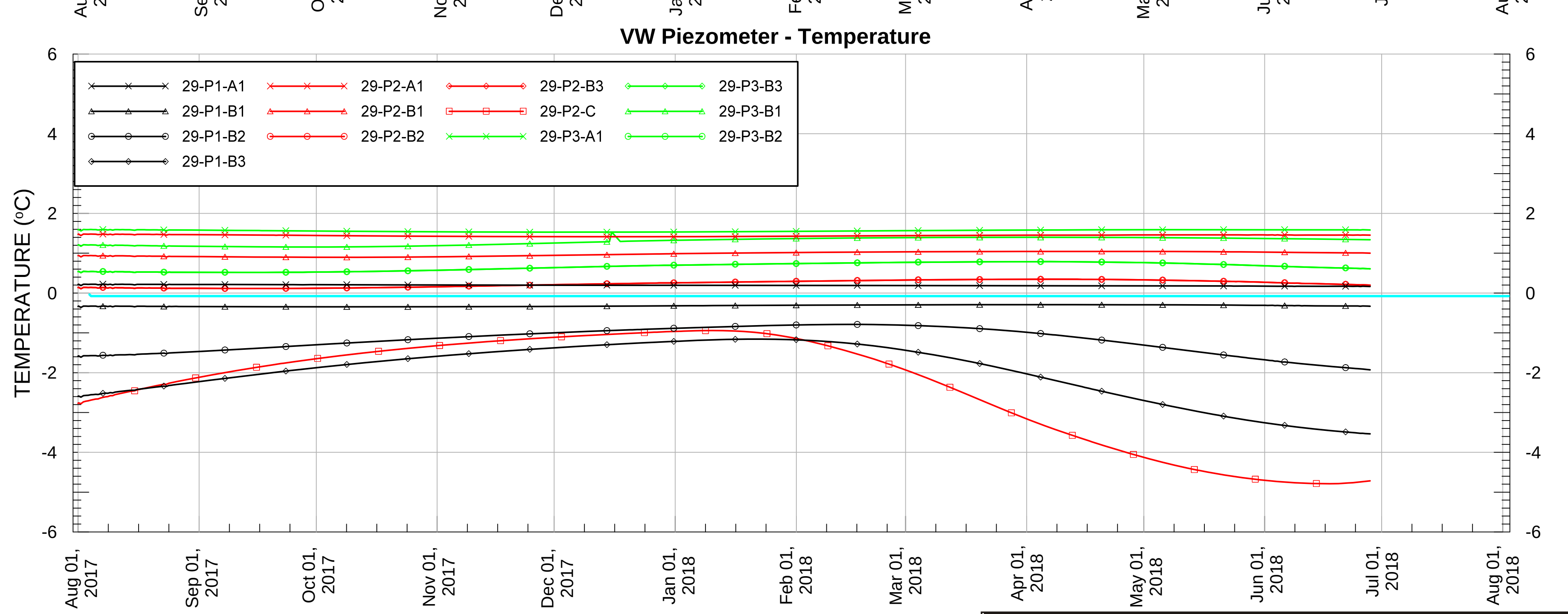
PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	FIGURE 22	
CHECK	PG	28AUG14		
REVIEW				











NOTES:

1. 29P1B2, 29P1B3, 29P2B3, 29P3B3 and 29P2C are given unstable readings and since the temperature shows a negative reading it is assumed to be frozen.
2. There is a signal loss since March 7/18 which is due to the snow accumulating on the Goose Waste Dump pile. Since the snow melt the signal has returned.
3. Gap in data in December is due to low battery. Battery was changed the following day after.

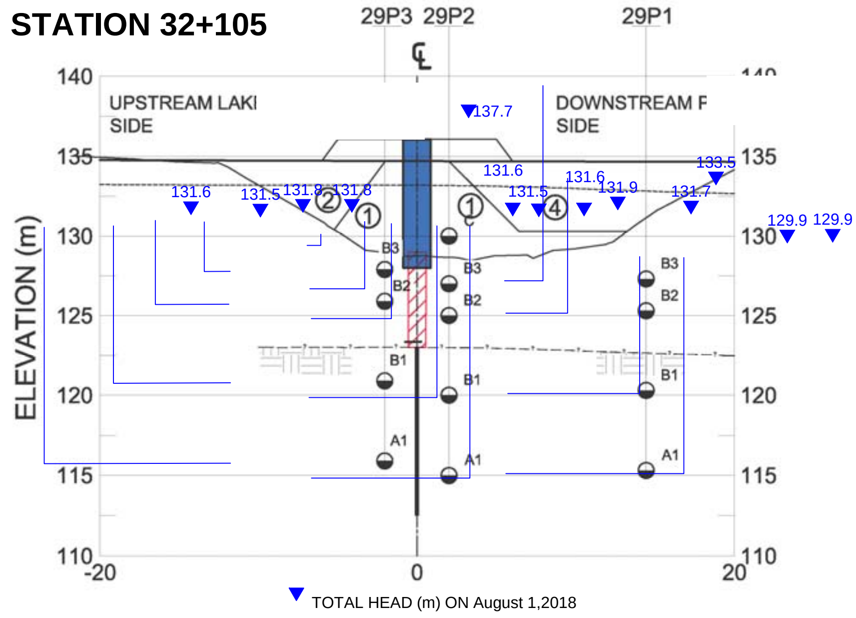
PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

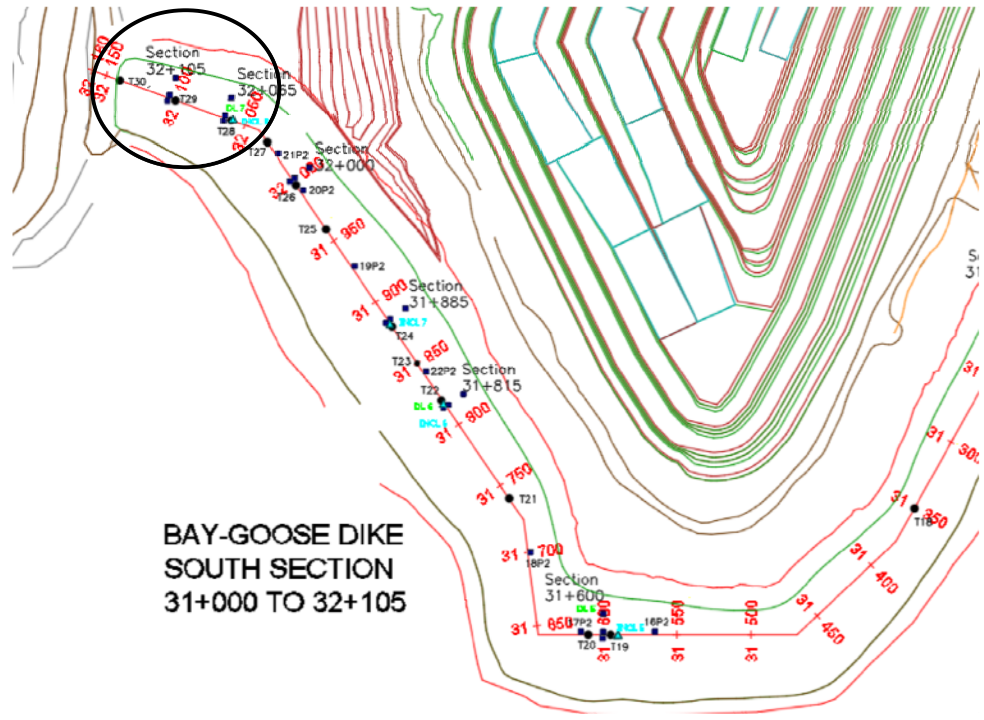
TITLE
BAYGOOSE DIKE
Station 32+105 - CHANNEL 1, PIEZOMETRIC DATA (Aug 1/17 to Aug 1/18)

AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	**FIGURE 23**	
CHECK	PG	28AUG14		
REVIEW				

STATION 32+105

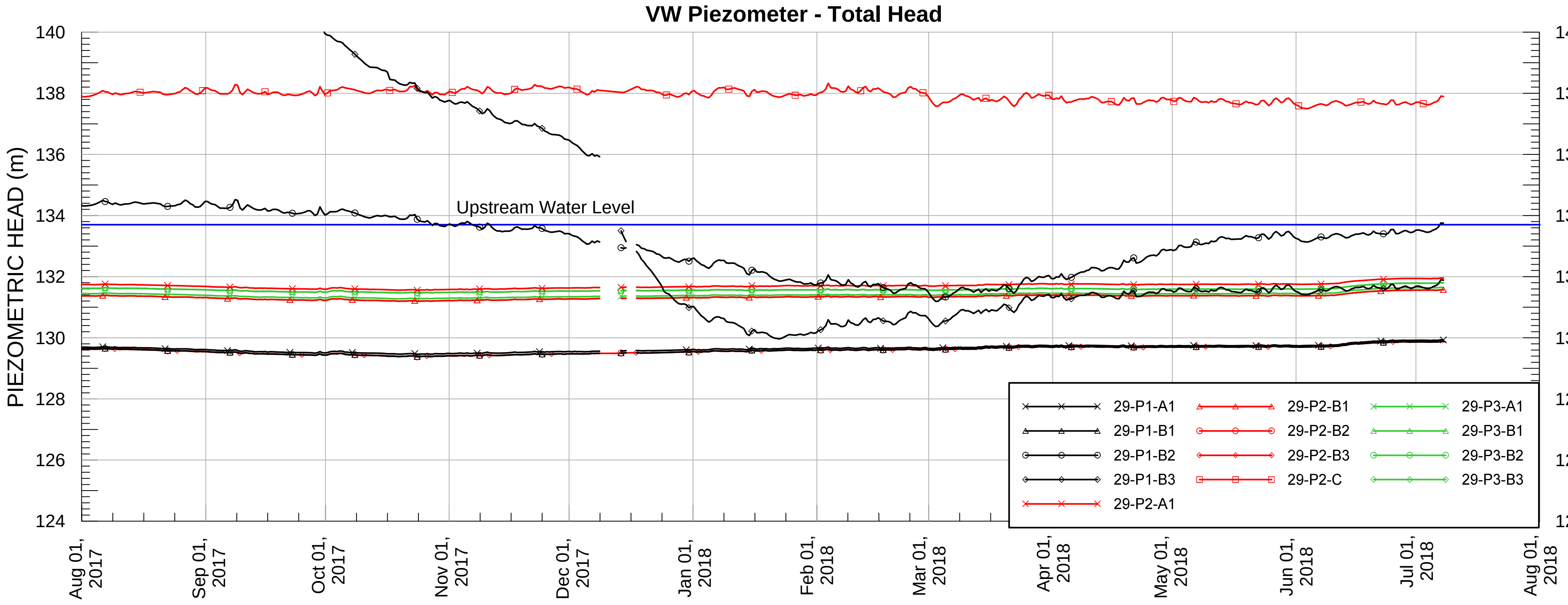




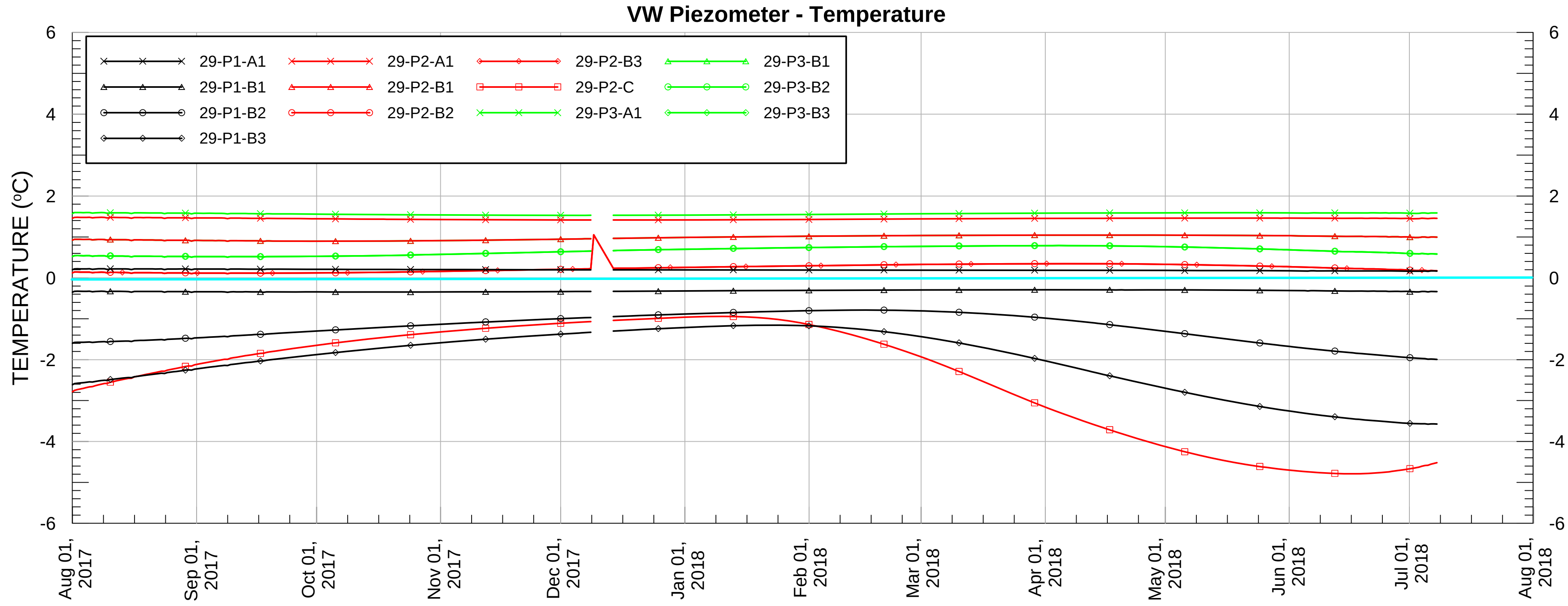
LEGEND

	CUTOFF (CSB)	①	CORE BACKFILL (19 mm MINUS)
	CUTOFF (SB)	②	COARSE BACKFILL (15mm MINUS)
	INITIAL ROCKFILL	③	ROCKFILL
	LAKEBED	④	FINE ROCKFILL
	BEDROCK		
	JET GROUT		
	GROUT		

VW Piezometer - Total Head



VW Piezometer - Temperature



NOTES:

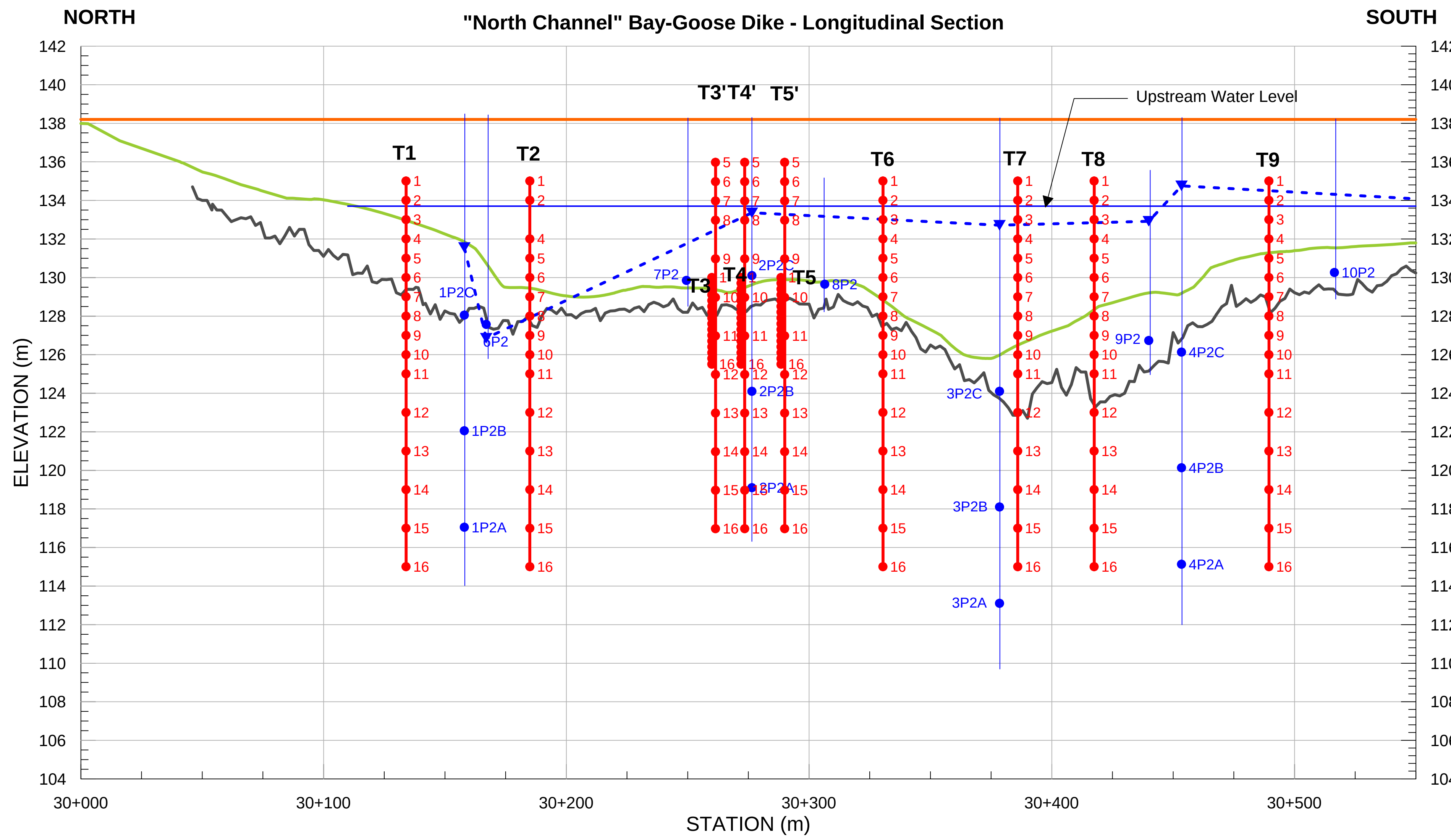
1. 29P1B2, 29P1B3, 29P2B3, 29P3B3 and 29P2C are given unstable readings and since the temperature shows a negative reading it is assumed to be frozen.
2. There is a signal loss since March 7/18 which is due to the snow accumulating on the Goose Waste Dump pile. Since the snow melt the signal has returned.
3. Gap in data in December is due to low battery. Battery was changed the following day after.

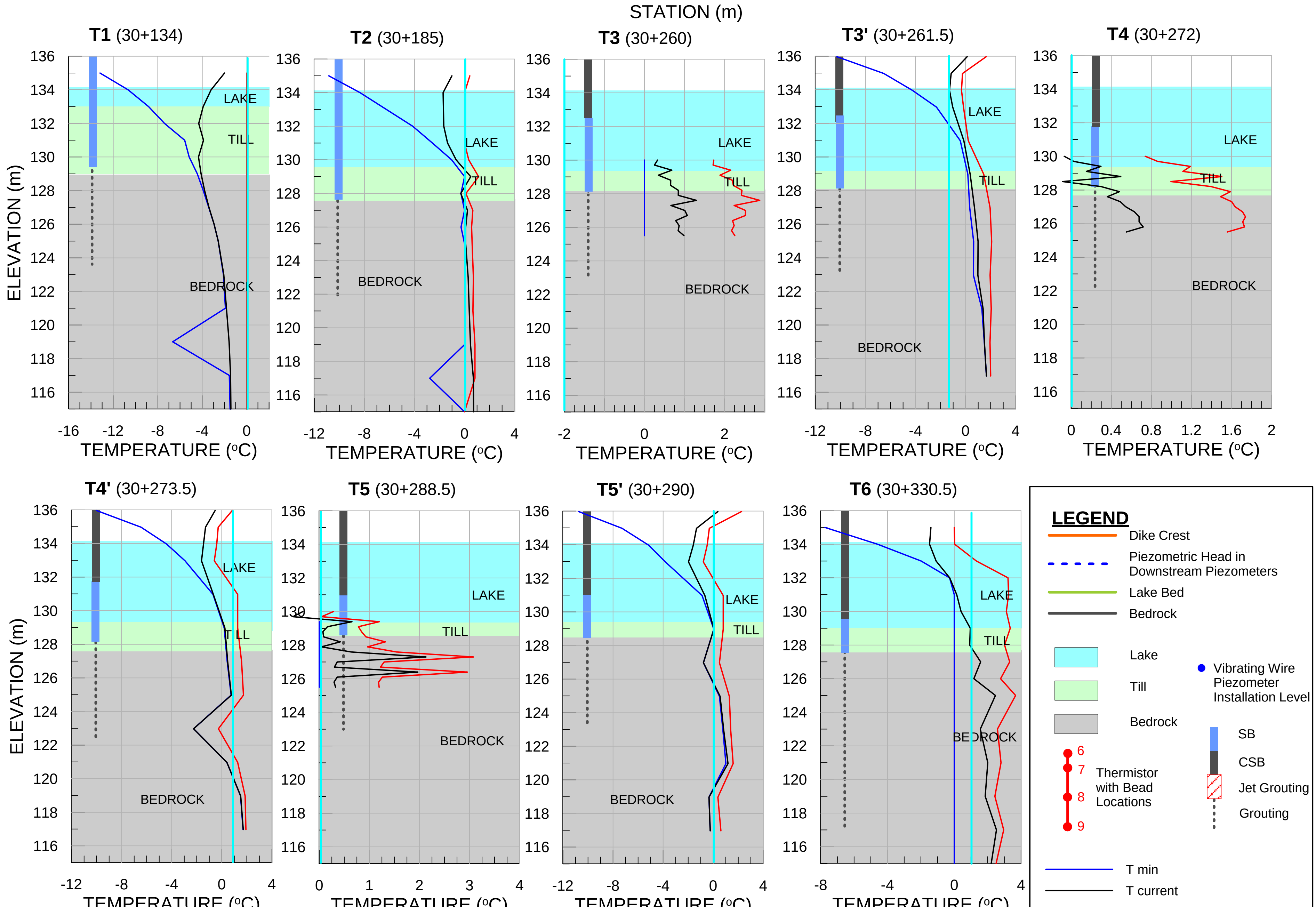
PROJECT: **AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT**

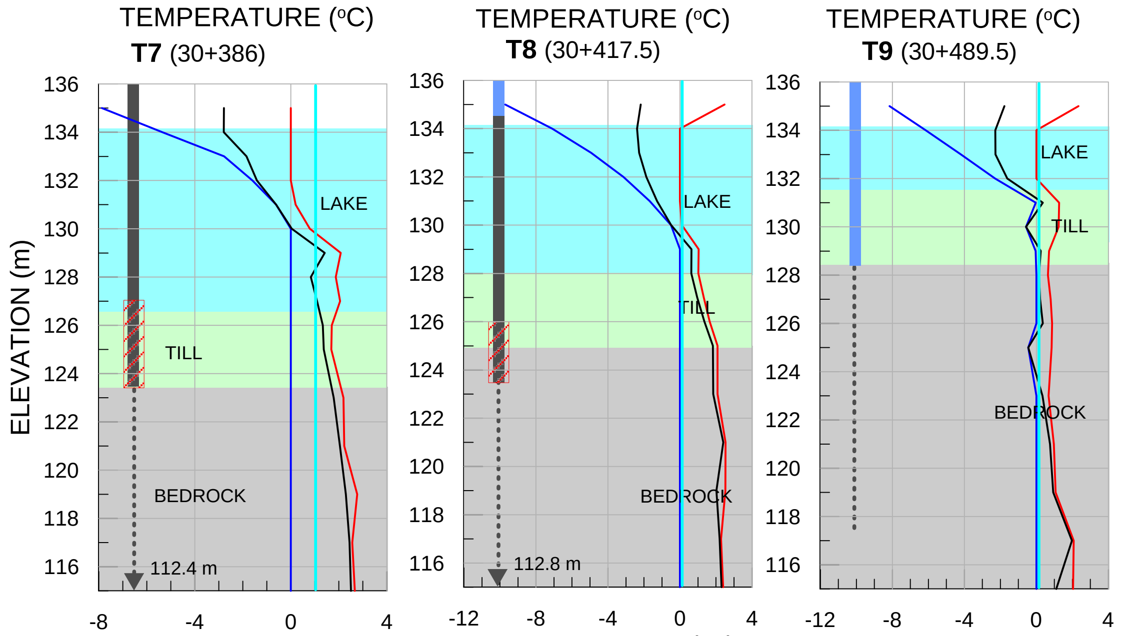
TITLE: **BAYGOOSE DIKE - SECTION 32+105 PIEZOMETRIC DATA (Aug 1/17 to Aug 1/18)**

AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	**FIGURE 24**	
CHECK	PG	28AUG14		
REVIEW				





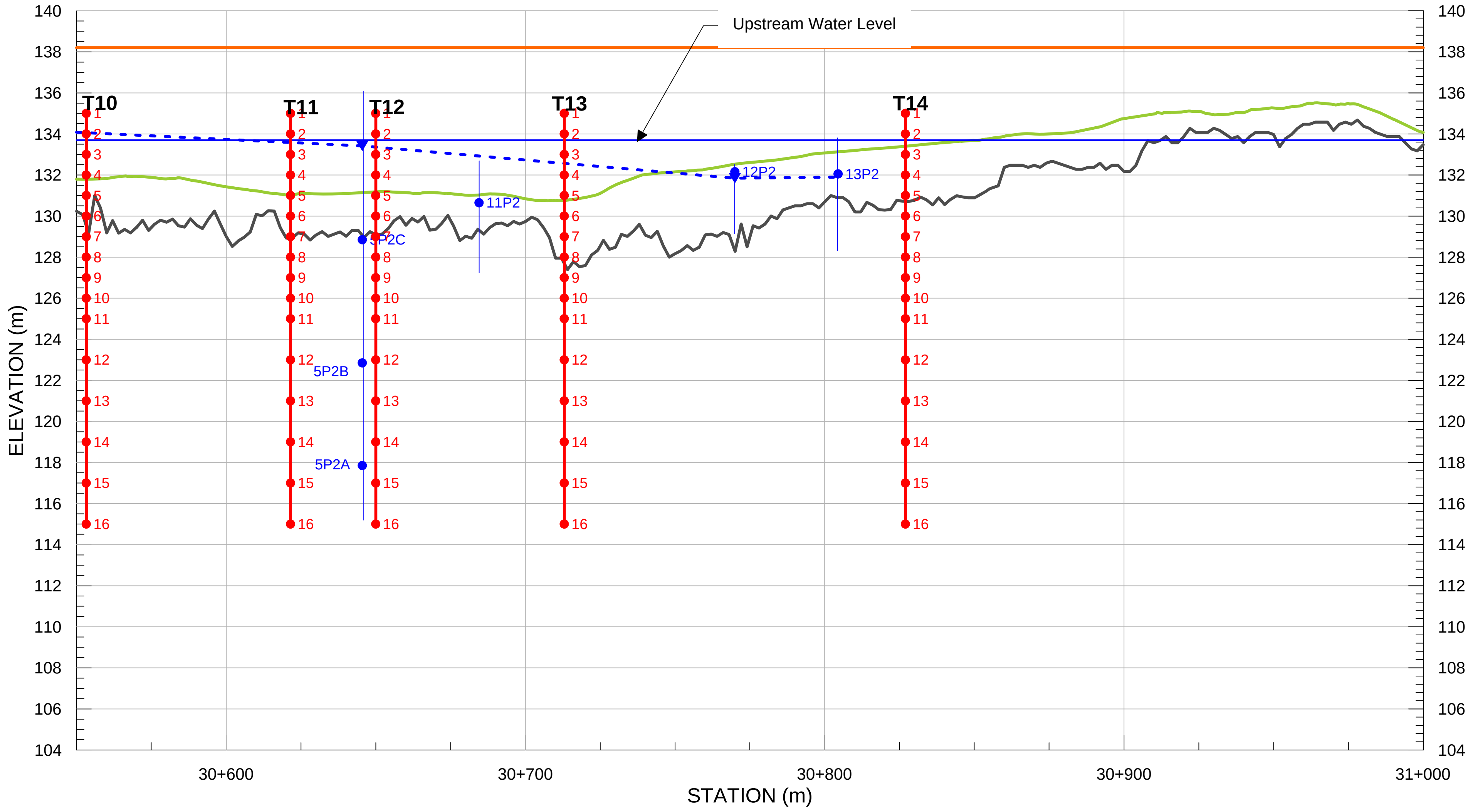


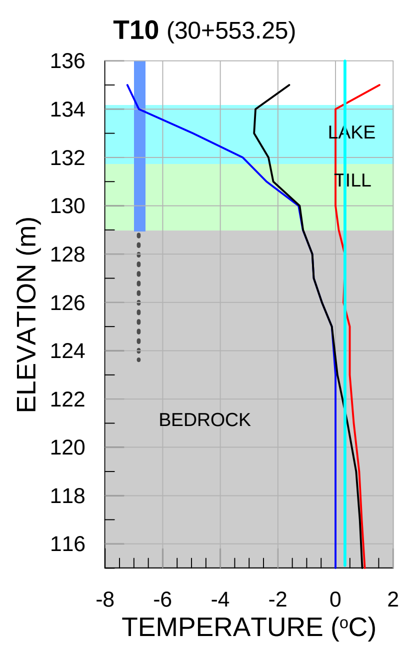
Current Temperature On August 1,2018

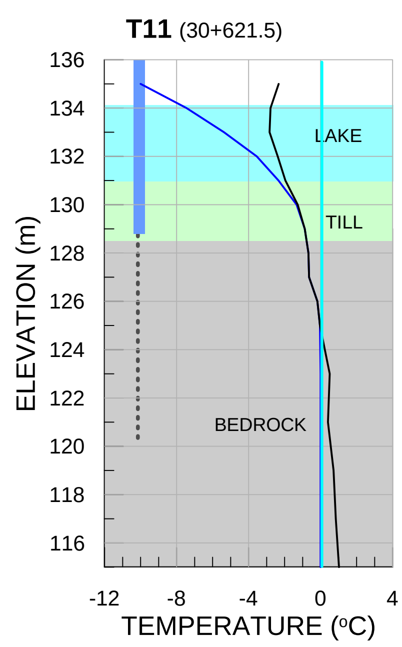
NOTES:
1. Third node of thermistor T2 (elevation 135 m) is not functional.

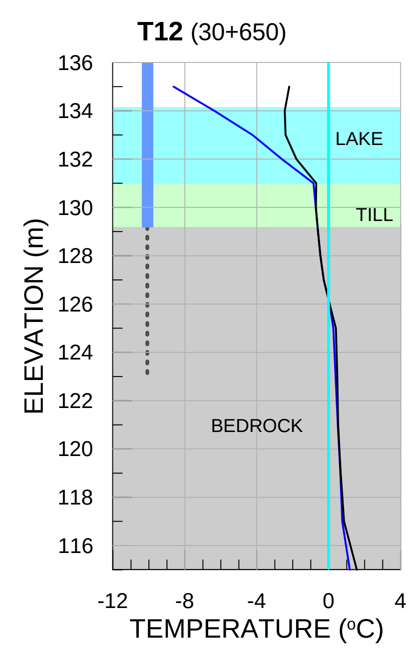
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT			
TITLE	BAYGOOSE DIKE 30+000 to 30+550 - TEMPERATURE DATA (Aug 1/17 to Aug 1/18)			
AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.
	DESIGN	TD	20JAN14	SCALE AS SHOWN / REV.
	CADD	TD	20JAN14	FIGURE 25
	CHECK			
	REVIEW			

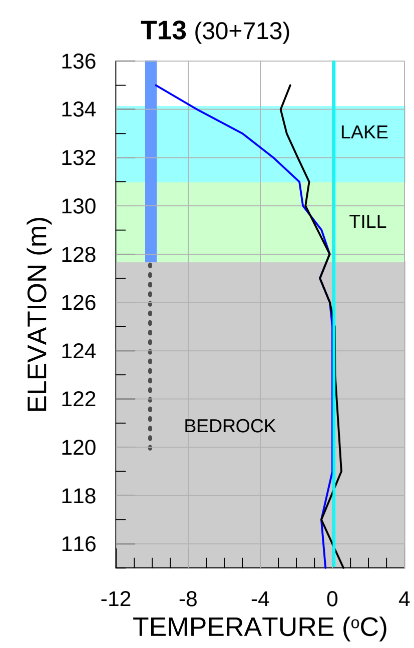
"North Shallows" Bay-Goose Dike - Longitudinal Section

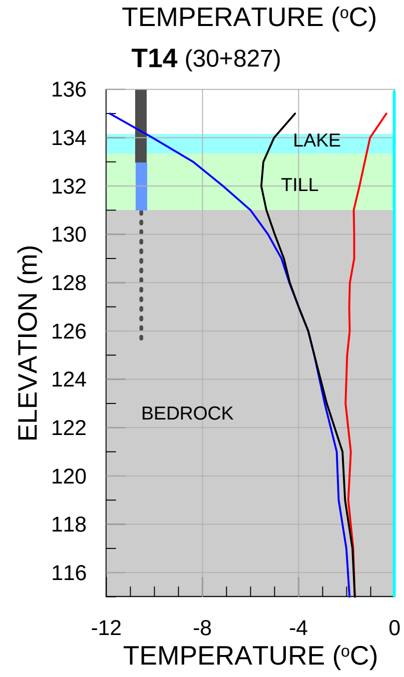












Current Temperature On August 1,2018

LEGEND

- Dike Crest
- Piezometric Head in Downstream Piezometers
- Lake Bed
- Bedrock
- T min
- T current
- T max
- Lake
- Till
- Bedrock
- Vibrating Wire Piezometer Installation Level
- SB
- CSB
- Jet Grouting
- Grouting
- Thermistor with Bead Locations

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE 30+550 to 31+000 - TEMPERATURE DATA (Aug 1/17 to Aug 1/18)

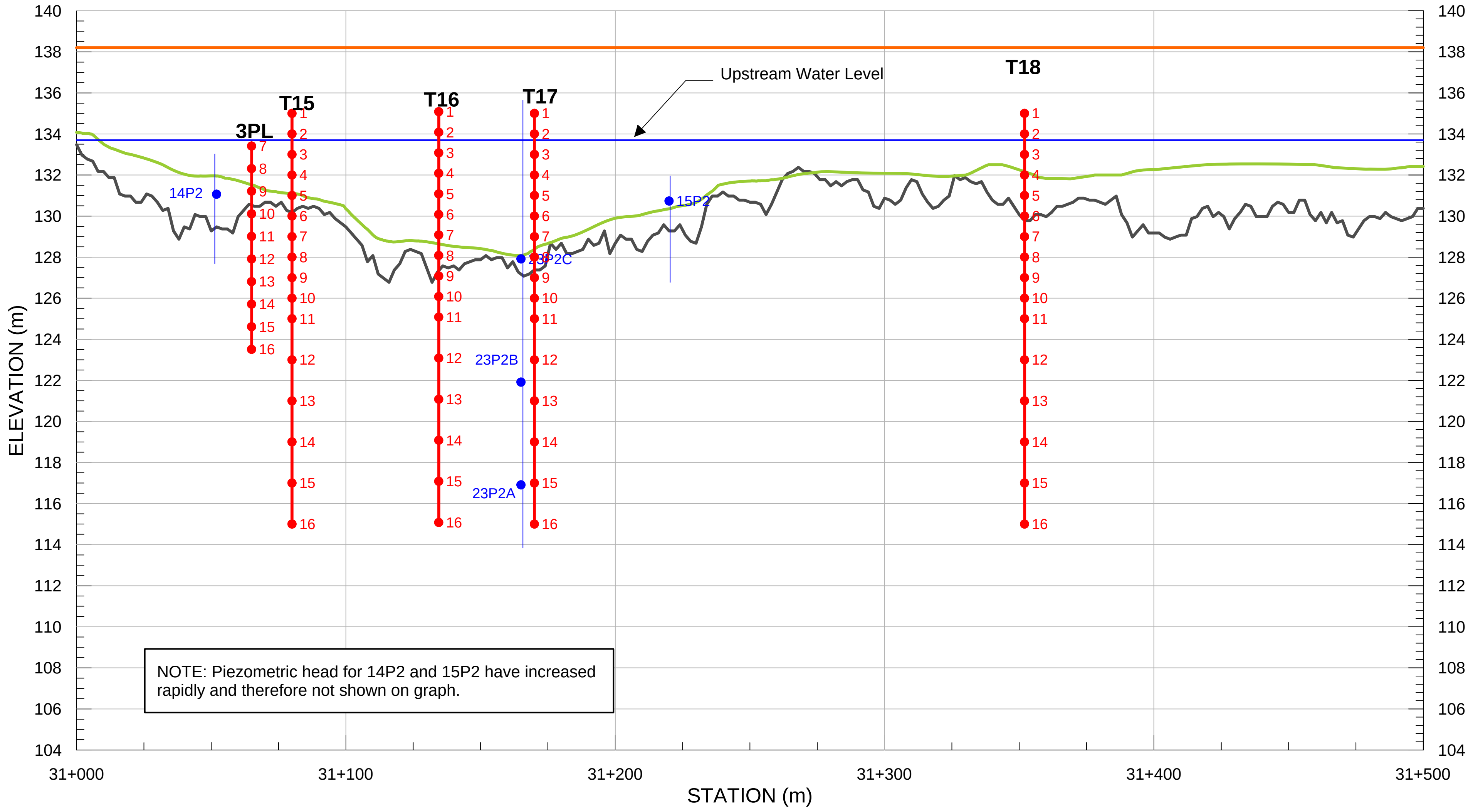
PROJECT No.			PHASE No.	
DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
CADD	TD	20JAN14	FIGURE 26	
CHECK				
REVIEW				

AGNICO EAGLE MEADOWBANK

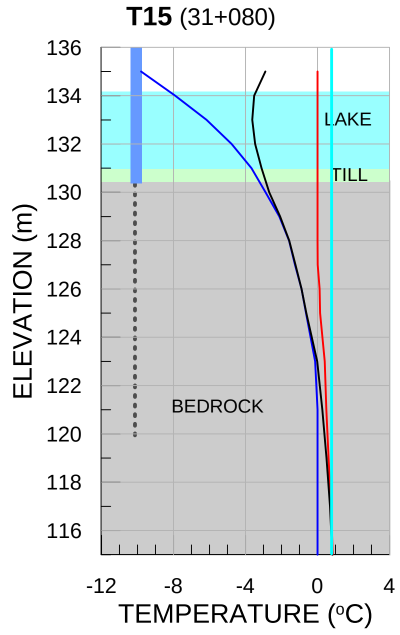
NORTH

"South Channel & Shallows" Bay-Goose Dike - Longitudinal Section

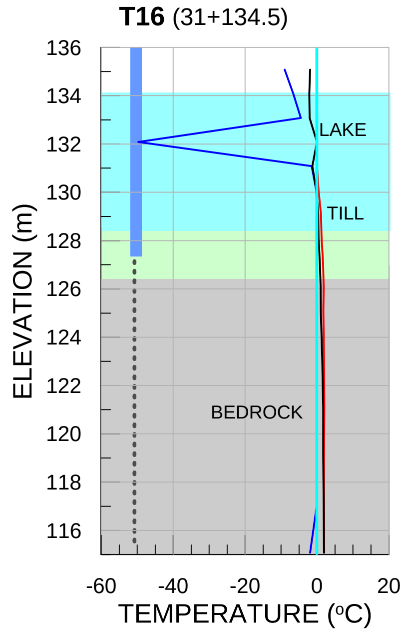
SOUTH



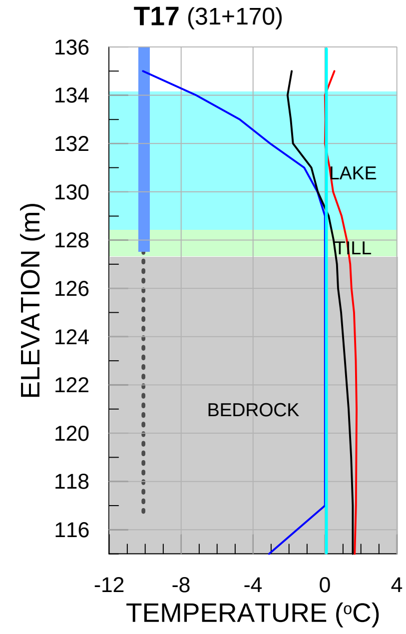
T15 (31+080)



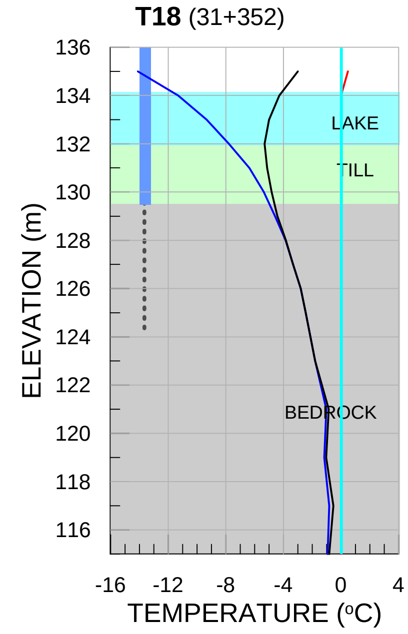
T16 (31+134.5)



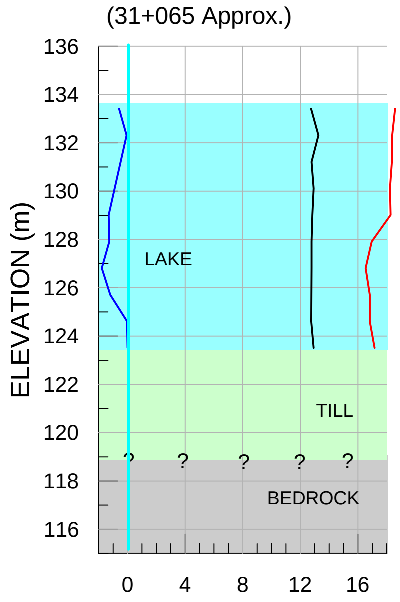
T17 (31+170)



T18 (31+352)



3PL - UPSTREAM LAKE
(31+065 Approx.)



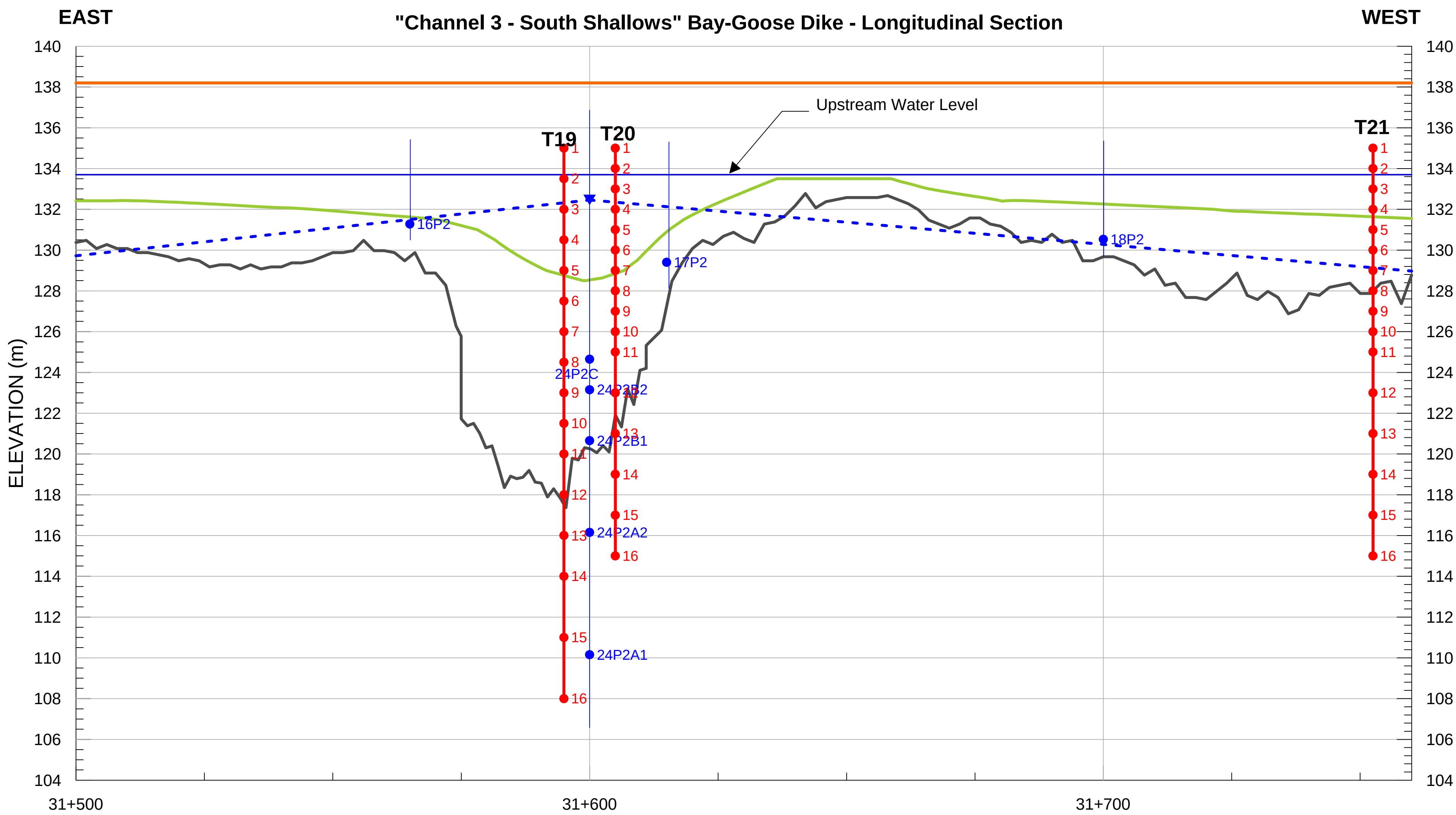
Current Temperature On August 1,2018

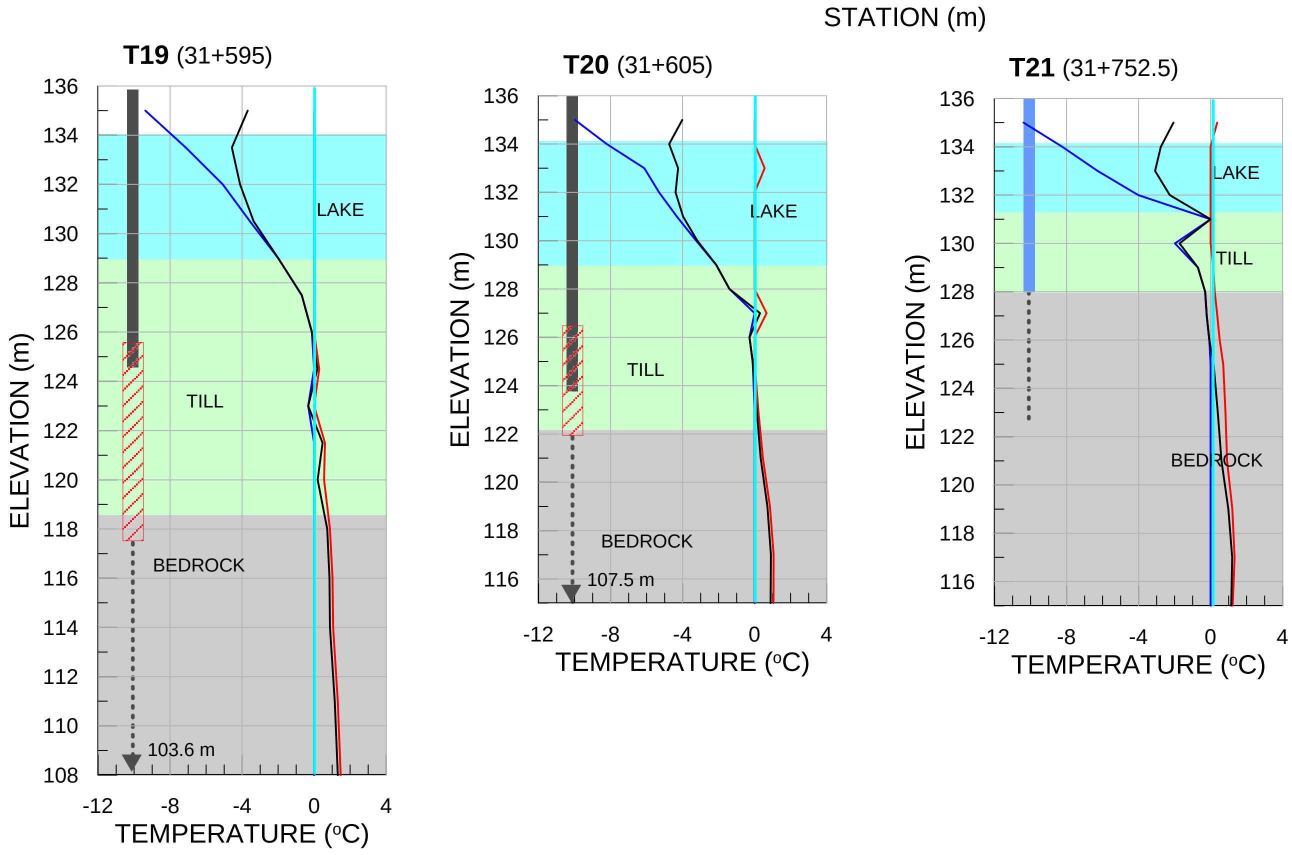
LEGEND

- Dike Crest
- Piezometric Head in Downstream Piezometers
- Lake Bed
- Bedrock
- T min
- T current
- T max
- Lake
- Till
- Bedrock
- Thermistor with Bead Locations (6, 7, 8, 9)
- Vibrating Wire Piezometer Installation Level
- SB
- CSB
- Jet Grouting
- Grouting

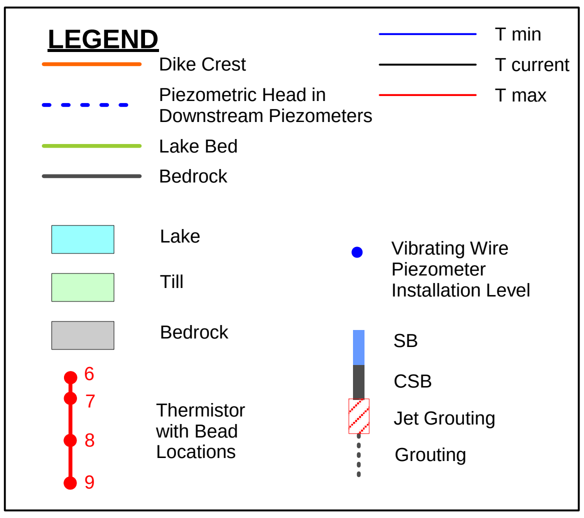
NOTES:
1. Thermistor 3PL is installed upstream of the dike within Third Portage Lake.

PROJECT	**AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT**				
TITLE	**BAYGOOSE DIKE 31+000 to 31+500 - TEMPERATURE DATA (Aug 1/17 to Aug 1/18)**				
AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.	
	DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
	CADD	TD	20JAN14	**FIGURE 27**	
	CHECK				
	REVIEW				





Current Temperature On August 1,2018

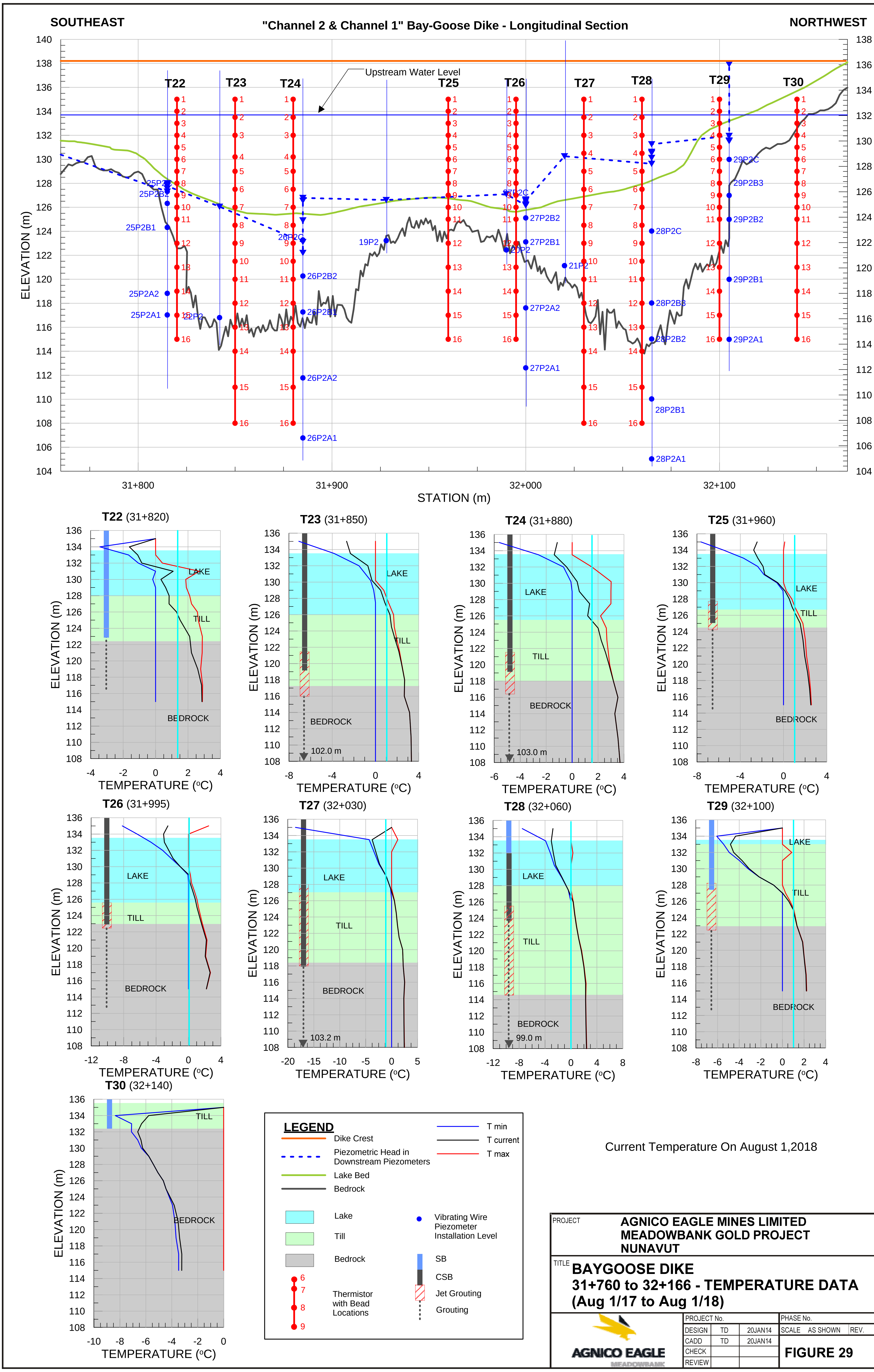


PROJECT **AGNICOEAGLE MINES LIMITED**
MEADOWBANK GOLD PROJECT
NUNAVUT

TITLE **BAYGOOSE DIKE**
31+500 to 31+760 - TEMPERATURE DATA
(Aug 1/17 to Aug 1/18)

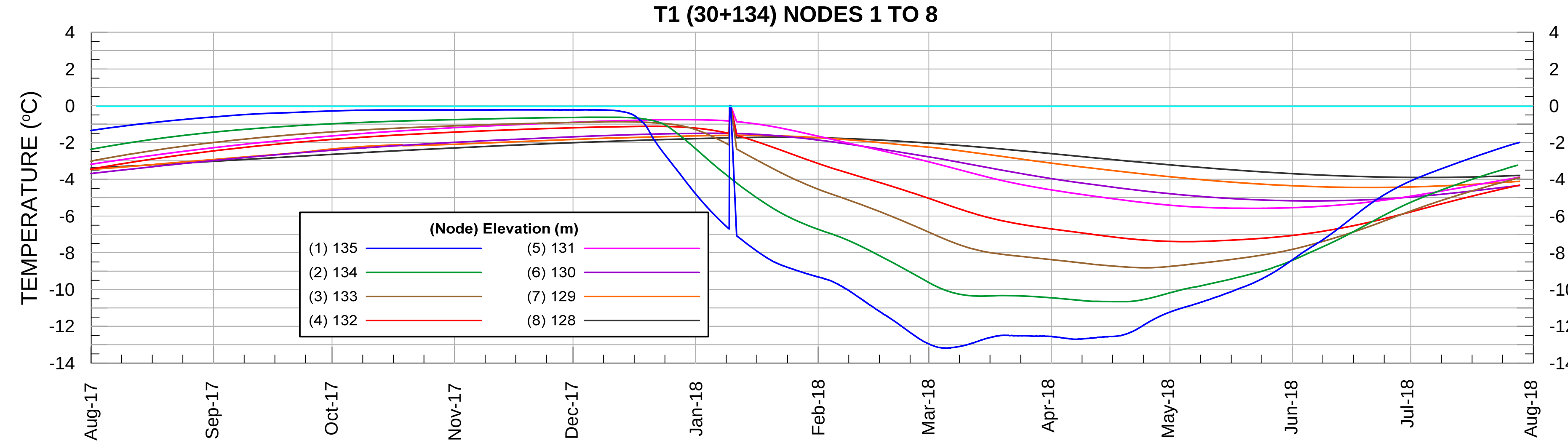
AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
CADD	TD	20JAN14	**FIGURE 28**	
CHECK				
REVIEW				

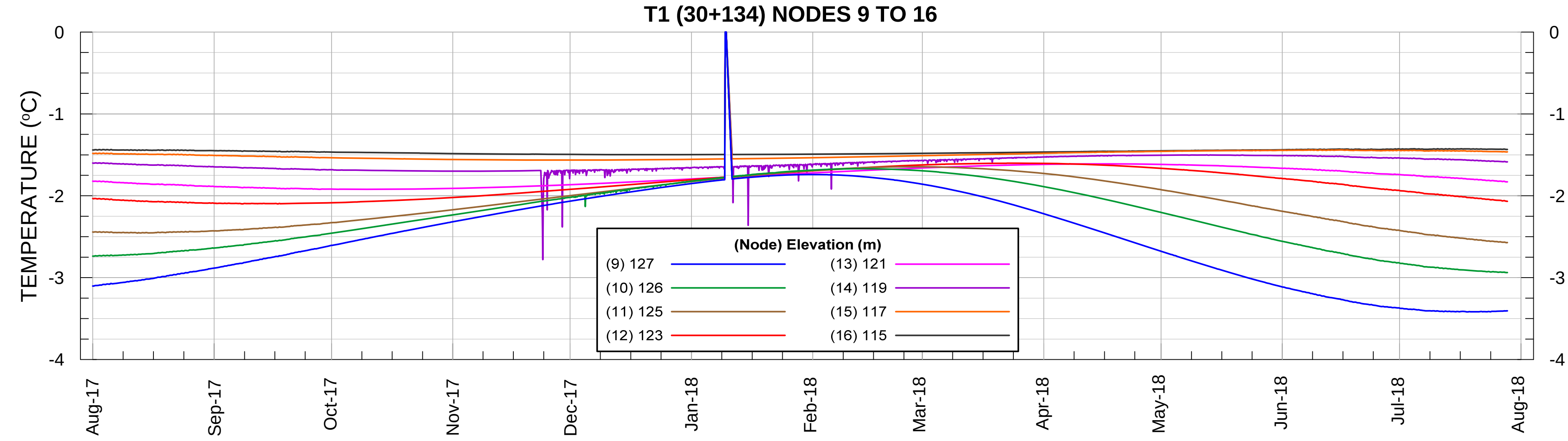


SOUTHEAST
"Channel 2 & Channel 1" Bay-Goose Dike - Longitudinal Section
NORTHWEST
Upstream Water Level
T22
T23
T24
T25
T26
T27
T28
T29
T30
ELEVATION (m)
STATION (m)
31+800
31+900
32+000
32+100
T22 (31+820)
T23 (31+850)
T24 (31+880)
T25 (31+960)
T26 (31+995)
T27 (32+030)
T28 (32+060)
T29 (32+100)
T30 (32+140)
LAKE
TILL
BEDROCK
TEMPERATURE (ºC)
102.0 m
103.0 m
103.2 m
99.0 m
LEGEND
Dike Crest
Piezometric Head in Downstream Piezometers
Lake Bed
Bedrock
Lake
Till
Bedrock
Thermistor with Bead Locations
T min
T current
T max
Vibrating Wire Piezometer Installation Level
SB
CSB
Jet Grouting
Grouting
Current Temperature On August 1,2018
PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT
TITLE
BAYGOOSE DIKE
31+760 to 32+166 - TEMPERATURE DATA
(Aug 1/17 to Aug 1/18)
AGNICO EAGLE
MEADOWBANK
PROJECT No.
PHASE No.
DESIGN TD 20JAN14
CADD TD 20JAN14
CHECK
REVIEW
SCALE AS SHOWN
REV.
FIGURE 29

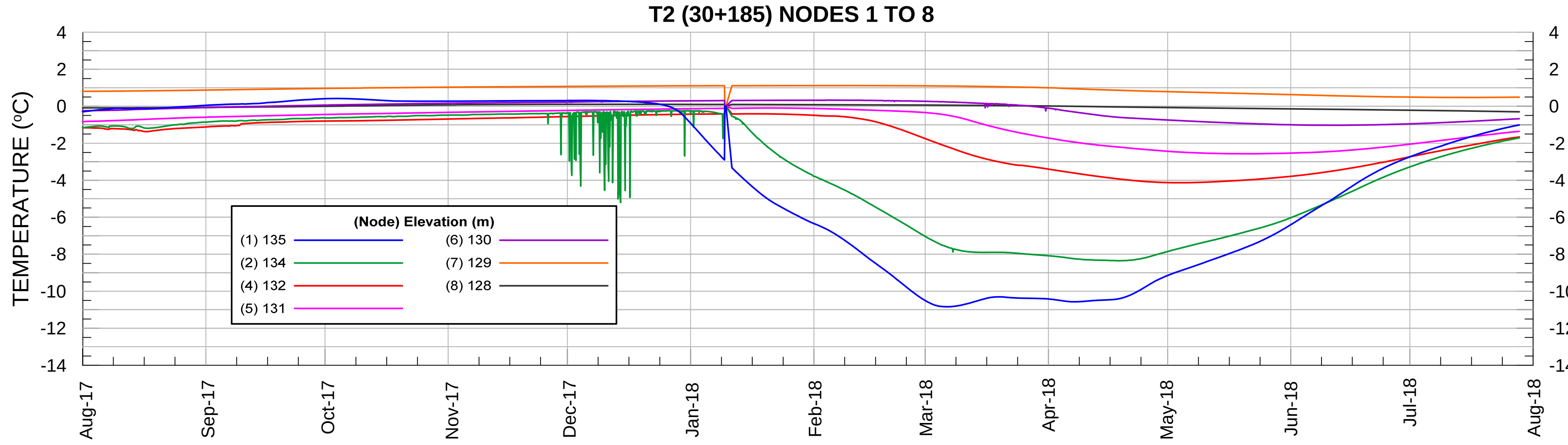
T1 (30+134) NODES 1 TO 8



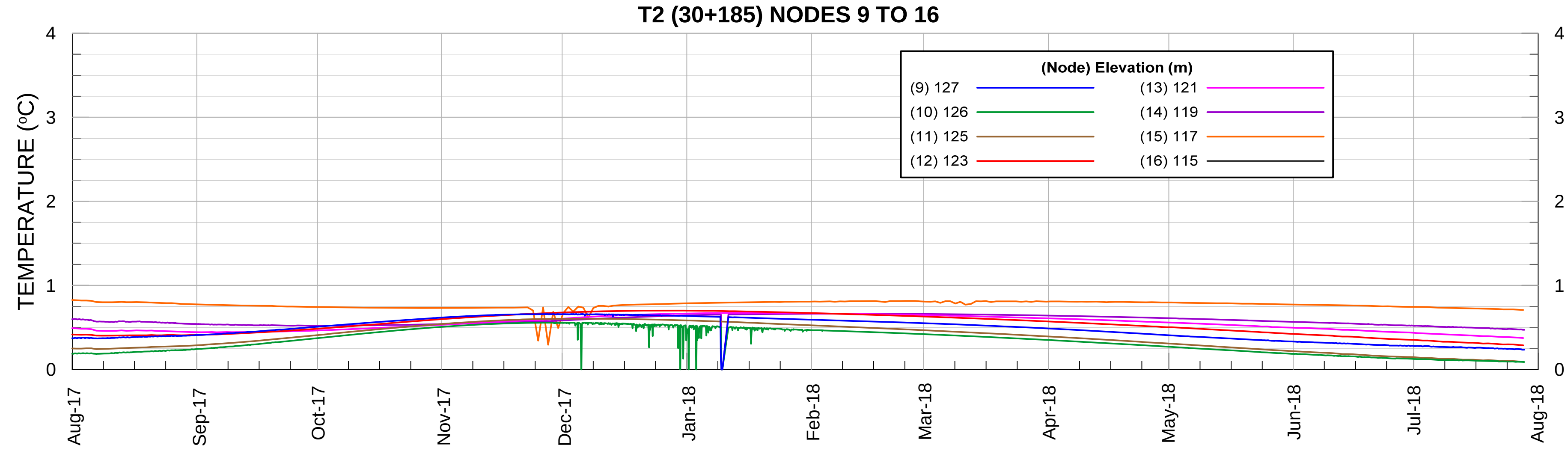
T1 (30+134) NODES 9 TO 16



T2 (30+185) NODES 1 TO 8



T2 (30+185) NODES 9 TO 16



NOTES:

1. T1 (30+134) - values less than -0.5°C are not shown for Node 8 at elevation 128 m from June 24, 2011 to June 30, 2011 as these values are believed to be inaccurate.
2. Third node of thermistor T2 (elevation 135 m) is not functional.
3. T1 and T2 thermistors stopped transmitting data on June 10, 2015. Inspecting areas to determine a cause.

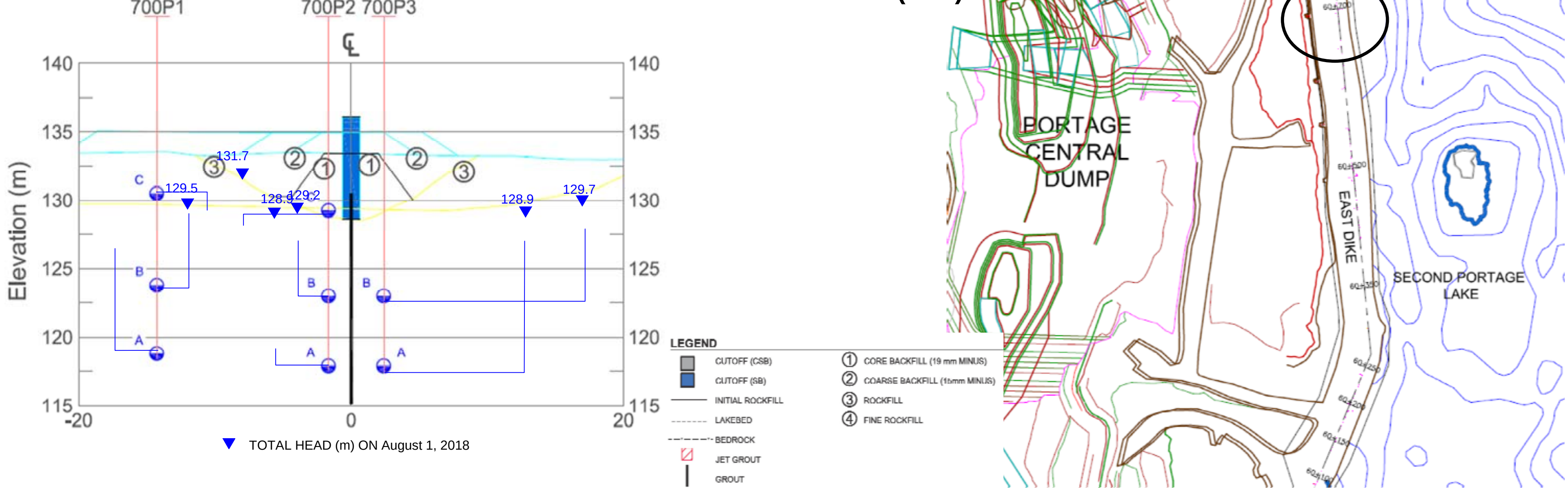
PROJECT: AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

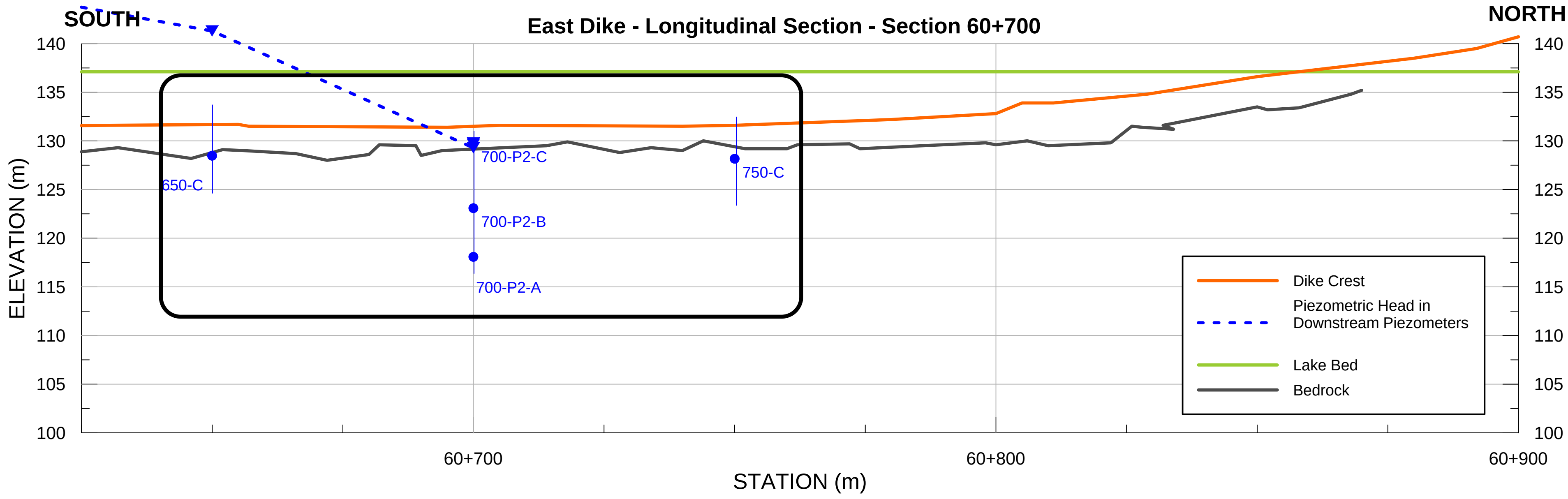
TITLE: **BAYGOOSE DIKE**
NODAL THERMAL TIMELINES
(Aug 1/17 to Aug 1/18)

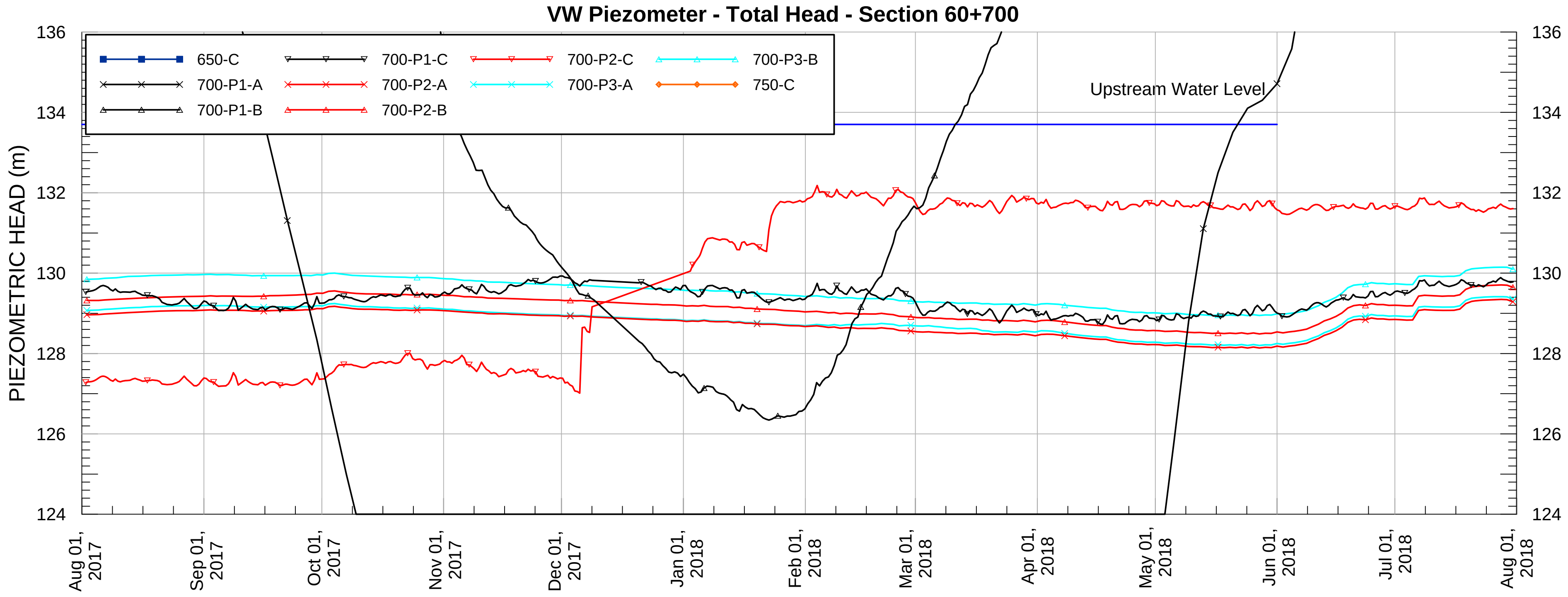
AGNICO EAGLE MEADOWBANK

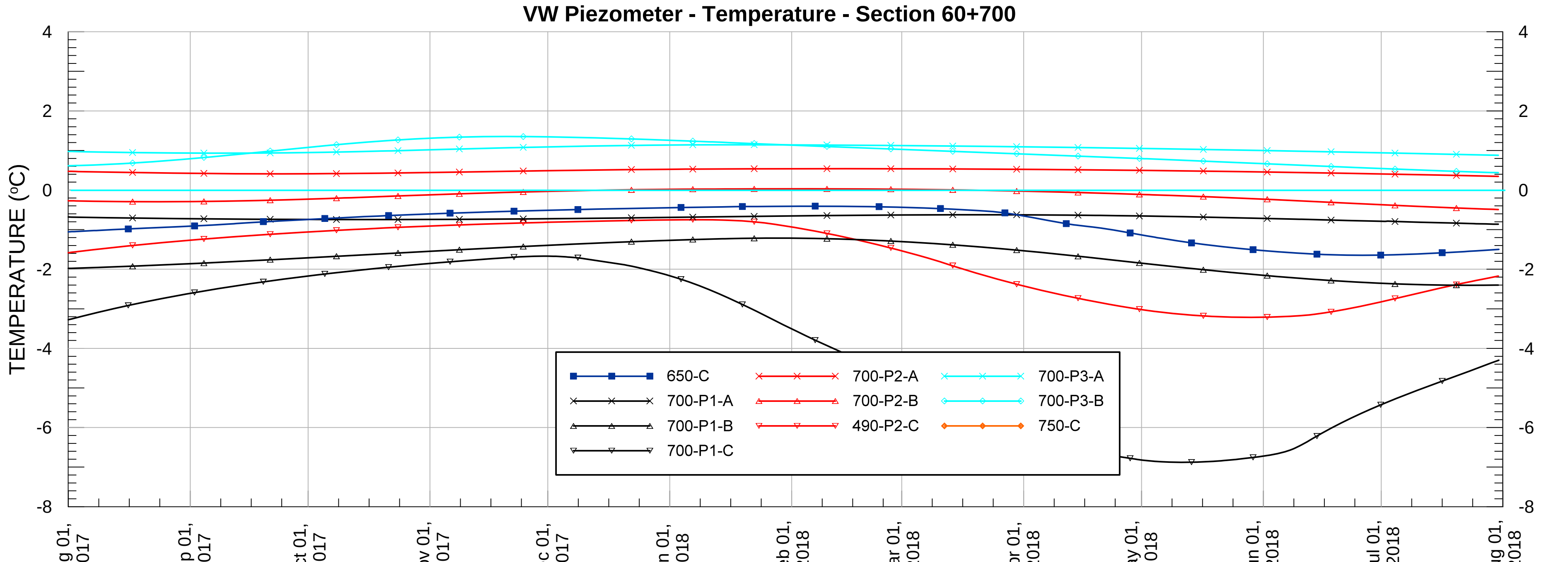
PROJECT No.			PHASE No.
DESIGN	TD	20JAN14	SCALE AS SHOWN REV.
CADD	TD	20JAN14	FIGURE 30
CHECK			
REVIEW			

East Dike - Section 60+700 (DL8)









NOTES:

1: 700-P1-B and 750-C are giving anomoly readings and with a negative temperature are assumed to be frozen.

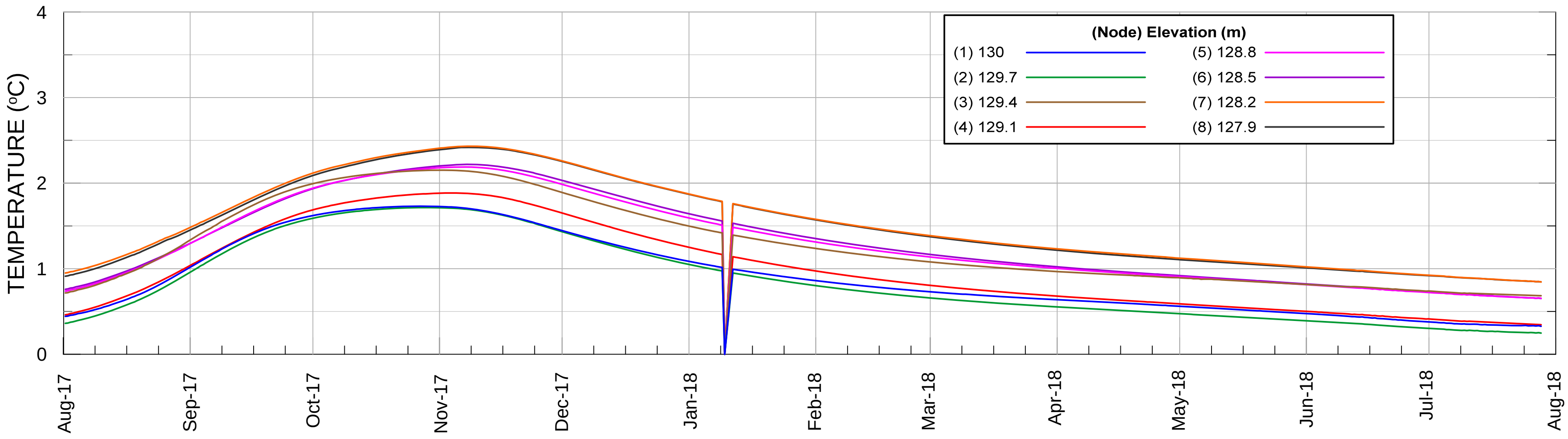
2. There wa a rise in PWP in June. This was an unkonwn reason as there was no indicaitons in the field.

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	EAST DIKE Section 60+700 - PIEZOMETRIC DATA (Aug 1/17 to Aug 1/18)

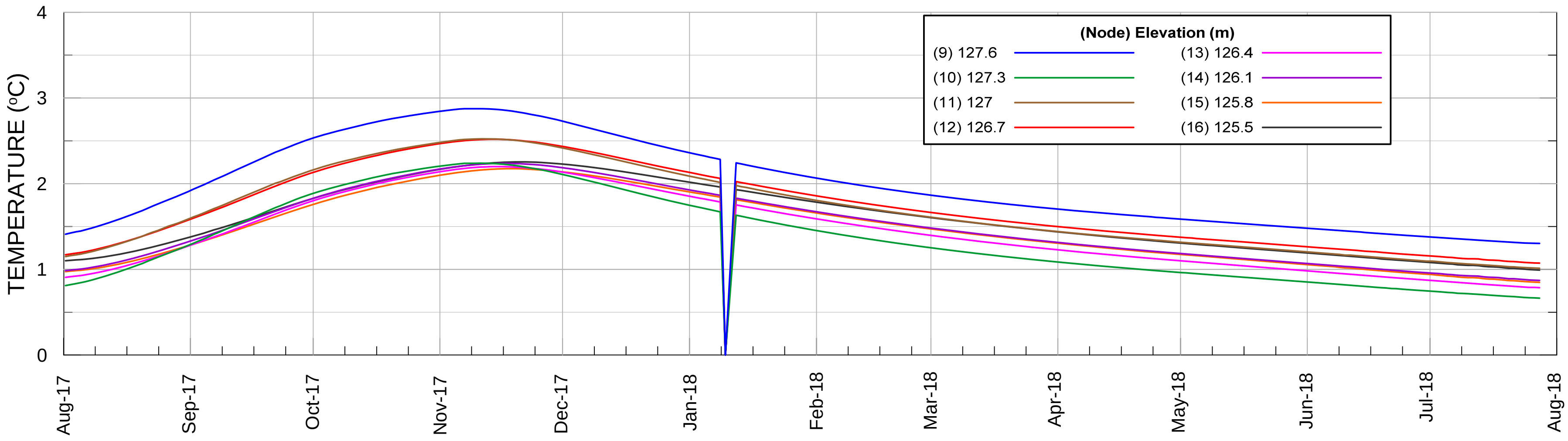
AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	FIGURE 31	
CHECK	PG	28AUG14		
REVIEW				

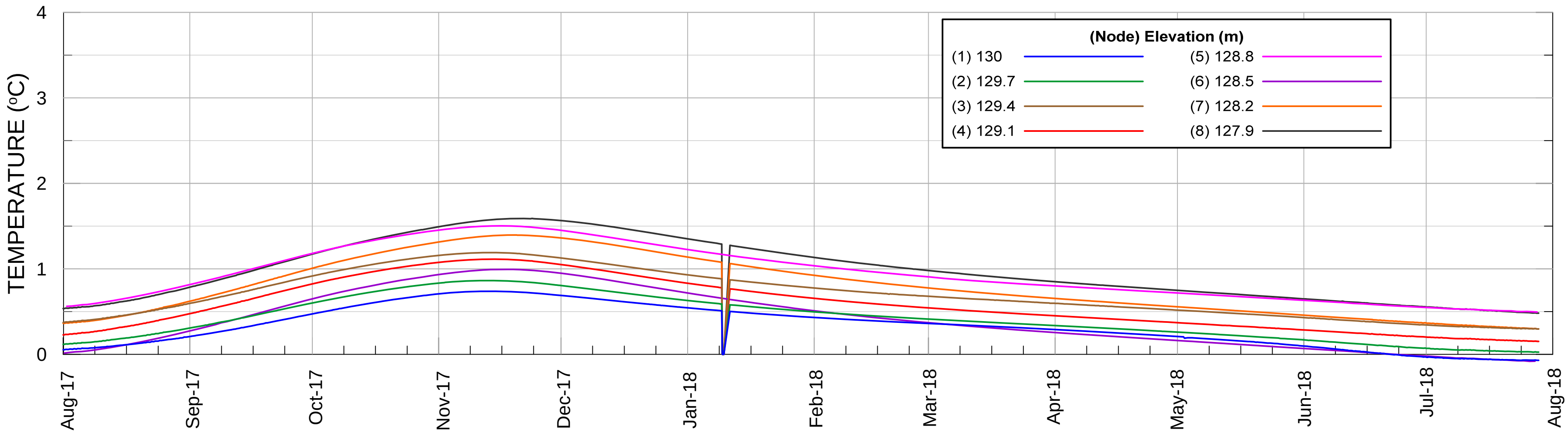
T3 (30+260) NODES 1 TO 8



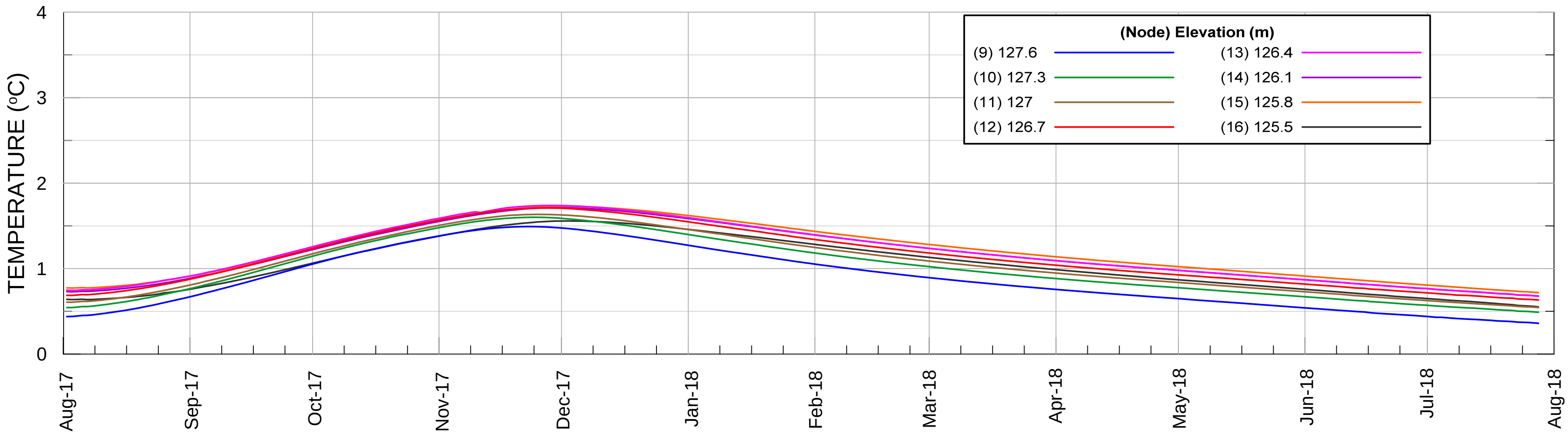
T3 (30+260) NODES 9 TO 16



T4 (30+272) NODES 1 TO 8



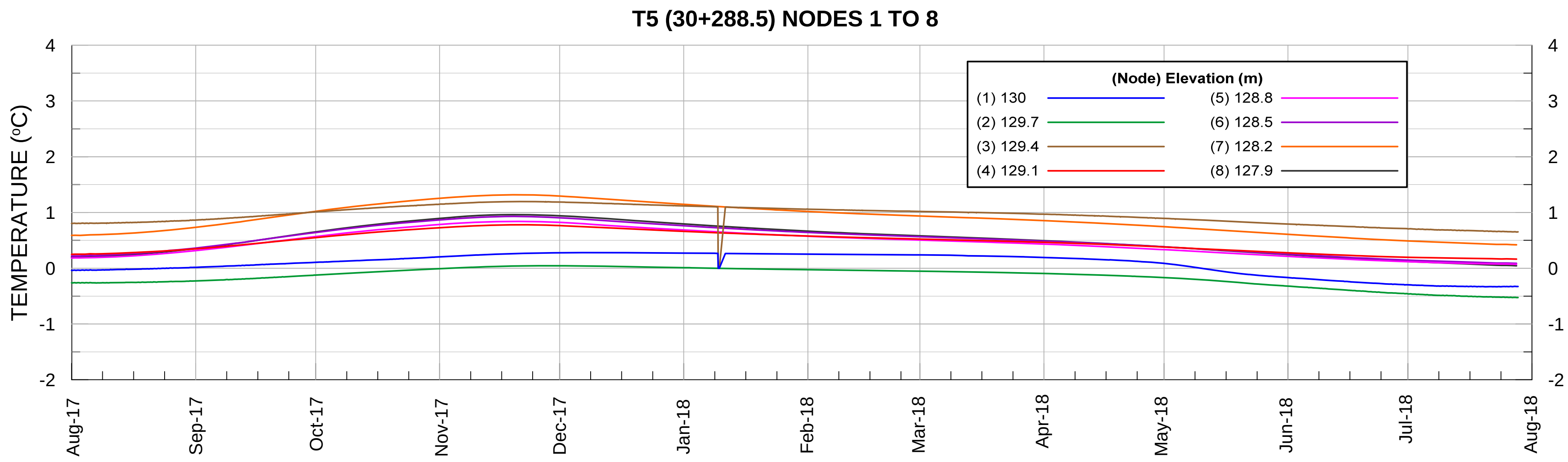
T4 (30+272) NODES 9 TO 16

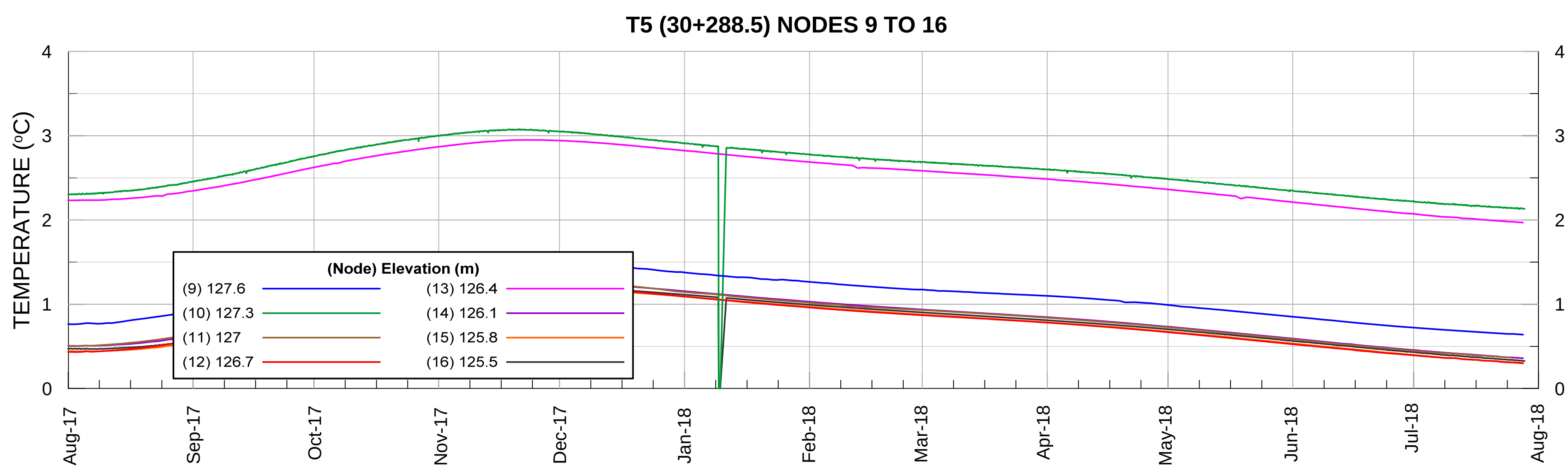


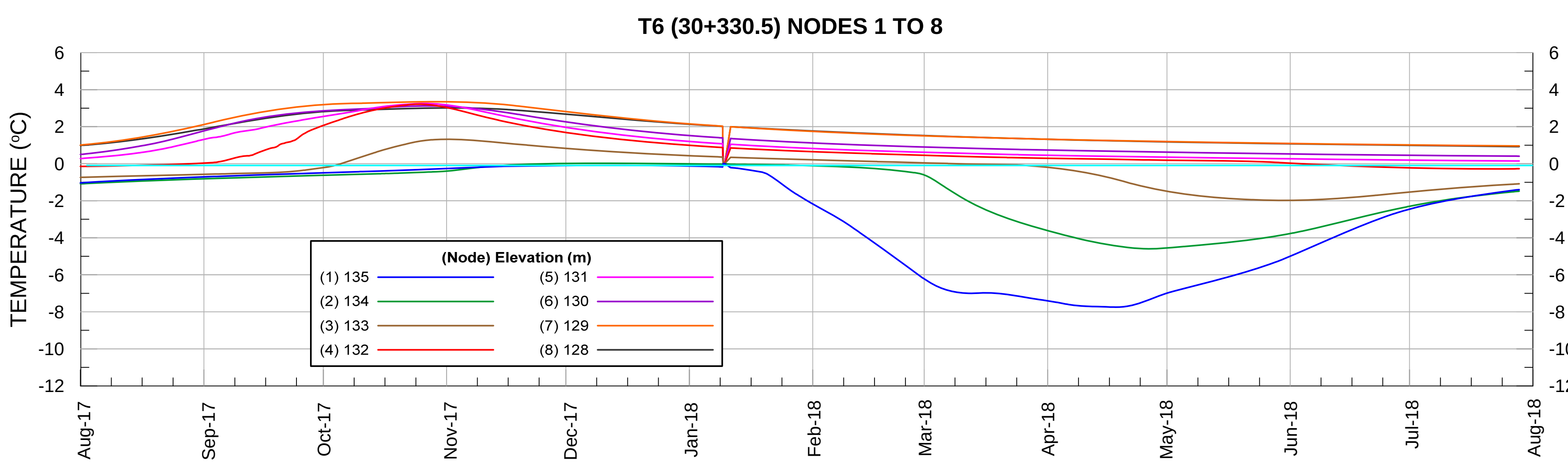
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE NODAL THERMAL TIMELINES (Aug 1/17 to Aug 1/18)

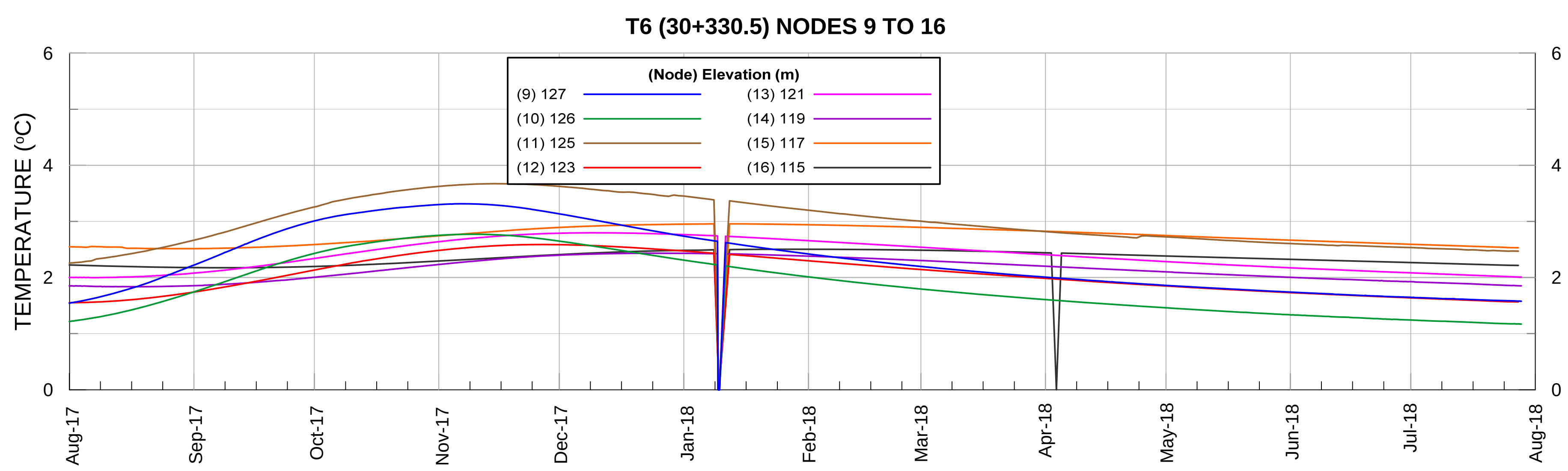
AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.
DESIGN	TD	20JAN14	SCALE AS SHOWN REV.
CADD	TD	20JAN14	FIGURE 31
CHECK			
REVIEW			







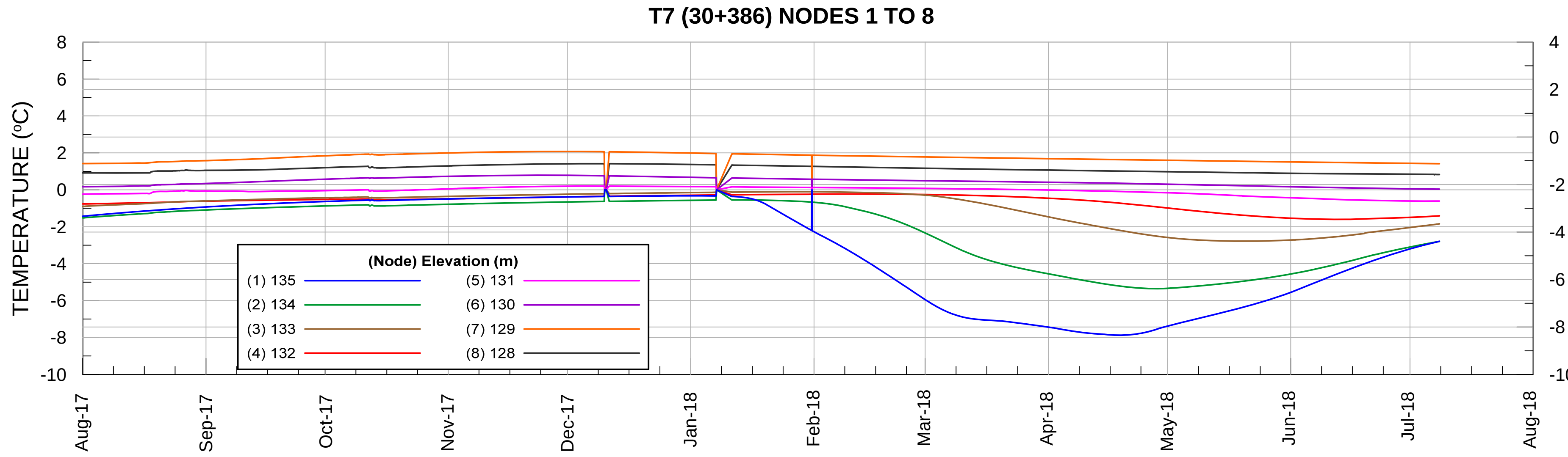


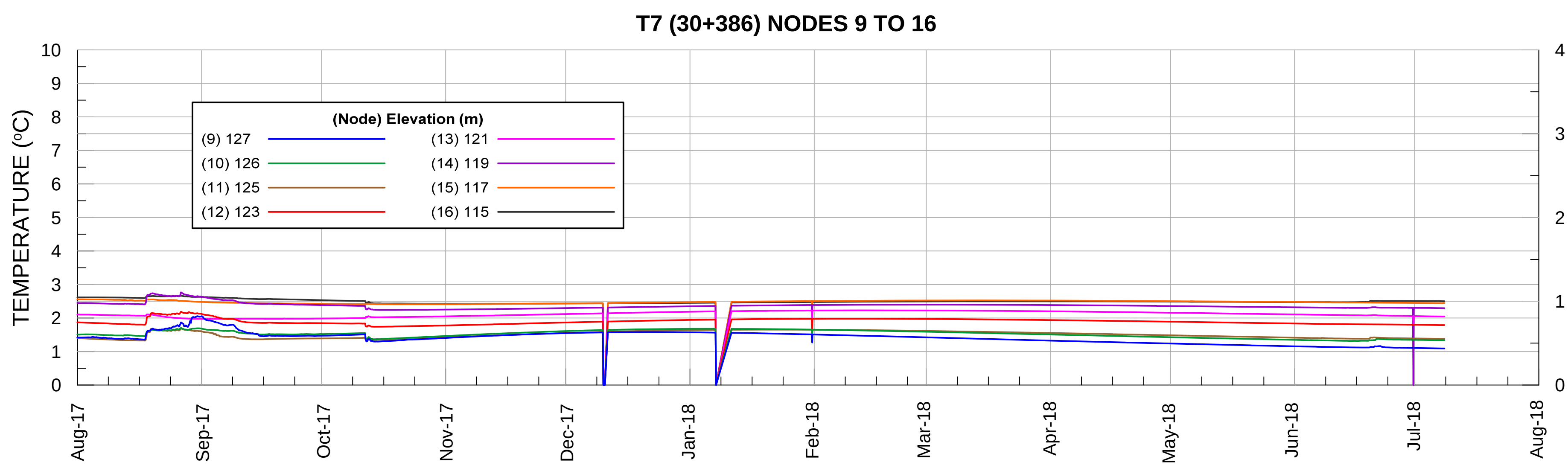
NOTE:

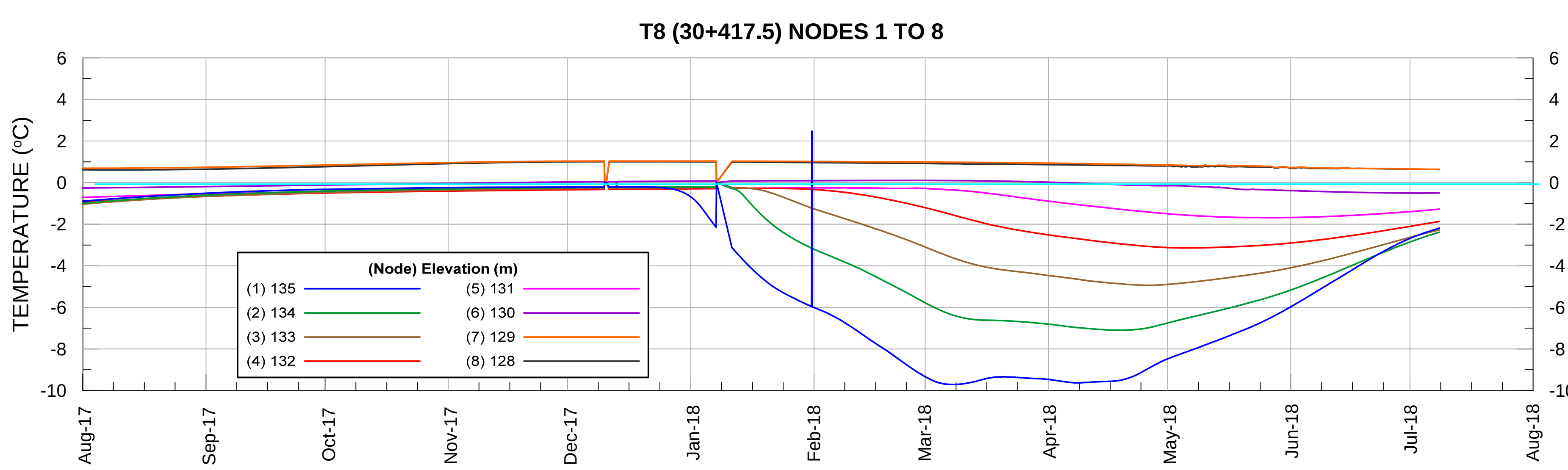
PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

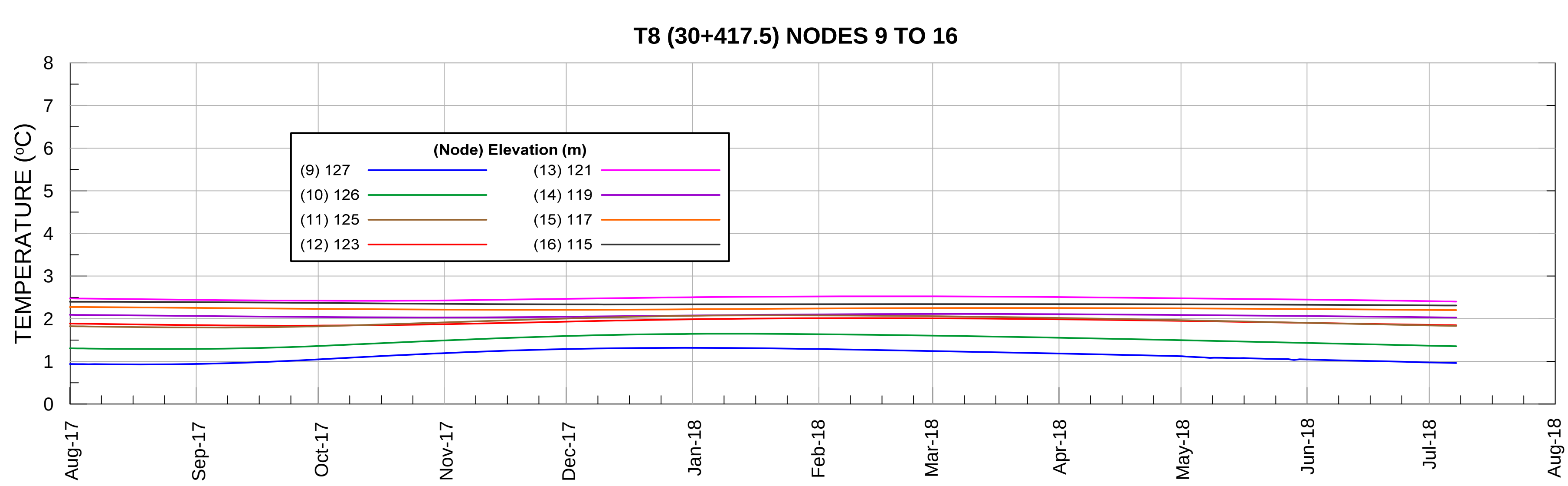
TITLE
BAYGOOSE DIKE
NODAL THERMAL TIMELINES
(Aug 1/17 to Aug 1/18)

PROJECT No.			PHASE No.
DESIGN	TD	20JAN14	SCALE AS SHOWN REV.
CADD	TD	20JAN14	FIGURE 32
CHECK			
REVIEW			









NOTE:

PROJECT

AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

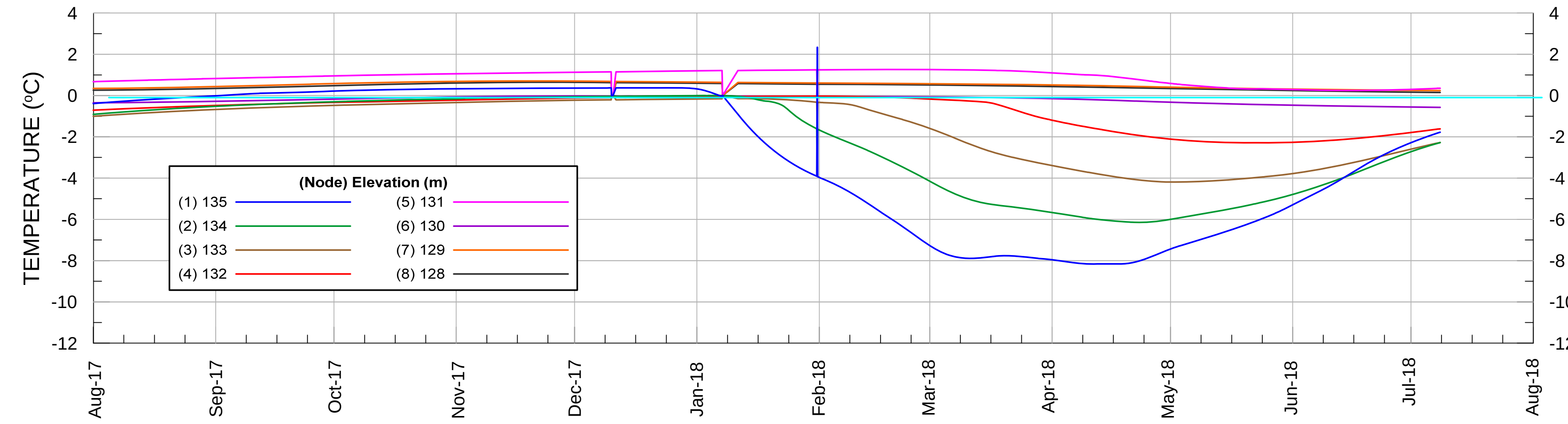
TITLE

BAYGOOSE DIKE
NODAL THERMAL TIMELINES
(Aug 1/17 to Aug 1/18)

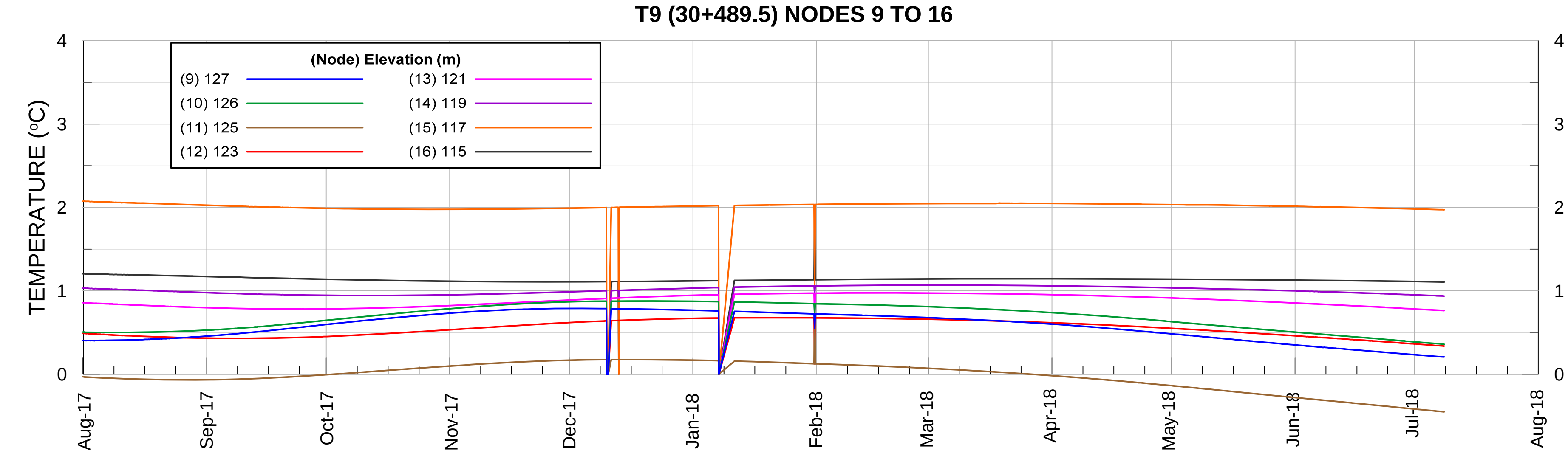
AGNICO EAGLE

PROJECT No.			PHASE No.	
DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
CADD	TD	20JAN14	**FIGURE 33**	
CHECK				
REVIEW				

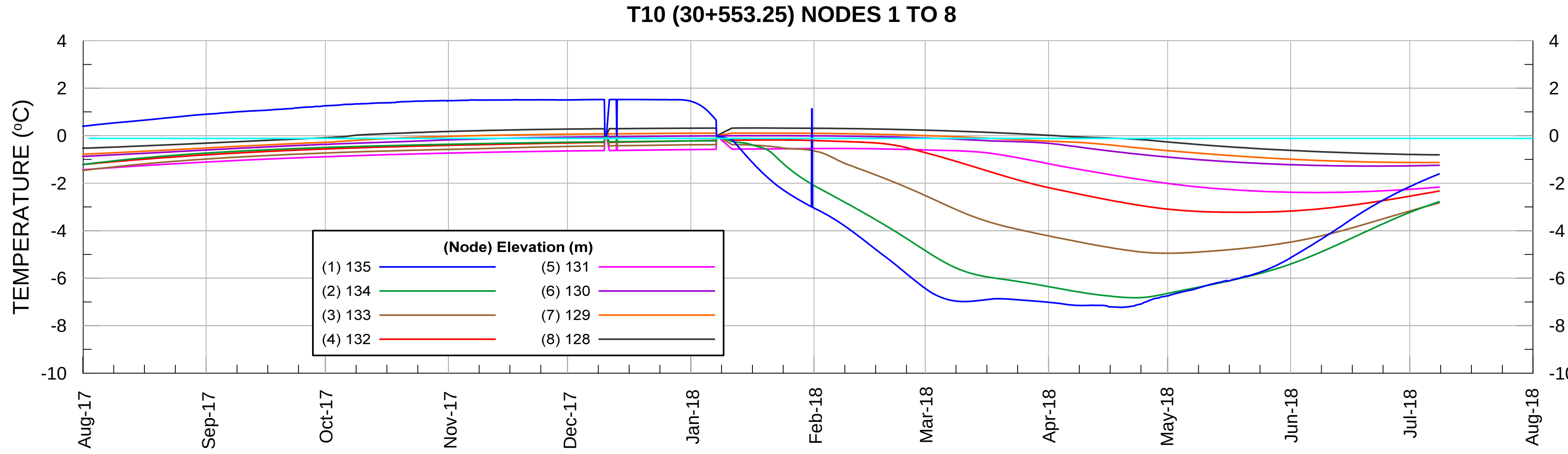
T9 (30+489.5) NODES 1 TO 8



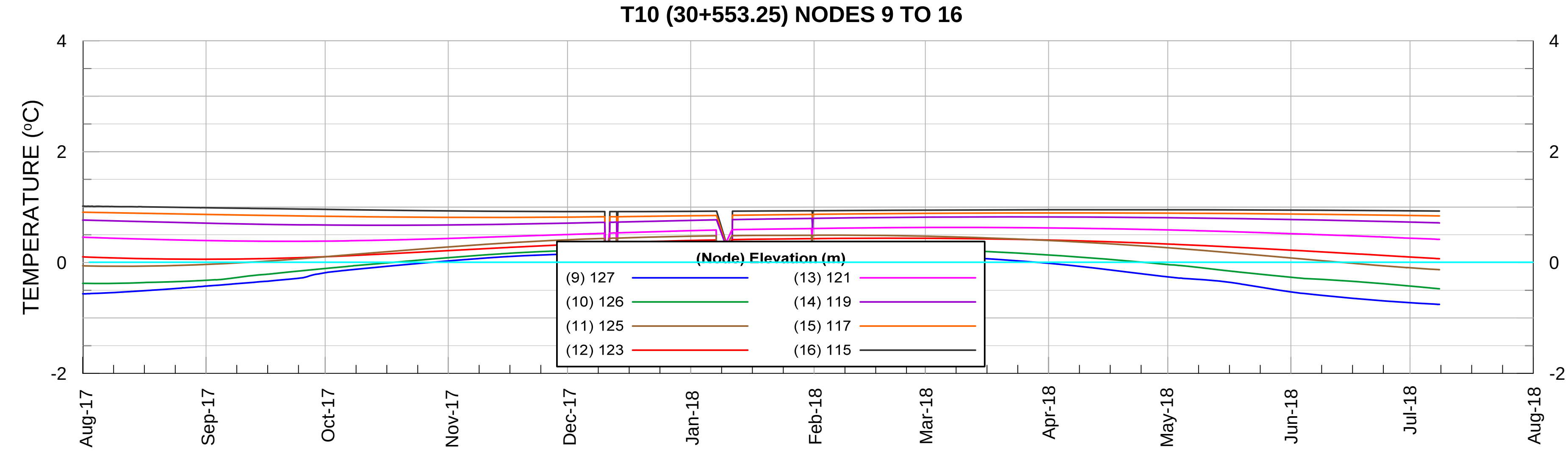
T9 (30+489.5) NODES 9 TO 16



T10 (30+553.25) NODES 1 TO 8



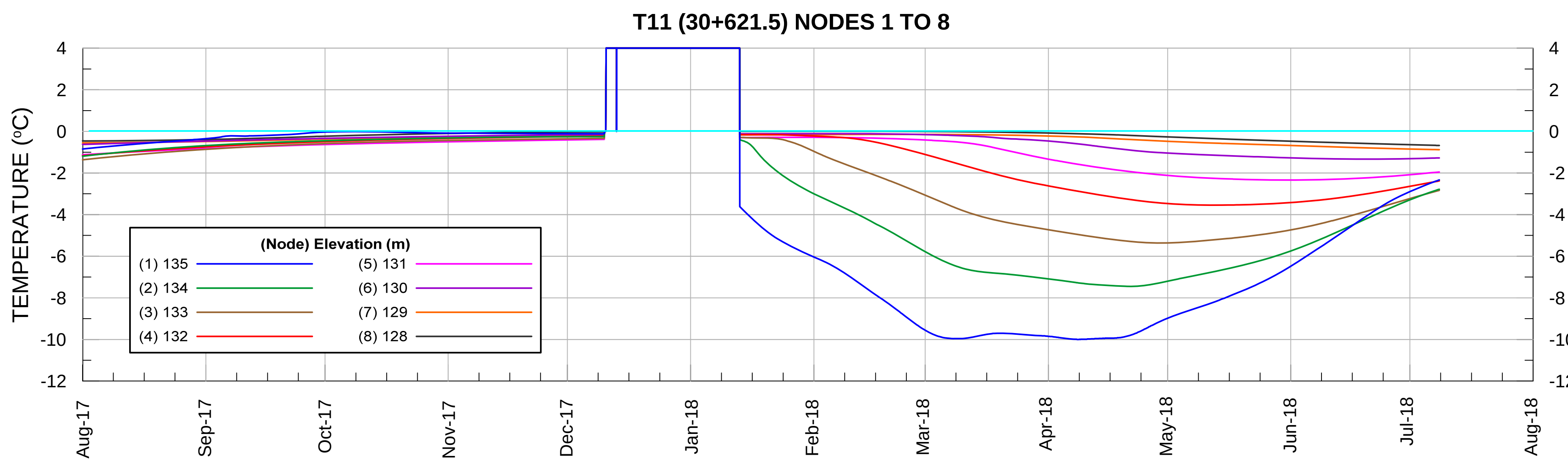
T10 (30+553.25) NODES 9 TO 16

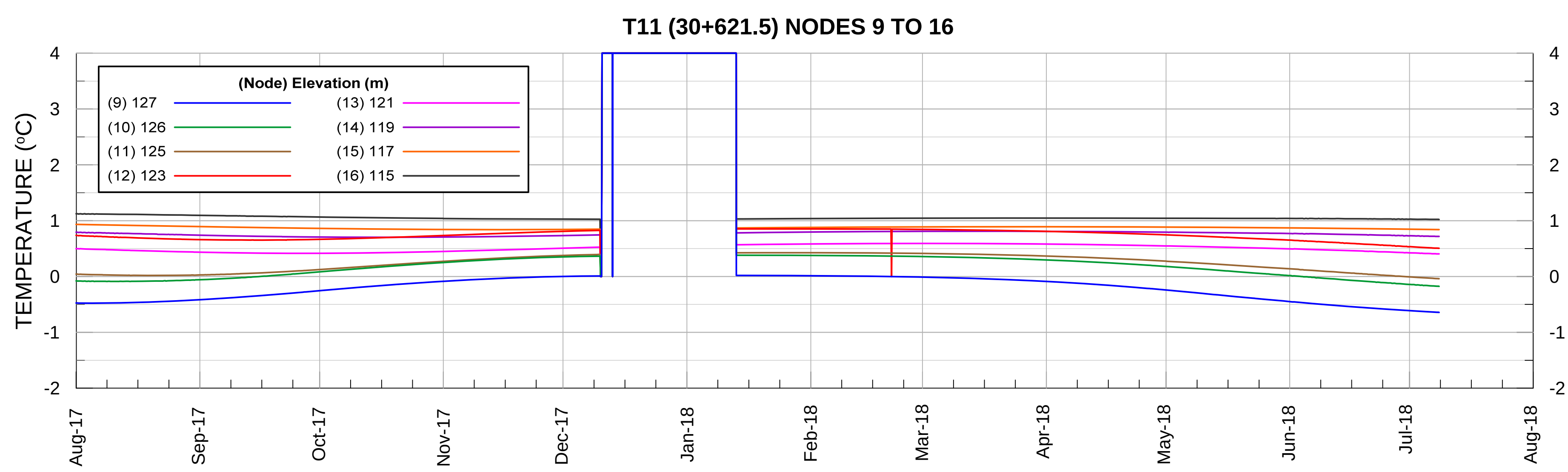


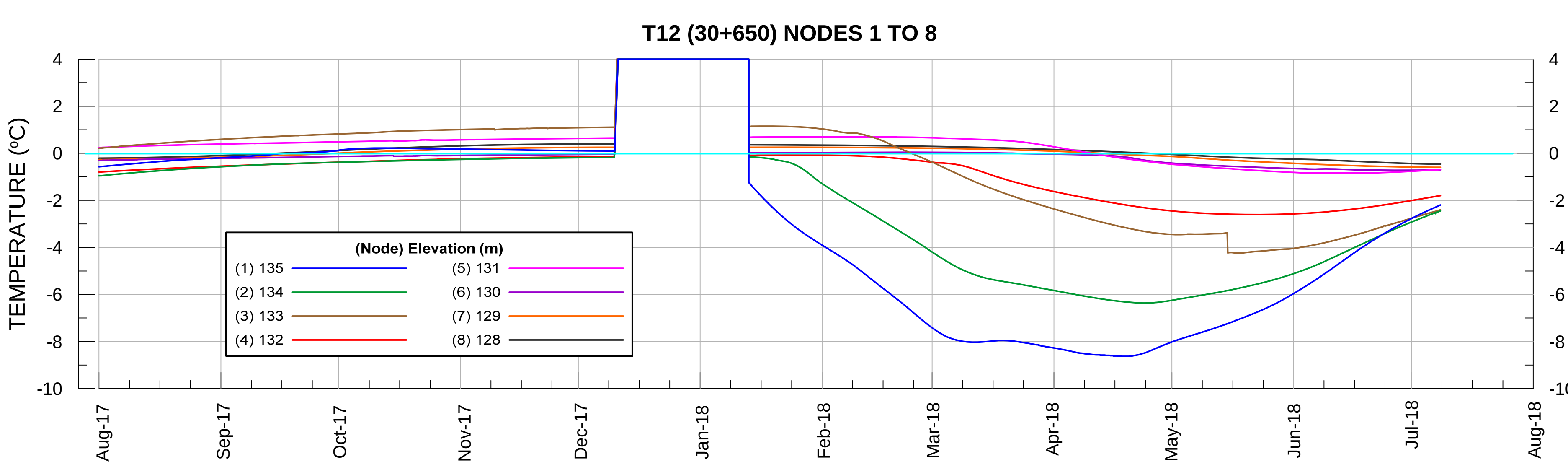
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE NODAL THERMAL TIMELINES (Aug 1/17 to Aug 1/18)

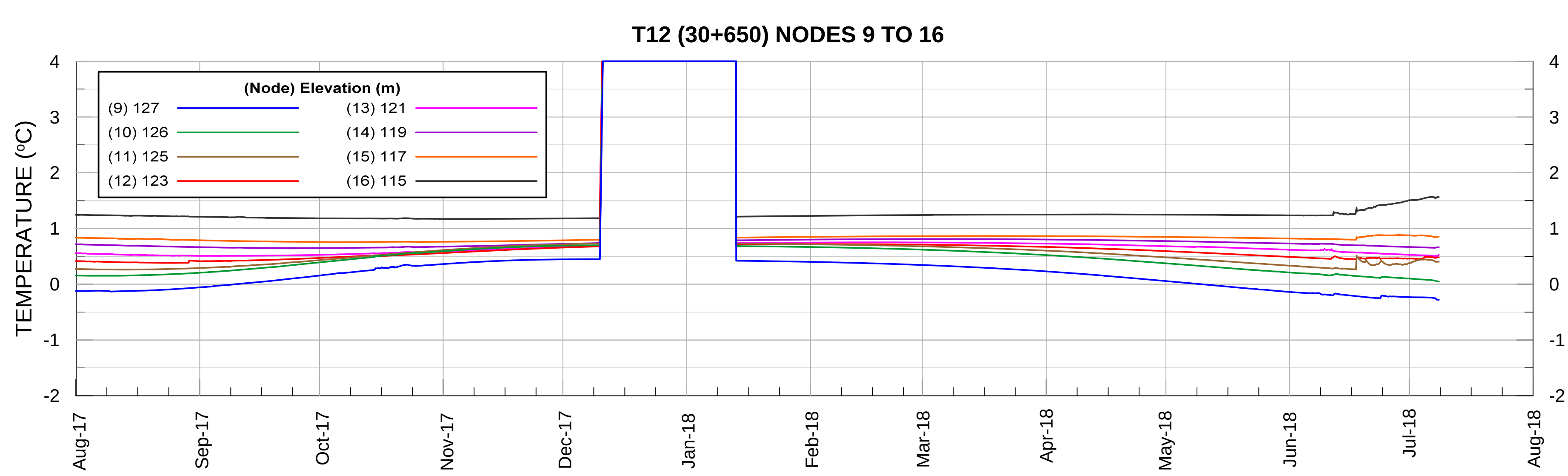
AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
CADD	TD	20JAN14	FIGURE 34	
CHECK				
REVIEW				



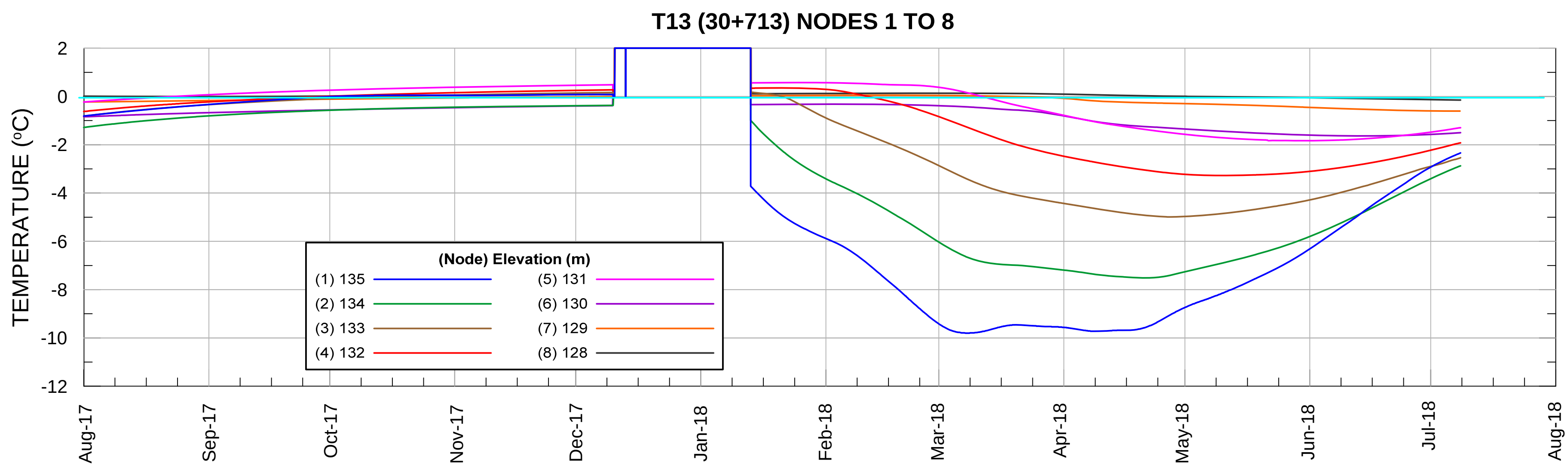


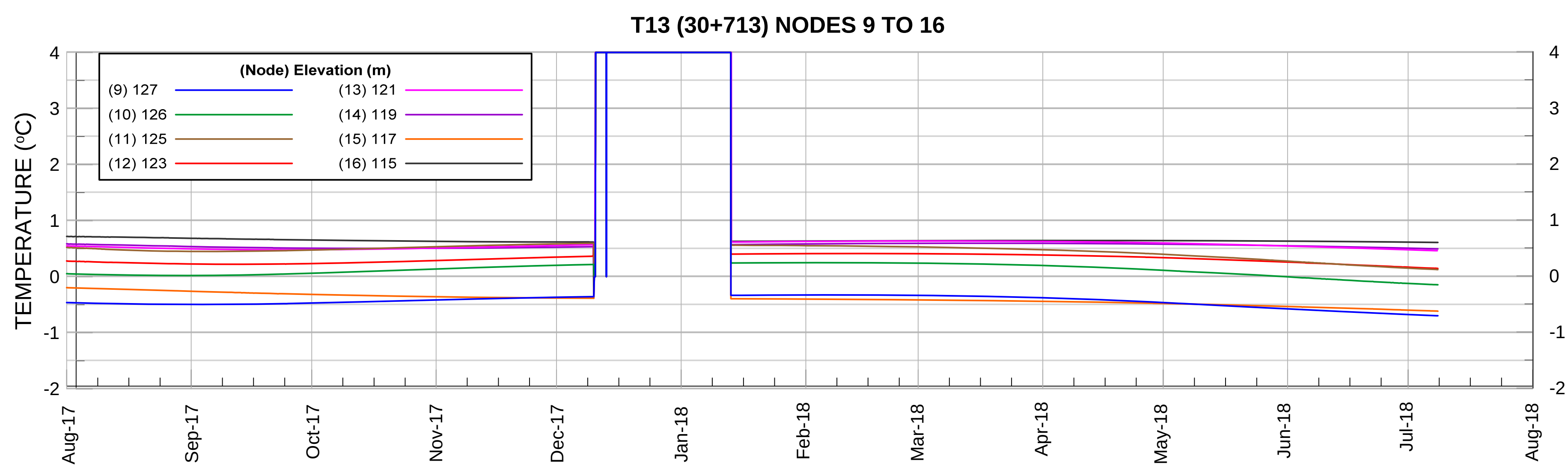


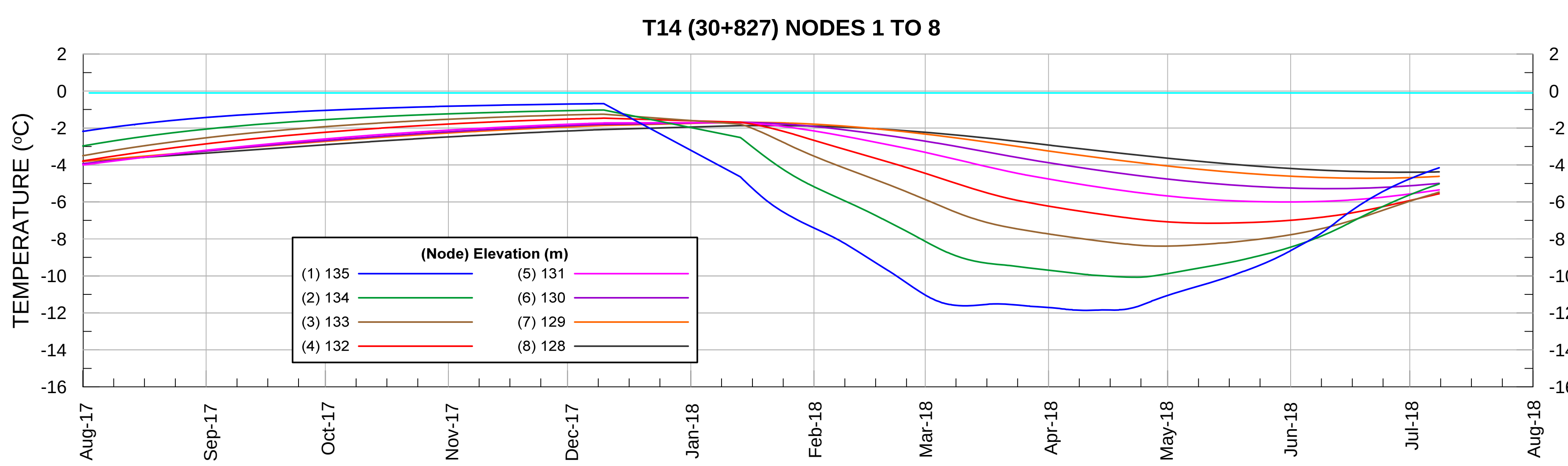


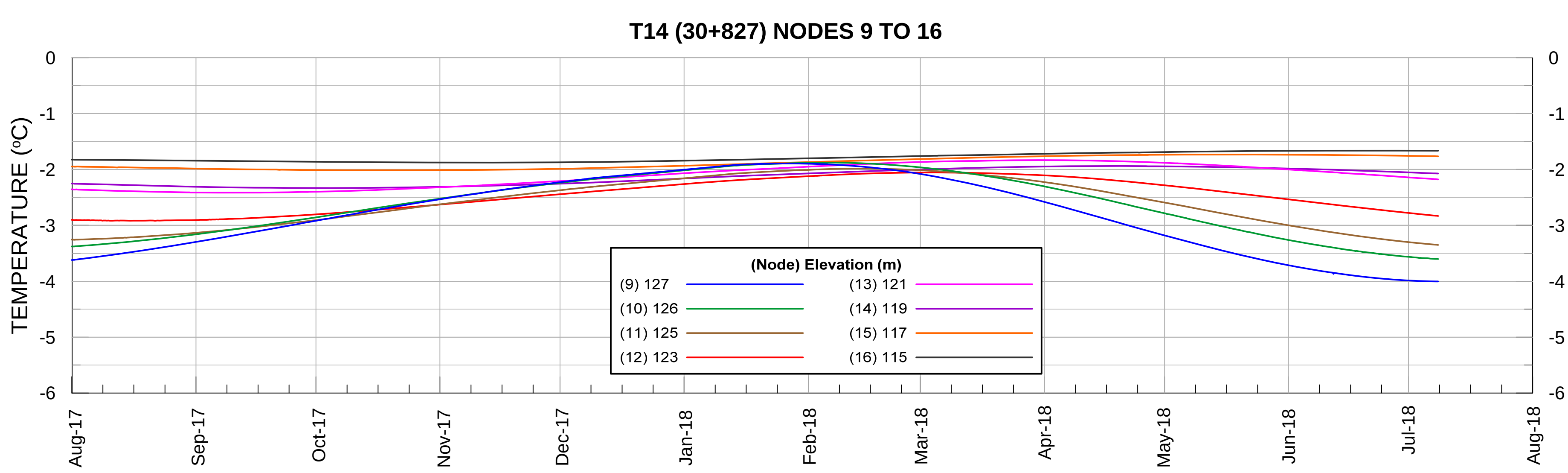
Note: The jump in temperature is an error with the MUX board in the data logger.
Board was replaced.

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT				
TITLE	BAYGOOSE DIKE NODAL THERMAL TIMELINES (Aug1/17 to Aug 1/18)				
AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.	
	DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
	CADD	TD	20JAN14	FIGURE 35	
	CHECK				
	REVIEW				







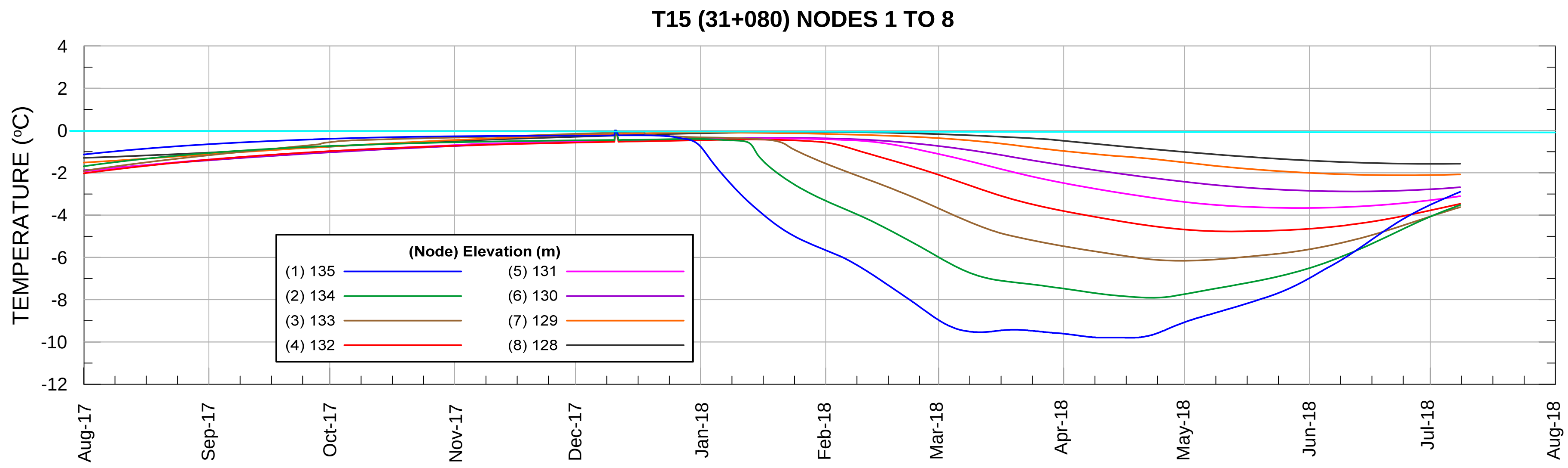


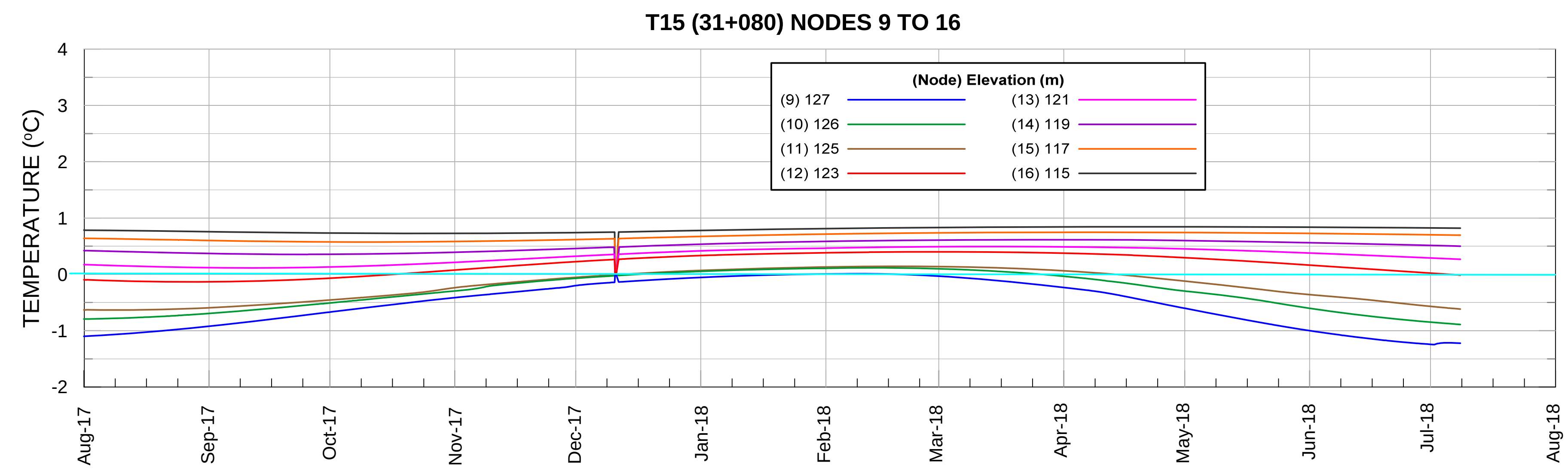
Note: The jump in temperature is an error with the MUX board in the data logger.
Board was replaced.

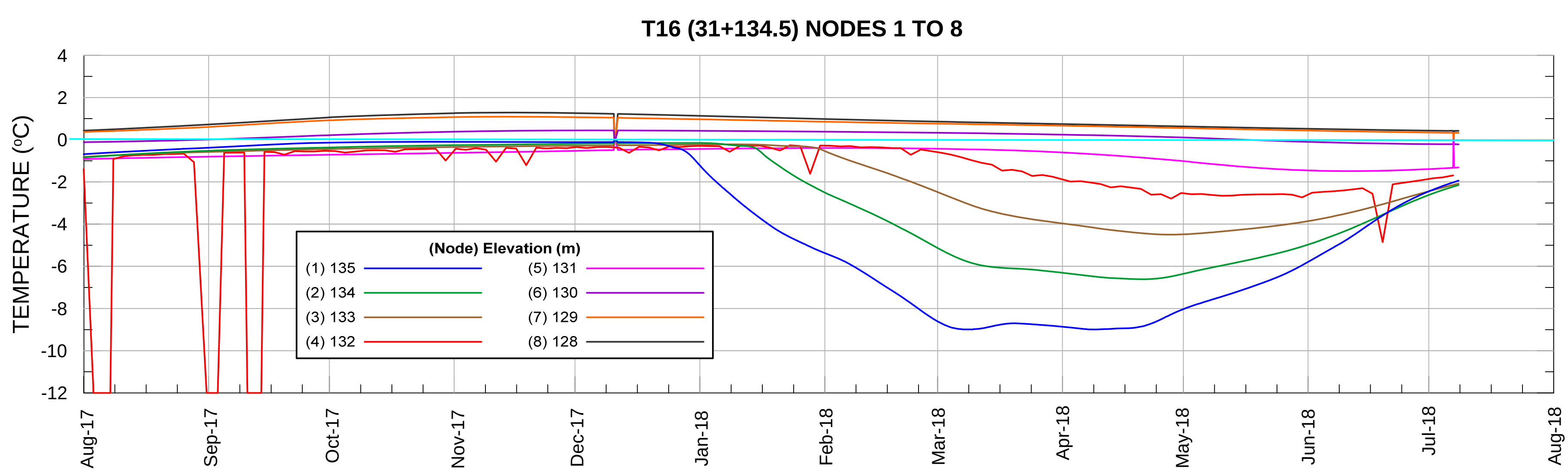
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE NODAL THERMAL TIMELINES (Aug 1/17 to Aug 1/18)

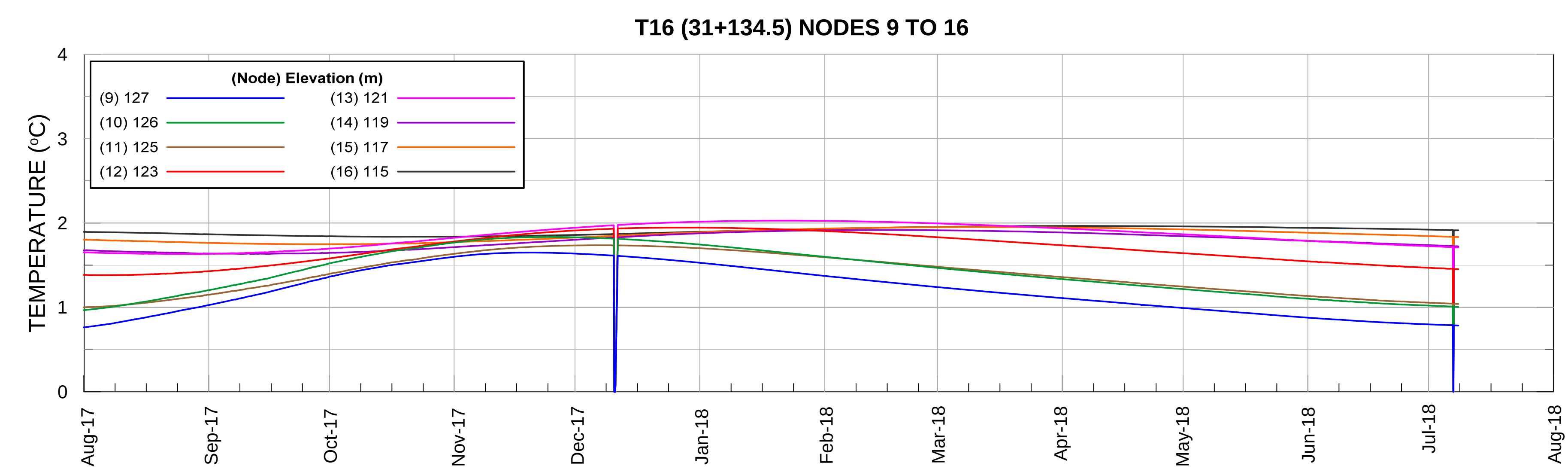
AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.
DESIGN	TD	20JAN14	SCALE AS SHOWN REV.
CADD	TD	20JAN14	FIGURE 36
CHECK			
REVIEW			









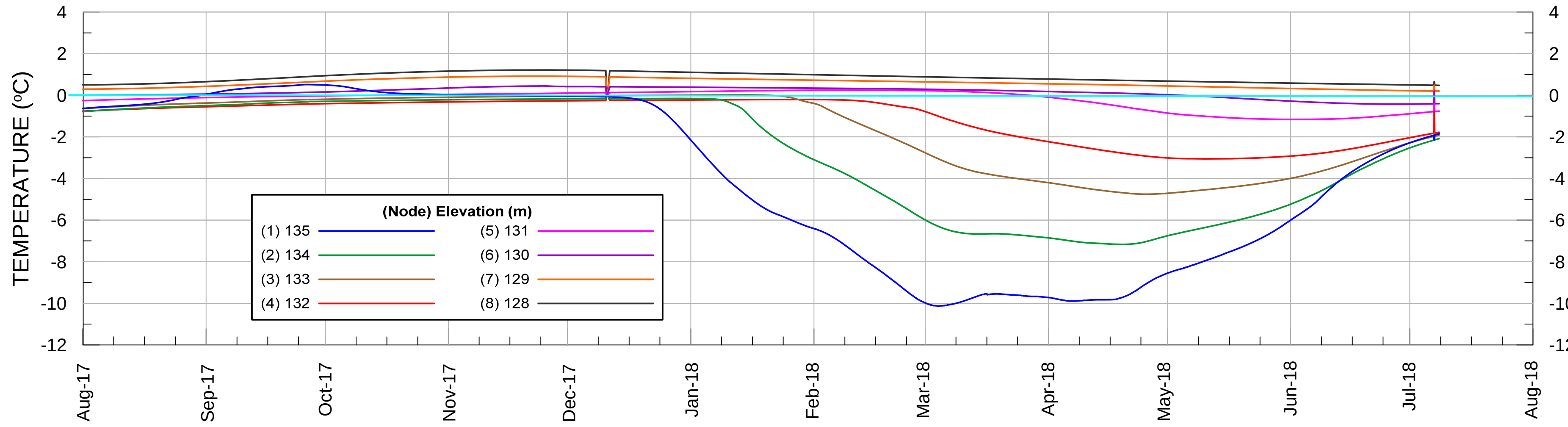
PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

TITLE
BAYGOOSE DIKE
NODAL THERMAL TIMELINES T15-T16
(Aug 1/17 to Aug 1/18)

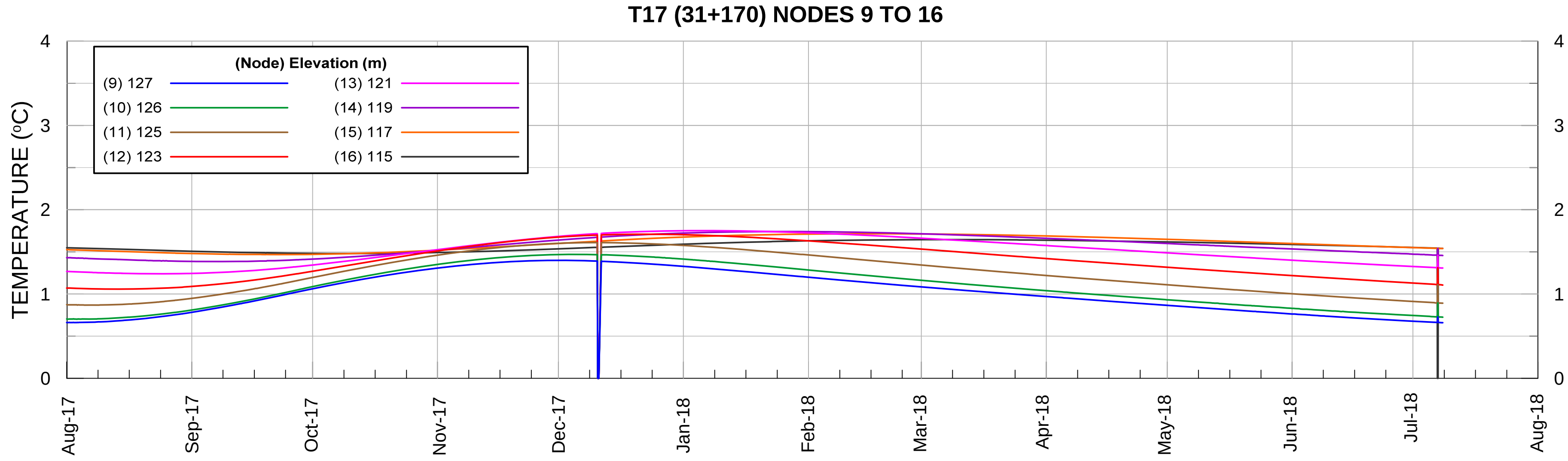
AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.
DESIGN	TD	20JAN14	SCALE AS SHOWN REV.
CADD	TD	20JAN14	FIGURE 37
CHECK			
REVIEW			

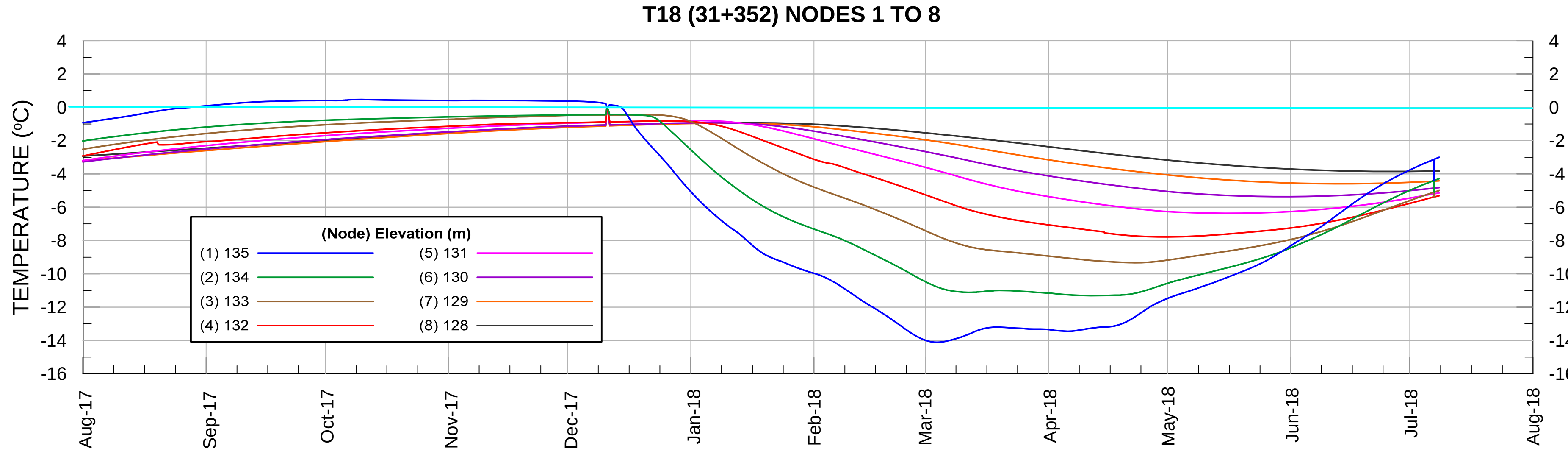
T17 (31+170) NODES 1 TO 8



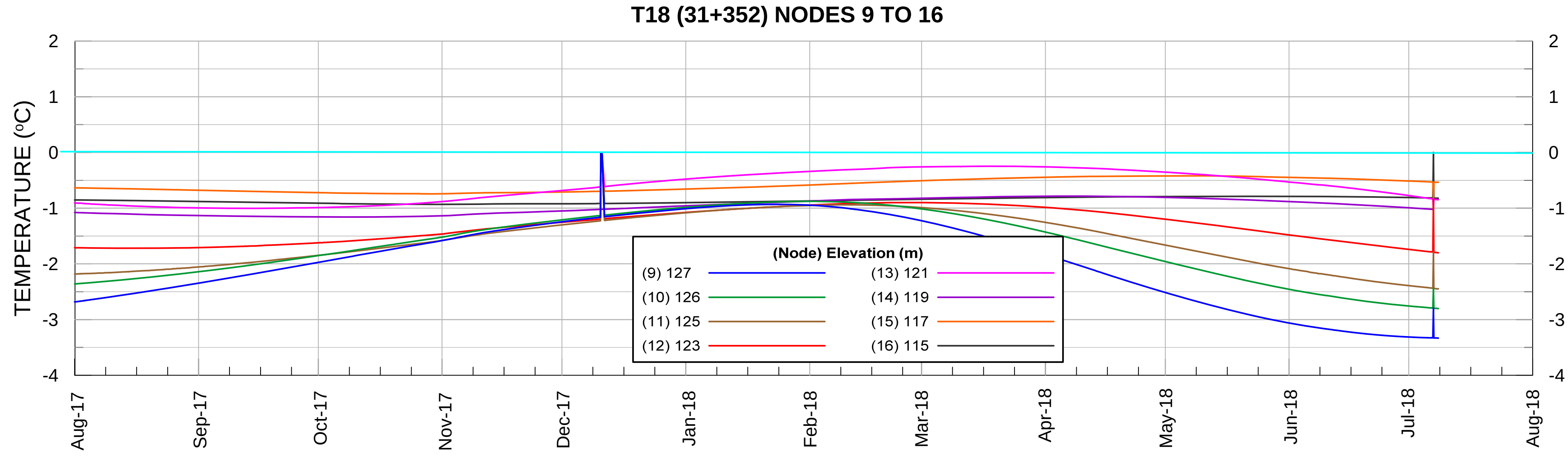
T17 (31+170) NODES 9 TO 16



T18 (31+352) NODES 1 TO 8



T18 (31+352) NODES 9 TO 16

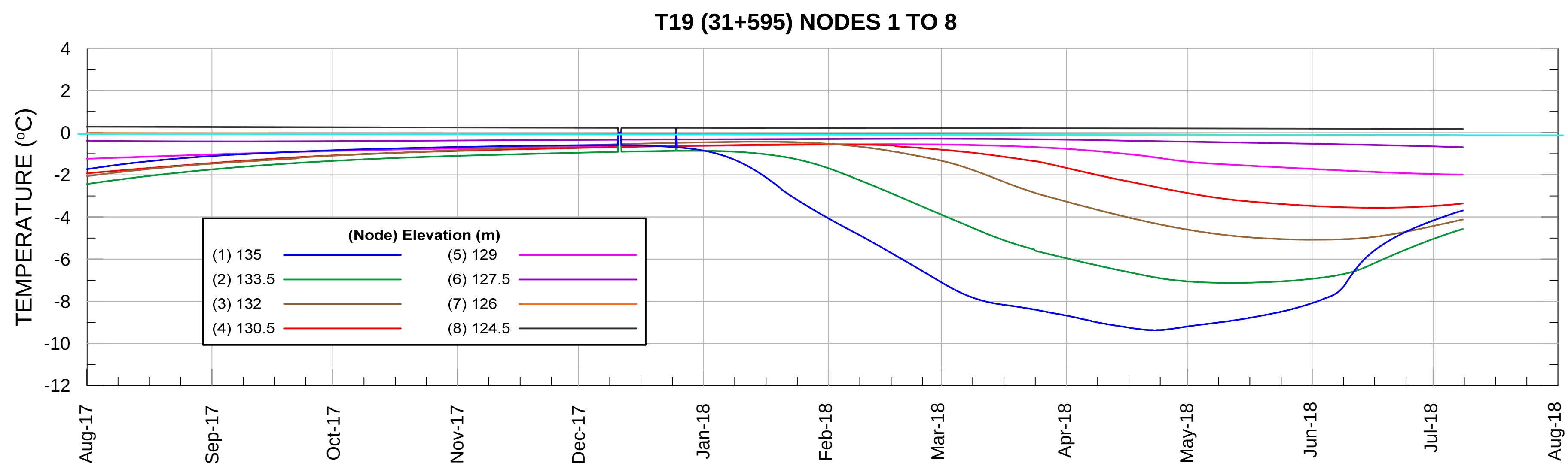


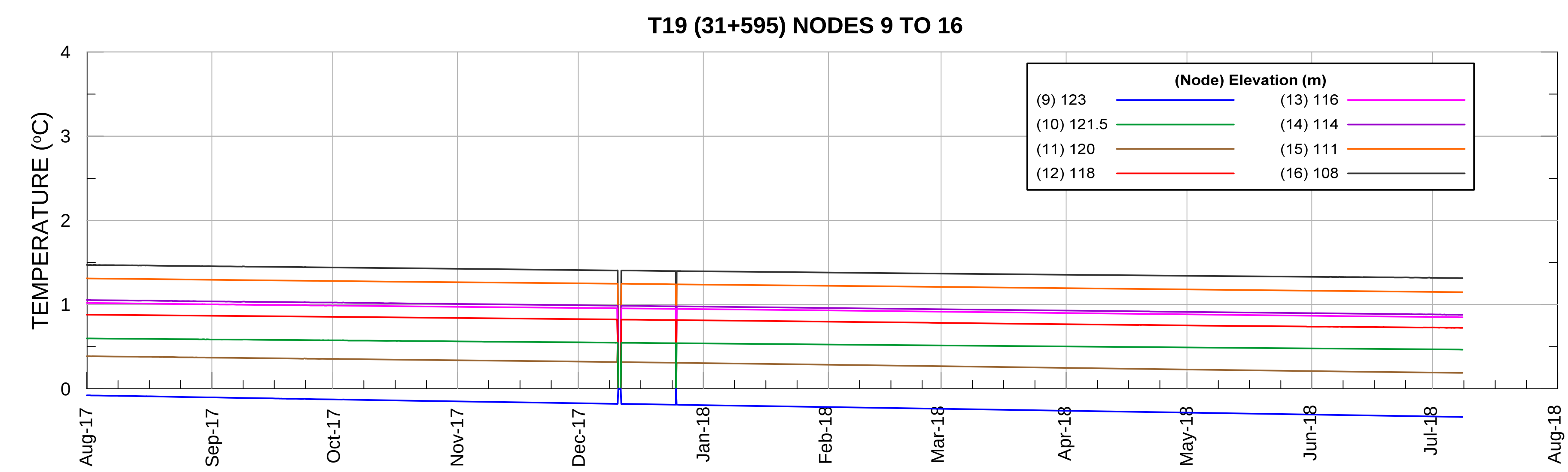
PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

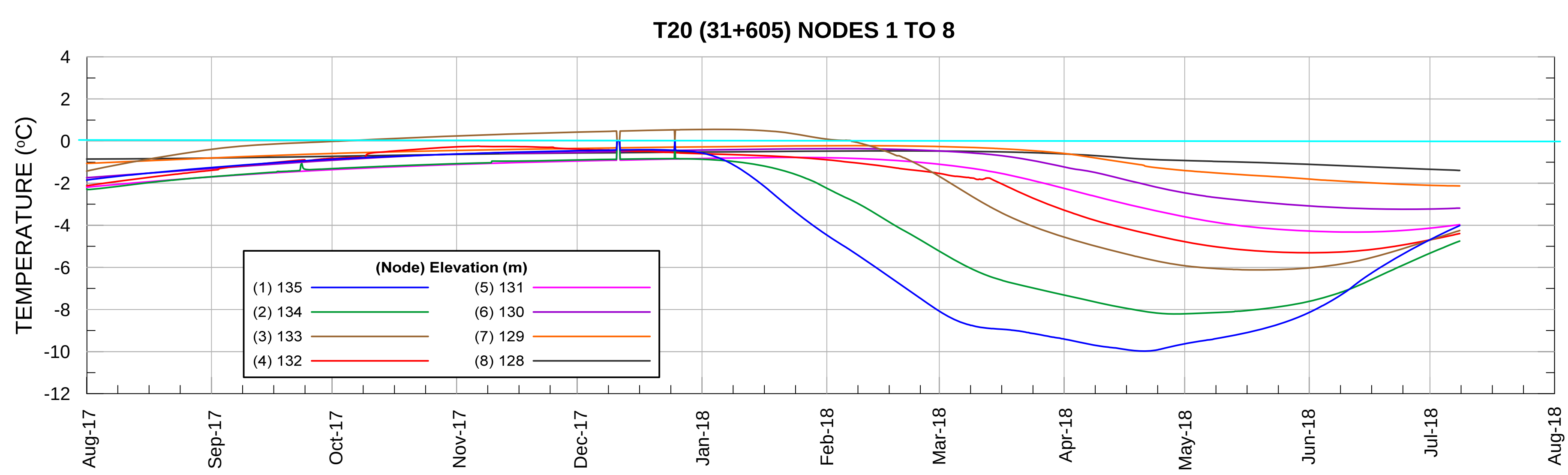
TITLE
BAYGOOSE DIKE
NODAL THERMAL TIMELINES
(Aug 1/17 to Aug 1/18)

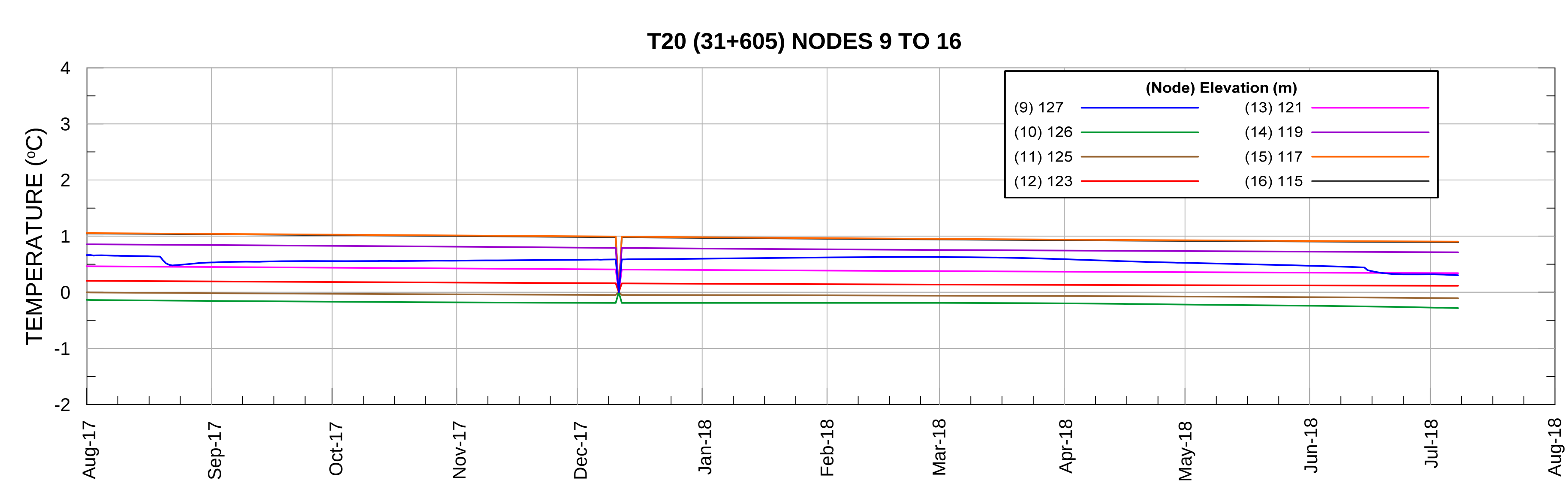
AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
CADD	TD	20JAN14	FIGURE 38	
CHECK				
REVIEW				









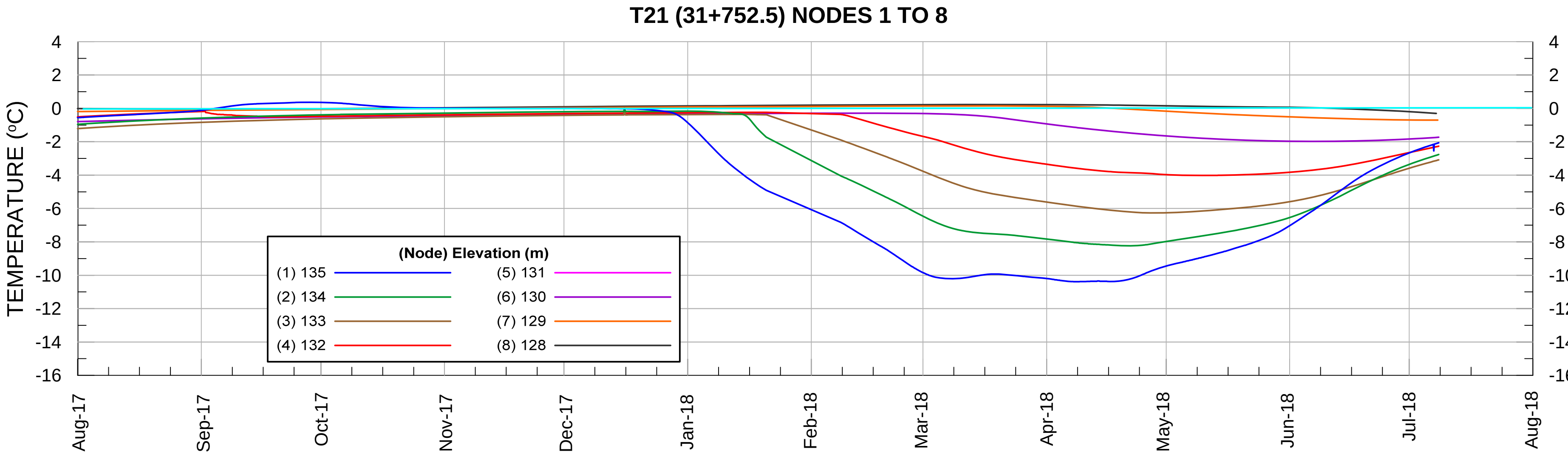
PROJECT

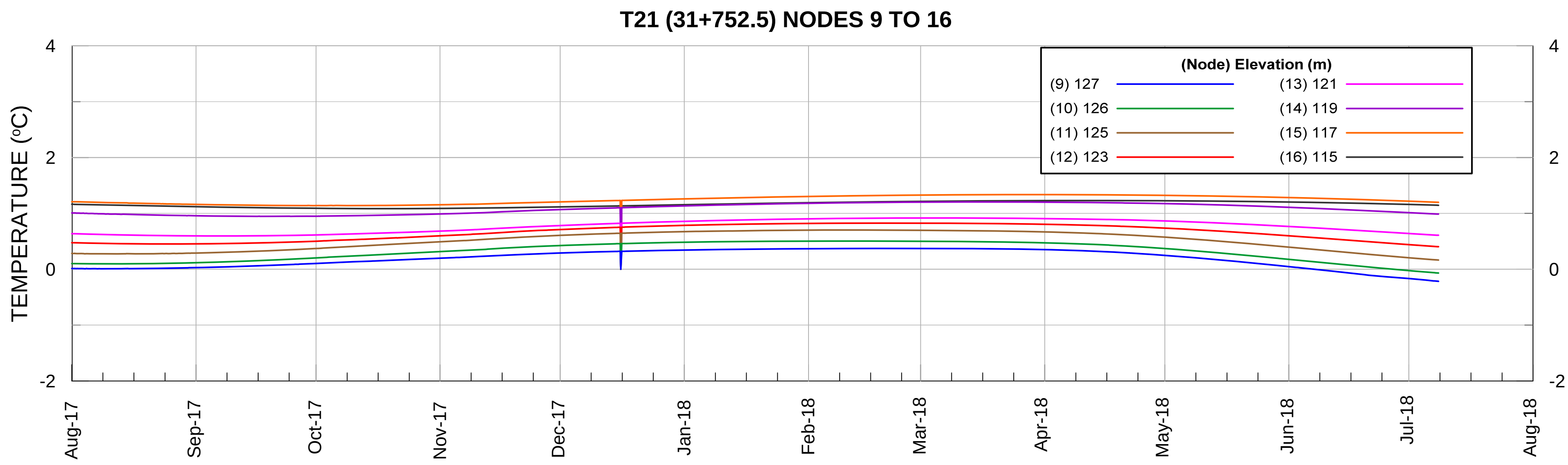
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

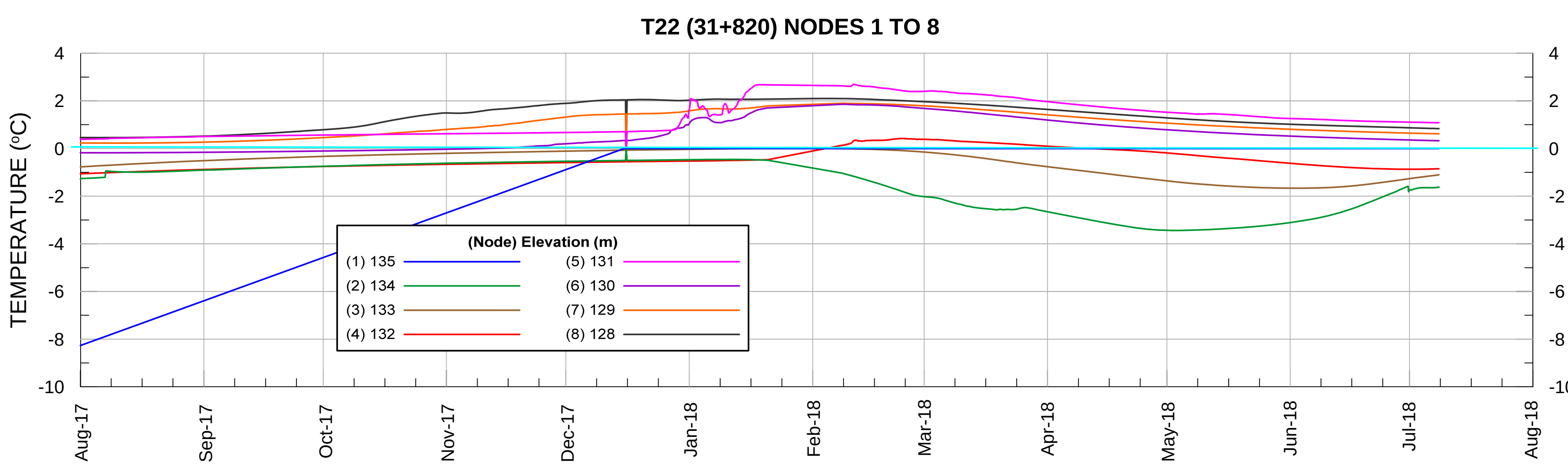
TITLE

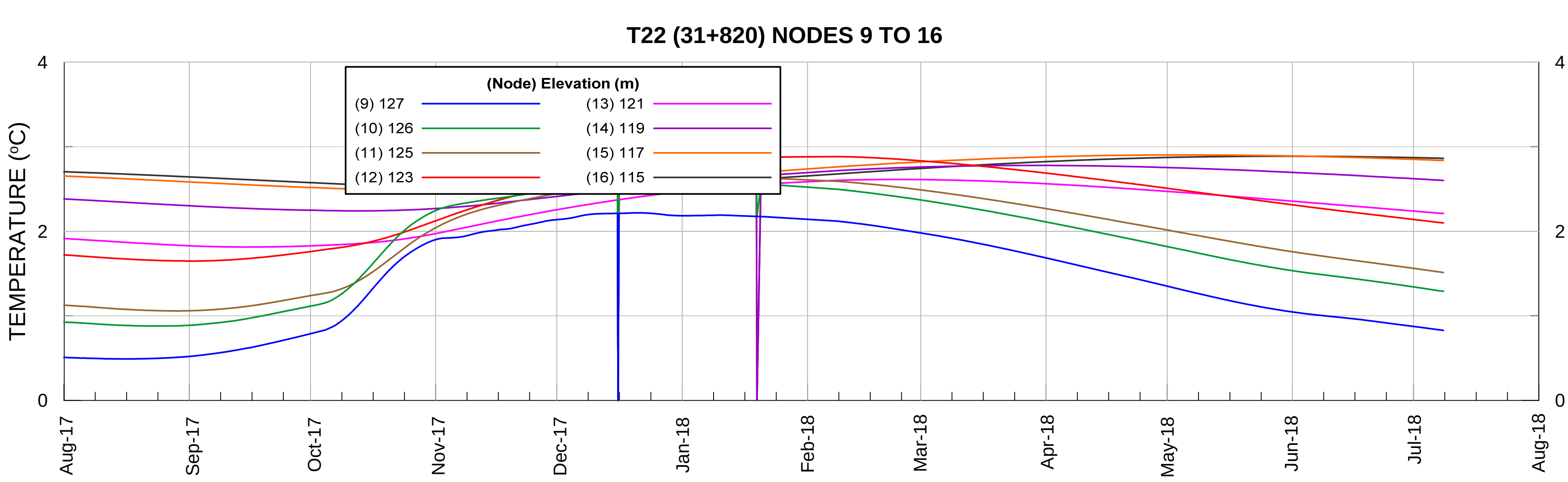
BAYGOOSE DIKE
NODAL THERMAL TIMELINES
(Aug 1/17 to Aug 1/18)

PROJECT No.			PHASE No.	
DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
CADD	TD	20JAN14	**FIGURE 39**	
CHECK				
REVIEW				





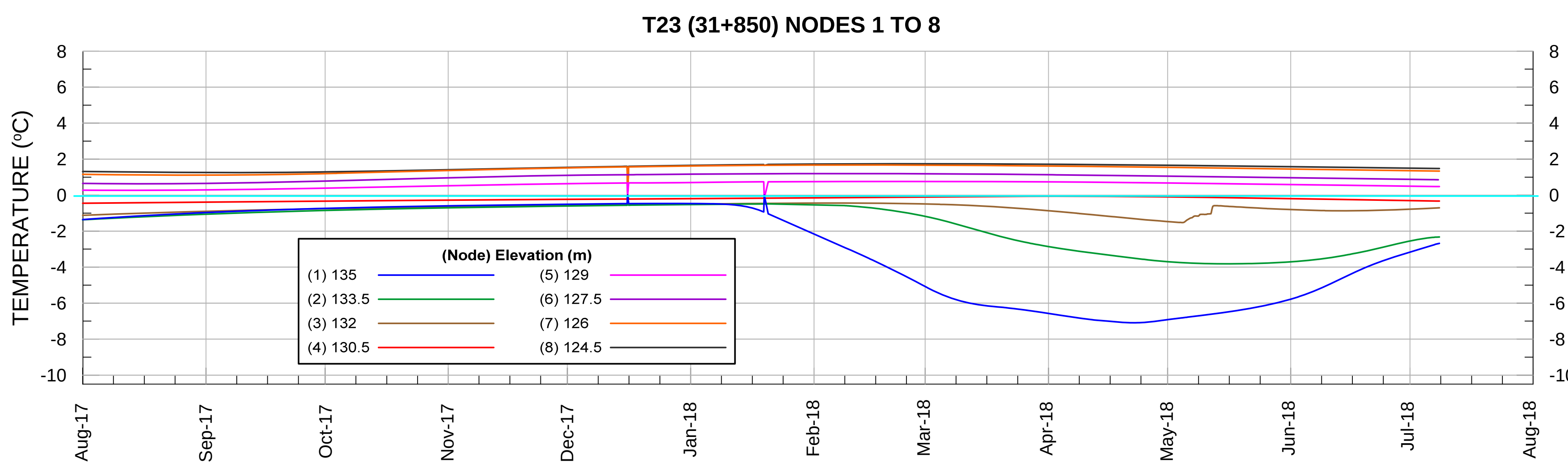


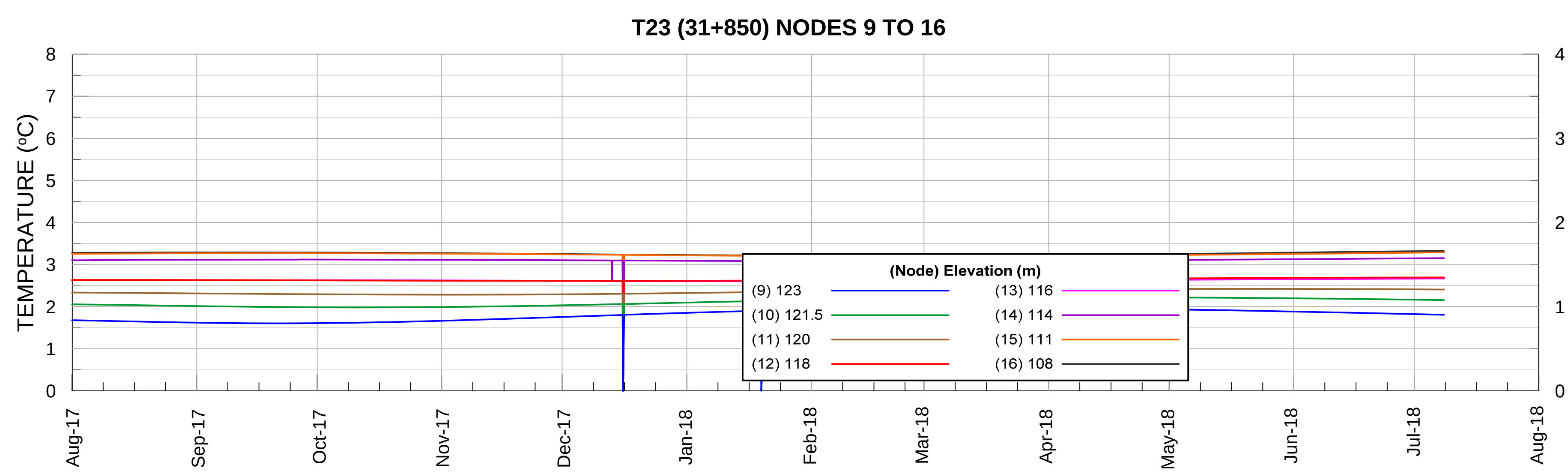


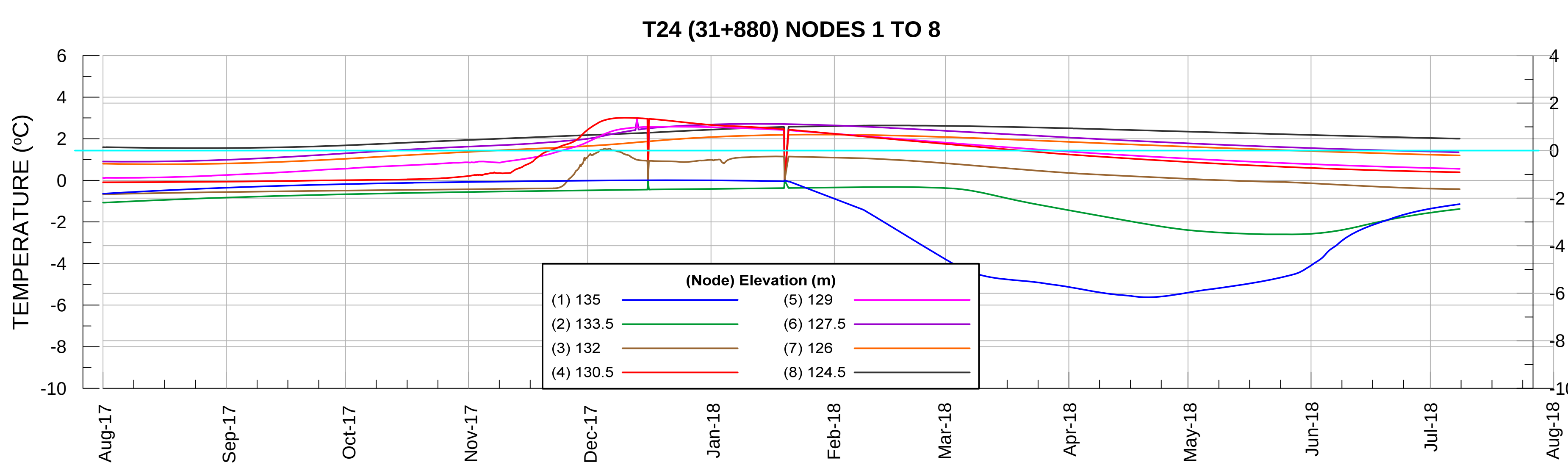
PROJECT	**AGNICO EAGLE MINES LIMITED** **MEADOWBANK GOLD PROJECT** **NUNAVUT**
TITLE	**BAYGOOSE DIKE** **NODAL THERMAL TIMELINES** **(Aug 1/17 to Aug 1/18)**

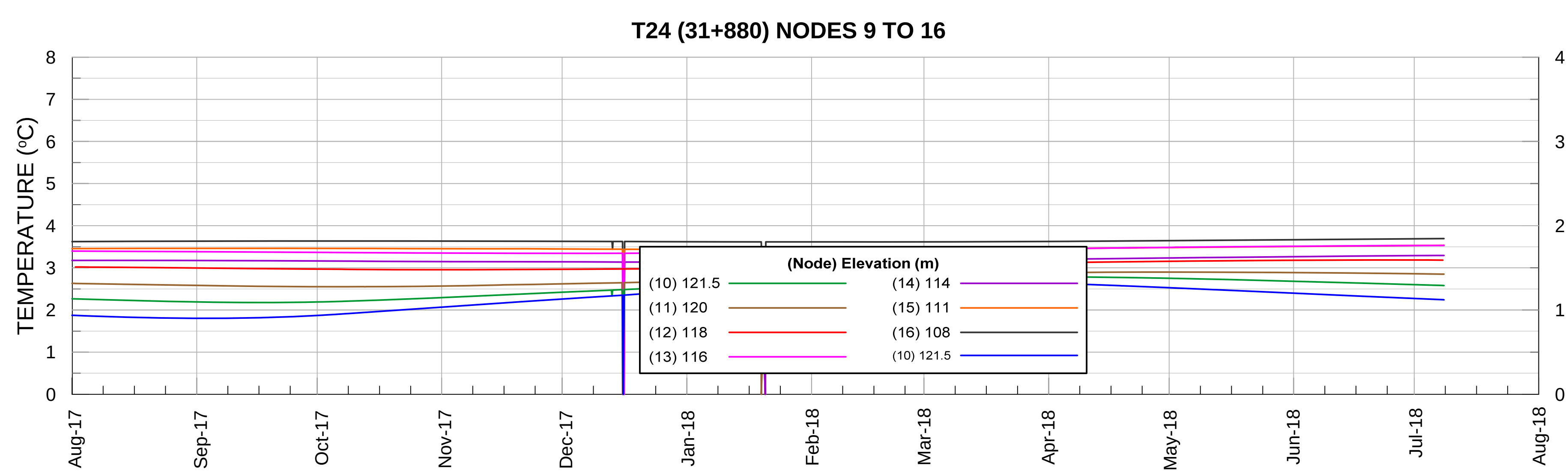
AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
CADD	TD	20JAN14	**FIGURE 40**	
CHECK				
REVIEW				









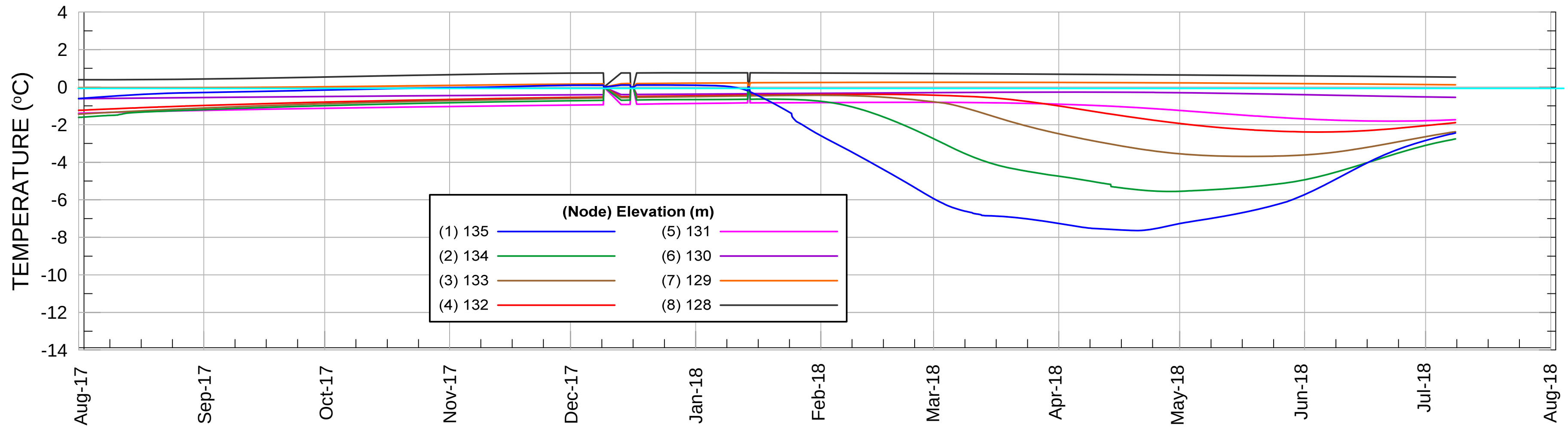
PROJECT: **AGNICO EAGLE MINES LIMITED**
MEADOWBANK GOLD PROJECT
NUNAVUT

TITLE: **BAYGOOSE DIKE**
NODAL THERMAL TIMELINES
(Aug 1/17 to Aug 1/18)

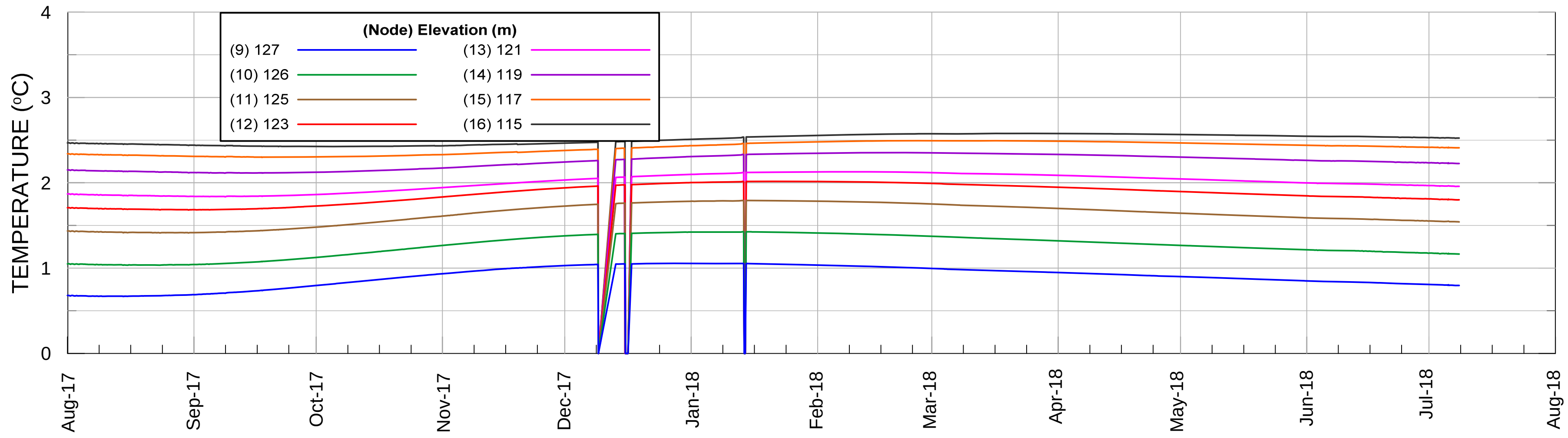
AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
CADD	TD	20JAN14	**FIGURE 41**	
CHECK				
REVIEW				

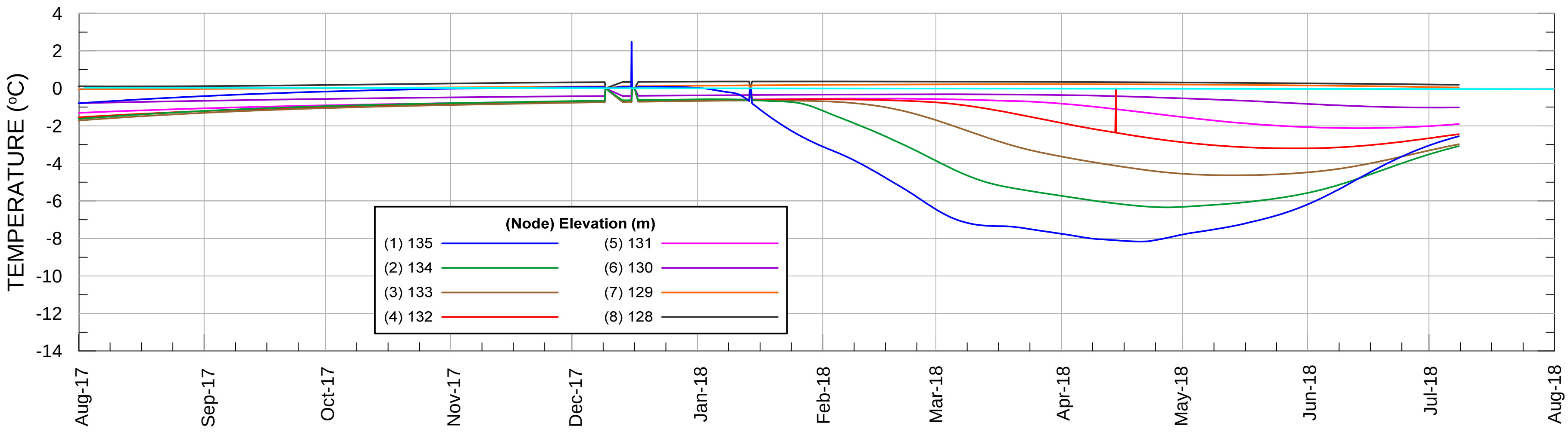
T25 (31+960) NODES 1 TO 8



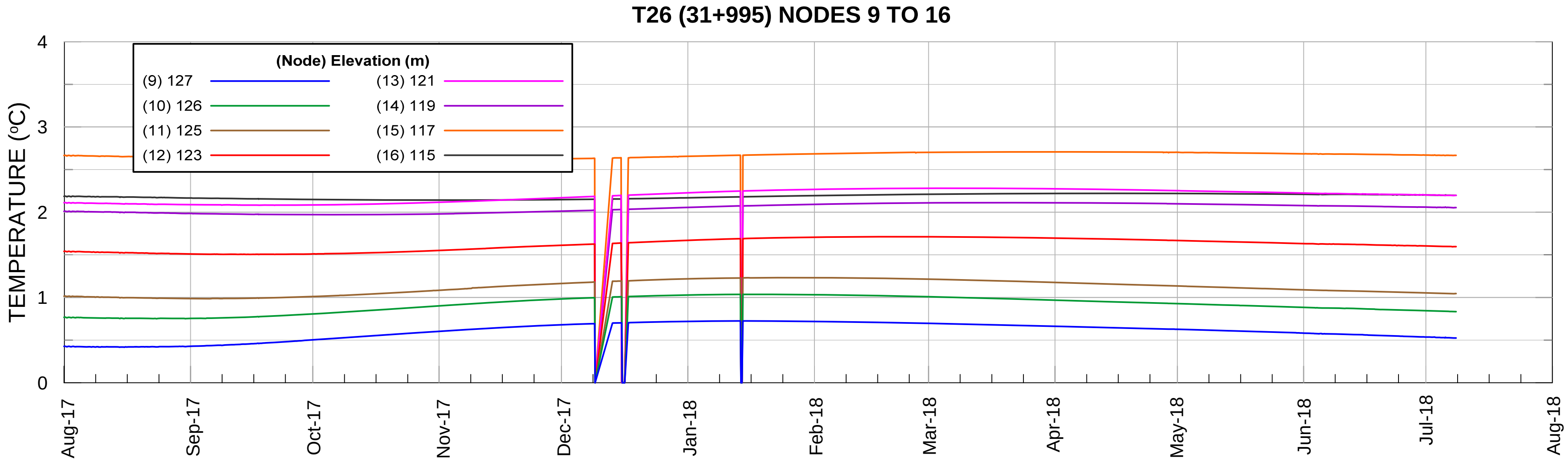
T25 (31+960) NODES 9 TO 16



T26 (31+995) NODES 1 TO 8



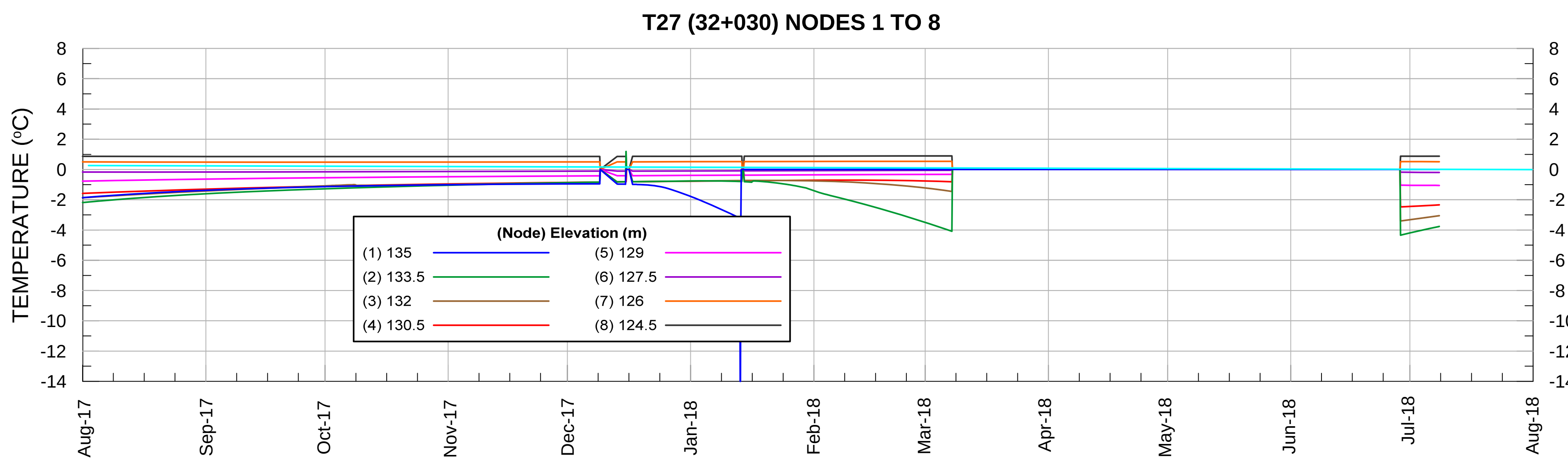
T26 (31+995) NODES 9 TO 16

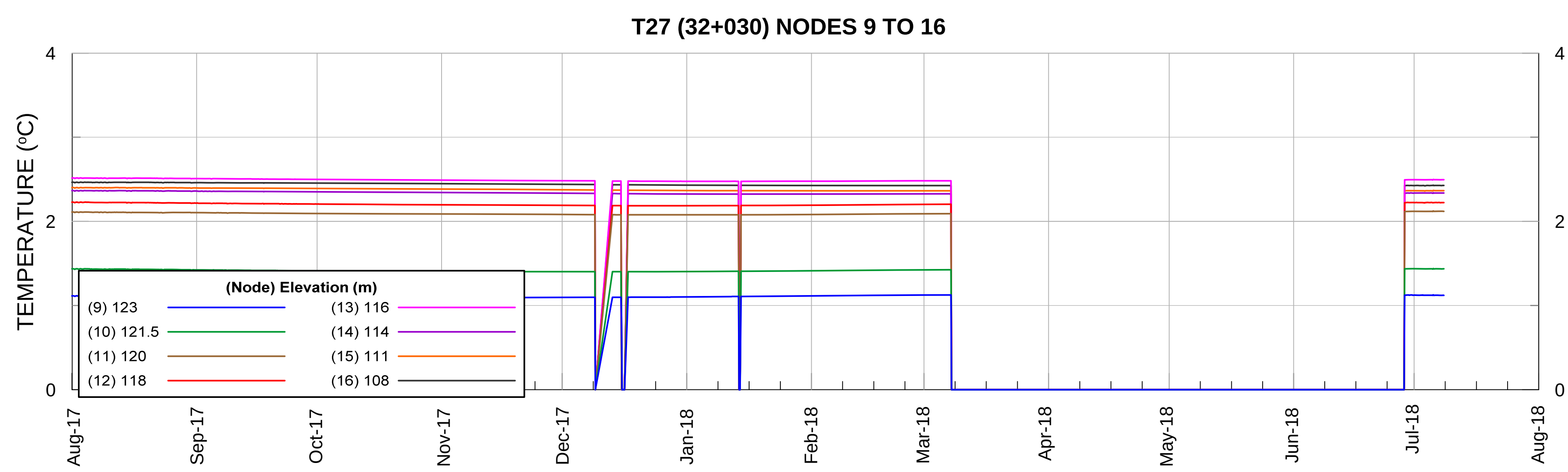


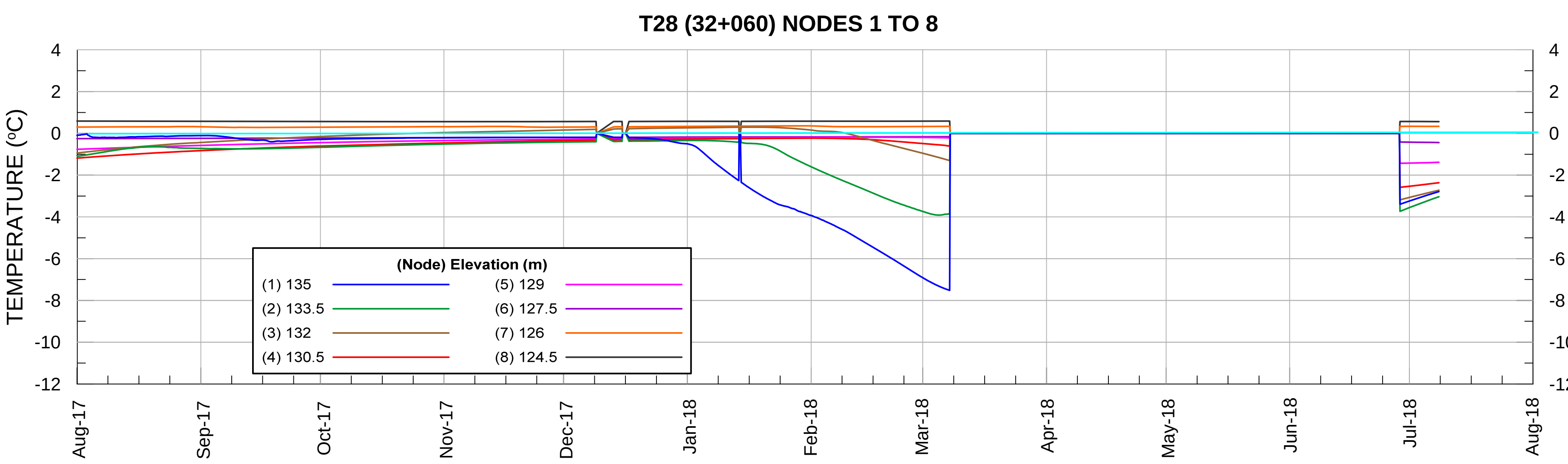
PROJECT	**AGNICO EAGLE MINES LIMITED** **MEADOWBANK GOLD PROJECT** **NUNAVUT**
TITLE	**BAYGOOSE DIKE** **NODAL THERMAL TIMELINES** **(Aug 1/17 to Aug 1/18)**

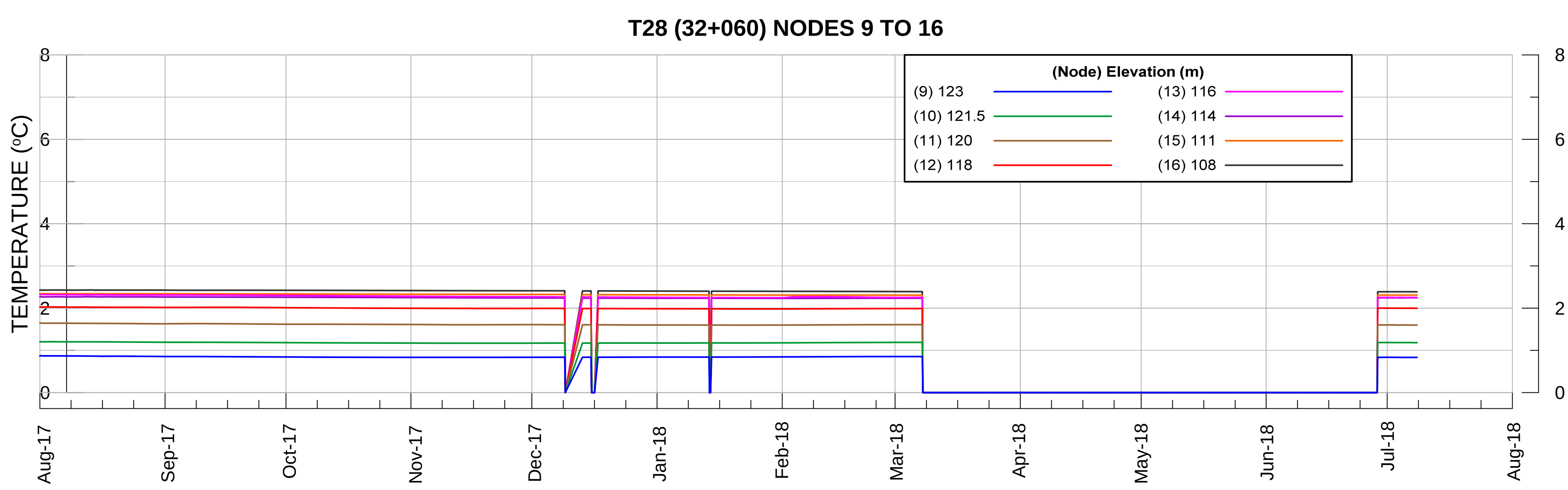
AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
CADD	TD	20JAN14	**FIGURE 42**	
CHECK				
REVIEW				







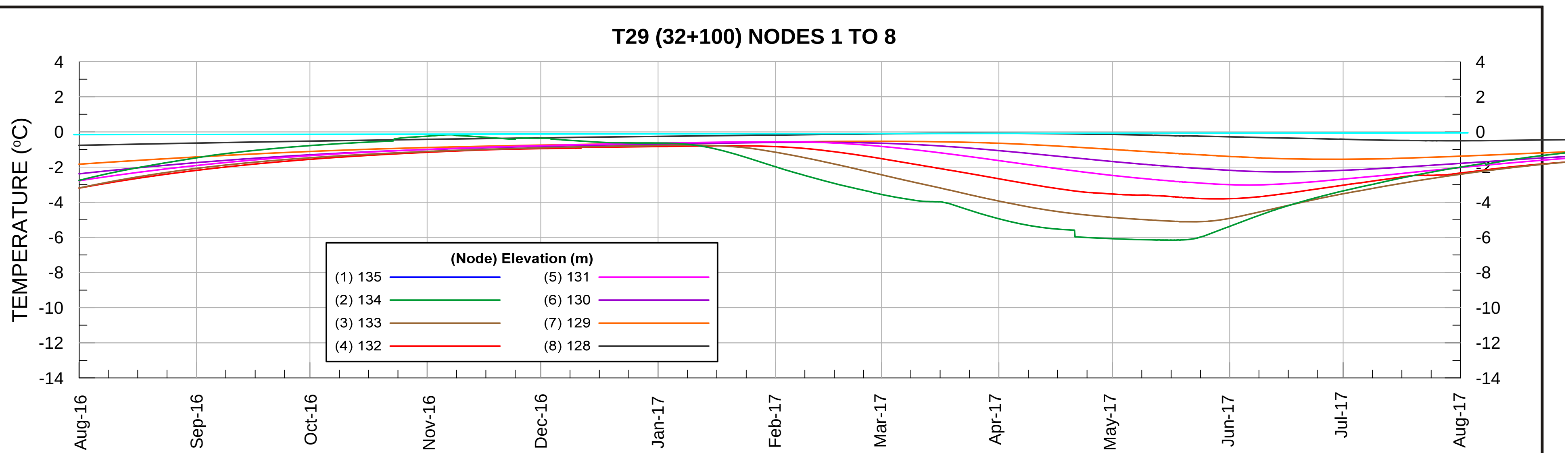


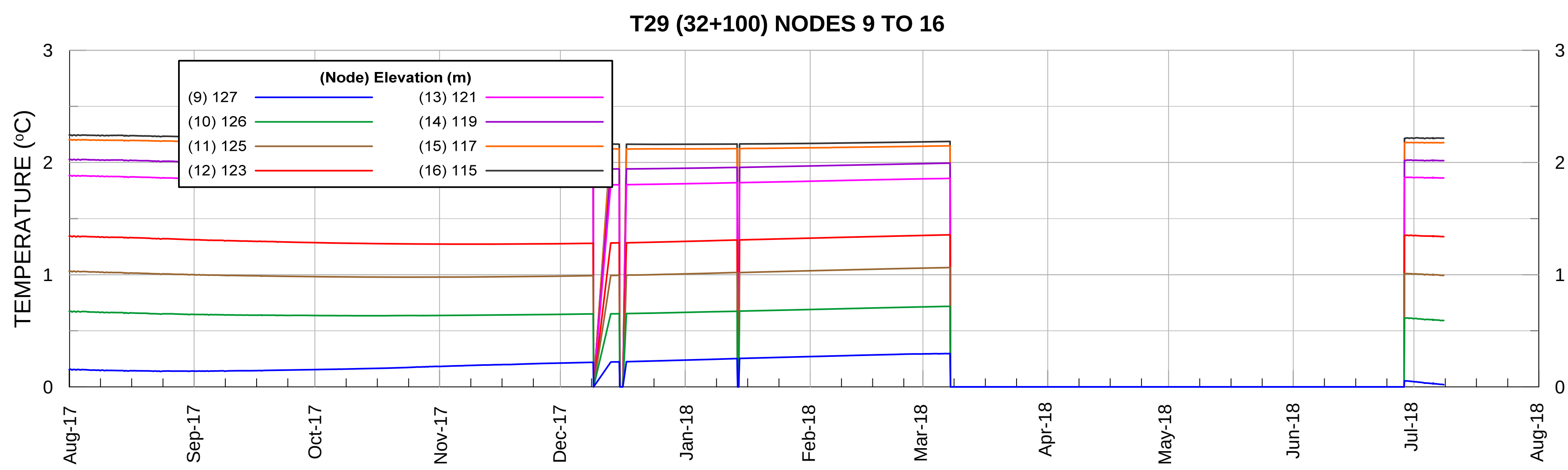
Note: The jump in temperature is an error with the instrument. Inspections in the field yielded no results.

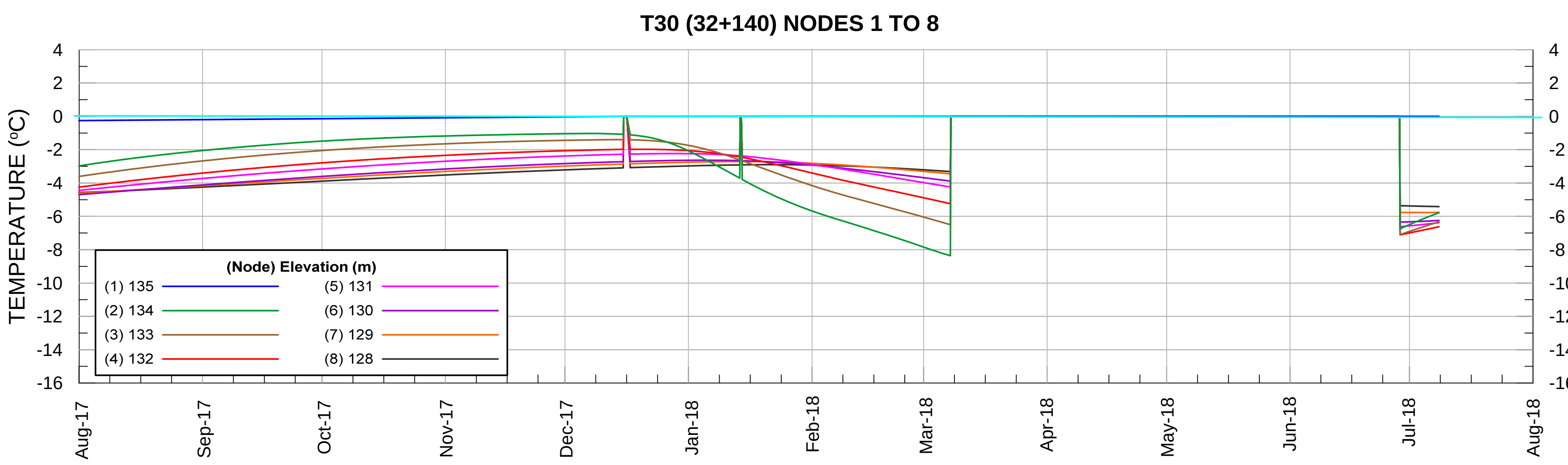
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE NODAL THERMAL TIMELINES (Aug 1/17 to Aug 1/18)

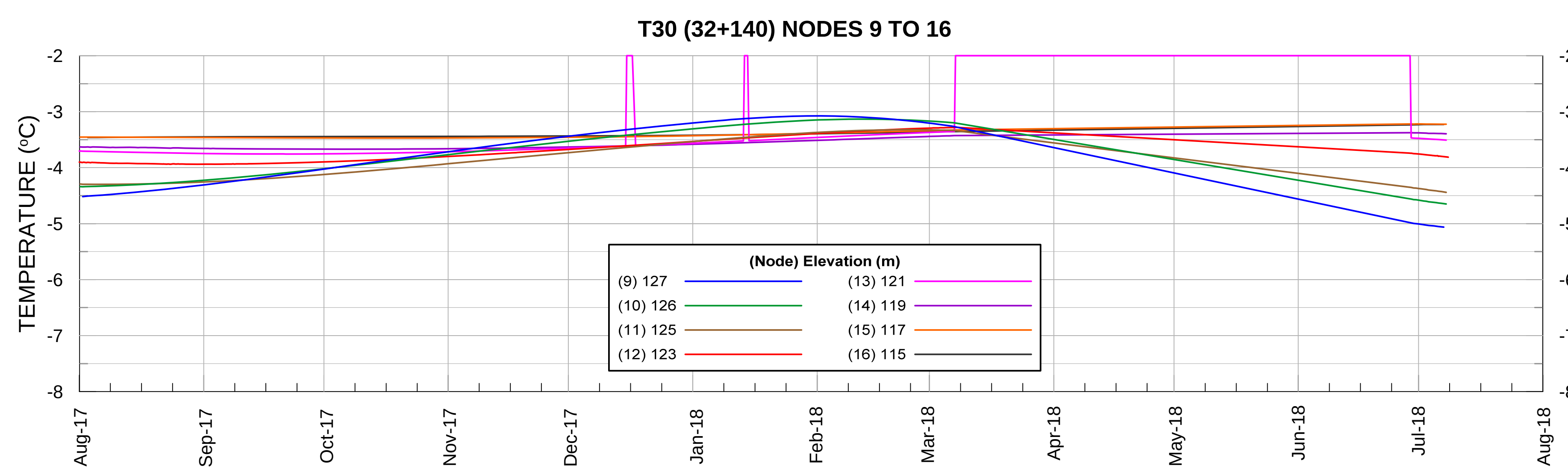
AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.
DESIGN	TD	17JAN14	SCALE AS SHOWN REV.
CADD	TD	17JAN14	
CHECK			FIGURE 43
REVIEW			









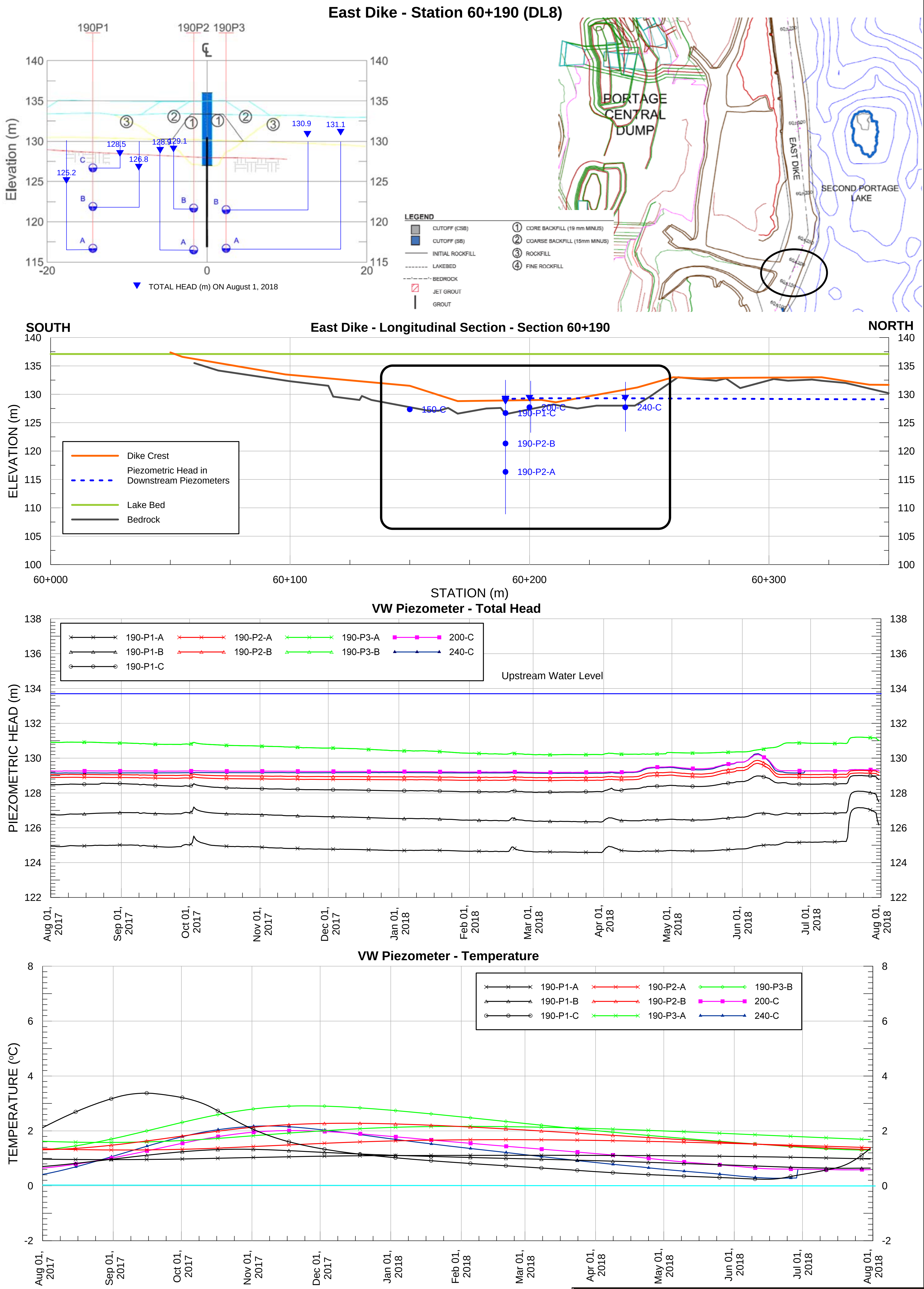
Note: The jump in temperature is an error with the instrument. Inspections in the field yielded no results.

PROJECT **AGNICO EAGLE MINES LIMITED**
MEADOWBANK GOLD PROJECT
NUNAVUT

TITLE **BAYGOOSE DIKE**
NODAL THERMAL TIMELINES
(Aug 1/17 to Aug 1/18)

AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	17JAN14	SCALE AS SHOWN	REV.
CADD	TD	17JAN14	**FIGURE 44**	
CHECK				
REVIEW				



NOTES:

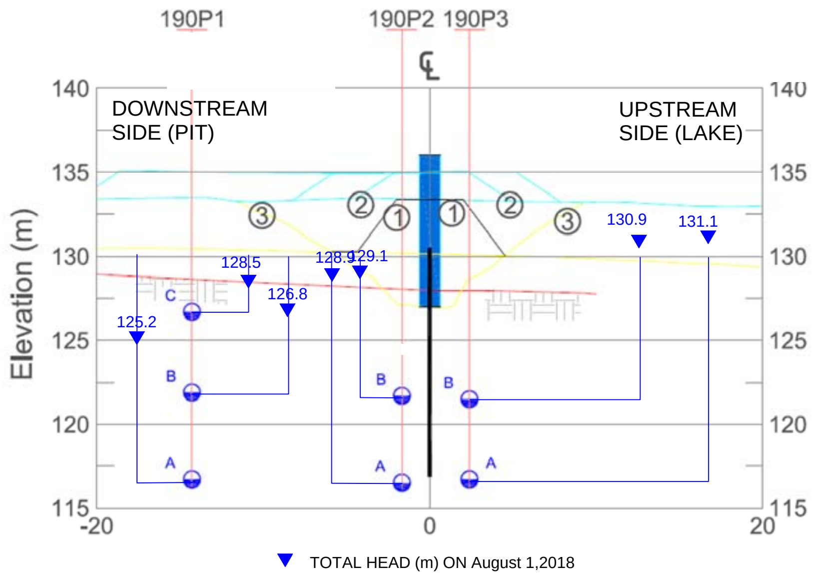
1: 150-C stopped working in Nov 2012

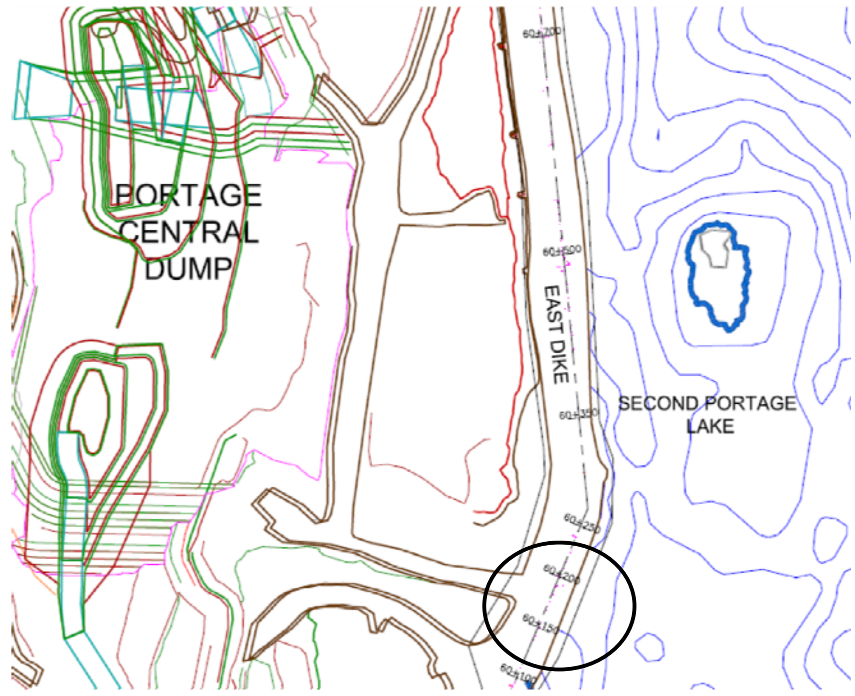
2. Change in PWP and temperature are related to the discharge pipe changed from pit to lake.

3. There was a rise in PWP in June. Inspections of the area noted no changes.

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT			
TITLE	EAST DIKE Section 60+190 - PIEZOMETRIC DATA (Aug 1/17 to Aug 1/18)			
AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.
	DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
	CADD	TD	28AUG14	FIGURE 45
	CHECK	PG	28AUG14	
	REVIEW			

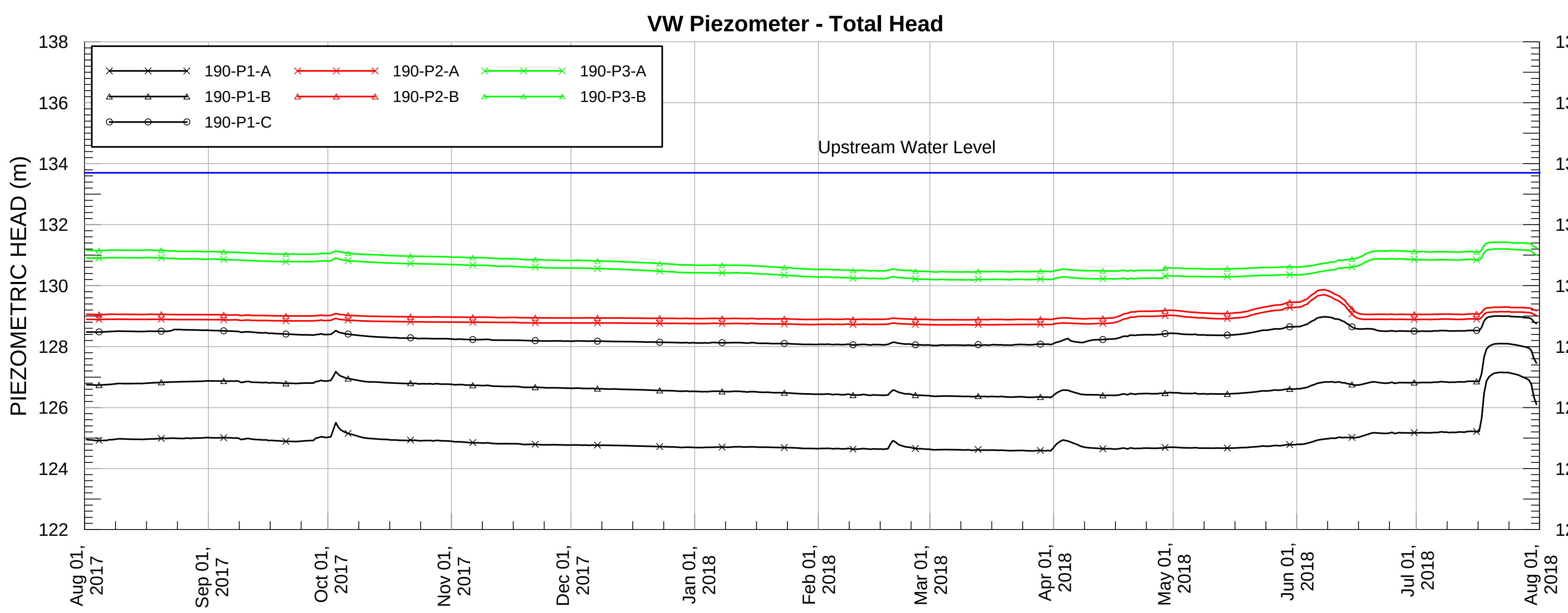
STATION 60+190

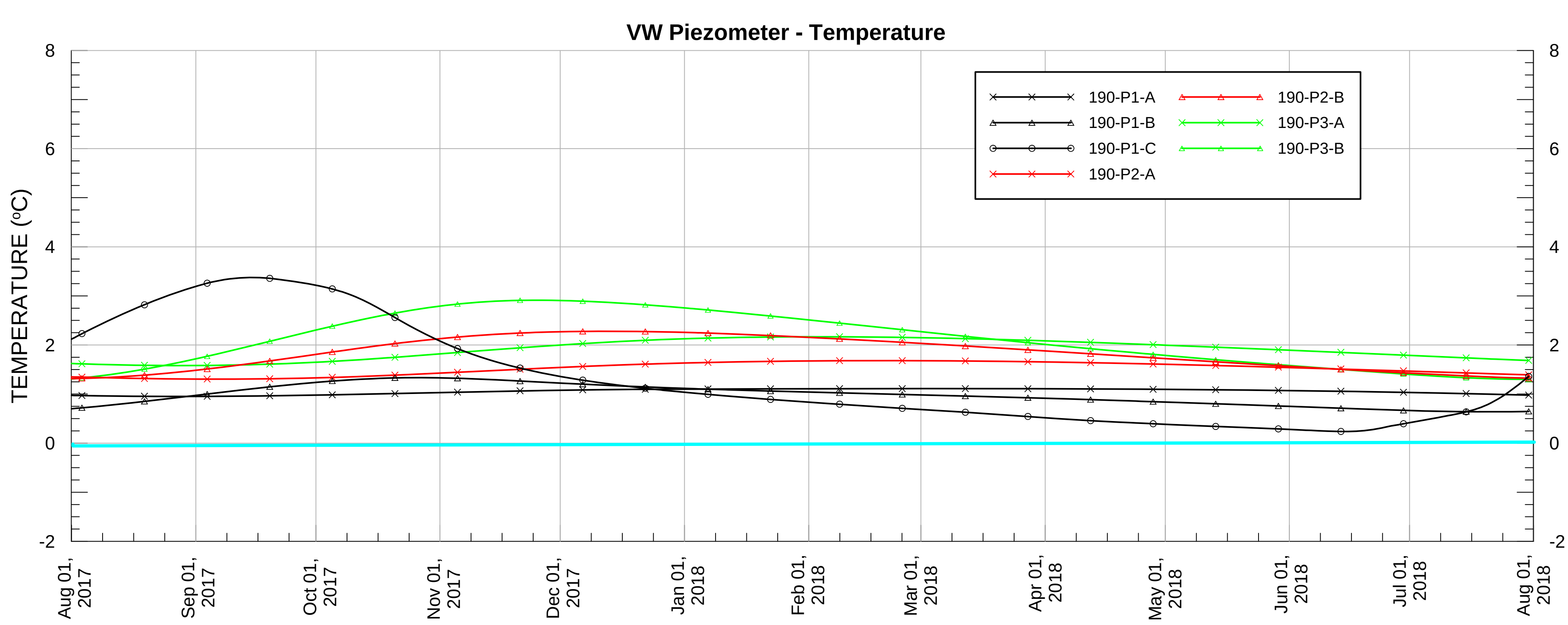




LEGEND

- CUTOFF (CSB)
- CUTOFF (SB)
- INITIAL ROCKFILL
- LAKEBED
- BEDROCK
- JET GROUT
- GROUT
- ① CORE BACKFILL (19 mm MINUS)
- ② COARSE BACKFILL (15mm MINUS)
- ③ ROCKFILL
- ④ FINE ROCKFILL





NOTES:

1. Change in PWP and temperature are related to the discharge pipe changed from pit to lake and lake to pit.

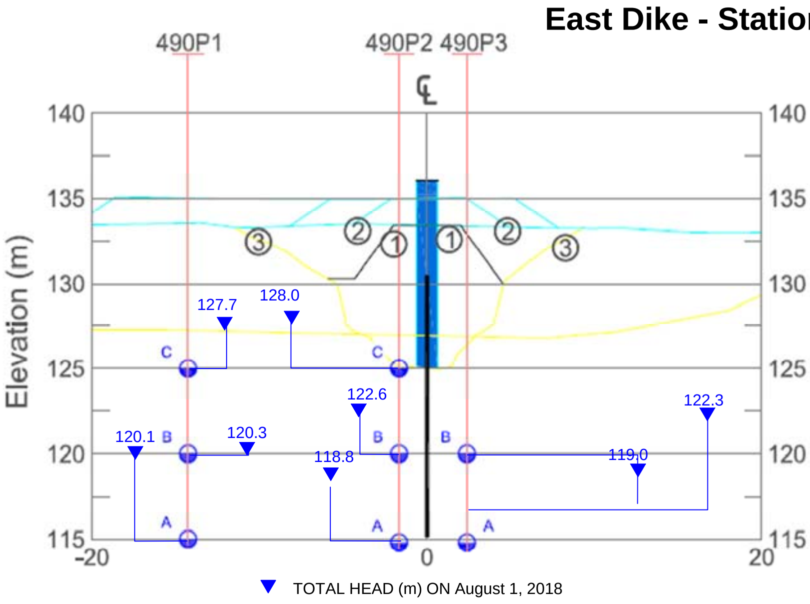
PROJECT: **AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT**

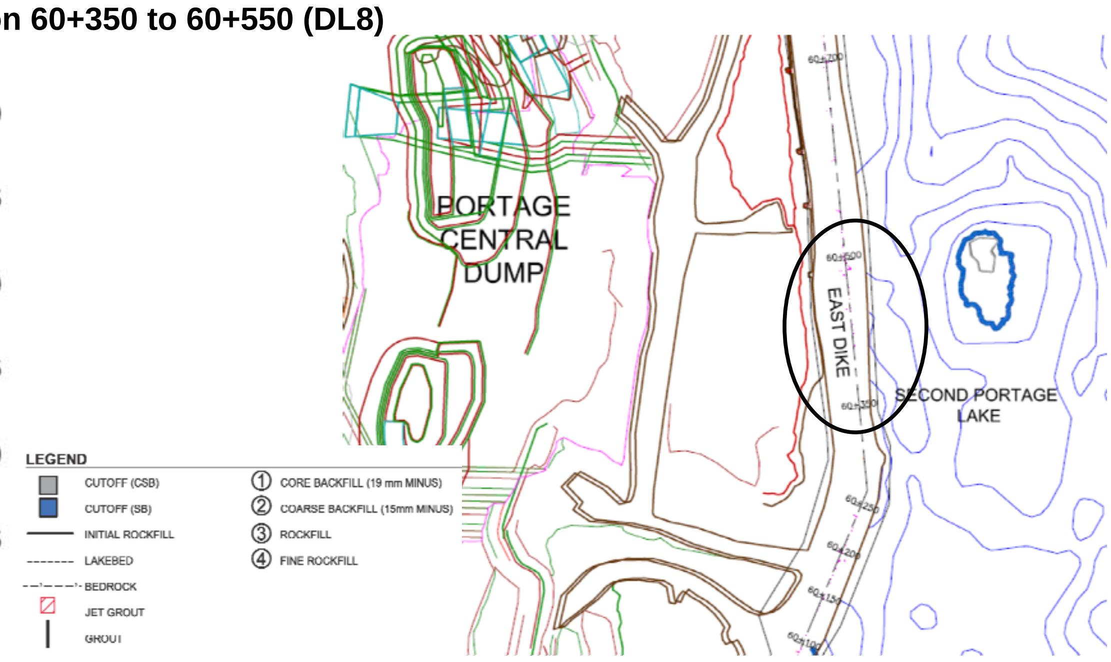
TITLE: **EAST DIKE - SECTION 60+190 PIEZOMETRIC DATA (Aug 1/17 to Aug 1/18)**

AGNICO EAGLE MEADOWBANK

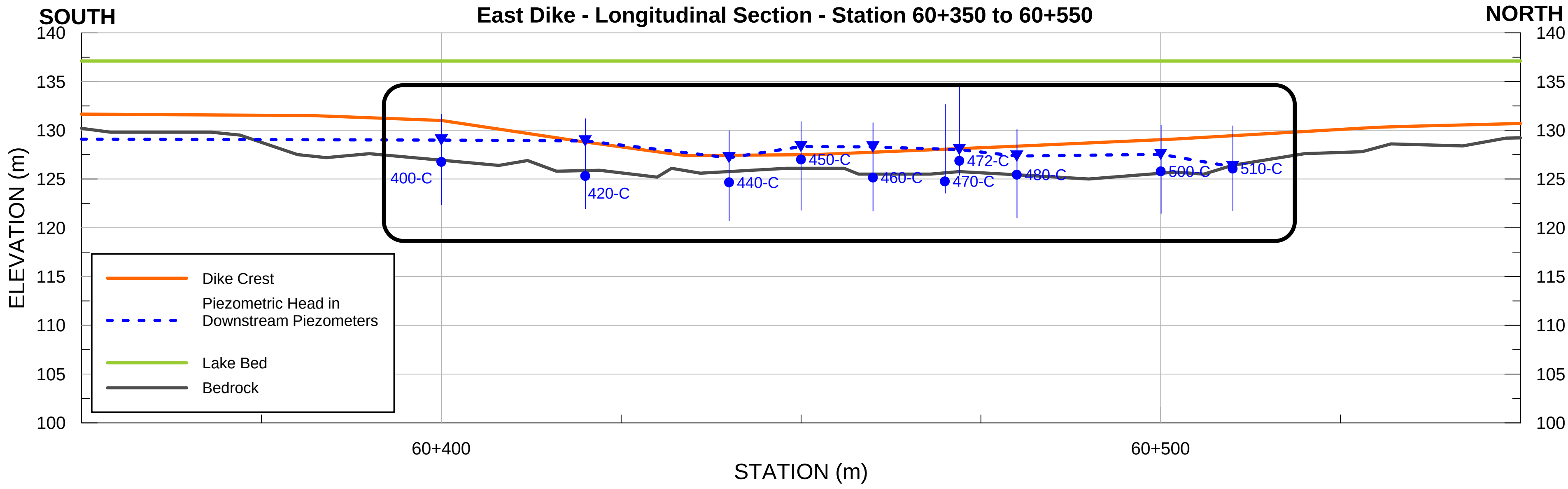
PROJECT No.			PHASE No.
DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
CADD	TD	28AUG14	**FIGURE 46**
CHECK	PG	28AUG14	
REVIEW			

East Dike - Station 60+350 to 60+550 (DL8)

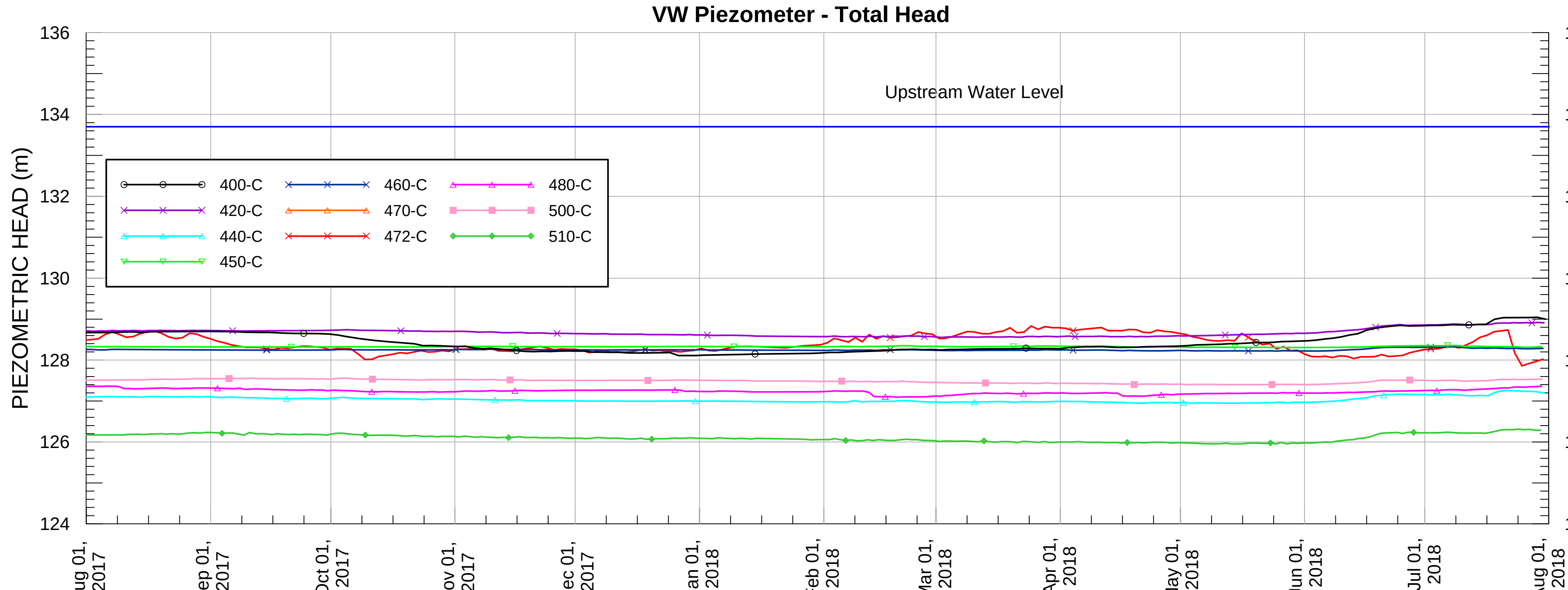




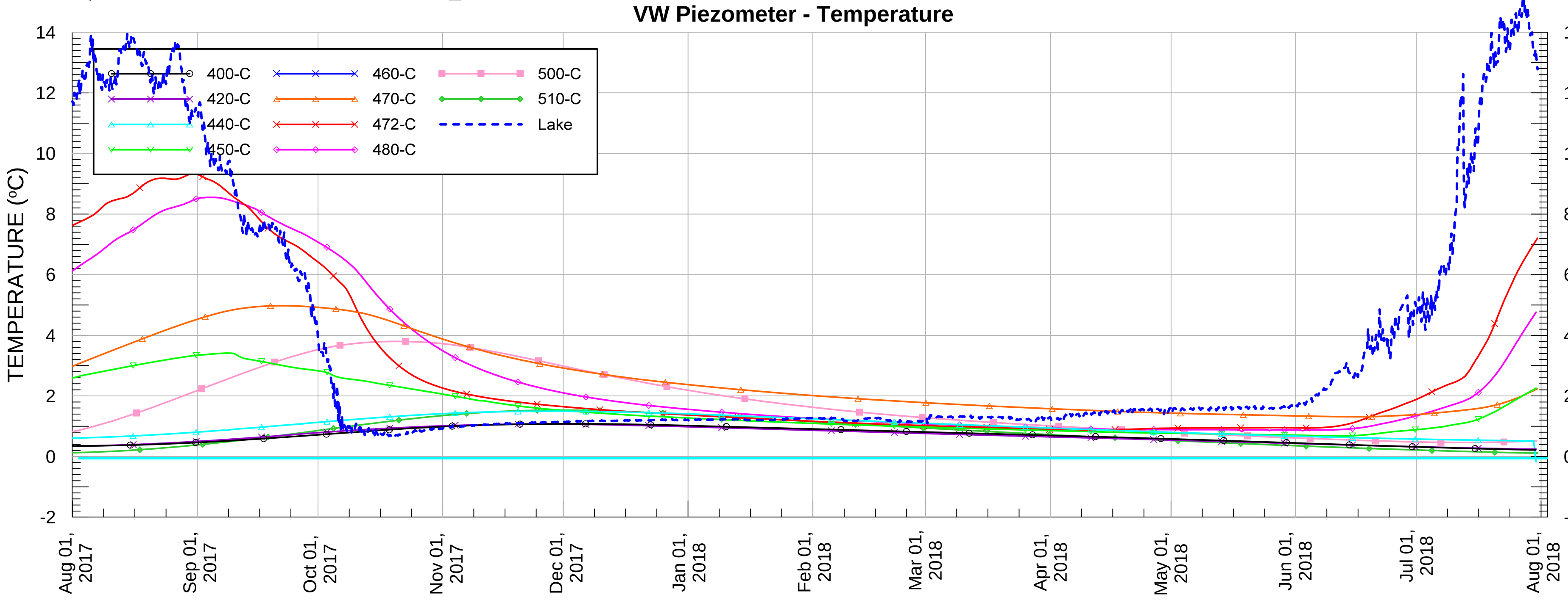
East Dike - Longitudinal Section - Station 60+350 to 60+550



VW Piezometer - Total Head



VW Piezometer - Temperature



NOTES:

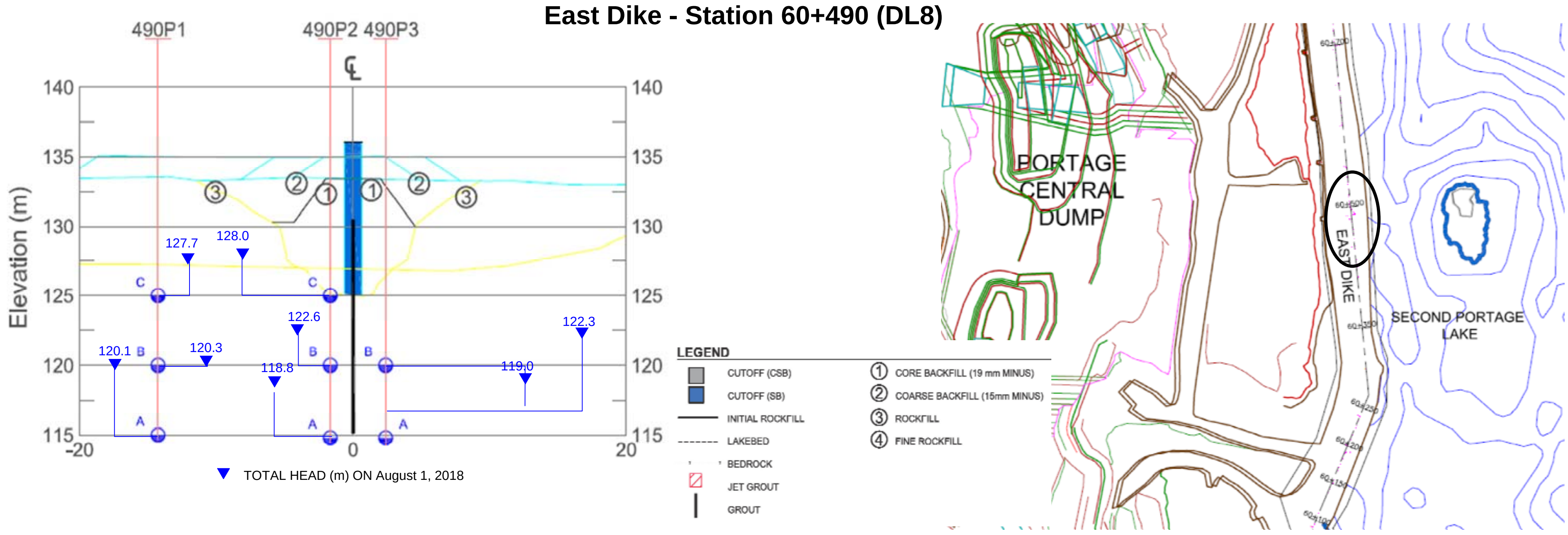
1. As seen in the graph on the side, the progression of the temperature in the Pz follows the lake temperature closely. Usually it takes approximately one to two weeks to see the trend following the lake temperature.

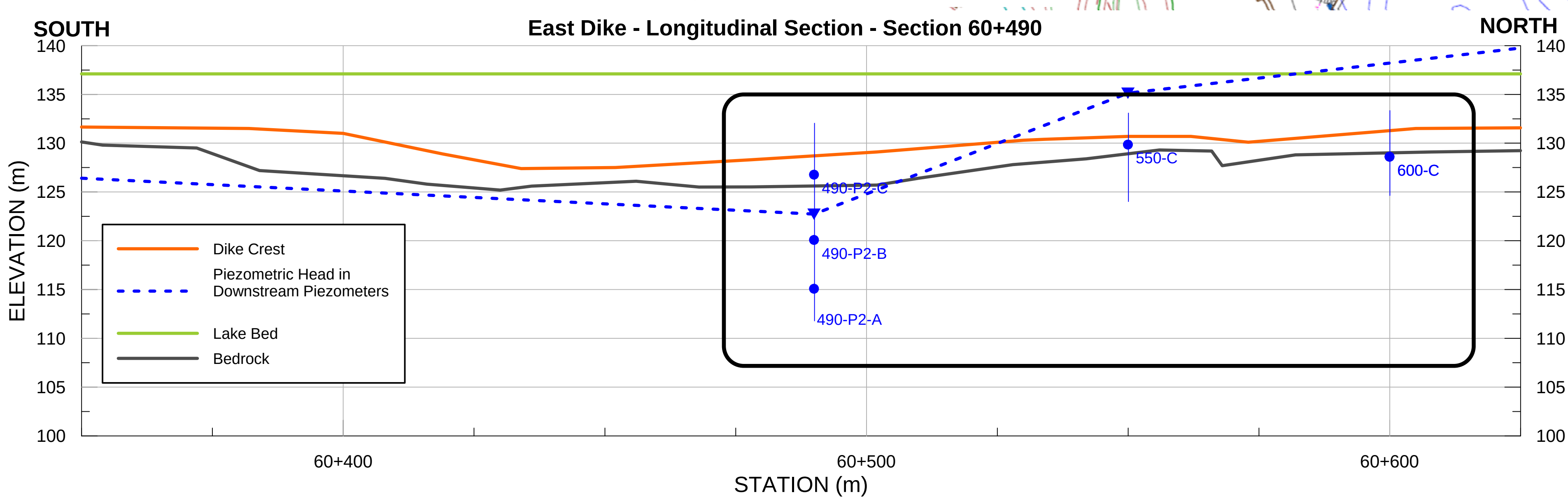
PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

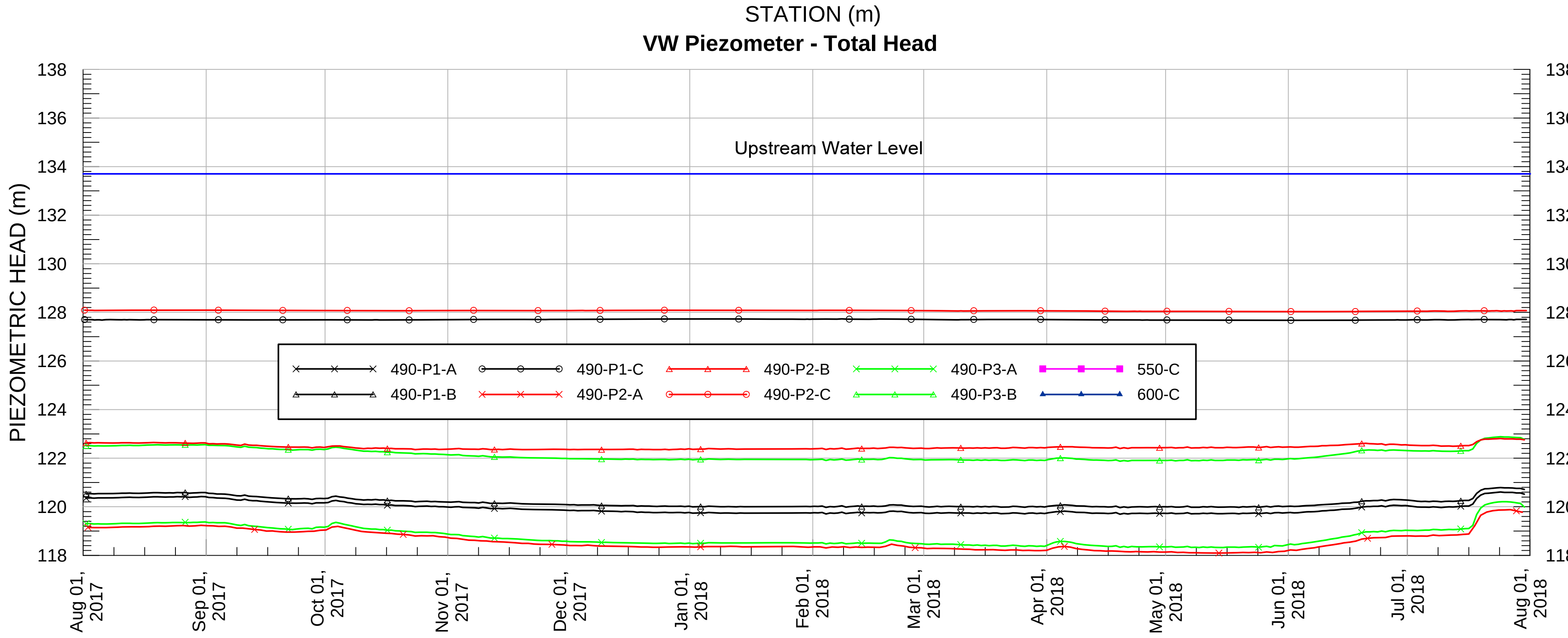
TITLE
EAST DIKE
Section 60+350 to60+550 - PIEZOMETRIC DATA (Aug 1/17 to Aug 1/18)

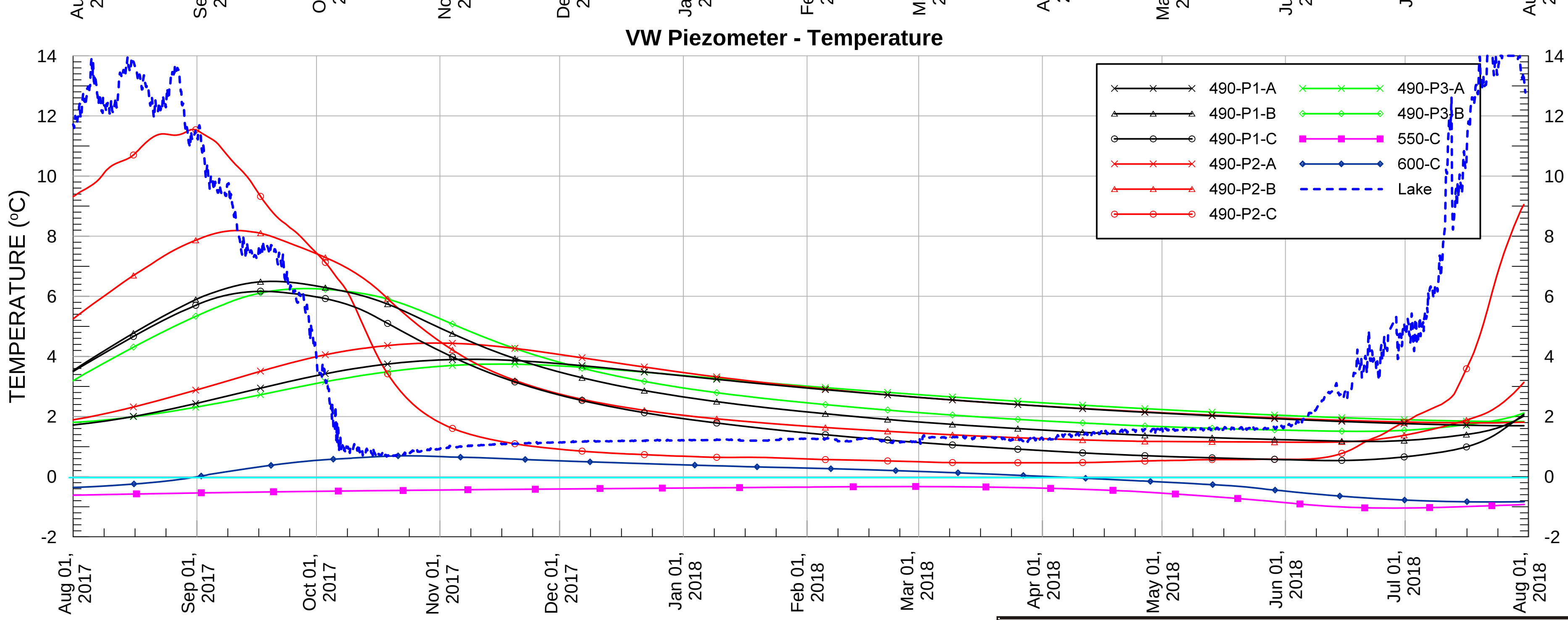
AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.
DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
CADD	TD	28AUG14	**FIGURE 47**
CHECK	PG	28AUG14	
REVIEW			









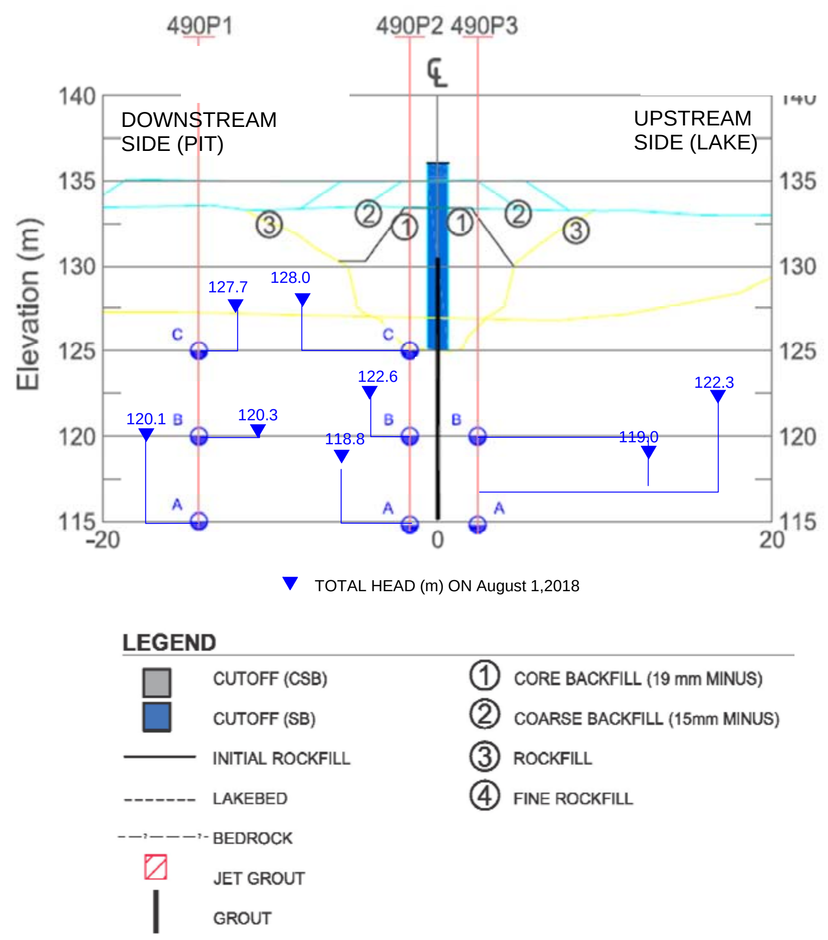
NOTES:

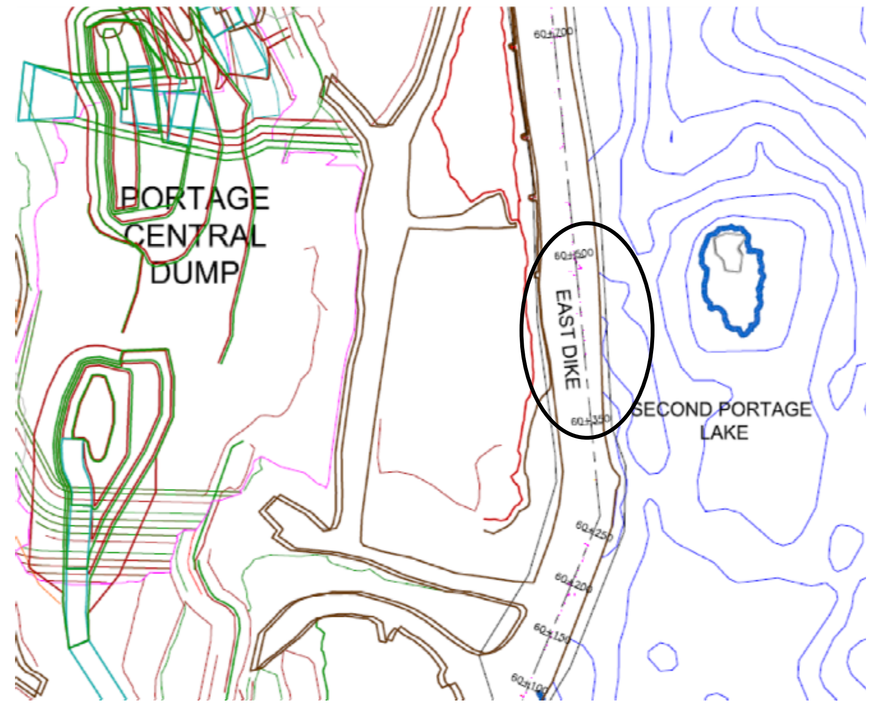
1: 550-C and 600-C are giving anomoly readings and with a negative temperature are assumed to be frozen.

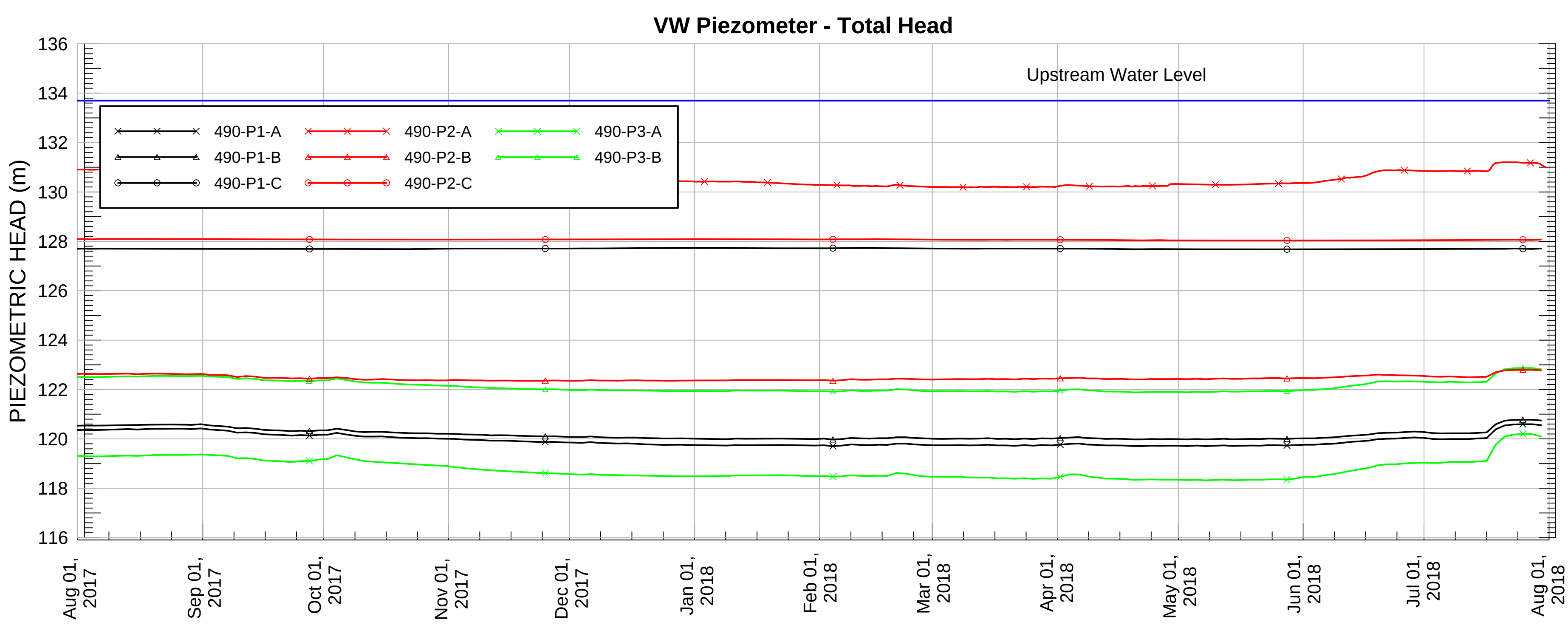
2. As seen in the graph on the side, the progression of the temperature in the Pz follows the lake temperature closely. Usually it takes approximately one to two weeks to see the trend following the lake temperature.

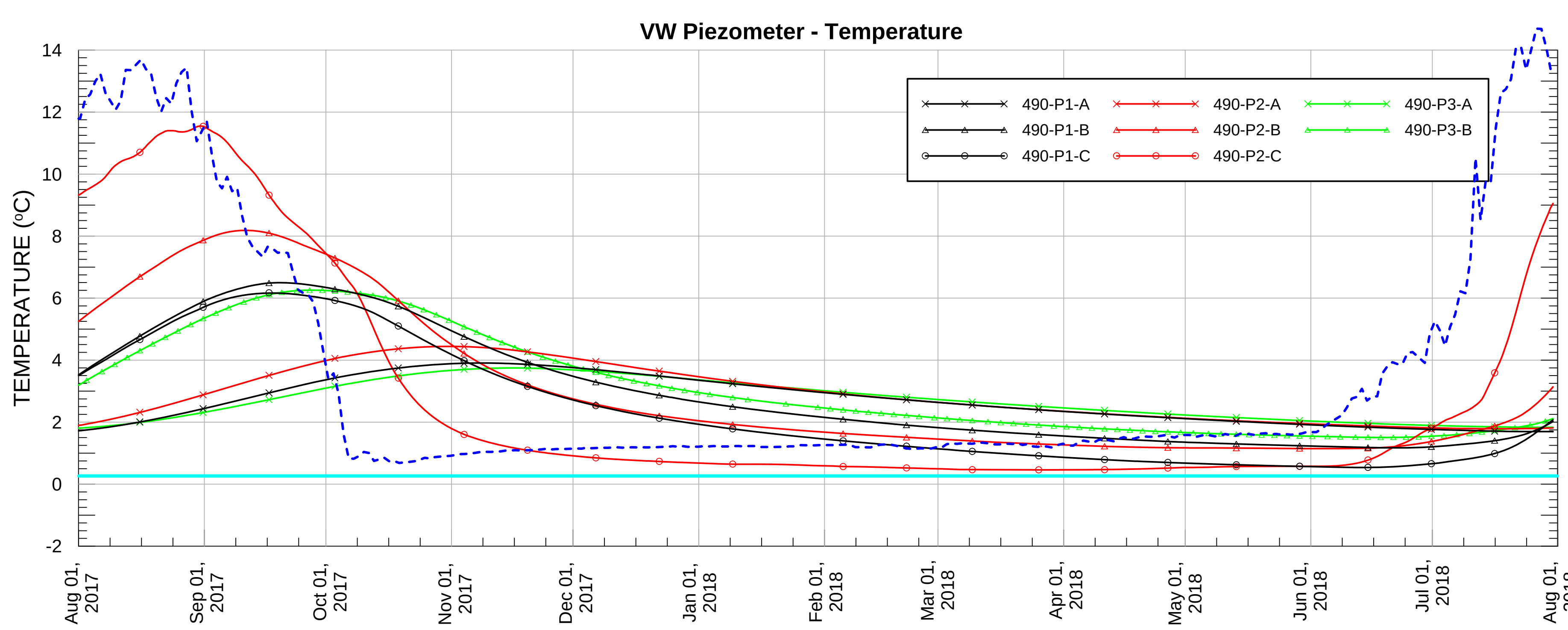
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT				
TITLE	EAST DIKE Section 60+490 - PIEZOMETRIC DATA (Aug 1/17 to Aug 1/18)				
AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.	
	DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
	CADD	TD	28AUG14	FIGURE 48	
	CHECK	PG	28AUG14		
	REVIEW				

STATION 60+490









NOTES:

1. As seen in the graph on the side, the progression of the temperature in the Pz follows the lake temperature closely. Usually it takes approximately one to two weeks to see the trend following the lake temperature.

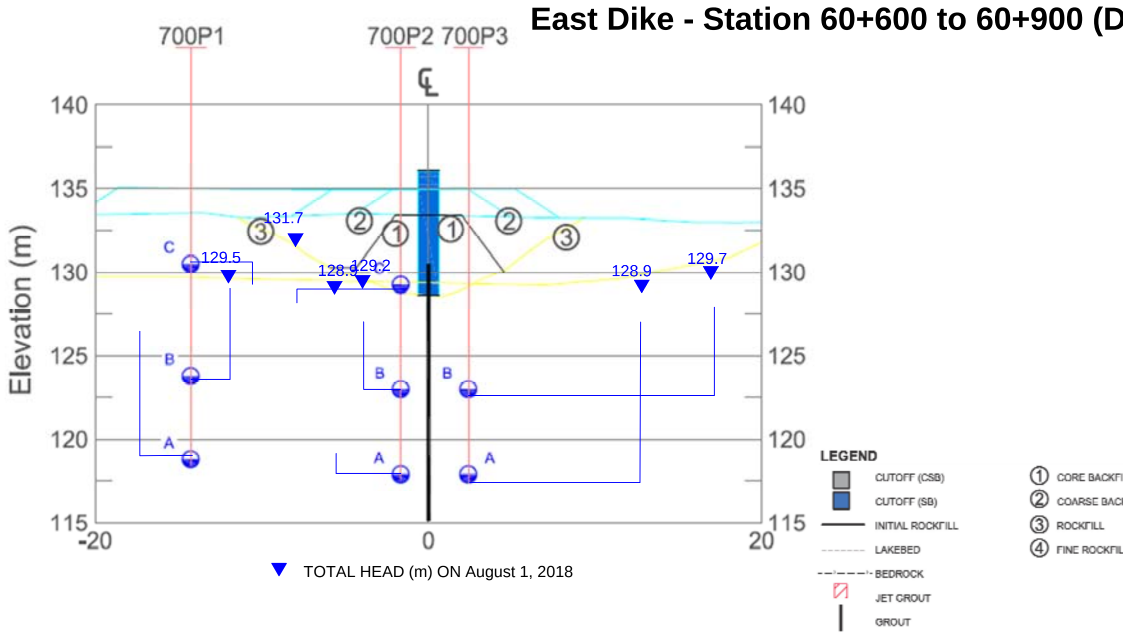
PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

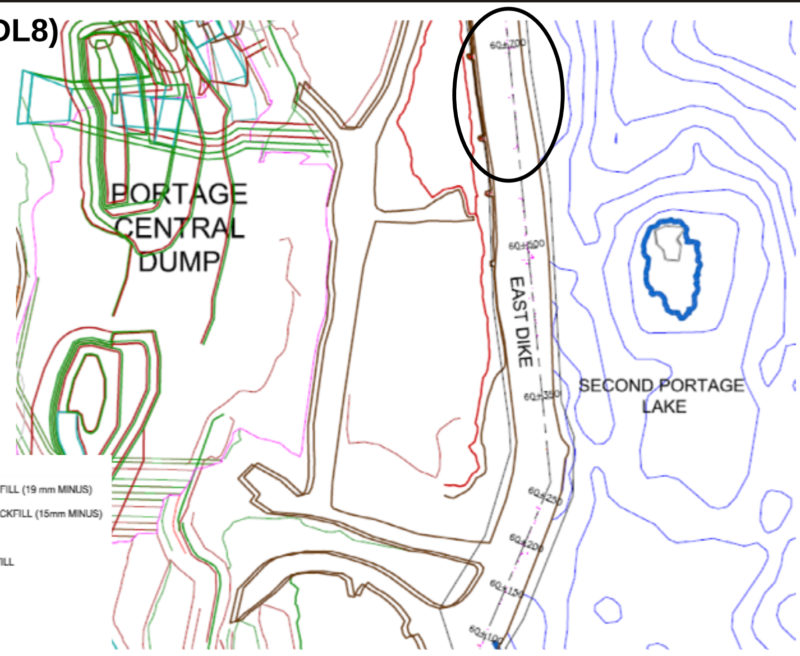
TITLE
EAST DIKE - SECTION 60+490
PIEZOMETRIC DATA
(Aug 1/17 to Aug 1/18)

AGNICO EAGLE
MEADOWBANK

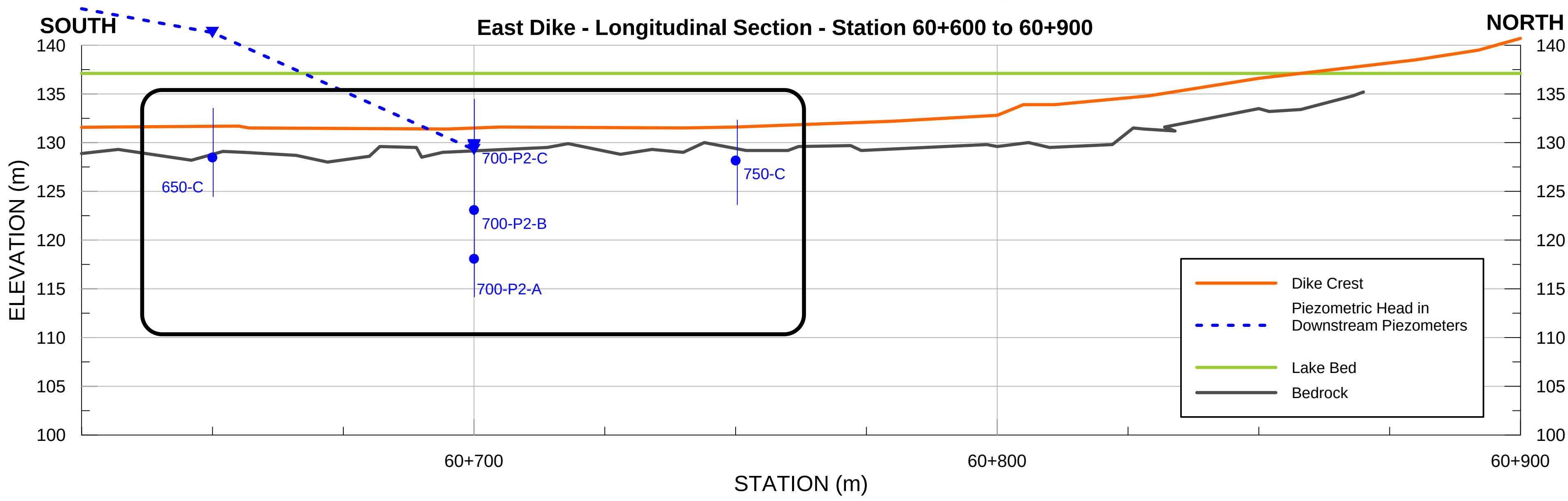
PROJECT No.			PHASE No.
DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
CADD	TD	28AUG14	**FIGURE 49**
CHECK			
REVIEW			

East Dike - Station 60+600 to 60+900 (DL8)

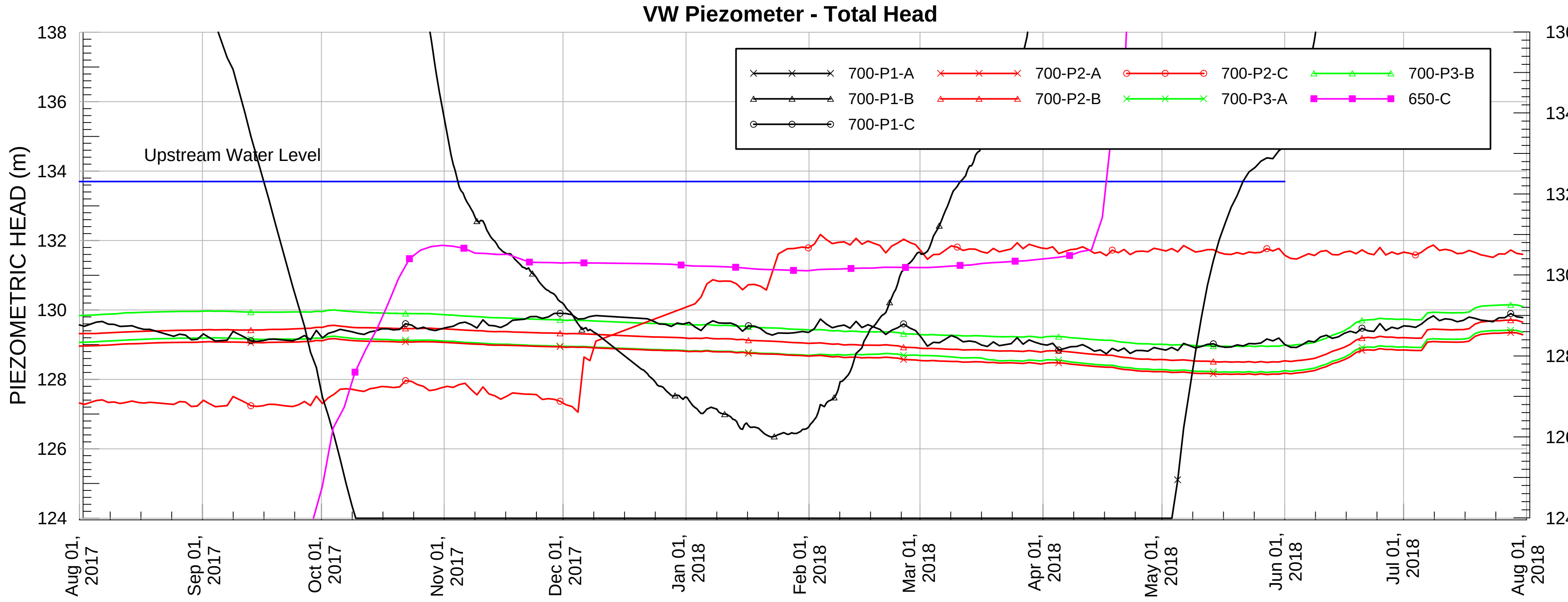




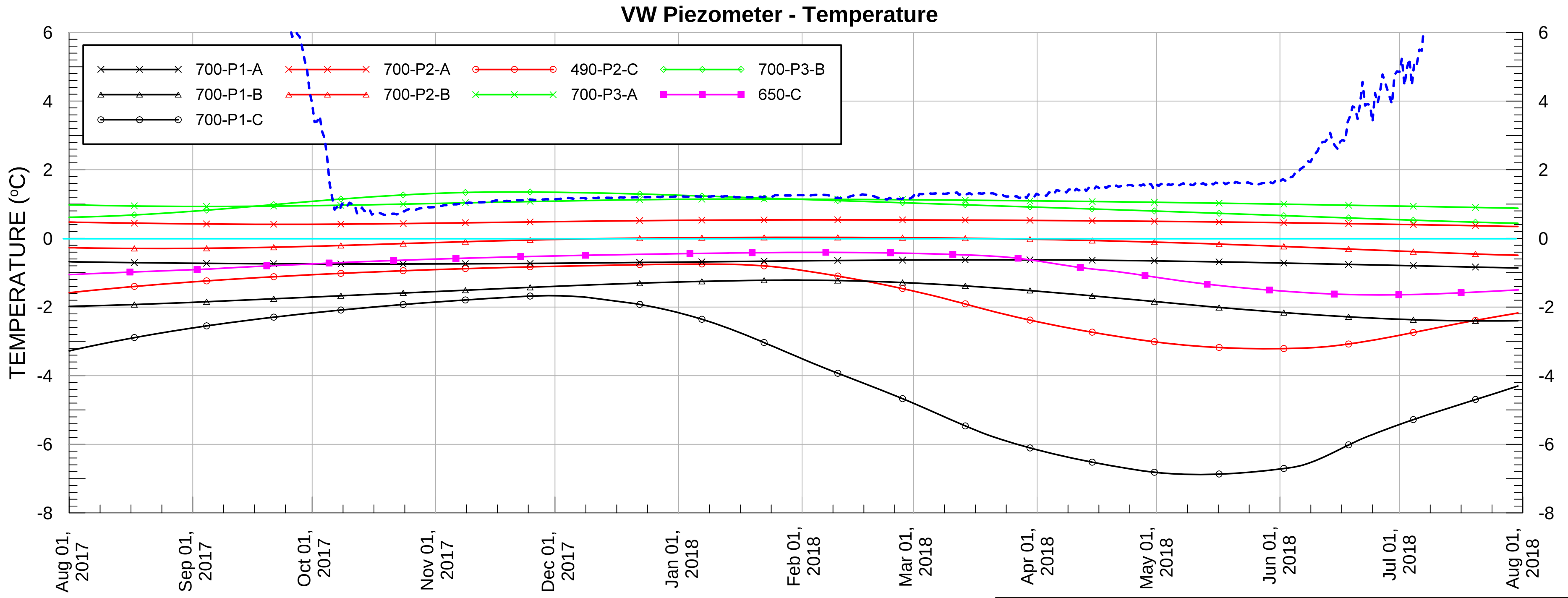
East Dike - Longitudinal Section - Station 60+600 to 60+900



VW Piezometer - Total Head



VW Piezometer - Temperature



NOTES:

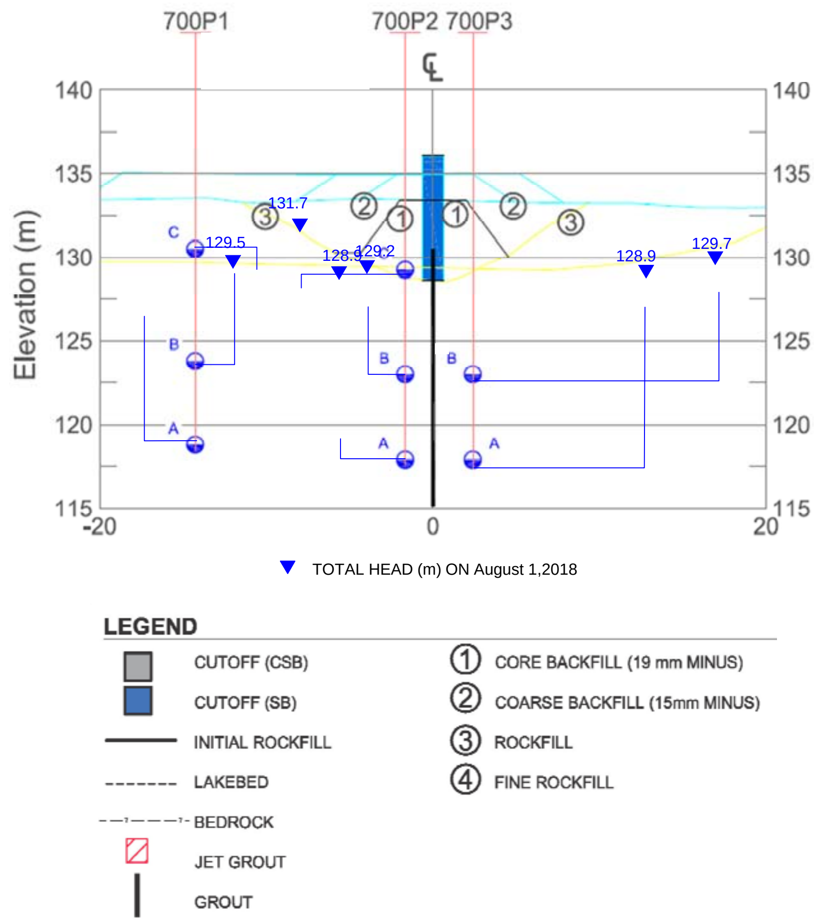
1: 700-P1-B and 750-C are giving anomoly readings and with a negative temperature are assumed to be frozen.
2. There was no data from Dec 10 on as the battery had lost charge. The battery was changed on Dec 20.
3. PWP follows same trends as previous years.
4. There was a rise in PWP in June. Inspections found no correlation.

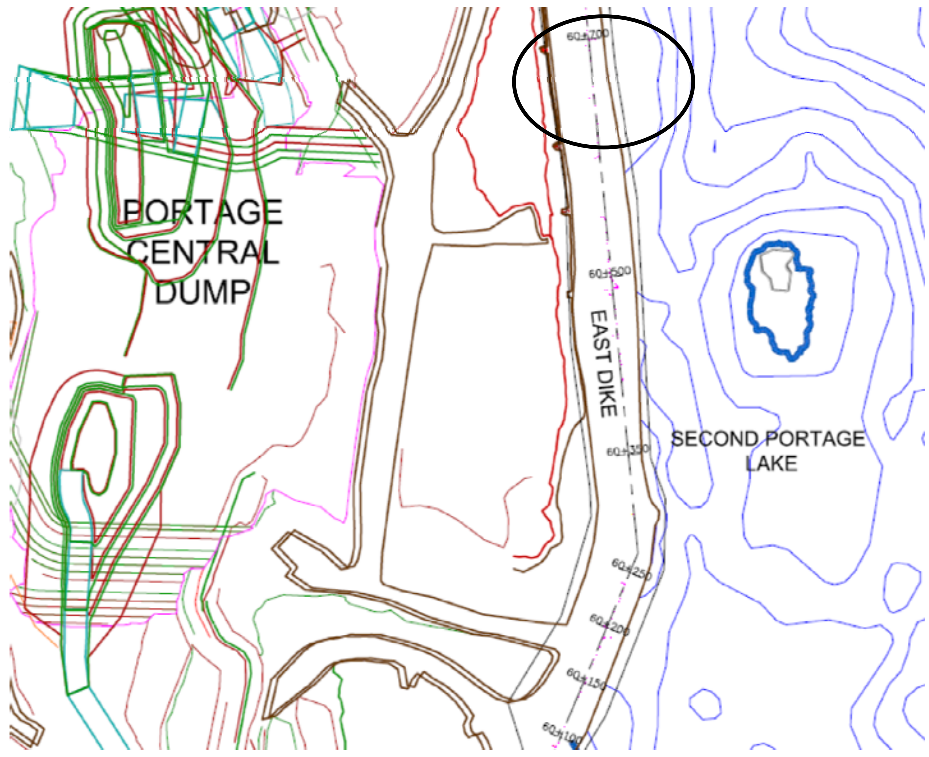
PROJECT	**AGNICO EAGLE MINES LIMITED** **MEADOWBANK GOLD PROJECT** **NUNAVUT**
TITLE	**EAST DIKE** **Section 60+600 to 60+900 - PIEZOMETRIC DATA** **(Aug 1/17 to Aug 1/18)**

AGNICO EAGLE MEADOWBANK

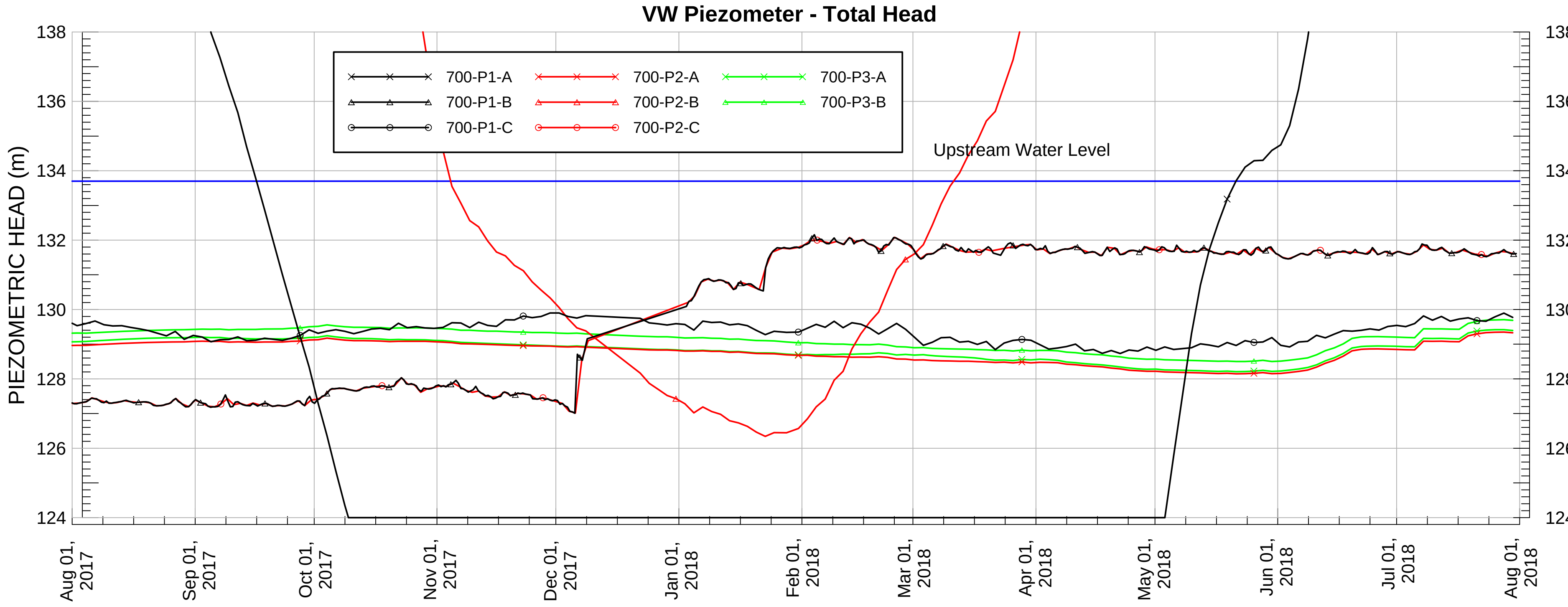
PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	**FIGURE 50**	
CHECK	PG	28AUG14		
REVIEW				

STATION 60+700

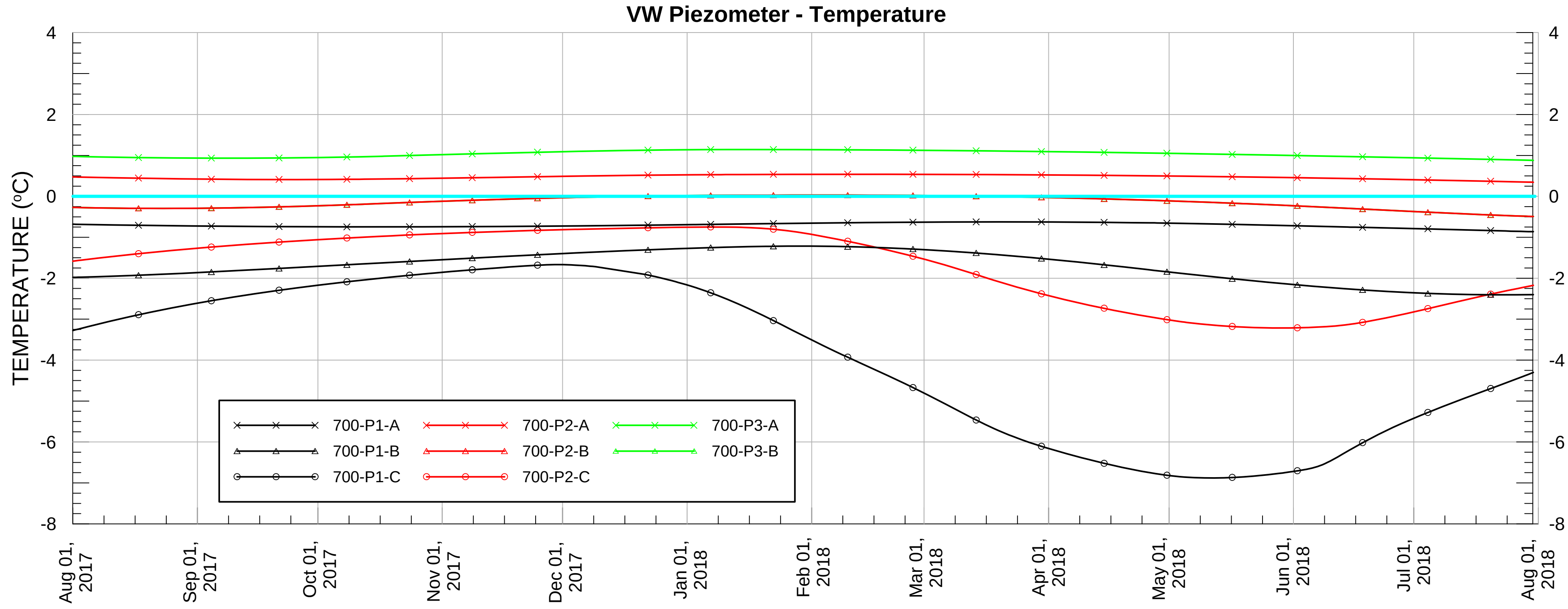




VW Piezometer - Total Head

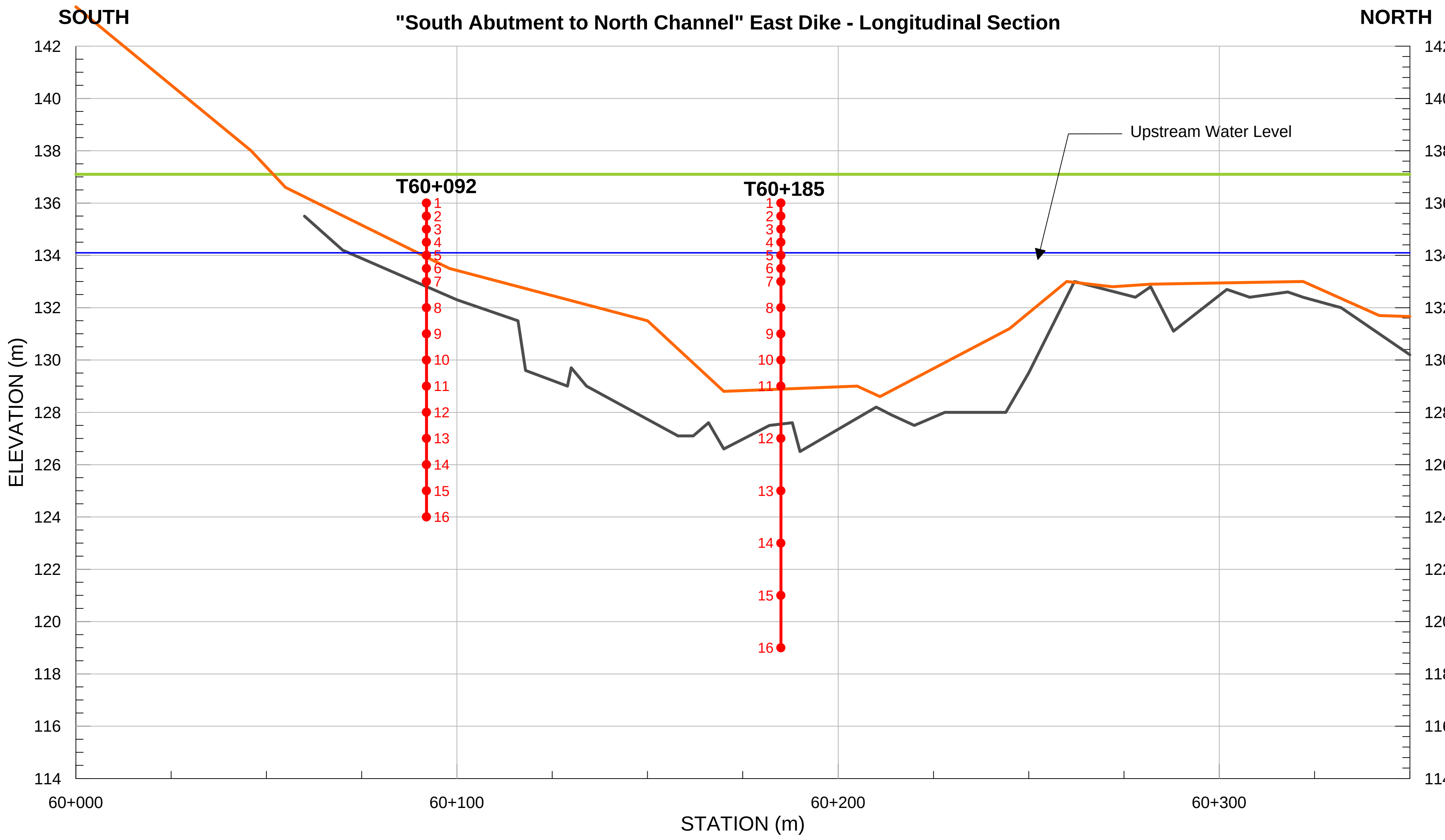


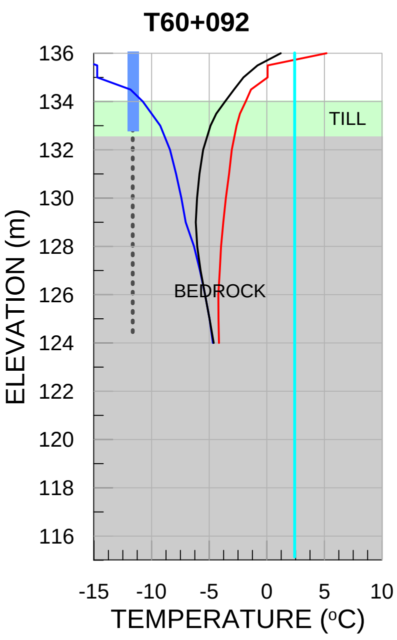
VW Piezometer - Temperature

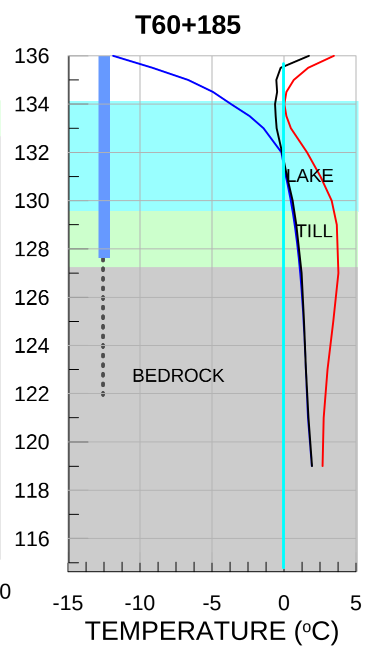


NOTES:
1: 700-P1-B and 750-C are giving anomoly readings and with a negative temperature are assumed to be frozen.

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT			
TITLE	EAST DIKE - SECTION 60+700 PIEZOMETRIC DATA (Aug 1/17 to Aug 1/18)			
AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.
	DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
	CADD	TD	28AUG14	FIGURE 51
	CHECK	PG	28AUG14	
	REVIEW			







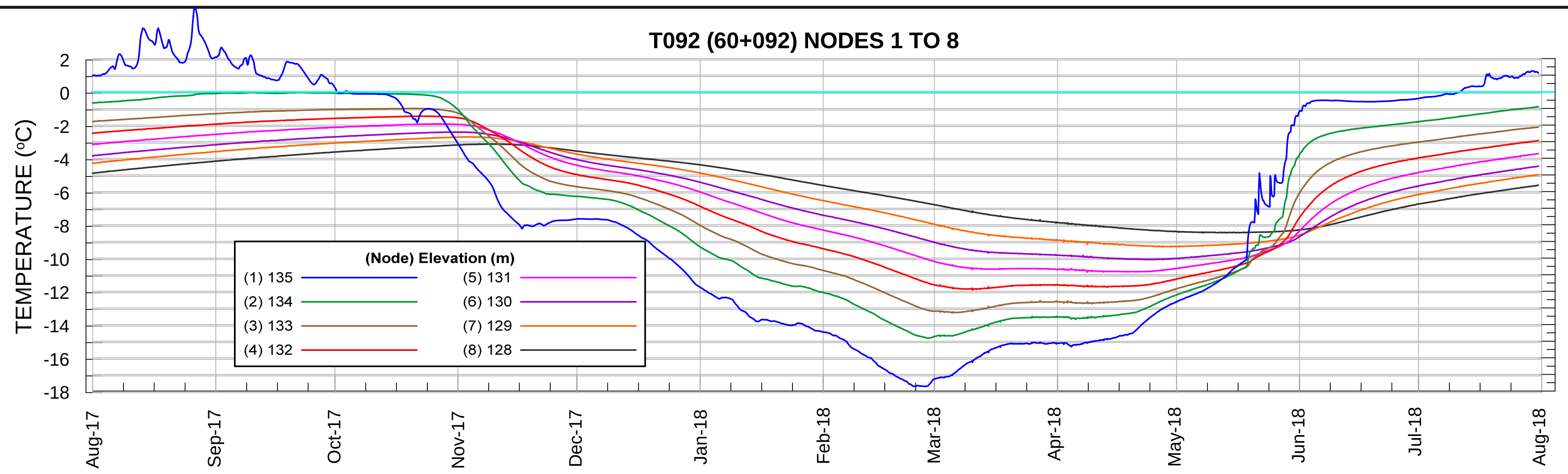
Current Temperature On August 1,2018

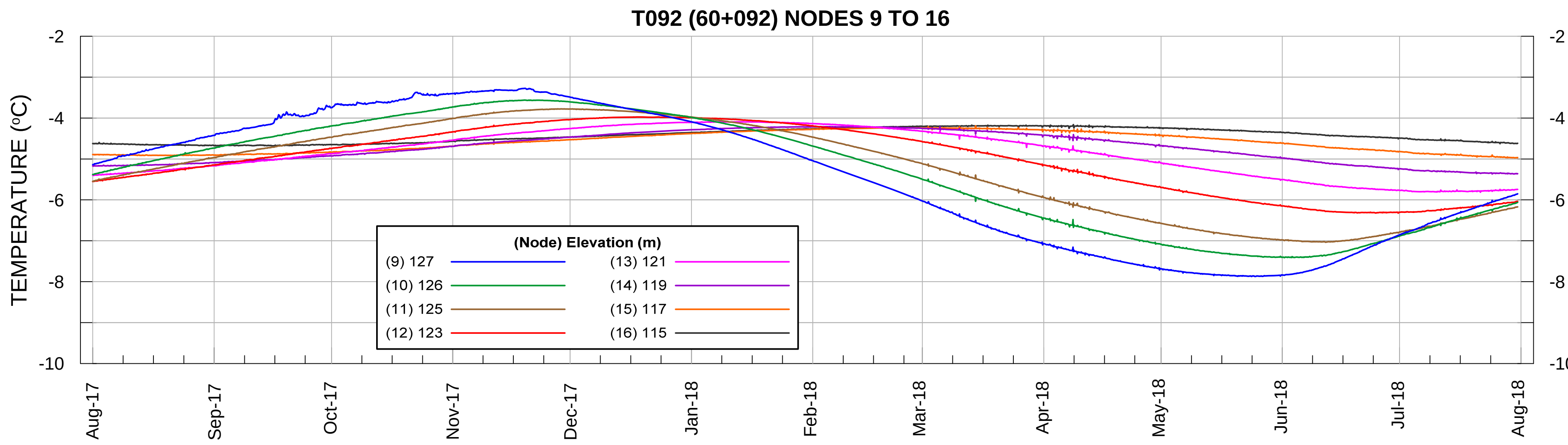
LEGEND

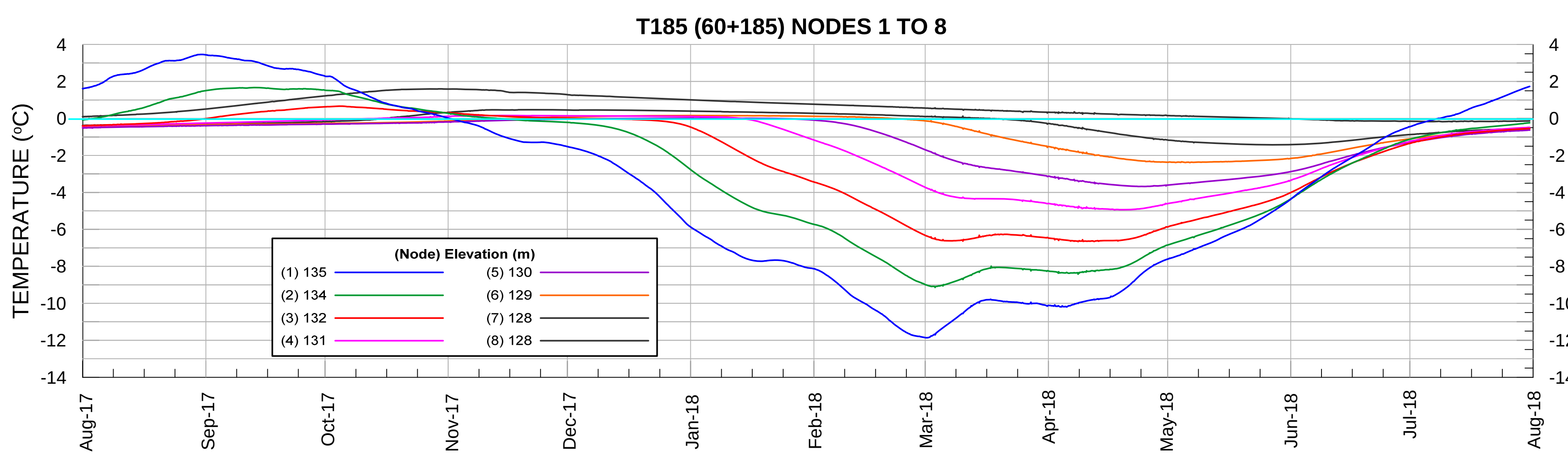
- Dike Crest
- Piezometric Head in Downstream Piezometers
- Lake Bed
- Bedrock
- Lake
- Till
- Bedrock
- Vibrating Wire Piezometer Installation Level
- Thermistor with Bead Locations
- SB
- CSB
- Jet Grouting
- Grouting
- T min
- T current
- T max

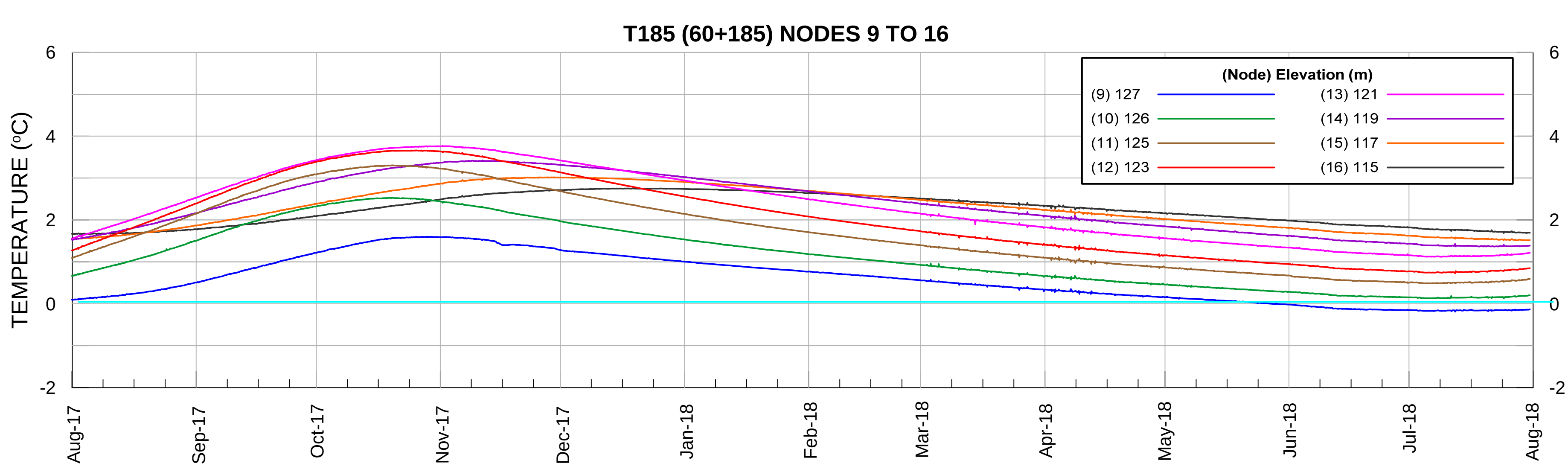
NOTES:
1.

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT				
TITLE	EAST DIKE 60+000 to 60+350 - TEMPERATURE DATA (Aug 1/17 to Aug 1/18)				
AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.	
	DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
	CADD	TD	20JAN14	FIGURE 57	
	CHECK				
	REVIEW				







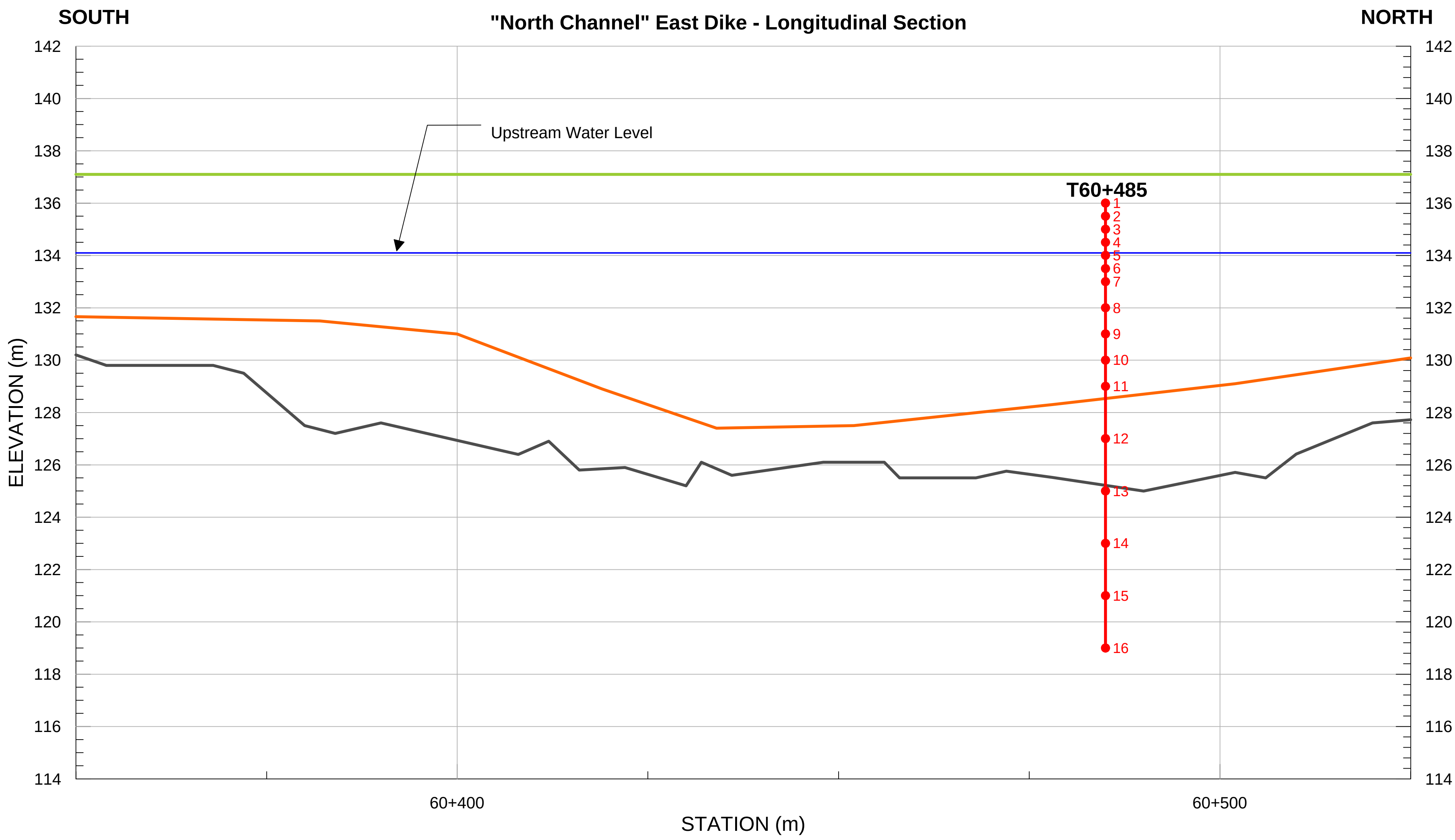


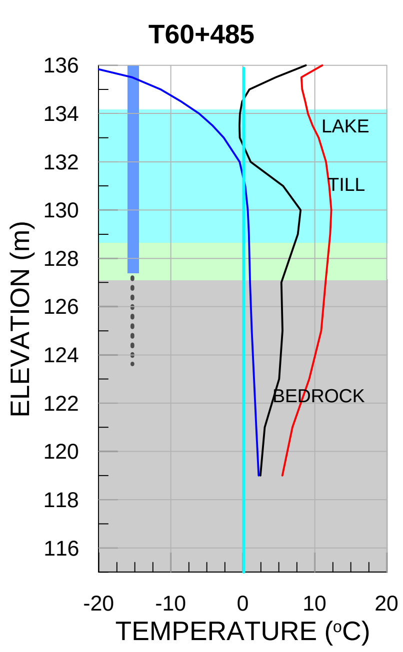
PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

TITLE
EAST DIKE
NODAL THERMAL TIMELINES
(Aug 1/17 to Aug 1/18)

AGNICO EAGLE

PROJECT No.			PHASE No.	
DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
CADD	TD	20JAN14	FIGURE 58	
CHECK				
REVIEW				





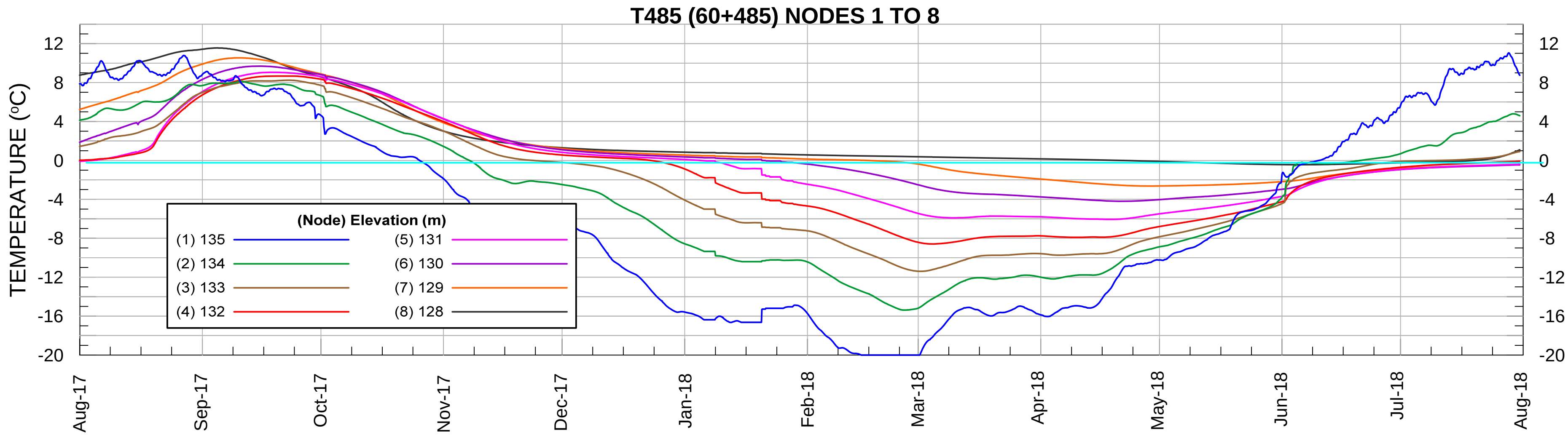
Current Temperature On August 1,2018

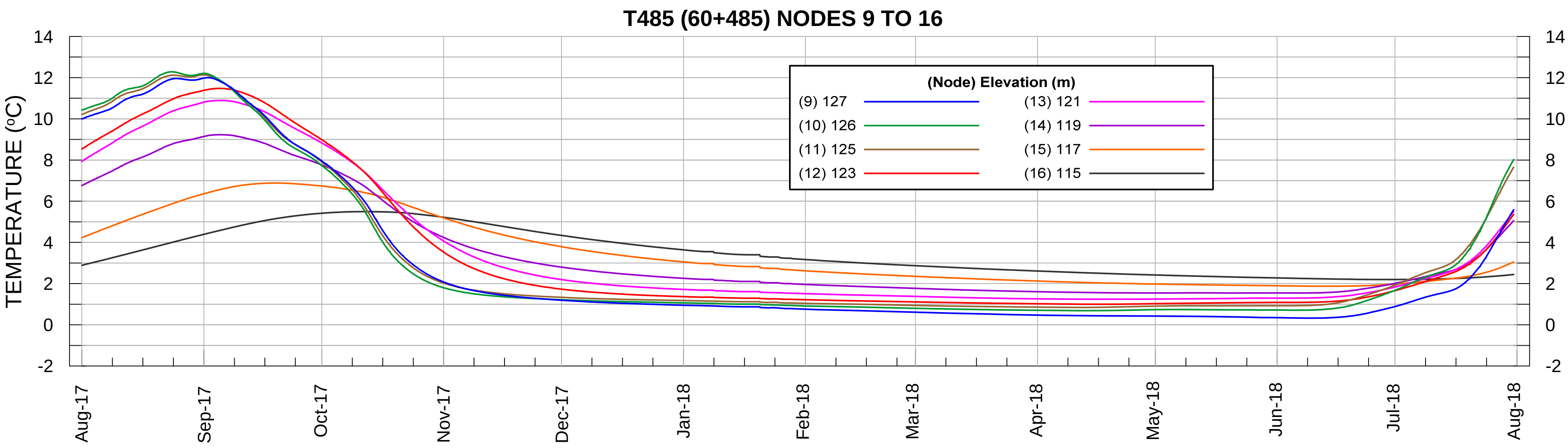
LEGEND

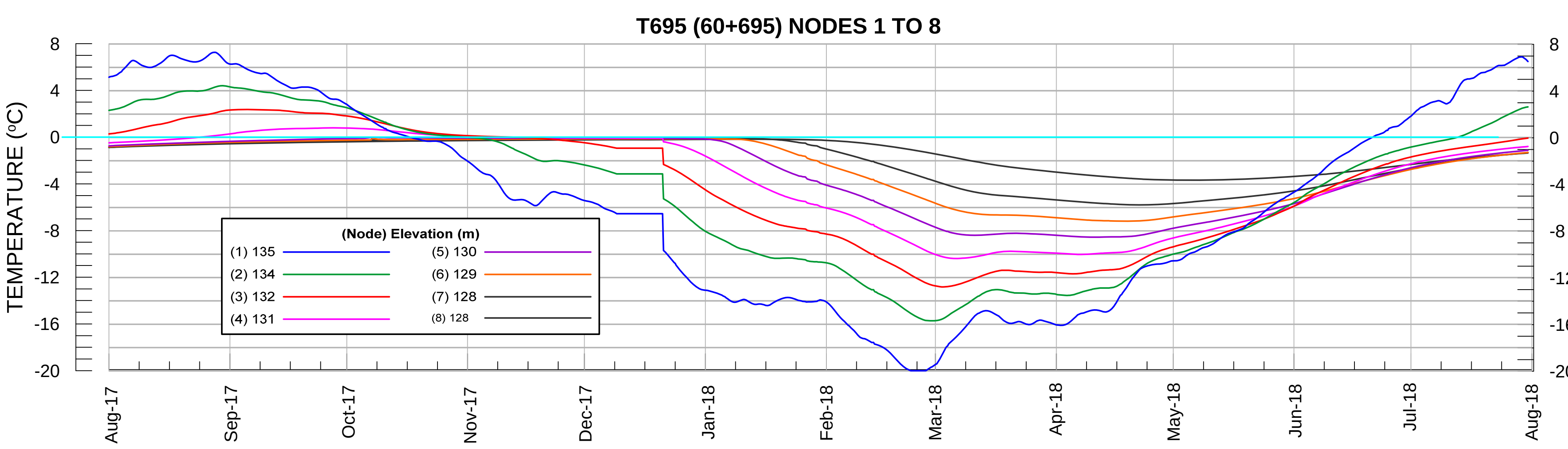
- Dike Crest
- Piezometric Head in Downstream Piezometers
- Lake Bed
- Bedrock
- Lake
- Till
- Bedrock
- 6, 7, 8, 9 Thermistor with Bead Locations
- Vibrating Wire Piezometer Installation Level
- SB
- CSB
- Jet Grouting
- Grouting
- T min
- T current
- T max

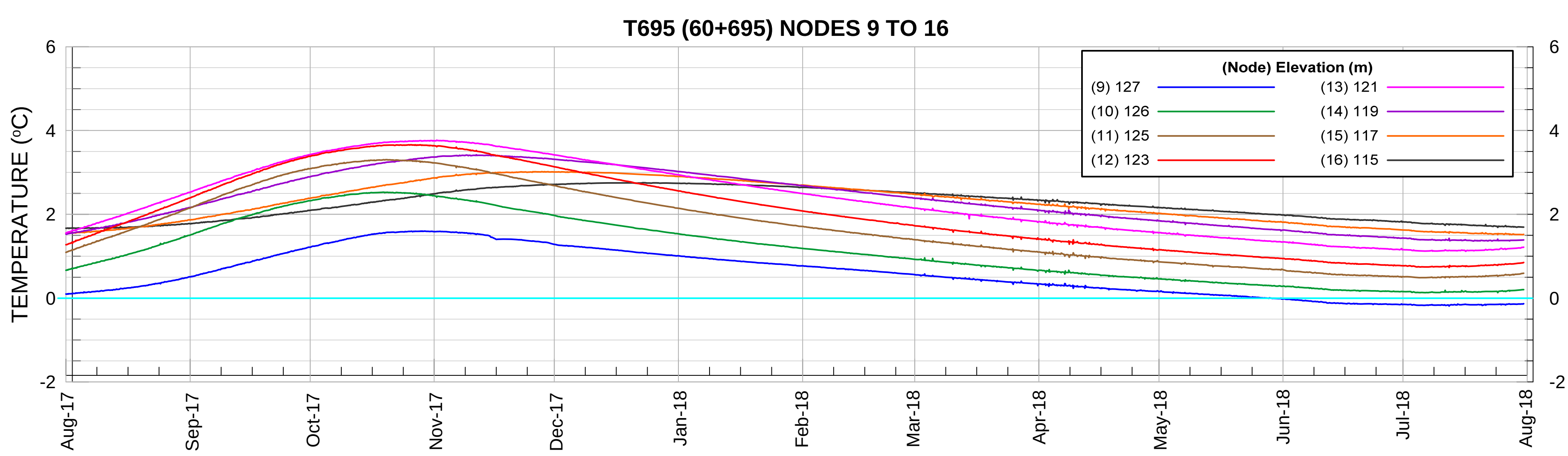
NOTES:
1.

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT					
TITLE	BAYGOOSE DIKE 60+350 to 60+525 - TEMPERATURE DATA (Aug 1/17 to Aug 1/18)					
AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.		
	DESIGN	TD	20JAN14	SCALE	AS SHOWN	REV.
	CADD	TD	20JAN14	FIGURE 58		
	CHECK					
	REVIEW					









PROJECT

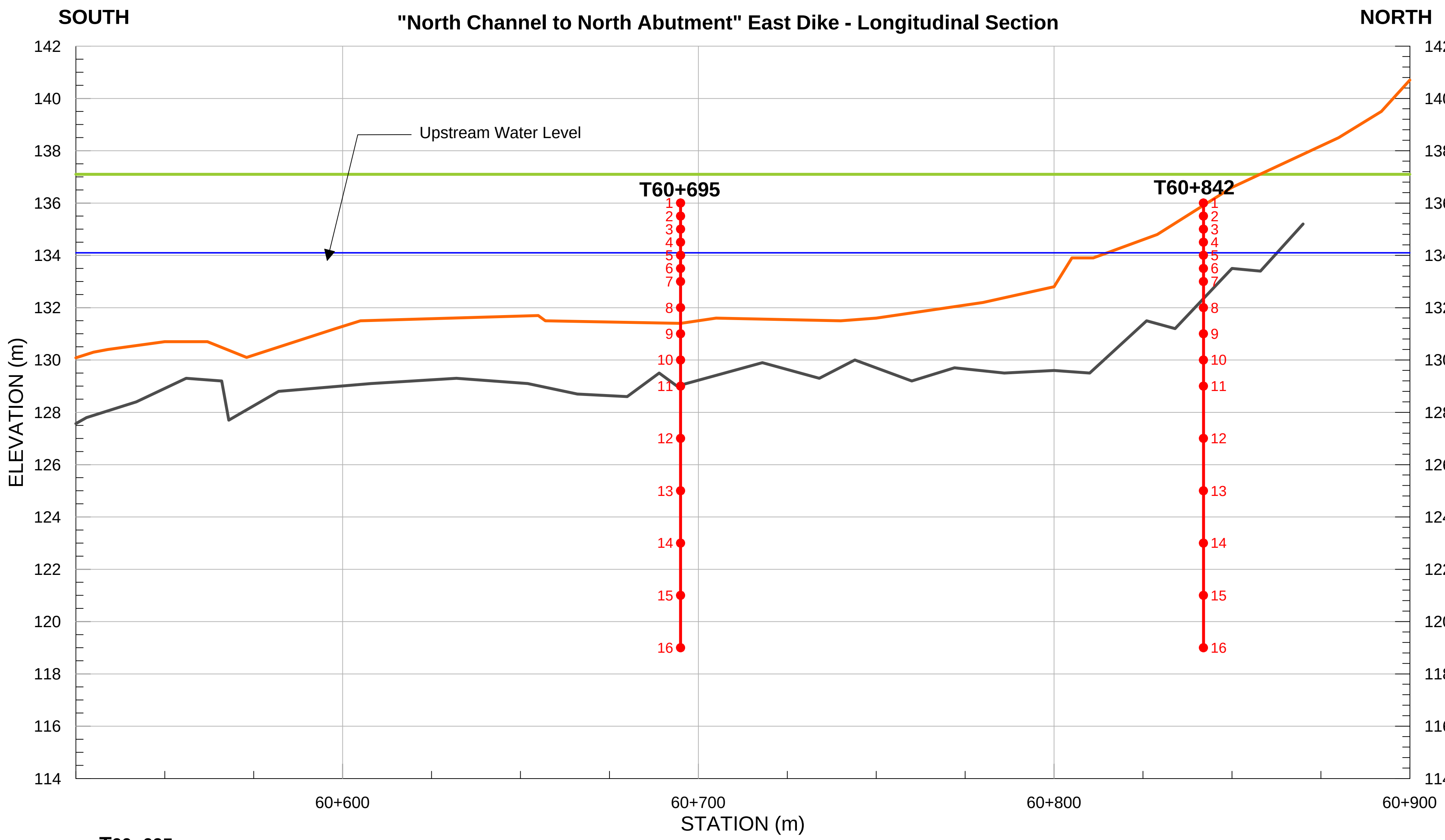
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

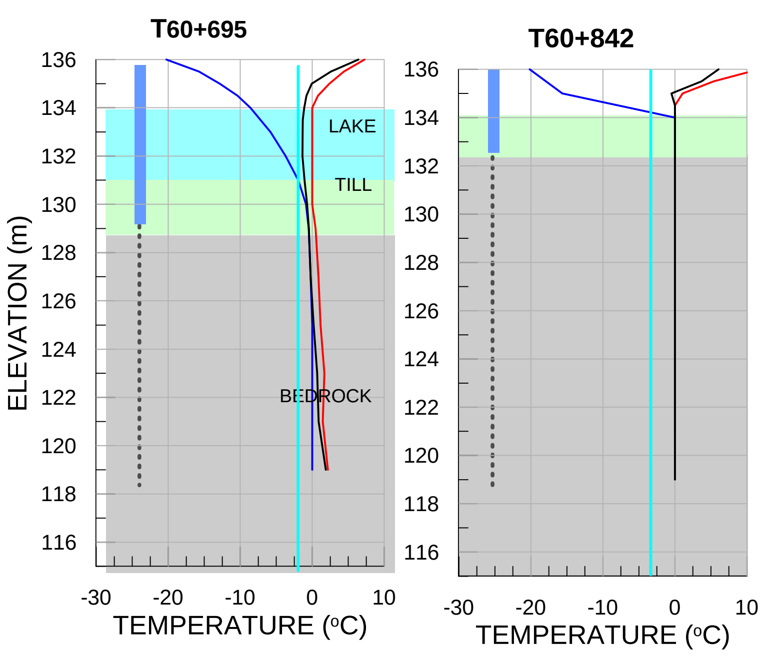
TITLE

EAST DIKE
NODAL THERMAL TIMELINES
(Aug 1/17 to Aug 1/18)

AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.
DESIGN	TD	20JAN14	SCALE AS SHOWN REV.
CADD	TD	20JAN14	FIGURE 60
CHECK			
REVIEW			





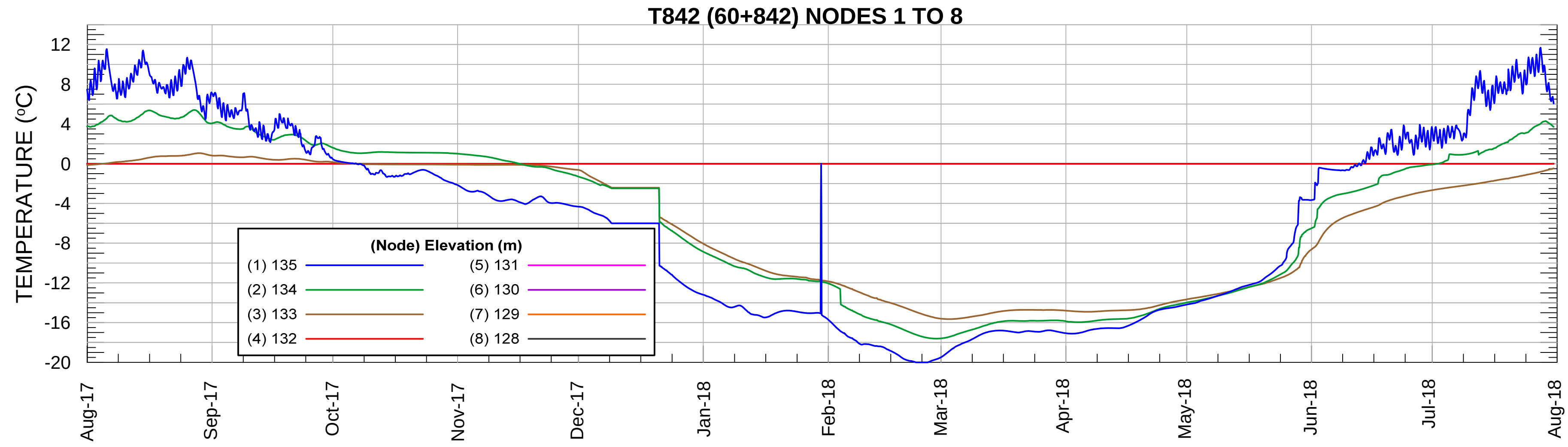
Current Temperature On August 1,2018

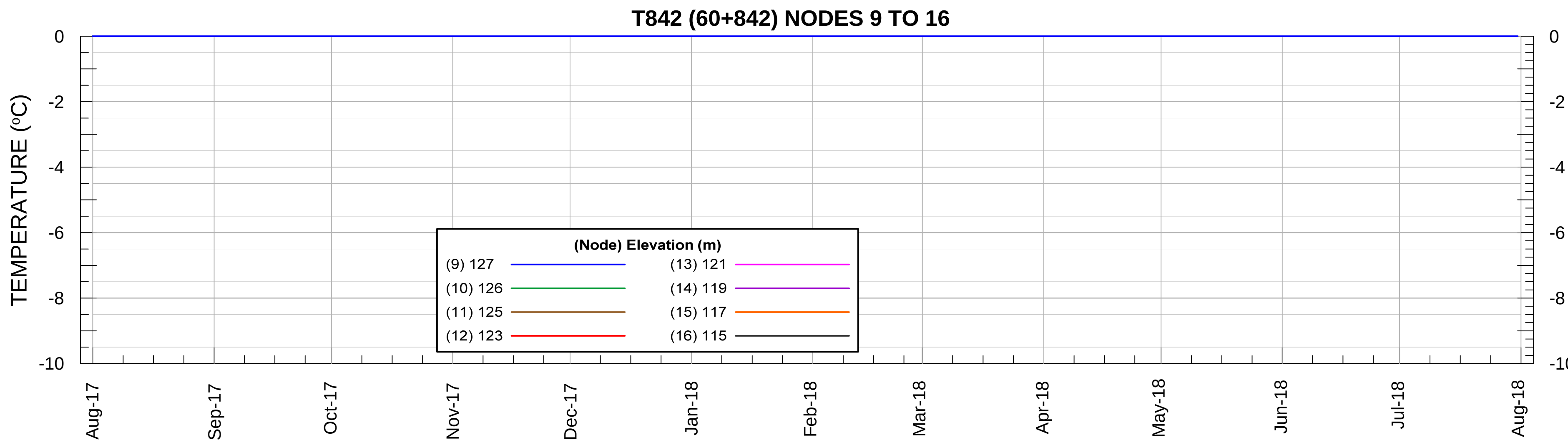
LEGEND

- Dike Crest
- Piezometric Head in Downstream Piezometers
- Lake Bed
- Bedrock
- Lake
- Till
- Bedrock
- Thermistor with Bead Locations
- Vibrating Wire Piezometer Installation Level
- SB
- CSB
- Jet Grouting
- Grouting
- T min
- T current
- T max

NOTES:
1. Beads on T60+842 do not seem to be working properly.

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT					
TITLE	BAYGOOSE DIKE 30+000 to 30+550 - TEMPERATURE DATA (Aug 1/17 to Aug 1/18)					
AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.		
	DESIGN	TD	20JAN14	SCALE	AS SHOWN	REV.
	CADD	TD	20JAN14	FIGURE 61		
	CHECK					
	REVIEW					



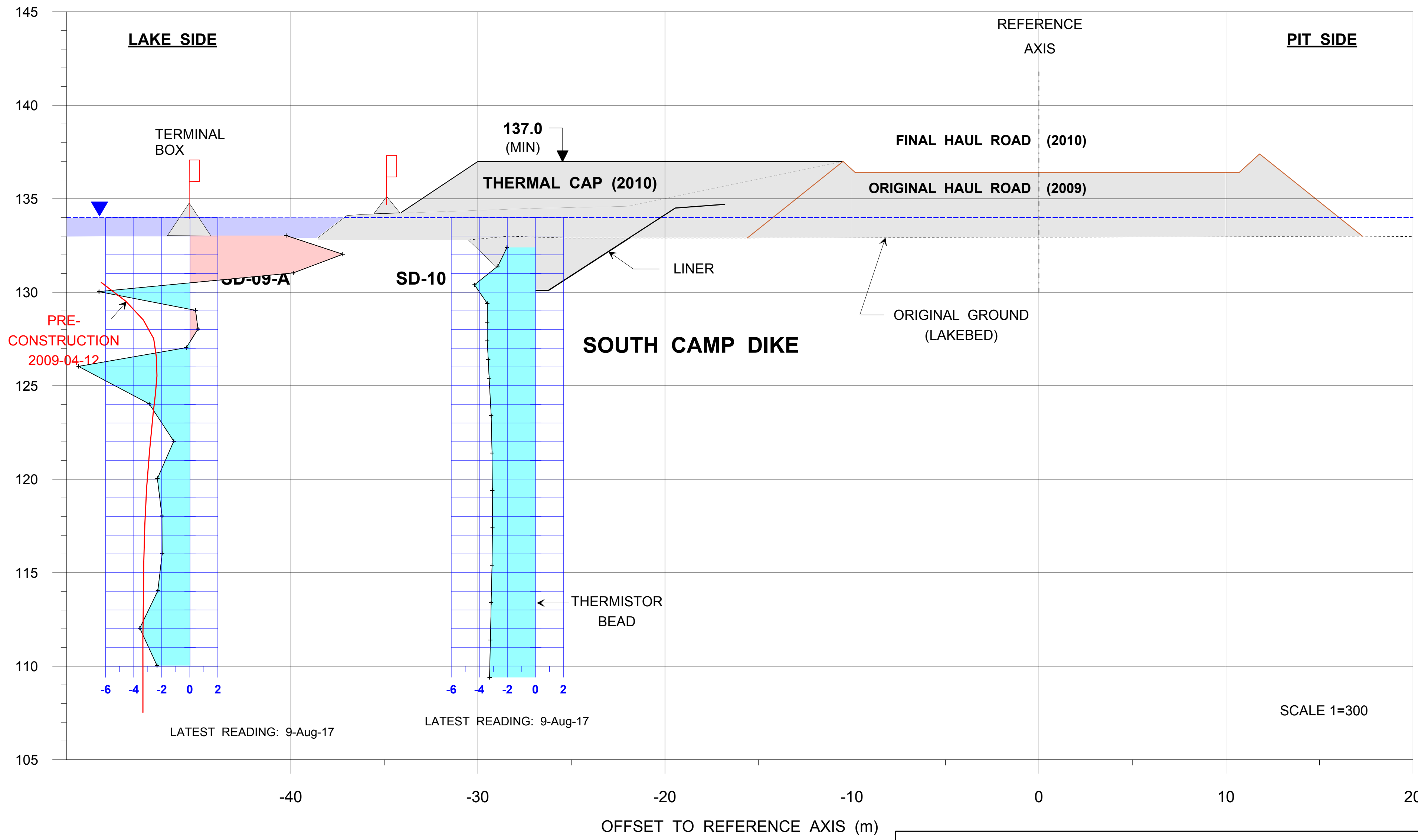


PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

TITLE
EAST DIKE
NODAL THERMAL TIMELINES
(Aug 1/17 to Aug 1/18)

AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
CADD	TD	20JAN14	**FIGURE 62**	
CHECK				
REVIEW				



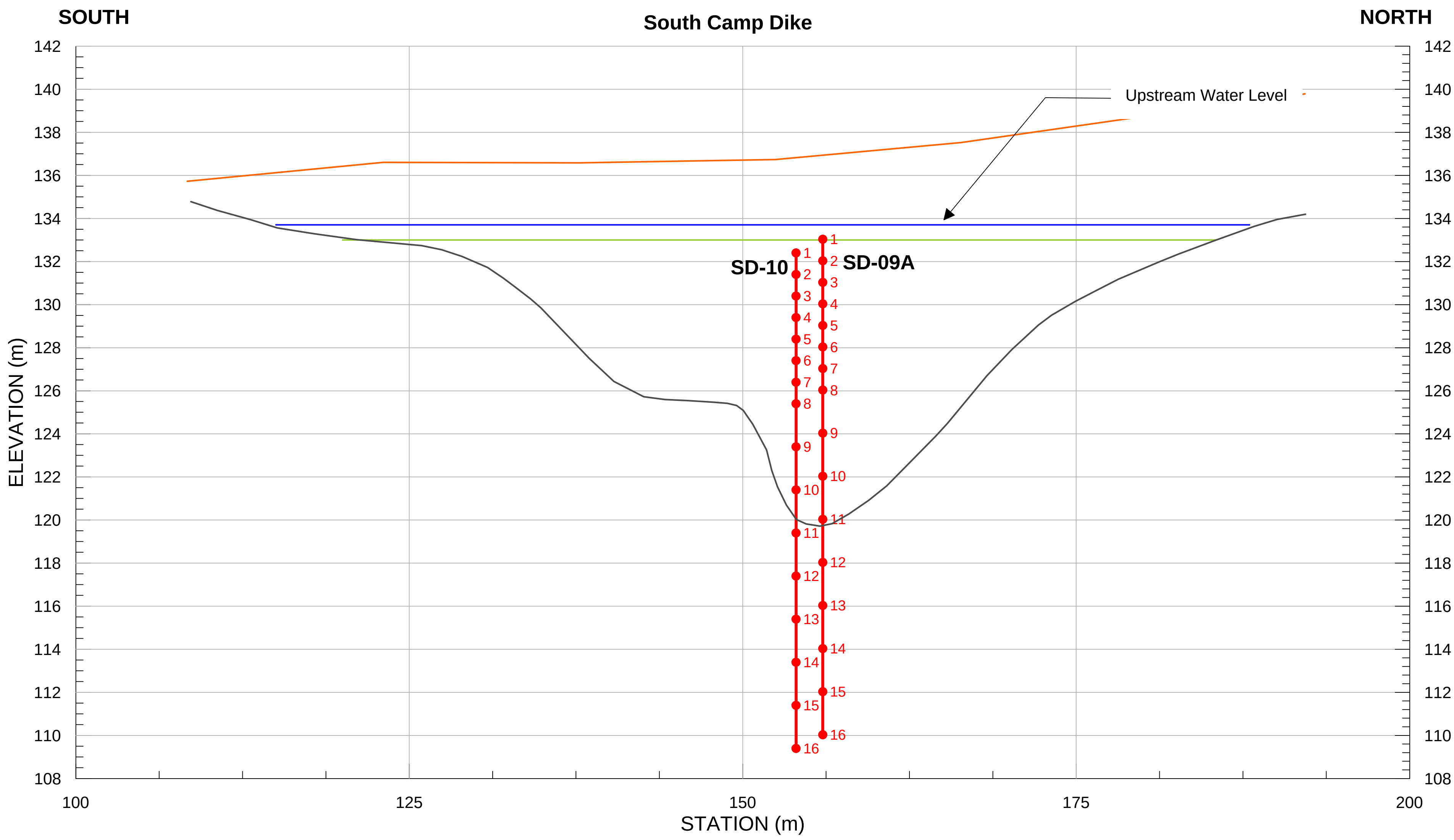
NOTE: COORDINATES FOR REFERENCE AXIS:
638,211 E 7,213,186 N
638,174 E 7,213,075 N

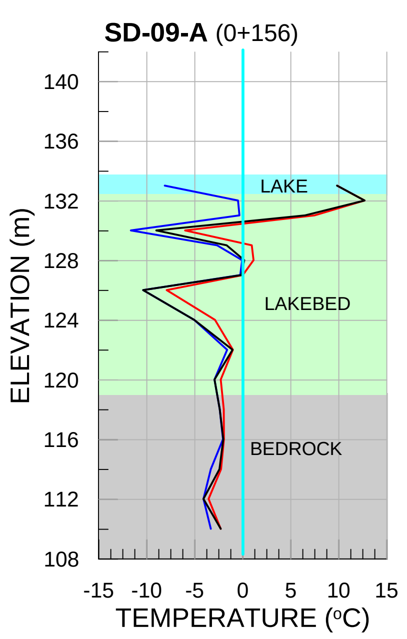
AGNICO-EAGLE MINES LIMITED - MEADOWBANK DIVISION

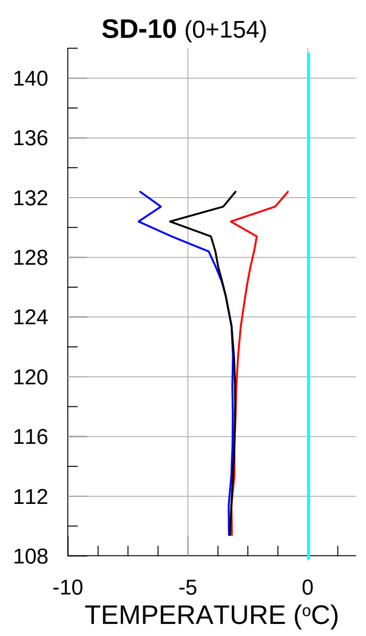
SOUTH CAMP DIKE CONSTRUCTION

TEMPERATURE MONITORING IN DIKE FOUNDATION

TEMPERATURE PROFILES AT SD1.GRF





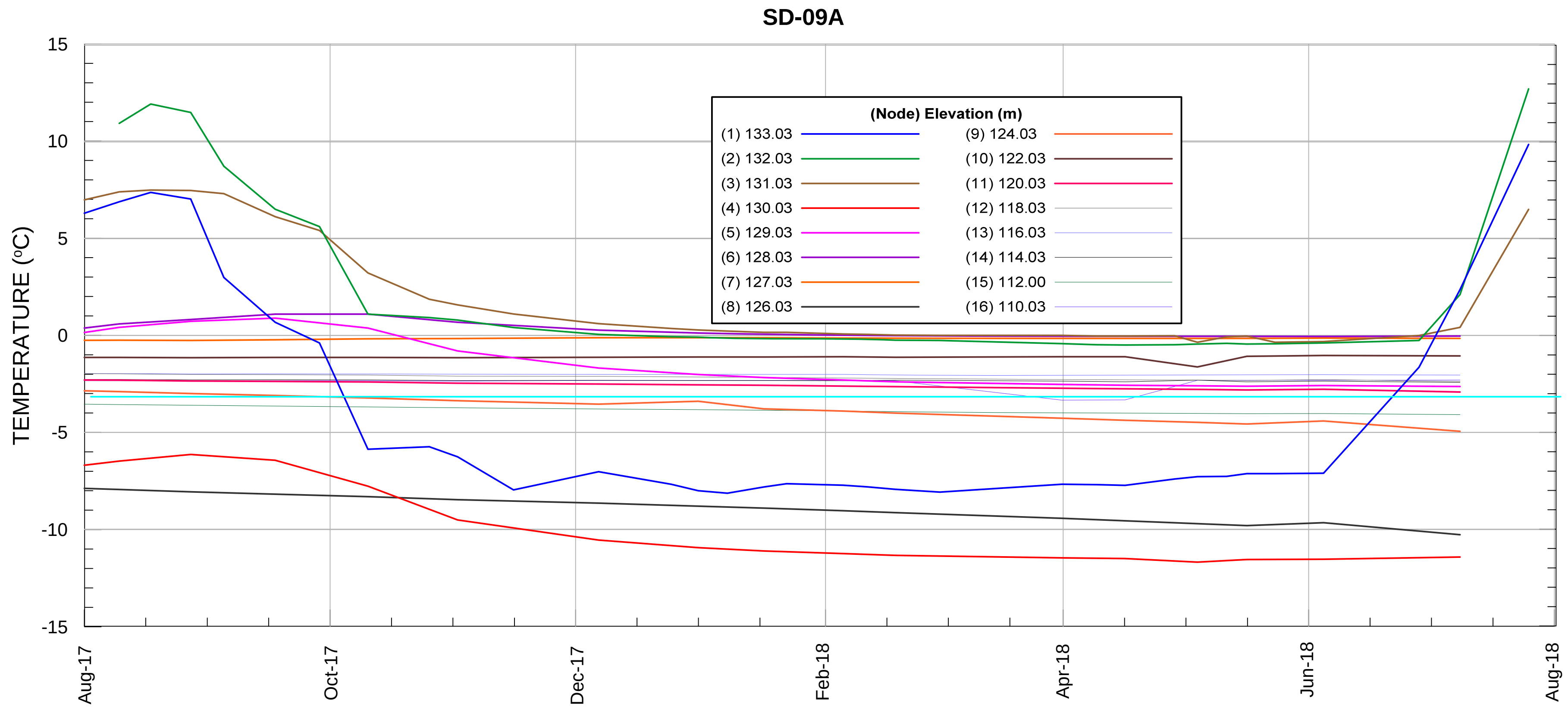


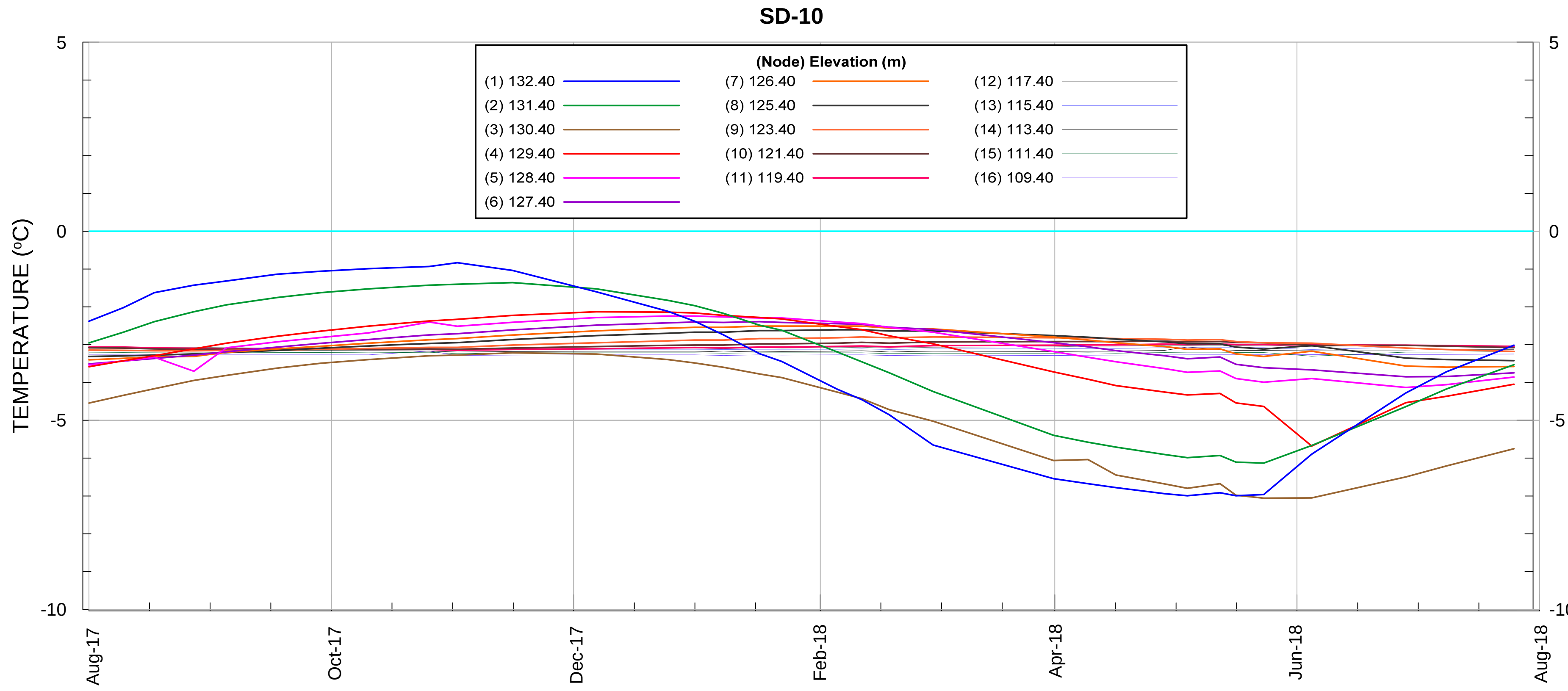
Current Temperature on July 25th, 2018

LEGEND

- Dike Crest
- Lake Bed
- Bedrock
- Lake
- Till
- Bedrock
- Thermistor with Bead Locations
- T min
- T current
- T max

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT				
TITLE	SOUTH CAMP DIKE TEMPERATURE DATA (Aug 1/17 to Aug 1/18)				
AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.	
	DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
	CADD	TD	28AUG14	FIGURE 52	
	CHECK	PG	28AUG14		
	REVIEW				



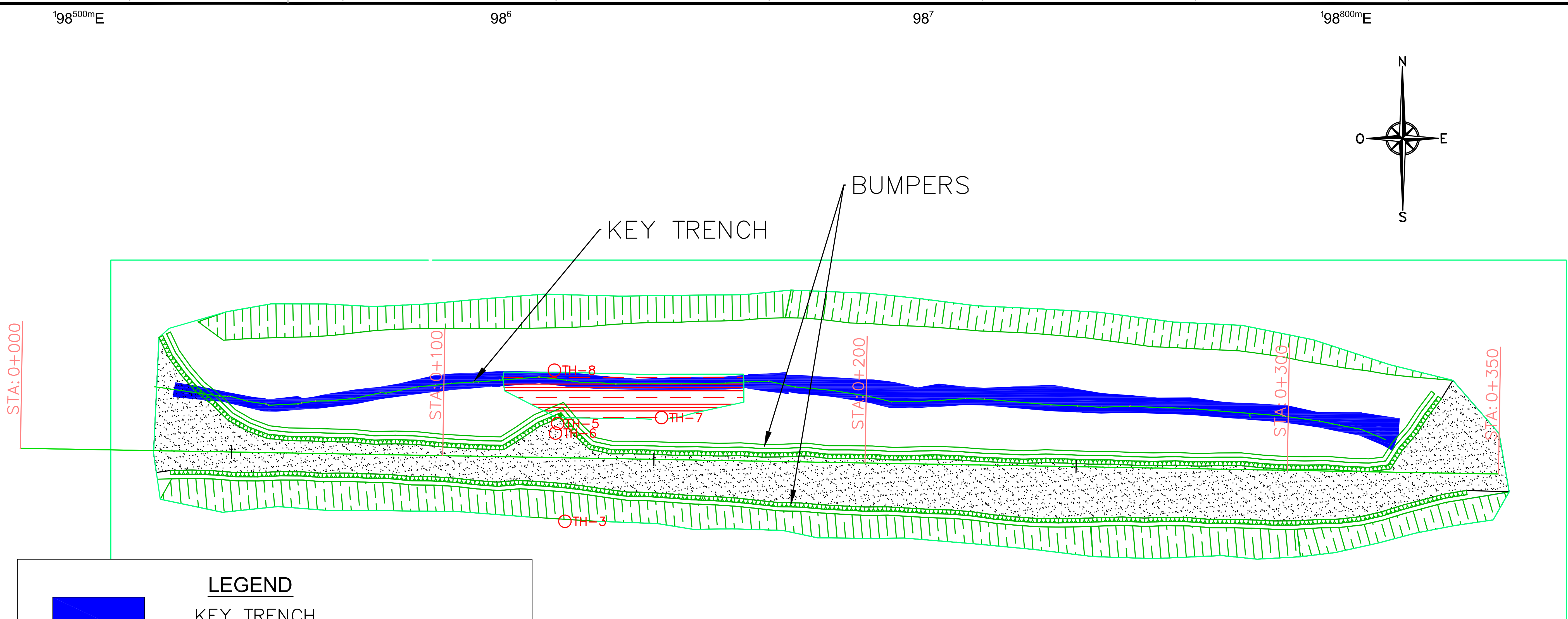


PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	SOUTH CAMP DIKE NODAL THERMAL TIMELINES (Aug 1/17 to Aug 1/18)

AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.
DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
CADD	TD	28AUG14	FIGURE 53
CHECK	PG	28AUG14	
REVIEW			

FORMAT ANSI B – LANDSCAPE



LEGEND

- KEY TRENCH
- WARM TILL
- SLOPES
- ACCESSES ROAD

PLAN VIEW– VAULT DIKE

TITLE	# DWG
REFERENCE DRAWINGS	

REV	DESCRIPTION	DATE	BY
REVISIONS			

AGNICO-EAGLE

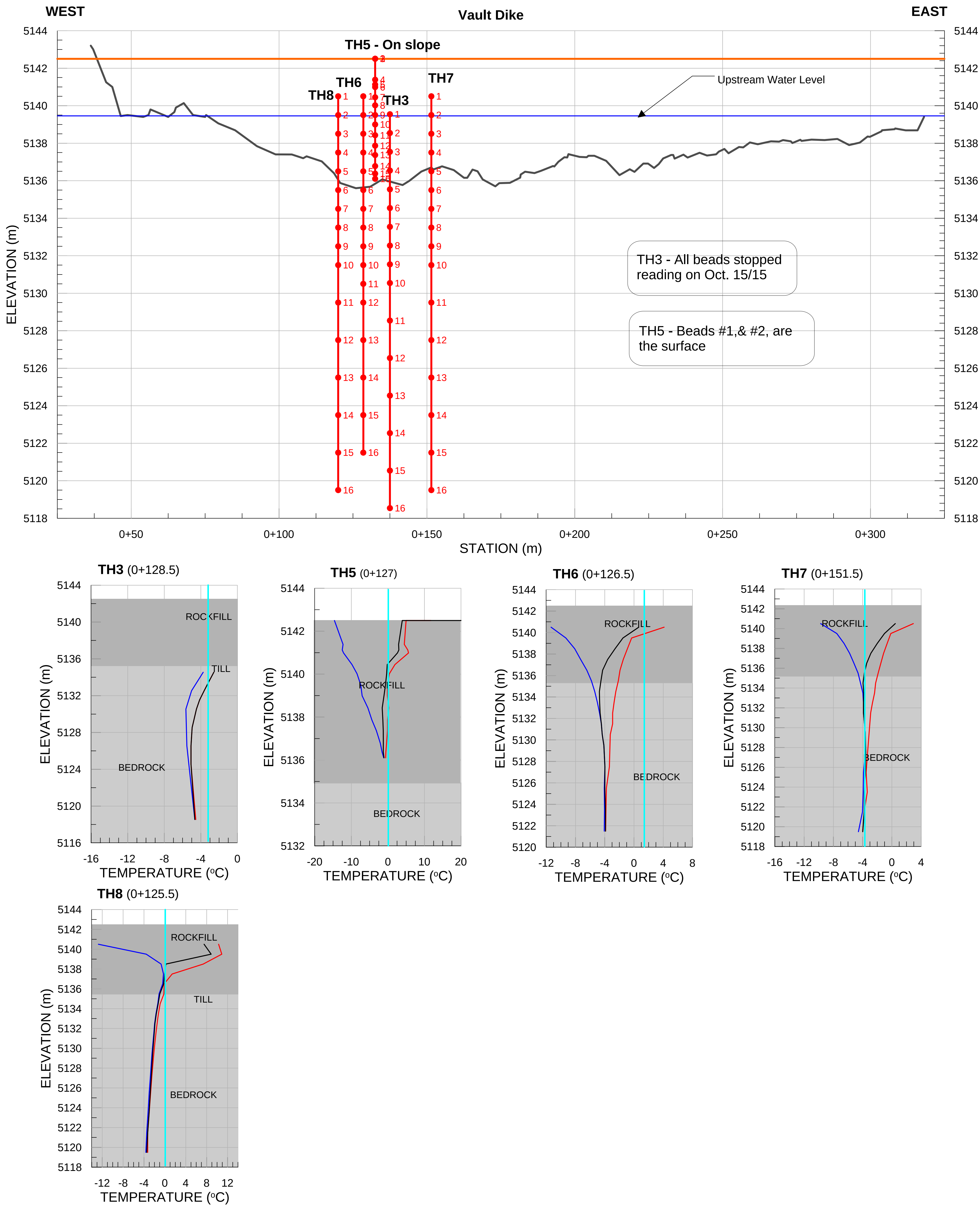
DRAWN BY	ROBERT CLOUATRE	DATE	02–04–2013
CHECKED BY	E.V. – R.C		02–04–2013
APPROVED BY			
PROJECT NO.			
DATE			

TITLE: AGNICO–EAGLE – MEADOWBANK DIVISION
VAULT DIKE
AS BUILT

SCALE	FILE
1:1000	.DWG

DRAWING NO.	REVISION	SHEET
		1 / 4

X:\Vault Dike\18– As–Built Report and Drawings\As–Built Drawings\ACAD–AS BUILT VAULT DIKE FINAL WITH ALL THERMISTORS LABELLED.dwg, 22 Aug 2013

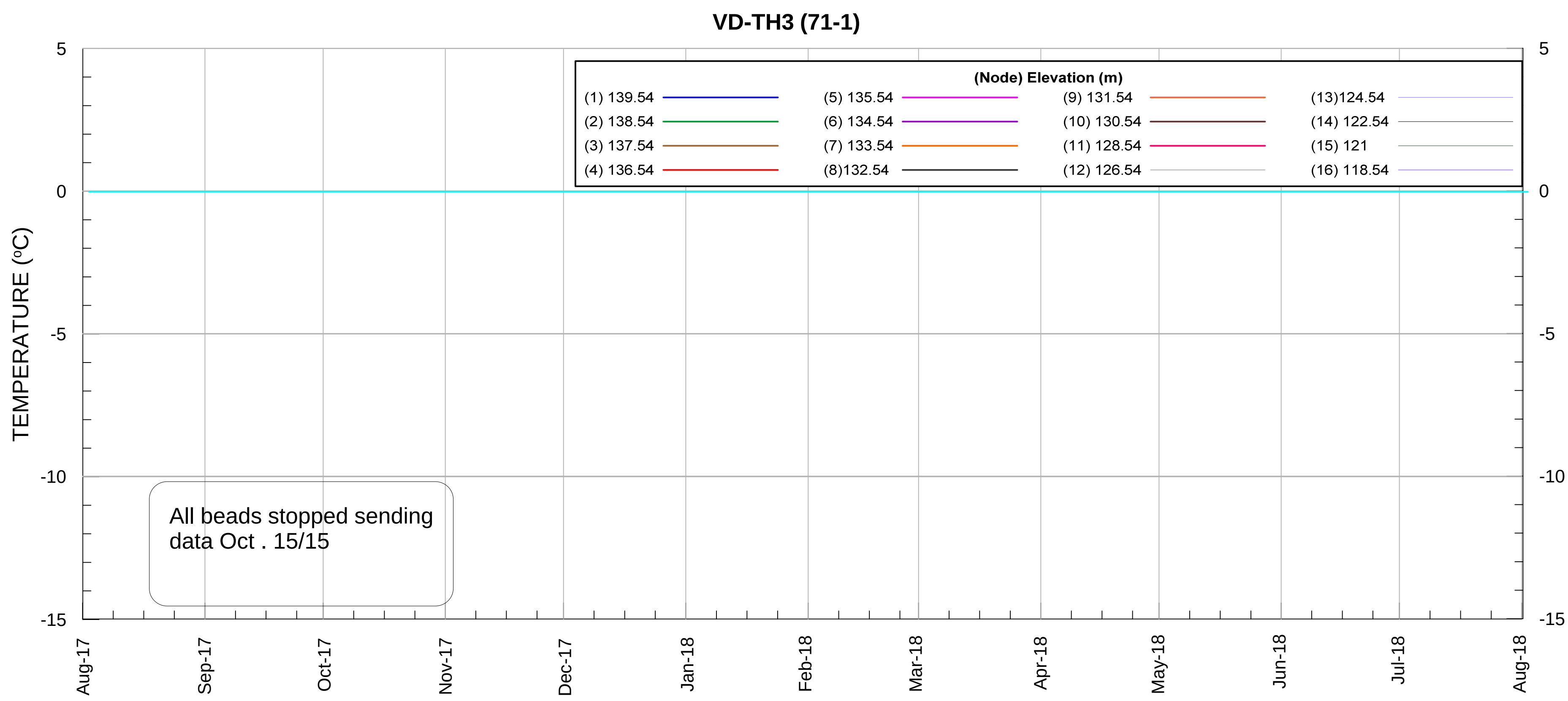


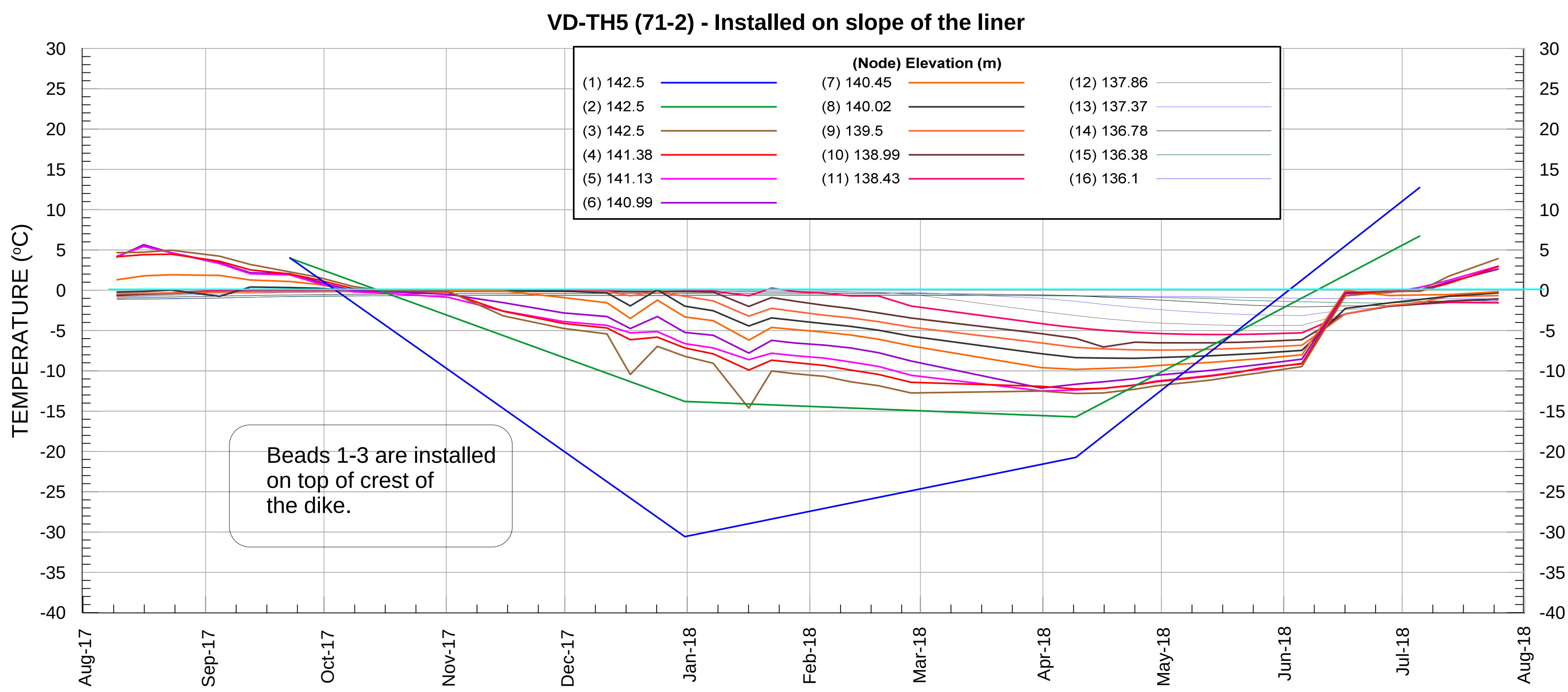
LEGEND

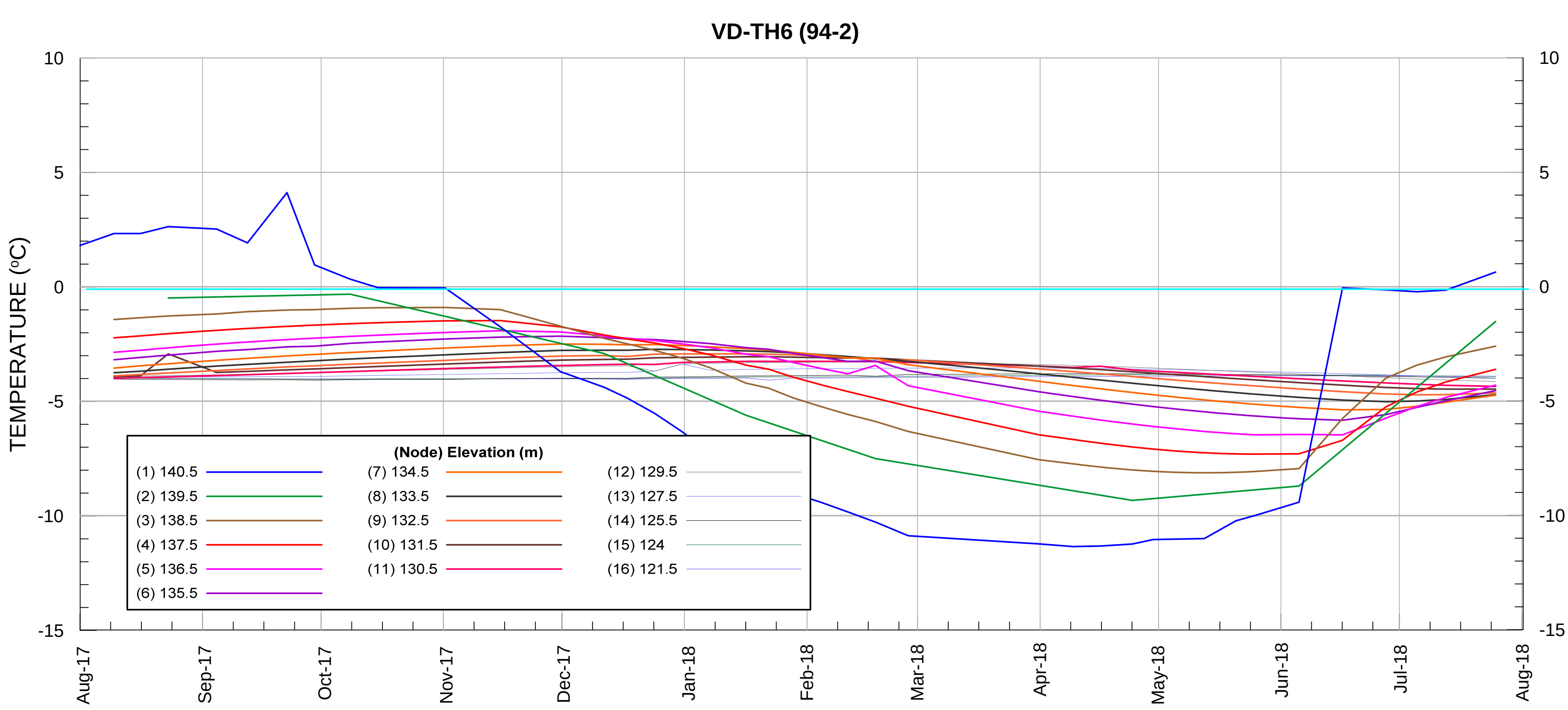
- Dike Crest
- Lake Bed
- Bedrock
- Lake
- Till
- Bedrock
- Thermistor with Bead Locations
- T min
- T current
- T max

Current Temperature on July 25th, 2018

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT				
TITLE	VAULT DIKE TEMPERATURE DATA (Aug 1/17 to Aug 1/18)				
AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.	
	DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
	CADD	TD	28AUG14	FIGURE 54	
	CHECK	PG	28AUG14		
	REVIEW				





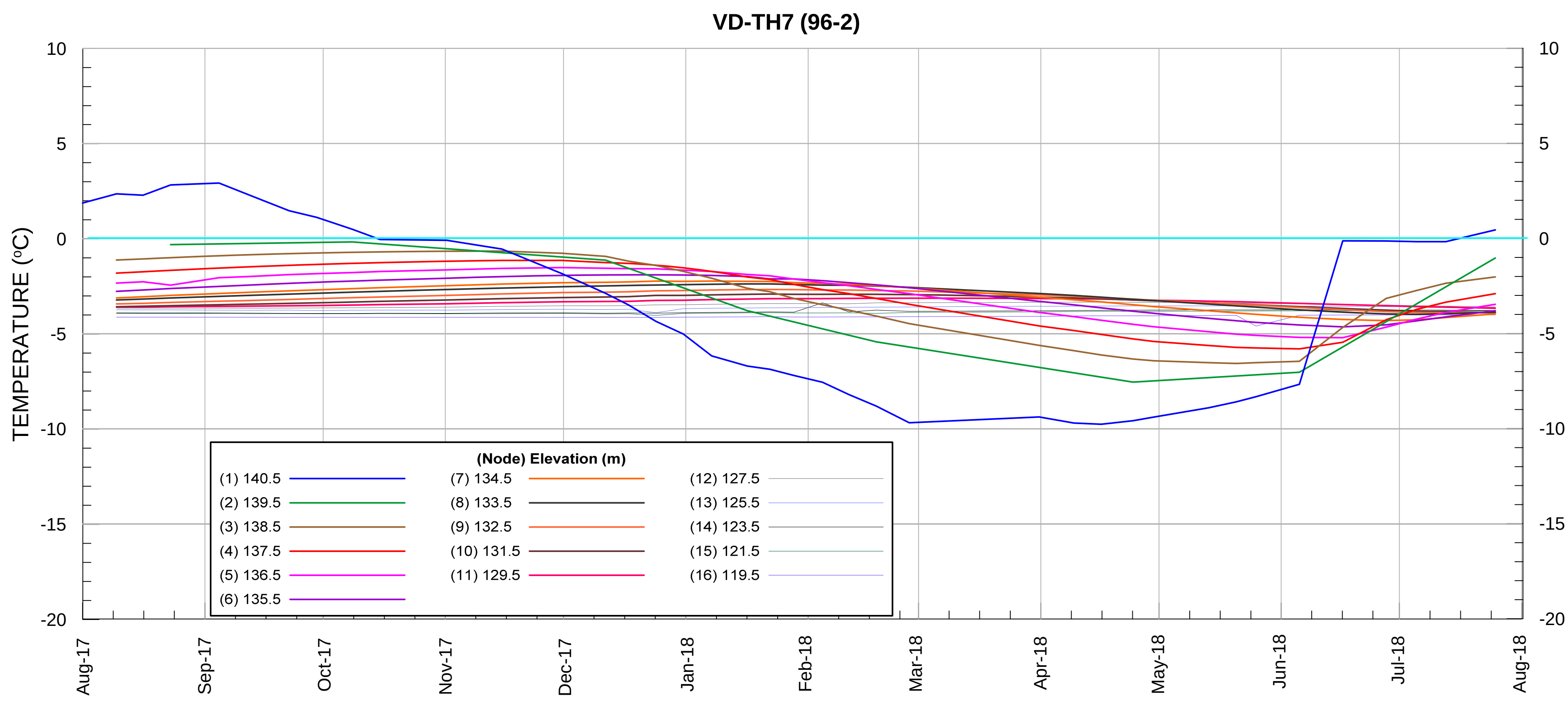


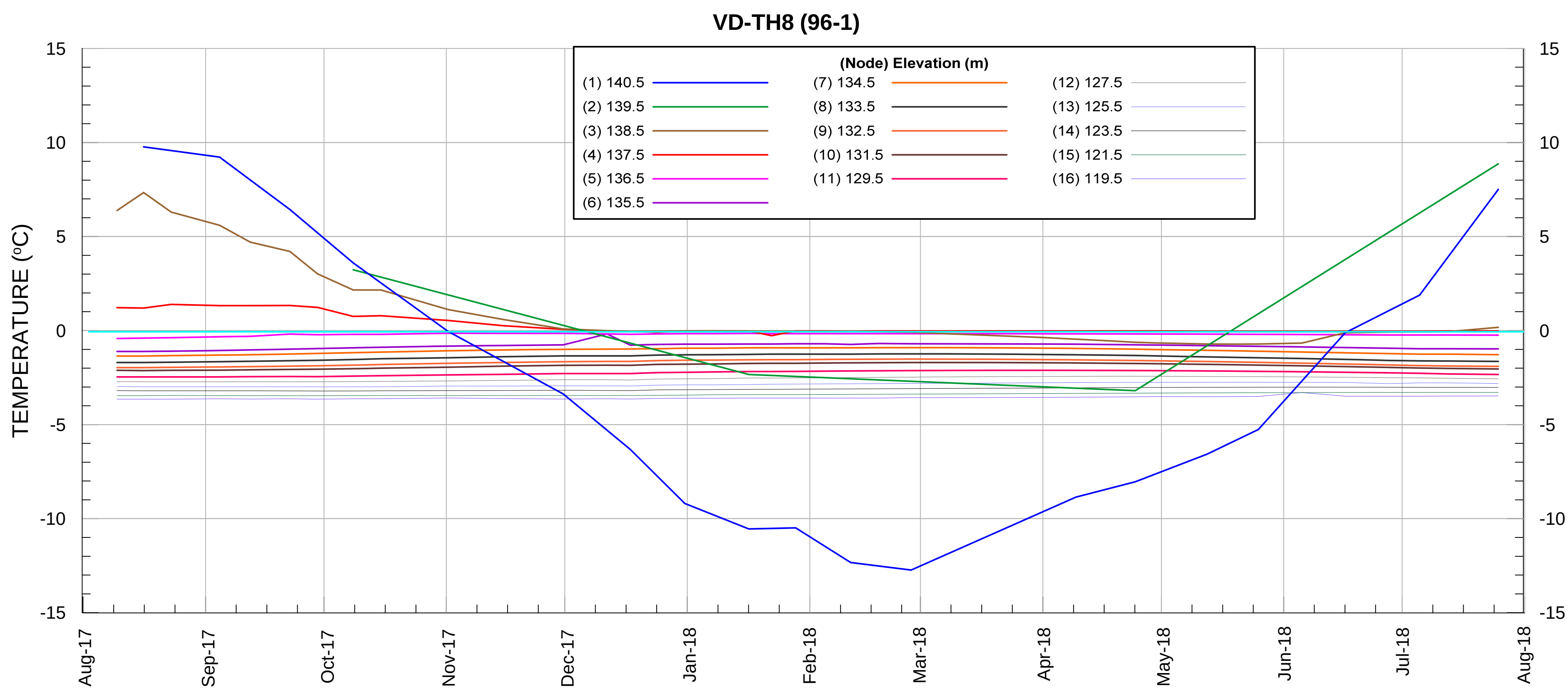
PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

TITLE
VAULT DIKE
NODAL THERMAL TIMELINES
(Aug 1/17 to Aug 1/18)

AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	**FIGURE 55**	
CHECK	PG	28AUG14		
REVIEW				





PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

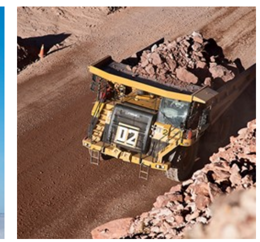
TITLE
VAULT DIKE
NODAL THERMAL TIMELINES
(Aug 1/17 to Aug 1/18)

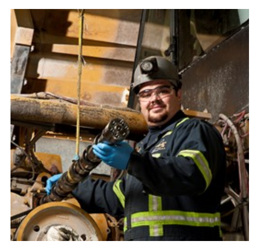
AGNICO EAGLE MEADOWBANK

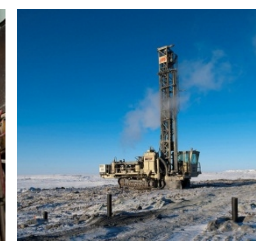
PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	**FIGURE 56**	
CHECK	PG	28AUG14		
REVIEW				

APPENDIX C2

TSF South Cell Instrumentation Data







MDRB # 24
P4– CENTRAL DIKE UPDATE

Frédérick L.Bolduc

September 24th 2018

PRESENTATION SECTIONS

Section 1 : **Dike Performance**

Section 2 : **Investigation and Sampling**

Section 3: **Instrumentation Review**

CENTRAL DIKE UPDATE 2018

HIGHLIGHTS

- TARP Level of Central Dike was decreased from Orange to Yellow on November 28, 2017
- 350 000 m3 of water were transfered out of the South Cell into Goose Pit in October 2017
- Progressive decline of seepage rate observed. From 567 m3/h on July 2017 to 350 m3/h on November 2017. Current seepage is stable in the 240-280 m3/hr range
- The TARP and ERP plan of Central Dike were updated and included in the 2018 revision of the OMS manual

CENTRAL DIKE UPDATE 2018

HIGHLIGHTS

- Complementary investigation performed in October 2017 to investigate potential void at 700-P1. No void encountered
- Water analysis program was resumed at freshet as per the action plan. Orange coloration of the downstream pond happened again in 2018 as expected.
- No more investigation program or modelling work planned for Central Dike

SECTION 1: CD PERFORMANCE

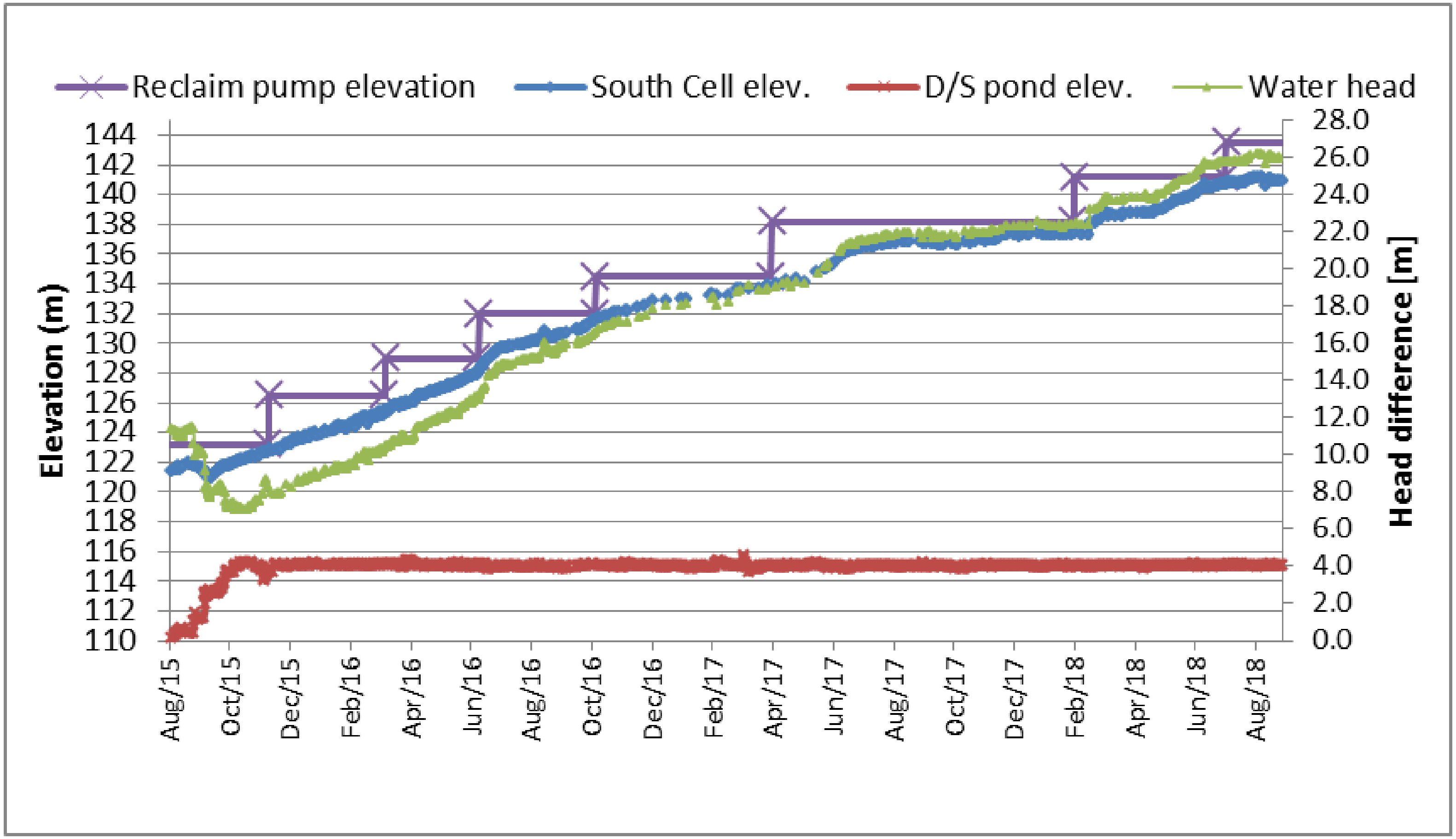
CENTRAL DIKE UPDATE 2018

CURRENT INSPECTION FREQUENCY

- TARP level of structure at Yellow
- Formal inspection 1 each month
  - Frequent routine inspection
  - No geotechnical concern observed
- Review of instrumentation every 2 days by geotechnical team
- Instrumentation update and analysis included in each formal inspection report
  - Anomalous data are followed-up on
- TSF Inspection 1 each month
  - No tailings depression observed in the tailings surface in the last year

AGNICO EAGLE

Water Elevation and Head Difference over Time

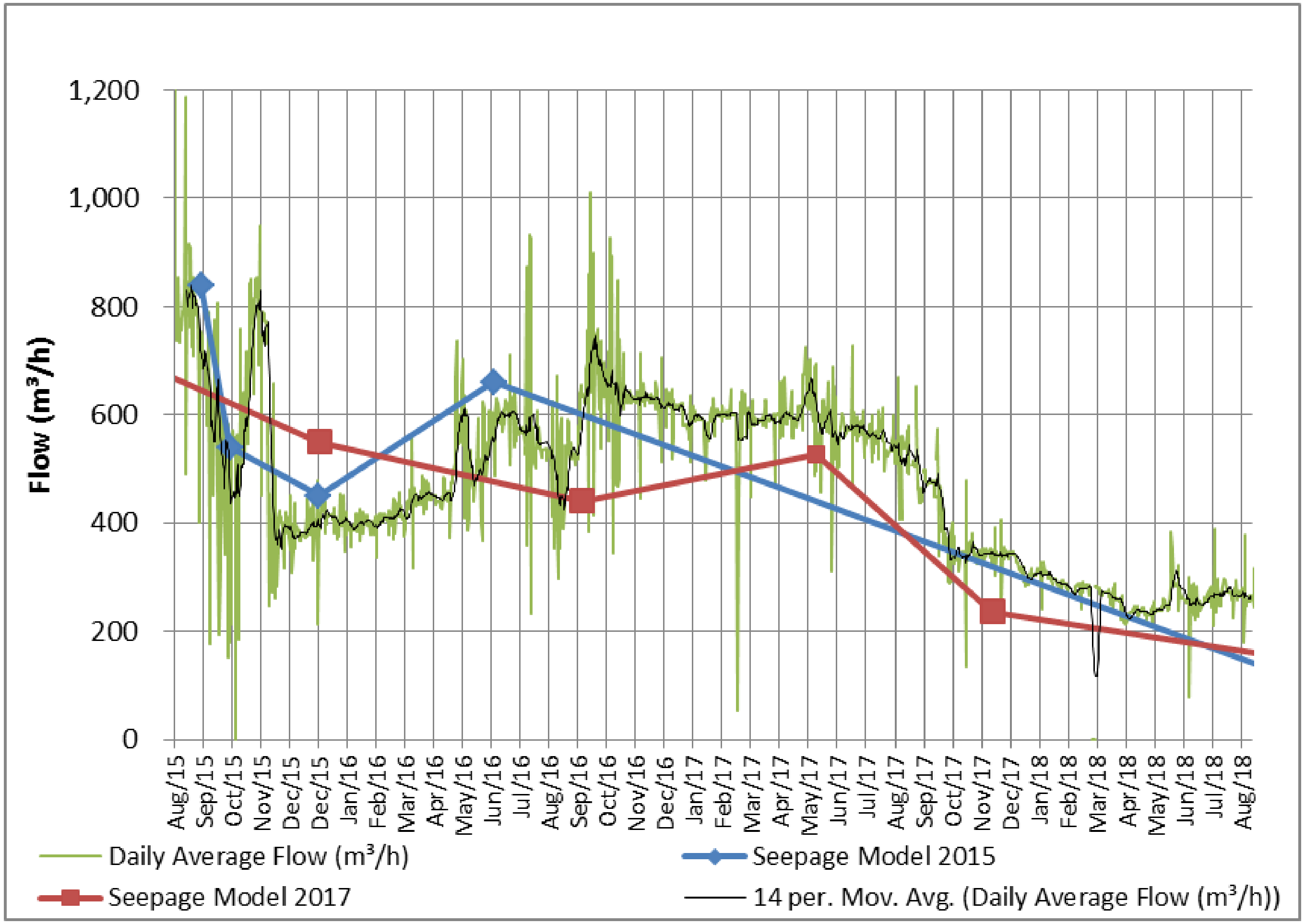


- The D/S pond is maintained around El. 114.9-115 m.
- Water is pumped back into the South Cell since September 2016.

1. CD PERFORMANCE

AGNICO EAGLE

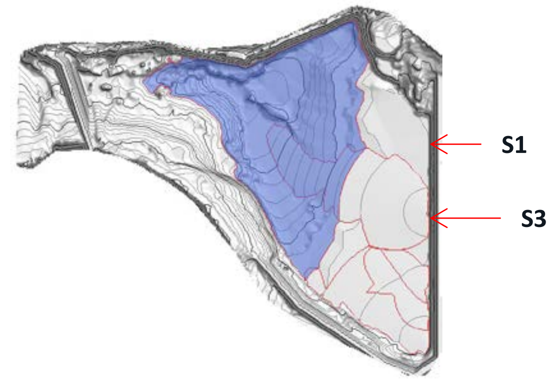
Seepage Flow (m³/h) over Time

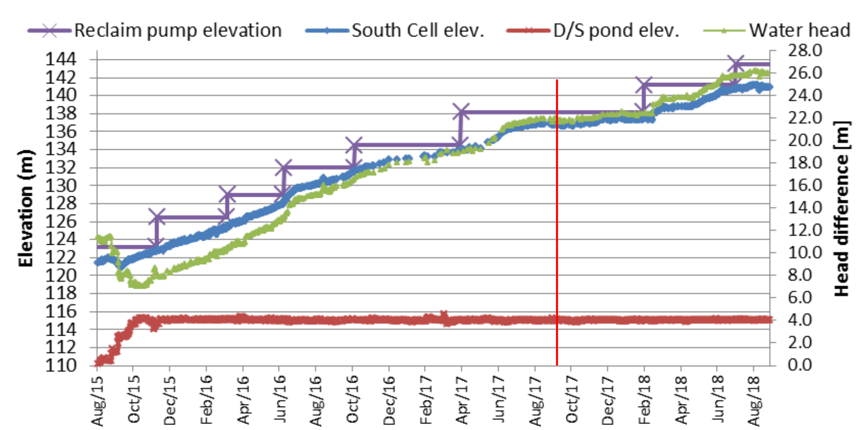


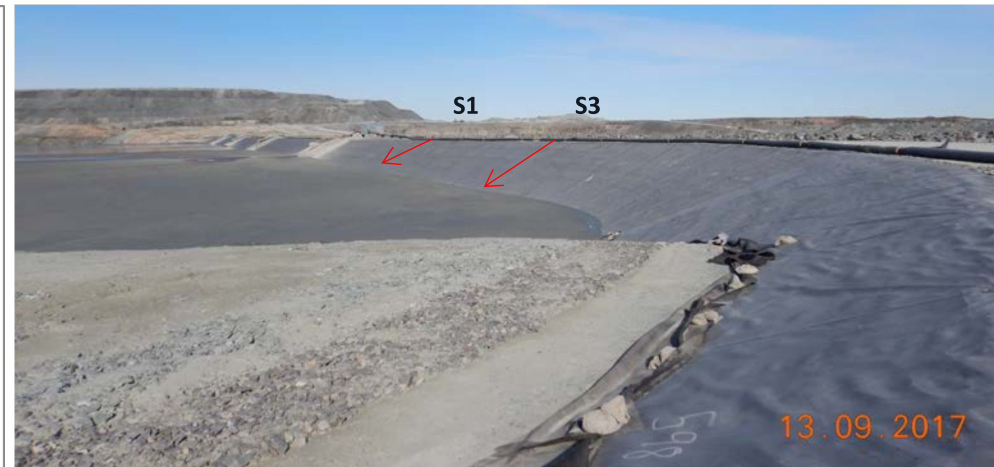
- Pump capacity of 455 m^3/h Second pump installed in parallel for an additional capacity of 1183 m^3/h

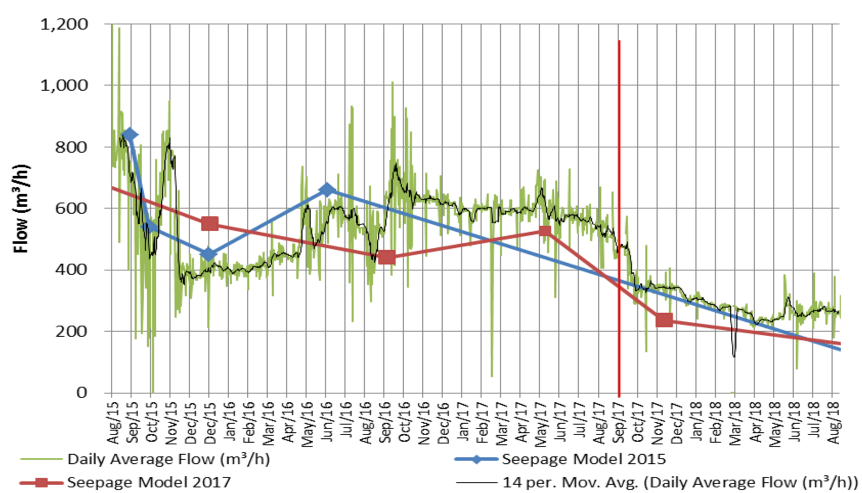
SEPTEMBER 2017

Average seepage flow	486 m³/h
EOM South Cell elevation	136.6 m
EOM CD D/S pond elevation	114.90 m
EOM Water head	21.7 m
EOM % Central Dike U/S toe cover	100 %



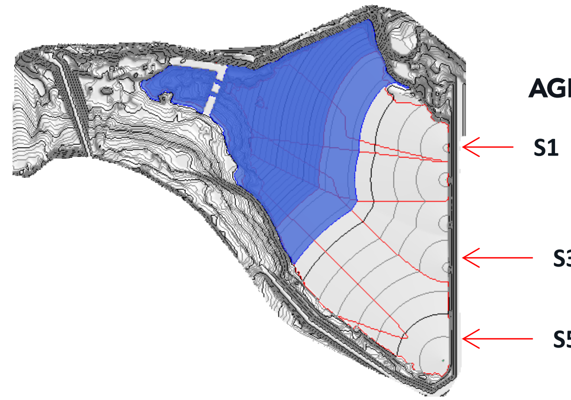


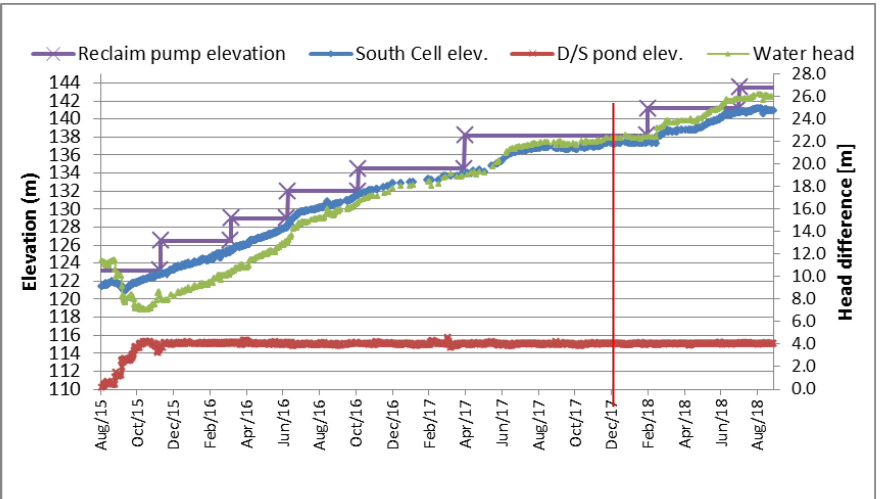


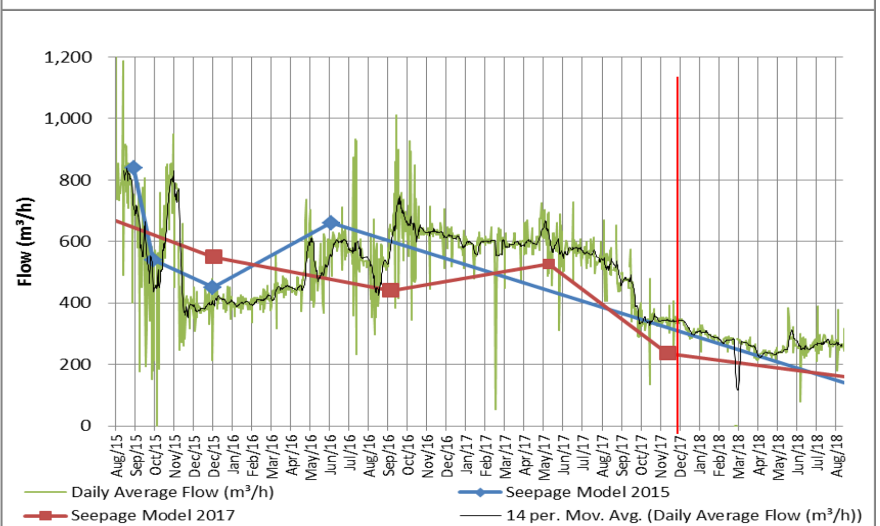


DECEMBER 2017

Average seepage flow	338 m³/h
EOM South Cell elevation	137.17 m
EOM CD D/S pond elevation	114.91 m
EOM Water head	22.26 m
EOM % Central Dike U/S toe cover	100 %







FEBRUARY 2018

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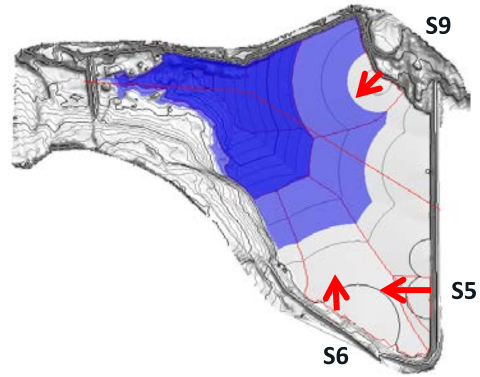
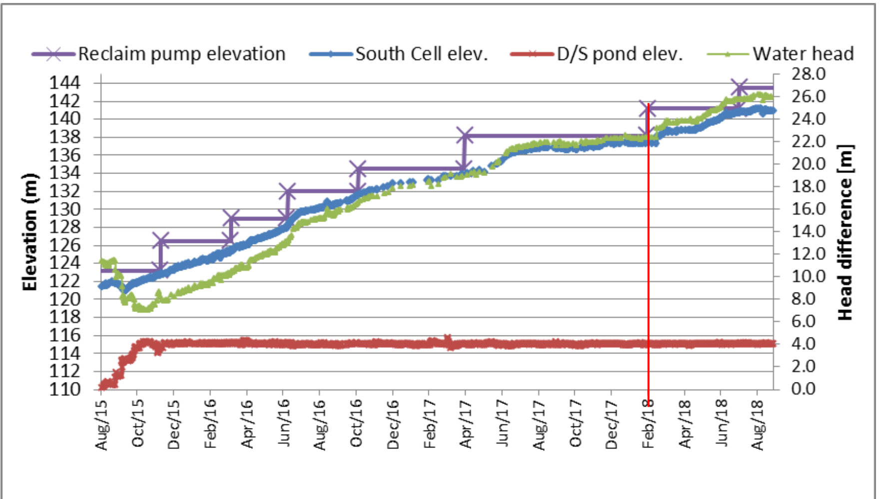
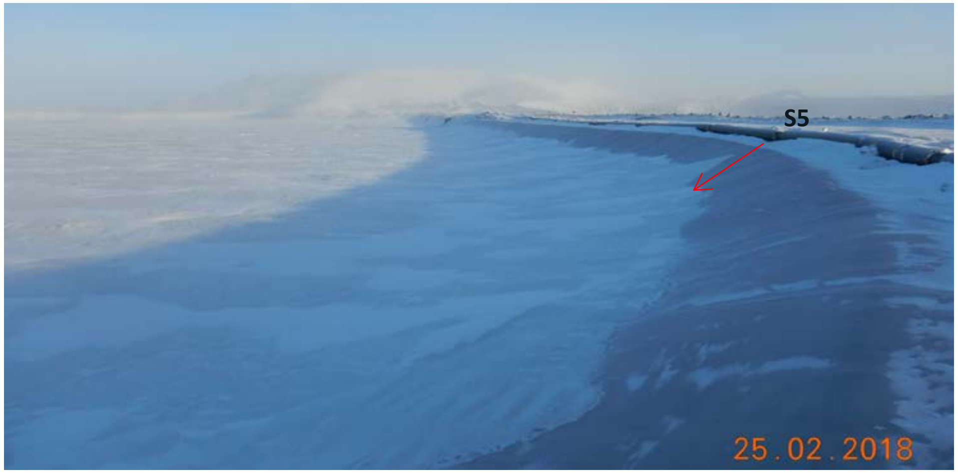
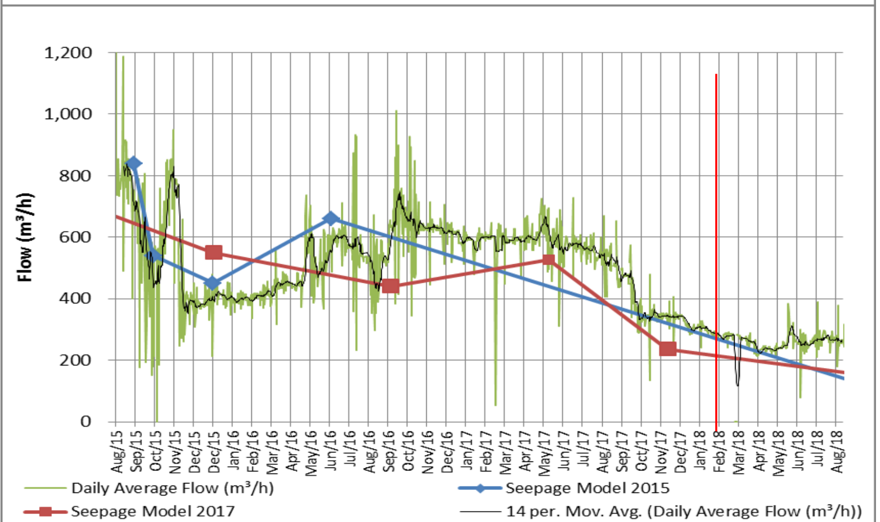
Average seepage flow	281 m³/h
EOM South Cell elevation	137.69 m
EOM CD D/S pond elevation	114.9 m
EOM Water head	22.79 m
EOM % Central Dike U/S toe cover	100 %



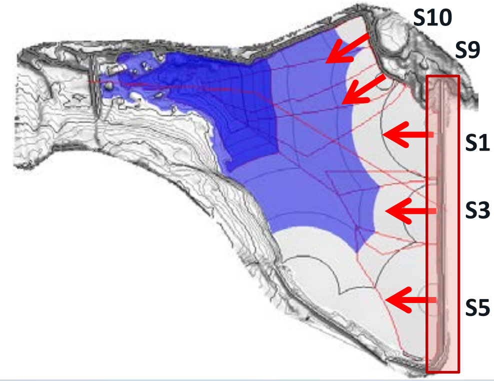


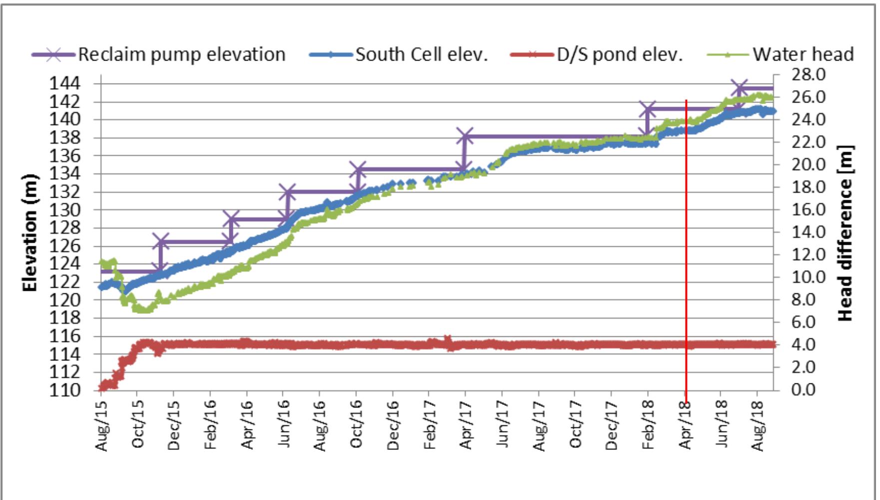


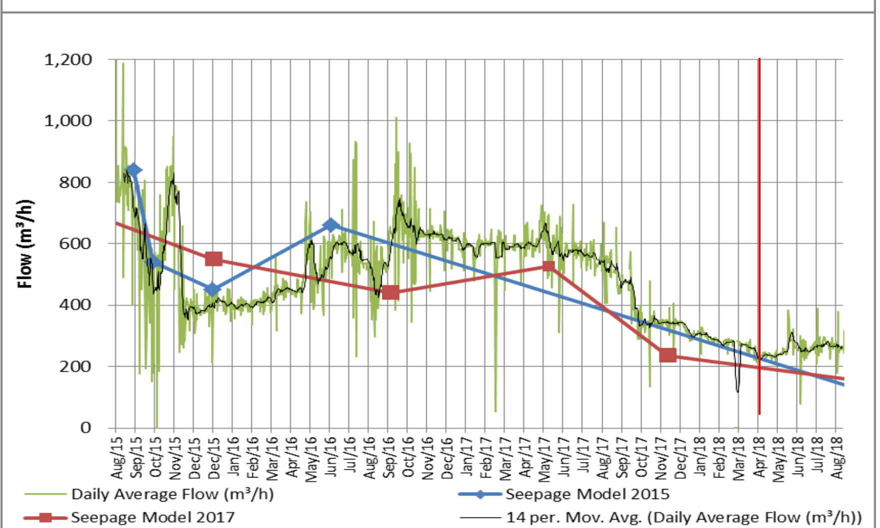


APRIL 2018

Average seepage flow	244 m³/h
EOM South Cell elevation	138.70 m
EOM CD D/S pond elevation	114.91 m
EOM Water head	23.79 m
EOM % Central Dike U/S toe cover	100 %



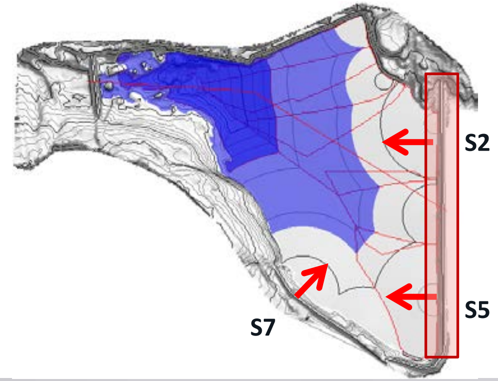




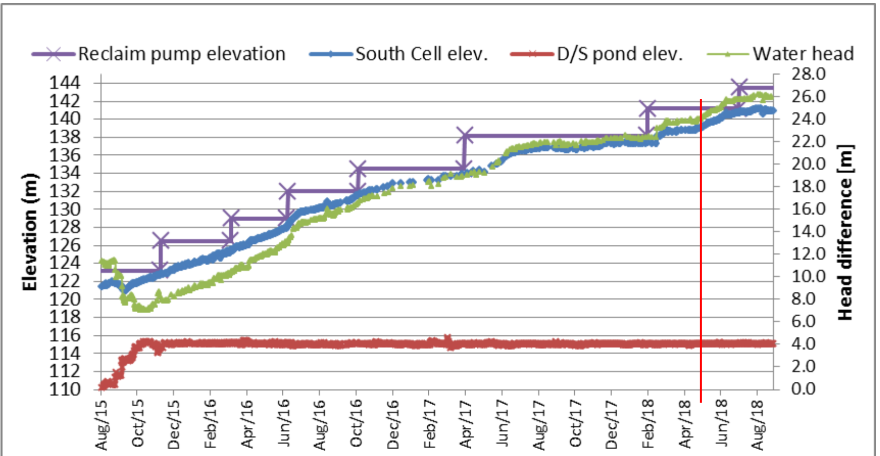
Construction started at the end of April, deposition points were removed

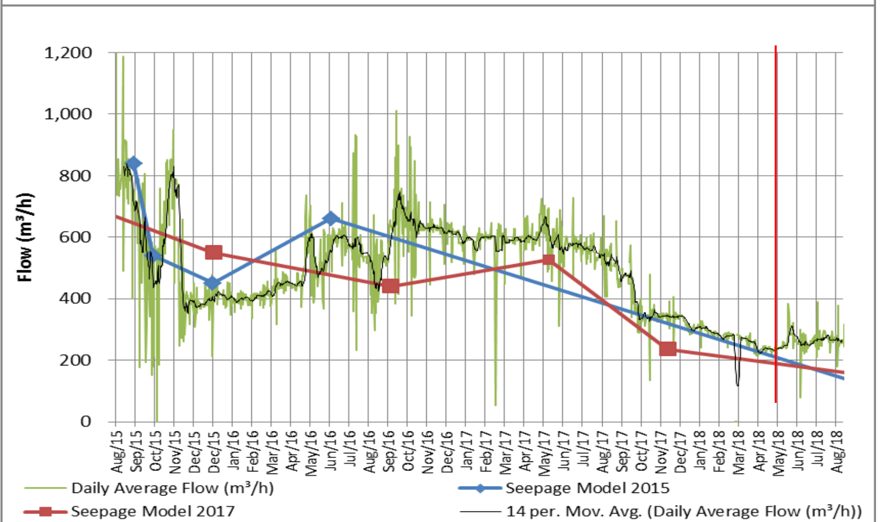
MAY 2018

Average seepage flow	239 m³/h
EOM South Cell elevation	139.45 m
EOM CD D/S pond elevation	114.95 m
EOM Water head	24.5 m
EOM % Central Dike U/S toe cover	100 %



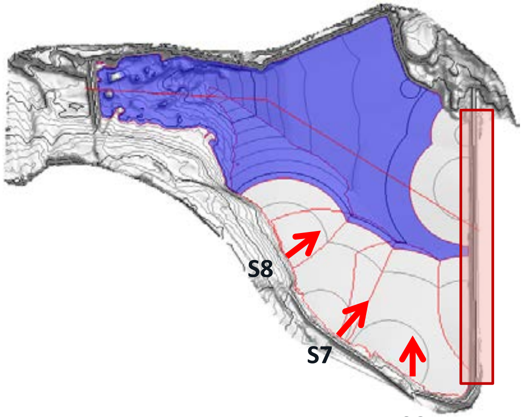
CD construction period

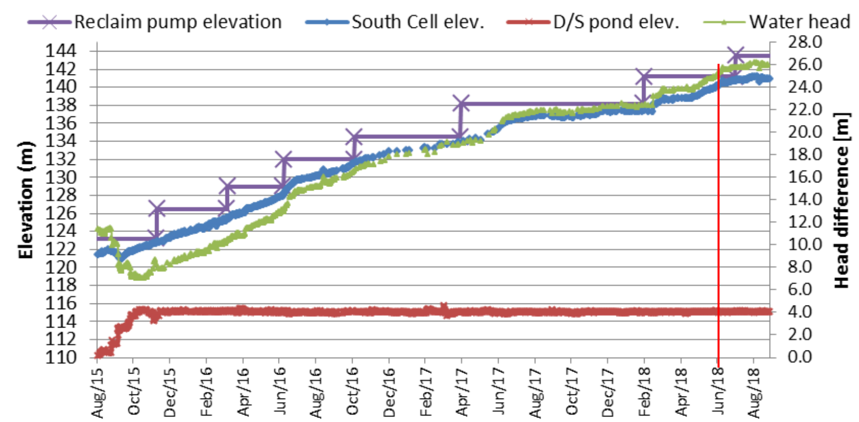




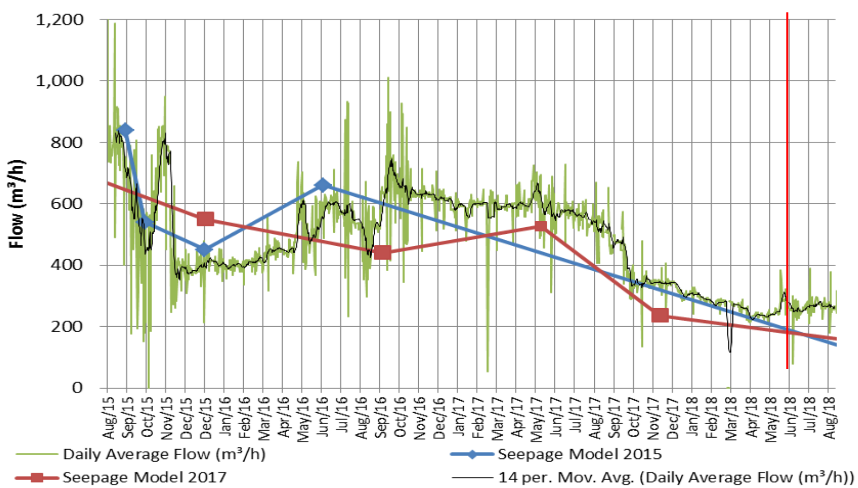
JUNE 2018

Average seepage flow	272 m³/h
EOM South Cell elevation	140.32 m
EOM CD D/S pond elevation	114.93 m
EOM Water head	25.39 m
EOM % Central Dike U/S toe cover	95 %



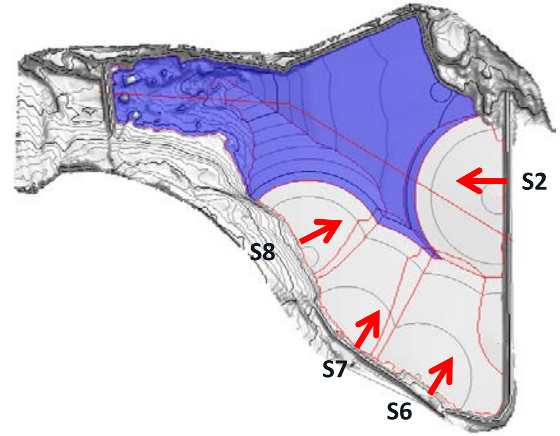


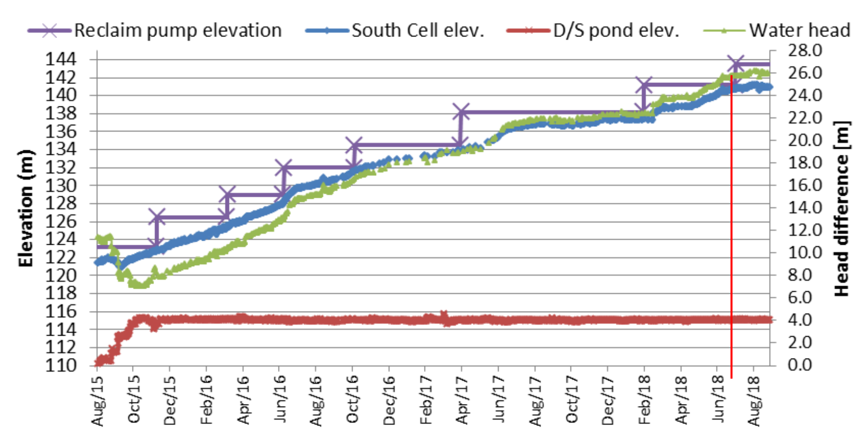
Deposition points were reinstalled

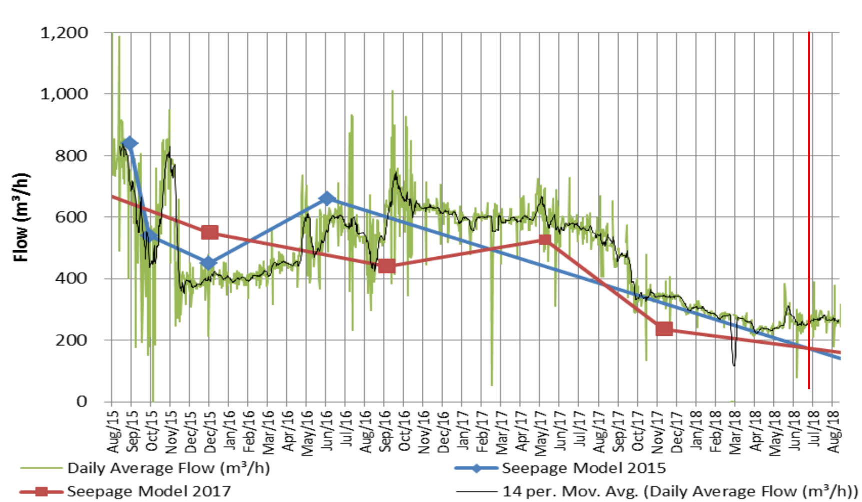


JULY 2018

Average seepage flow	263 m³/h
EOM South Cell elevation	140.71 m
EOM CD D/S pond elevation	114.97 m
EOM Water head	25.74 m
EOM % Central Dike U/S toe cover	100 %

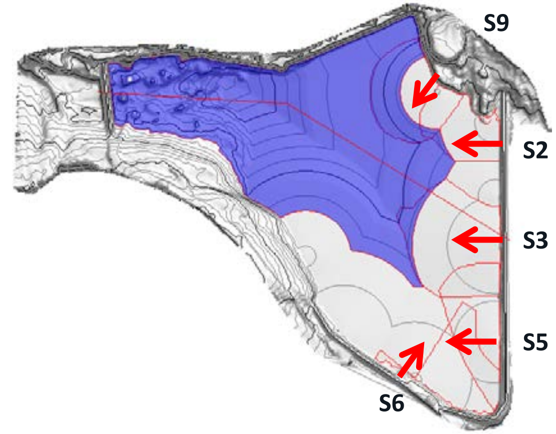


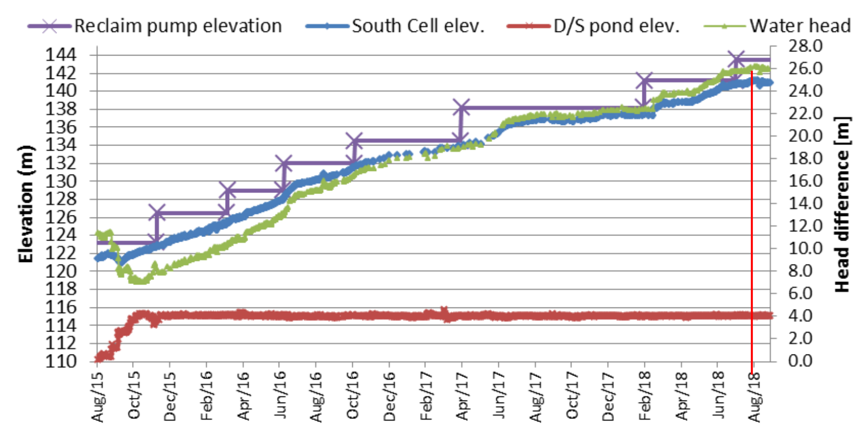


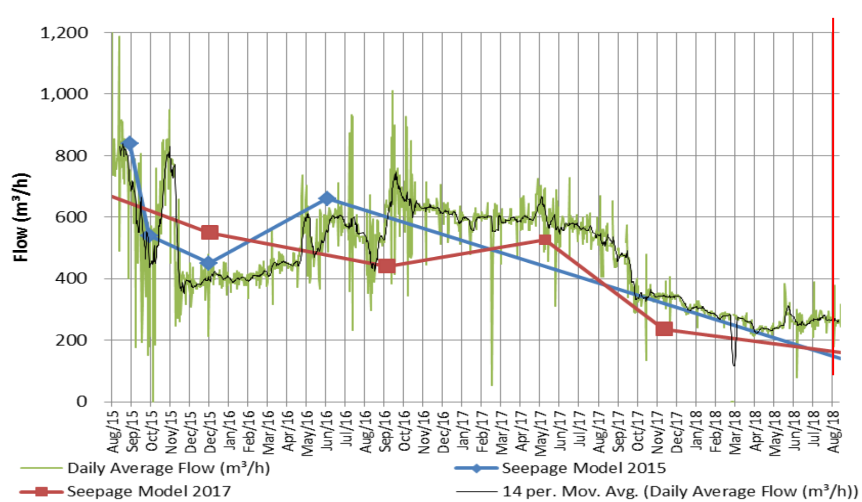


AUGUST 2018

Average seepage flow	273 m³/h
EOM South Cell elevation	140.92 m
EOM CD D/S pond elevation	114.92 m
EOM Water head	26 m
EOM % Central Dike U/S toe cover	100 %

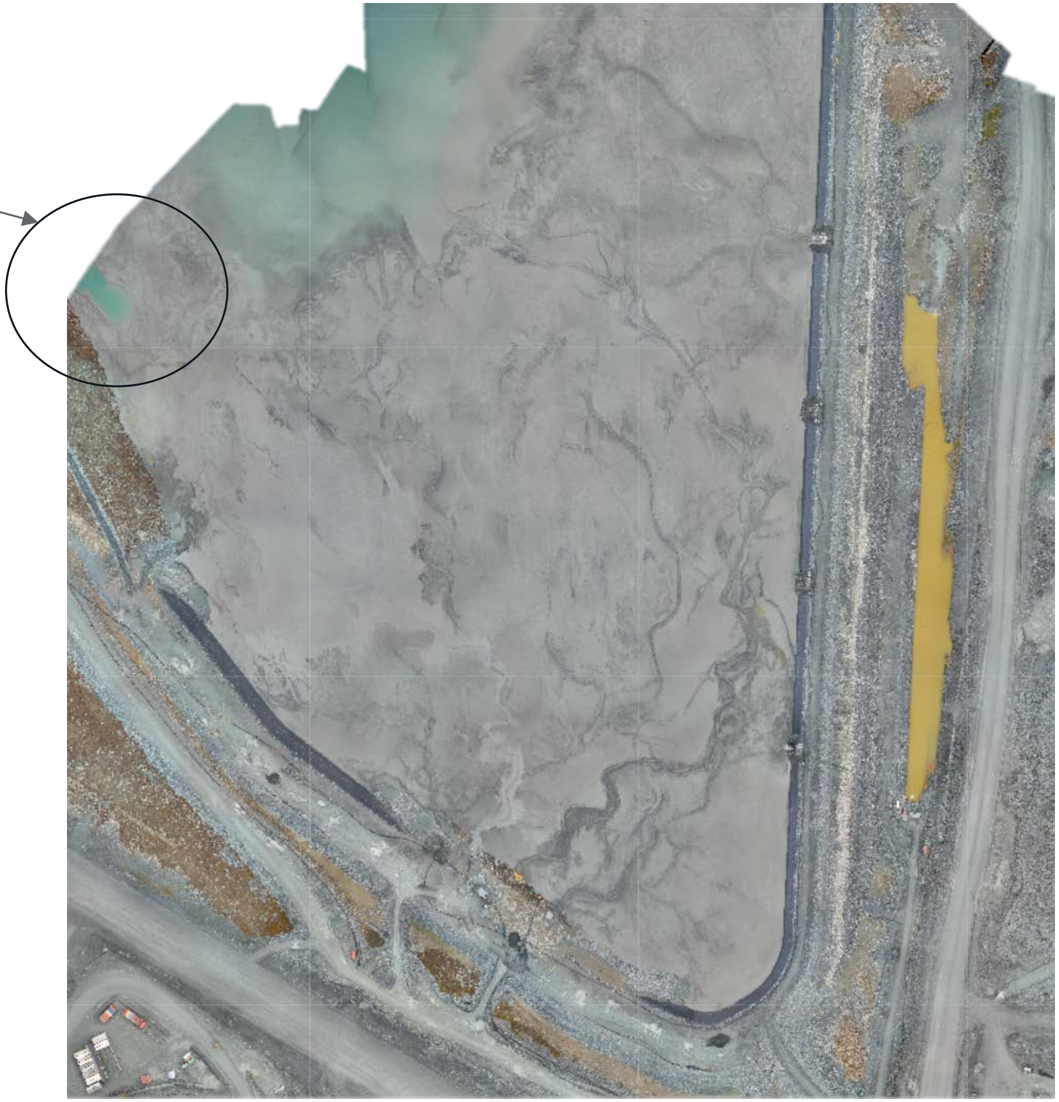






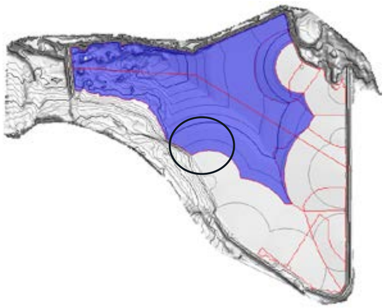
SEPTEMBER 2018

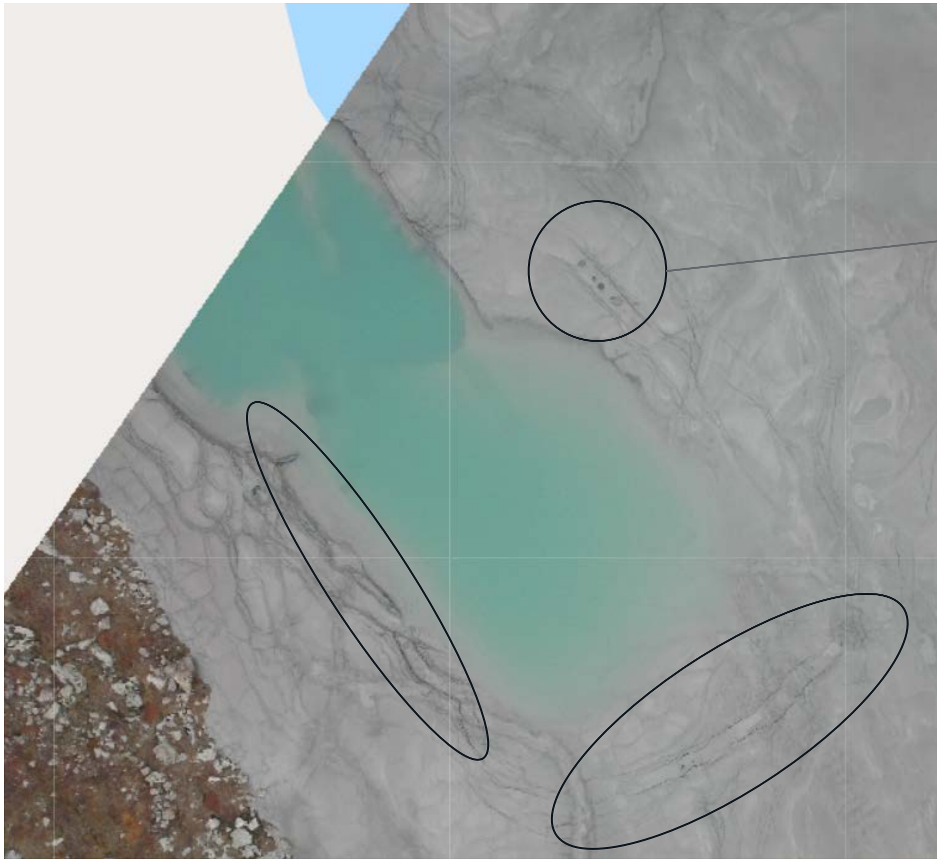
See Next Slide

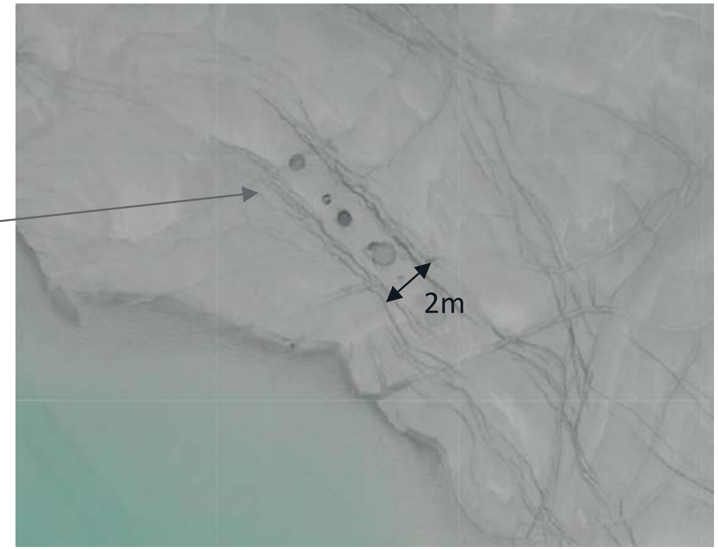


Drone survey September 7th 2018

SEPTEMBER 2018







file:///P:/Engineering/11-Drone/Portage_2018-09-07/3_dsm_ortho/2_mosaic/google_tiles/Portage_2018-09-07_mosaic.html

SECTION 3: SITE INVESTIGATION

2.1 Coloration of Downstream pond

(2018)

Monthly Photo of D/S Pond Coloration

May 17th, 2018

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Monthly Photo of D/S Pond Coloration

June 13th, 2018

Monthly Photo of D/S Pond Coloration

July 12th, 2018

Monthly Photo of D/S Pond Coloration

August 14th, 2018

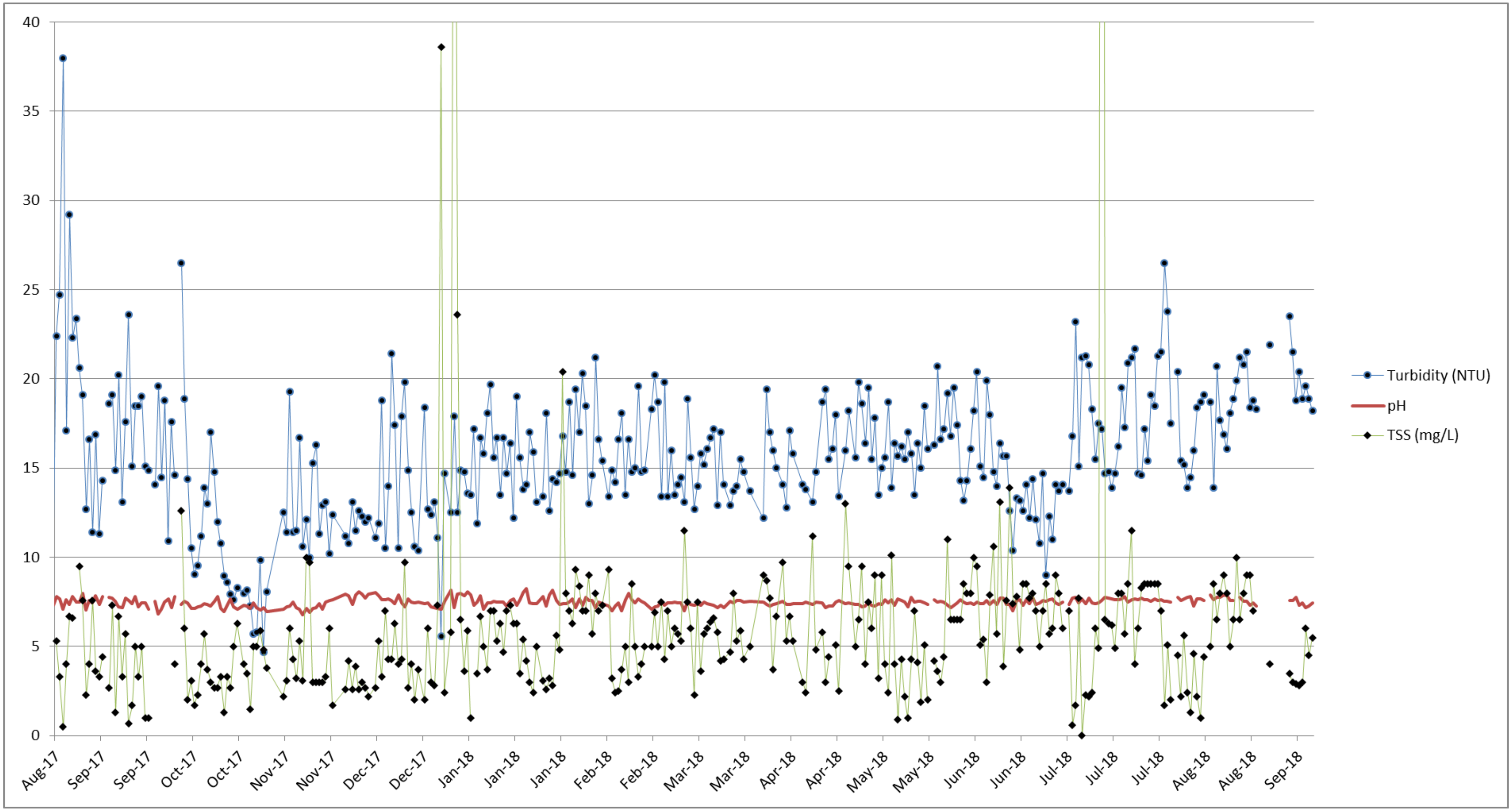
Monthly Photo of D/S Pond Coloration

September 5th, 2018

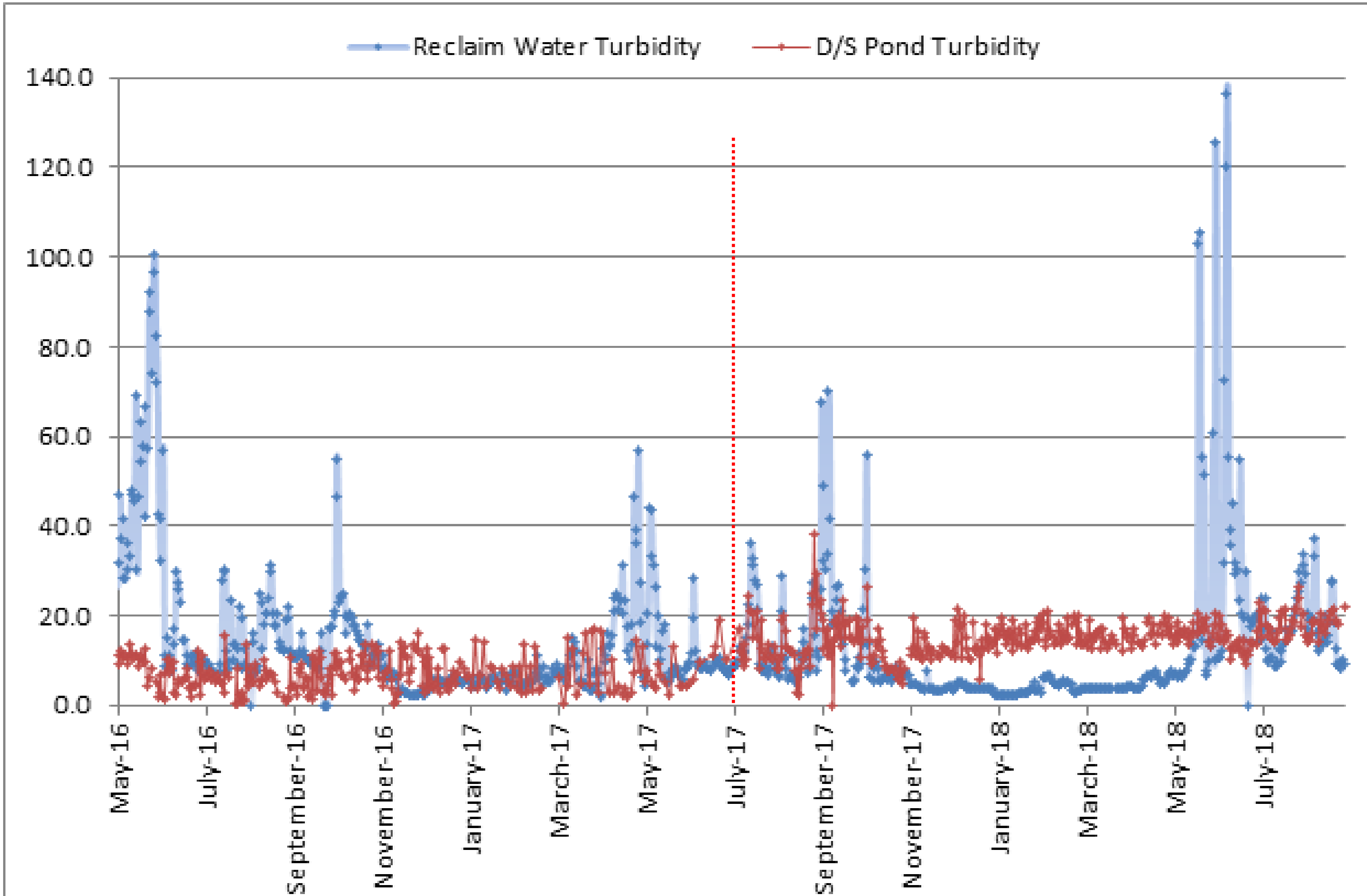
D/S POND TSS, PH, TURBIDITY

TSS = 70.4 mg/L

TSS = 144 mg/L

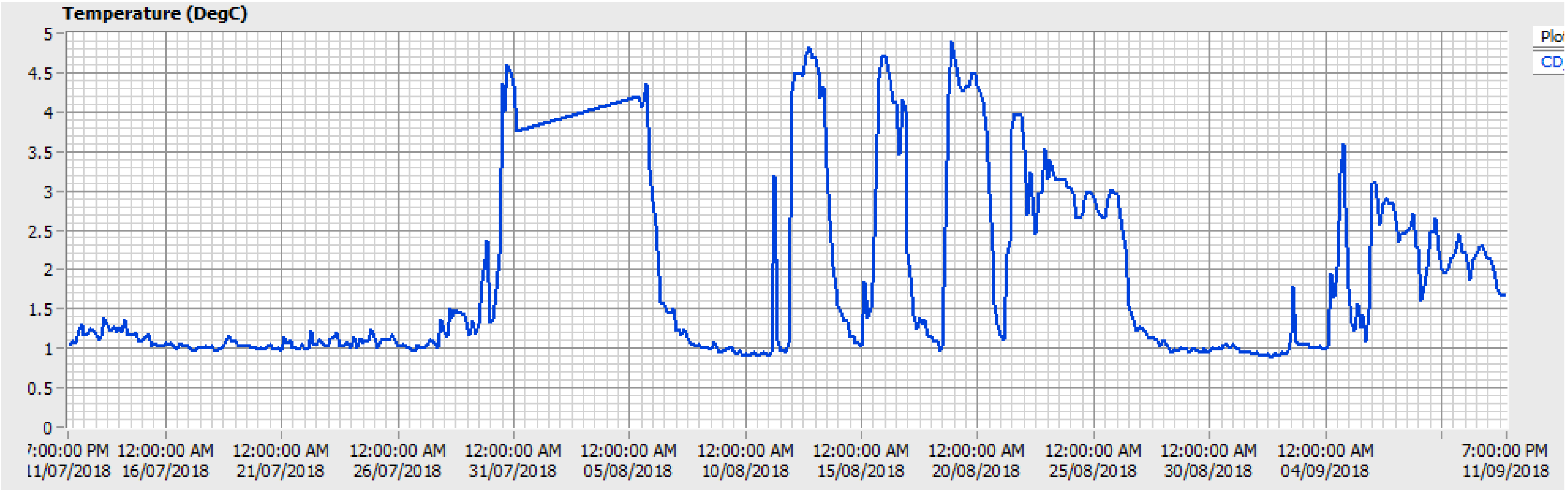


D/S POND TURBIDITY VS RECLAIM TURBIDITY

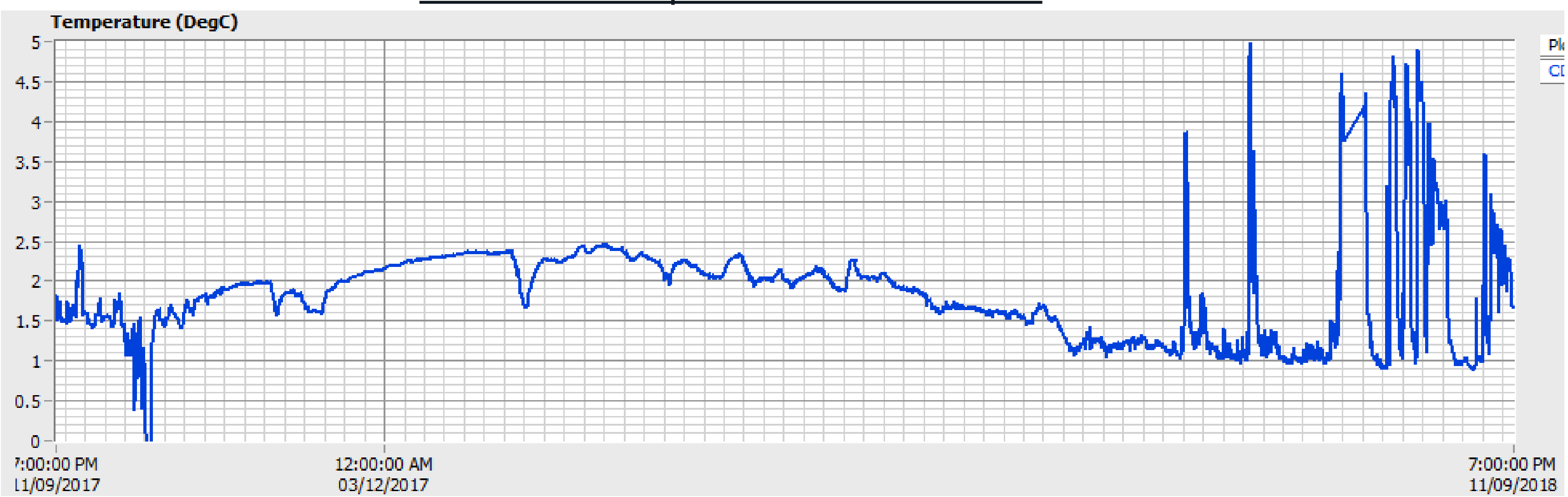


D/S POND TEMPERATURE

D/S Pond Temperature for Last Two Months



D/S Pond Temperature for Last Year



CENTRAL DIKE UPDATE 2018

COLORATION DOWNSTREAM POND

- Water sample analysis parameter are reviewed on a monthly basis by an AEM geochemist
- Expected trend ongoing and support the hypothesis of coloration change due to microbial metabolism resulting in a reduction of ferric iron
- The process will likely happen every year, but is not expected to worsen
- Water sampling will stop once the pond freeze and will resume in 2019

2.2 700P1 Area

(October 2017)

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Introduction

- During the Central Dike investigation campaign performed in June 2017, an anomaly was detected during the drilling of the hole 700P1.
- An hypothesis for this anomalie was the presence of a void in the till layer.
- To investigate this hypothesis, AEM decided to perform additional drilling in the vicinity of the 700P1.

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Methodology

- The campaign was performed between October 04th and October 07th, 2017.
- Three holes were drilled with TCG Rockmaster drill (percussion drilling) operated by an experimented driller.
- Steel casing was lowered as the drilling occurred.
- Geotechnical Technician was present during all the drilling of the holes and was collecting observation and measurements
- During the critical moment of the drilling, when the potential void was expected, the Geotechnical Eng was also present on the field

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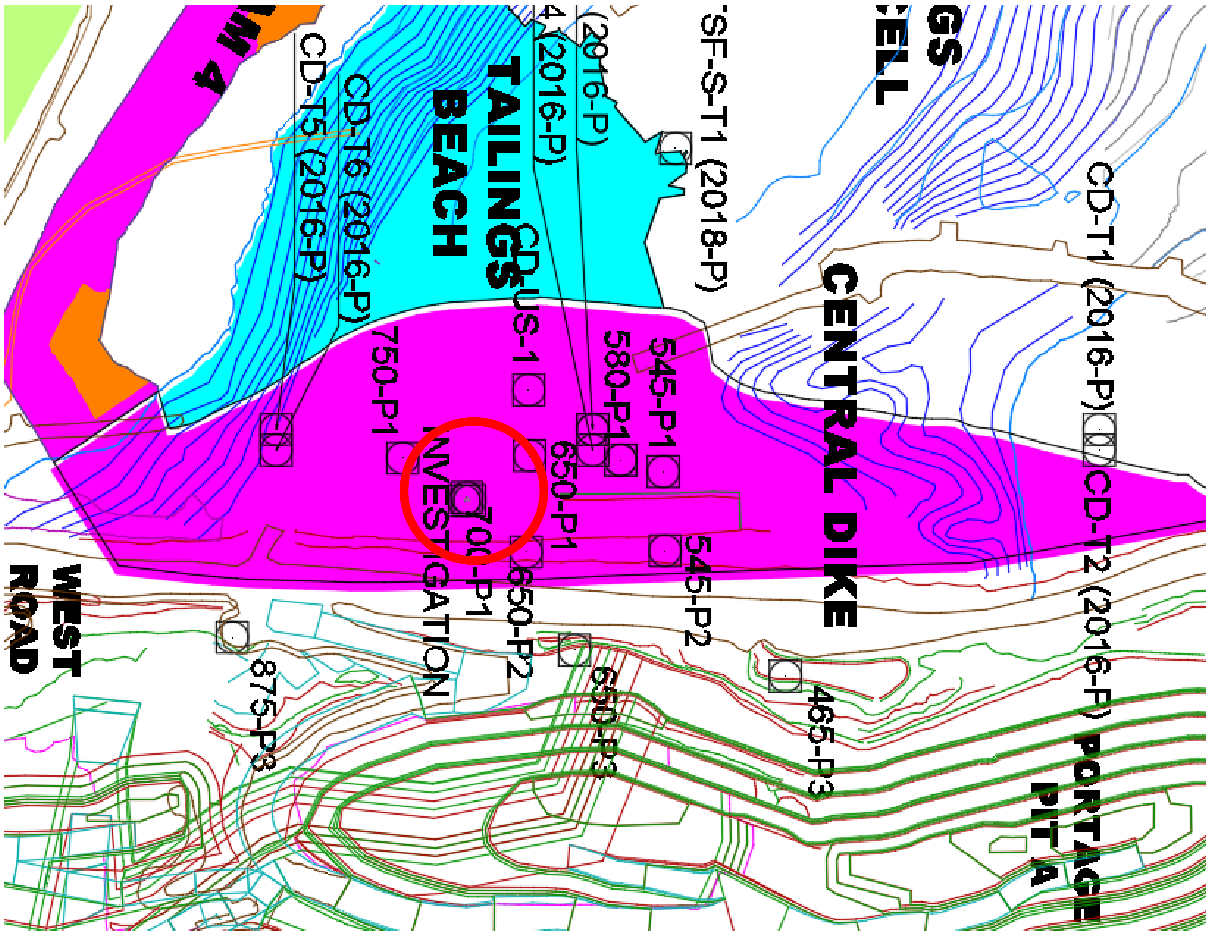
Location of the holes



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Results

Table 1 : Collar location (as-built)

Hole #	Easting UTMz14N	Northing UTMz14N	Elevation top casing (masl)	Elevation of ground surface (masl)	Elevation original Casing (masl)	Elevation of bottom of hole (masl)
698-P1	638713.378	7214592.298	120.132	119.90	120.800	98.02
702-P1	638713.614	7214588.111	120.355	119.99	120.300	101.83
700-P1W	638710.94	7214590.127	119.675	119.64	120.741	97.92

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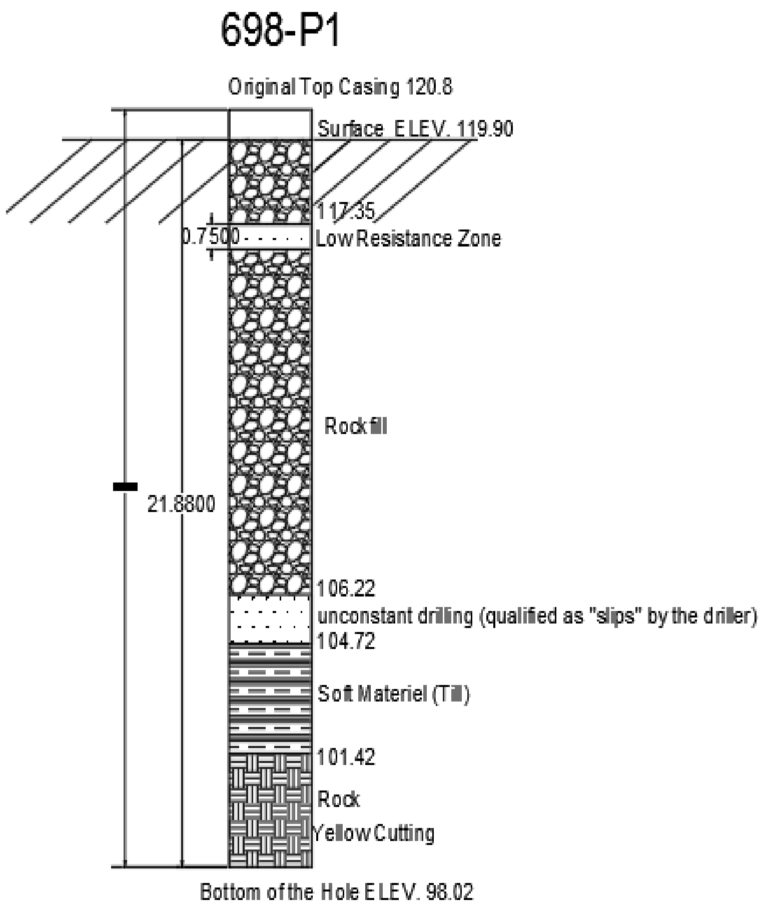
Results

First Drill Hole October 5, 2017



Hole 698-P1

- Started to be drilled at around 1:30 PM October 5, 2017.
- Starting at elevation 117.35, a small zone in the rockfill (0.75m) was encountered where there was not much resistance on the drill. It went back to the rockfill after that.
- The water started pouring out of the hole at elevation 115.
- At elevation 106.22, the driller mentioned that he was feeling some kind of slips in the material
- No void was encountered around the till zone.

2.2 SITE INVESTIGATION – 700P1 AREA POTENTIAL VOID

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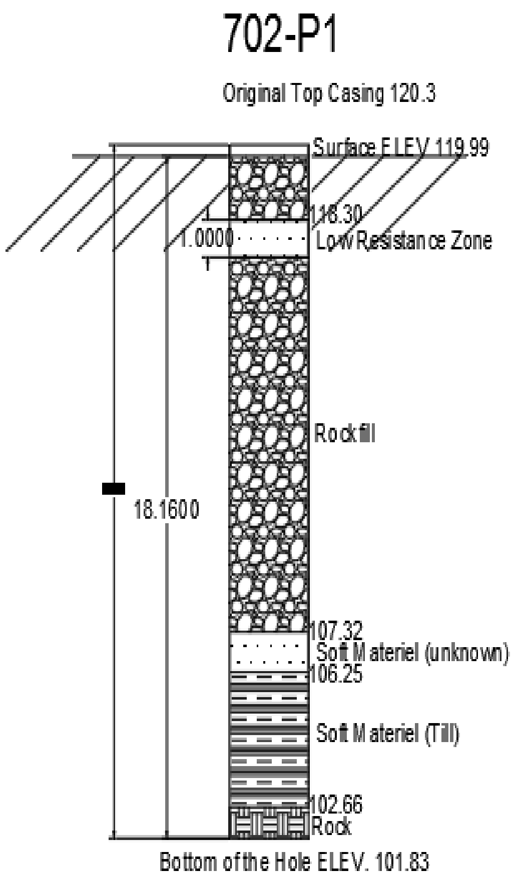
Results

Second Drill Hole October 6, 2017



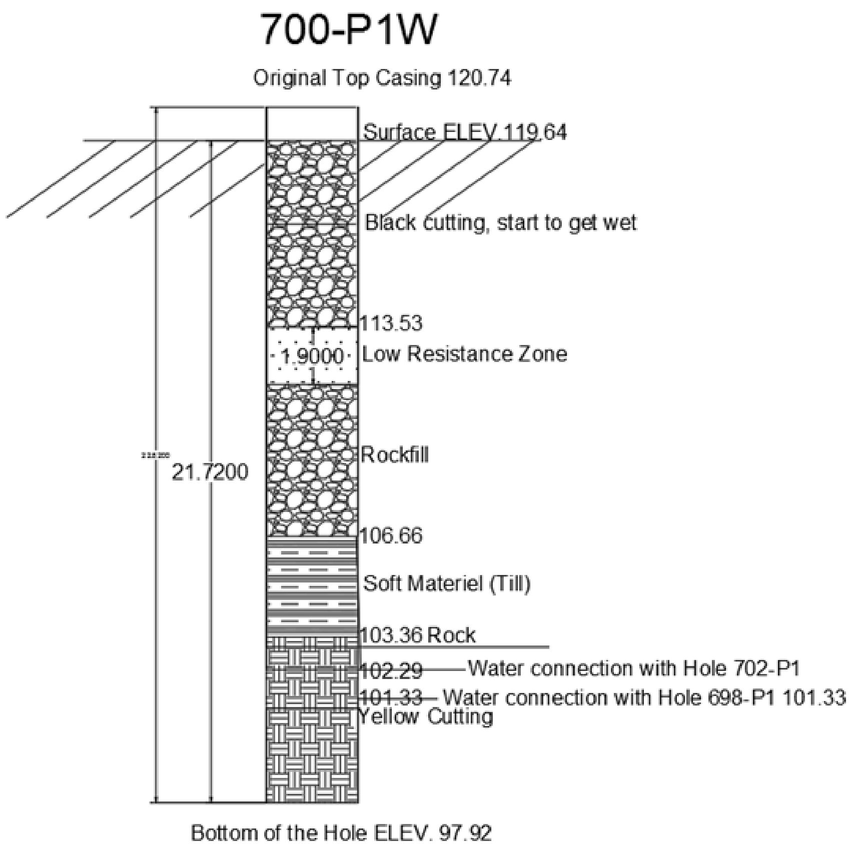
Hole 698-P1

- The hole 702-P1 started to be drilled at around 7:30 AM October 6, 2017.
- Starting at elevation 118.30, a small zone in the rockfill was encountered (1.0m) where there was not much resistance on the drill.
- The water started pouring out of the hole at elevation 115.
- At elevation 107.32, the driller mentioned that the materiel was very soft and shortly after that, the till zone was confirmed.
- No void was encountered around the till zone.

2.2 SITE INVESTIGATION – 700P1 AREA POTENTIAL VOID

AGNICO EAGLE

Results



Hole 698-P1

- The hole 700-PW started to be drilled at around 1:30 PM October 6, 2017.
- Starting at elevation 113.53, a zone in the rockfill (1.9m) was encountered where there was not much resistance on the drill. It went back to the rockfill after that.
- The water started pouring out of the hole at elevation 115. At elevation 106.66 the drill encountered the till. Around the same time and elevation, the water started to poured out of the second hole that was drilled (702-P1). No void was encountered around the till zone. At elevation 101.33 the water started pouring out of the first hole that was drilled (698-P1). Water resurgence was observed in nearby holes while drilling in the bedrock.

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Conclusion

- No supporting evidence for the void in till theory
- It is highly likely that the perceived void in June 2017 is either a result of drilling issue, washing of till during during operation or a localised void with limited lateral extension

SECTION 4: INSTRUMENTATION REVIEW

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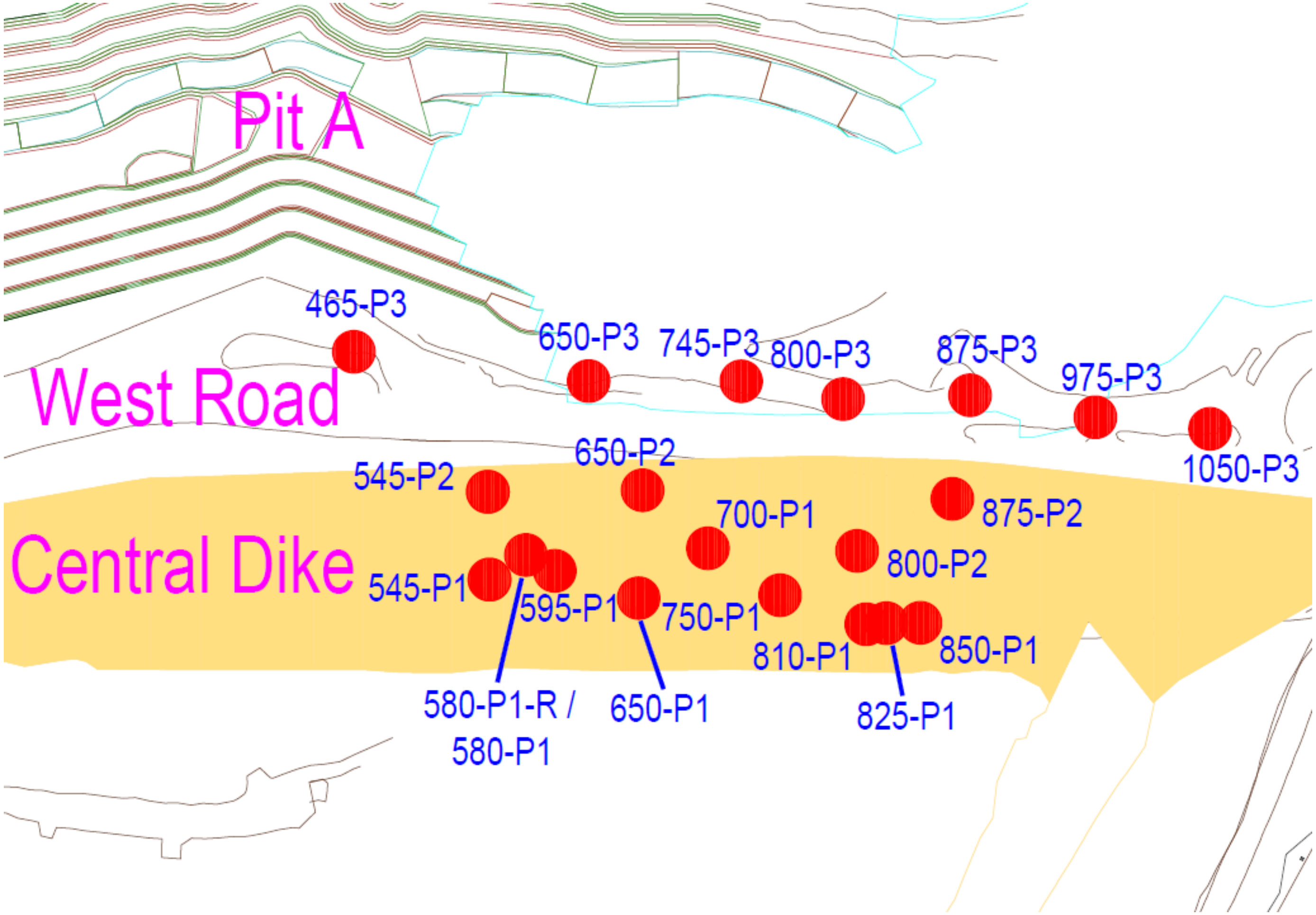
Map of Central Dike instrumentation

69 Piezometers and 20 Thermistors Strings Installed in 20 Boreholes



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Central Dike instrumentation status

Hole	Instrument ID	Type	Status
#	ID	PZ/TH	Operational (✓)/Not operational (×)
465-P3	465-P3-A	Piezo	Frozen
	465-P3-B	Piezo	Frozen
	465-TH-P3	Thermistor	✓
545-P1	545-P1-A	Piezo	✓
	545-P1-B	Piezo	✓
	545-P1-C	Piezo	✓
	545-P1-D	Piezo	✓
	545-TH-P1	Thermistor	✓
545-P2	545-P2-A	Piezo	Frozen
	545-P2-B	Piezo	Frozen
	545-P2-C	Piezo	Frozen
	545-P2-D	Piezo	Frozen
	545-TH-P2	Thermistor	✓
580-P1	580-P1-A	Piezo	× (since July 2016)
	580-P1-B	Piezo	× (since July 2016)
	580-P1-C	Piezo	× (since July 2016)
	580-P1-D	Piezo	× (since July 2016)
	580-P1-E	Piezo	× (since July 2016)
	580-TH-P1	Thermistor	× (since July 2016)
595-P1	595-P1-A	Piezo	✓
	595-P1-B	Piezo	✓
	595-P1-C	Piezo	✓
	595-P1-D	Piezo	× (June 2017)
	595-P1-E	Piezo	× (June 2017)
	595-TH	Thermistor	✓
650-P1	650-P1-A	Piezo	× (since February 2016)
	650-P1-B	Piezo	× (since September 2016)
	650-P1-C	Piezo	× (since September 2016)
	650-P1-D	Piezo	× (since September 2016)
	650-TH-P1	Thermistor	× (since August 2016)

650-P2	650-P2-A	Piezo	✓
	650-P2-B	Piezo	✓
	650-P2-C	Piezo	✓
	650-P2-D	Piezo	✓
	650-TH-P2	Thermistor	✓
650-P3	650-P3-A	Piezo	Frozen
	650-P3-B	Piezo	Frozen
	650-TH-P3	Thermistor	✓
750-P1	750-P1-A	Piezo	✓
	750-P1-B	Piezo	✓
	750-P1-C	Piezo	✓
	750-P1-D	Piezo	✓
	750-P1-E	Piezo	✓
	750-TH-P1	Thermistor	✓
810-P1	810-P1-A	Piezo	× (since Dec. 2017)
	810-P1-B	Piezo	× (since January 2017)
	810-P1-C	Piezo	✓
	810-P1-D	Piezo	× Elev. Working only
	810-TH	Thermistor	× (since February 2018)
825-P1	825-P1-A	Piezo	✓
	825-P1-B	Piezo	✓
	825-P1-E	Piezo	✓
	825-TH	Thermistor	✓
850-P1	850-P1-A	Piezo	✓
	850-P1-B	Piezo	✓
	850-P1-E	Piezo	✓
	850-TH	Thermistor	✓
875-P3	875-P3-A	Piezo	✓
	875-P3-B	Piezo	✓
	875-TH-P3	Thermistor	✓

875-P2	875-P2-A	Piezo	✓
	875-P2-B	Piezo	✓
	875-P2-C	Piezo	Frozen
	875-P2-D	Piezo	Frozen
	TH-875-P2	Thermistor	✓
800-P2	800-P2-A	Piezo	✓
	800-P2-B	Piezo	✓
	800-P2-C	Piezo	✓
	800-P2-D	Piezo	✓
	TH-800-P2	Thermistor	✓
700-P1	700-P1-A	Piezo	✓
	700-P1-B	Piezo	✓
	700-P1-C	Piezo	✓
	700-P1-D	Piezo	✓
	TH-700-P1	Thermistor	✓
580-P1 (R)	580-P1-R-A (R)	Piezo	✓
	580-P1-R-B (R)	Piezo	✓
	580-P1-R-C (R)	Piezo	✓

	TH-580-P1 (R)	Thermistor	✓
1050-P3	1050-P3-A	Piezo	Frozen
	1050-P3-B	Piezo	Frozen
	TH-1050-P3	Thermistor	✓
975-P3	975-P3-A	Piezo	✓
	975-P3-B	Piezo	✓
	TH-975-P3	Thermistor	✓
800-P3	800-P3-A	Piezo	✓
	800-P3-B	Piezo	✓
	800-P3-C	Piezo	✓
	TH-800-P3	Thermistor	✓
745-P3 (WR-P3)	TH-745-P3	Thermistor	✓
CD_US-0+650	CD-US-1	Thermistor	✓
	CD-US-2	Thermistor	✓
SD5	TH-02	Thermistor	✓
	TH-03	Thermistor	✓
	TH-04	Thermistor	✓

Thermistor with capacitance effect in the last year

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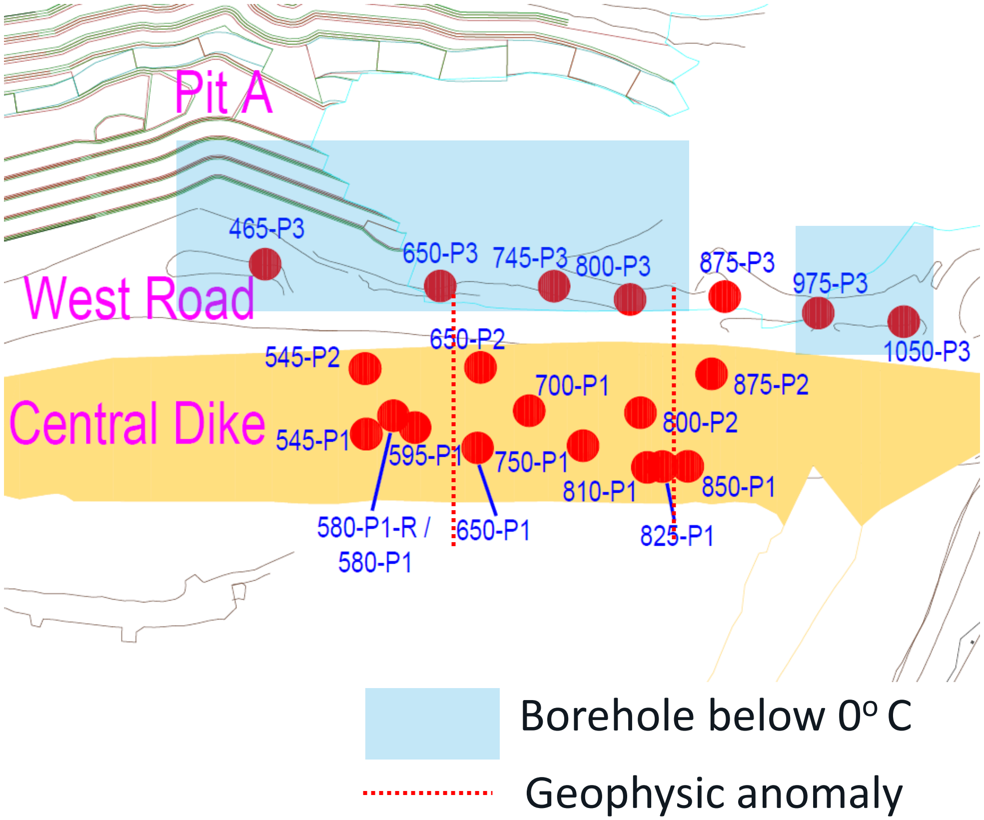
General Trend Observed

Thermistors

- Line P1 and P2 are unfrozen. Frozen instruments near Portage wall
- Zone near Portage between 875 and 975 with temperature profile above 0º
- Typical temperature in unfrozen holes varie from 0.5 º C to 2º C
- 2017 instruments are stabilized

Piezometers

- Most instruments are correlated with D/S pond elevation.
- Some instruments follow South Cell trend (generally the one deeper in bedrock).
- General piezometric trend is stable.



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Presentation Summary

Thermistors

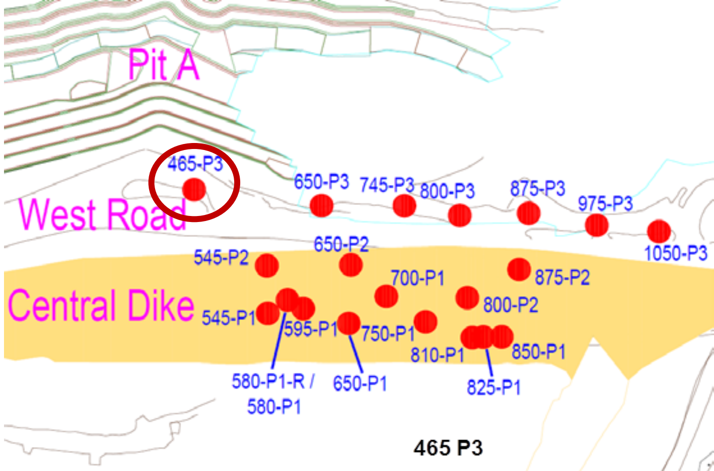
- Thermistor graphs show 12 plots with a 29 days interval
- Graph are produced with VDV – AEM updated the software in the last year and work on the presentation of the data in order to ease daily follow up of the structure.

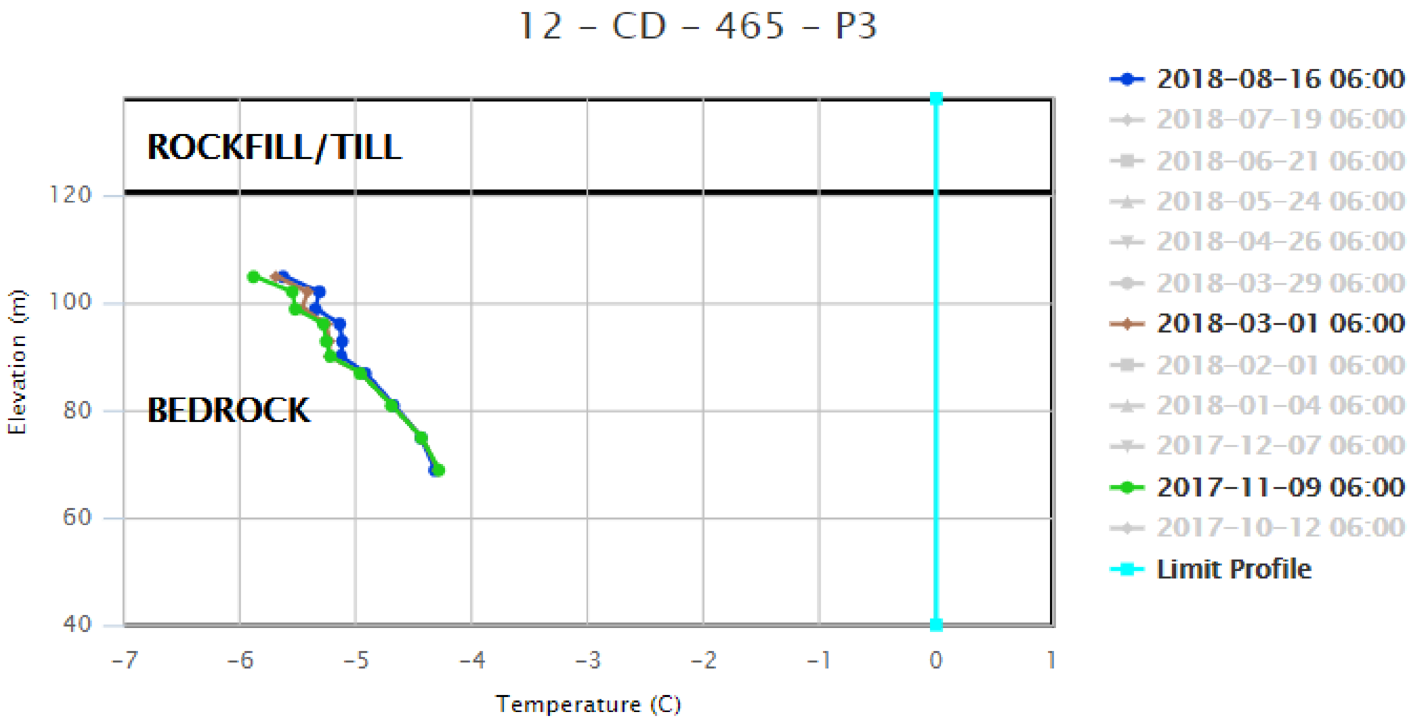
Piezometers

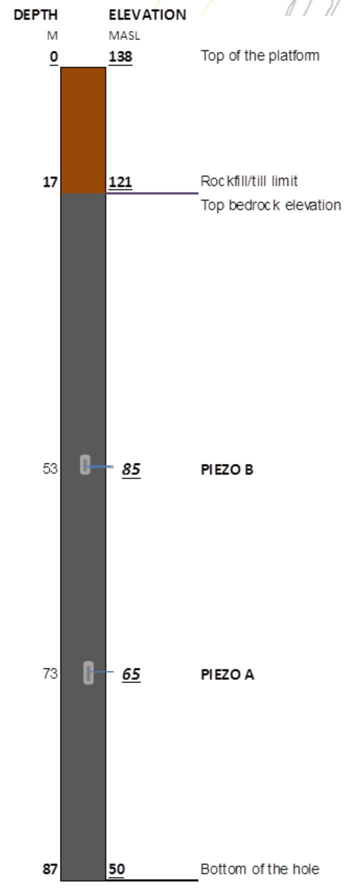
- Piezometer graph show pressure readings over time.
- Graph are produced with Excel. Migration of the data toward VDV is on going. Work is still needed to rework visual presentation.

THERMISTOR 465 P3

- Bedrock Below 0º C at 465-P3 [-5.6 º C to -4.3º C]

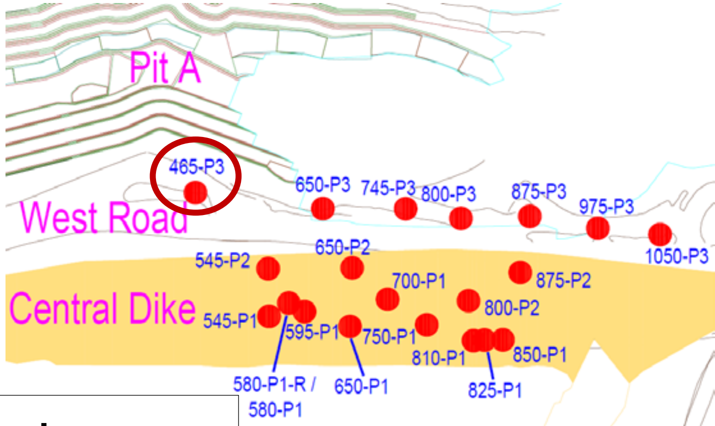


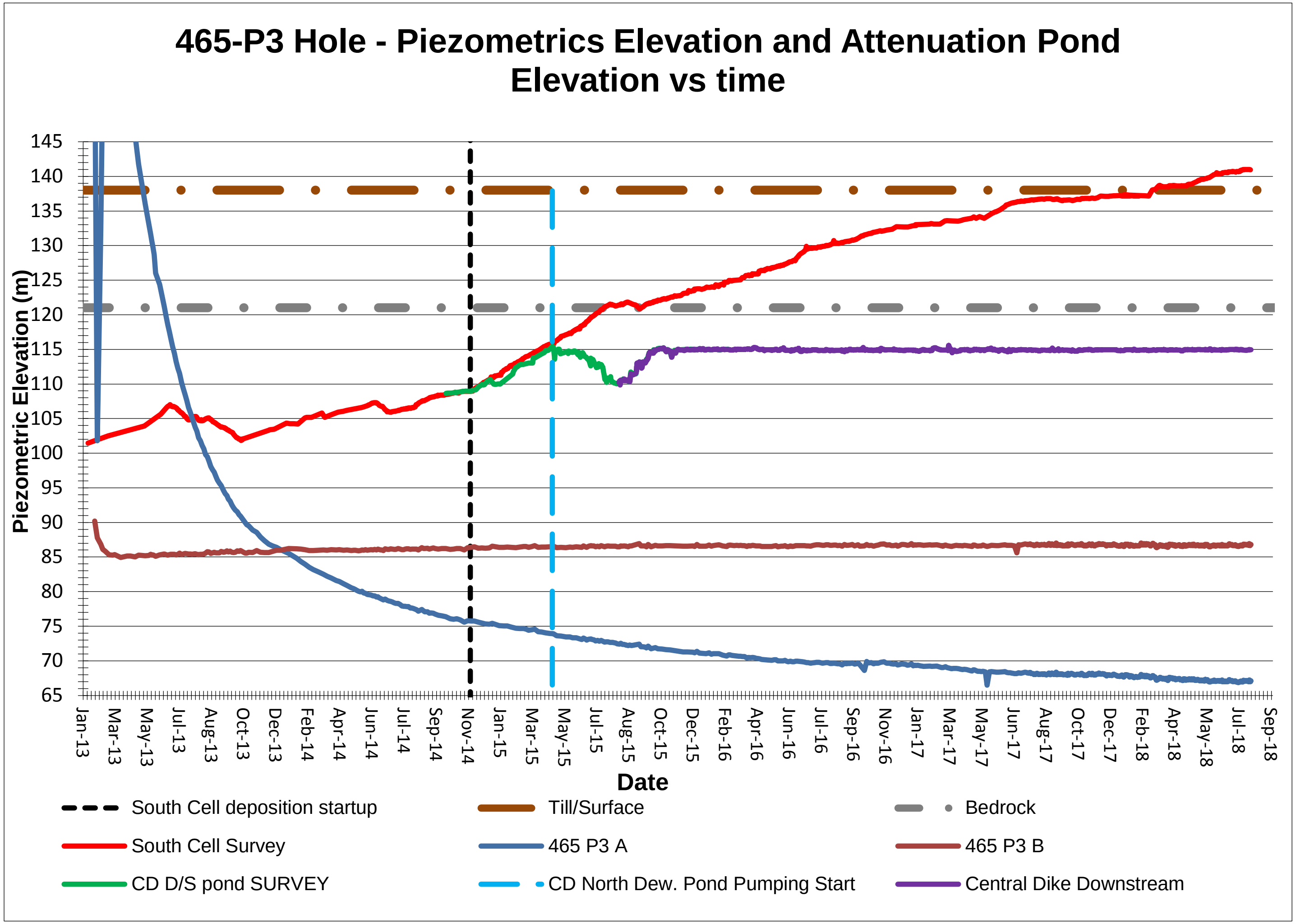


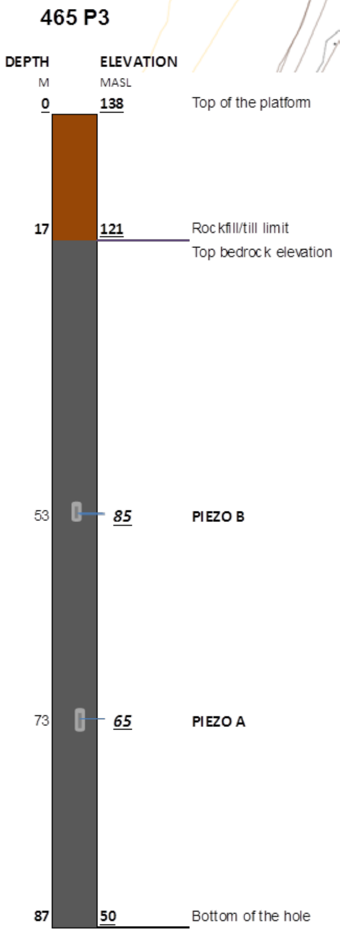


PIEZOMETERS 465-P3

- Both Piezo are showing temperature values under the freezing point

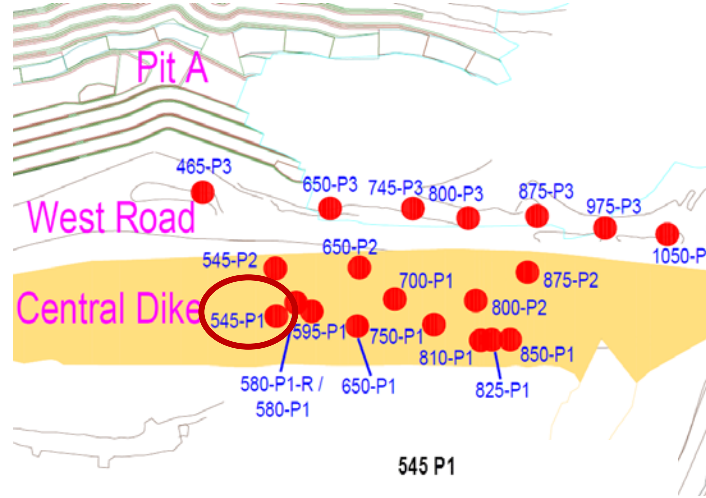


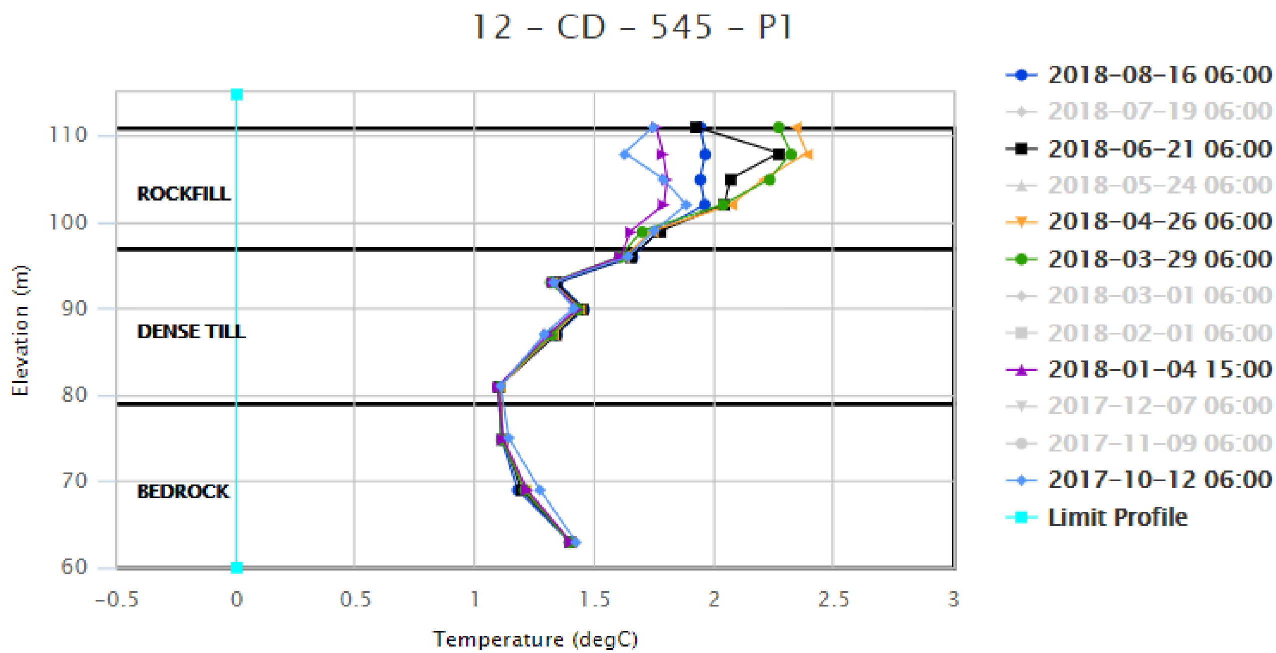


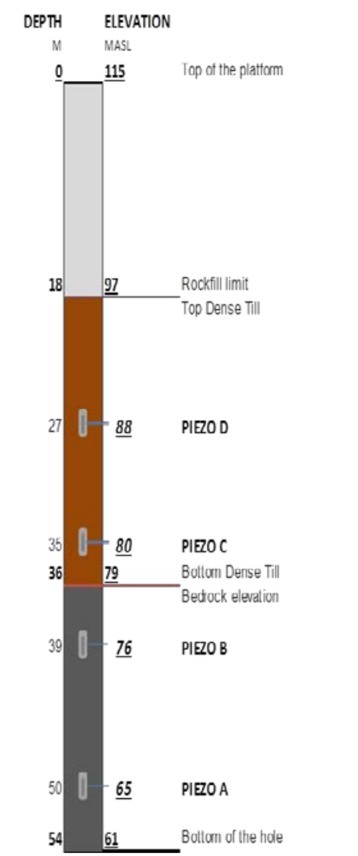


THERMISTOR 545-P1

- 545-P1 thermistor is showing the same temperature profile than last year. Warmer peak observed at elevation 81.
- Temperature in the bedrock/till unit is in between 1.1° C and 1.4° C.

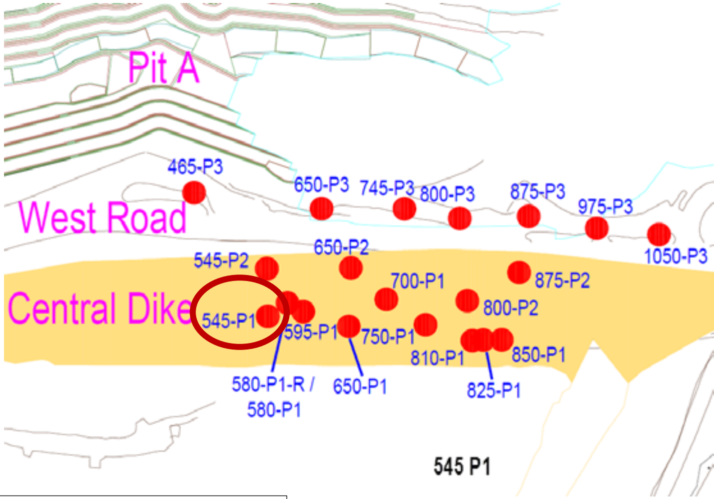


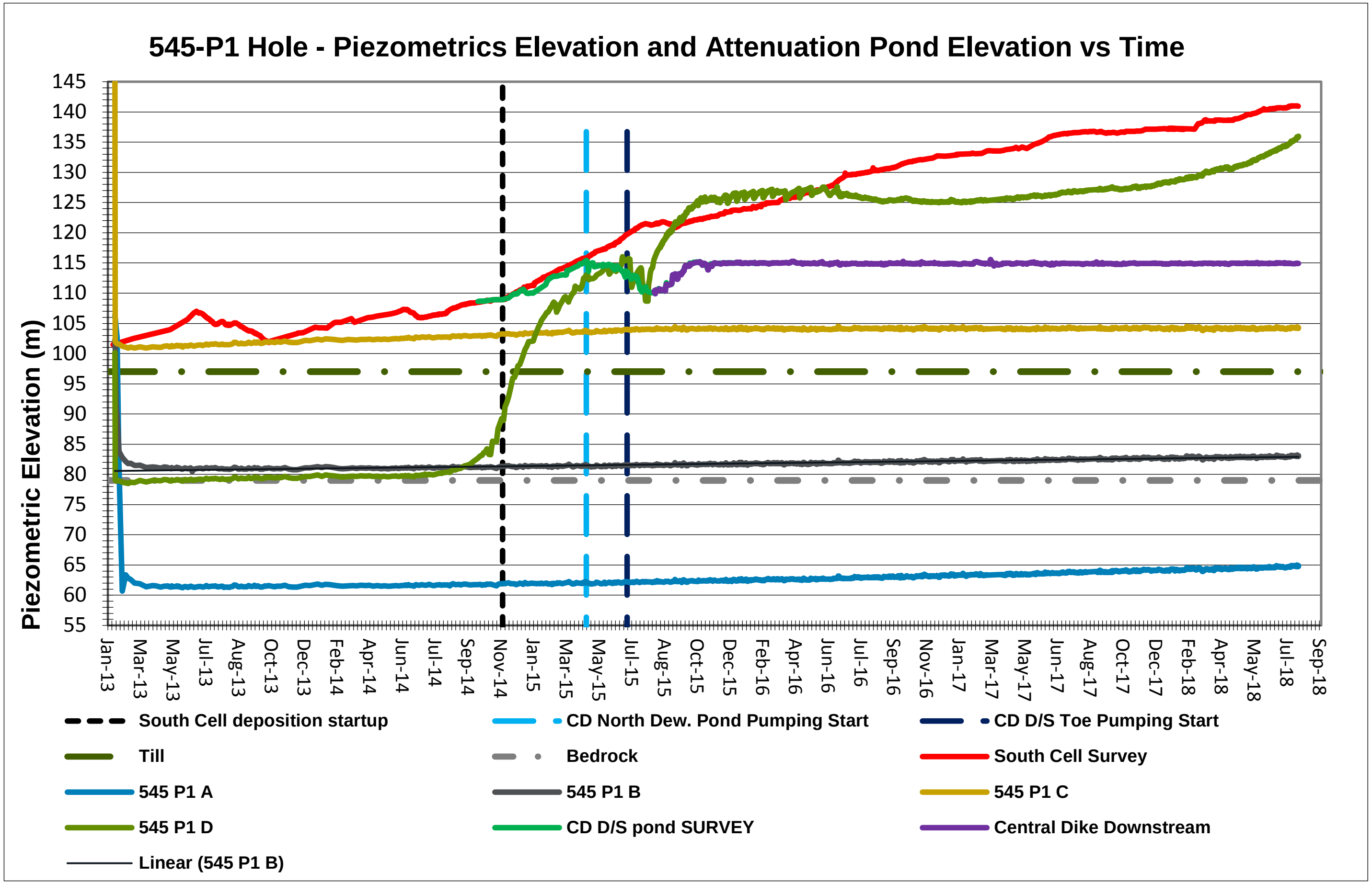


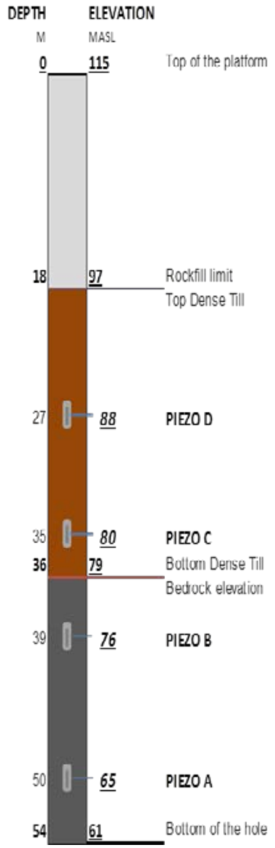


PIEZOMETER 545-P1

- Piezometer D is on a rising trend (approximatively the same rate than SC)
- Piezometer A, B & C are increasing at a very slow rate
- Piezometer A is recording suction since its installation

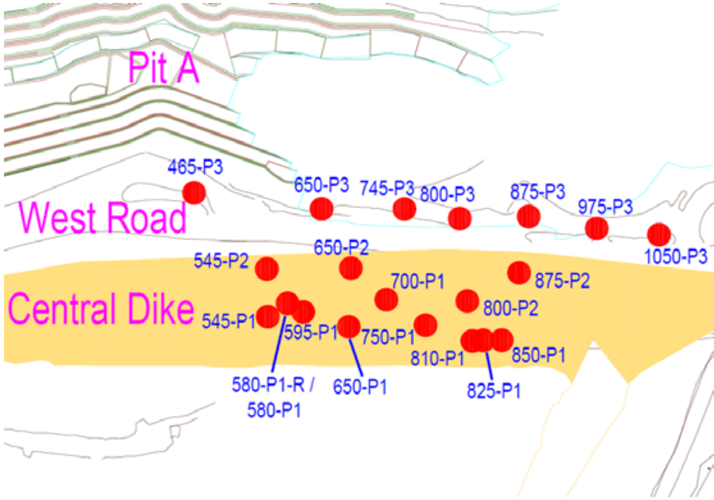


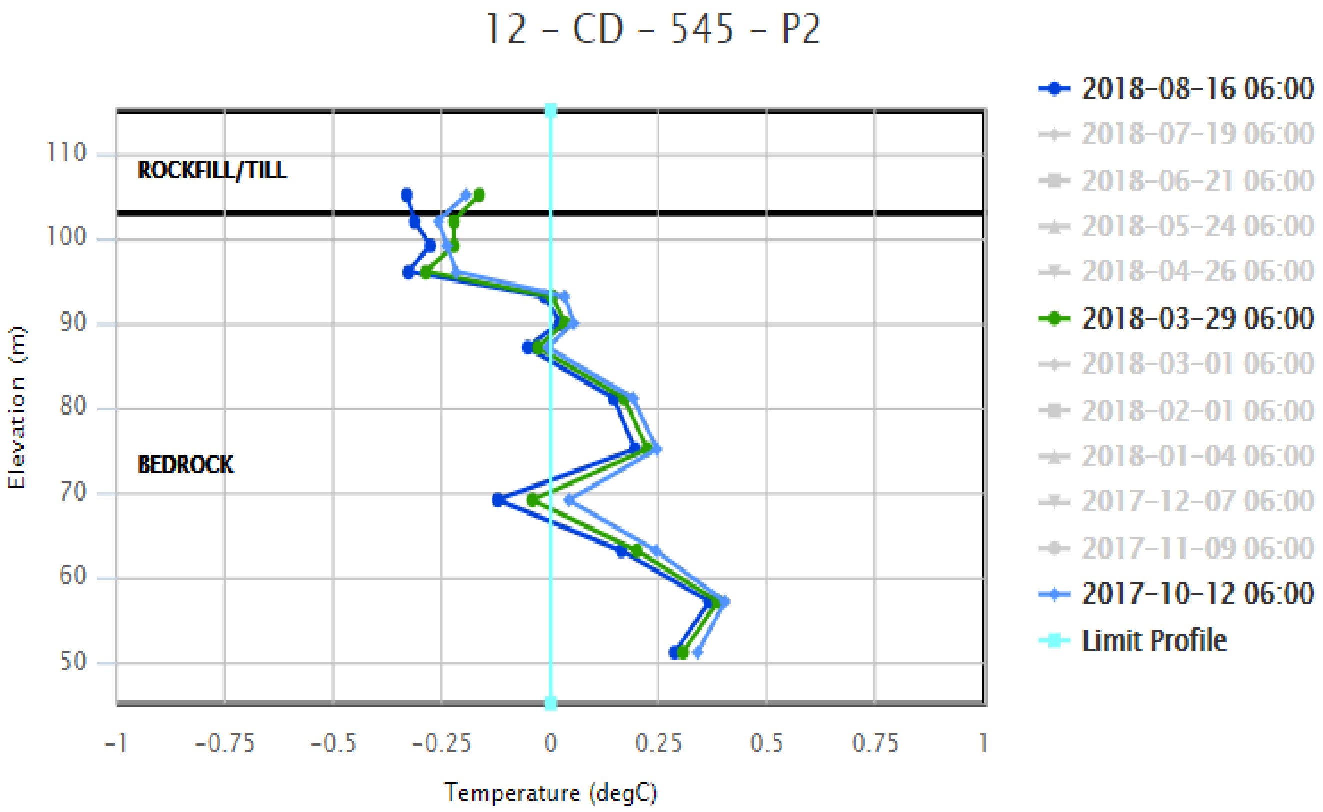


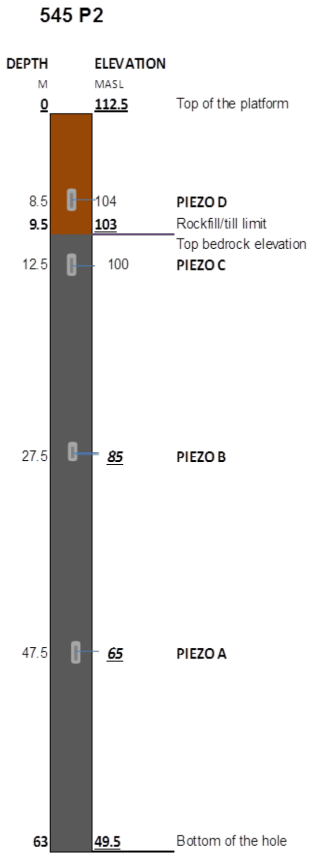


THERMISTOR 545-P2

- All data set are following the same trend
- Temperature at El.69 is slowly deacresing since the end of 2017

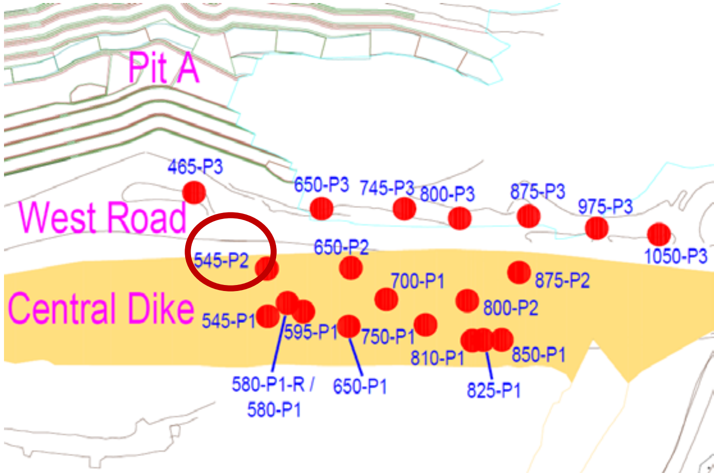


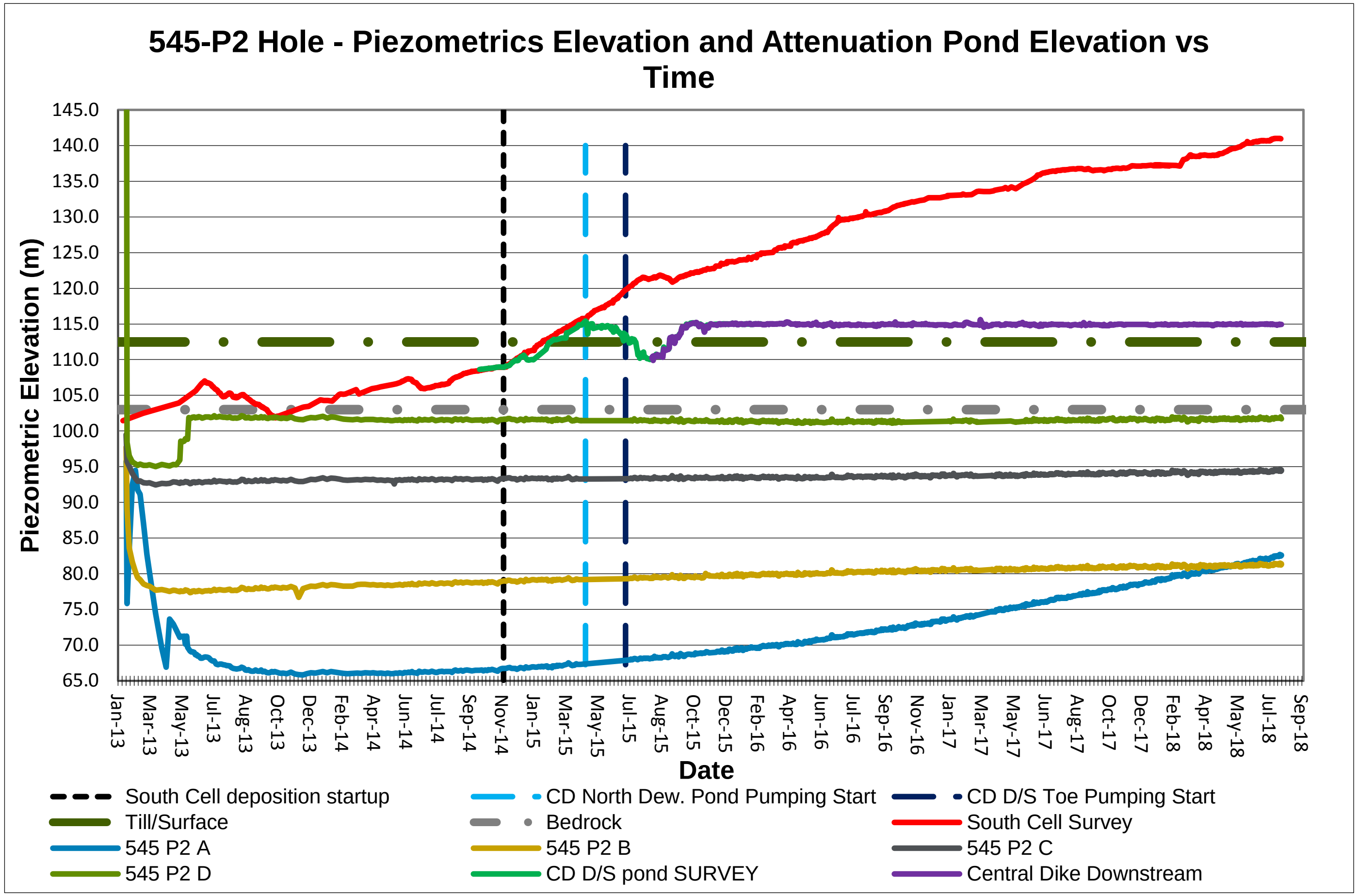


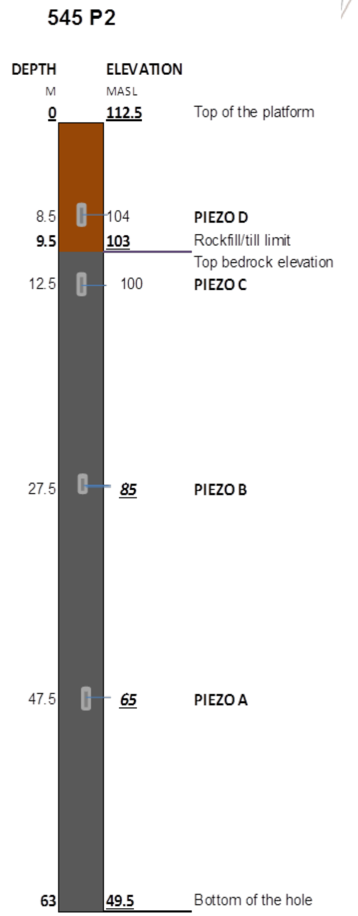


PIEZOMETER 545-P2

- Piezometer A reading is increasing with South Cell level
- Other piezometers are recording suction

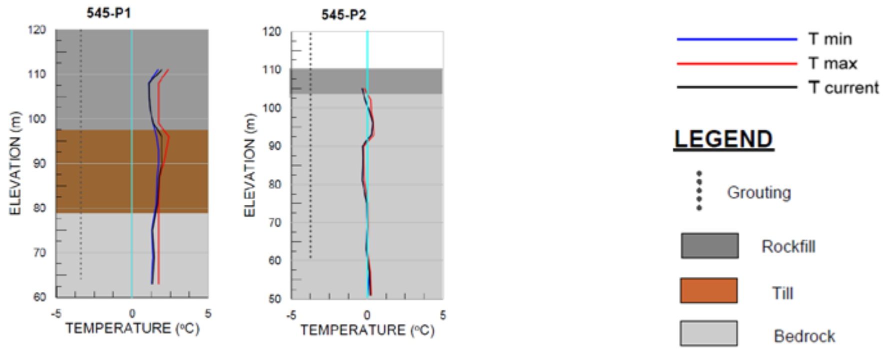


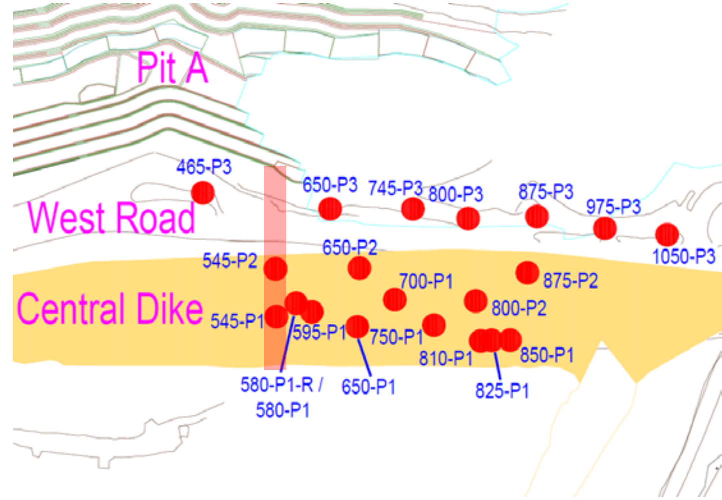




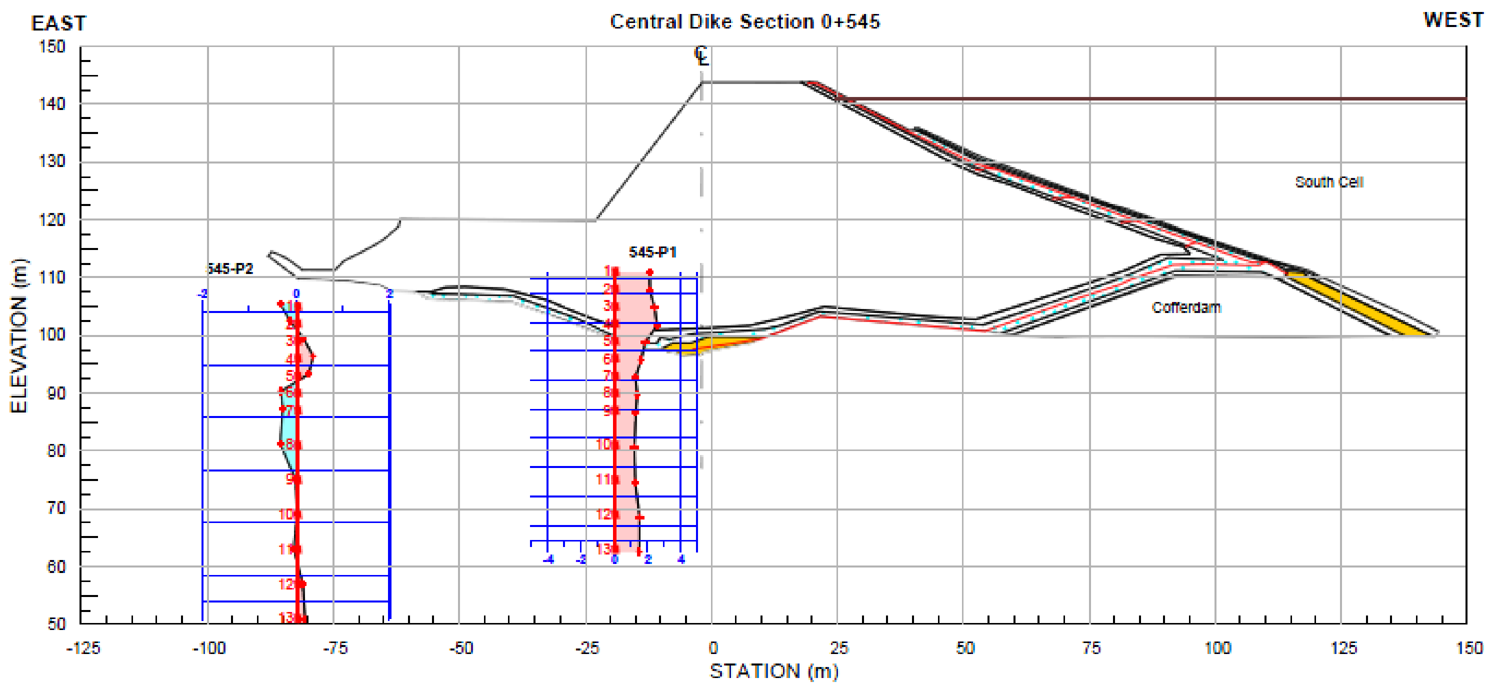
SECTION 545

THERMISTOR READINGS FROM AUGUST 2017- 2018

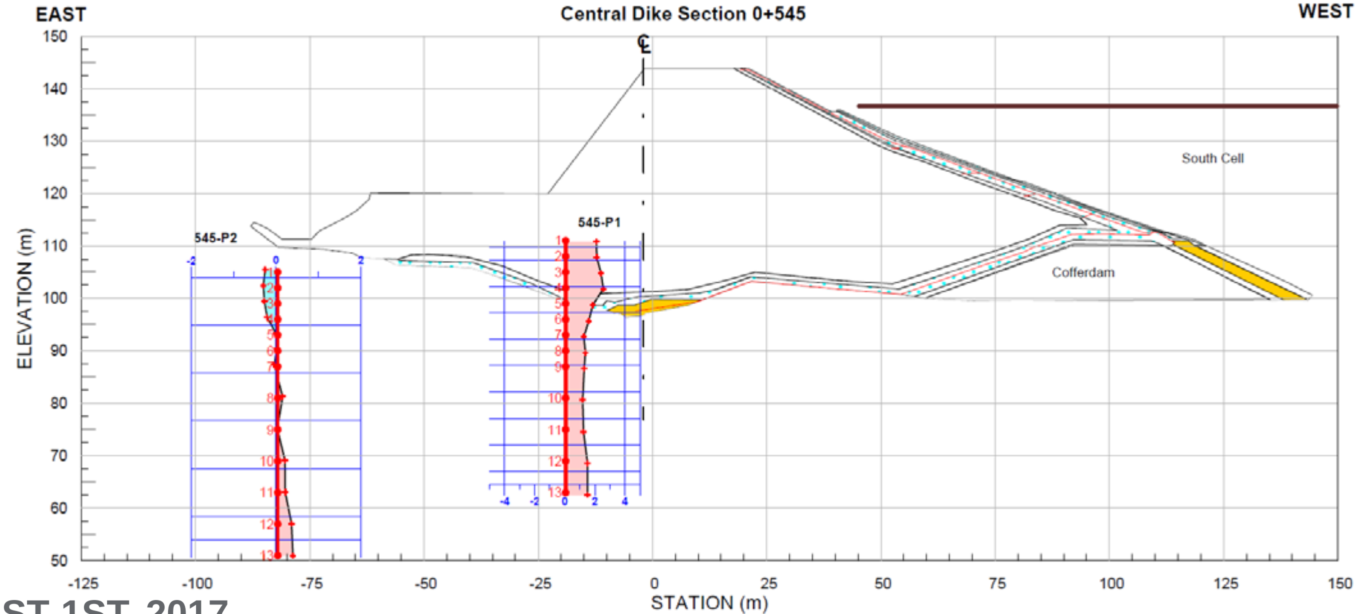




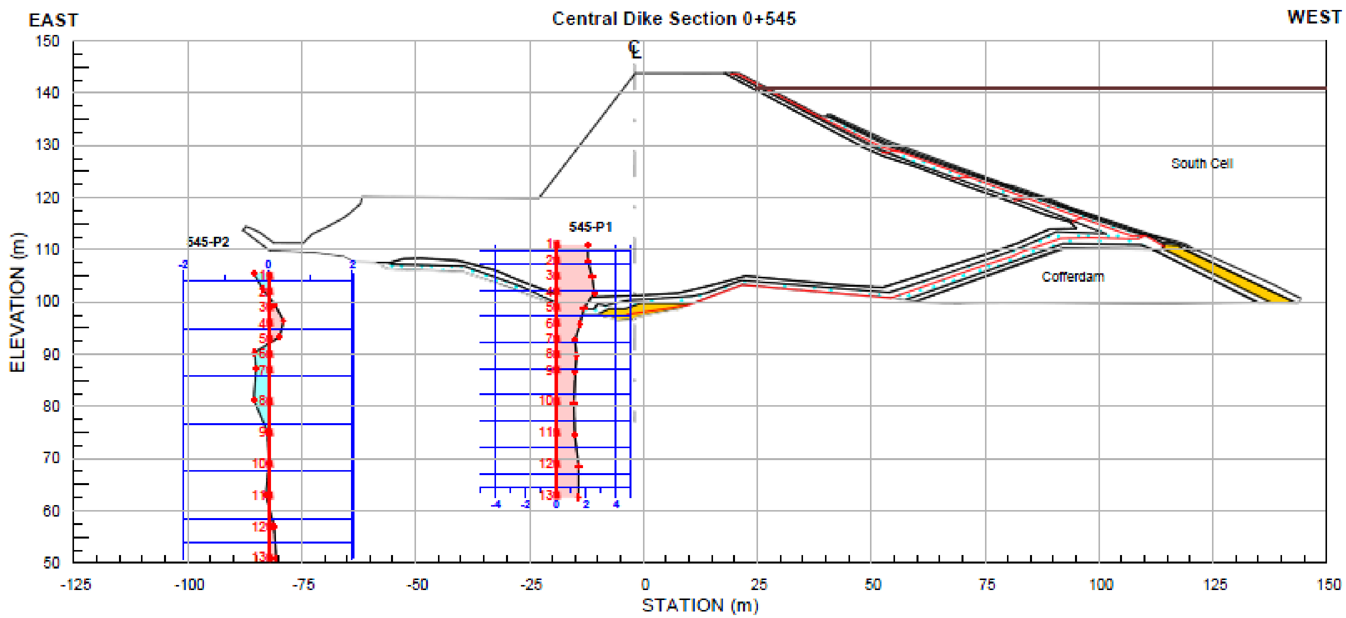
THERMISTOR READINGS AUGUST 15TH, 2018



SECTION 545



AUGUST 1ST, 2017

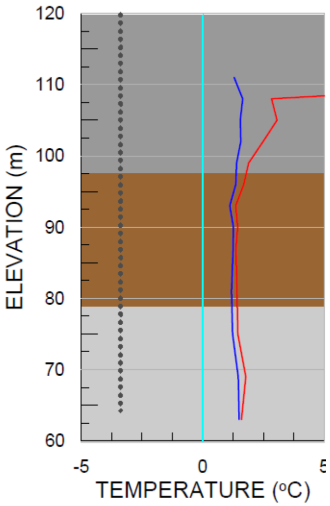


AUGUST 15TH, 2018

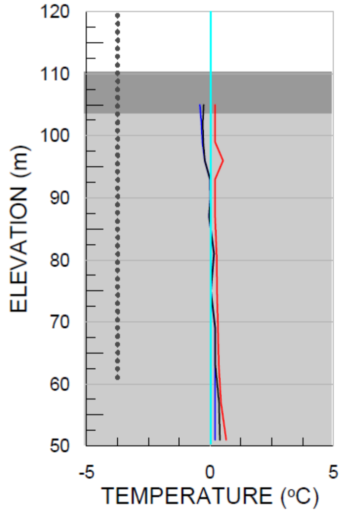
SECTION 545

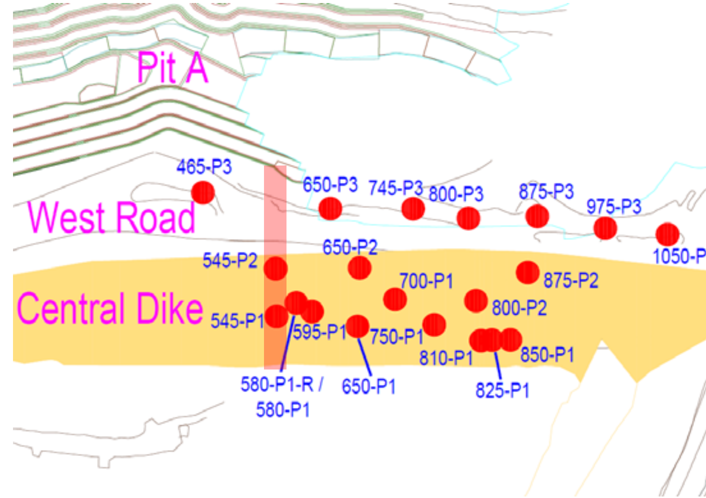
THERMISTOR READINGS FROM AUGUST 2017 - 2018

545-P1



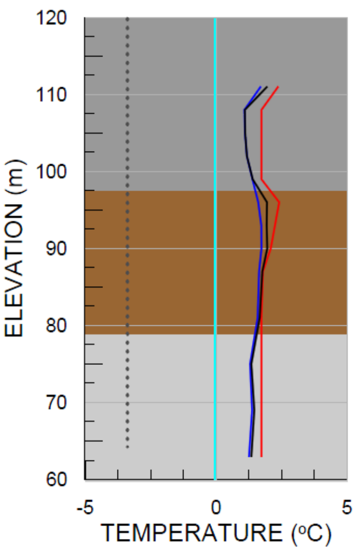
545-P2



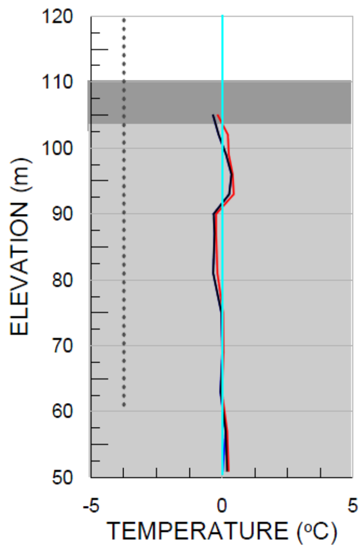


THERMISTOR READINGS FROM AUGUST 2017 - 2018

545-P1



545-P2



T min

T max

T current

LEGEND

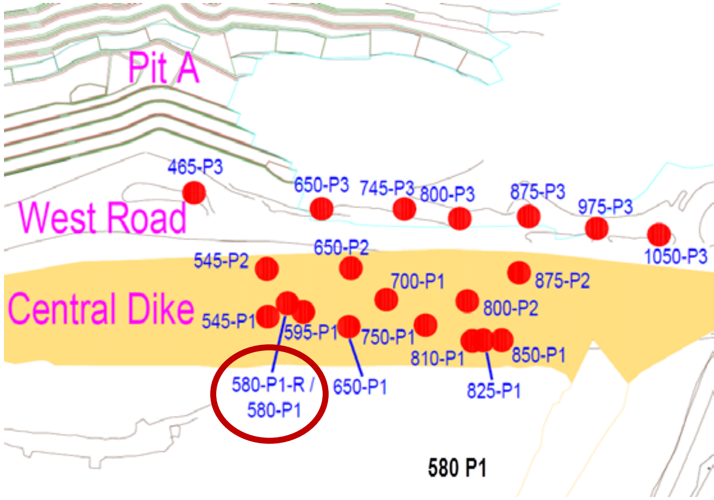
Grouting

Rockfill

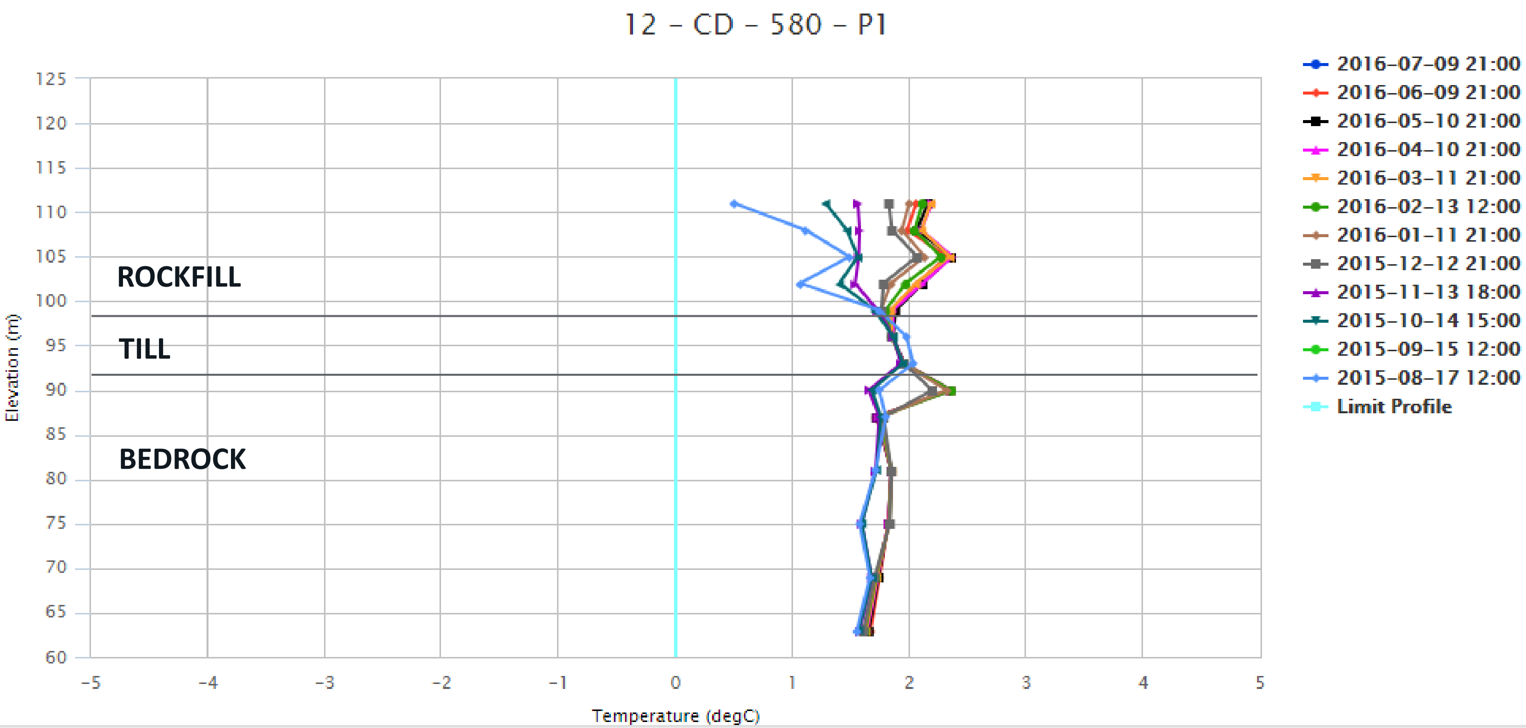
Till

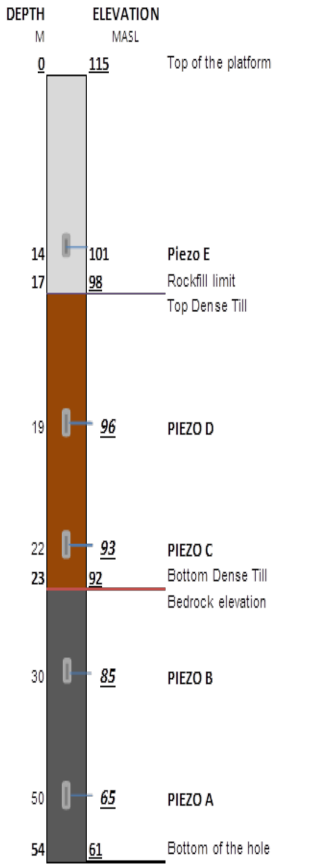
Bedrock

580-P1



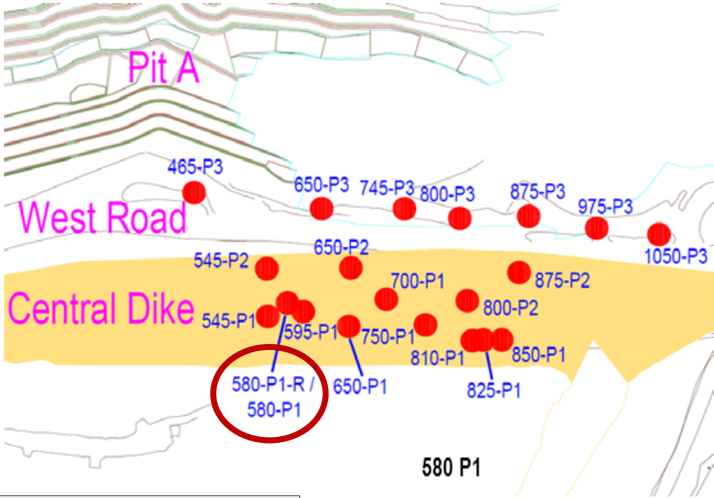
- Piezometer and thermistance readings are not functional since July 2016
- Replacement hole 580-P1R drilled during 2017 campaign

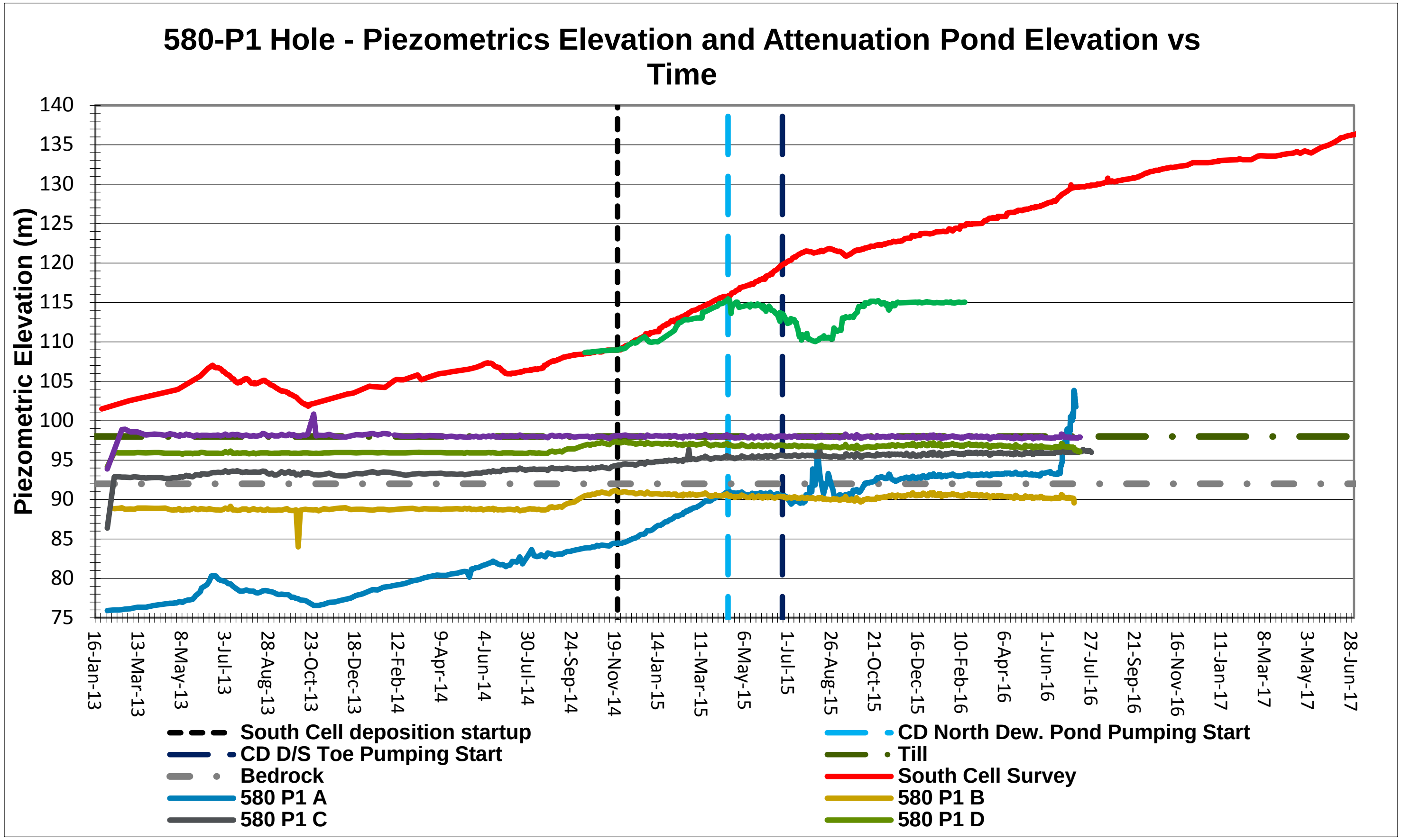


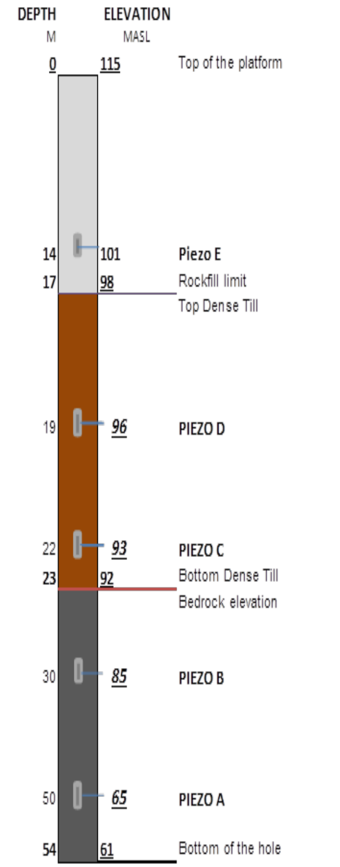


580-P1

- Piezometer and thermistor readings are not functional since July 2016
- Replacement hole 580-P1R drilled during 2017 campaign

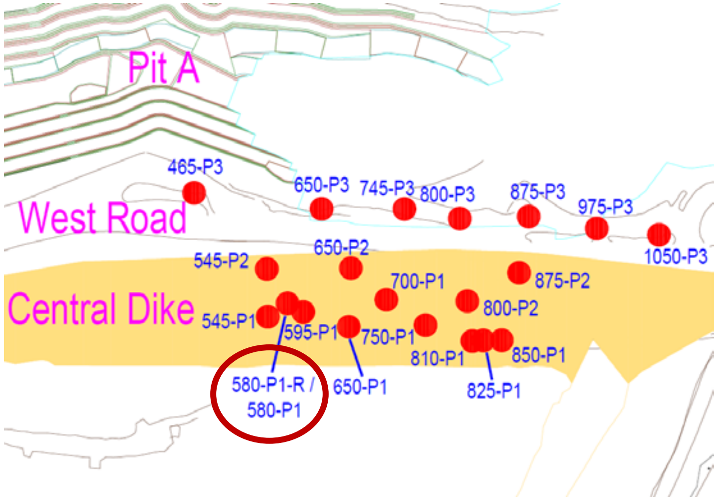


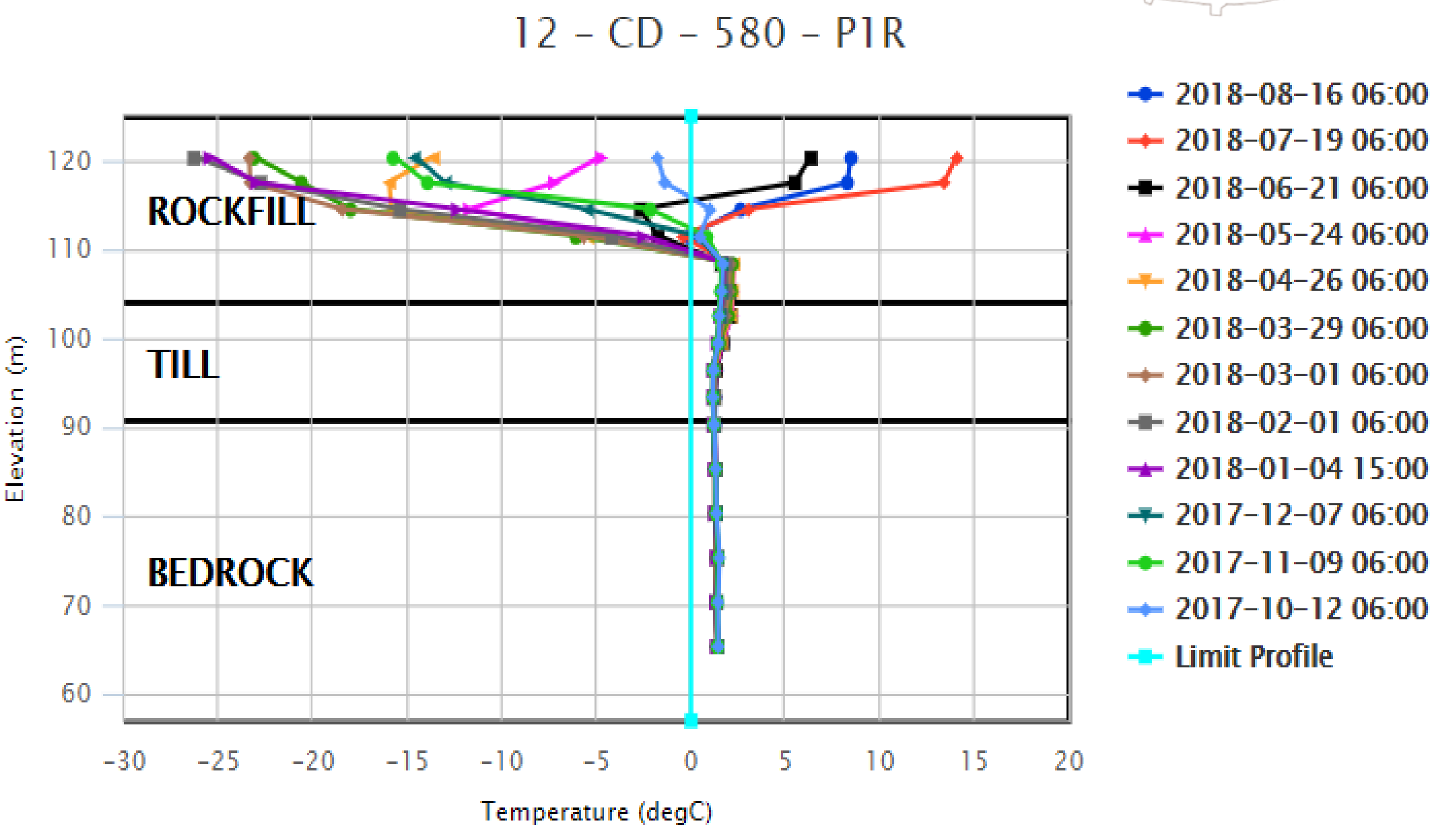


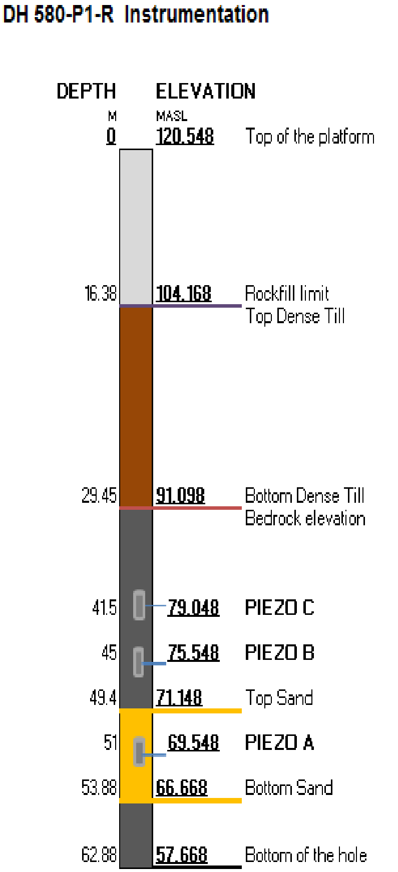


THERMISTOR 580-P1R

- Unfrozen thermal situation from elevation 110 MASL to the bottom of the hole at elevation 65 MASL

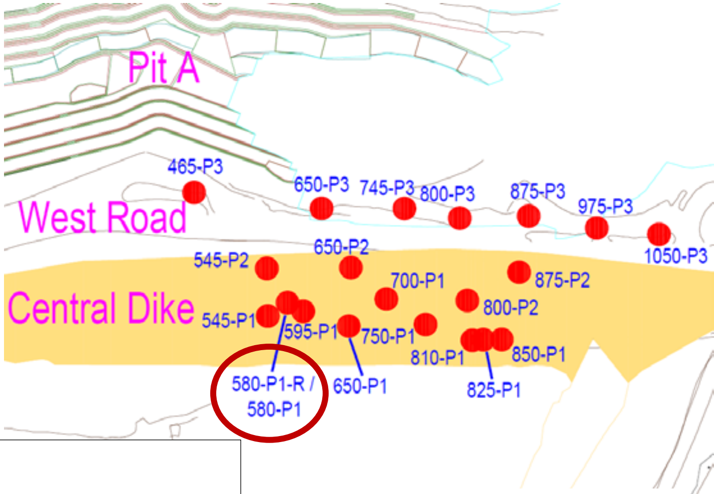


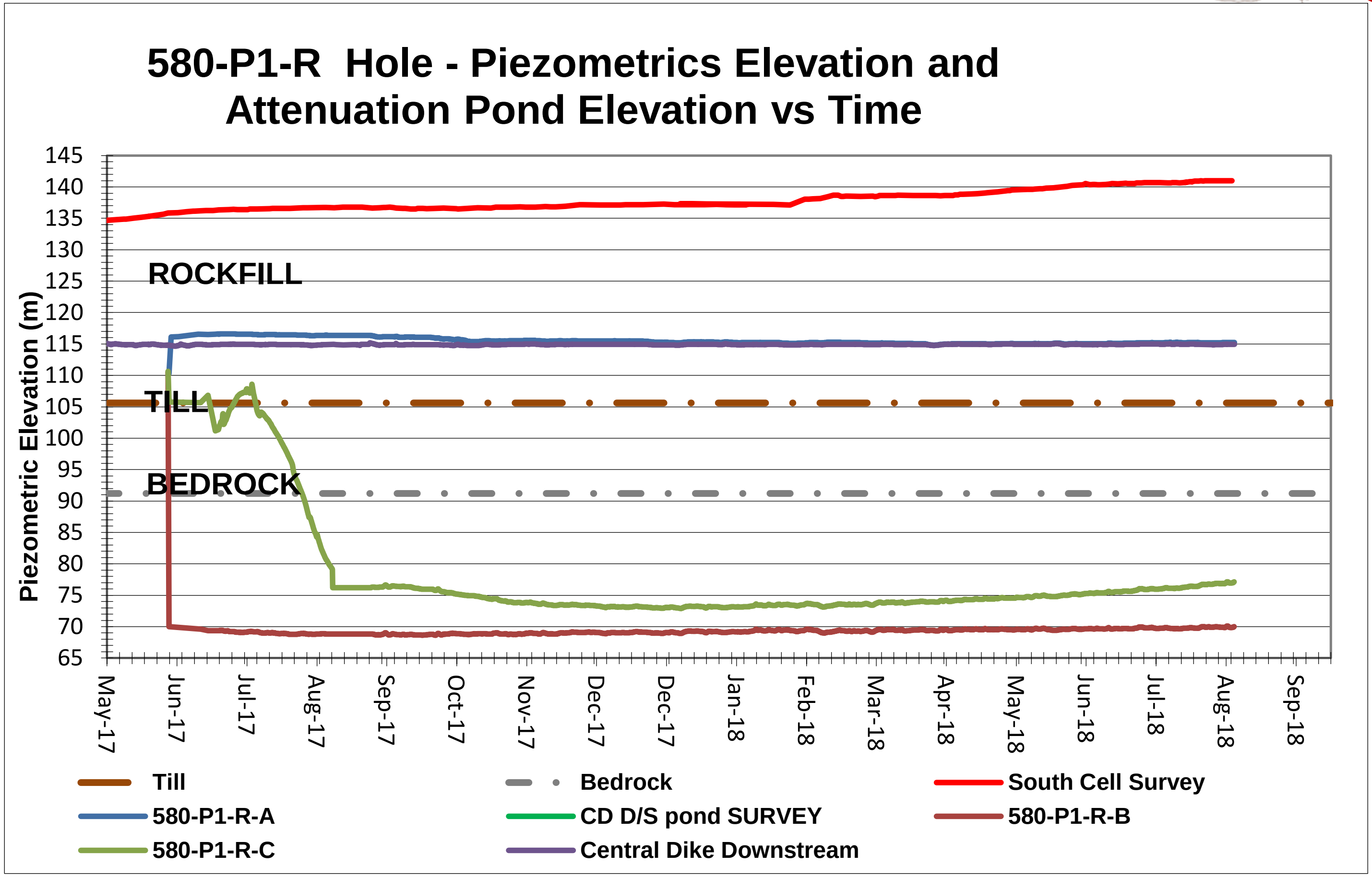


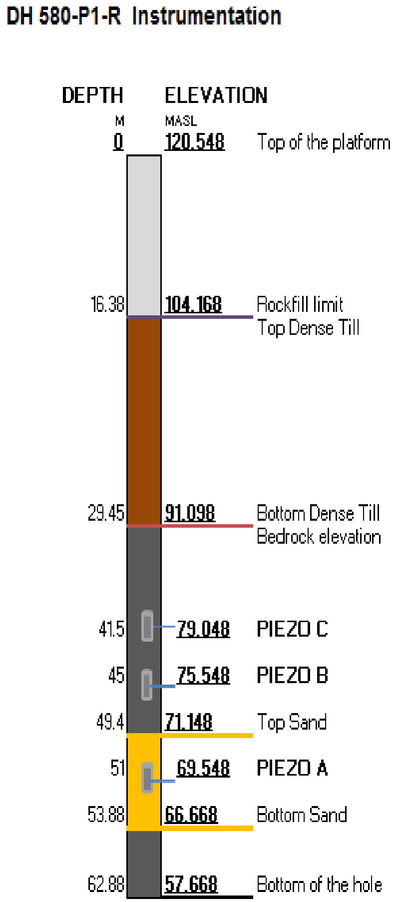


PIEZOMETER 580-P1R

- Piezo A is located in a sand layer and pressure readings are following the D/S pond regime
- Piezo A & C are increasing following a similar trend to the SC Survey

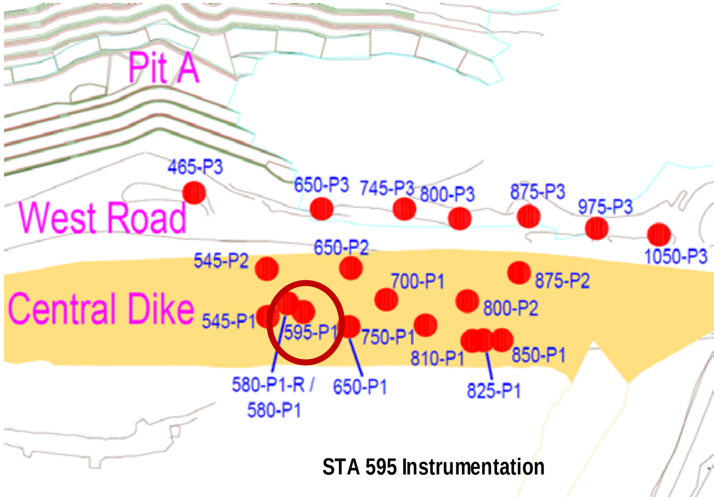


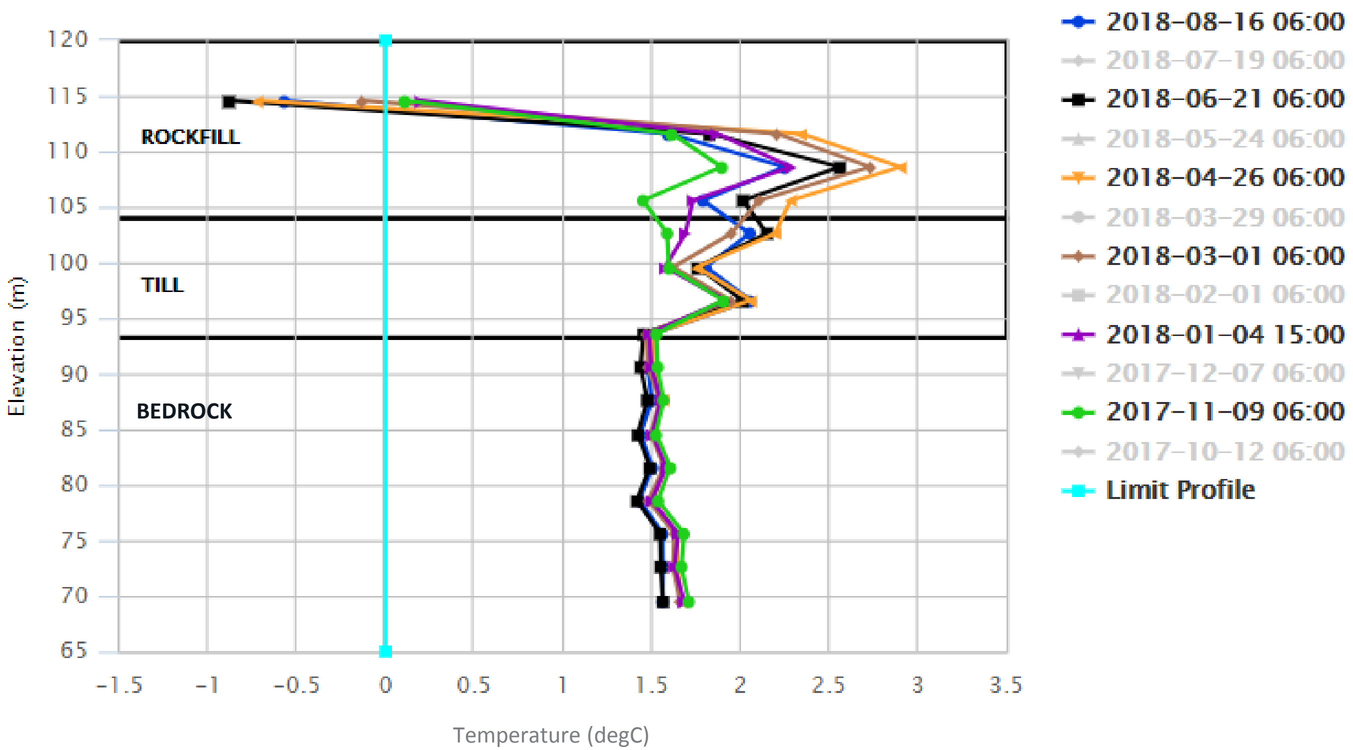


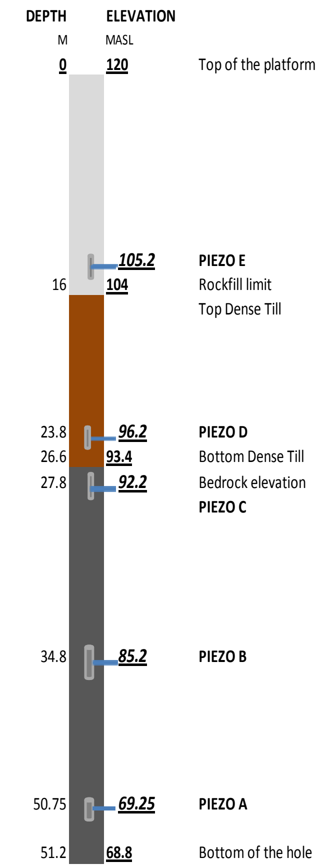


THERMISTOR 595-P1

- Temperature in the bedrock/till unit is in between 1.5º C and 2.0º C.
- Glitch of 0.25º C could be caused by the automatization works done in August 2017.

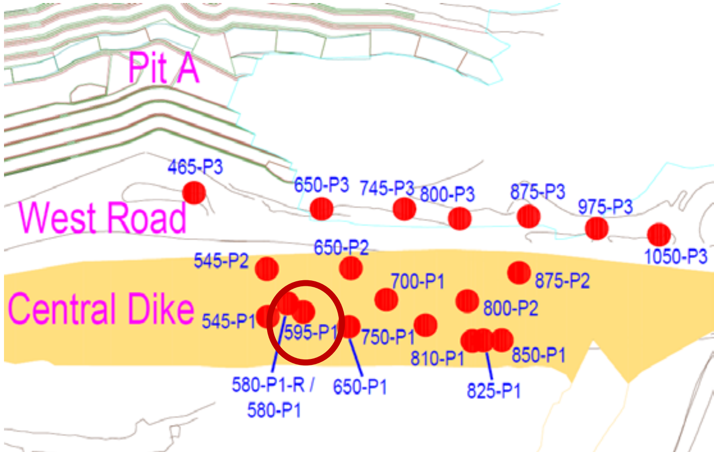




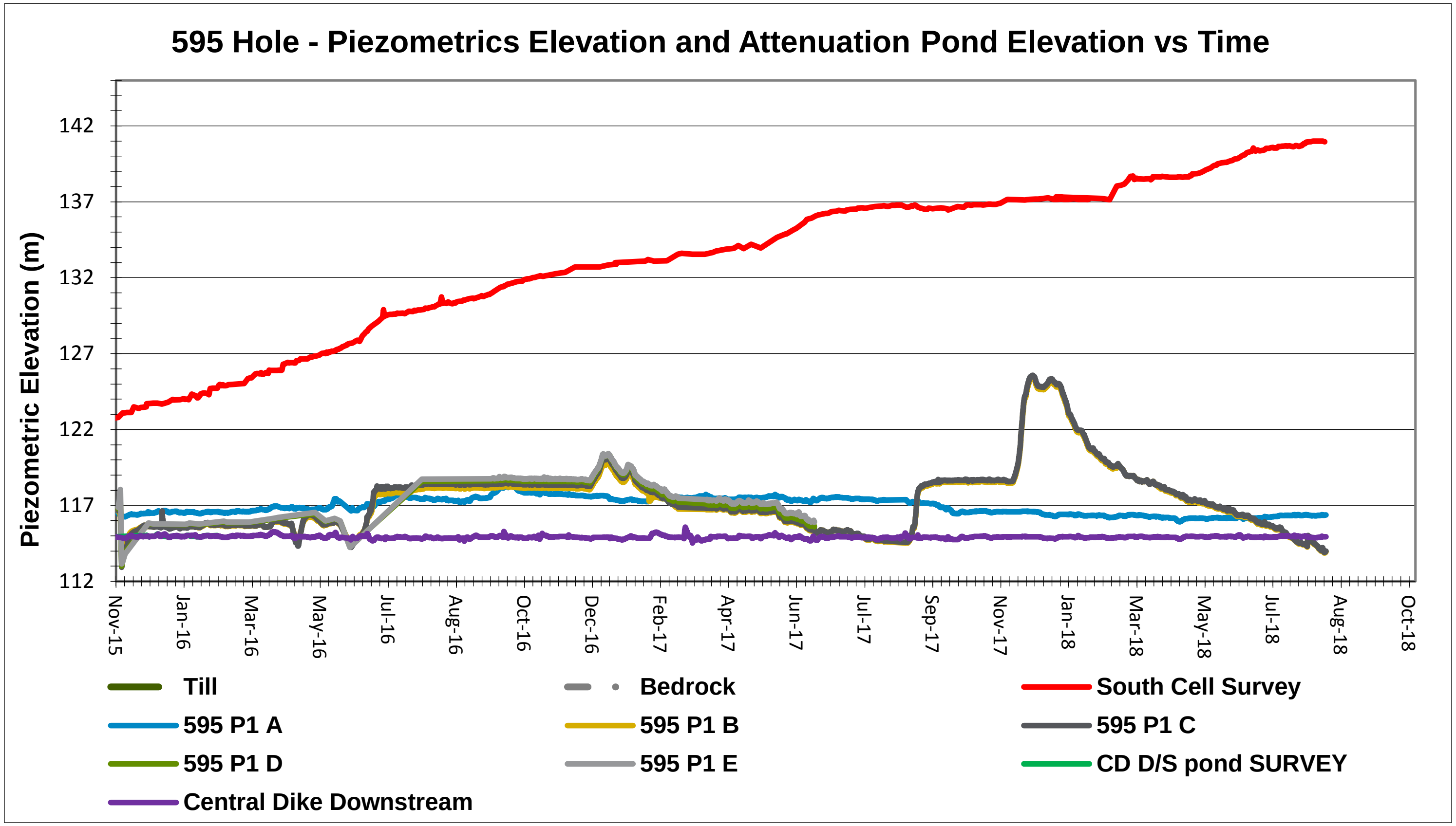


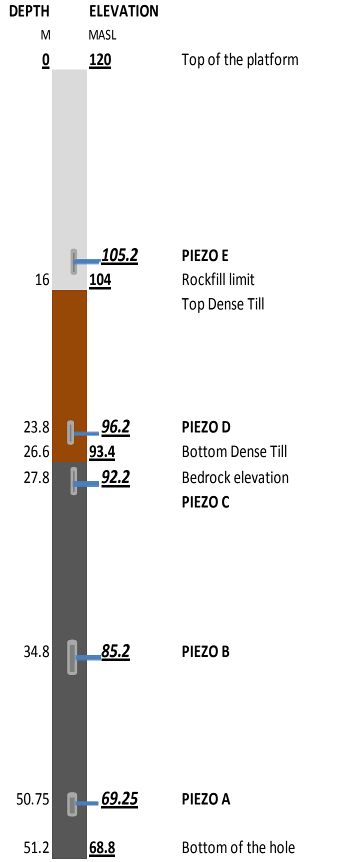
PIEZOMETER 595-P1

- Piezometric readings are fluctuating around D/S pond elevation since the installation.
- The drop trend adopted in the last couple months has softened lately for piezometer 595-P1 B & C. Piezo C to E was installed in casing
- Piezo D & E were removed from VDV in June 2017 since they are broken



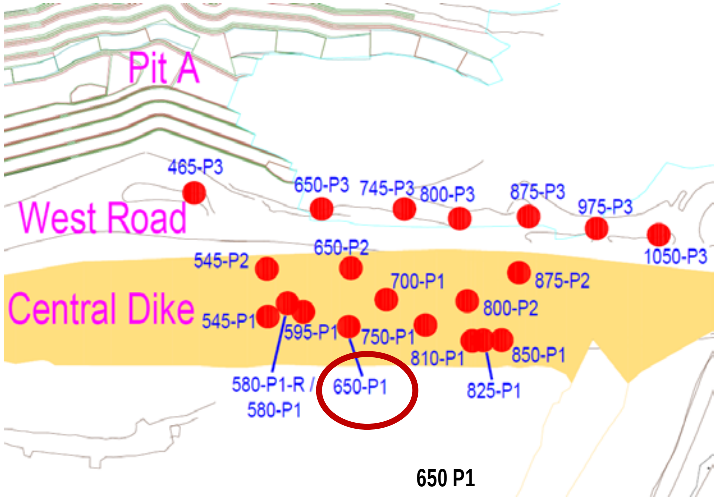
STA 595 Instrumentation

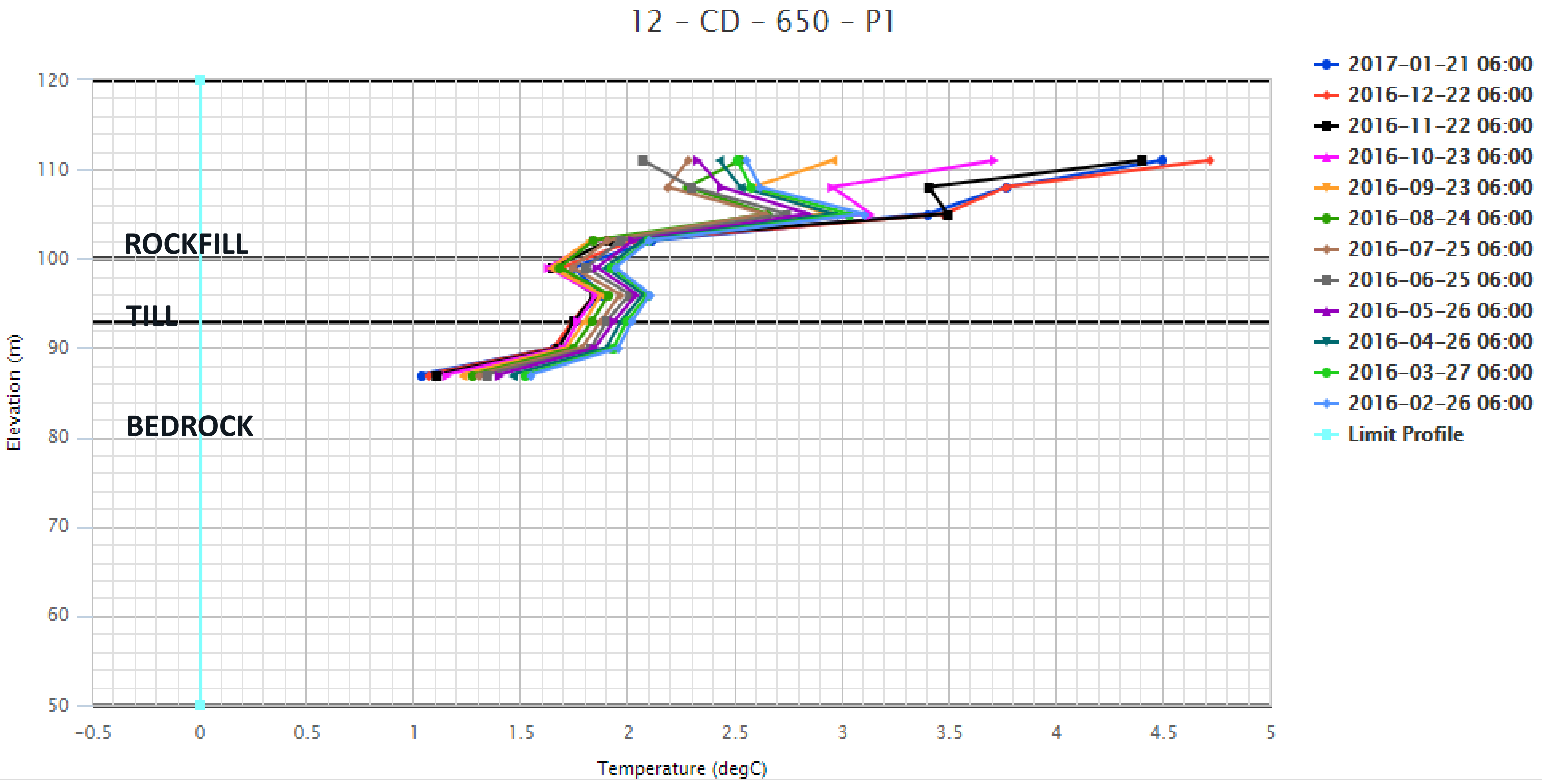


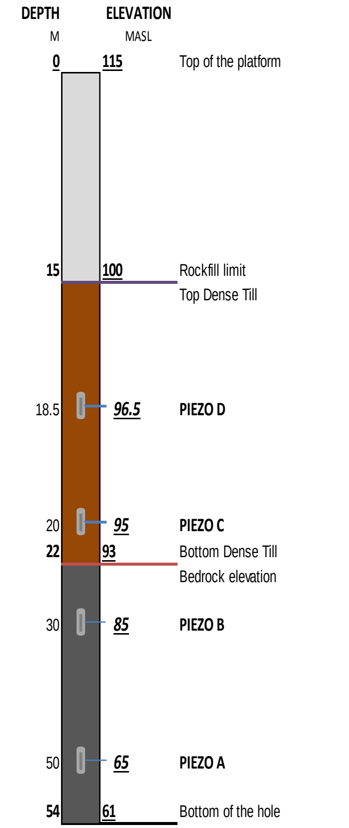


THERMISTOR 650-P1

- Thermistance reading not functional since January 2017
- Beads 10 to 12 are not functionning since August 2016
- Temperature of the bedrock/till units were in between 1.0 and 2.1º C.

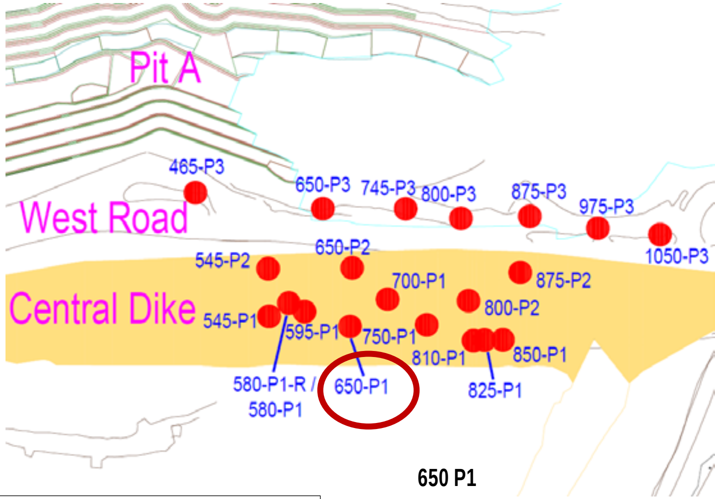


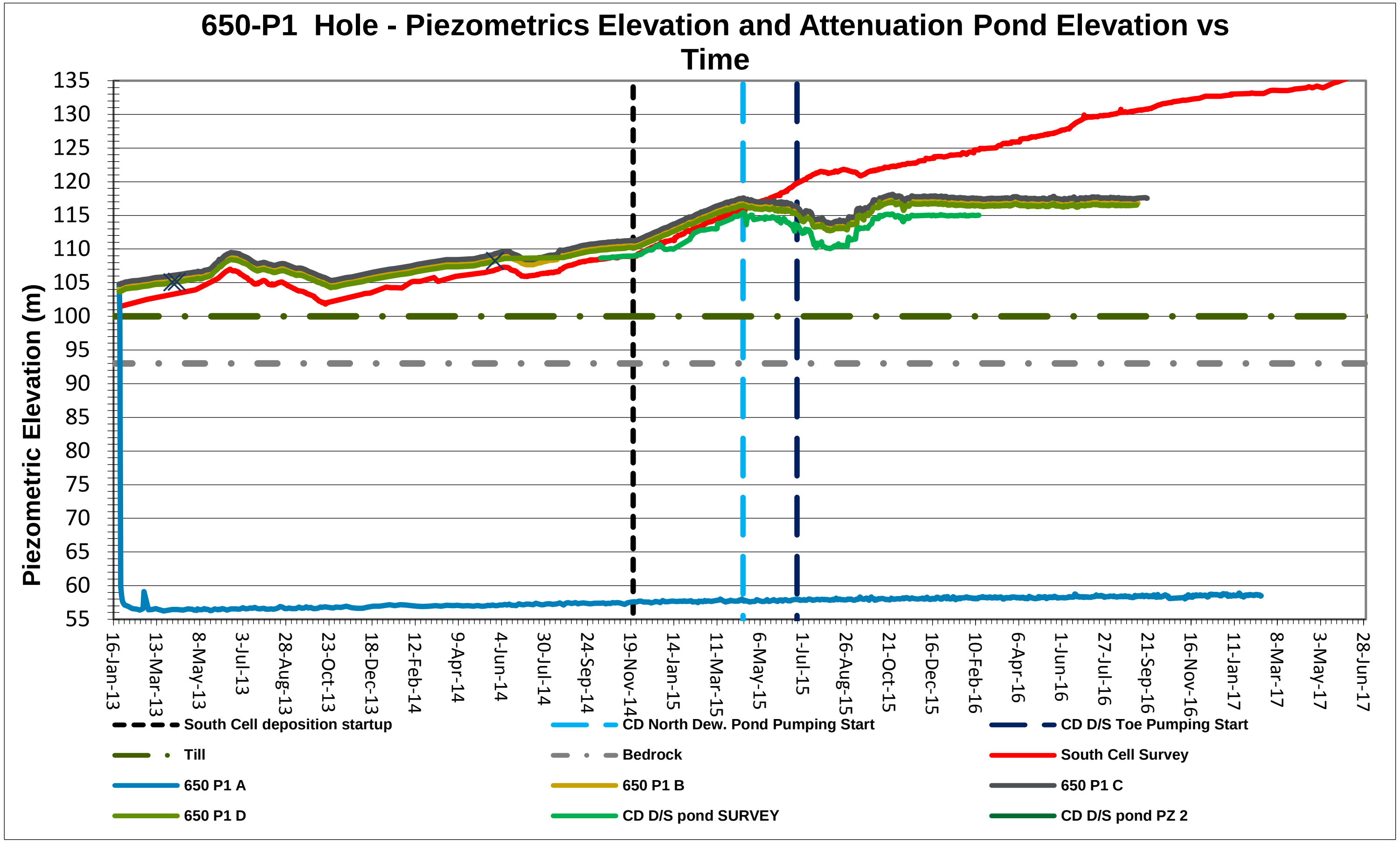


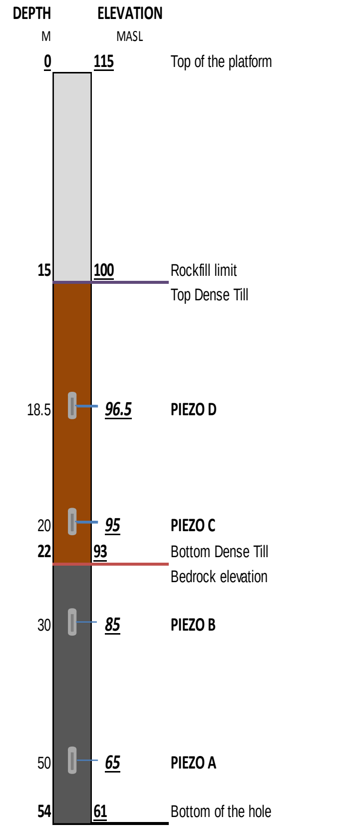


650-P1

- Piezometer reading not functional since February 2017
- Piezo A was in suction and piezo B to D were following D/S pond regime with readings around 117m.

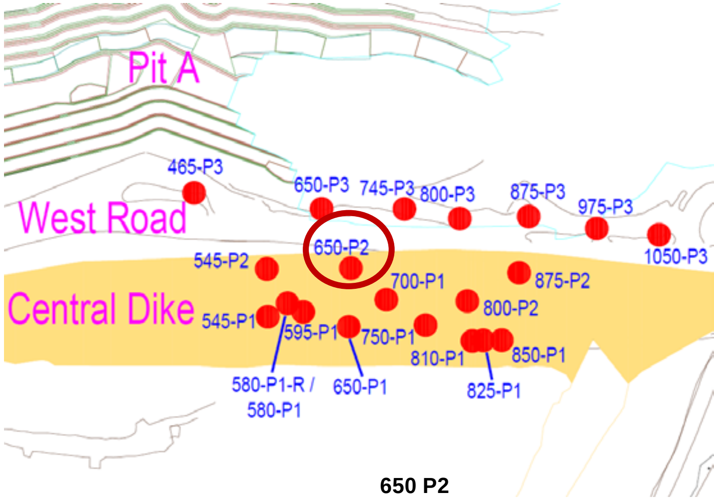


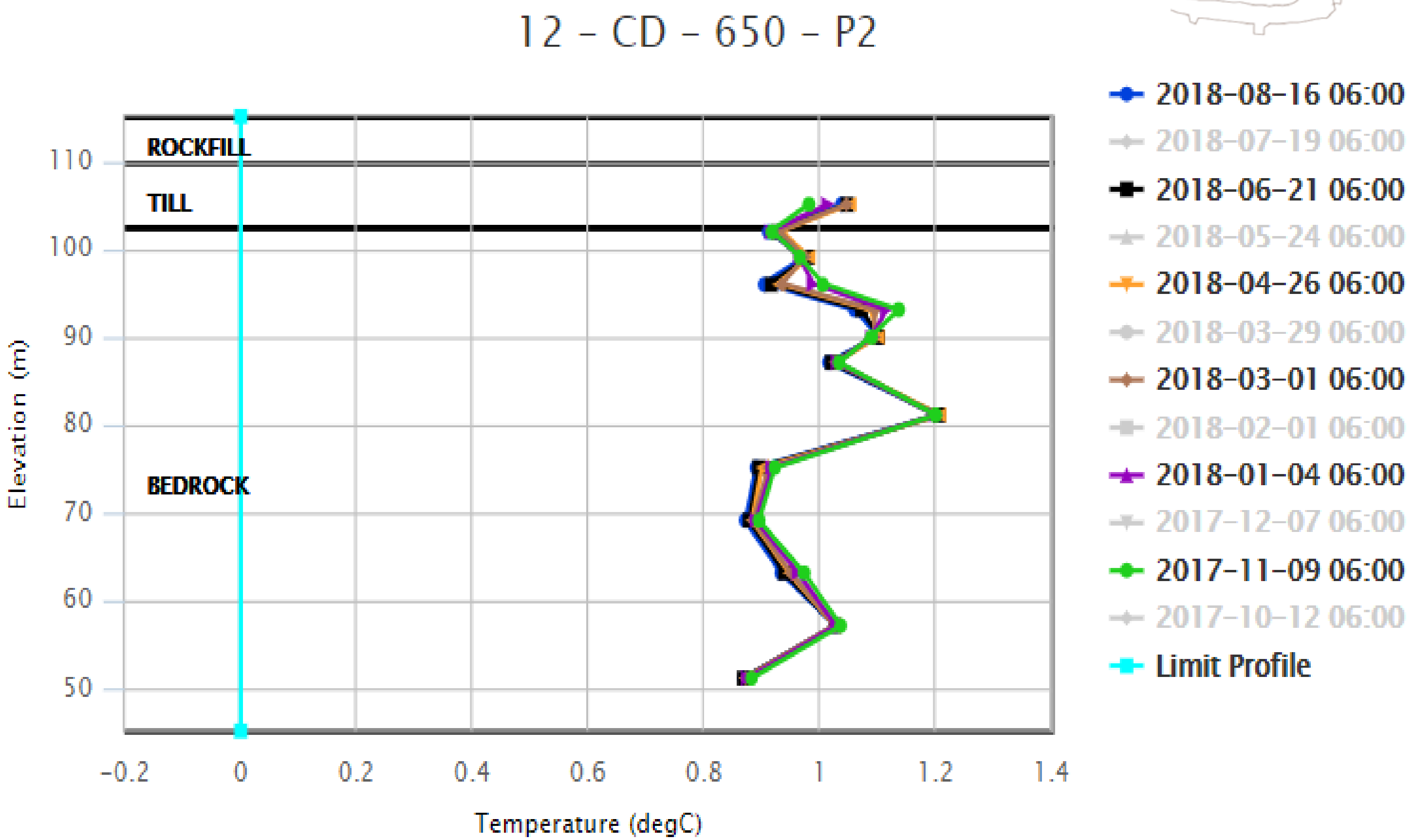


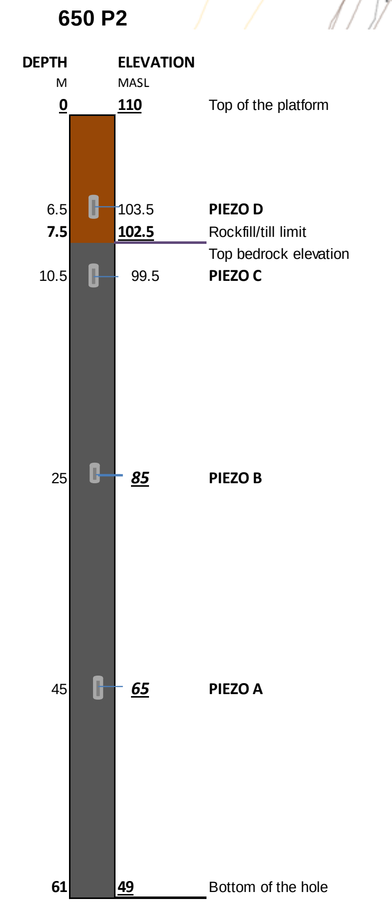


THERMISTOR 650-P2

- Cooling trend observed below El. 80 similar to 2016-2017 readings.
- Temperature peak of 1.2º C at El.81 MASL.

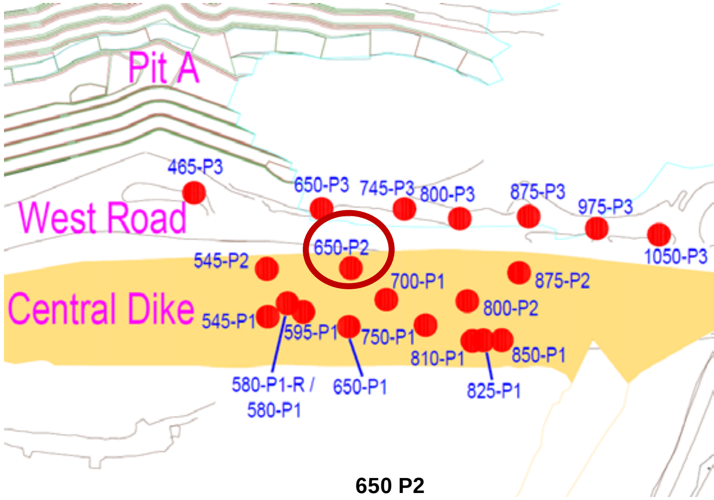


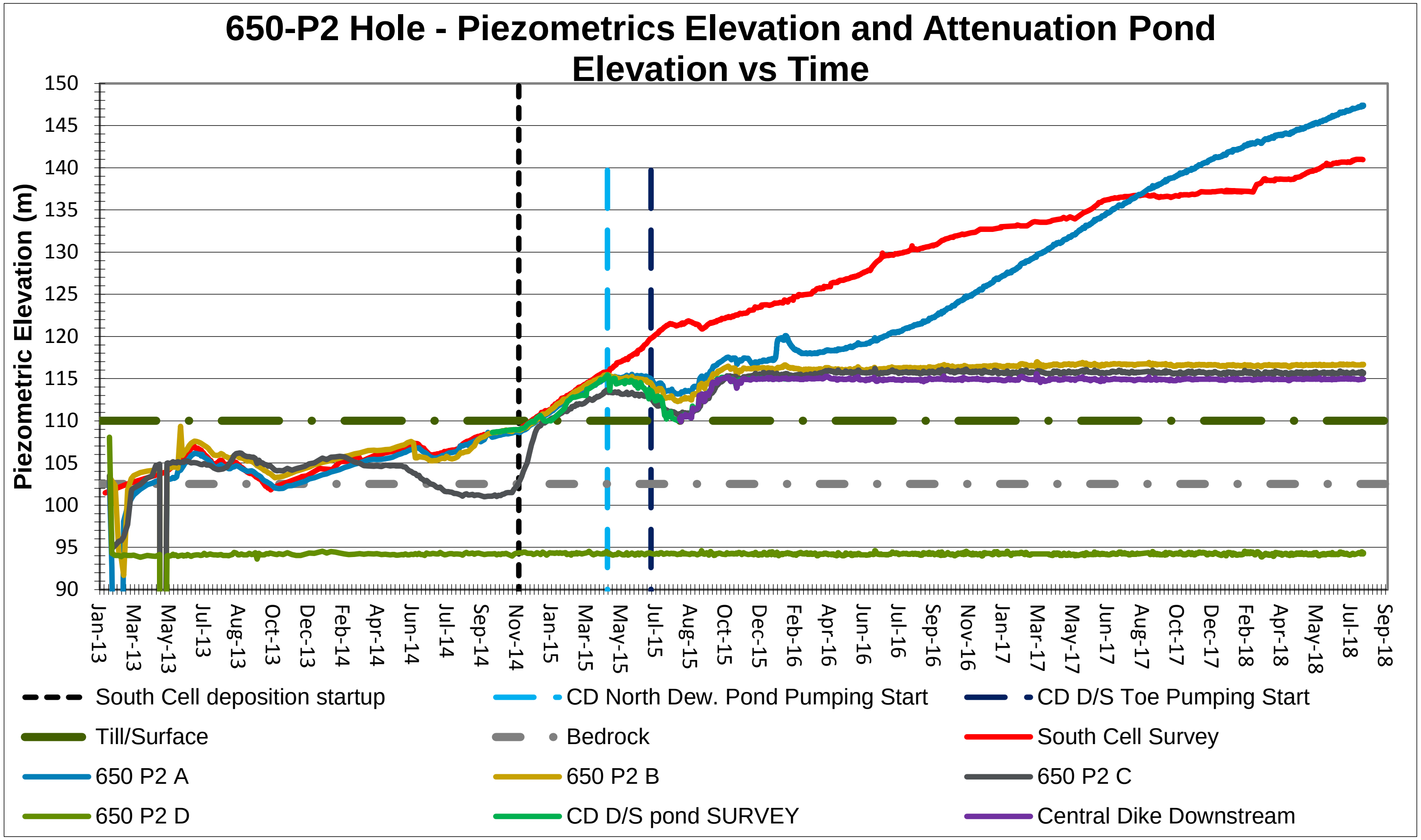




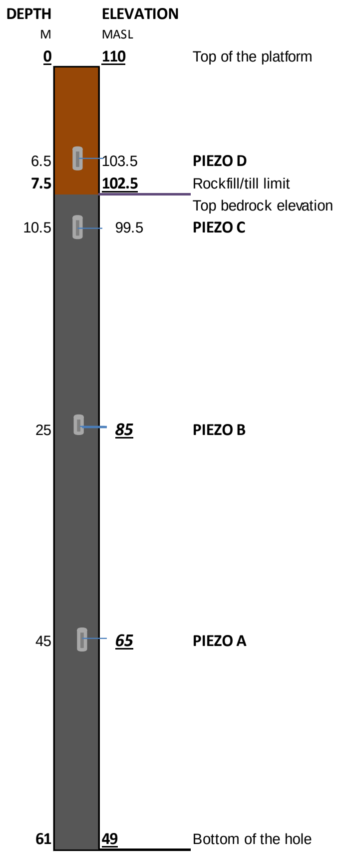
PIEZOMETER 650-P2

- Piezometer A in bedrock continue its rise and is now over the elevation of the South Cell
- Piezo B-C are following the piezometric regime of the D/S pond
- Piezo D is in suction



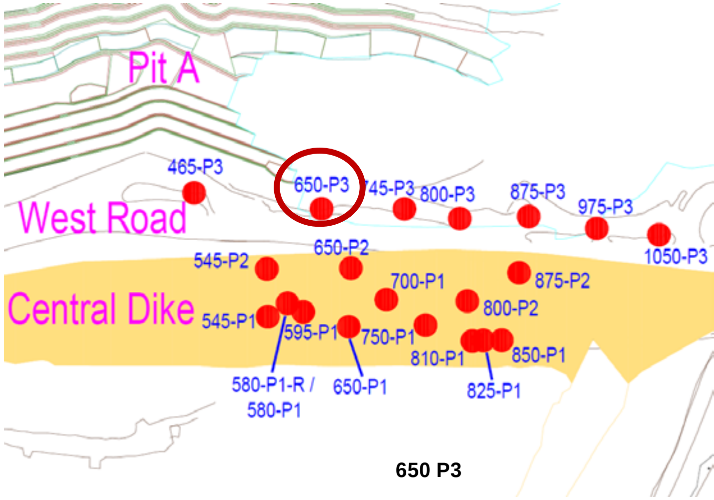


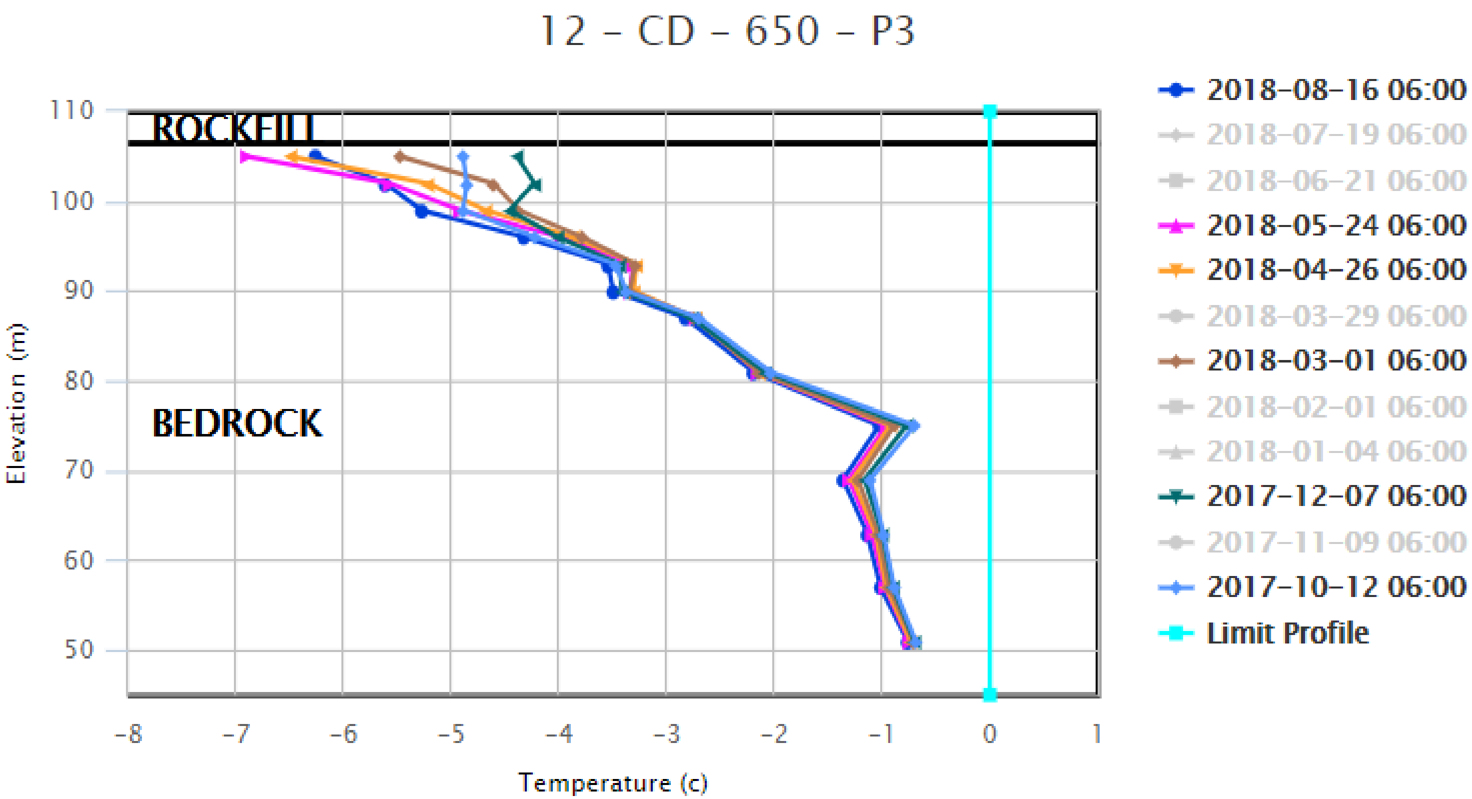
650 P2

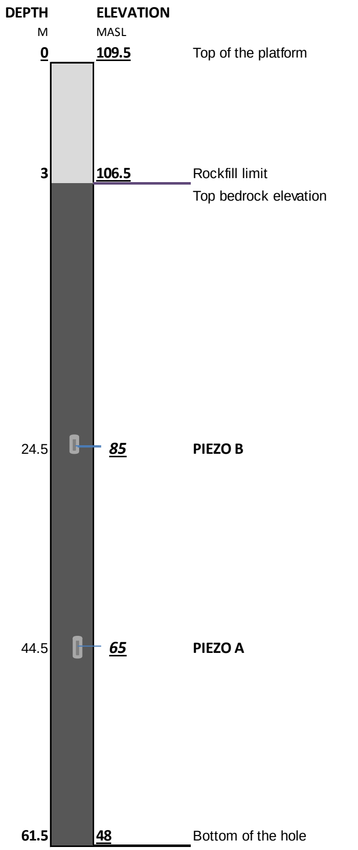


THERMISTOR 650-P3

- Bedrock Below 0º C at 650-P3
- Temperature spike at El. 75 m is related to capacitance effect on this specific bead.

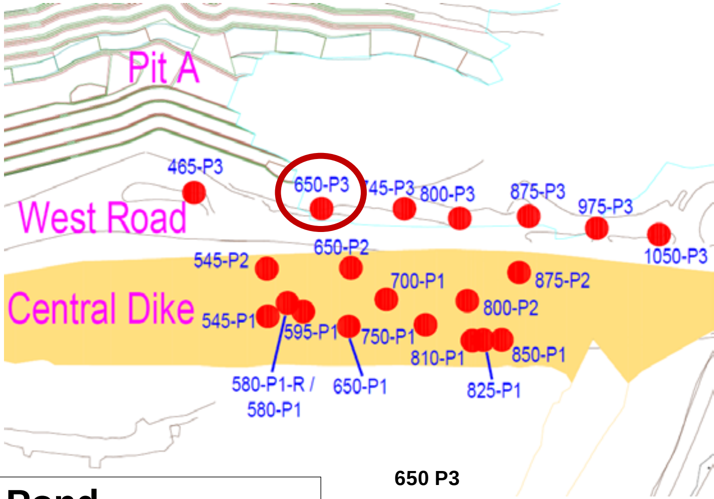


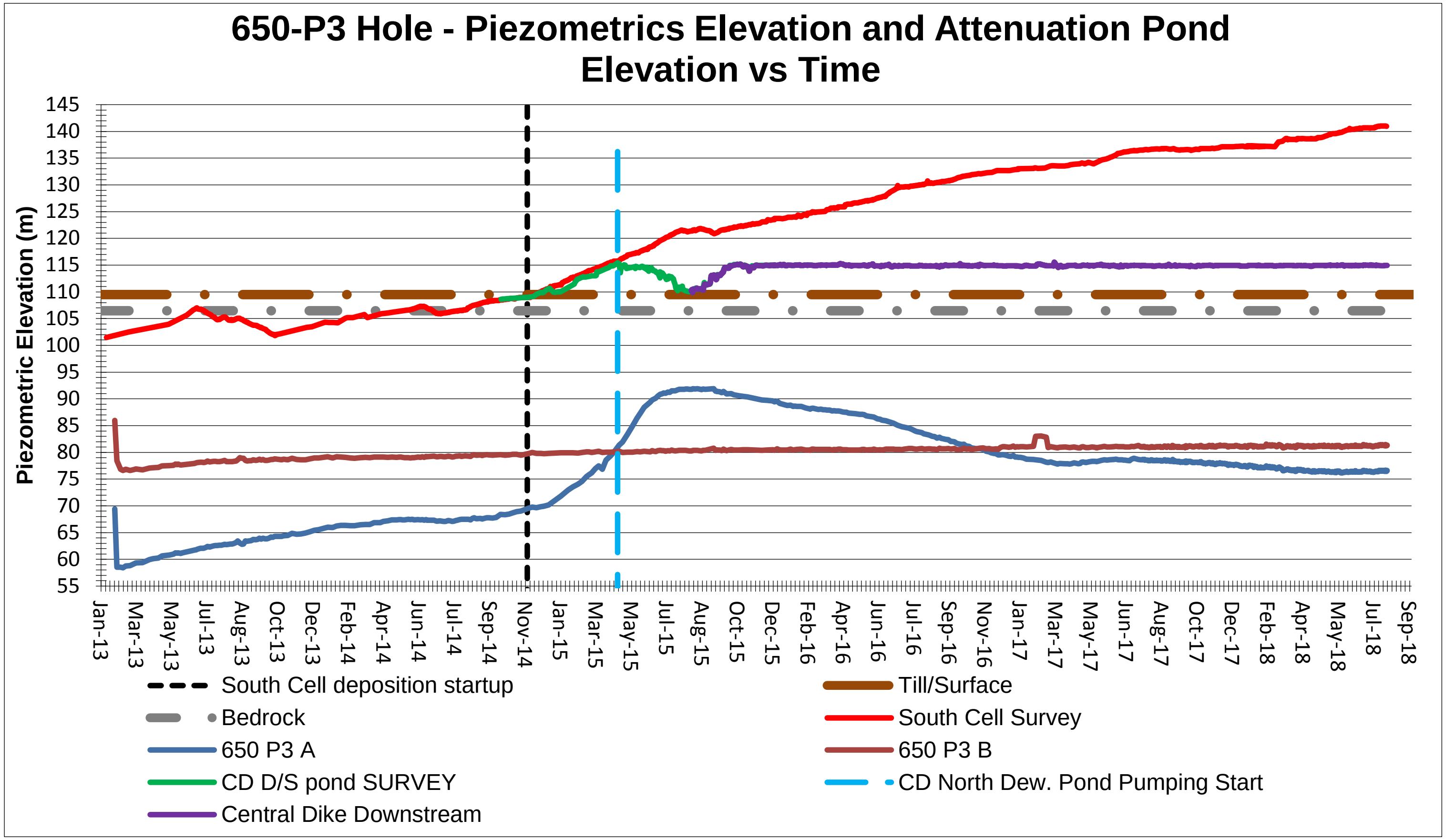


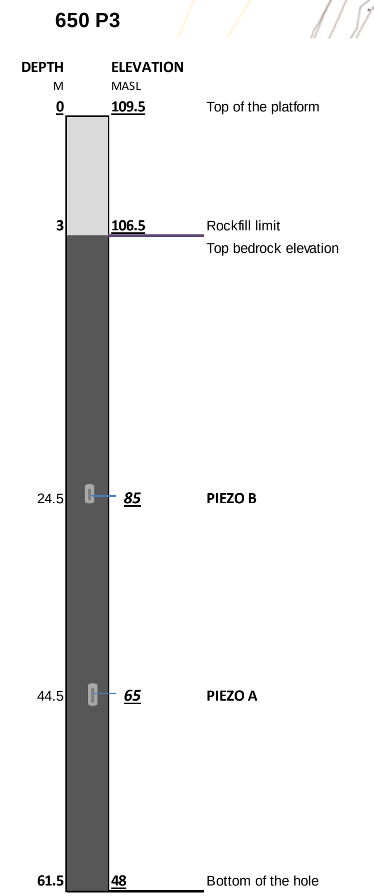


PIEZOMETERS 650-P3

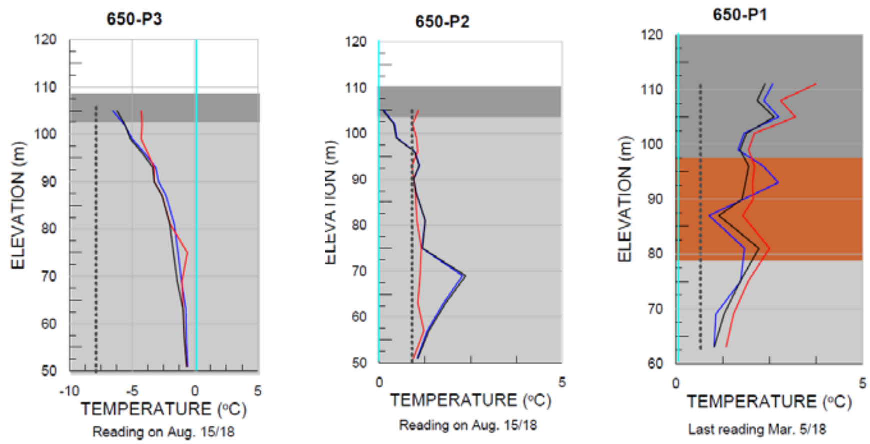
- Frozen Piezometers

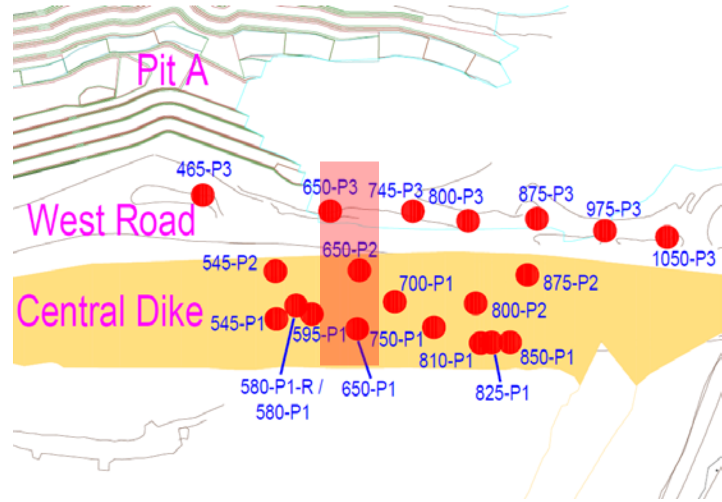


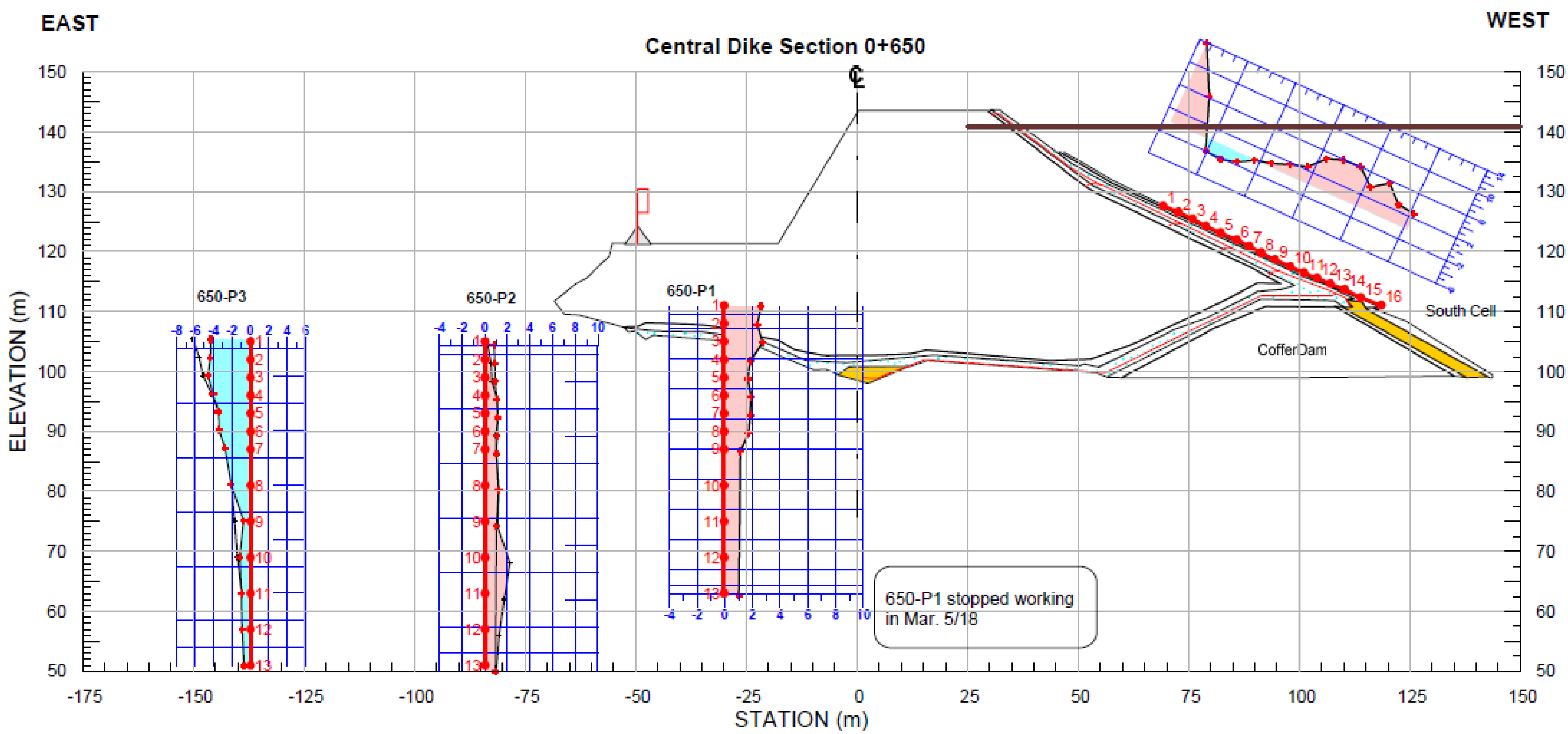




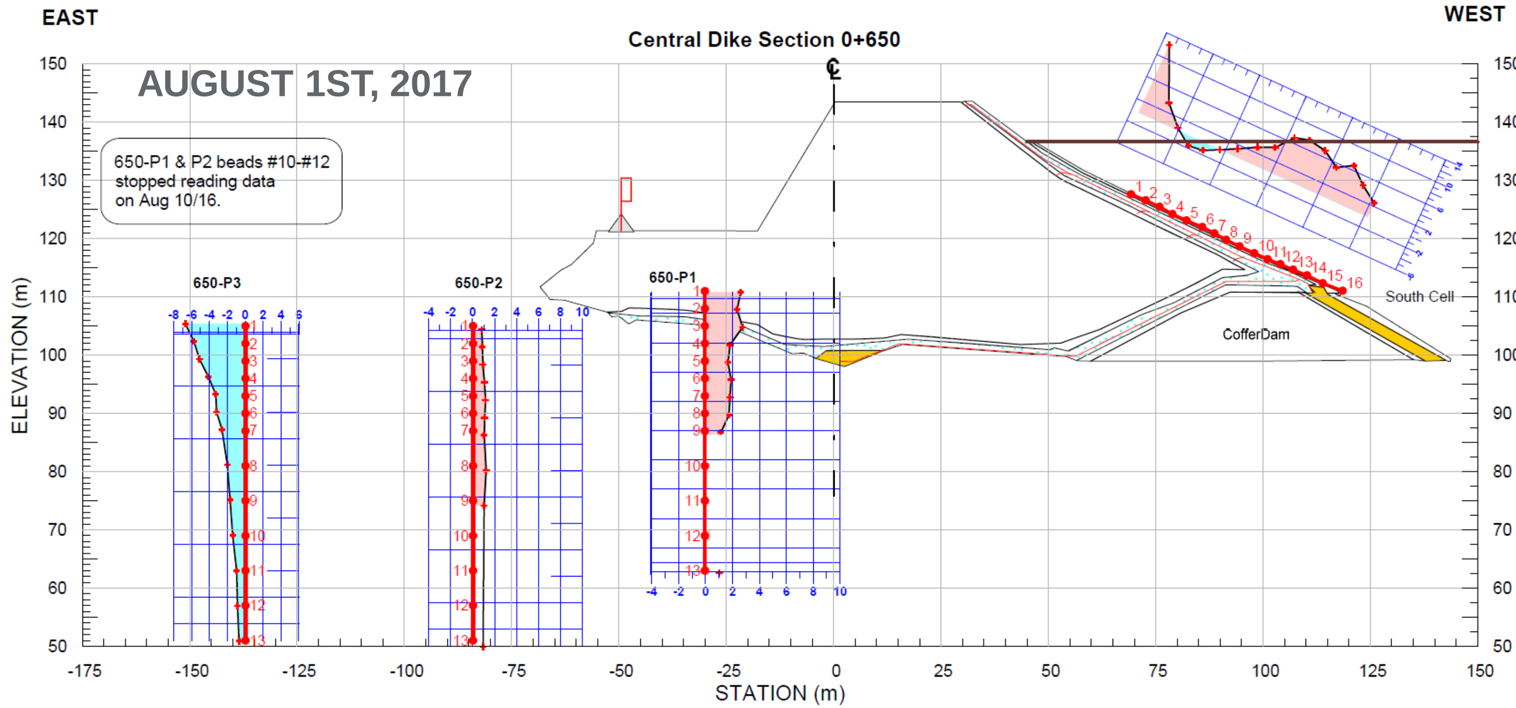
SECTION 650

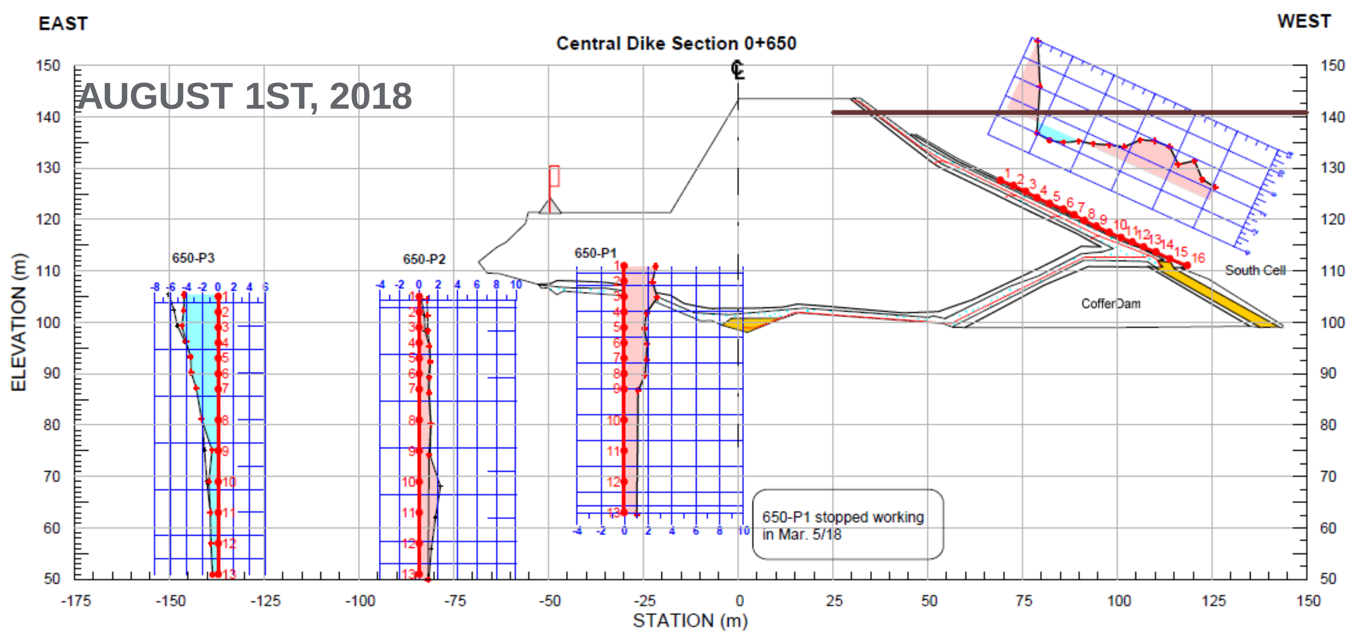

650-P3
ELEVATION (m)
TEMPERATURE (°C)
Reading on Aug. 15/18
650-P2
ELEVATION (m)
TEMPERATURE (°C)
Reading on Aug. 15/18
650-P1
ELEVATION (m)
TEMPERATURE (°C)
Last reading Mar. 5/18


Pit A
West Road
Central Dike
465-P3
650-P3
745-P3
800-P3
875-P3
975-P3
1050-P3
545-P2
650-P2
700-P1
875-P2
800-P2
545-P1
595-P1
750-P1
810-P1
850-P1
580-P1-R /
580-P1
650-P1
825-P1


EAST
WEST
Central Dike Section 0+650
ELEVATION (m)
STATION (m)
650-P3
650-P2
650-P1
South Cell
CofferDam
650-P1 stopped working
in Mar. 5/18

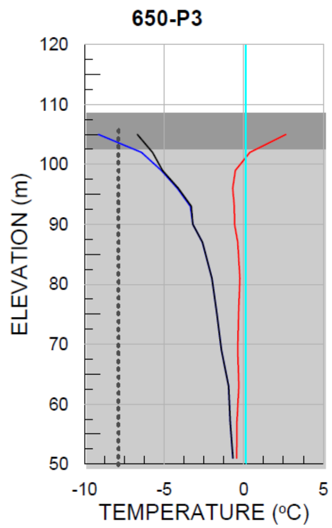
SECTION 650

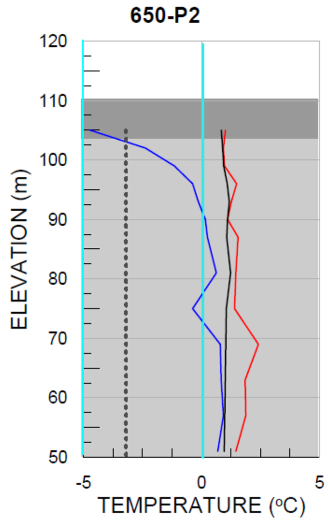

EAST
WEST
Central Dike Section 0+650
AUGUST 1ST, 2017
650-P1 & P2 beads #10-#12 stopped reading data on Aug 10/16.
650-P3
650-P2
650-P1
South Cell
CofferDam
ELEVATION (m)
STATION (m)

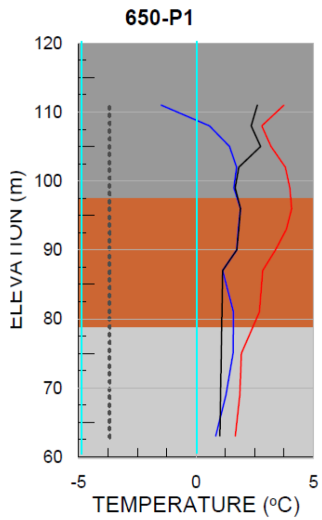

EAST
WEST
Central Dike Section 0+650
AUGUST 1ST, 2018
650-P3
650-P2
650-P1
South Cell
CofferDam
650-P1 stopped working in Mar. 5/18
ELEVATION (m)
STATION (m)

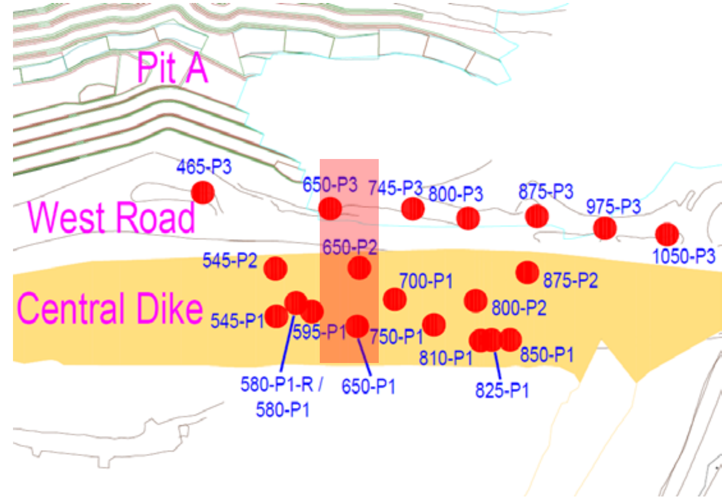
SECTION 650

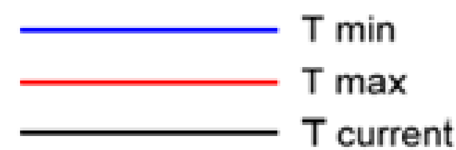
THERMISTOR READINGS FROM AUGUST 2016 - 2017



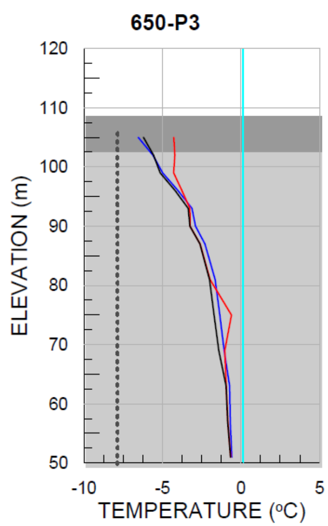




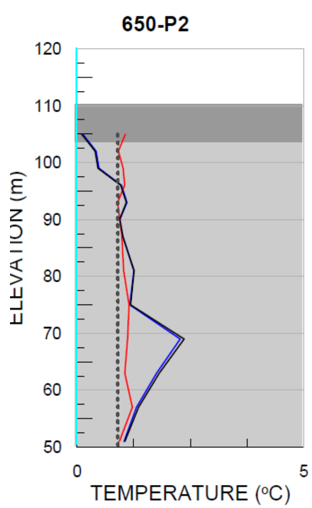




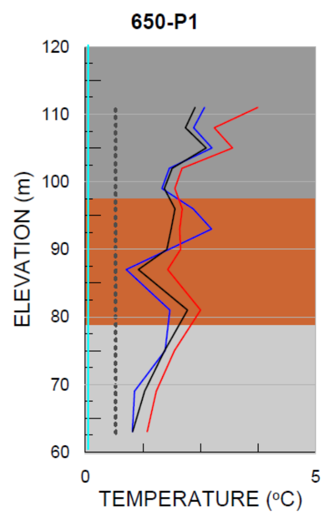
THERMISTOR READINGS FROM AUGUST 2017 - 2018



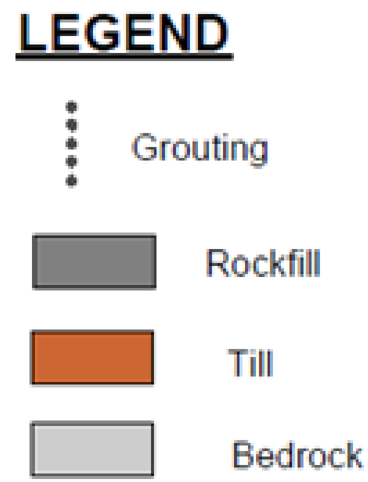
Reading on Aug. 15/18



Reading on Aug. 15/18

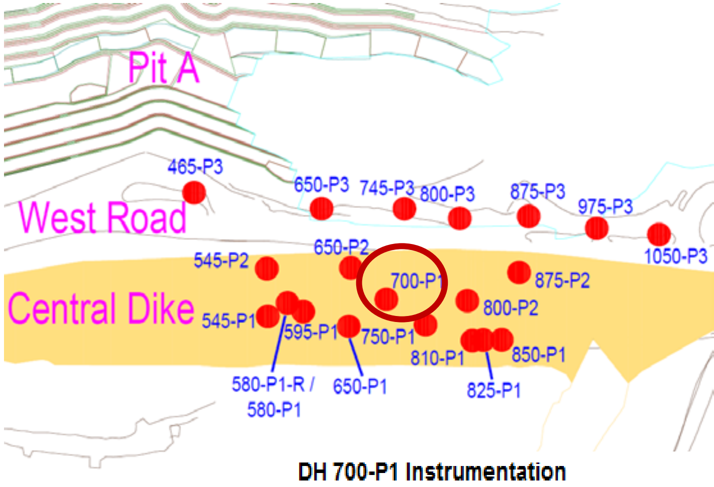


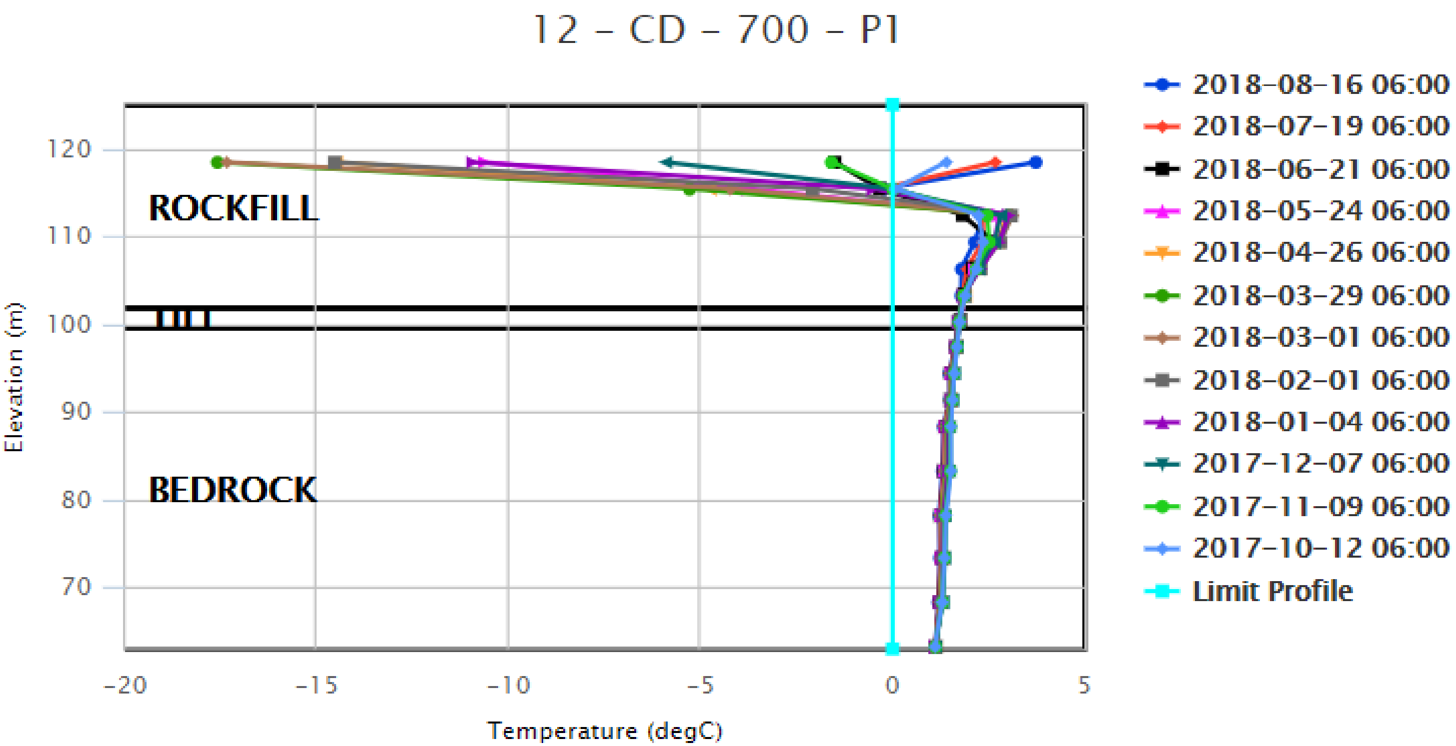
Last reading Mar. 5/18

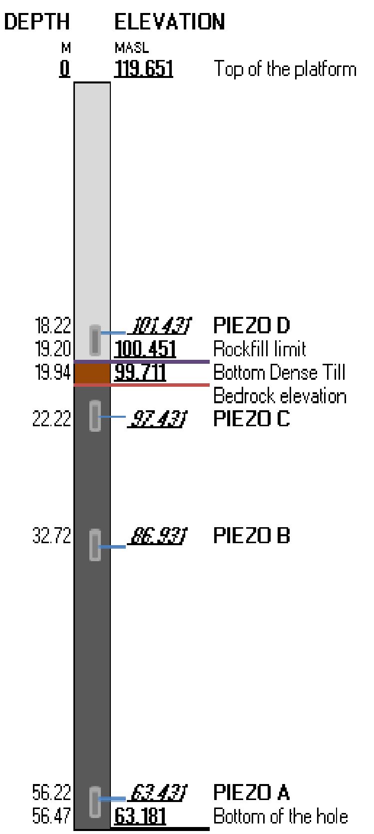


THERMISTOR 700-P1

- New instrument installed in 2017
- Till and bedrock temperature readings above 0º C

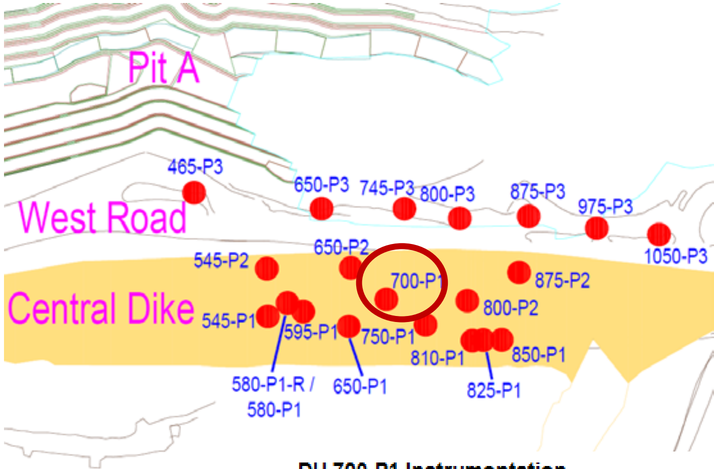


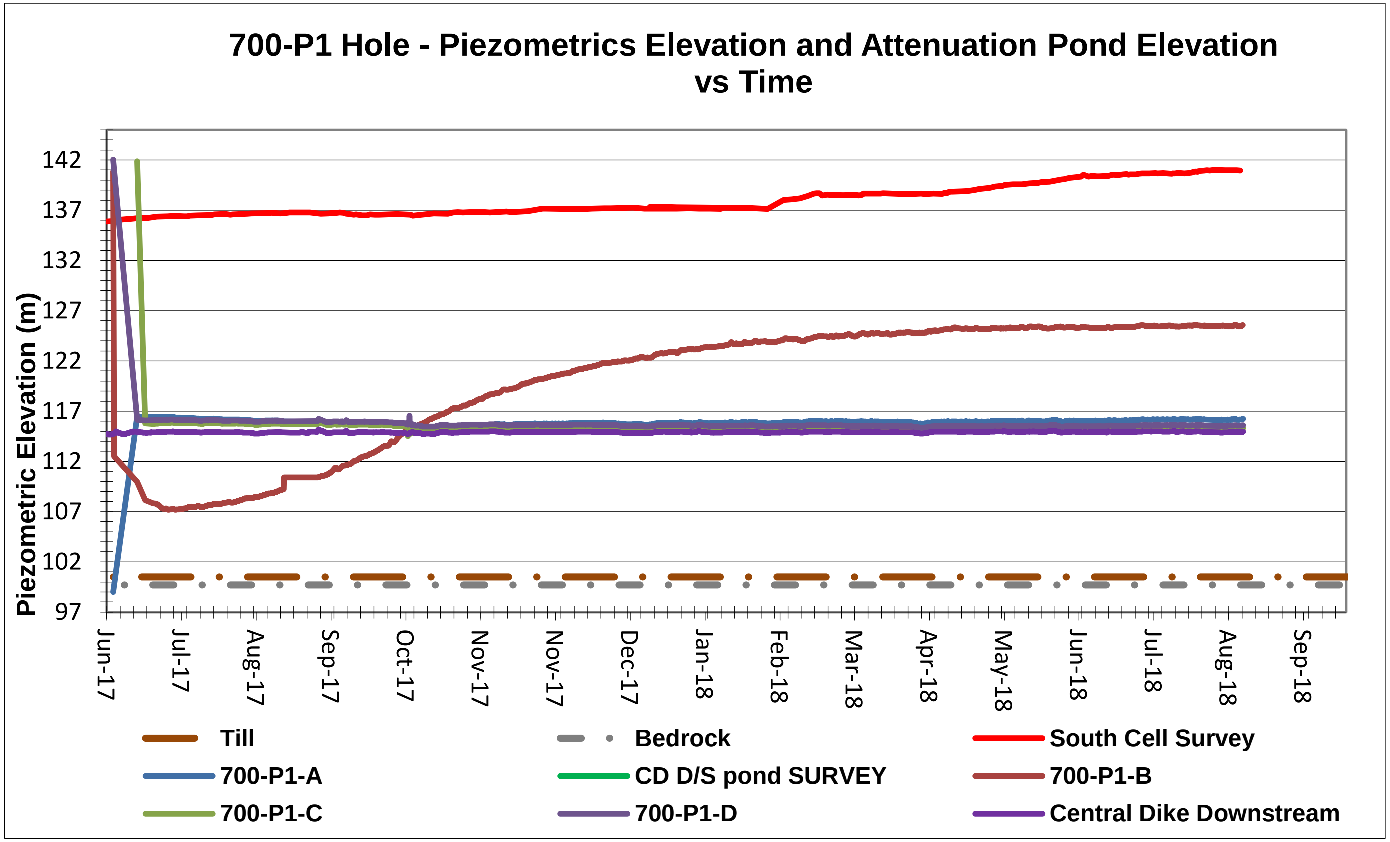




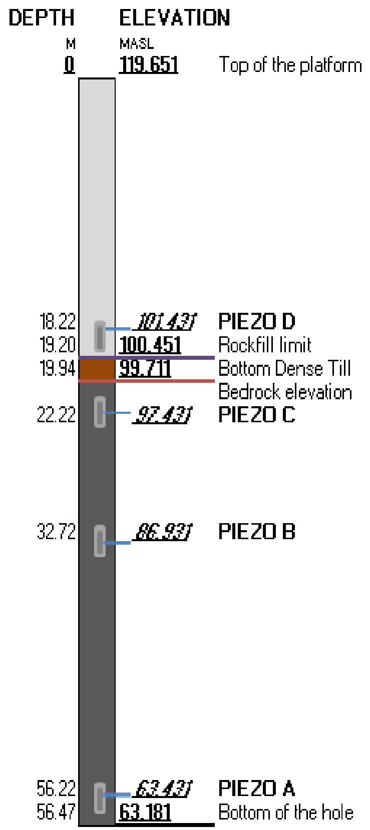
PIEZOMETER 700-P1

- New instrument installed in 2017
- Piezo B was on a rising trend but has stabilized
- Piezo A, C and D are showing reading similar to the D/S pond.



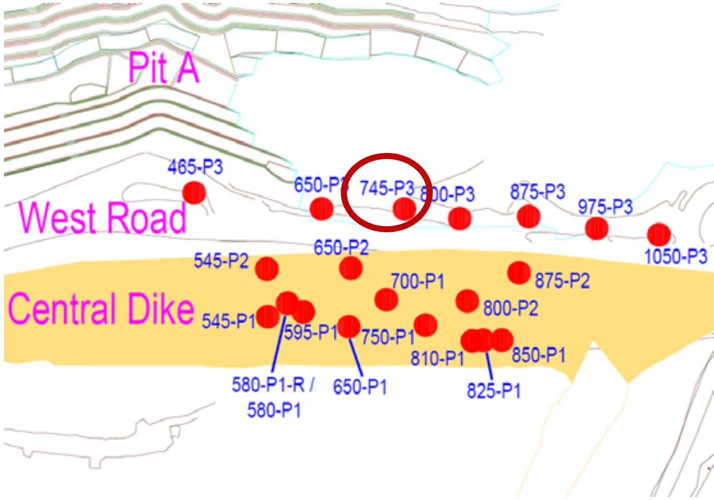


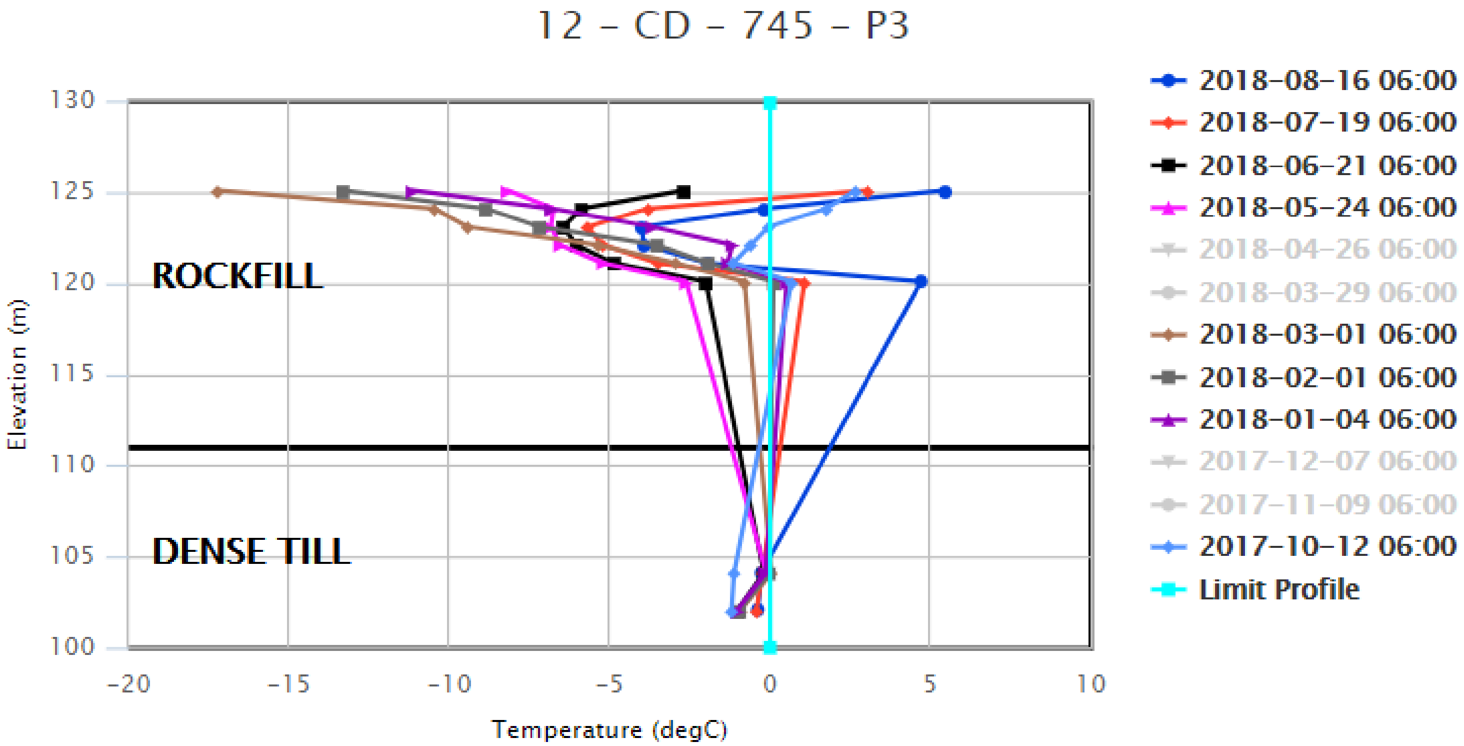
DH 700-P1 Instrumentation



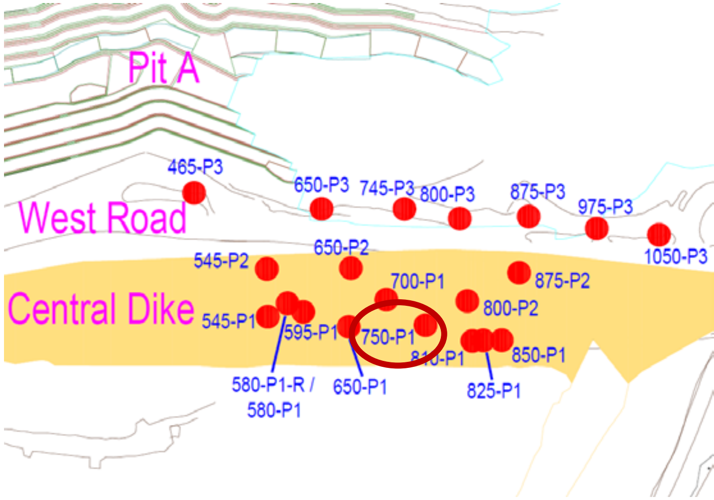
THERMISTOR 745-P3

- Thermistor installed to monitor freeze back of the West Road. This thermistor do not reach bedrock
- Temperatures are above the freezing point for July & August, 2018
- Frozen limit of the northen section of the P3 line

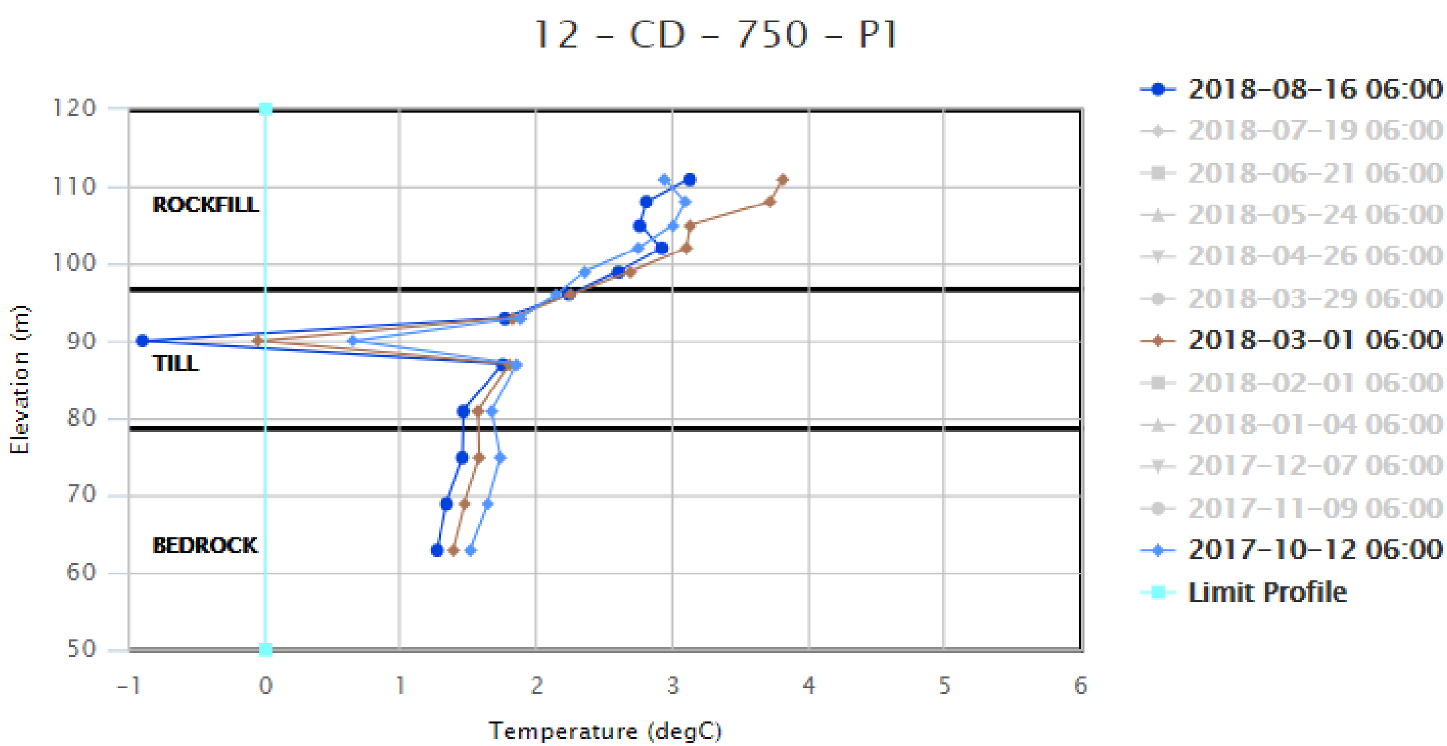


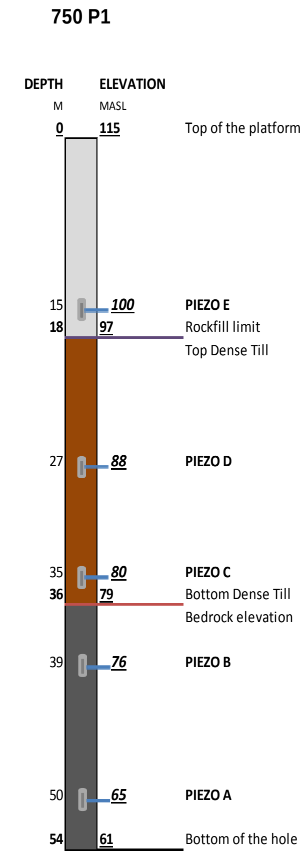


THERMISTOR 750-P1



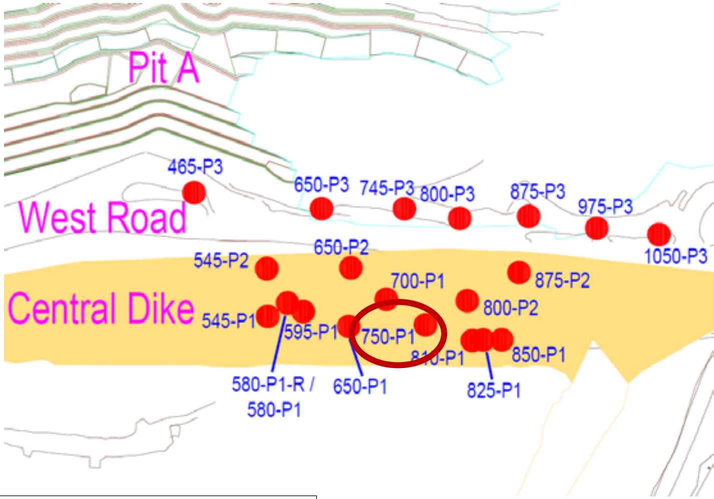
- Cooling trend in till layer. The bead located at elevation 90m is approximately 1° C cooler than in 2017.

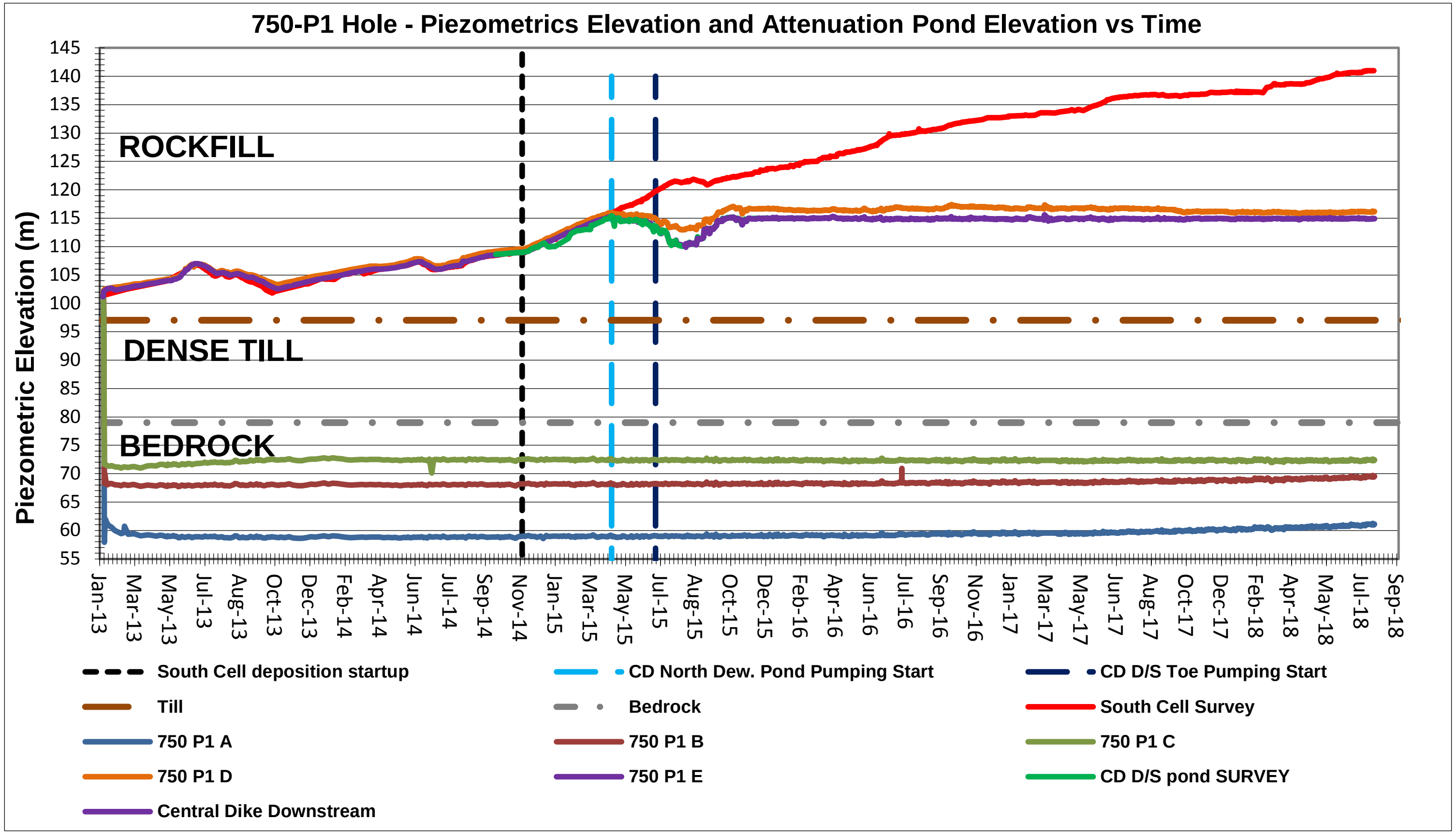


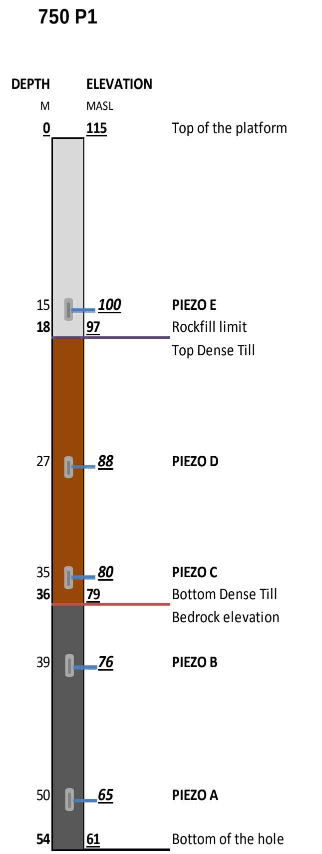


PIEZOMETER 750-P1

- Piezo A, B and C are in suction
- Piezo D is have a direct reaction to any variation in elevation observe in the D/S pond.

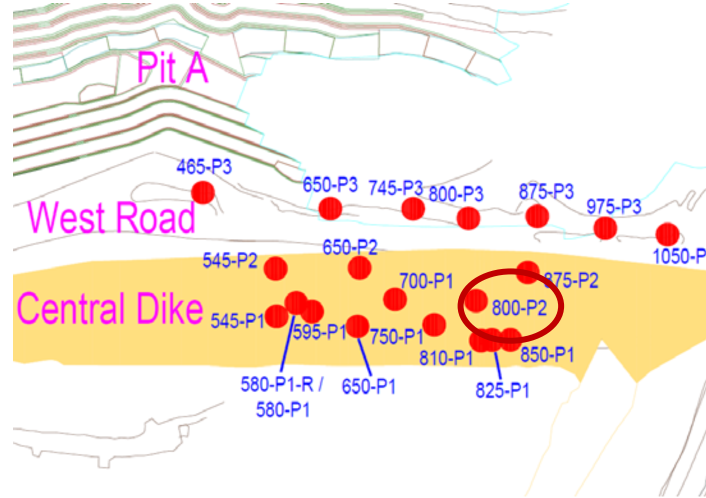


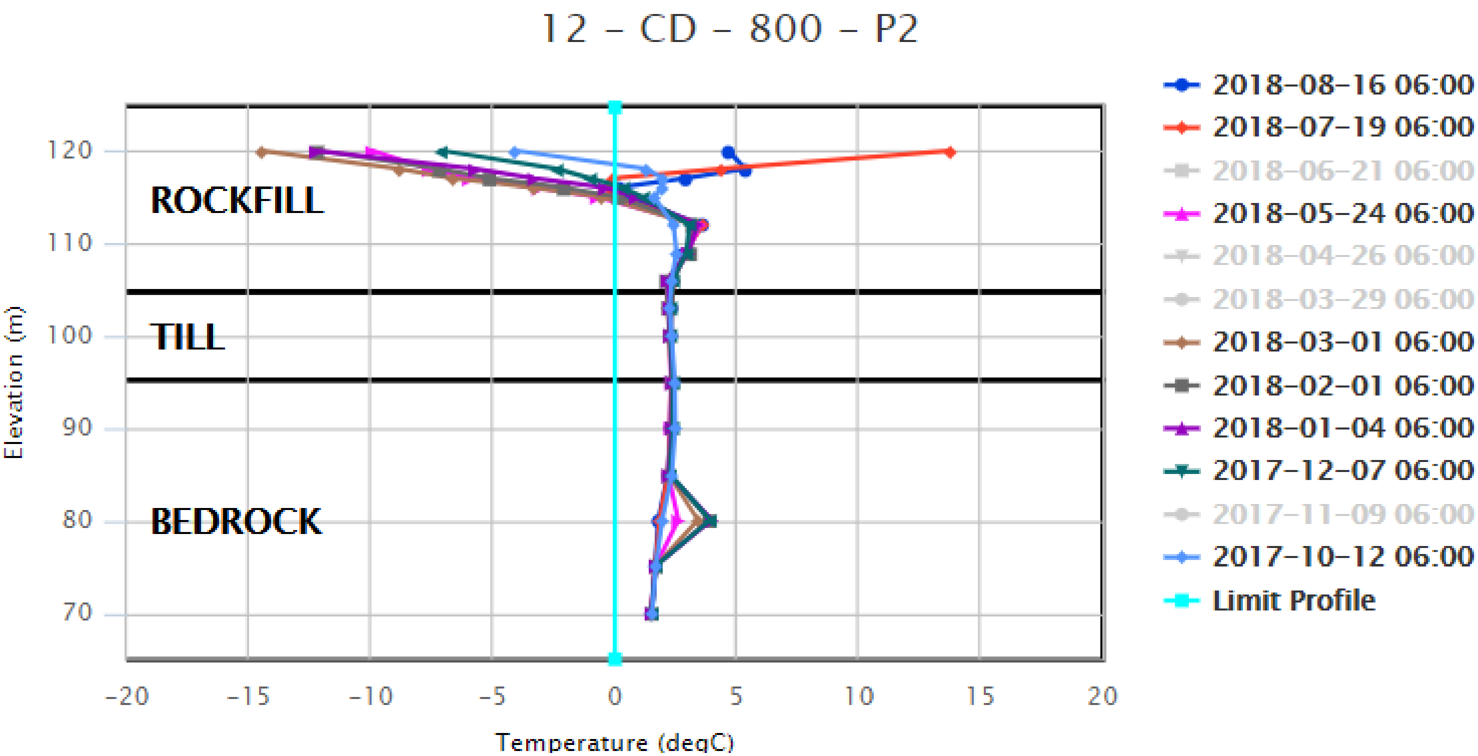


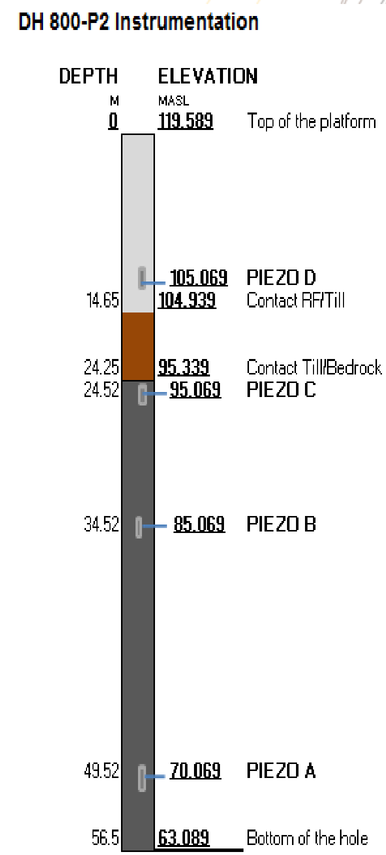


THERMISTOR 800-P2

- New instrument installed in 2017
- Capacitance effect was observed at the end of 2017/beginning 2018. Stabilized since June 2018.
- Temperature above 0 º C

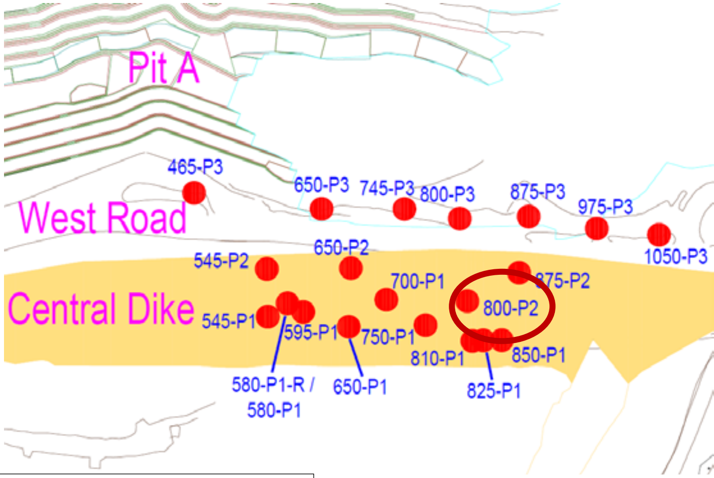


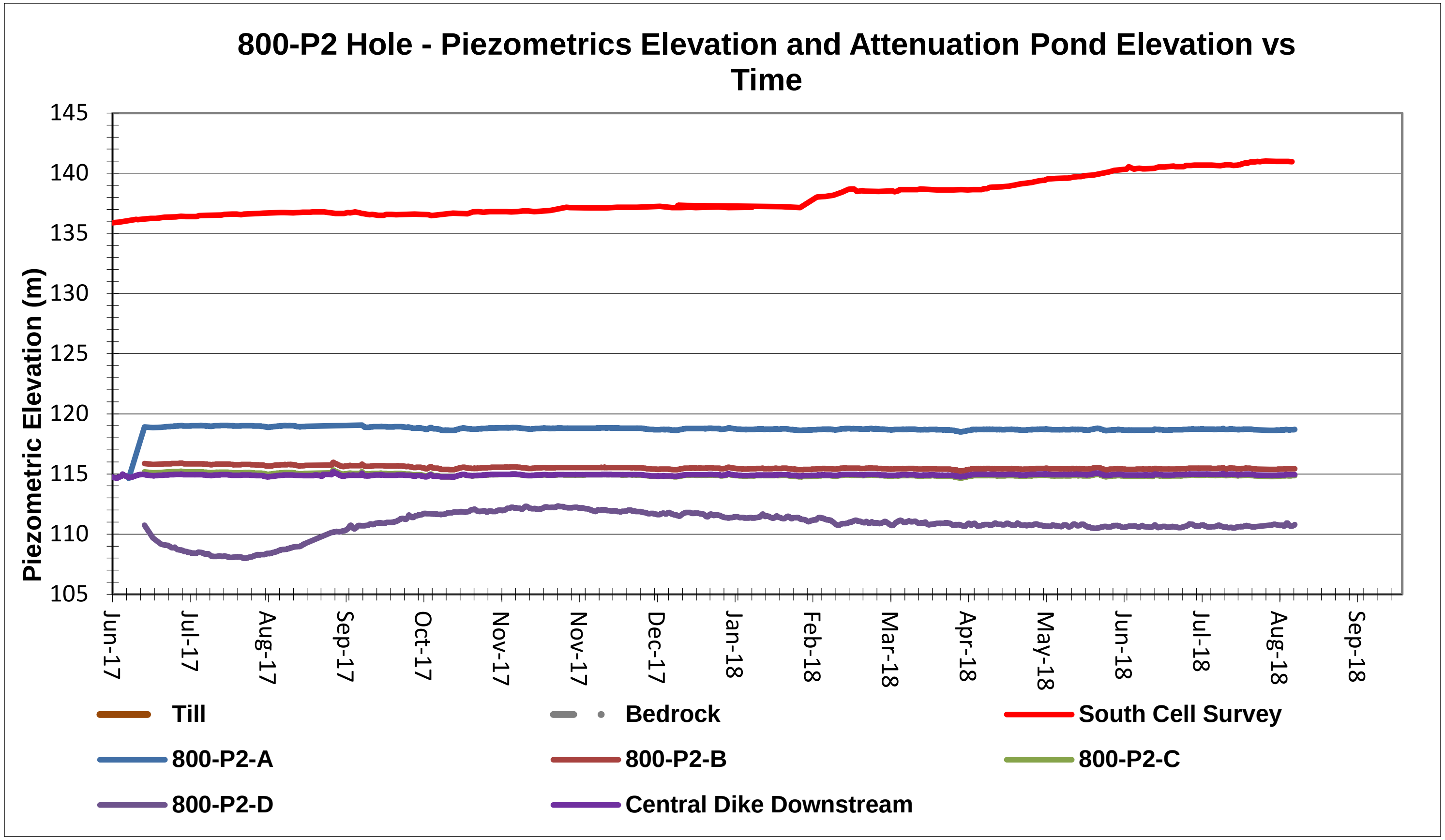


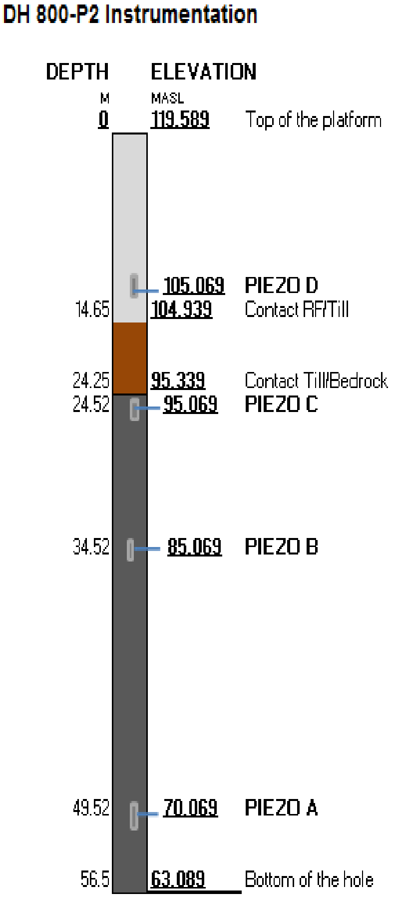


PIEZOMETER 800-P2

- New instrument installed in 2017
- All Piezo are stable
- Piezo A,B and C are showing pressure readings similar to the elevation of the D/S pond.

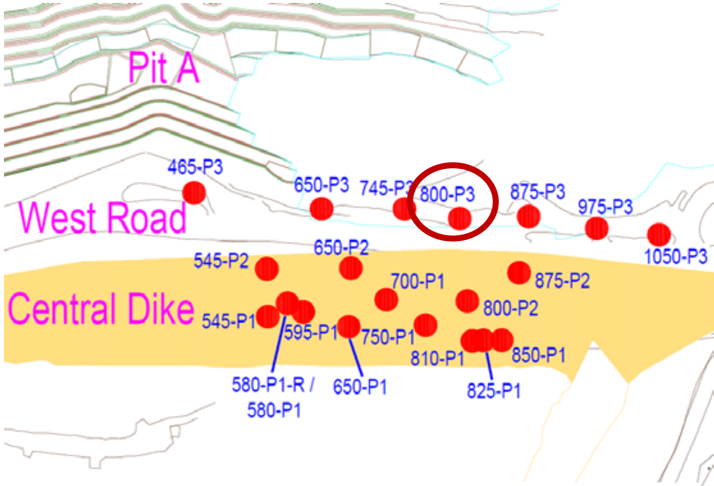




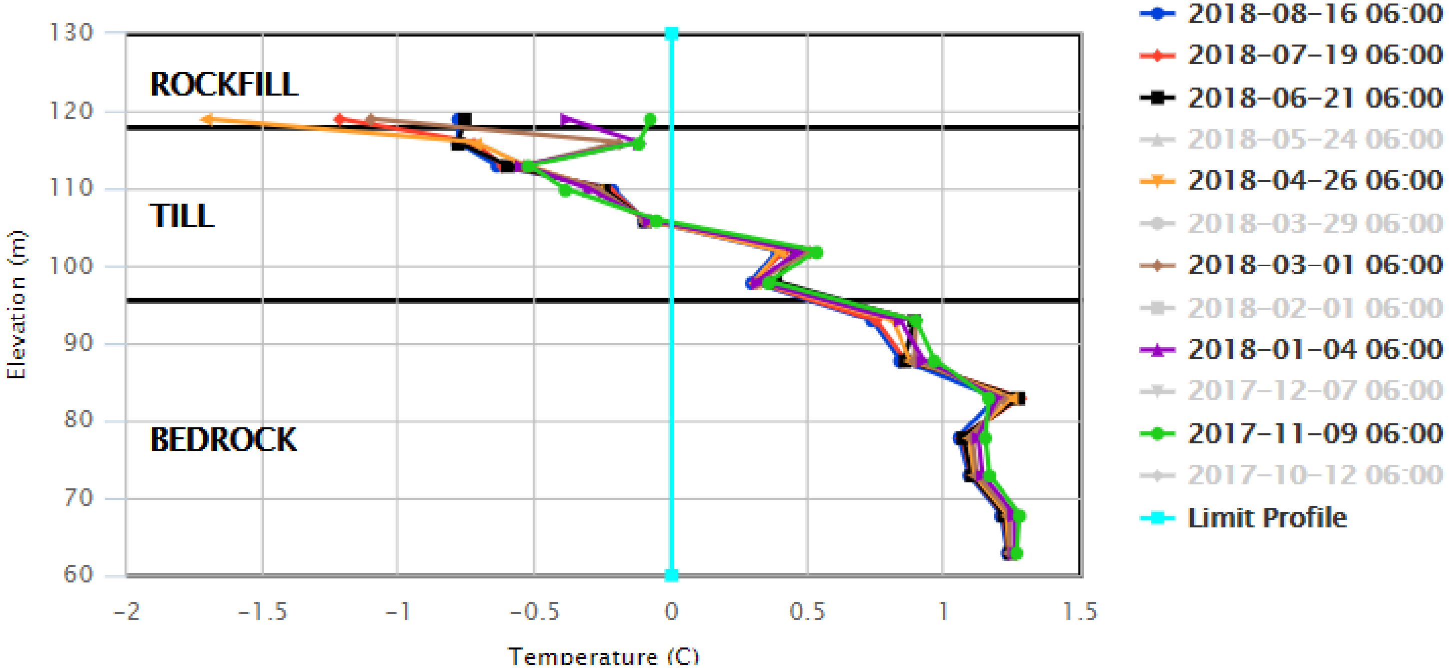


THERMISTOR 800-P3

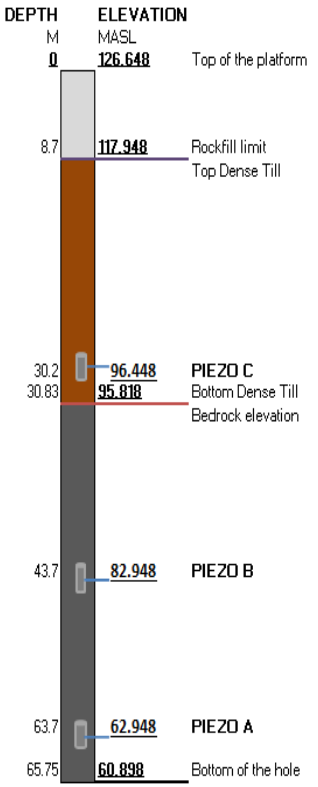
- New instrument installed in 2017
- The unfreezing point occurs around elevation 103 MASL.
- From elevation 78 to the bottom of the hole, temperatures are stable at approximately 1.2 ˚C.



12 - CD - 800 - P3

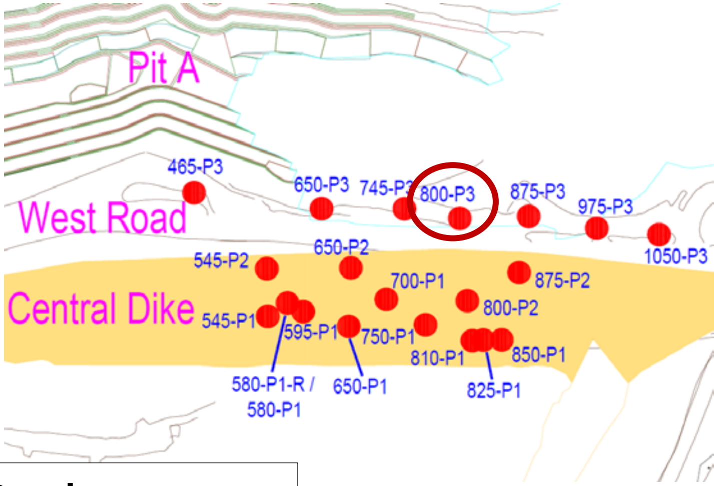


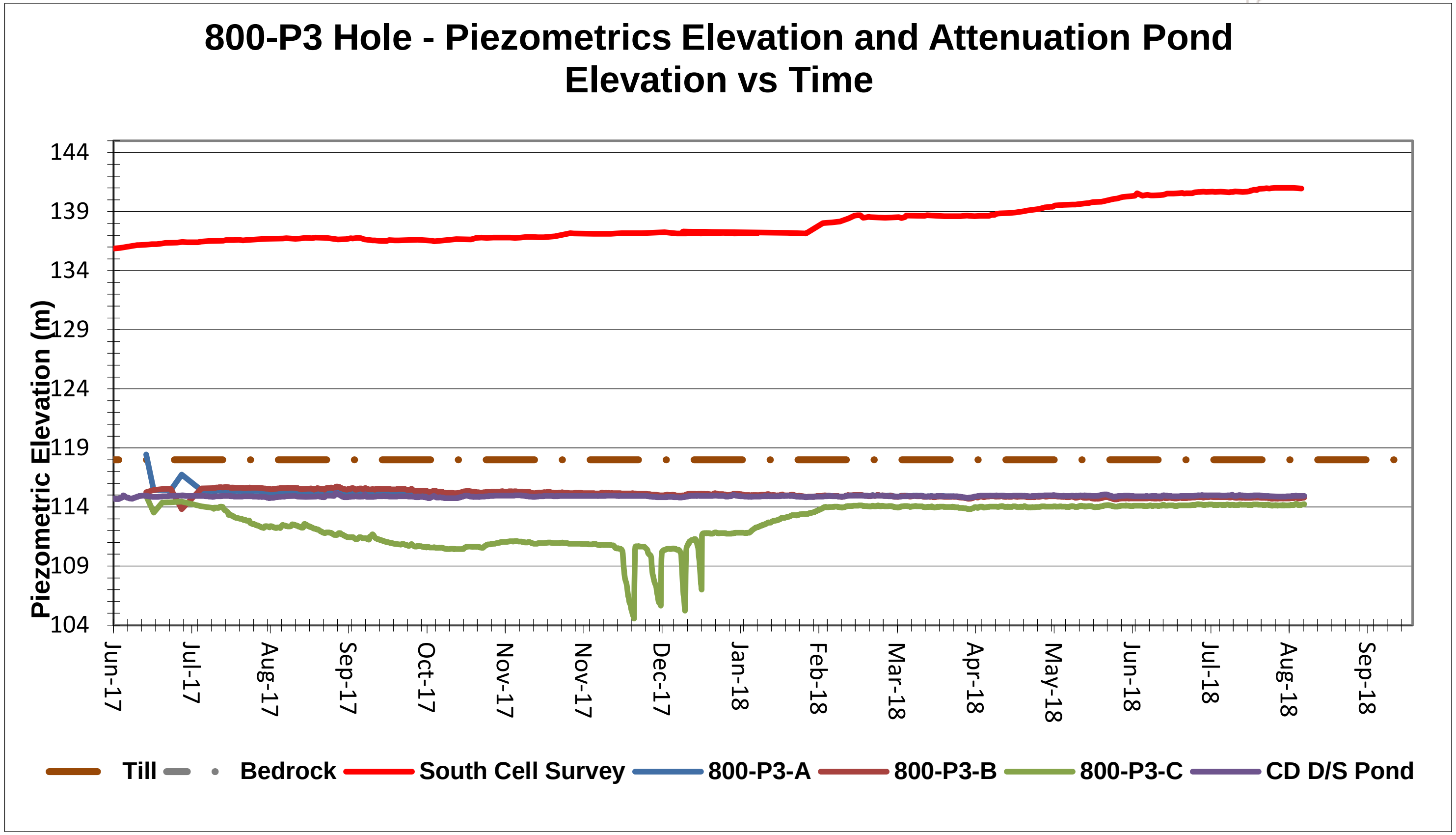
DH 800-P3 Instrumentation

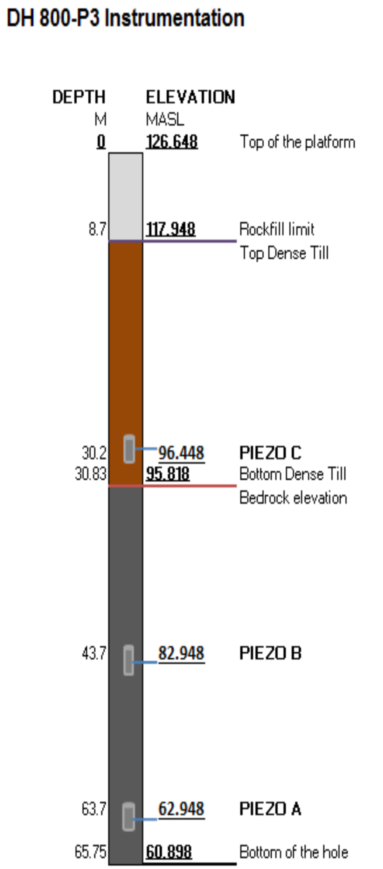


PIEZOMETERS 800-P3

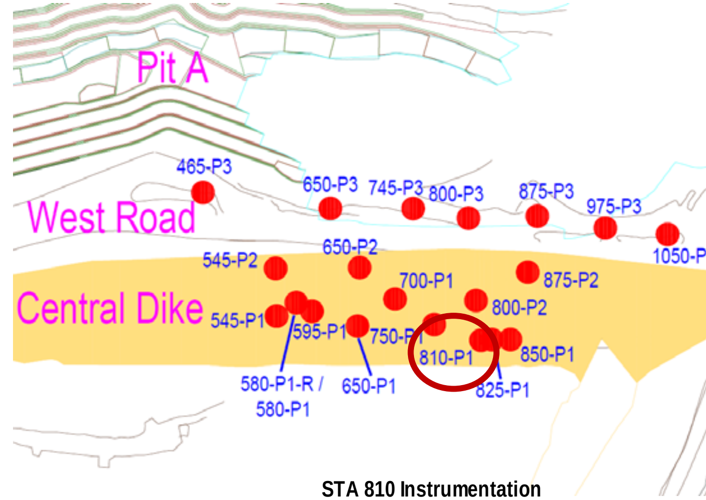
- New instrument installed in 2017
- Piezo are stable
- Piezo A, B & C readings are similar to the D/S pond elevation readings



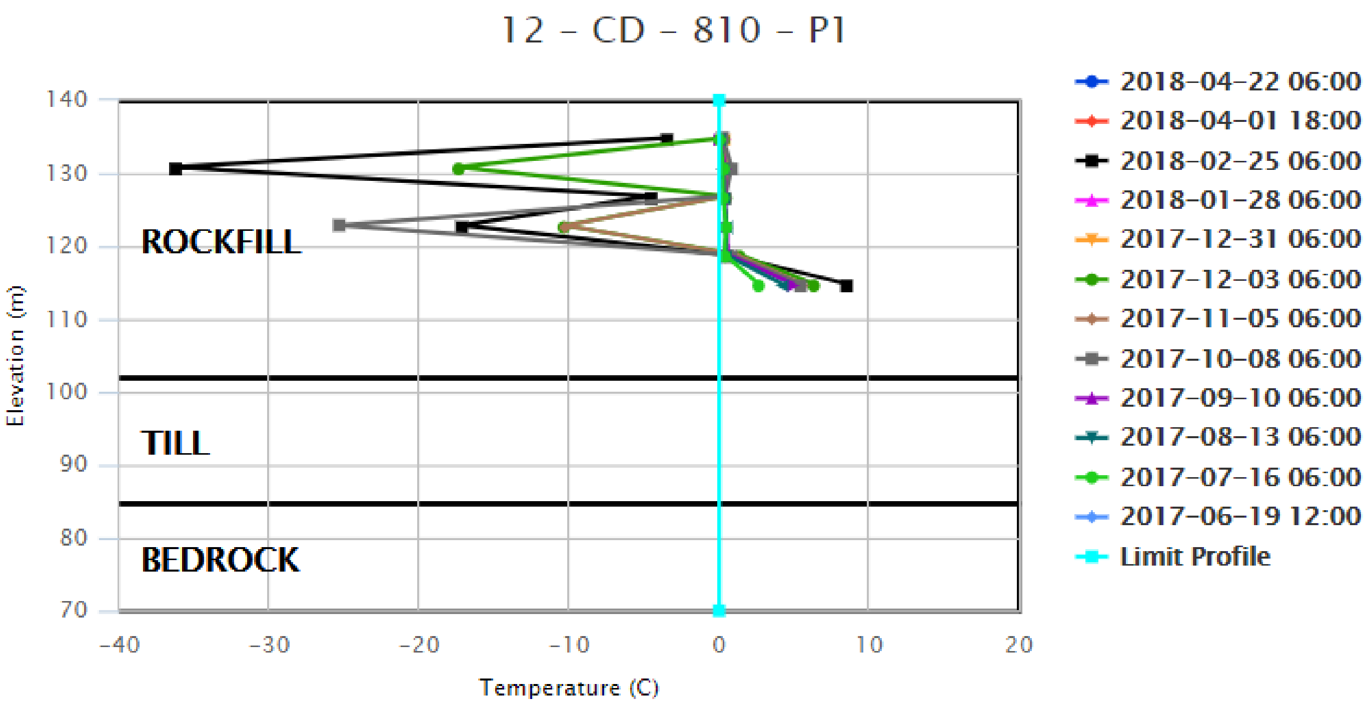


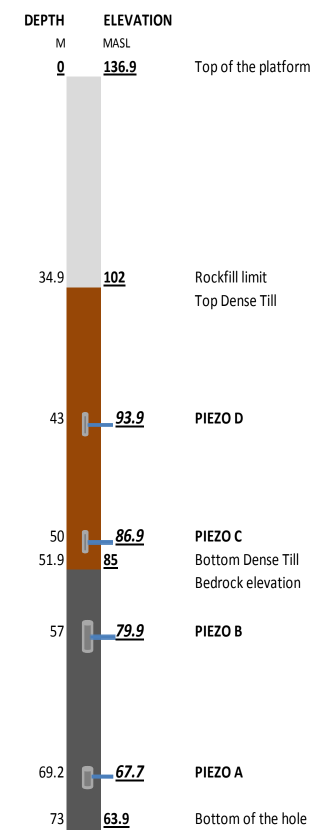


THERMISTOR 810-P1



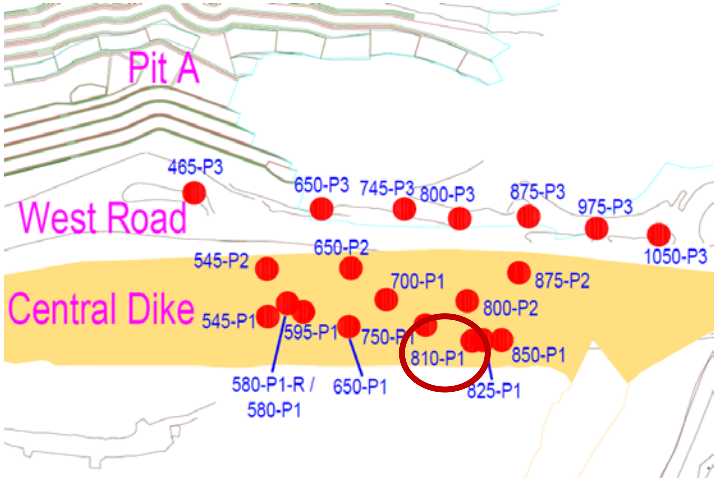
- Bead below El. 114.84 m stop working in February 2017
- Higher temperature observed in this hole (might be the instrument progressively failing)



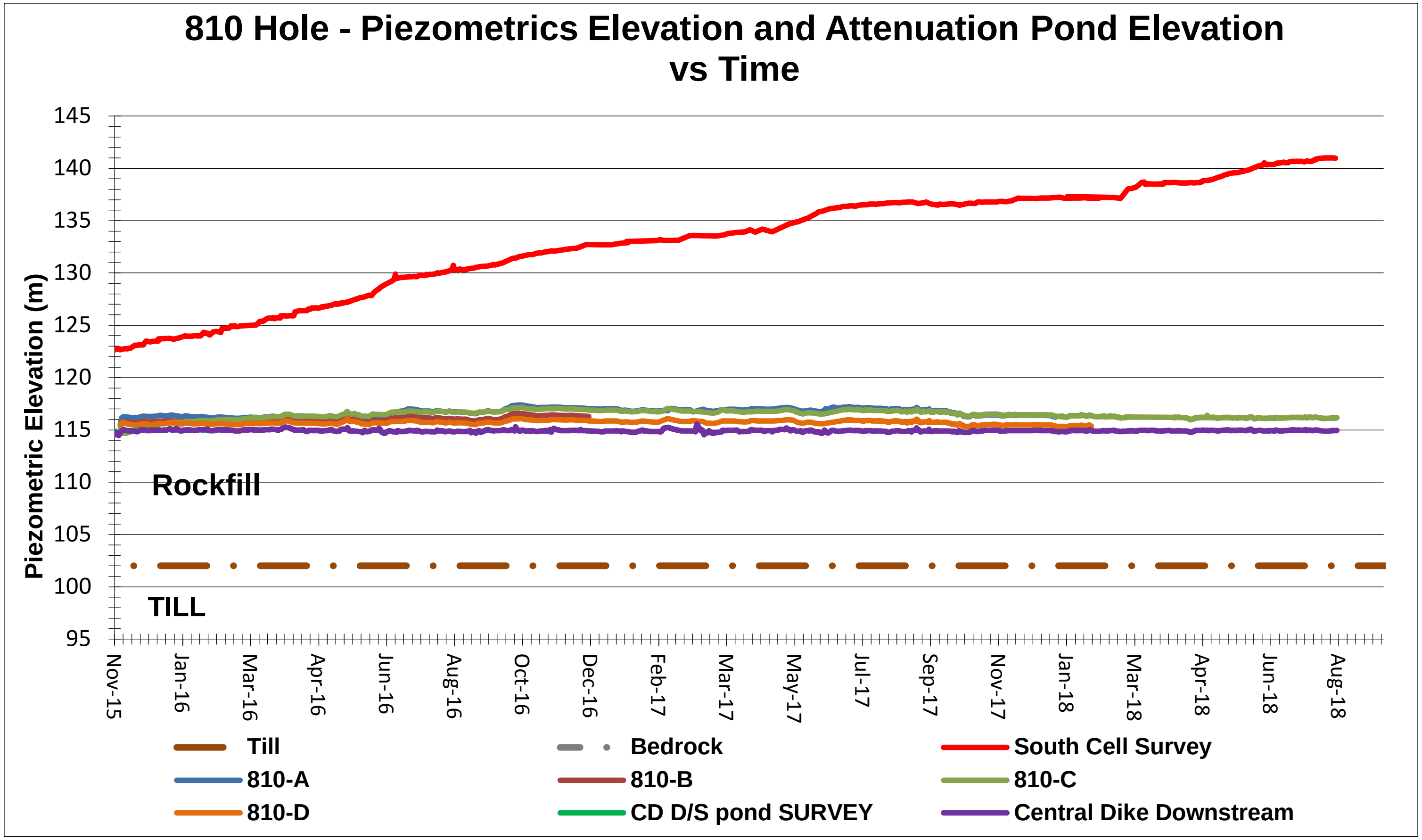


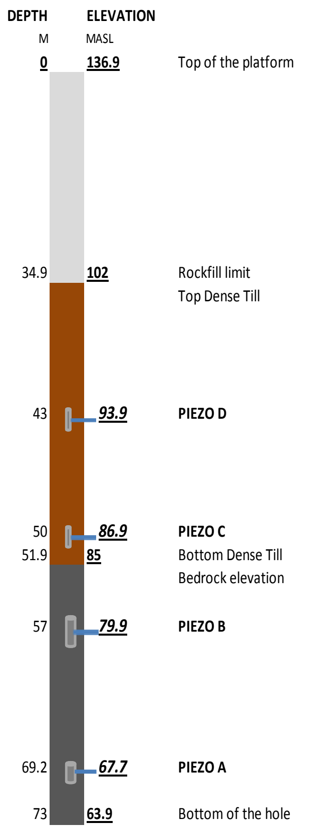
PIEZOMETER 810-P1

- Piezo B stop working in December 2016
- Piezo A stop working in December 2017
- Piezo D stop working in May 2018
- Piezo C is following the elevation change of the D/S pond



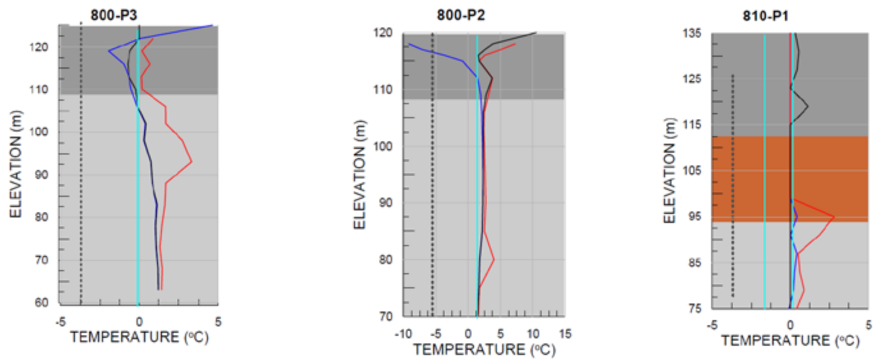
STA 810 Instrumentation

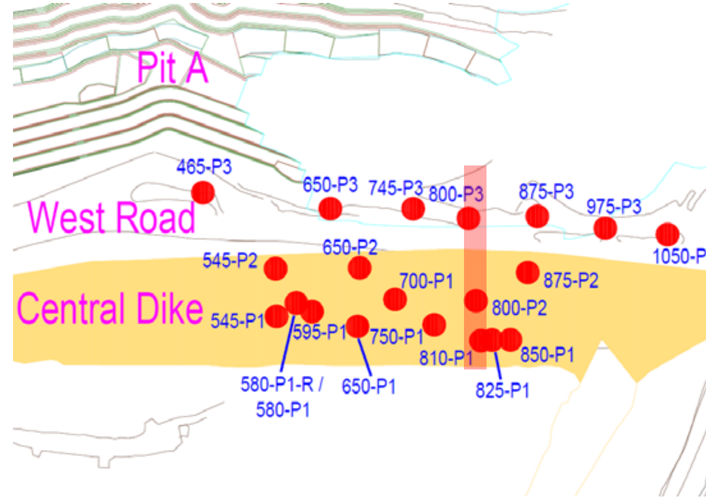




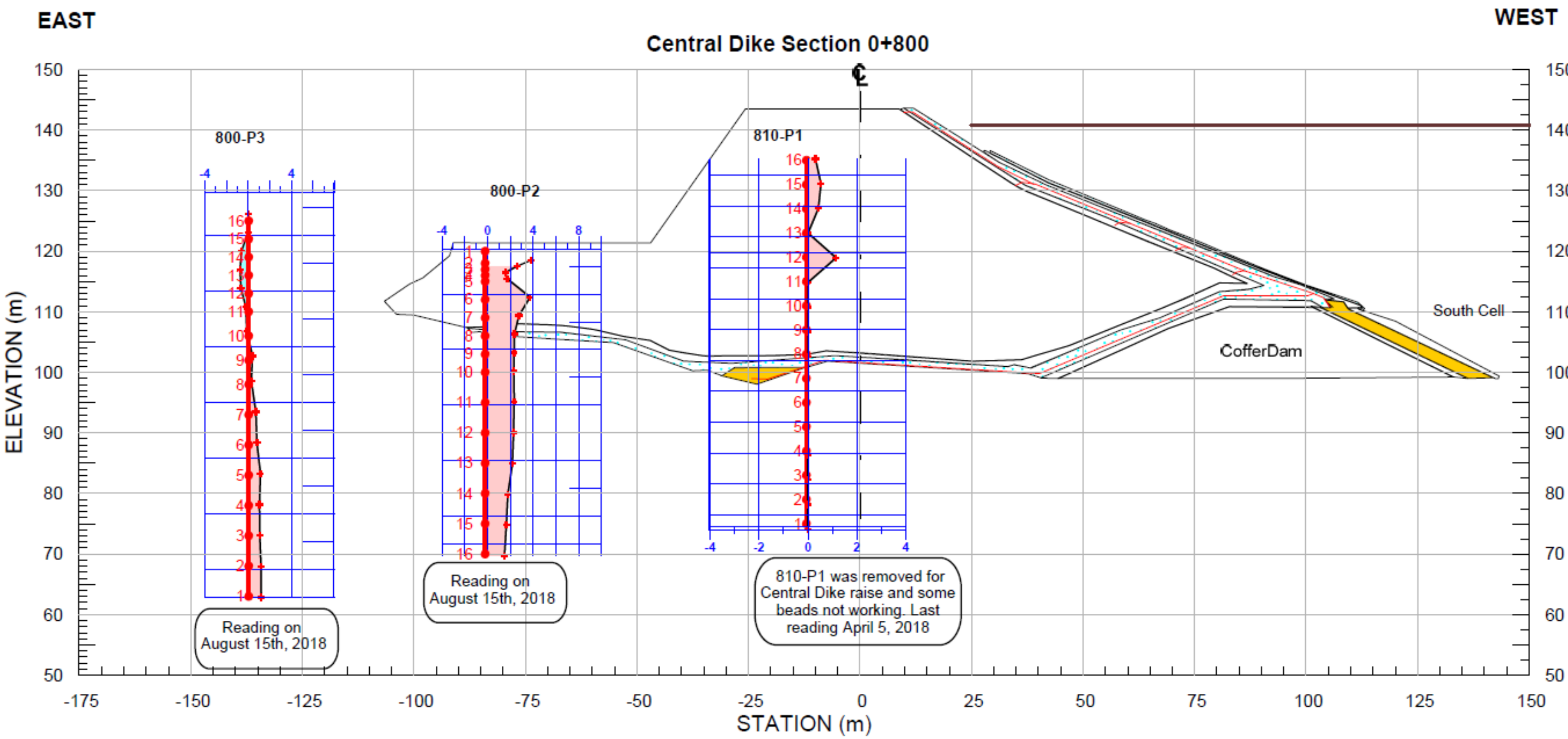
SECTION 800-810

THERMISTOR READINGS FROM AUGUST 2017 - 2018



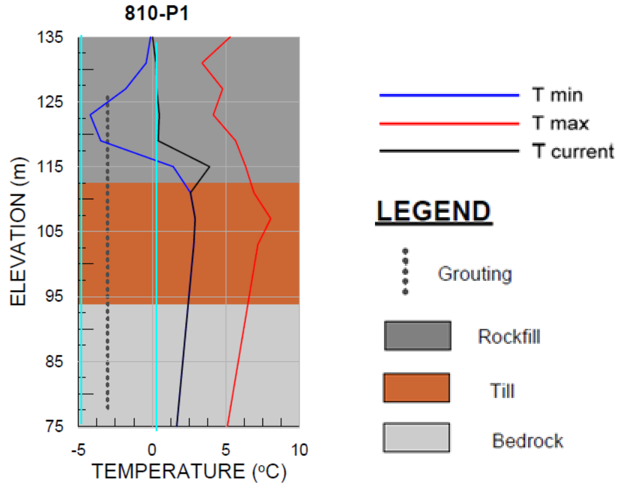


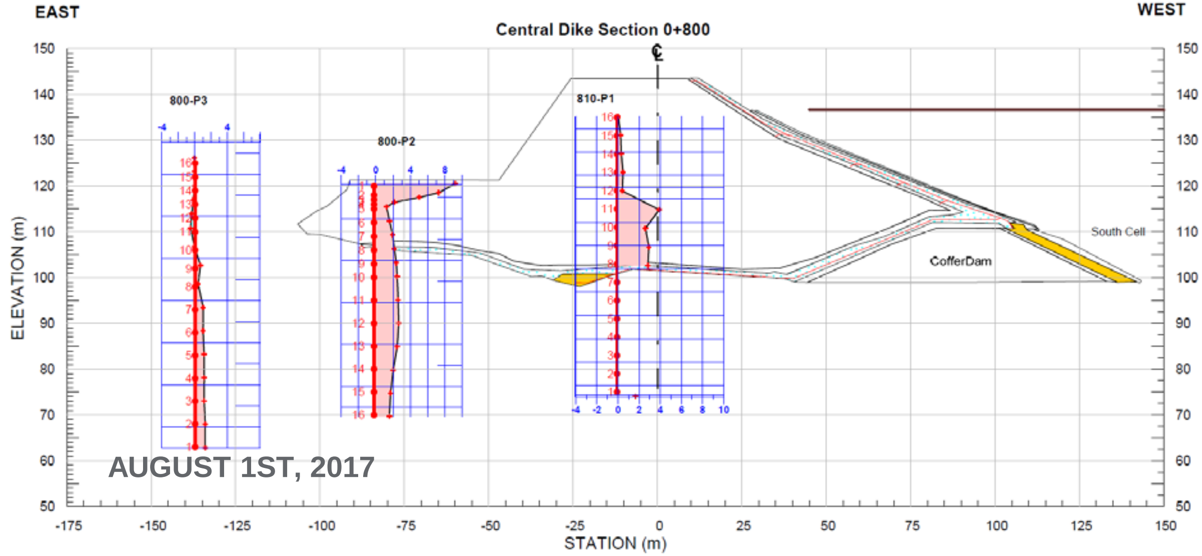
THERMISTOR READINGS AUGUST 15TH, 2018



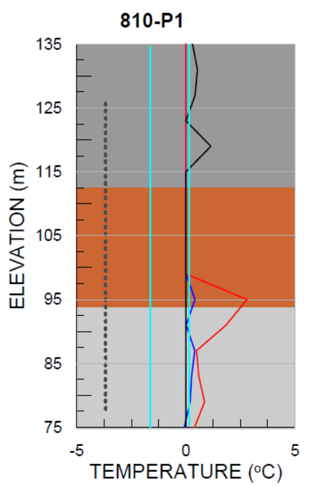
SECTION 800-810

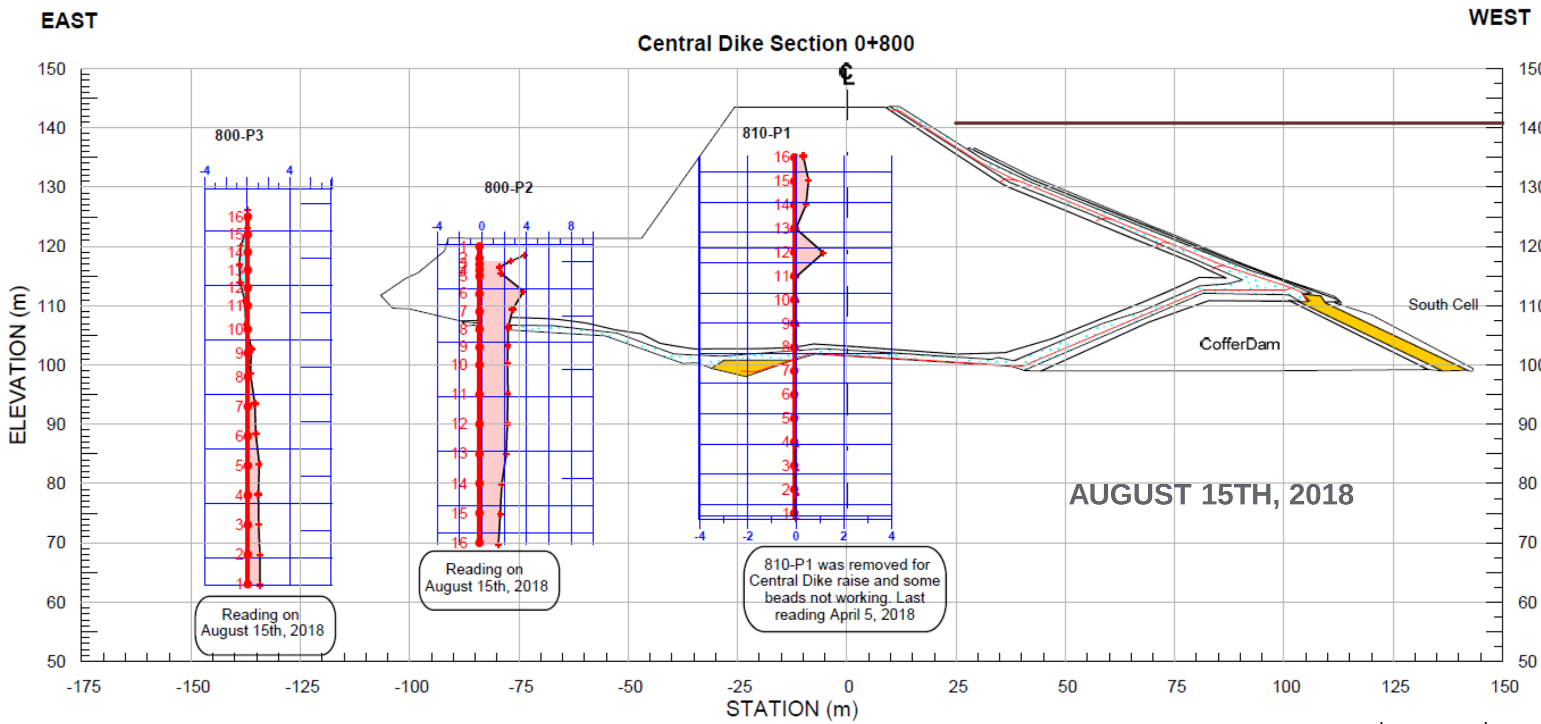
THERMISTOR READINGS FROM AUGUST 2016 - 2017





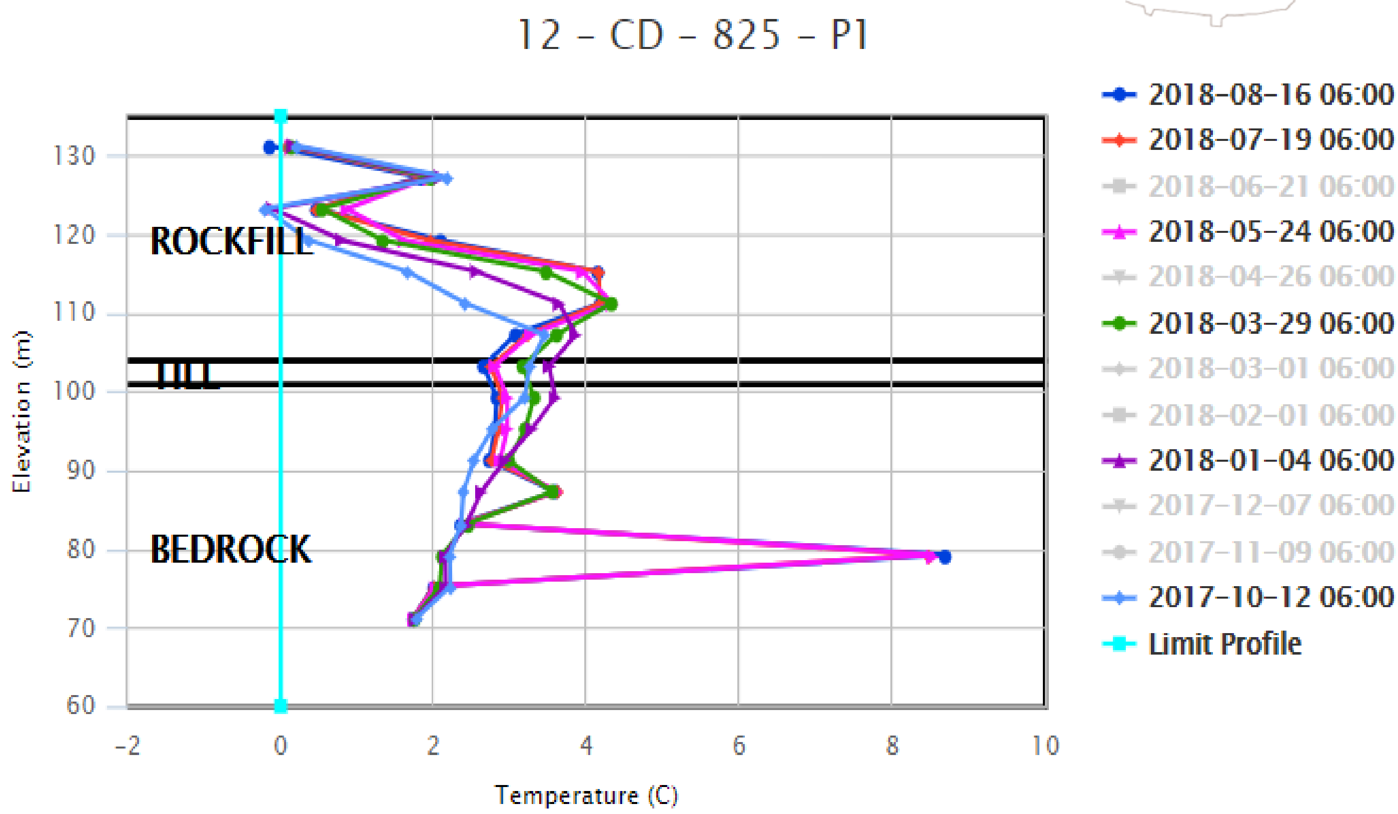
THERMISTOR READINGS FROM AUGUST 2017 - 2018

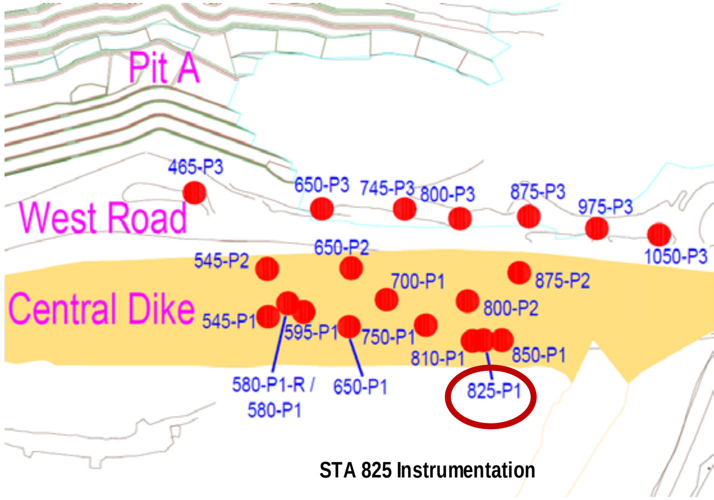


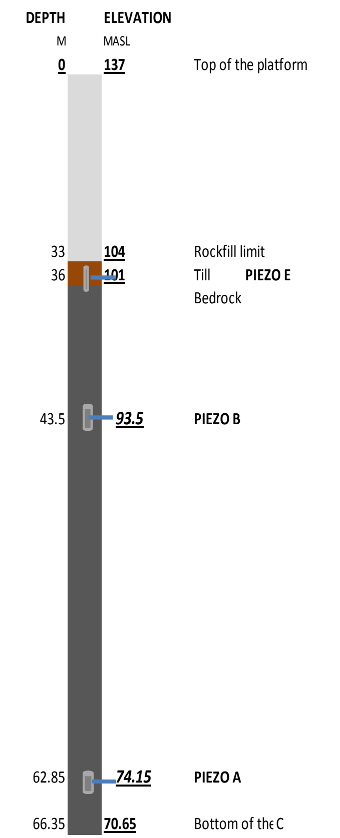


THERMISTOR 825-P1

- Capacitance effect at elevation 79.25 MASL and 87.5 MASL.
- Peak of temperature at El.111 MASL (4.1 ˚C)

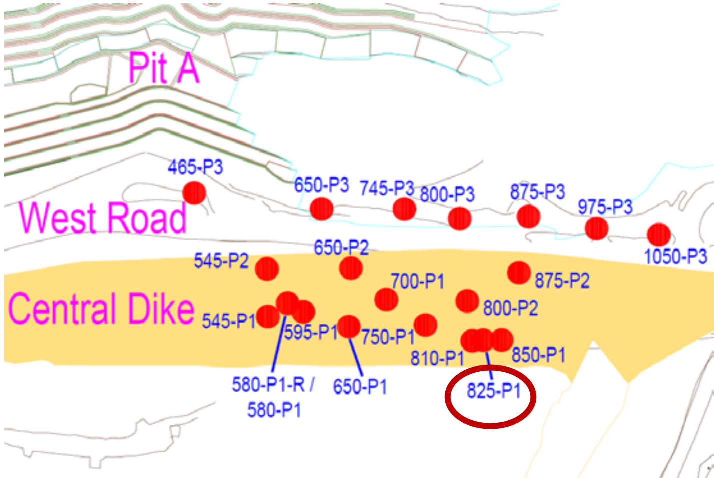




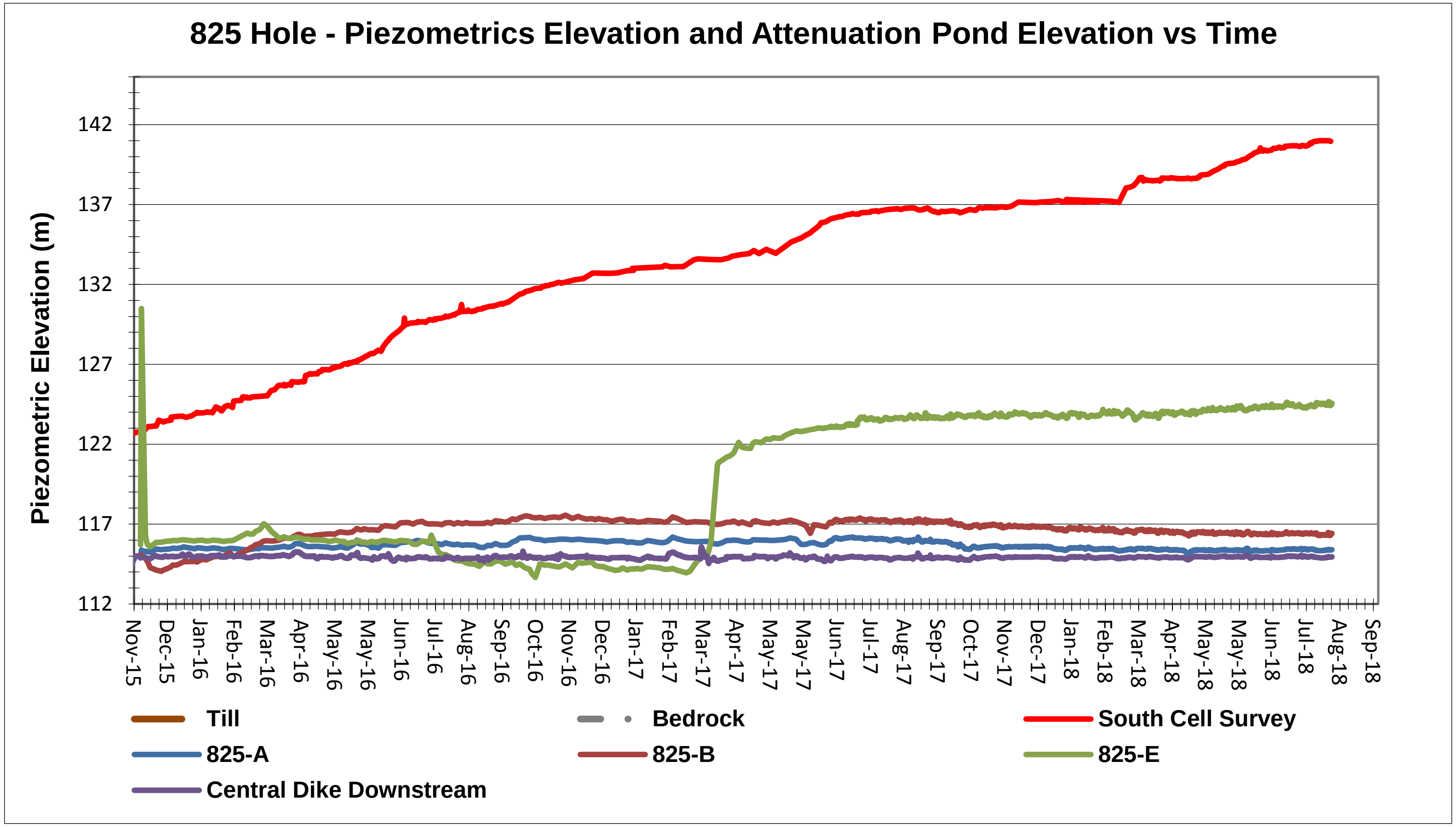


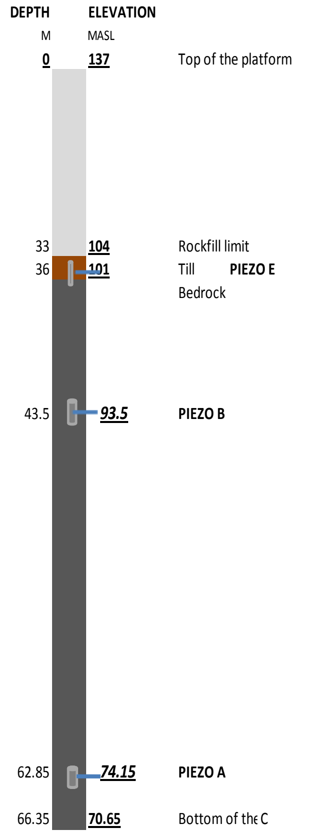
PIEZOMETER 825-P1

- Increased in piezometric elevation of Piezo E since April 2017. Seem to be connected now with South Cell.
- Piezo A and B showing readings similar to the D/S pond and are reacting directly with elevation change.



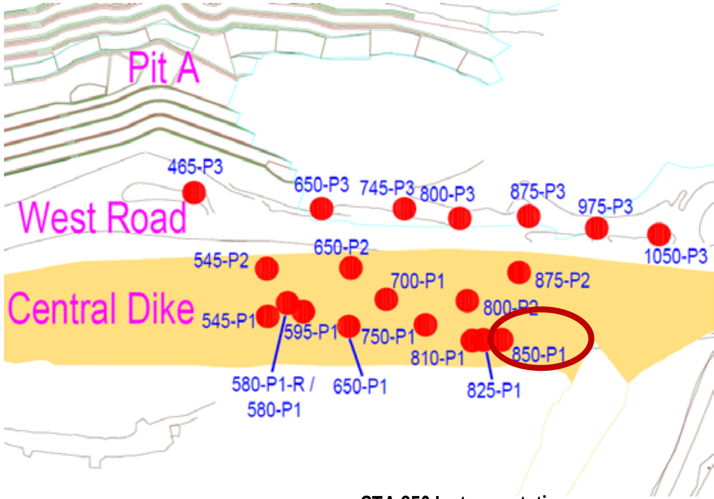
STA 825 Instrumentation





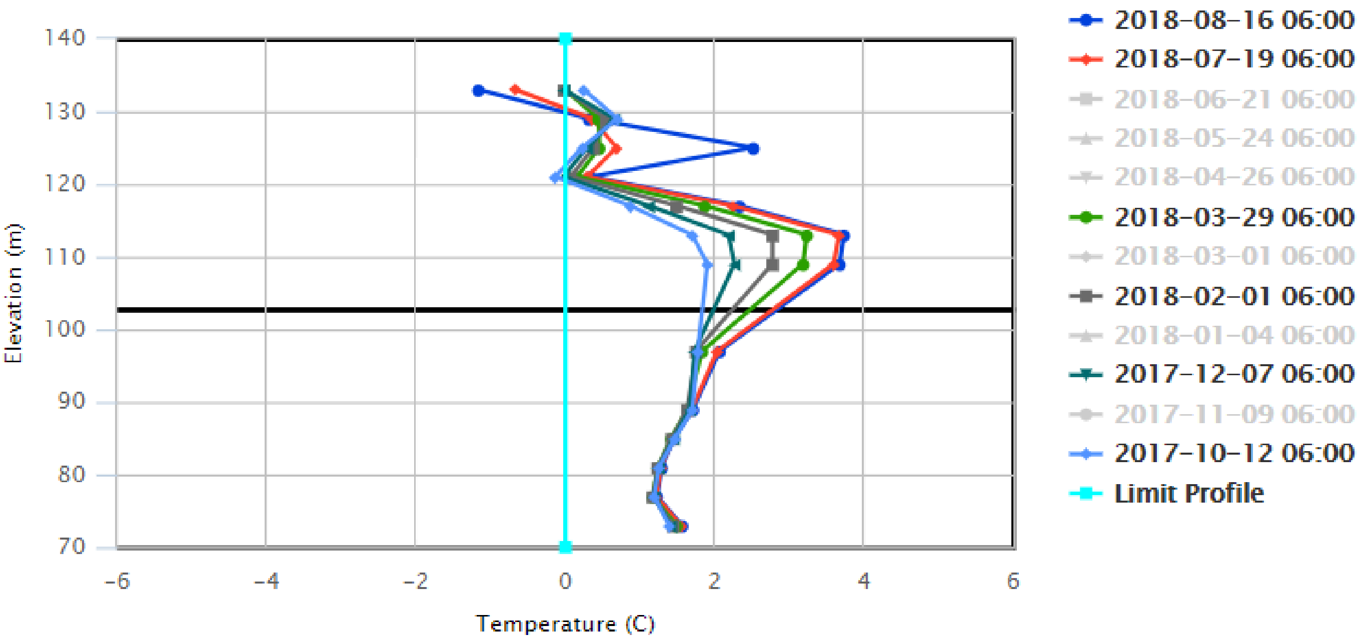
THERMISTOR 850-P1

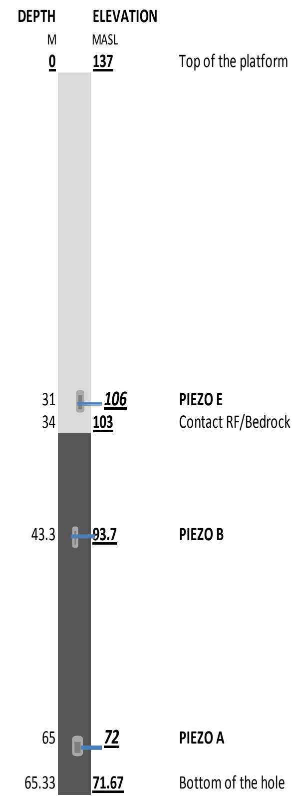
- Temperature above 0º C in bedrock at 850-P1
- General temperature rising since the end of 2017
- Peak of temperature at El.125 MASL



STA 850 Instrumentation

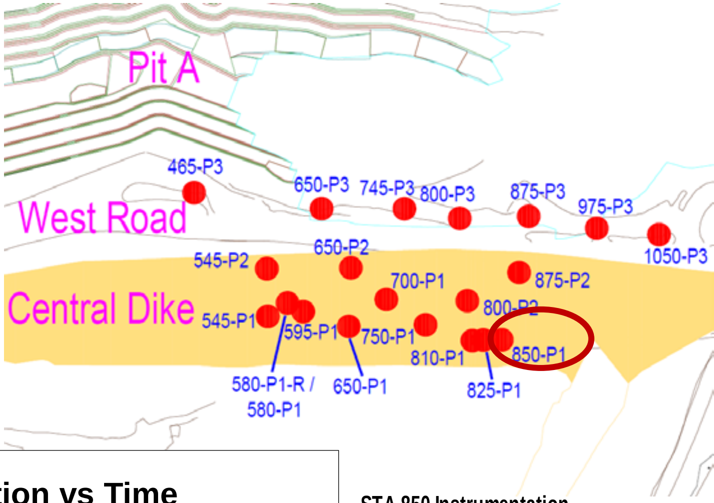
12 – CD – 850 – P1

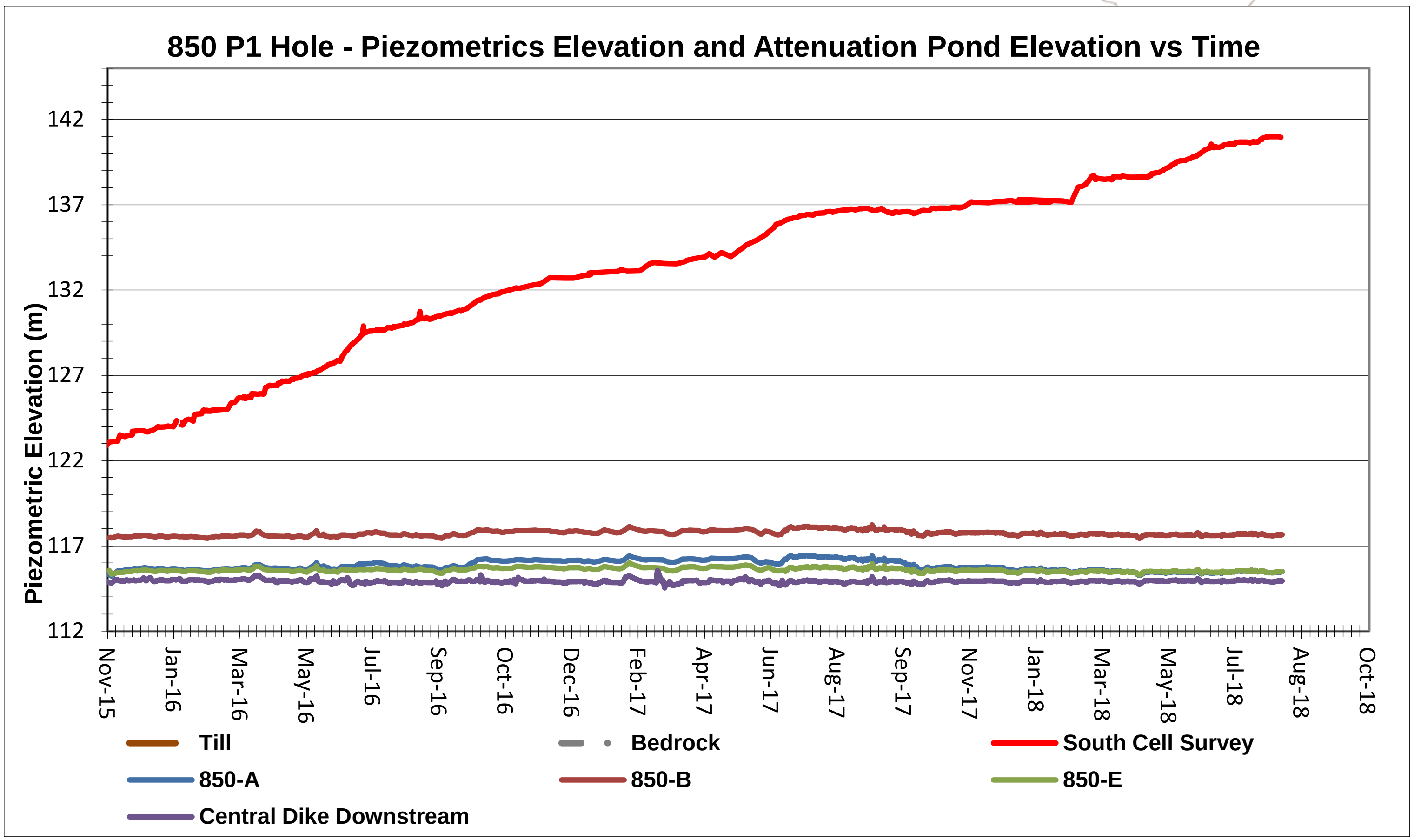


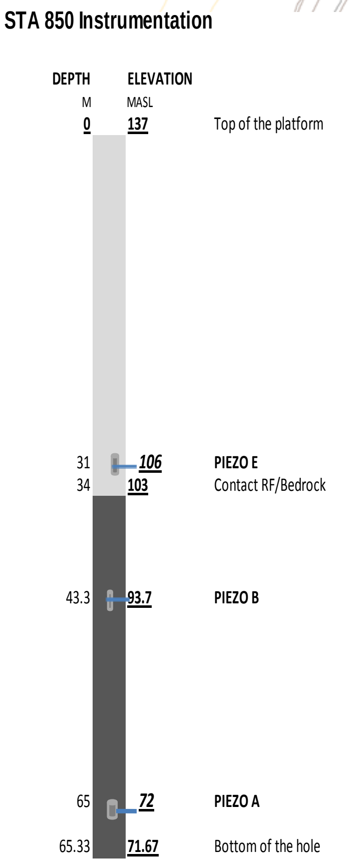


PIEZOMETER 850-P1

- All piezometer are following the trend of the D/S pond regime
- However piezo B is one of the highest in the piezometer readings that have stable reading (117.7m)

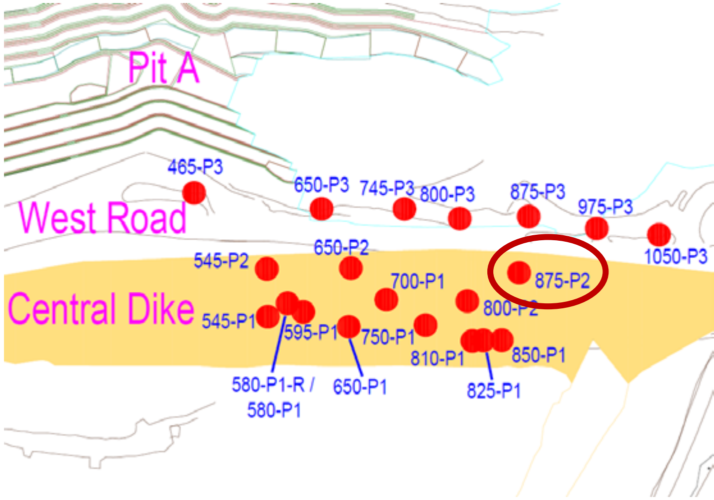


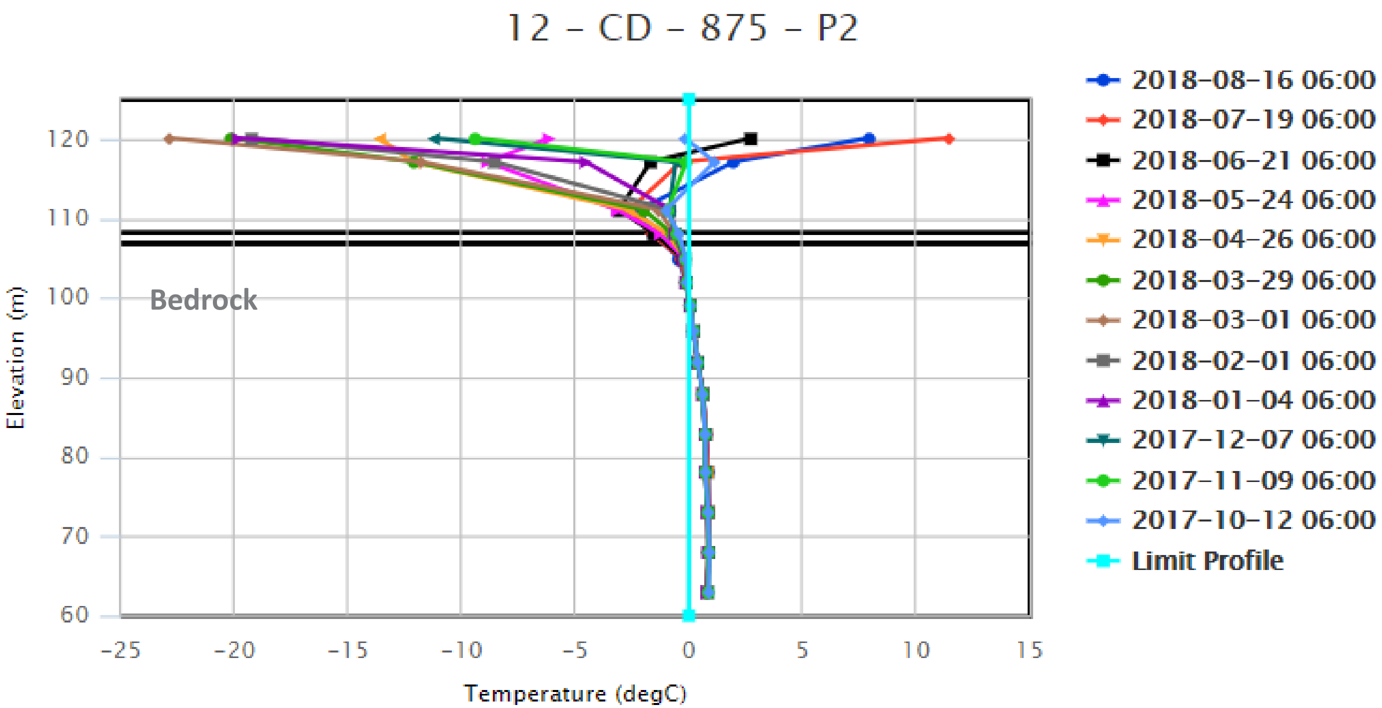




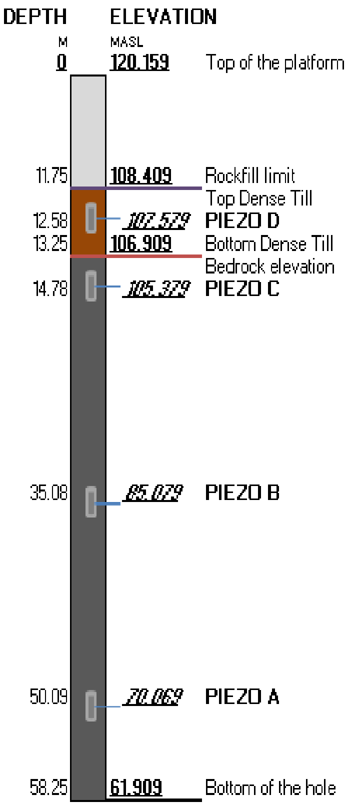
THERMISTOR 875-P2

- New thermistor installed in 2017
- Bedrock temperature above 0º C



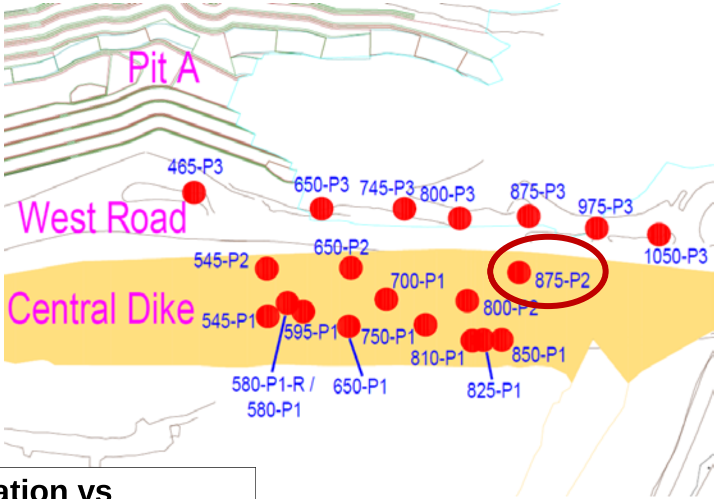


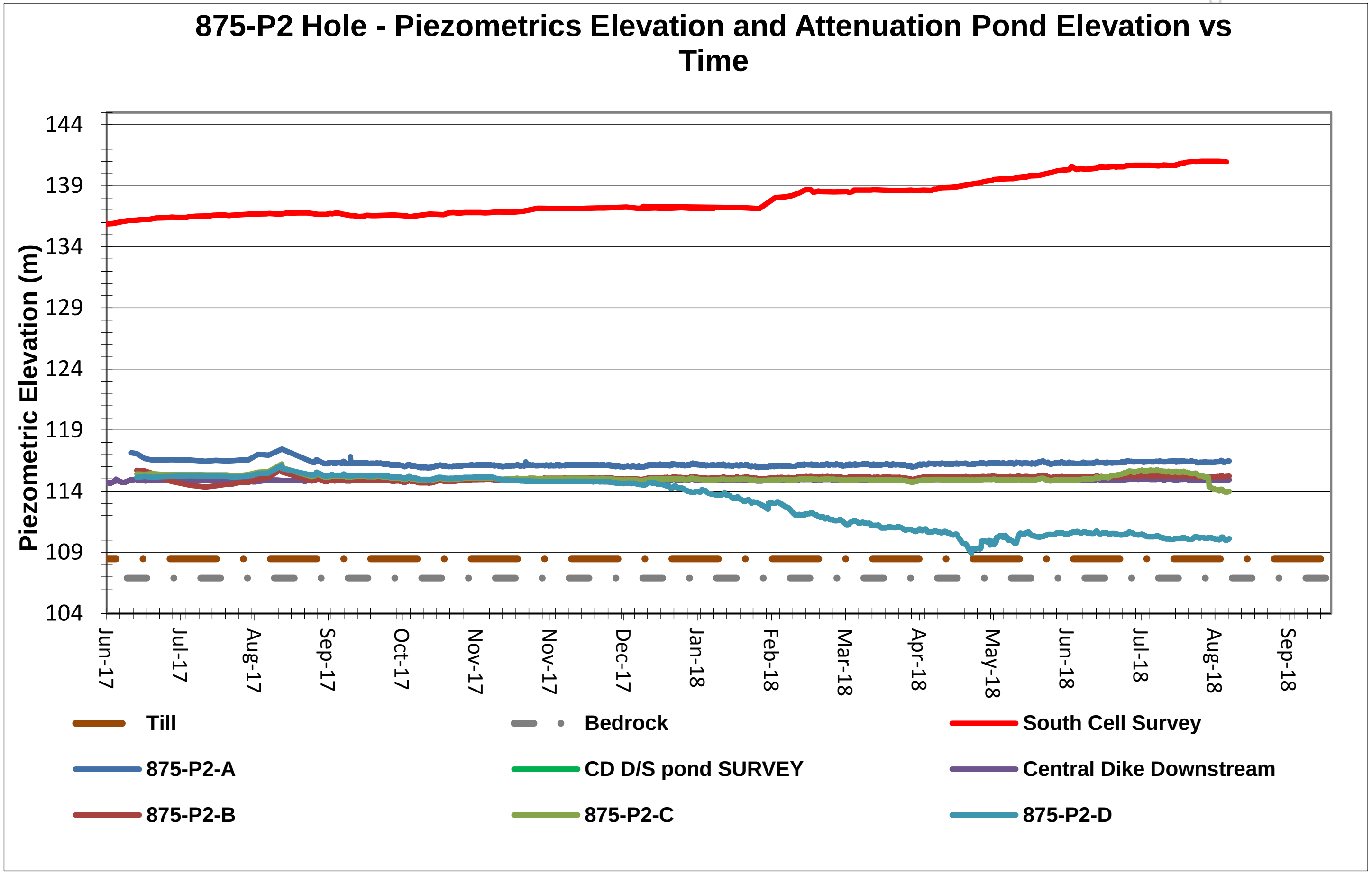
DH 875-P2 Instrumentation

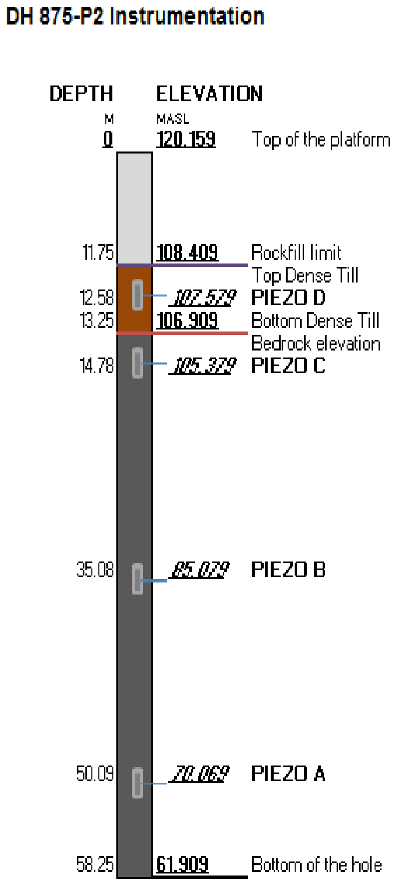


PIEZOMETER 875-P2

- All piezometer are following the trend of the D/S pond regime
- PZ-D show temperatures under the freezing point

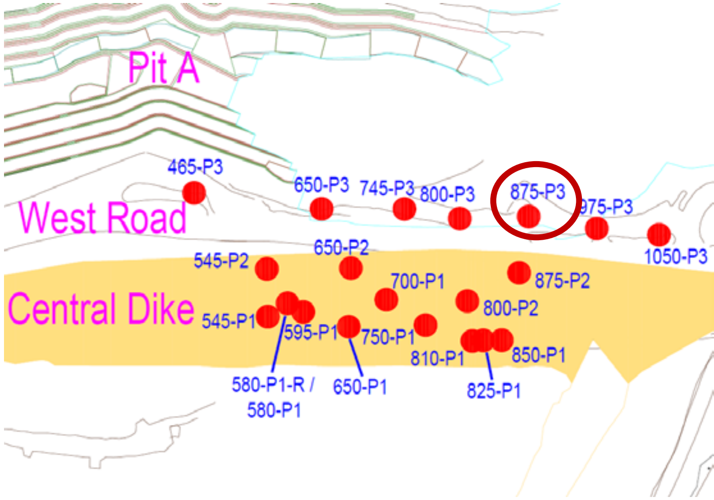


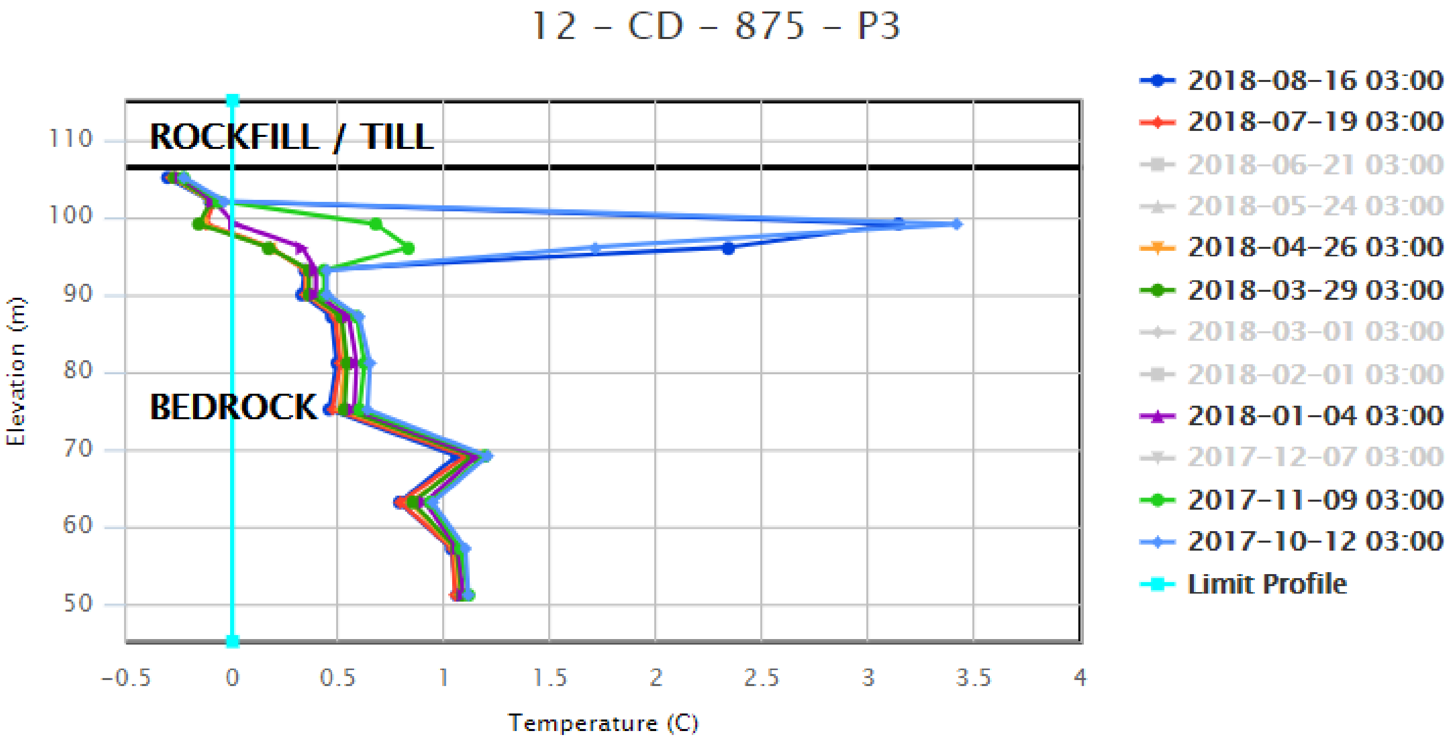


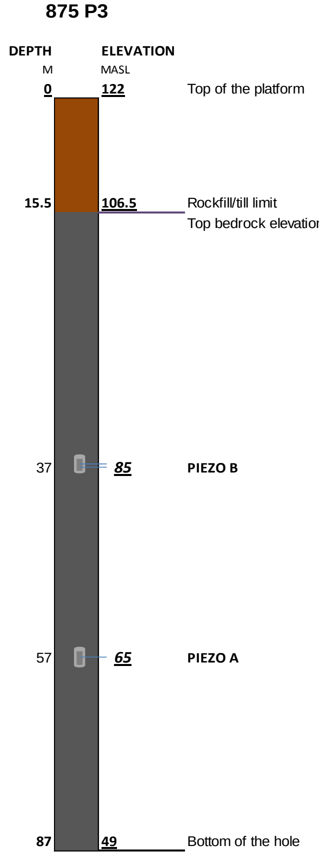


THERMISTOR 875-P3

- Temperature above 0º C in bedrock at 875-P3
- Temperature spike at El.96 m and 99 m are realted to capicitance effect.

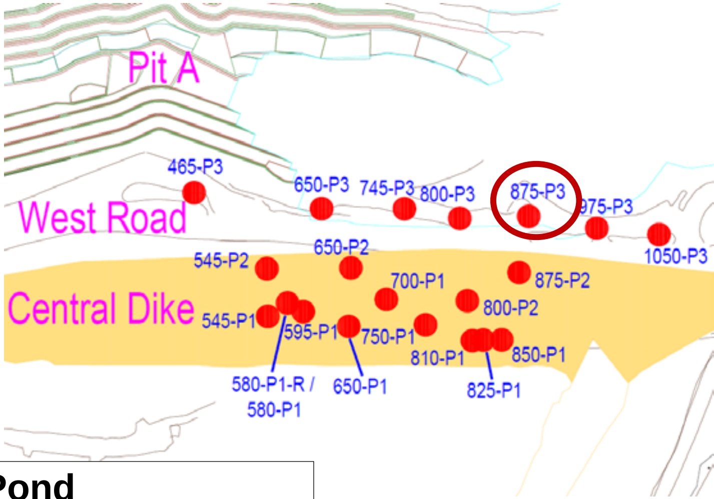


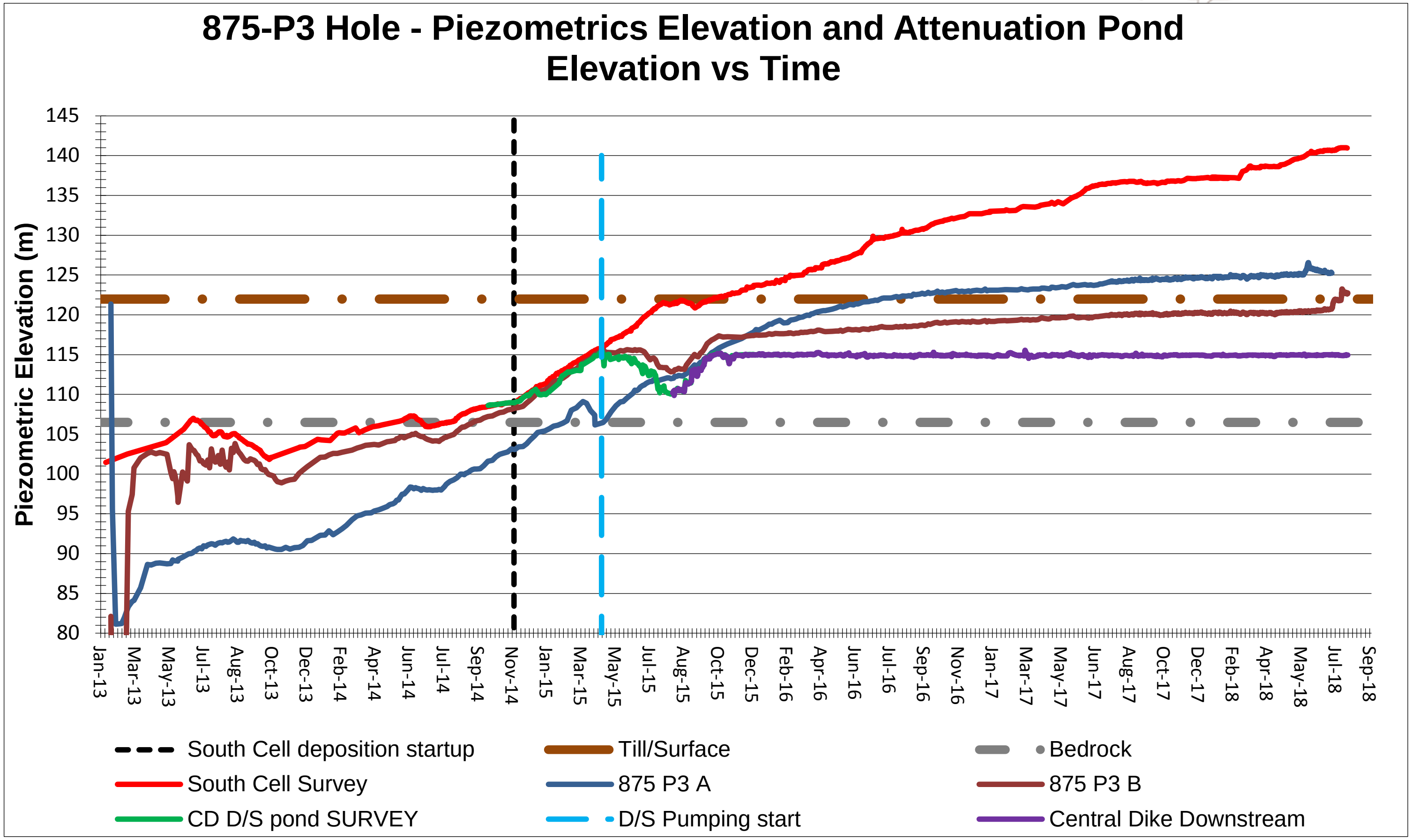


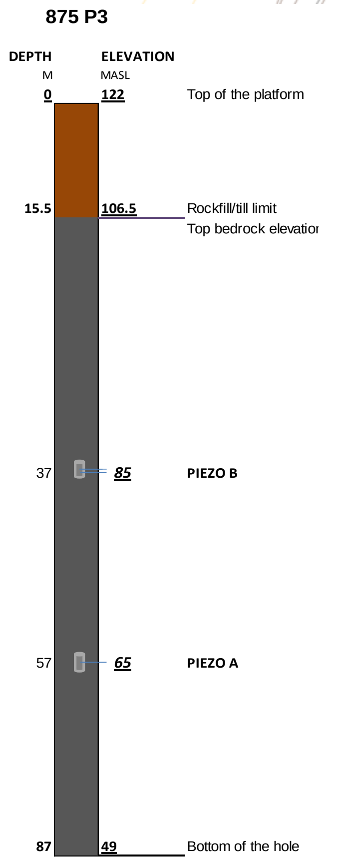


PIEZOMETER 875-P3

- Piezometer at 875-P3 are in bedrock and are impacted by increase in South Cell head

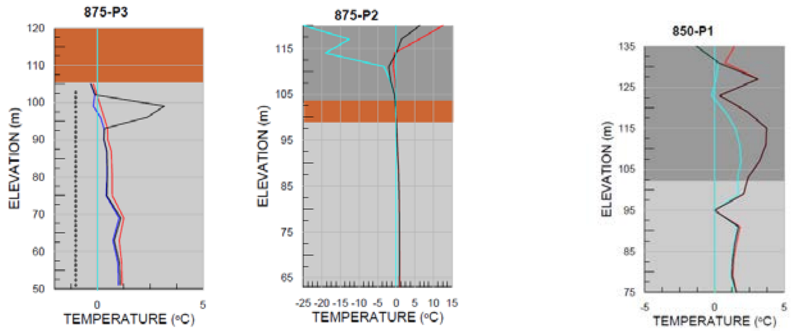


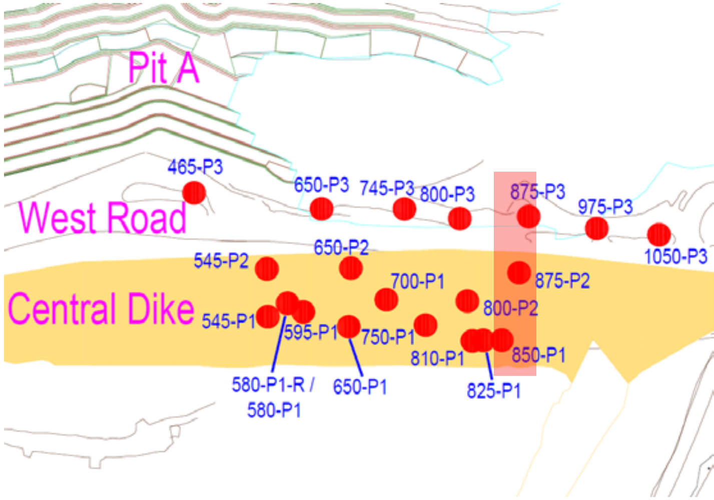




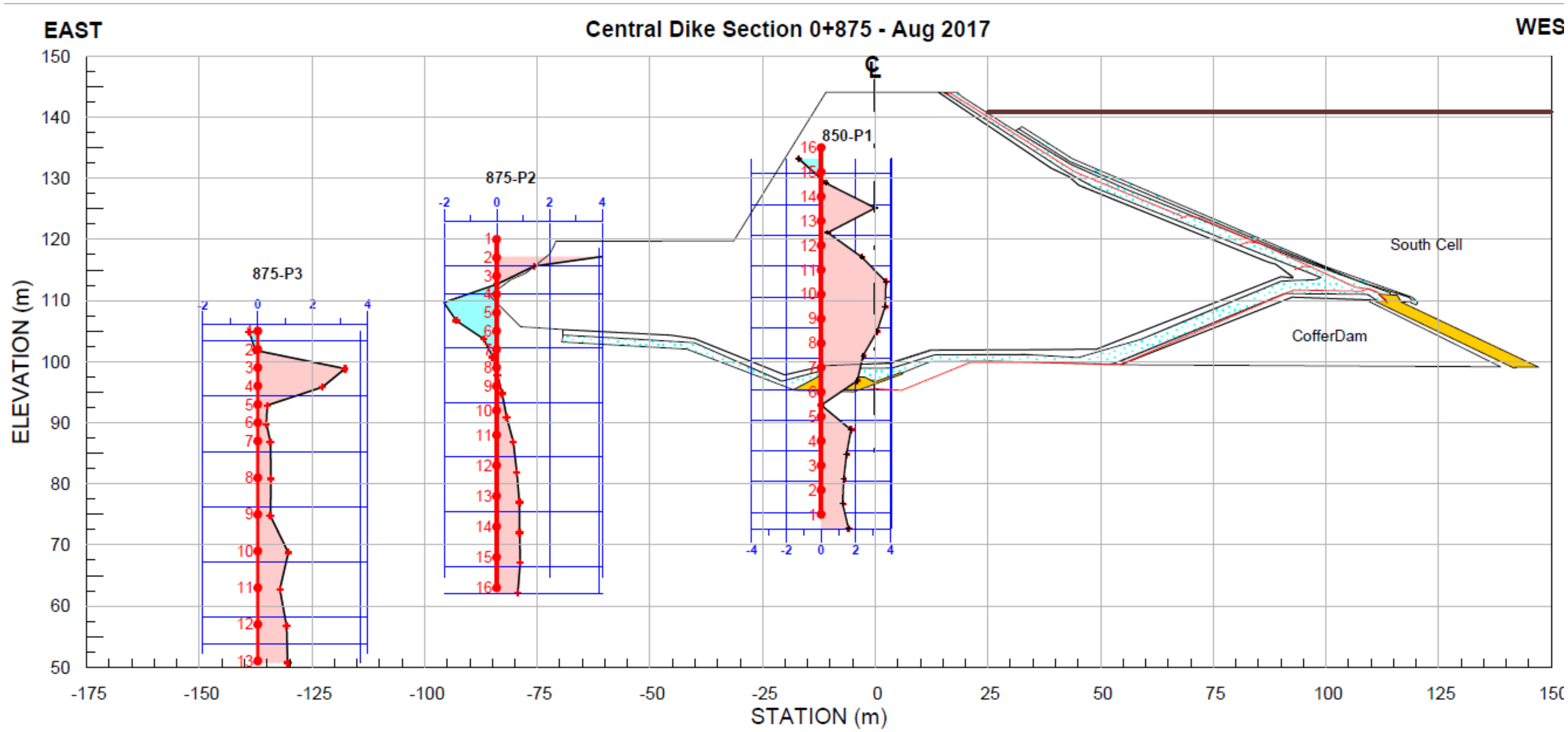
SECTION 850-875

THERMISTOR READINGS FROM AUGUST 2017 - 2018



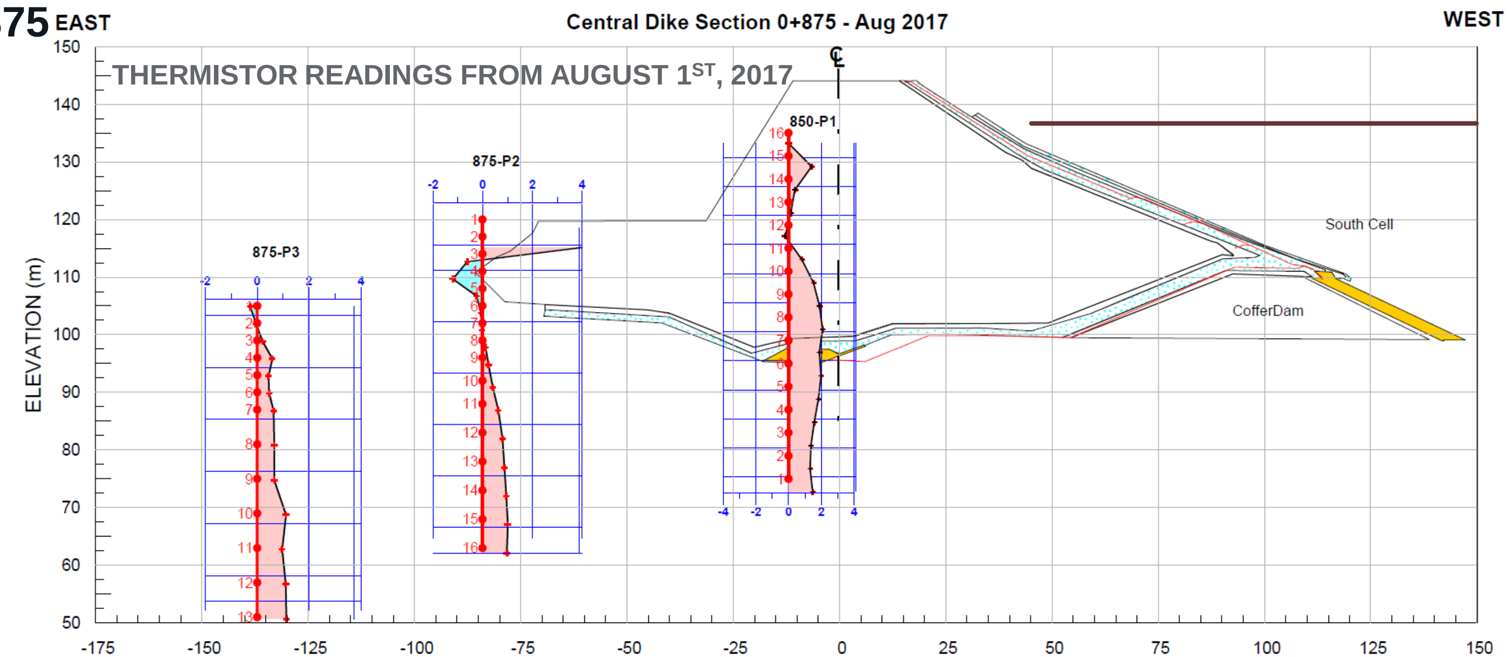


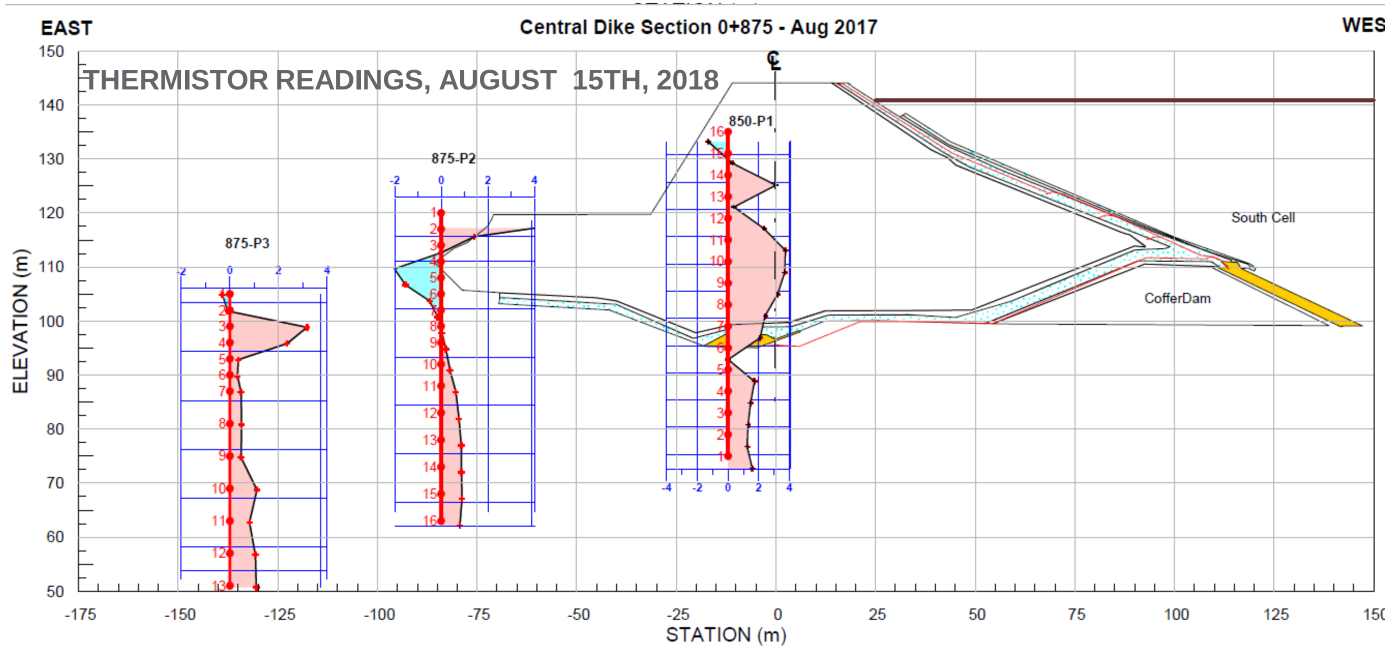
THERMISTOR READINGS AUGUST 15TH, 2018



Readings on August 15th, 2018

SECTION 850-875

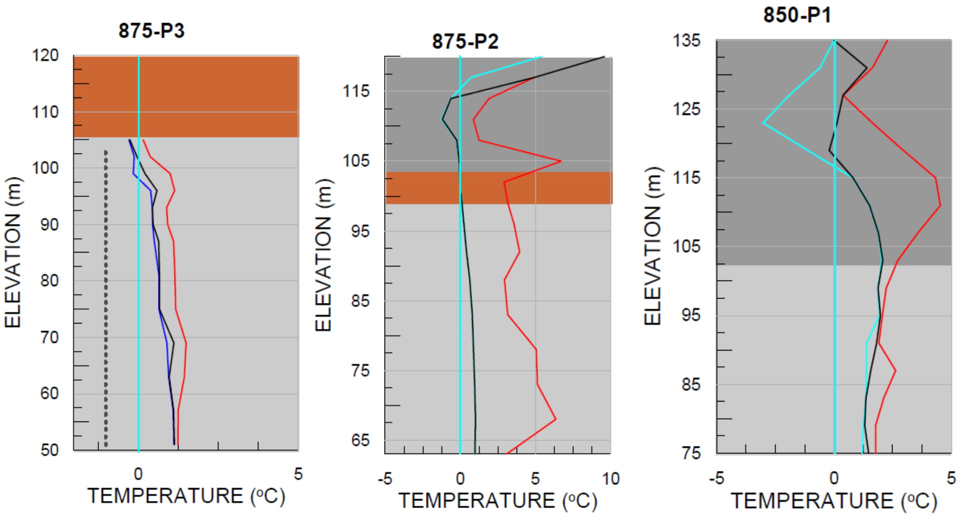




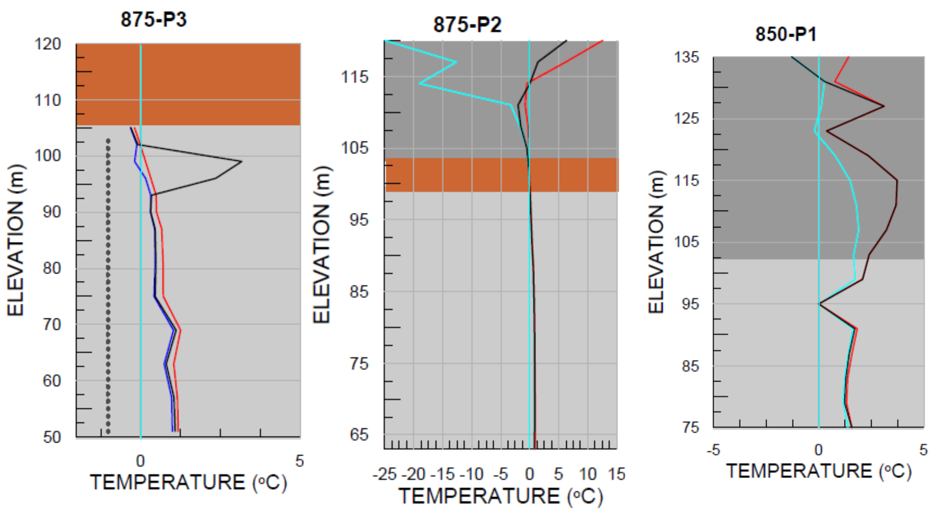
Readings on August 15th, 2018

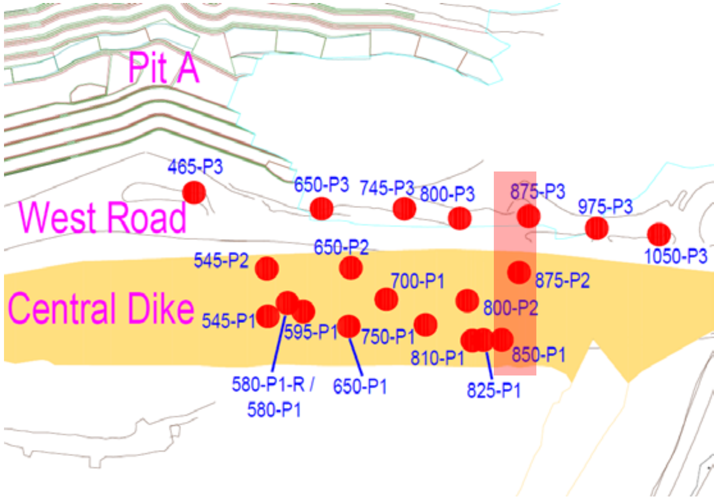
SECTION 850-875

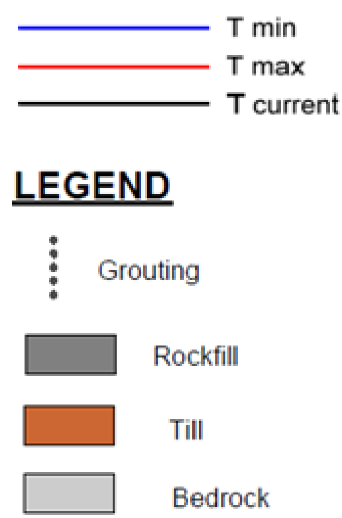
THERMISTOR READINGS AUGUST 2016-2017



THERMISTOR READINGS AUGUST 2017-2018



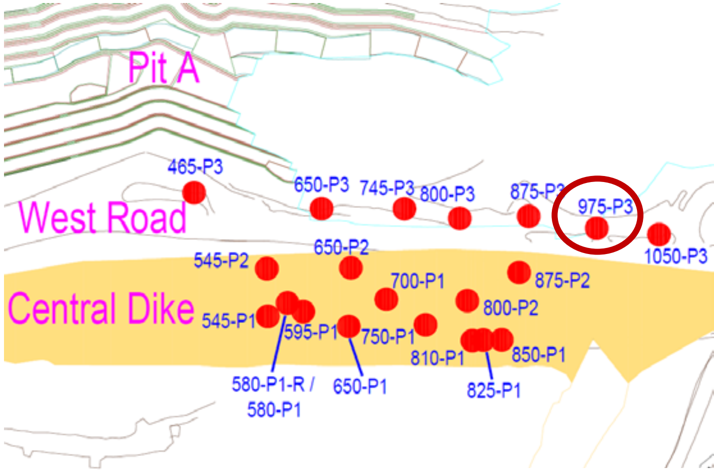


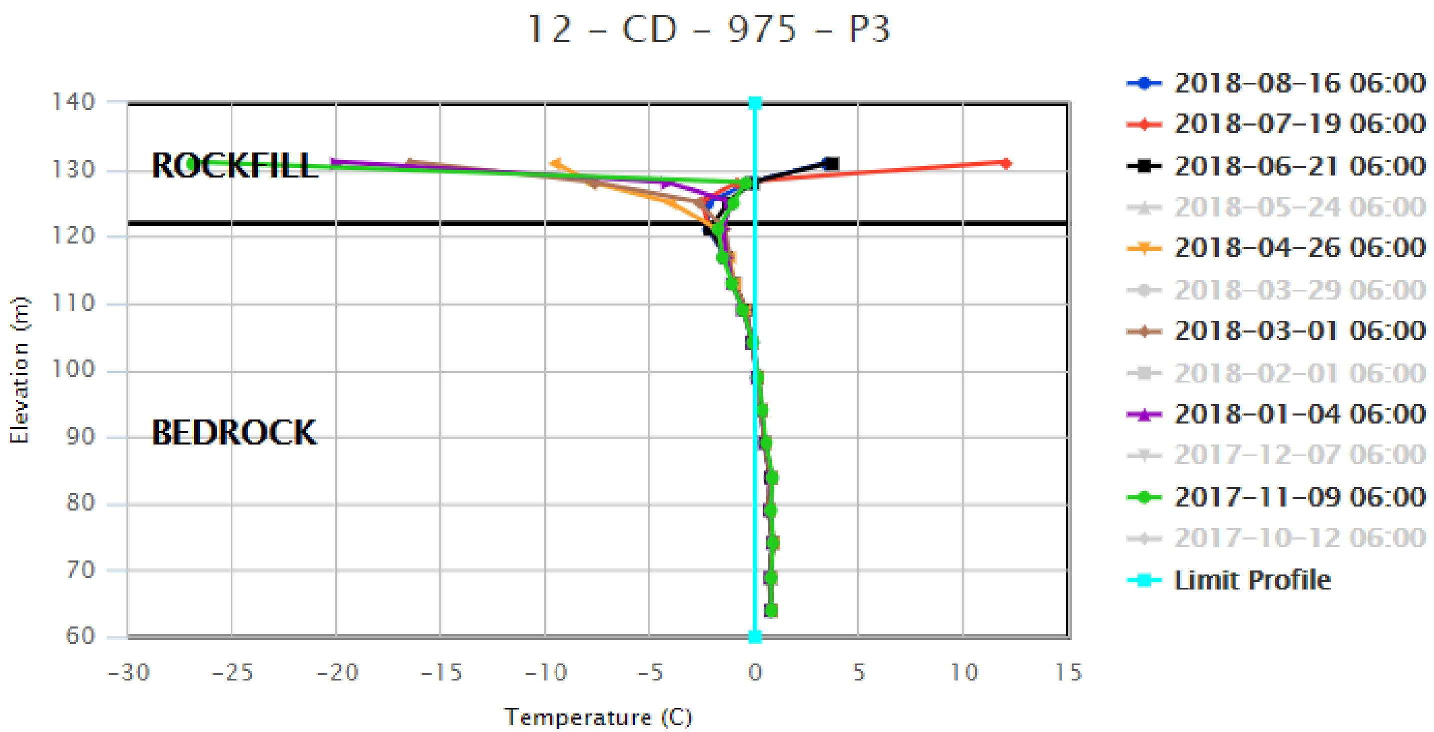


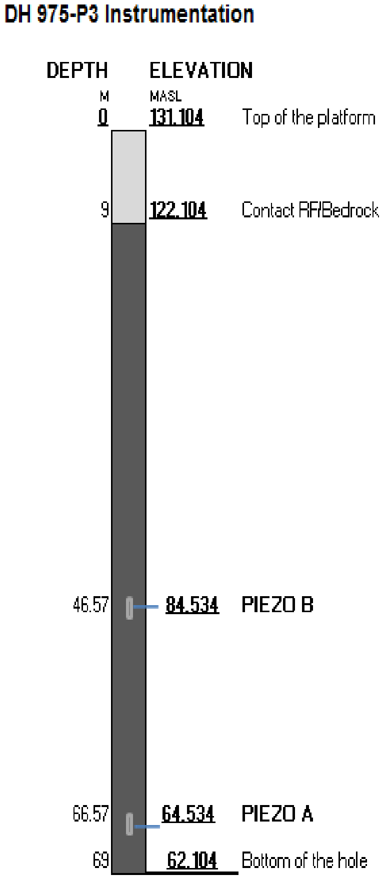
2018 graph are showing the good representation of the bedrock/till/rockfill units

THERMISTOR 975-P3

- New instrument installed in 2017
- Temperature above 0º C in bedrock below El. 105 m

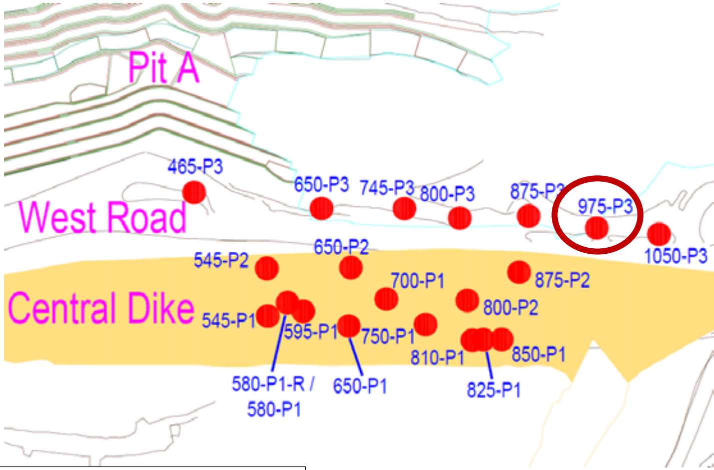


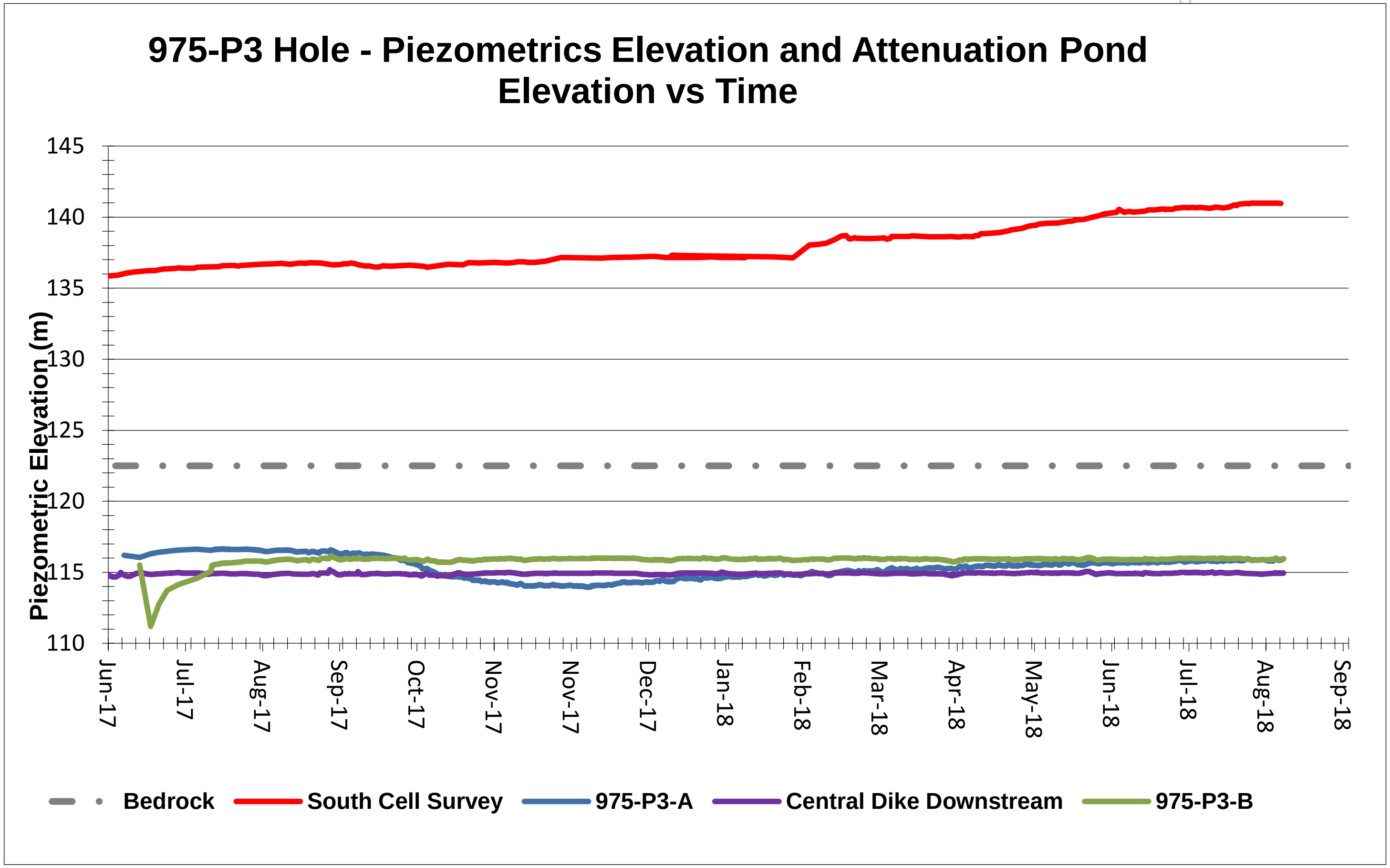


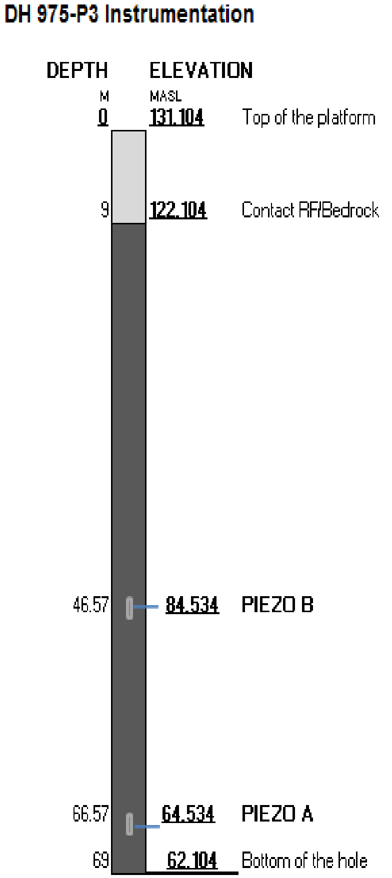


PIEZOMETER 975-P3

- New instrument installed in 2017
- Both piezometers are following the trend of the D/S pond regime

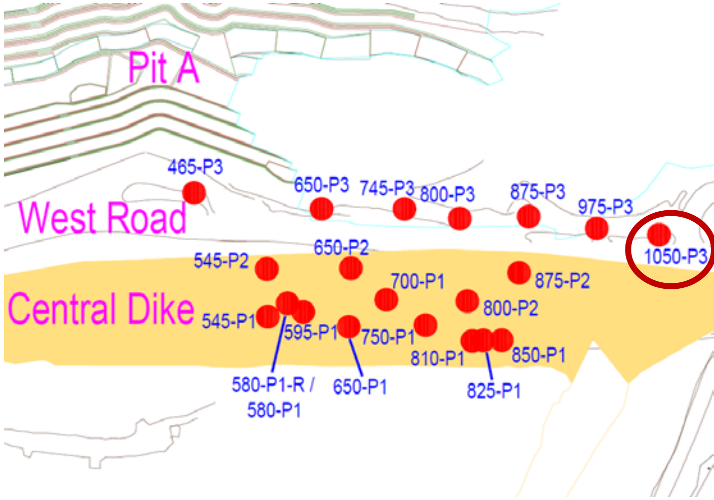


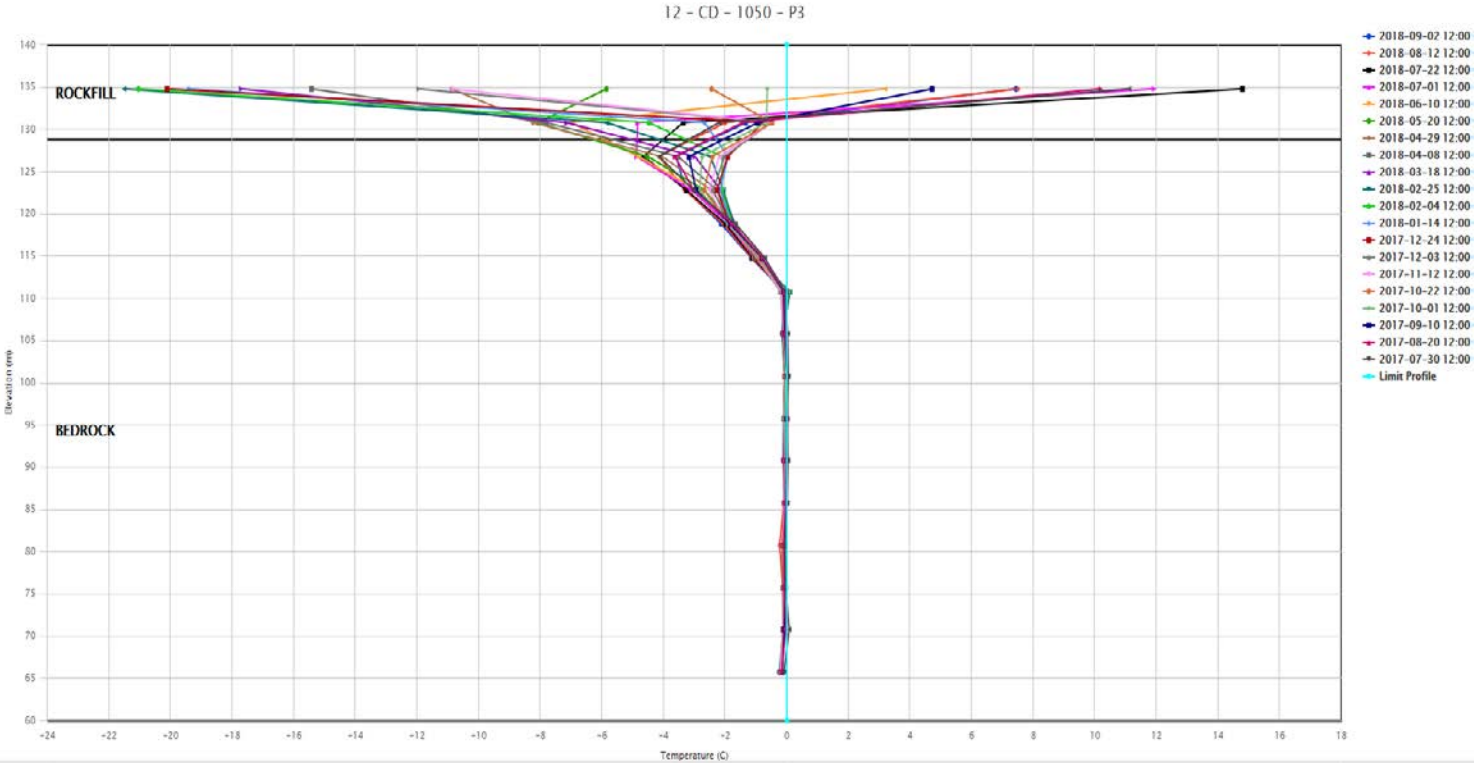


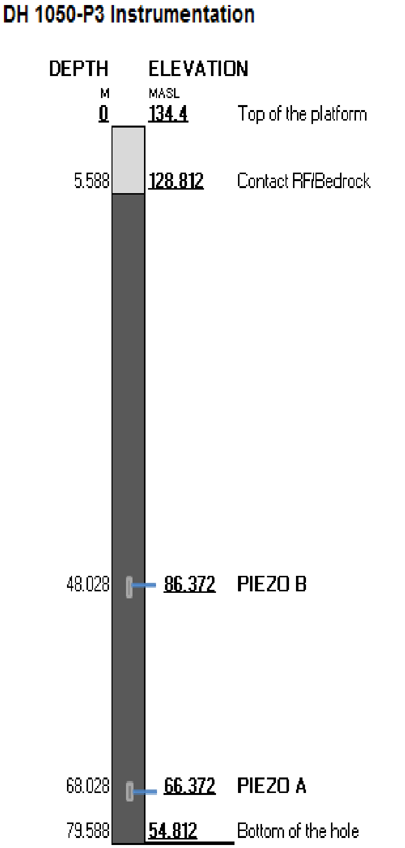


THERMISTOR 1050-P3

- Temperature at 0º C in bedrock

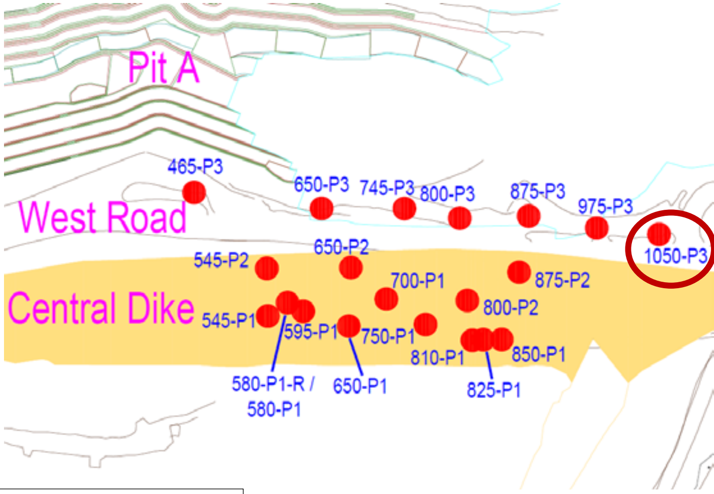


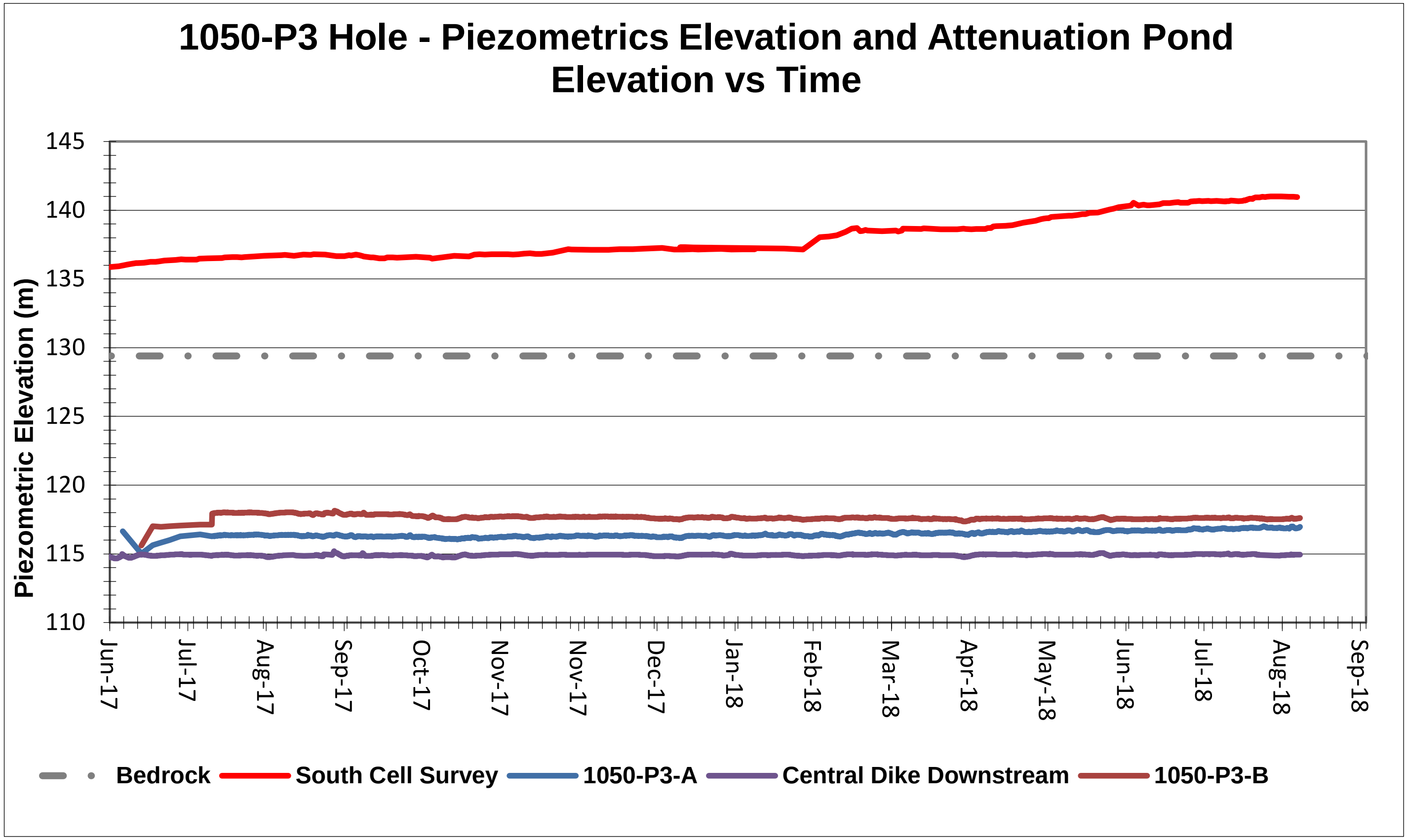


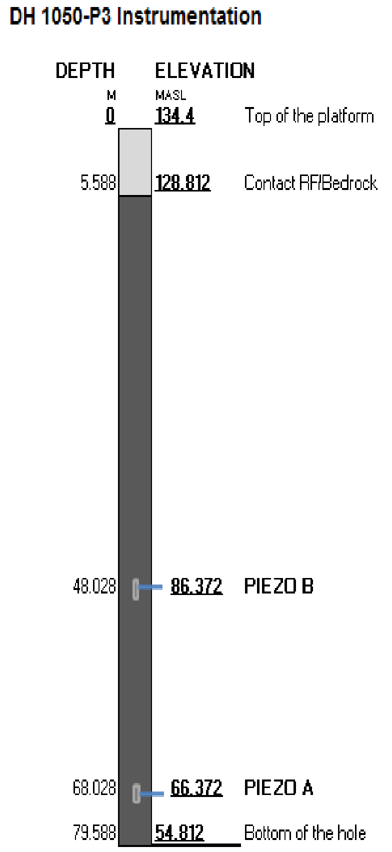


PIEZOMETER 1050-P3

- Piezometers temperature just below the freezing point
- Piezometers are following the trend of the D/S pond elevation.



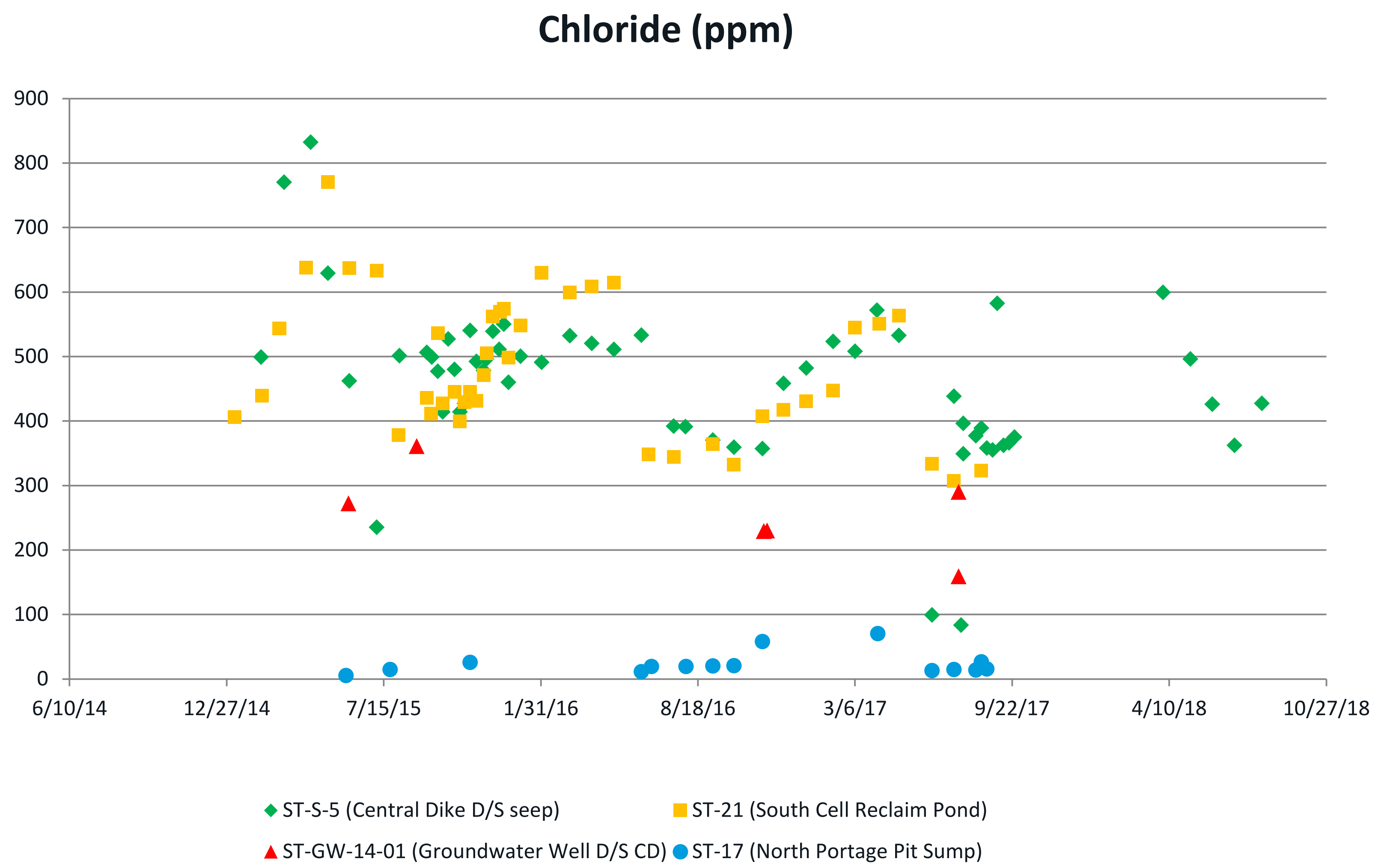




THANK YOU

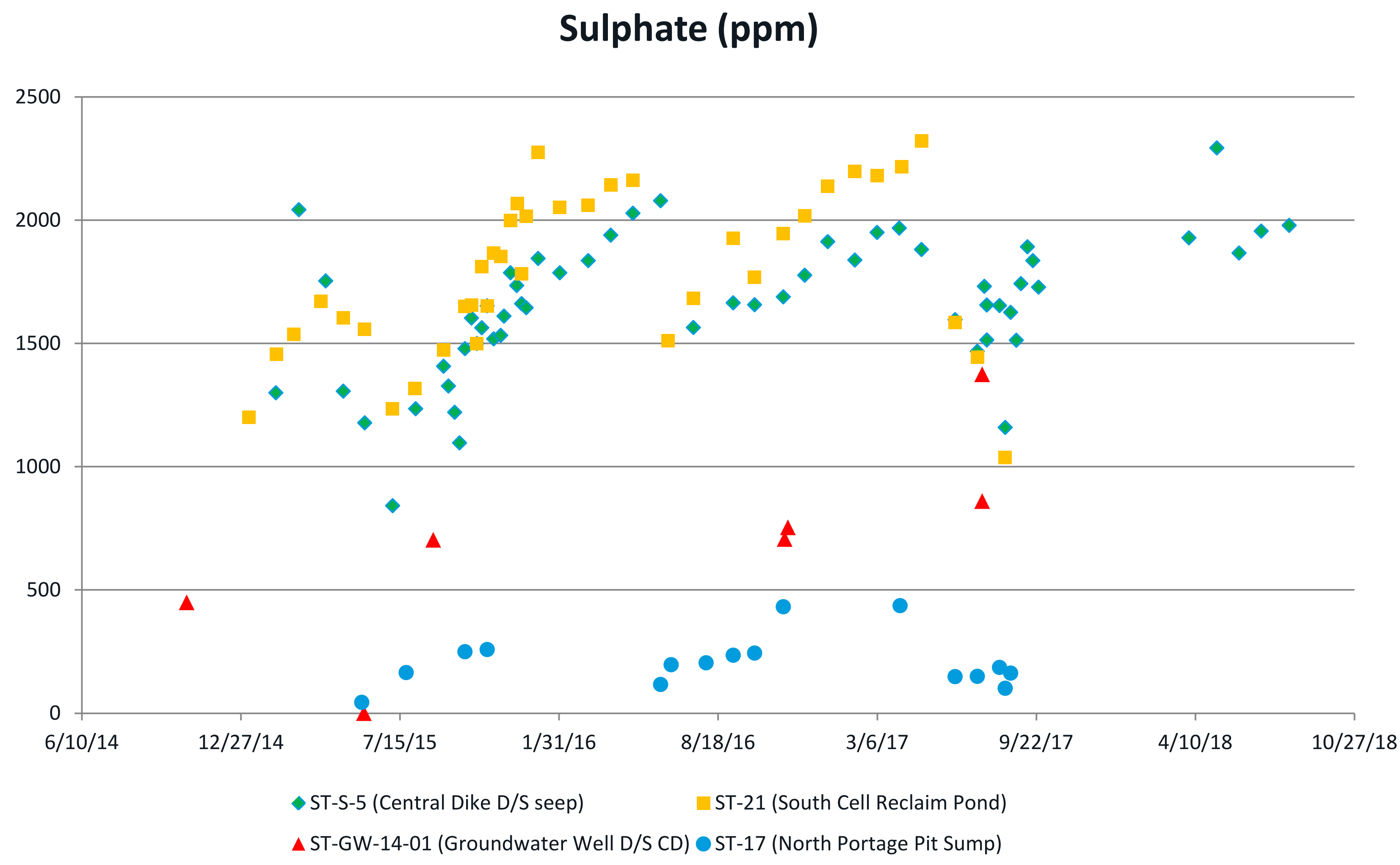
WATER ANALYSIS

CHLORIDE



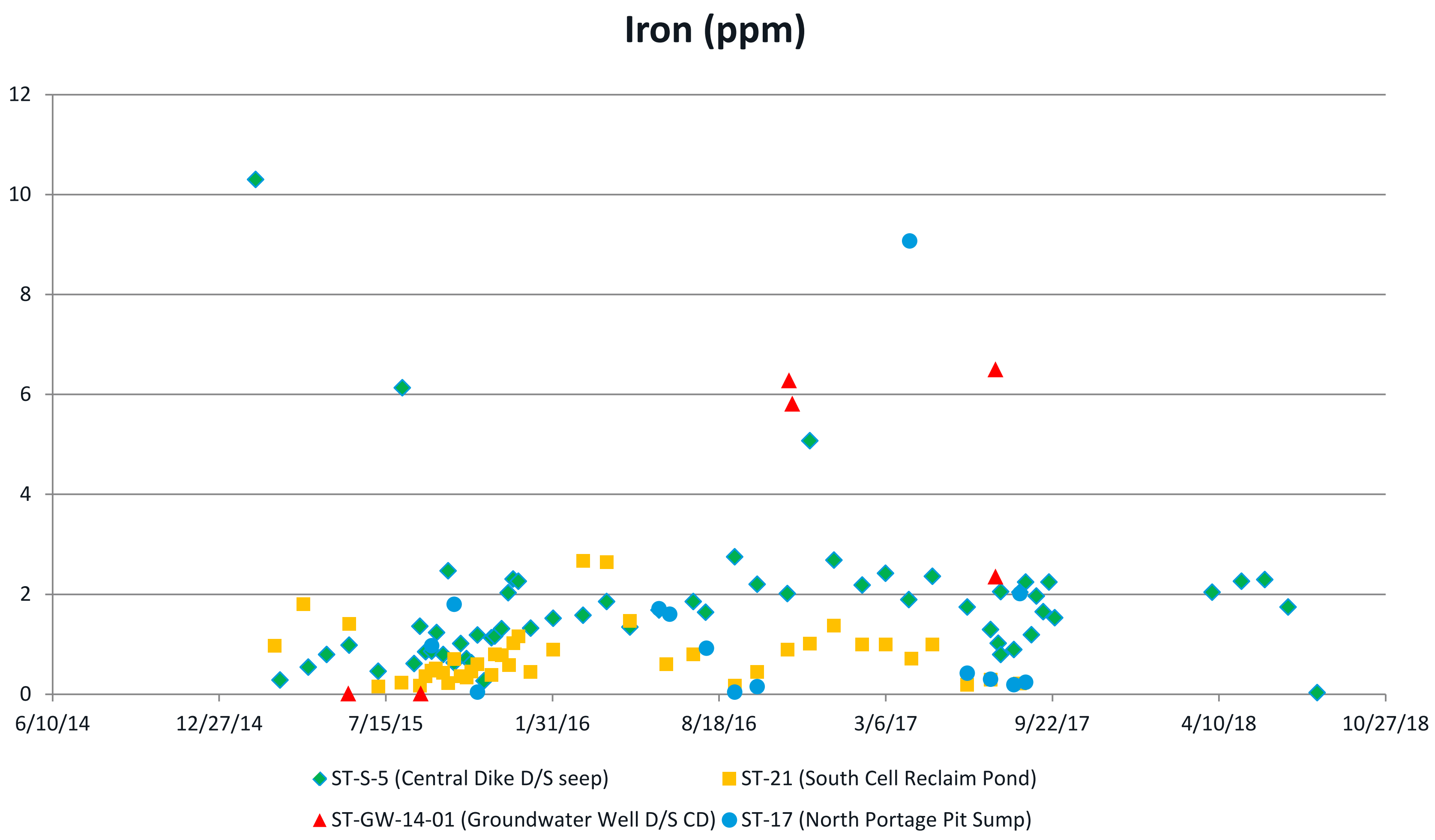
WATER ANALYSIS

SULFATE



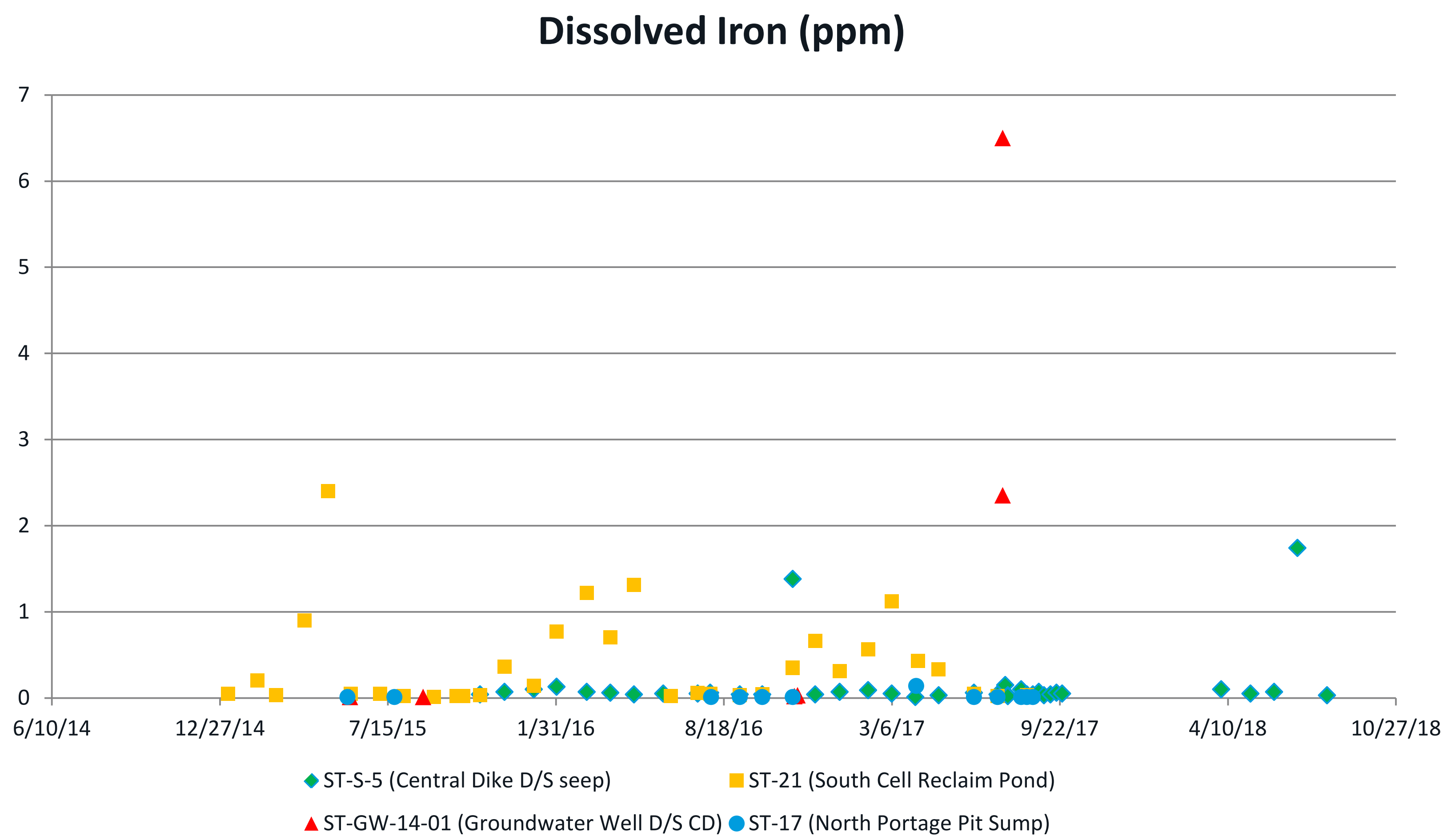
WATER ANALYSIS

IRON



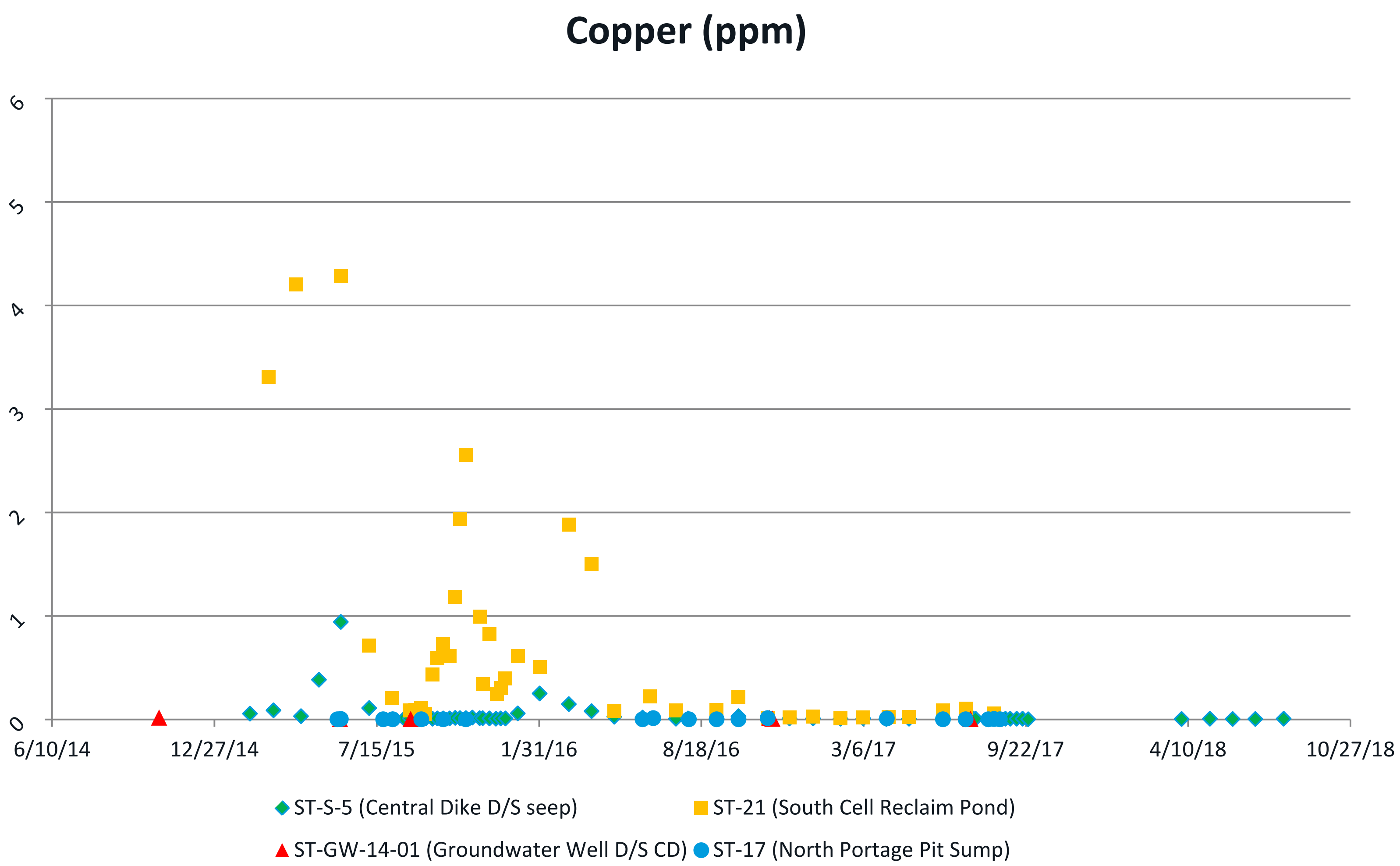
WATER ANALYSIS

DISSOLVED IRON



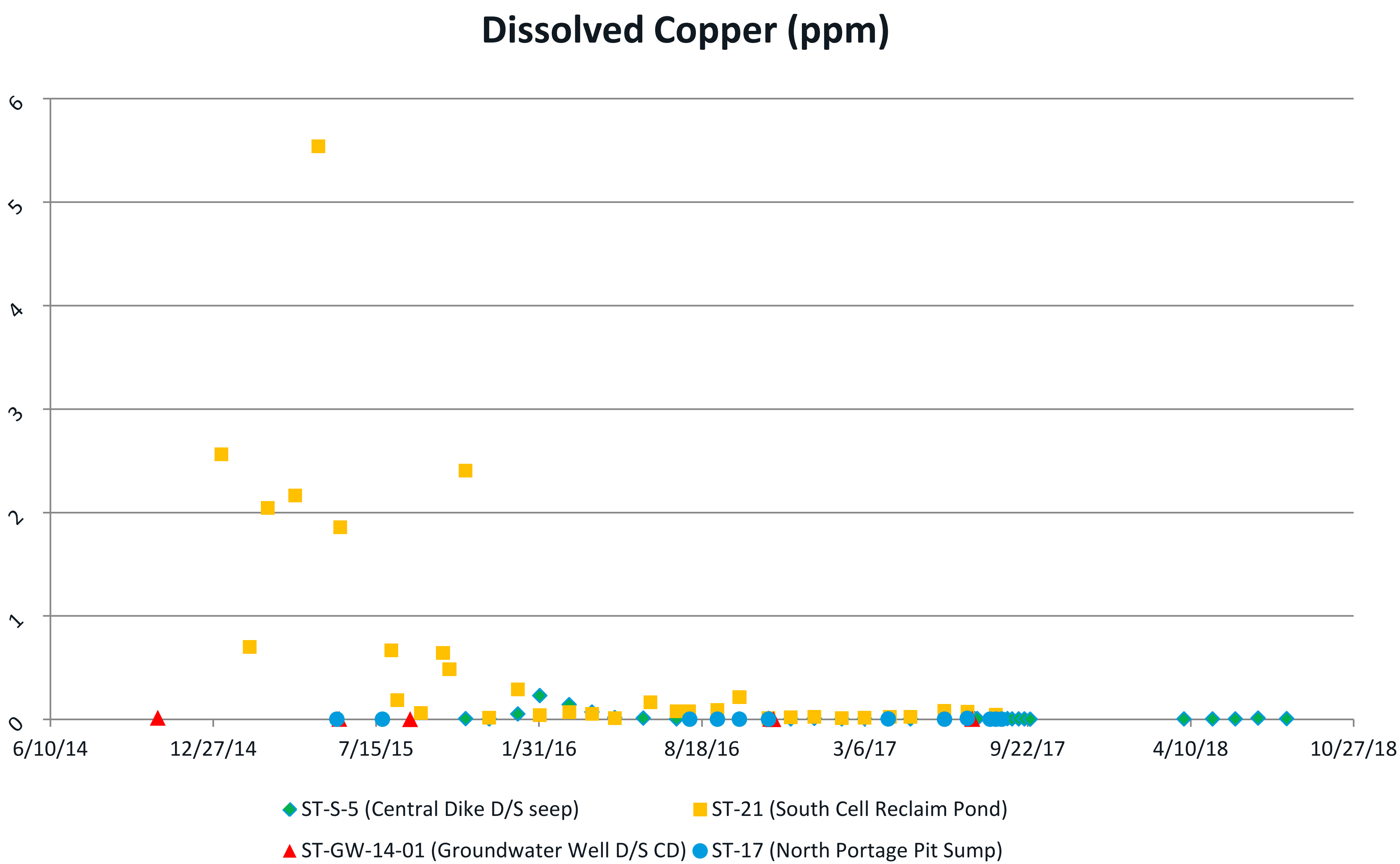
WATER ANALYSIS

COPPER



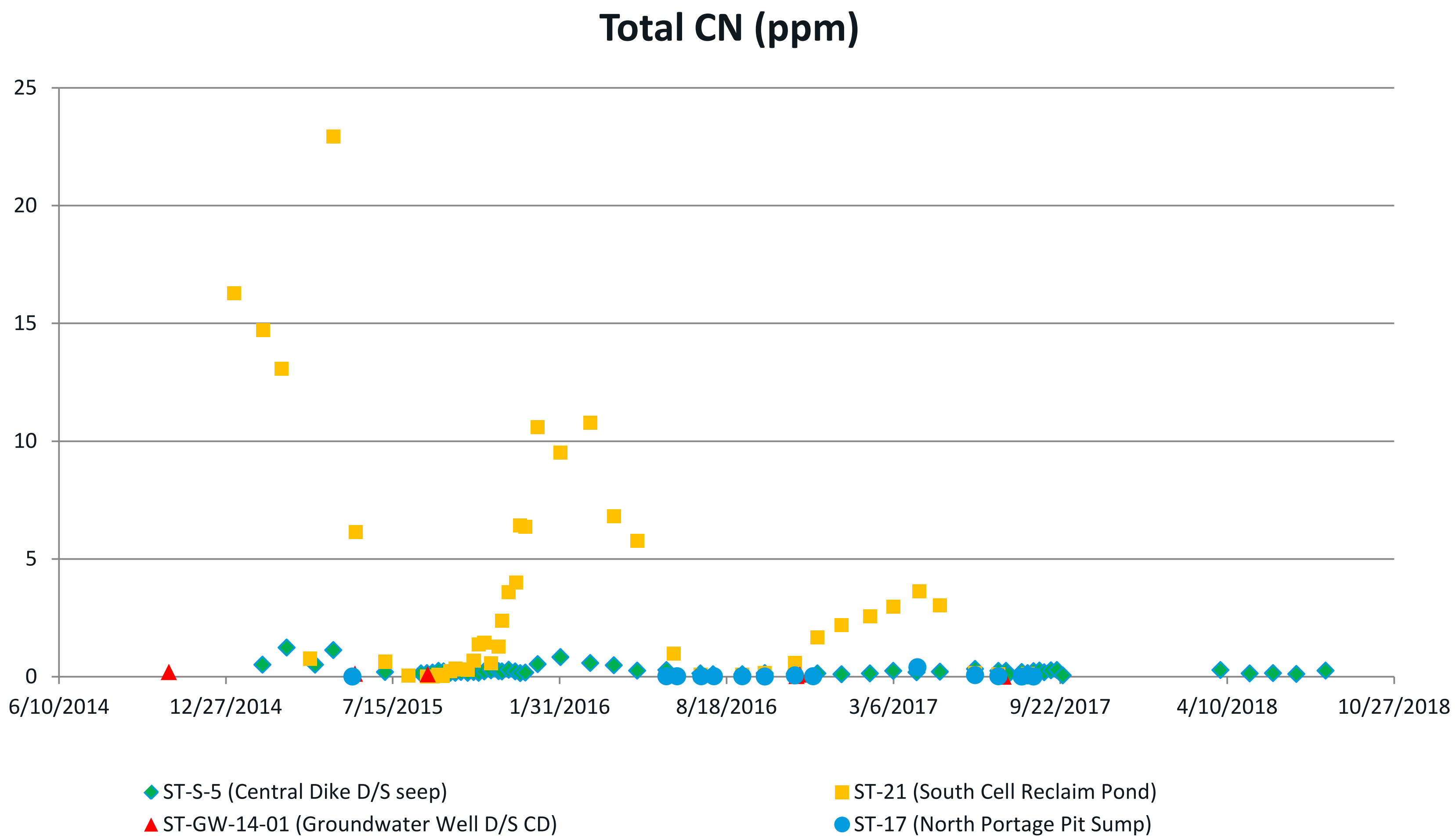
WATER ANALYSIS

DISSOLVED COPPER



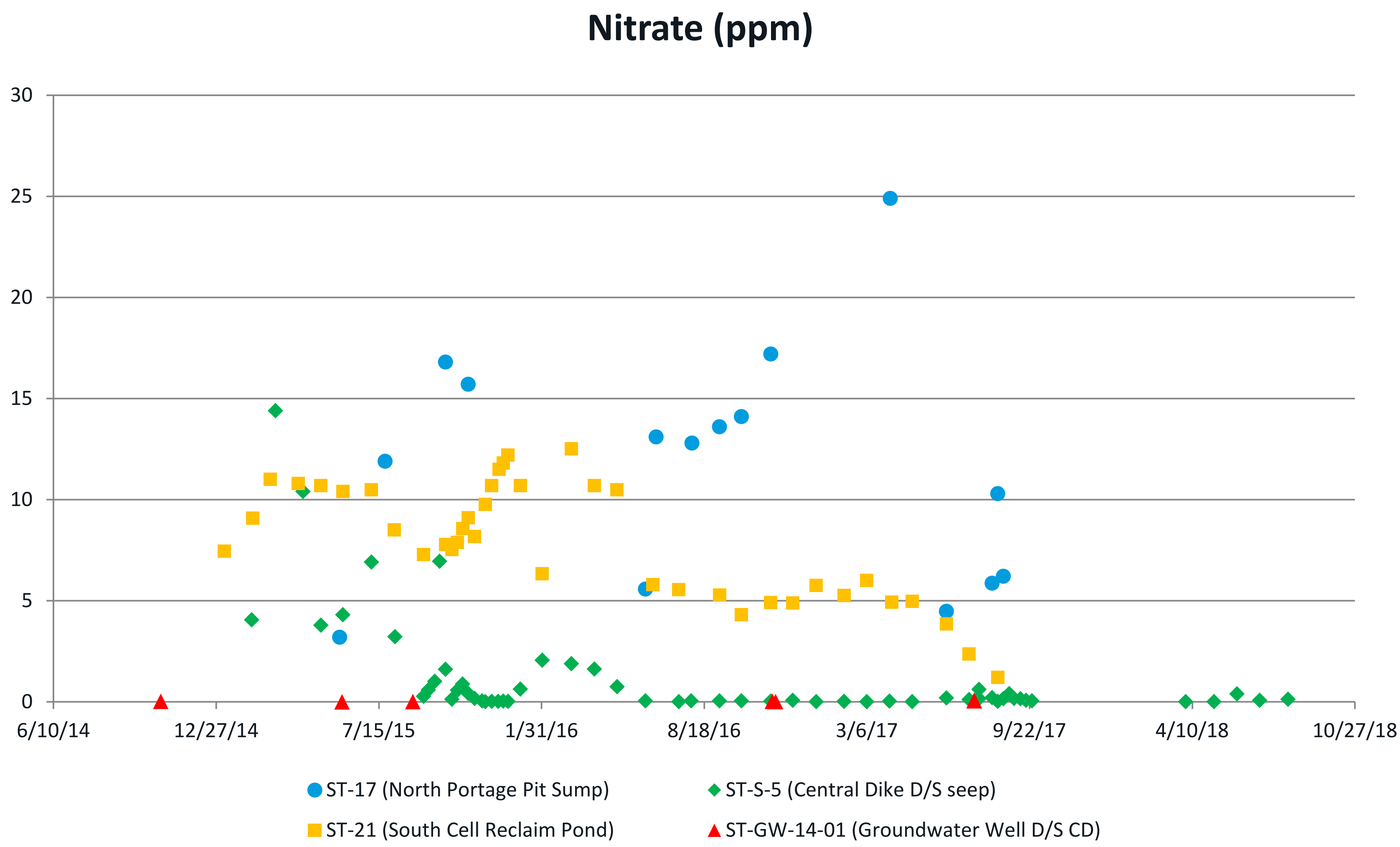
WATER ANALYSIS

CYANIDE



WATER ANALYSIS

NITRATE



WATER ANALYSIS

ARSENIC

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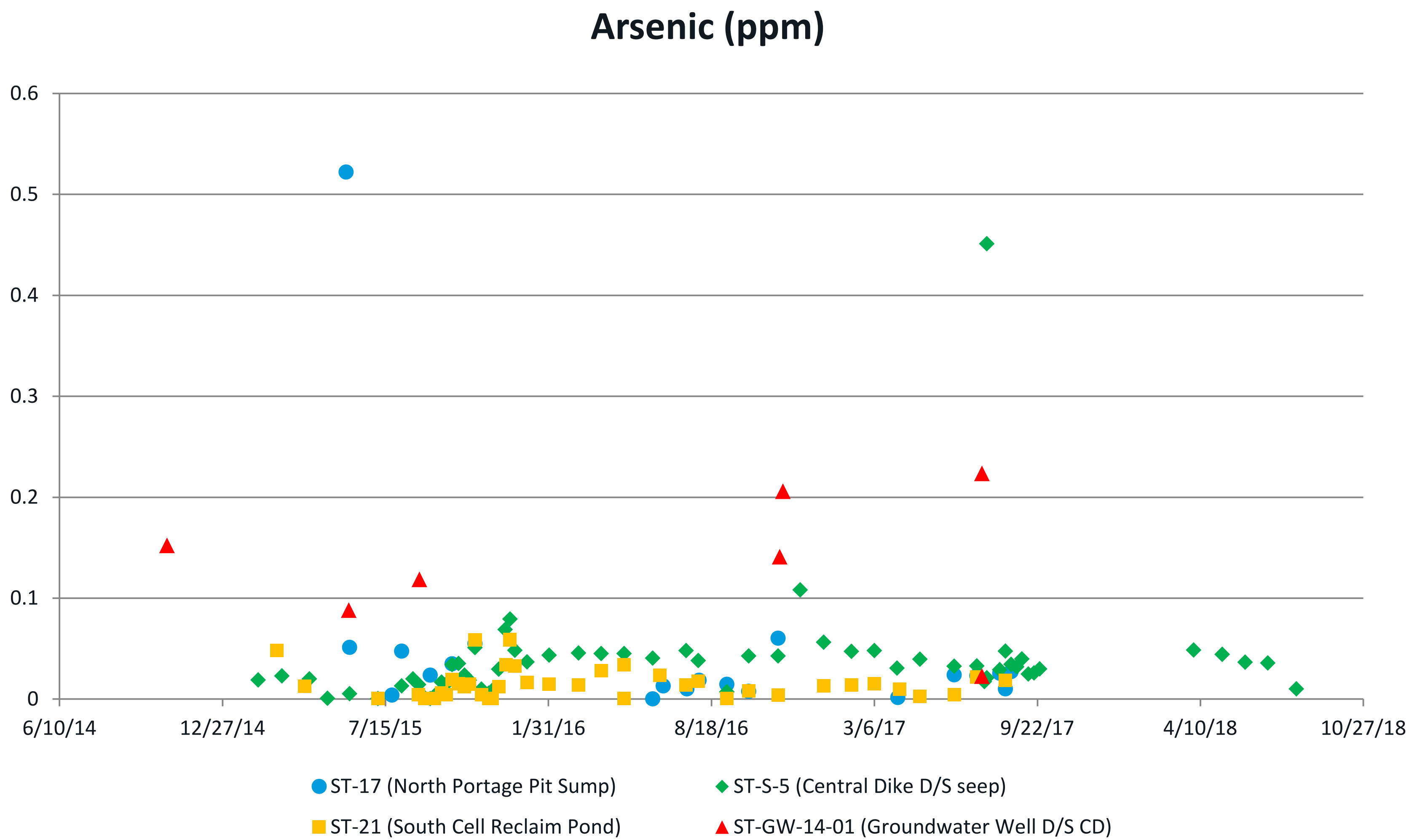
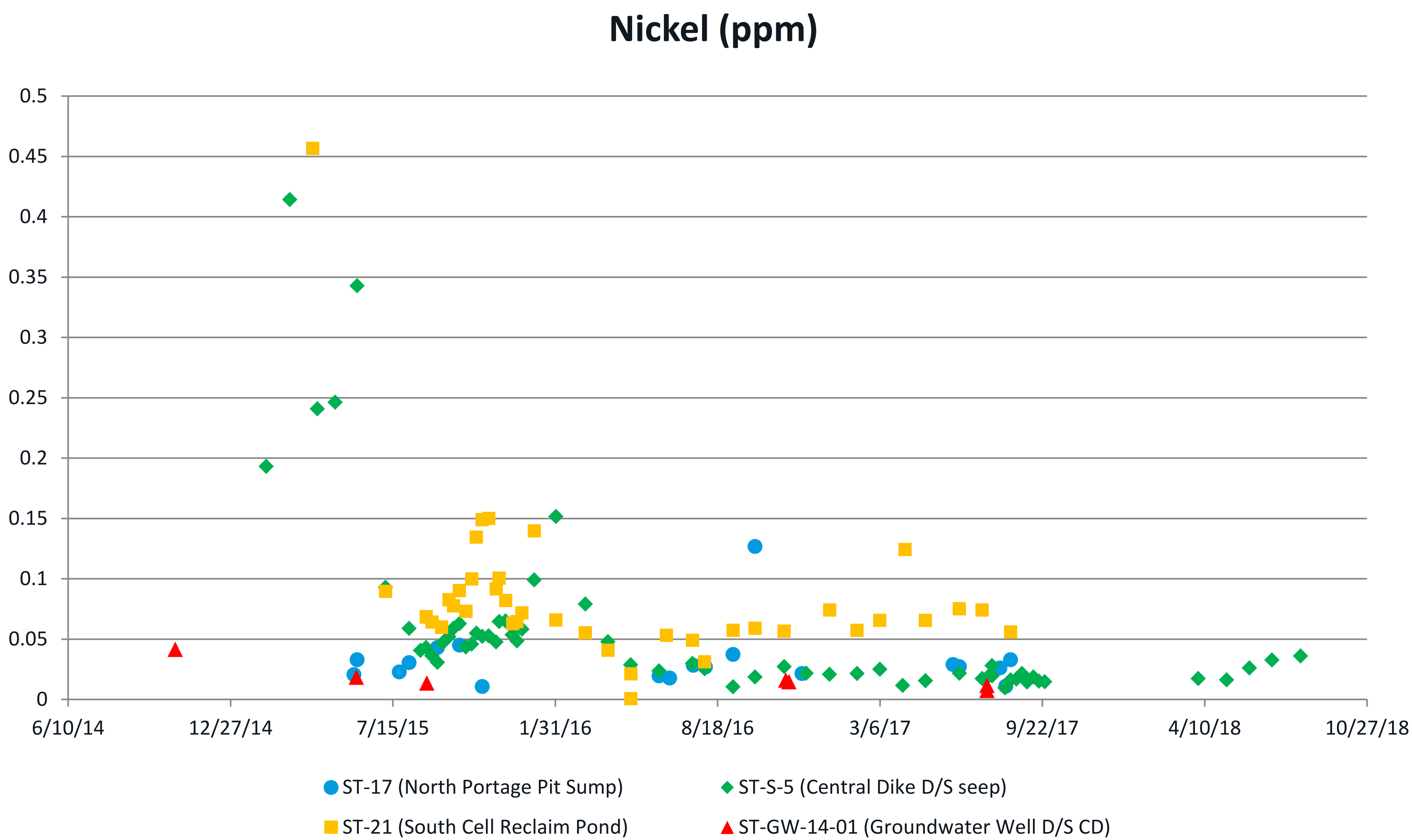


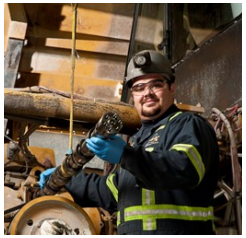
WATER ANALYSIS

ARSENIC



APPENDIX C3

TSF North Cell Instrumentation Data



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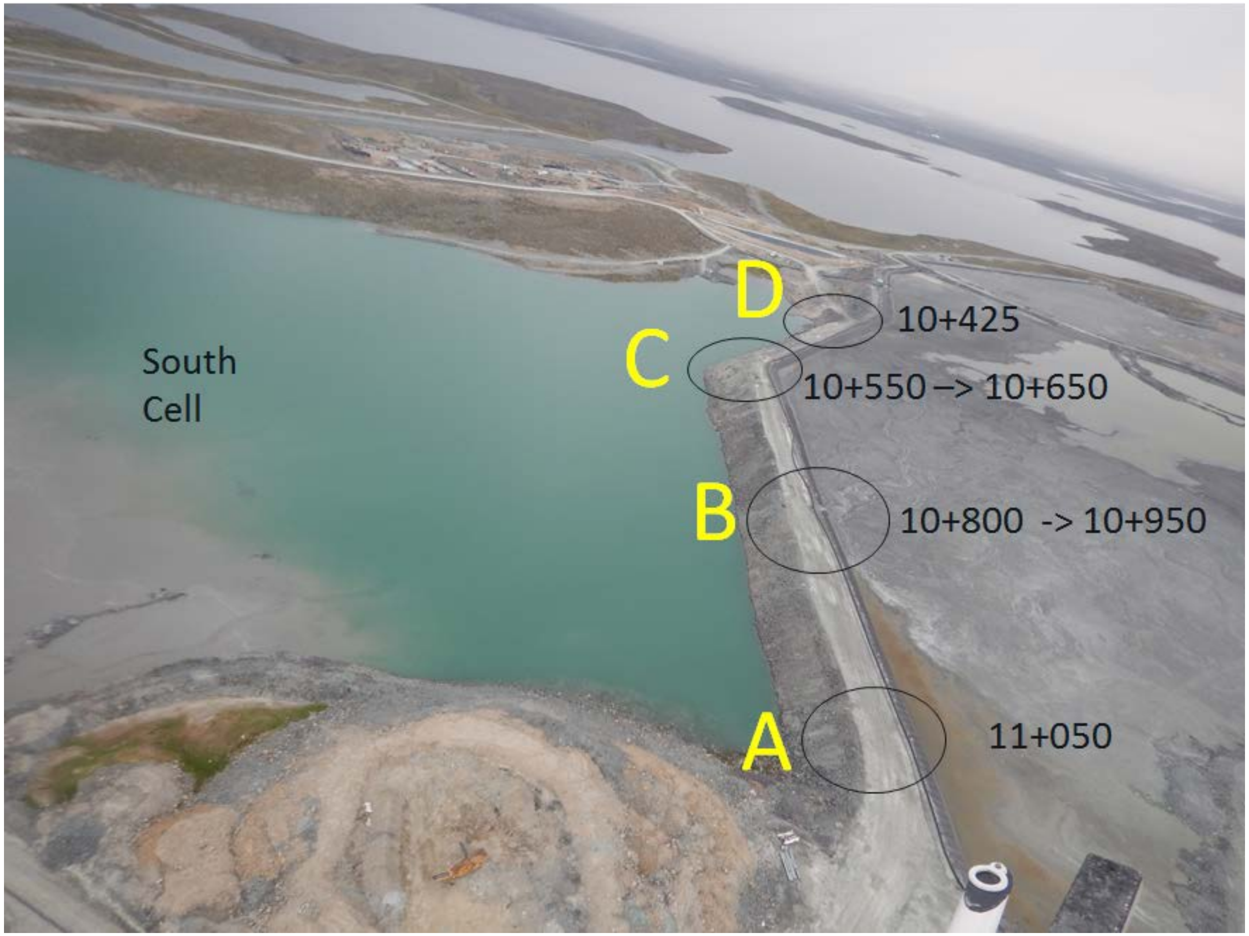
MDRB # 24
P3 – STORMWATER DIKE UPDATE

Pier-Éric McDonald

September 24th 2018

Stormwater Dike Highlights

(2018)



Sequence of Events

April 27 - New sign of movements (cracks) were detected on the crest of Stormwater Dike from Sta. 10+900 to 10+950.

May 5 - An additional prism (S119) was installed in the new crack area (S119) at station 10+925 (total 20).

May 6 - One (1) crackmeter was installed on the most developped crack to monitor its opening.

July 2 - Two (2) additional crackmeters were installed to increase movement monitoring in the new crack area (total of 3).

July 22 - New cracks observed in between prisms S114 and S115

July 23 - Cracks were filled with bentonite to prevent water infiltration

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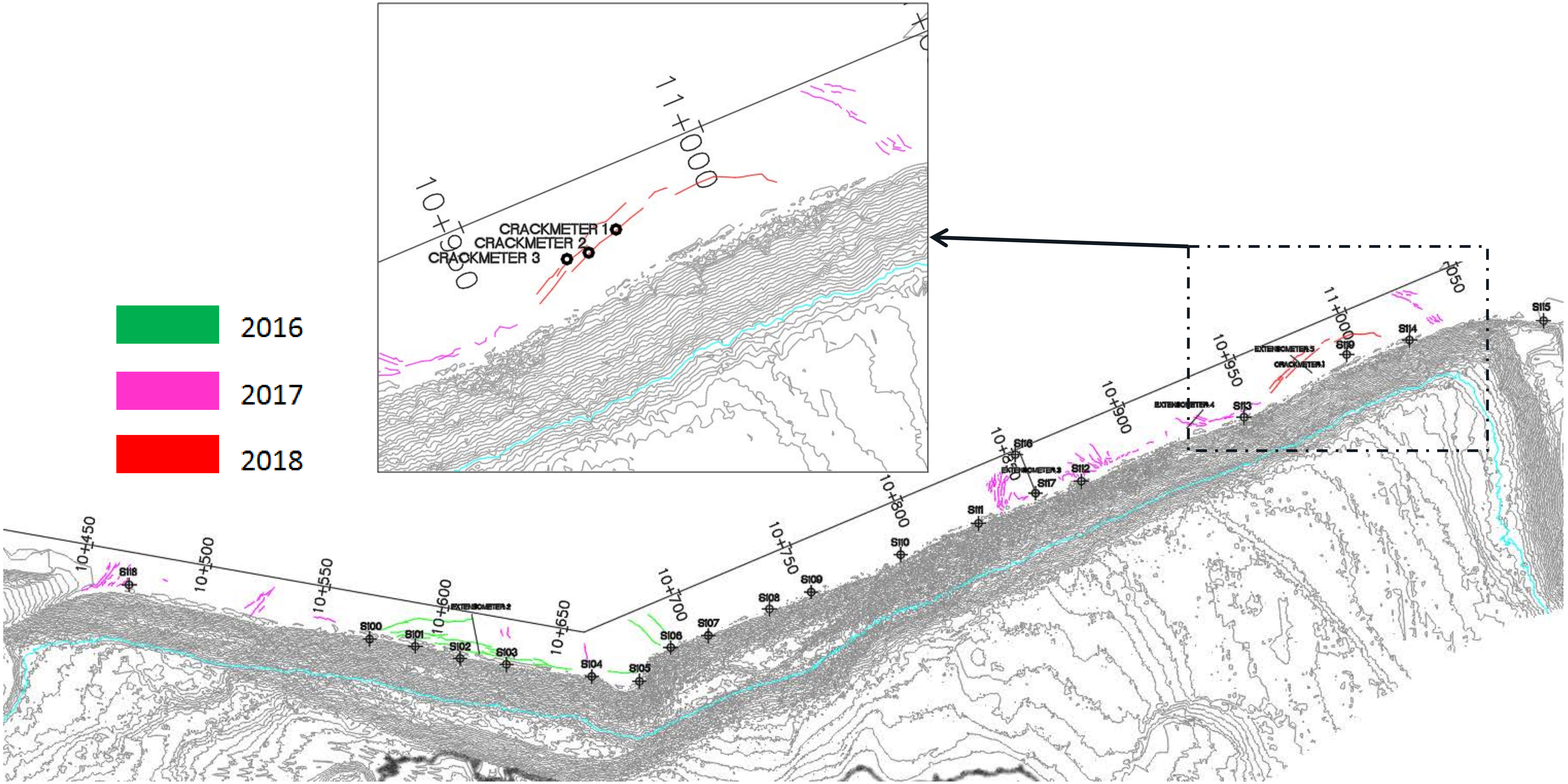
2018 action plan for movement monitoring

- Weekly visual inspection of Stormwater Dike increased to every 3 days.
- Prisms survey monitoring every 3 days.
- Extensometers and crackmeters reading every 3 days.
- Weekly/ bi-weekly update to AEM Management
- Instrumentation that is monitored

	Instruments	Operational	Damaged	Measurement Taken	
☒	*Piezometers (auto) (3)*	☒	☐	☒	Every 3 hours
☒	*Extensometer (0)* 4	☐	☐	☐	Every 3 days
☐	*Tension crack STA (0)*	☐	☐	☐	Daily
☒	*Survey Prisms (19)* 20	☒	☐	☒	Every week
☒	*Thermistors (auto) (3)*	☒	☐	☒	Every 3 hours
☒	*Crackmeters (auto) (3)*	☒	☐	☒	Every hour

Cracks Evolution on Stormwater dike, from 2016 to 2018



1. HIGHLIGHTS

New cracks formed between station 10+950 and 11+000

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New cracks formed between station 10+950 and 11+000

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Description of the new cracks area

- Observed initially on April 27th 2018
- Appeared at the end of the winter with warmer temperature
- Cracks width varying approximately from 1cm to 4 cm
- No significant visual changes since April 27th 2018

STORMWATER DIKE UPDATE 2018

1. HIGHLIGHTS

New cracks filled with bentonite; July 23rd and 29th, 2018

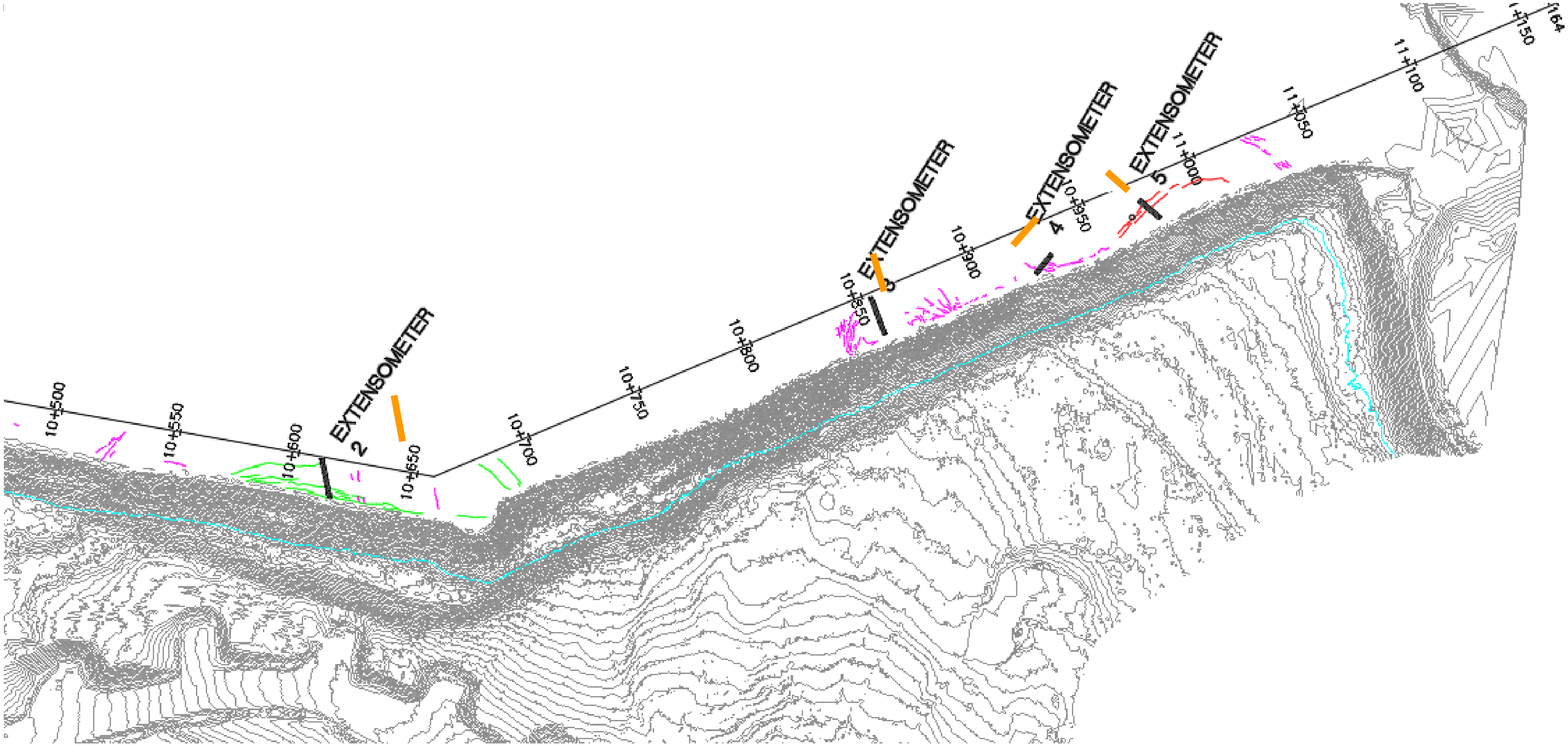
2. Instrumentation

(Wireline extensometer)

STORMWATER DIKE UPDATE 2018

2. INSTRUMENTATION - EXTENSOMETER

Location of extensometers 2, 3, 4 & 5



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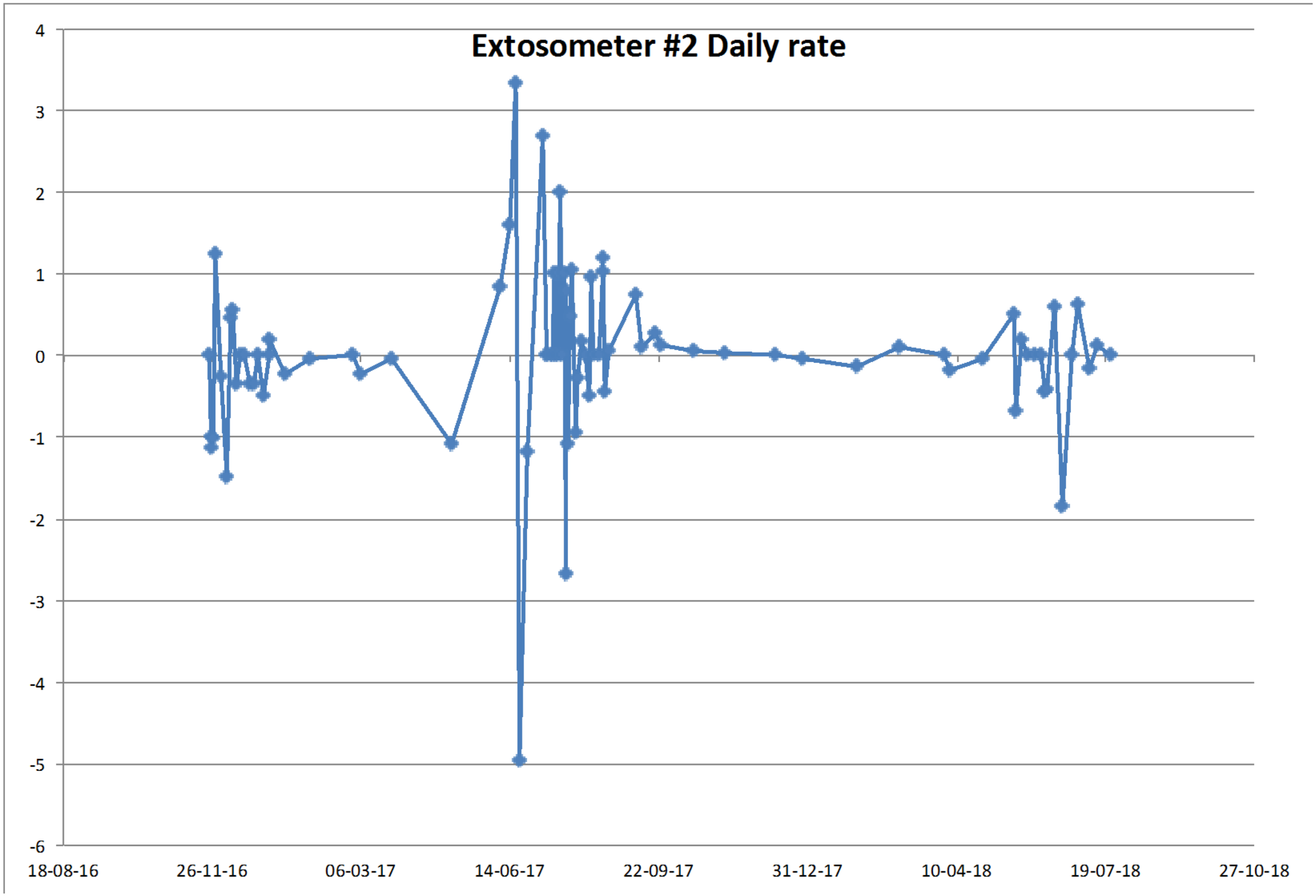
Data Monitoring and Interpretation

- Four wireline extensometers are installed on Stormwater Dike.
- Located at stations 10 + 620, 10+850, 10+925 and 10+975.
- Monitored every three days.
- The four extensometers have shown none or very little variations.

STORMWATER DIKE UPDATE 2018

2. INSTRUMENTATION - EXTENSOMETER



3. Instrumentation

(Monitoring Prisms)

3. INSTRUMENTATION – MONITORING PRISMS

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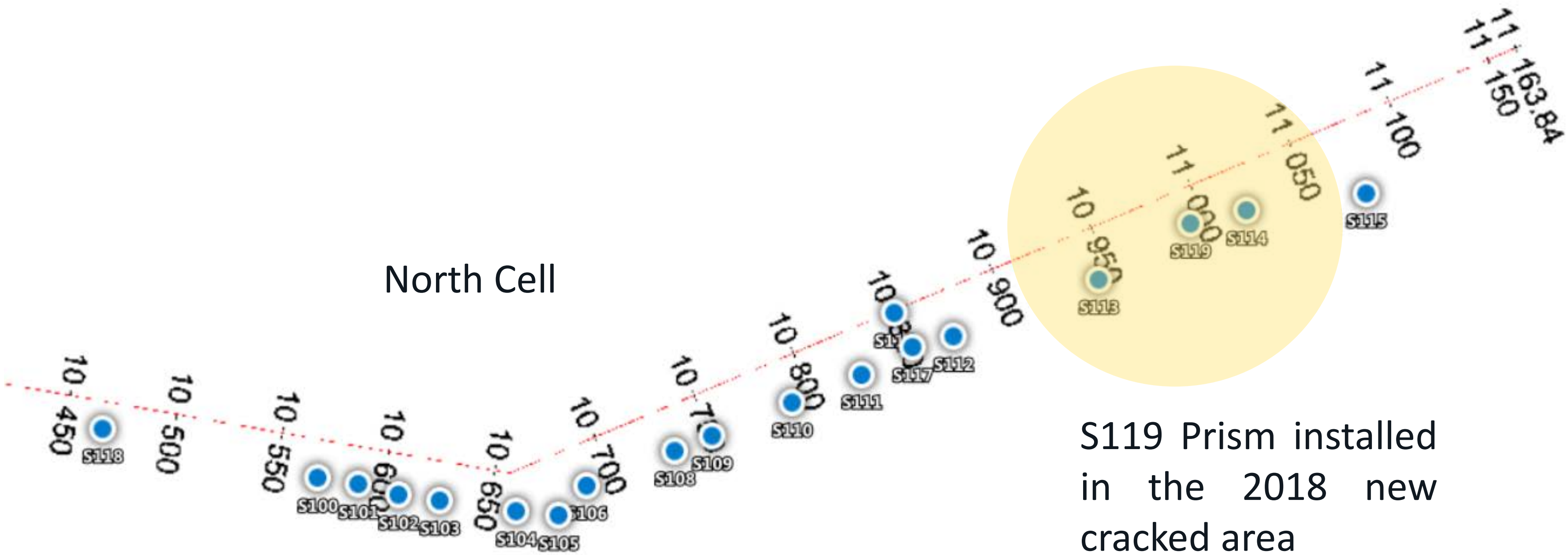
Location of the monitoring prisms



S119 Prism installed in the 2018 new cracked area

Data Monitoring

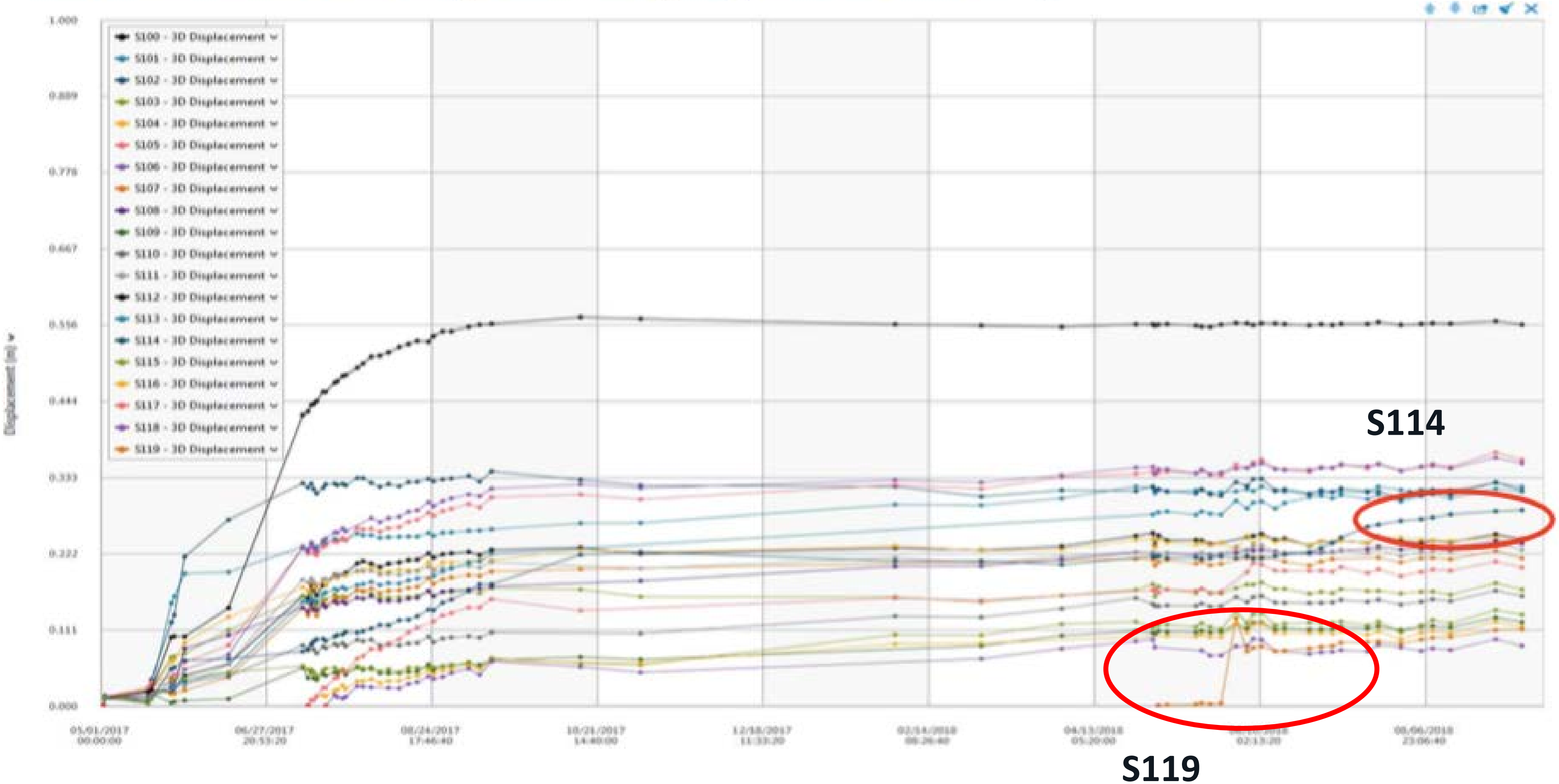
- 20 prisms are installed along the crest of Stromwater dike
- Prisms are surveyed every 3 days
- The prisms vertical displacement, 3D displacement and 3D velocity are computed and analysed.

Data Interpretation

- The prisms S119 is located in the 2018 new crack area
- The prisms analysis shows that the prisms movement was fairly constant throughout season
- 3D displacement is in majority due to the vertical displacement
- Significant variations of velocity and vertical displacement recorded at S119 between June 1st and 5th. These displacements were probably due to the settling of the boulder installed during the winter.

3. INSTRUMENTATION – MONITORING PRISMS

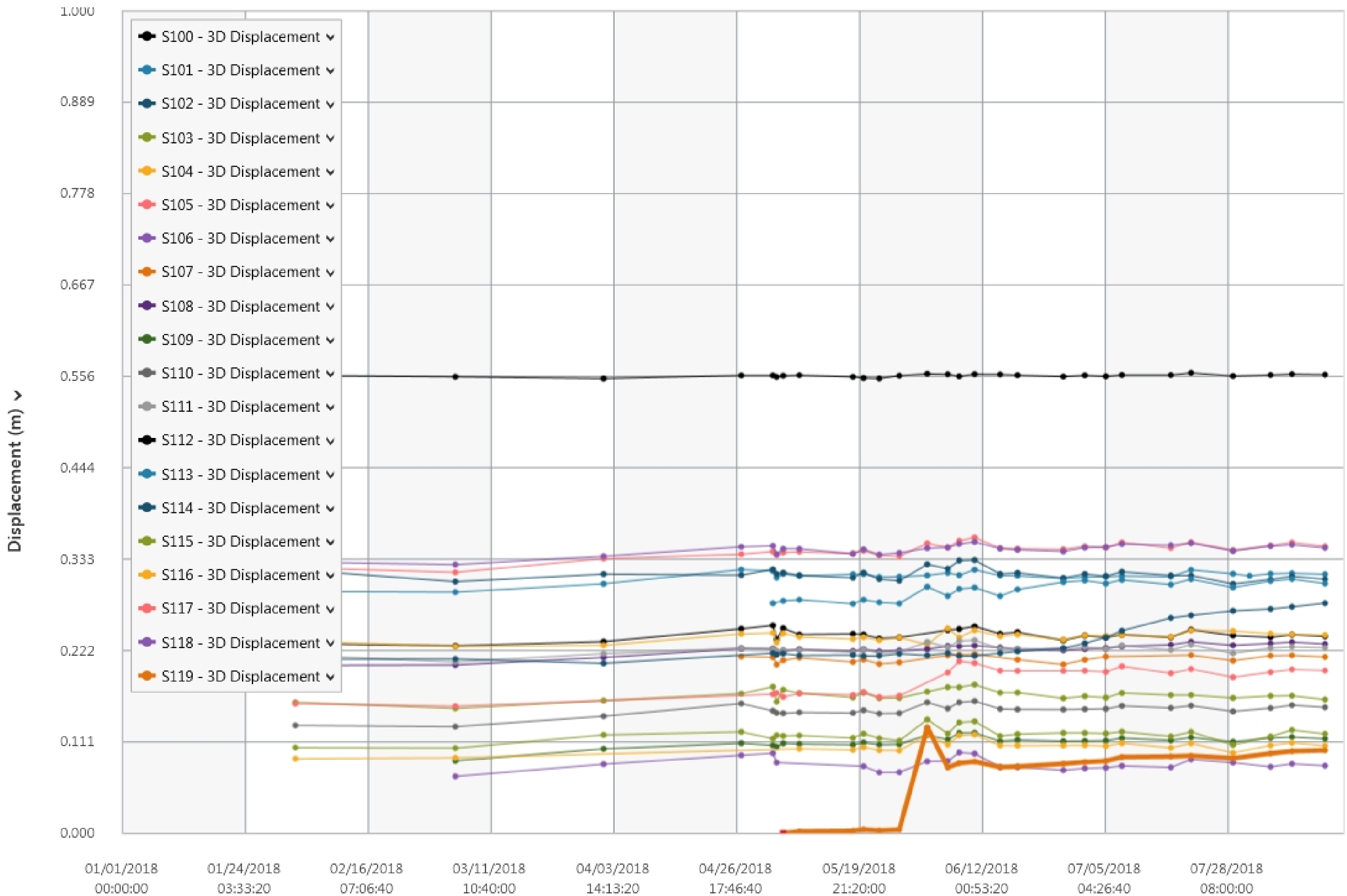
Prisms cumulative 3D displacement (May 2017-June 2018)



STORMWATER DIKE UPDATE 2018

3. INSTRUMENTATION – MONITORING PRISMS

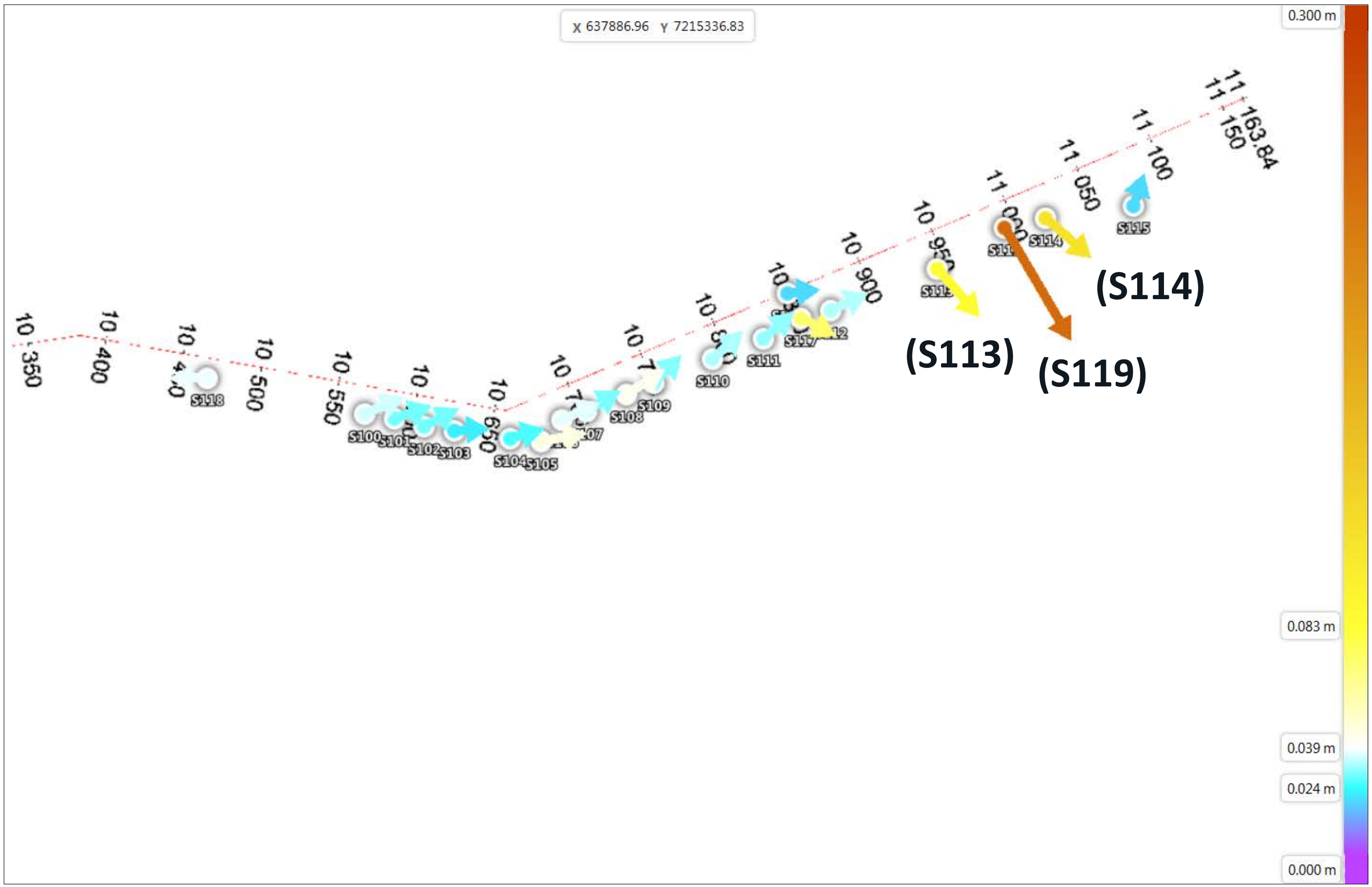
Cumulative 3D Displacement (m) vs. Date – 2018 only



STORMWATER DIKE UPDATE 2018

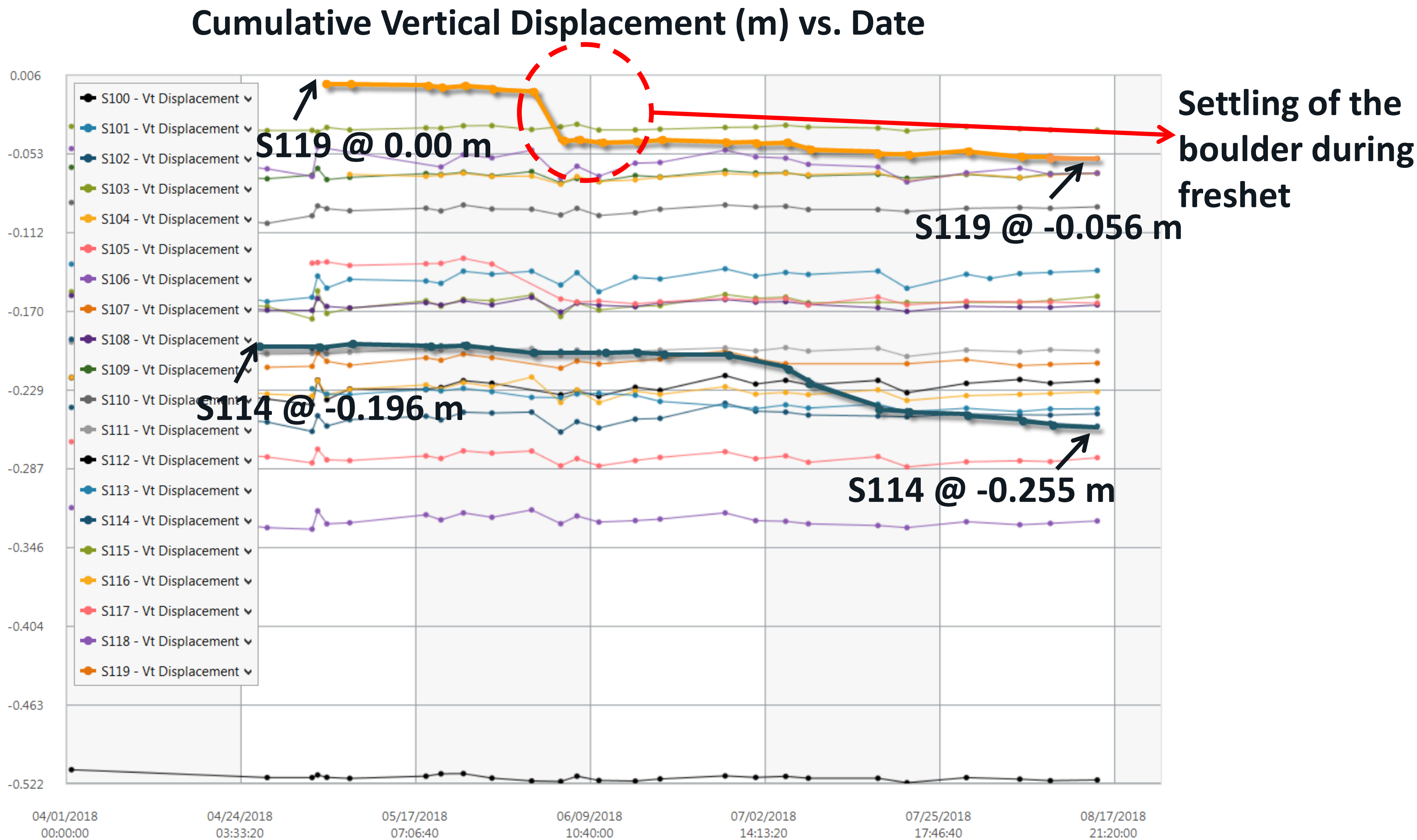
3. INSTRUMENTATION – MONITORING PRISMS

Prisms 3D Displacement Map (m), January 1st to July 23rd, 2018



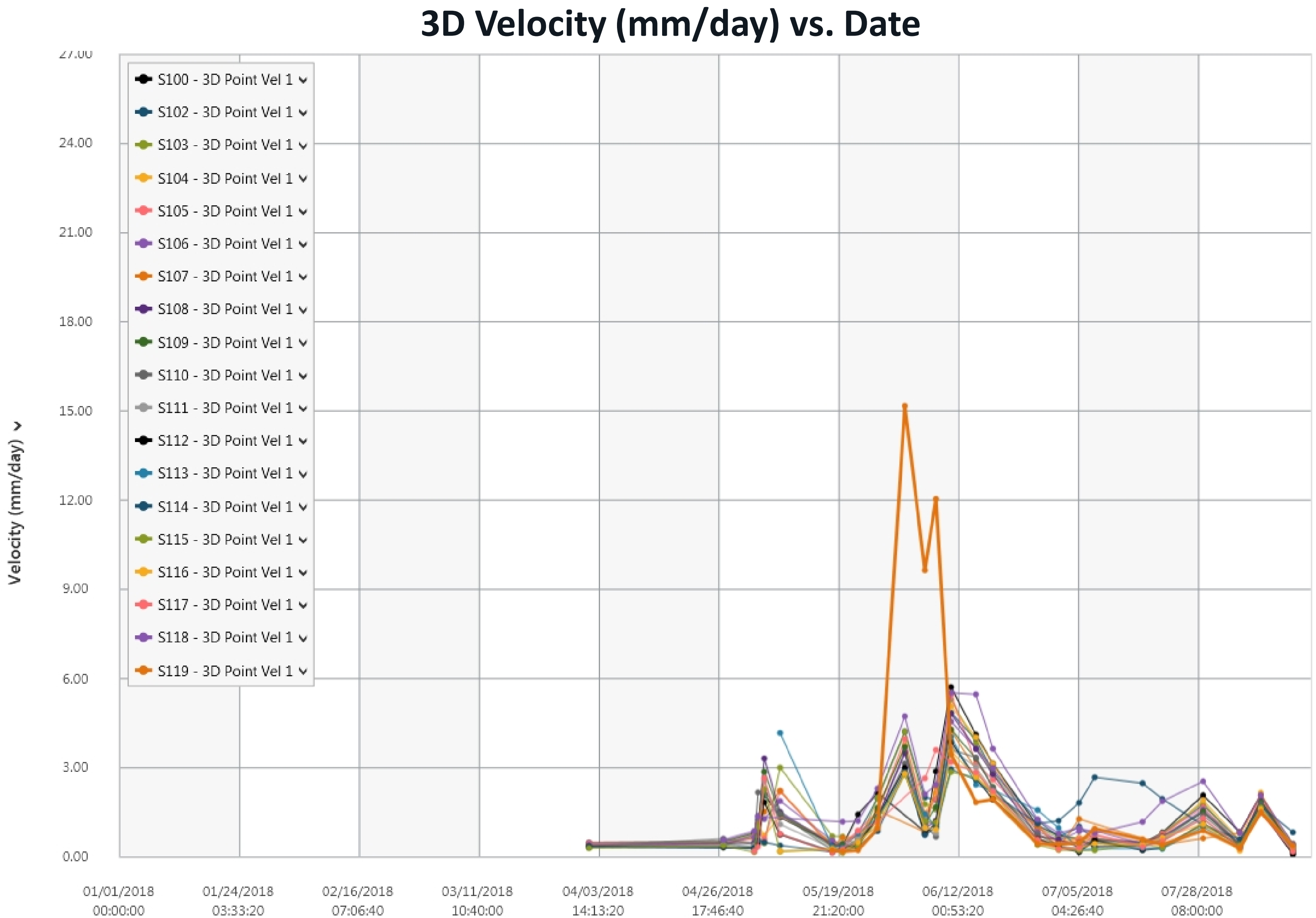
3. INSTRUMENTATION – MONITORING PRISMS

AGNICO EAGLE



STORMWATER DIKE UPDATE 2018

3. INSTRUMENTATION – MONITORING PRISMS

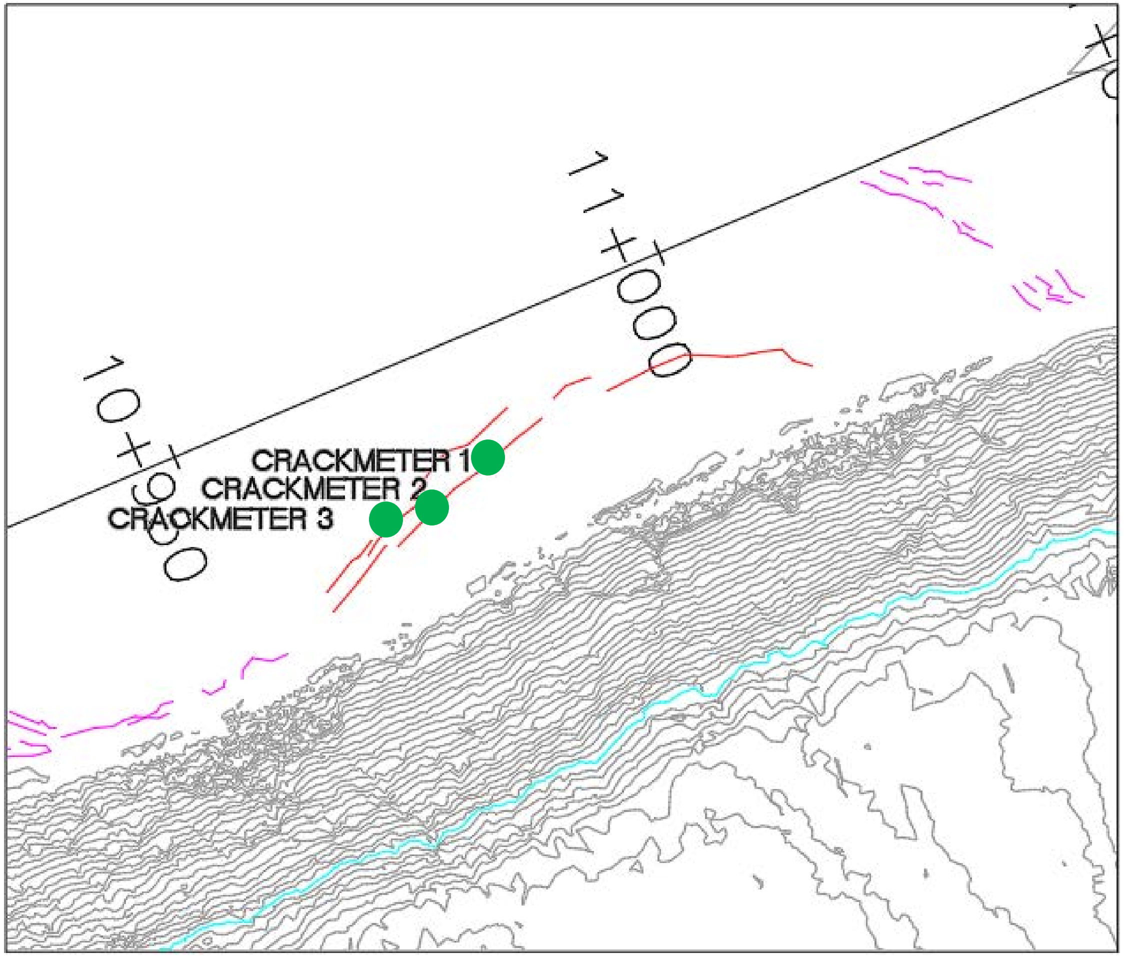


4. *Instrumentation*

(Crackmeters)

4. INSTRUMENTATION – CRACKMETERS

Location of the crackmeters



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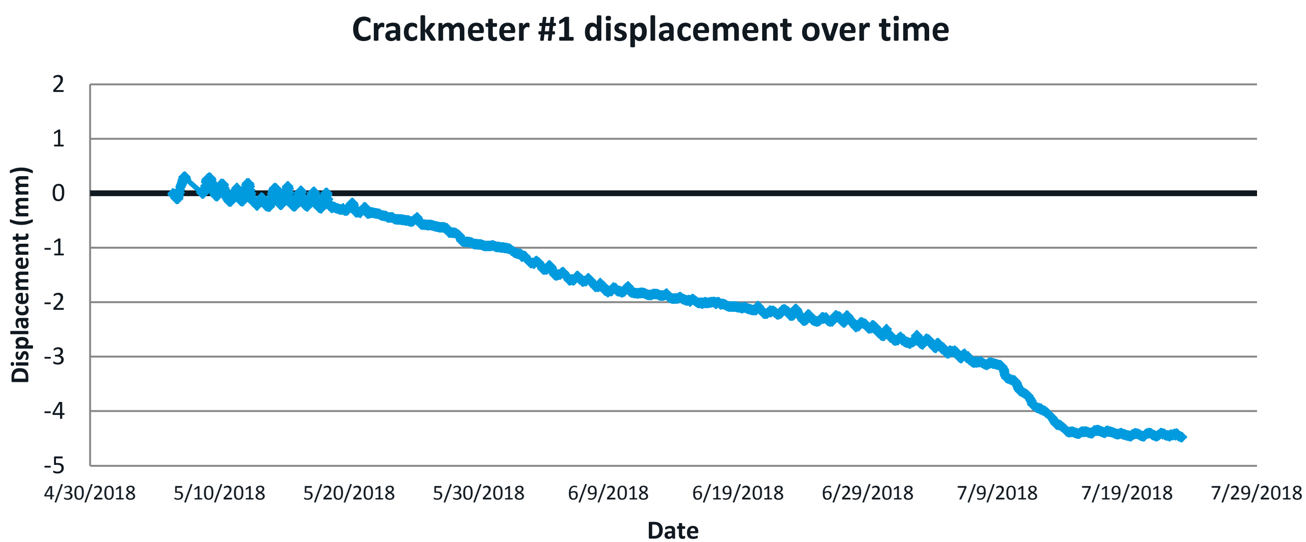
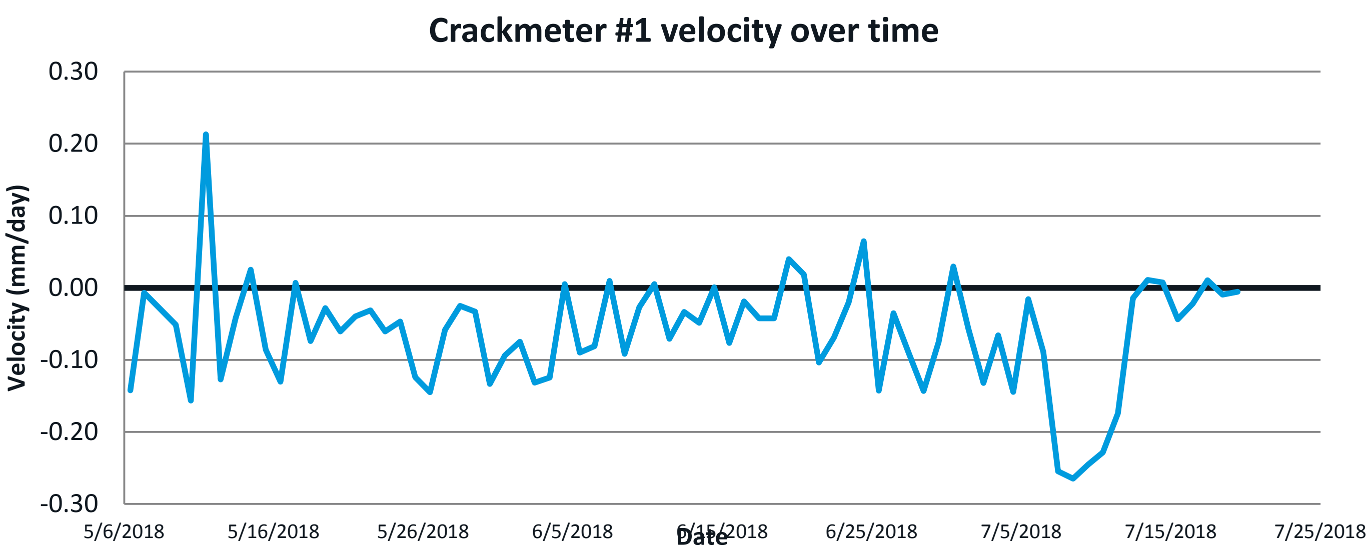
Data Monitoring

- Three (3) crackmeters are installed on SWD.
- Connected to datalogger and a reading is recorded every hour.
- Crackmeter #1 was installed on May 6th, 2018.
- Crackmeter #2 and #3 were installed on July 2nd, 2018
- Data are collected and analysed every 3 days

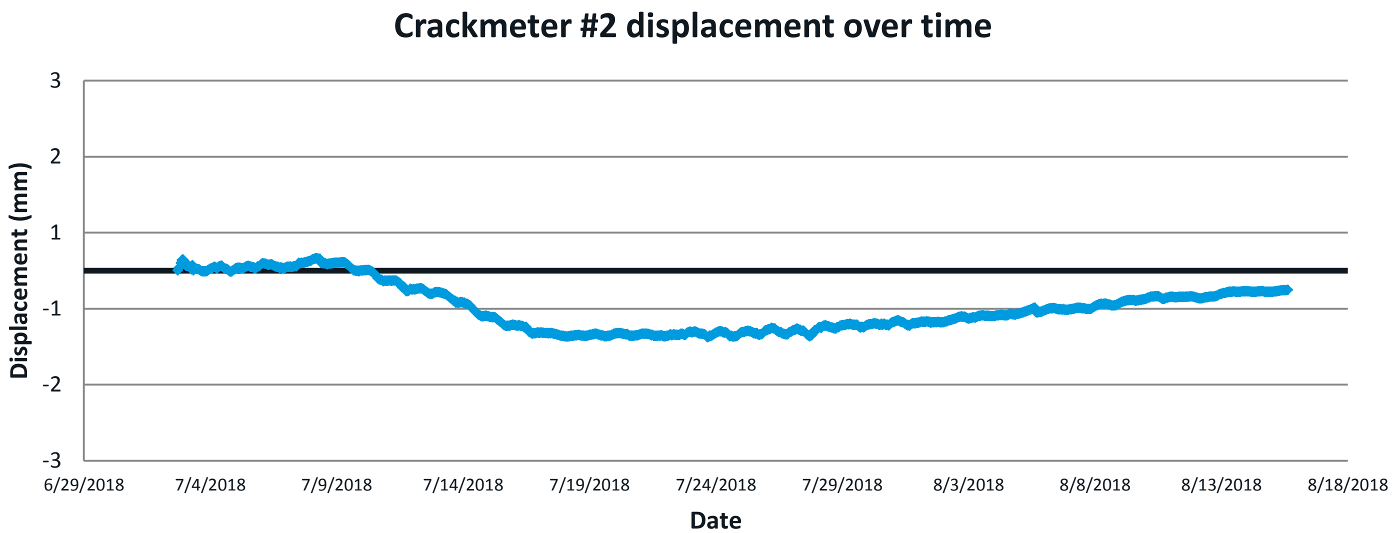
STORMWATER DIKE 2018 UPDATE

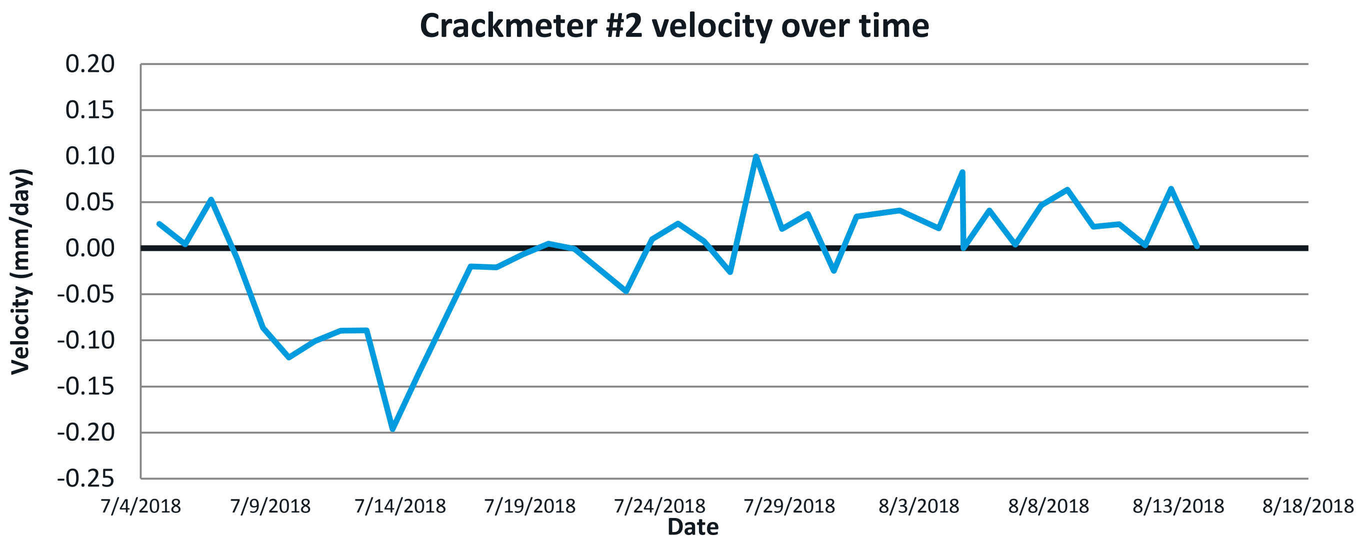
4. INSTRUMENTATION – CRACKMETERS





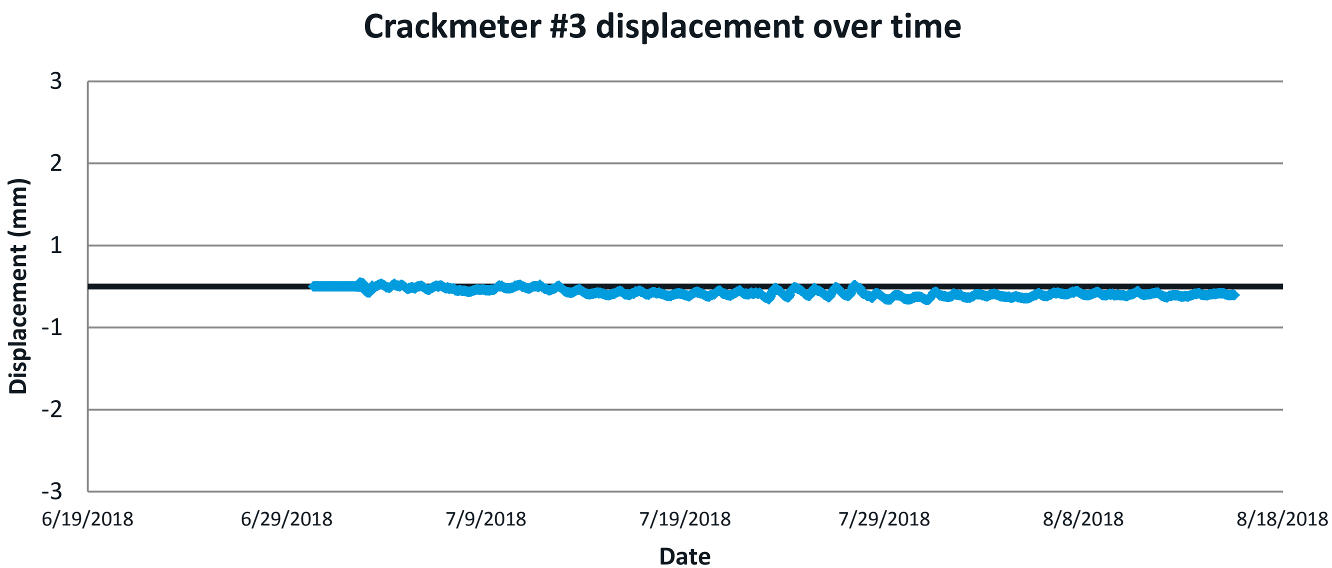
4. INSTRUMENTATION – CRACKMETERS

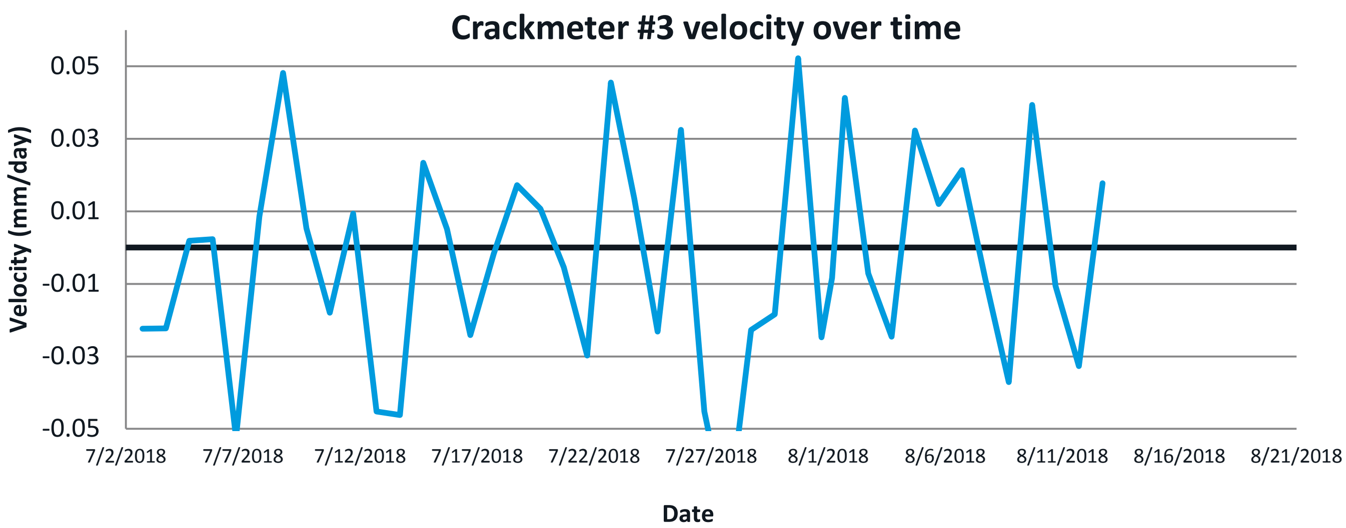




STORMWATER DIKE 2018 UPDATE

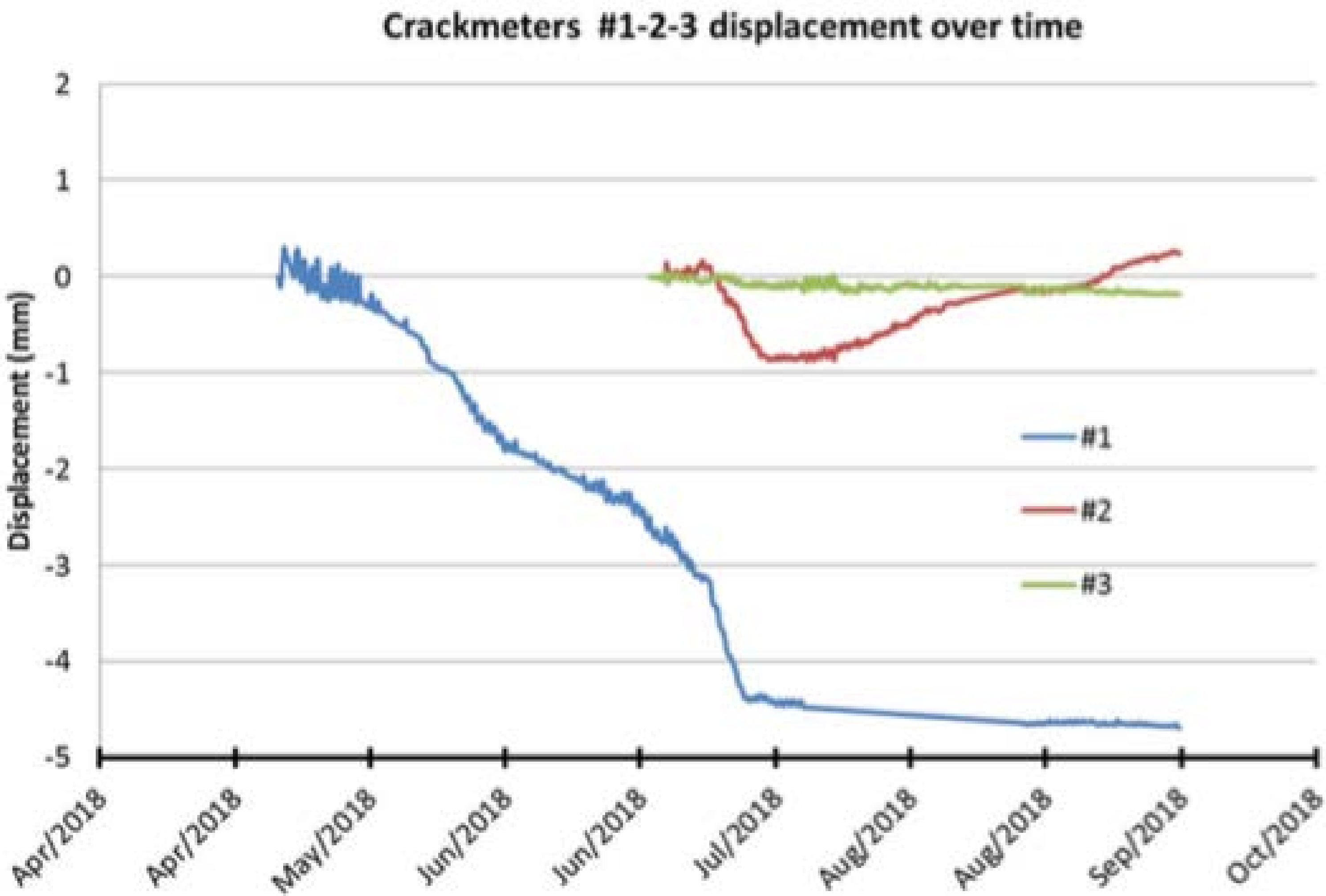
4. INSTRUMENTATION – CRACKMETERS





STORMWATER DIKE 2018 UPDATE

4. INSTRUMENTATION – CRACKMETERS



5. Instrumentation Holes

(Thermistors & Piezometers)

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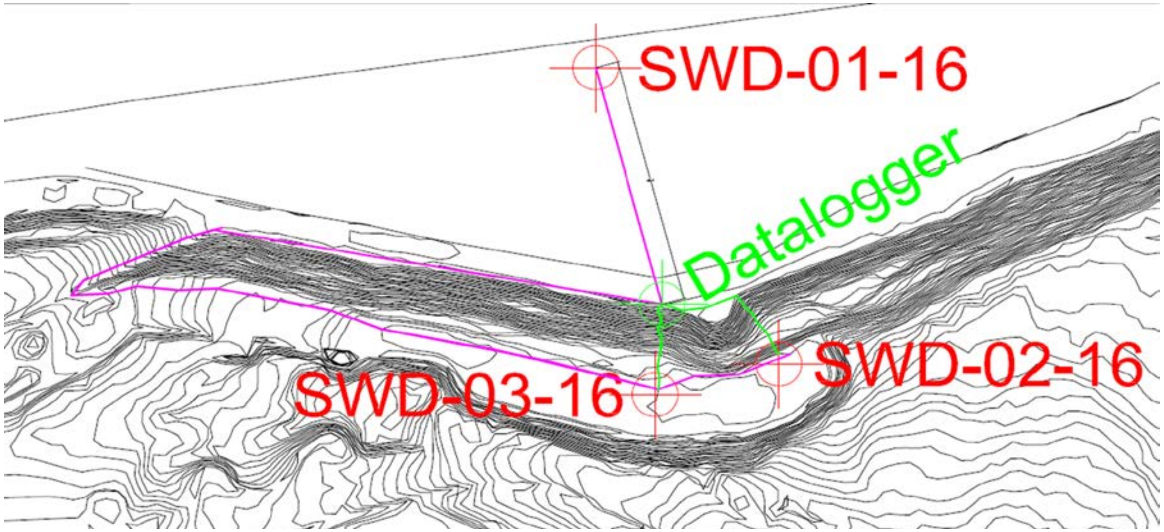
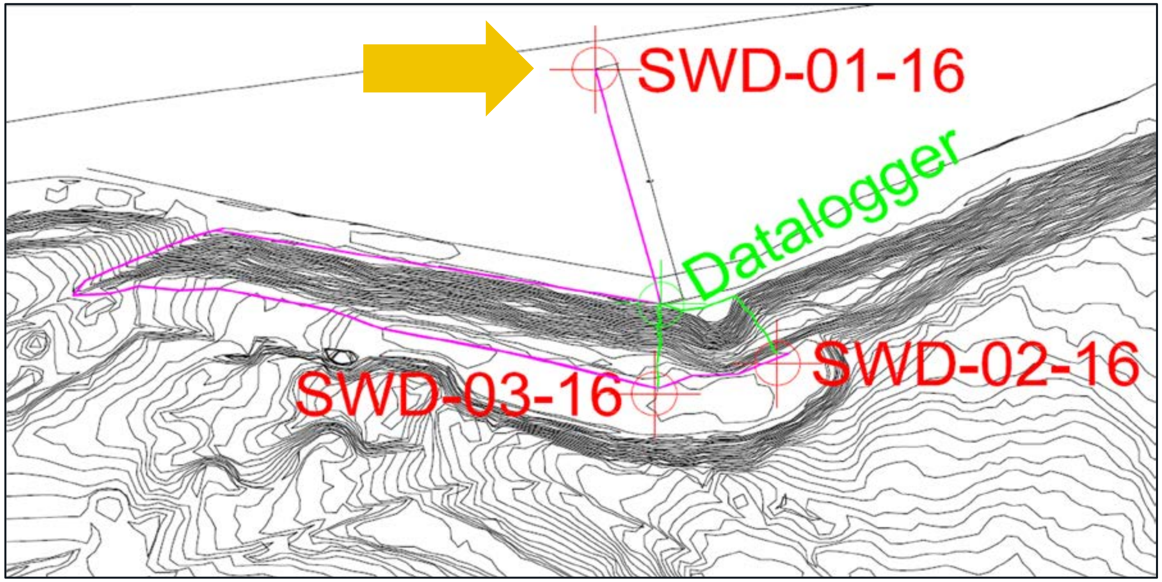
Instrumentation Holes Location:



Hole	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
SWD-01	TH-SWD-01	Thermistor	✓	Automatic	-	-	16	148/118
SWD-02	PZ-SWD-02-A	Piezo	✓	Automatic	62	Bedrock	-	-
	TH-SWD-02	Thermistor	✓	Automatic	-	-	6	127/67
SWD-03	PZ-SWD-03-A	Piezo	✓	Automatic	110	Bedrock	-	-
	PZ-SWD-03-B	Piezo	✓	Automatic	122	Bedrock	-	-
	TH-SWD-03	Thermistor	✓	Automatic	-	-	14	125/111

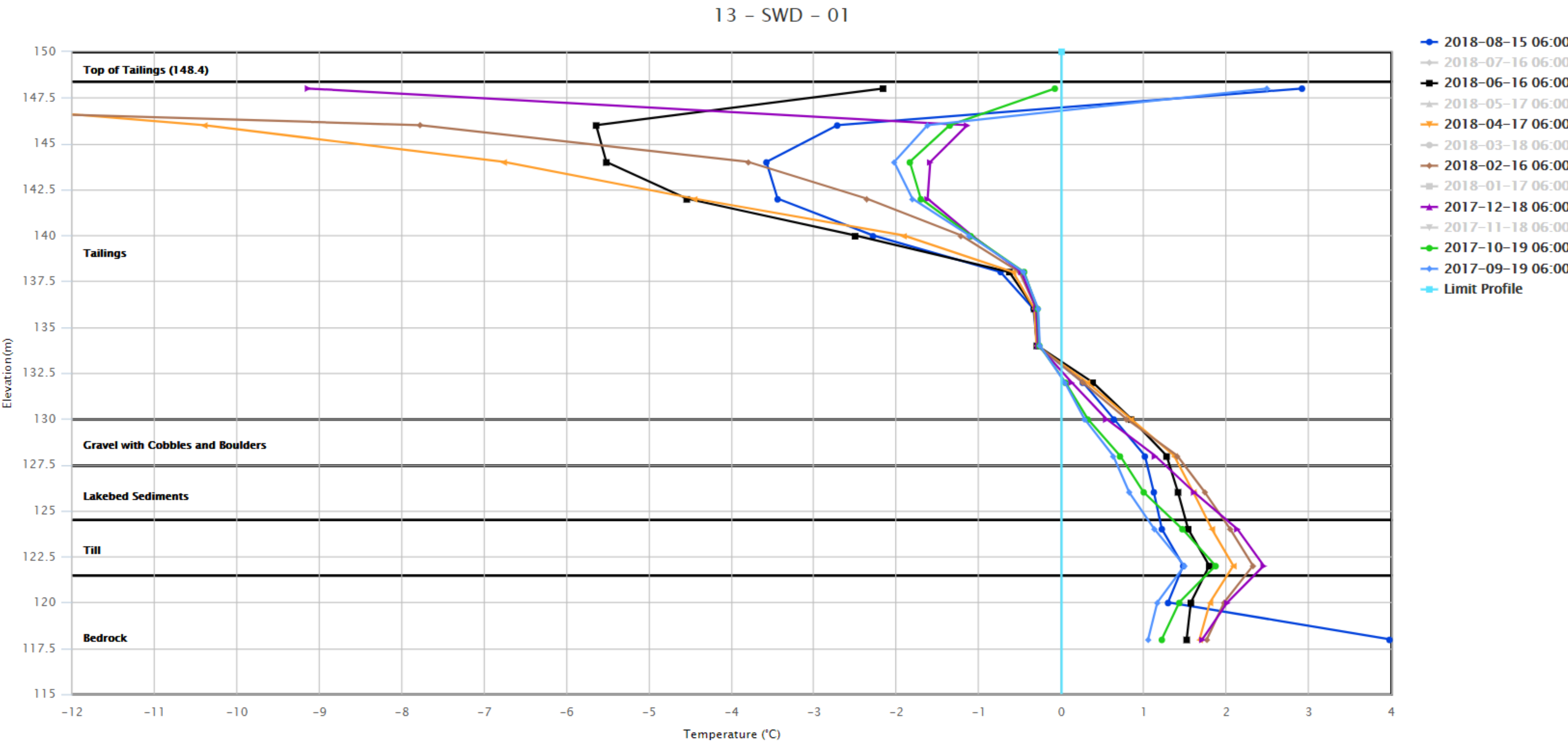
SWD-01-16 Description:

- Located upstream (North Cell side)
- One (1) thermistor string with (16) beads
- No VW Piezometer



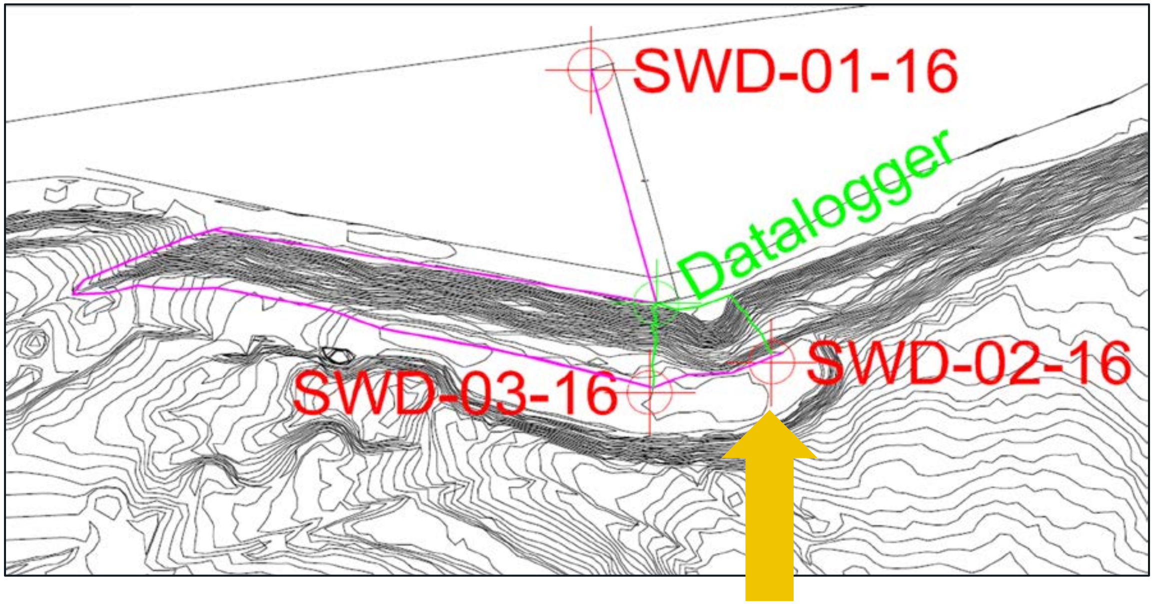
5. INSTRUMENTATION – VW PIEZOMETERS AND THERMISTORS

SWD-01-16 Temperature Monitoring:

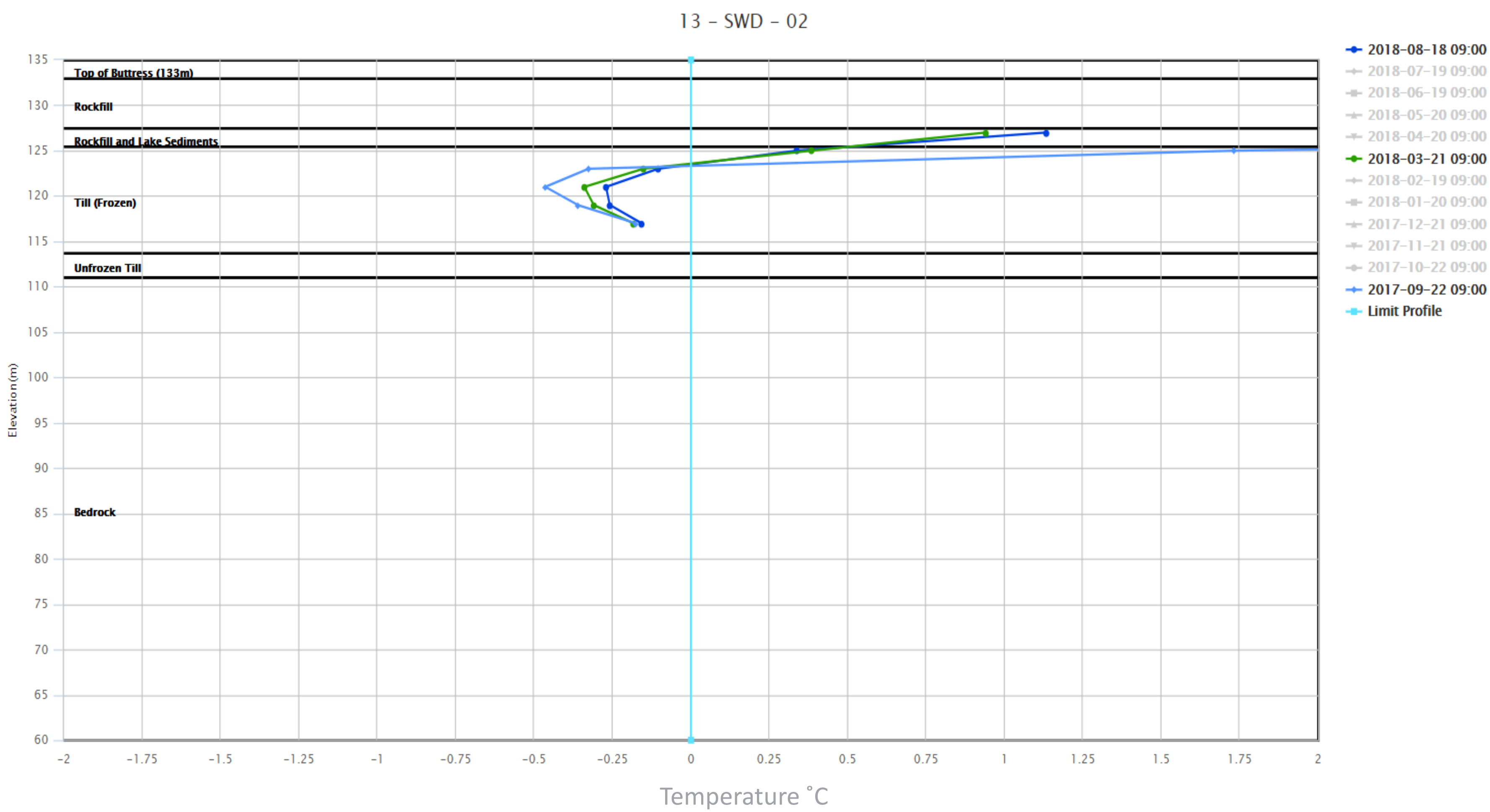


SWD-02-16 Description:

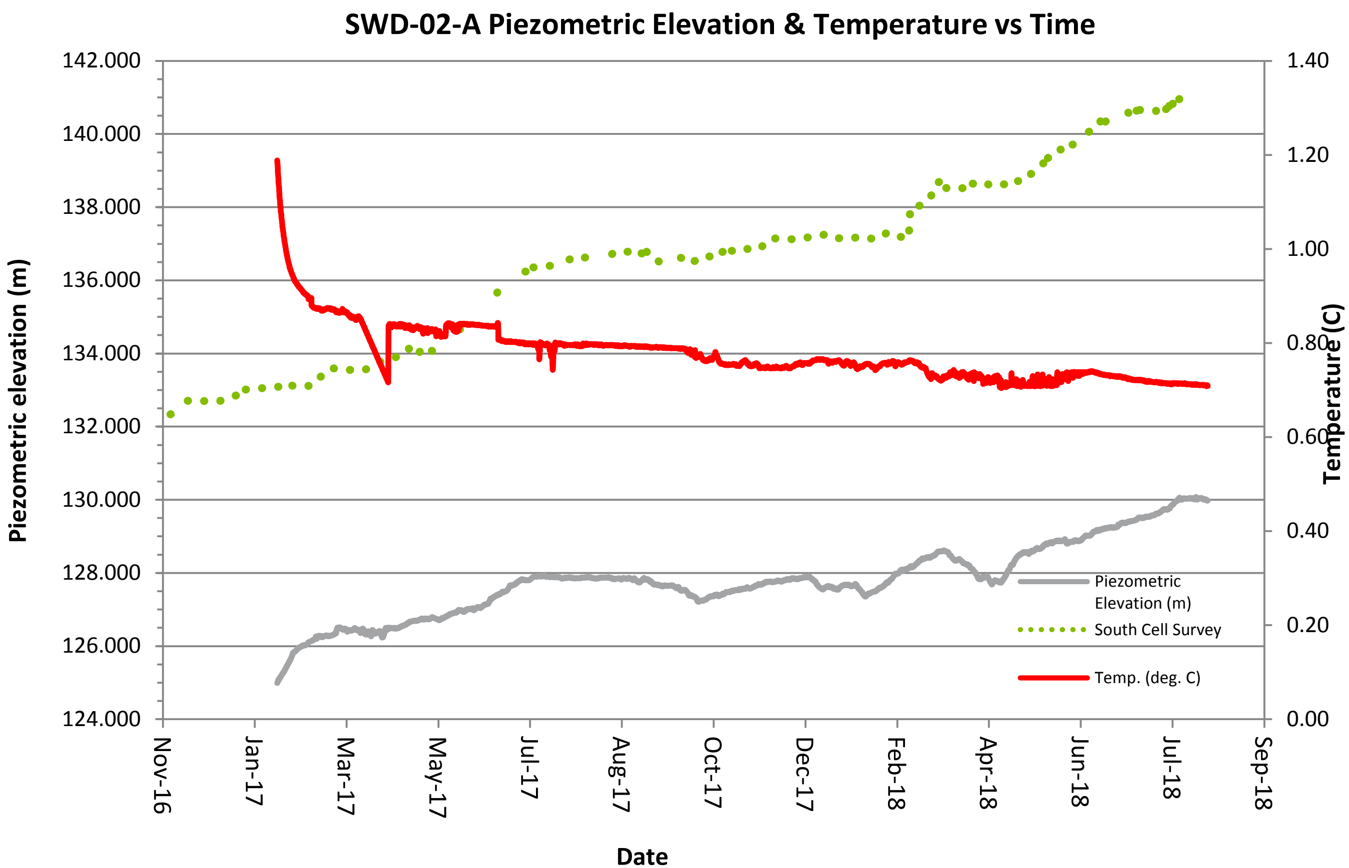
- Located downstream (South Cell side)
- One (1) thermitor string with (16) beads
- One (1) VW Piezometer at a depth of 71m

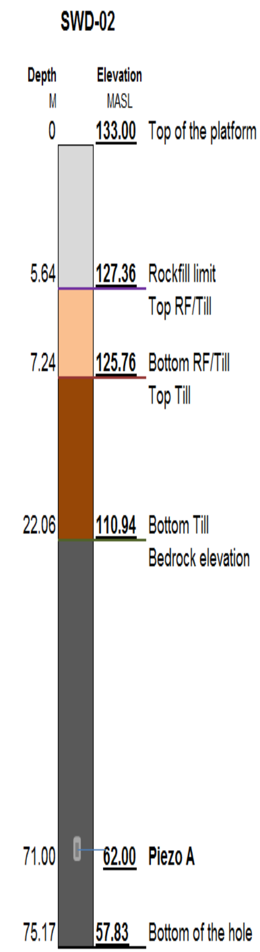


SWD-02-16 Temperature Monitoring:



SWD-02-16 PZ Head Monitoring:

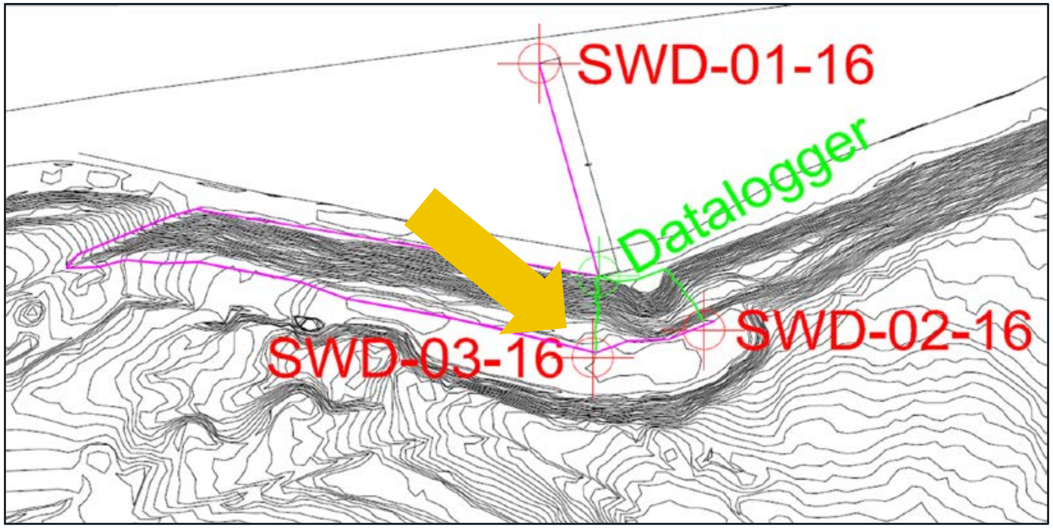




AGNICO EAGLE

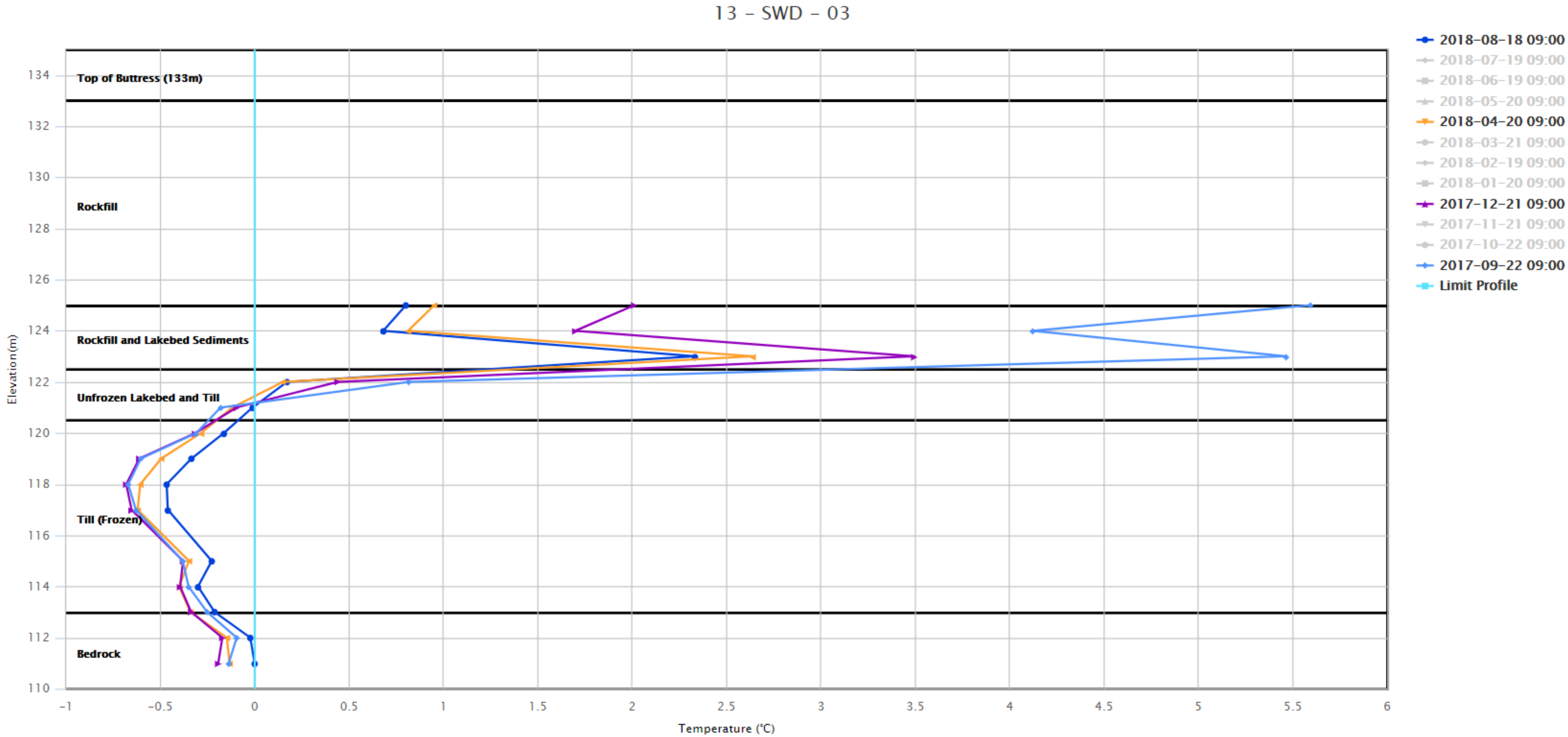
SWD-03-16 Description:

- Located downstream (South Cell side)
- One (1) thermistor string with (16) beads
- Two (2) VW Piezometers
  - PZ-SWD-03-A depth : 23m
  - PZ-SWD-03-B depth : 11m



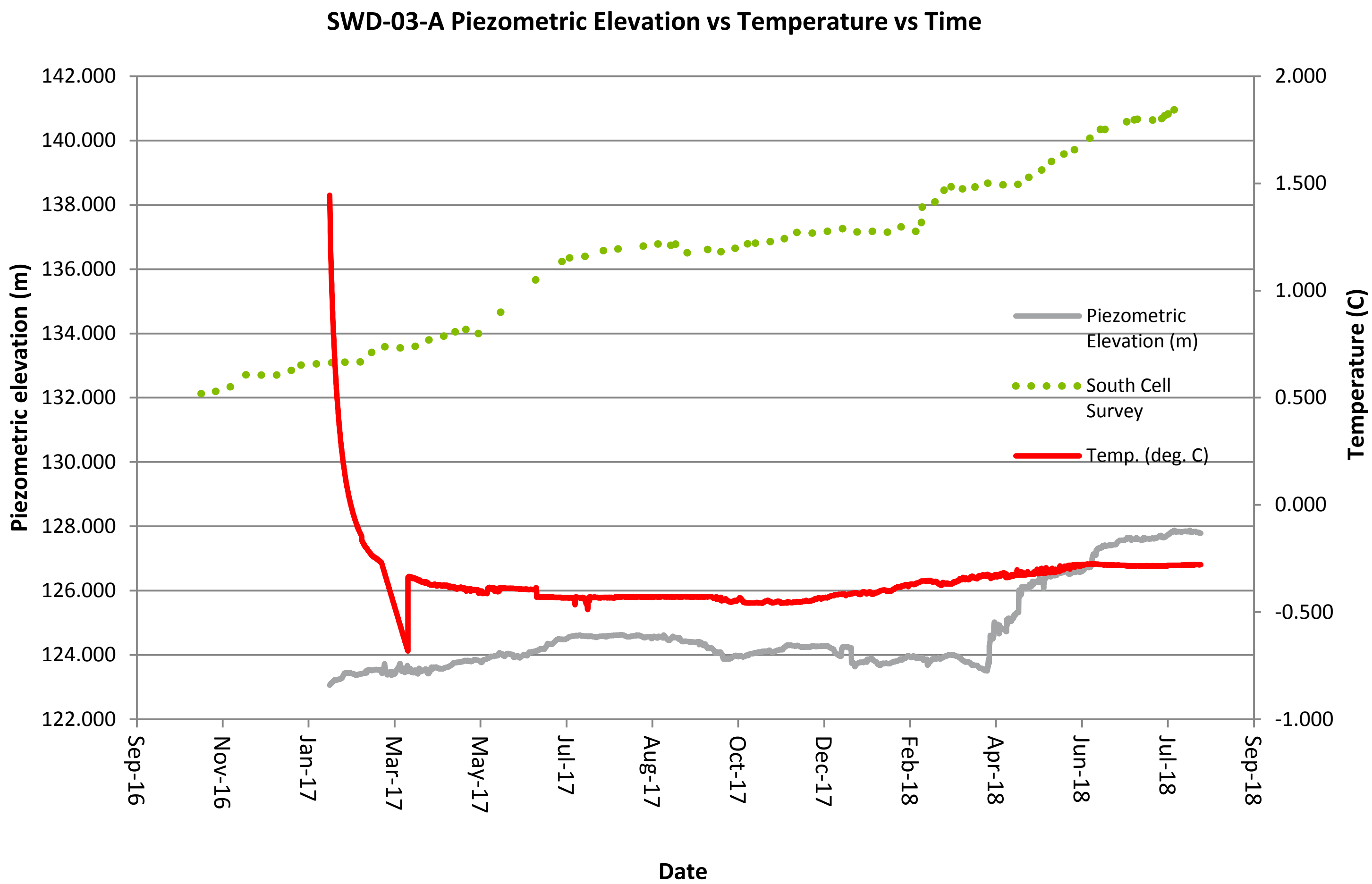
AGNICO EAGLE

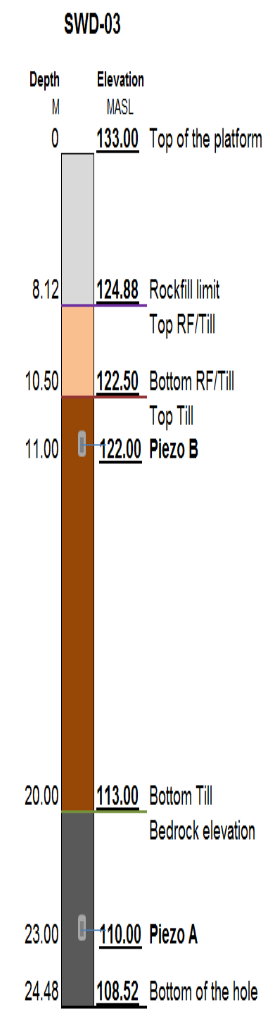
SWD-03-16 Temperature Monitoring:



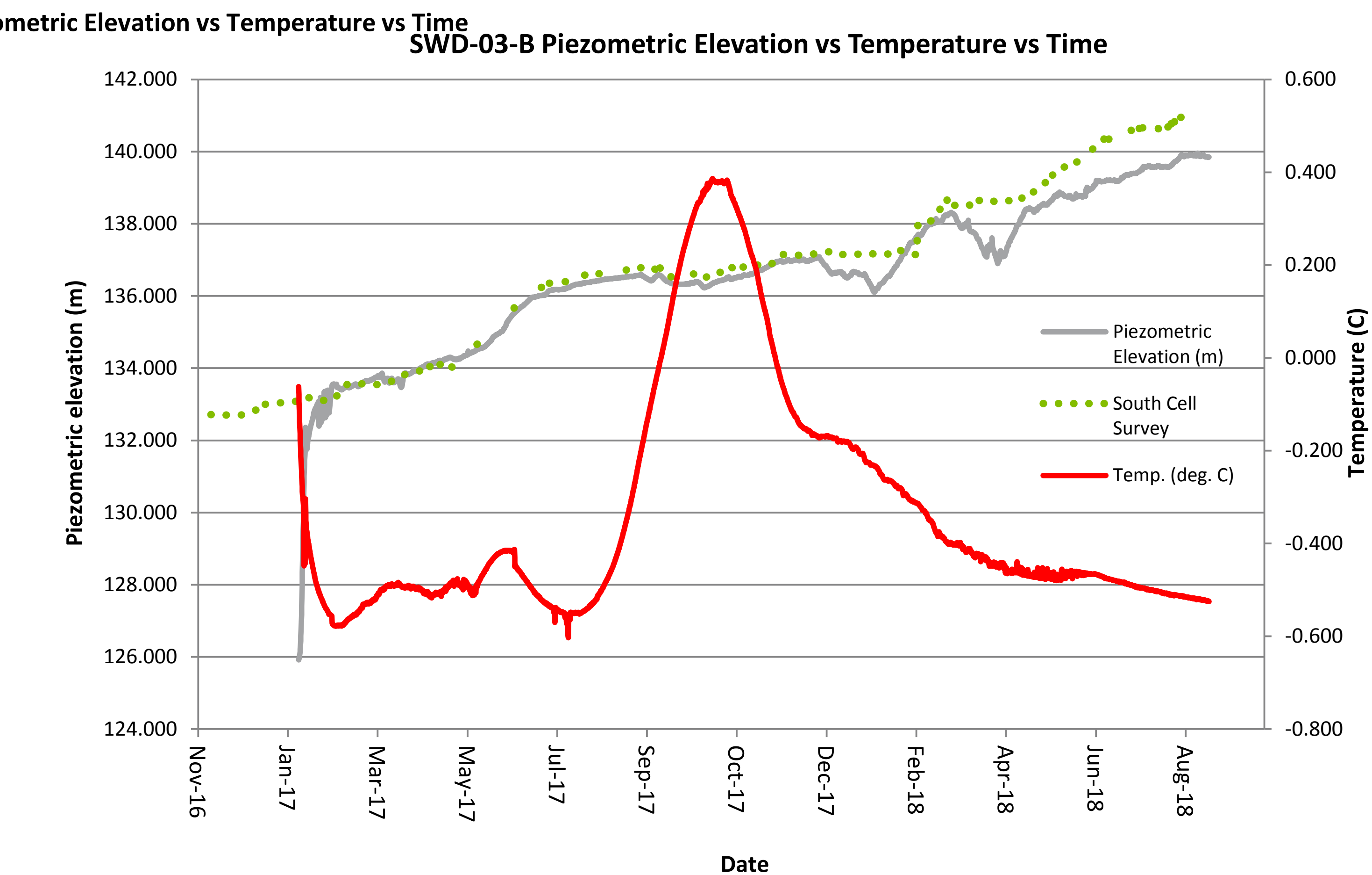
AGNICO EAGLE

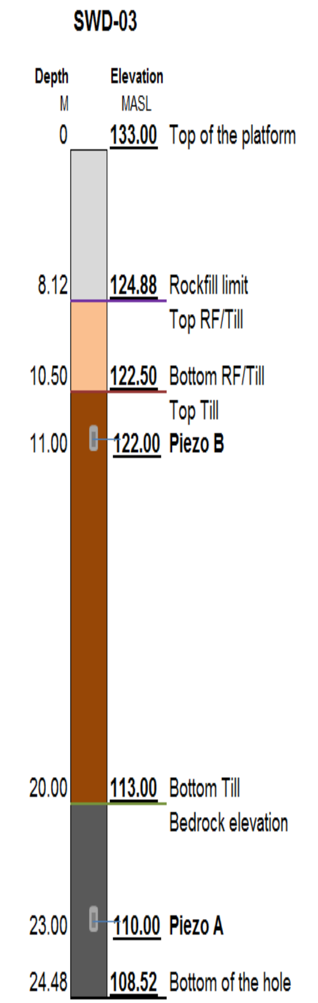
SWD-03-A PZ Head Monitoring:





SWD-03-B PZ Head Monitoring:





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Summary of the situation:

- The Stormwater dike is still in the yellow category as per the OMS and the monitoring is ongoing.
- The instrumentation data still show movement but in a stabilizing trend since after freshet.
- The new cracks discovered in 2018 were filled with bentonite.
- Monitoring of the prisms will continue on weekly frequency.
- Frequent visual inspections of the structure are planned for freshet 2019.
- In front of SWD, tailings in the North Cell are frozen down to 18 m deep.

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THANK YOU

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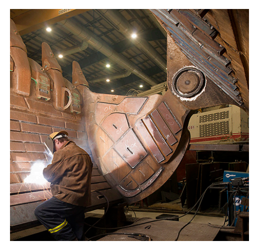

MDRB #24

TAILINGS STORAGE FACILITIES INSTRUMENTATION REVIEW

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TAILING STORAGE FACILITIES (TSF) INSTRUMENTATION 2018

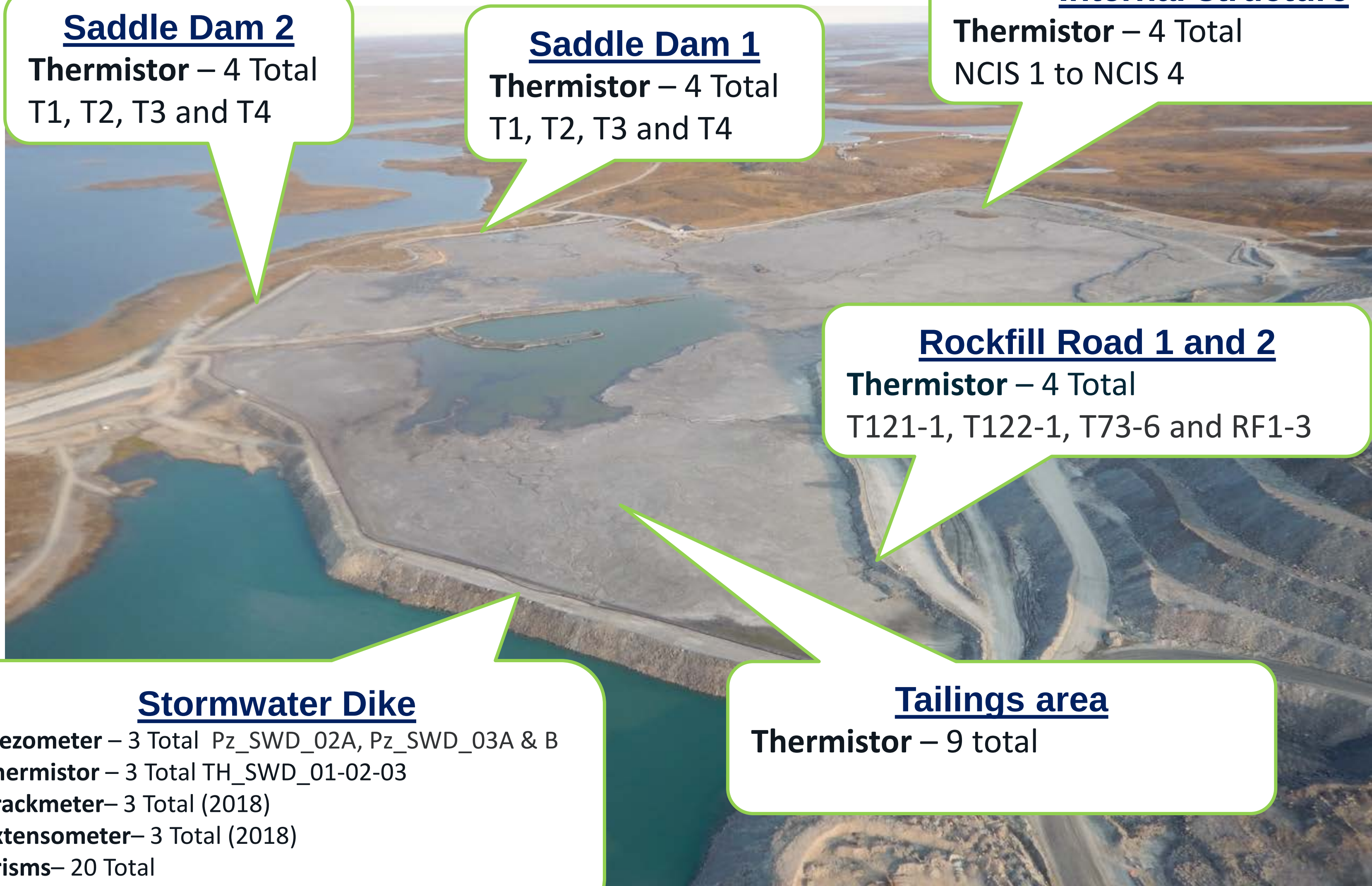
1. **NORTH CELL**
    1. Saddle Dam 1
    2. Saddle Dam 2
    3. Tailings area
    4. Rock Fill (RF1 & RF2)
    5. Internal structure (built in 2018)
2. **SOUTH CELL**
    1. Saddle Dam 3
    2. Saddle Dam 4
    3. Saddle Dam 5

THERMISTORS DATA REVIEW

- Thermistors graphs present 12 data sets with a monthly interval
- The objective is to present a review of the TSF year data
- Graphs are produced with VDV or Excel
- Stormwater and Central Dikes not presented here.

1. North Cell Operational Structures

(2018)



Saddle Dam 2
Thermistor – 4 Total
T1, T2, T3 and T4

Saddle Dam 1
Thermistor – 4 Total
T1, T2, T3 and T4

Internal structure
Thermistor – 4 Total
NCIS 1 to NCIS 4

Rockfill Road 1 and 2
Thermistor – 4 Total
T121-1, T122-1, T73-6 and RF1-3

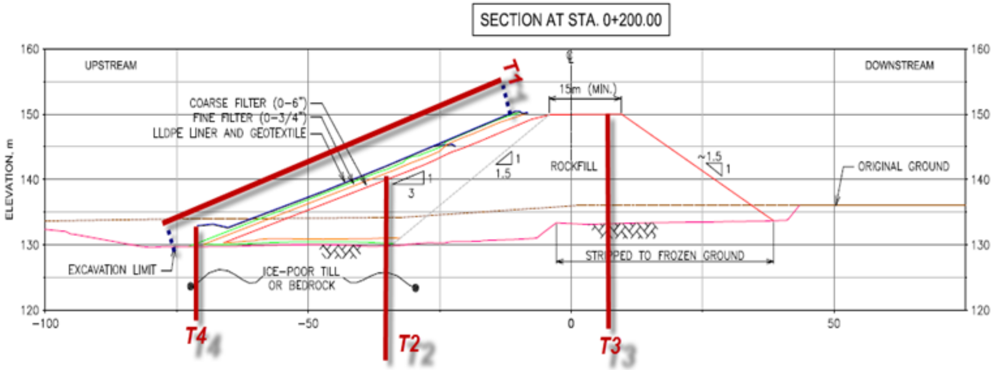
Stormwater Dike
Piezometer – 3 Total Pz_SWD_02A, Pz_SWD_03A & B
Thermistor – 3 Total TH_SWD_01-02-03
Crackmeter– 3 Total (2018)
Extensometer– 3 Total (2018)
Prisms– 20 Total

Tailings area
Thermistor – 9 total

TAILING STORAGE FACILITIES INSTRUMENTATION 2018

1. NORTH CELL: SADDLE DAM 1

Thermistors Emplacement : T1, T2, T3 & T4

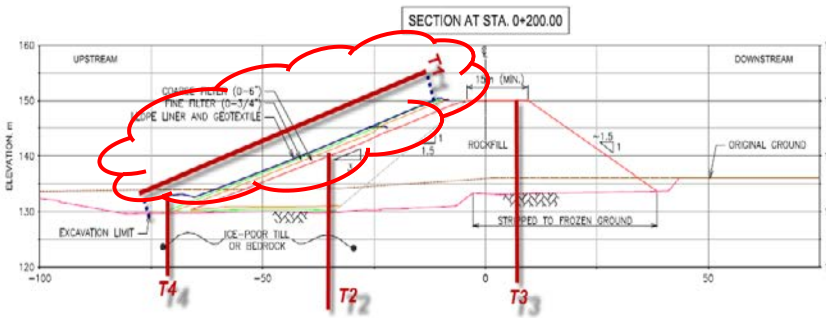


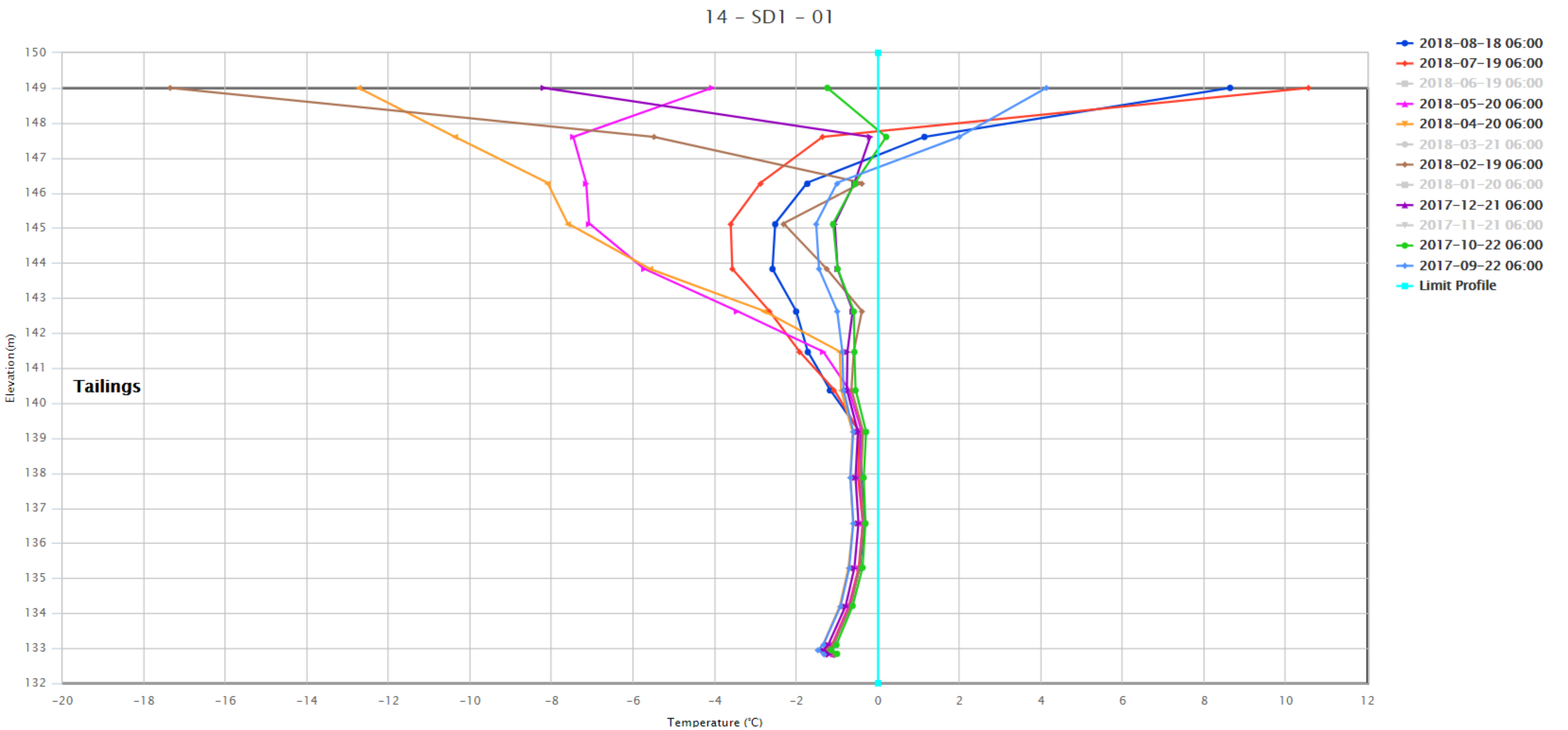
TAILING STORAGE FACILITIES INSTRUMENTATION 2018

1.1 NORTH CELL: SADDLE DAM 1

Thermistors 1 (T1)

- From Sept 22th, 2017 to Aug 18th, 2018
- Tailings frozen all year long below elevation 146.5 (masl)



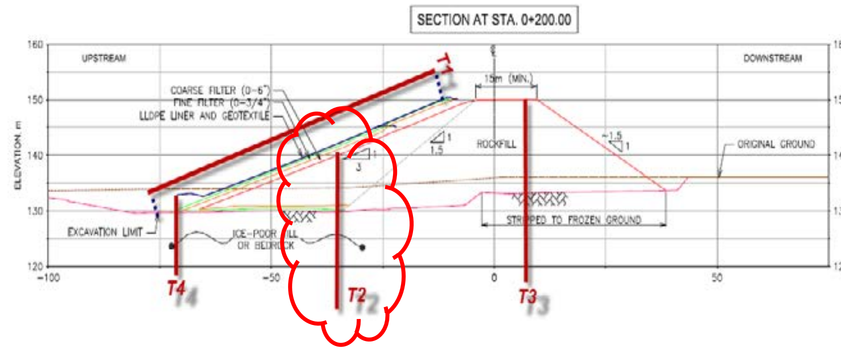


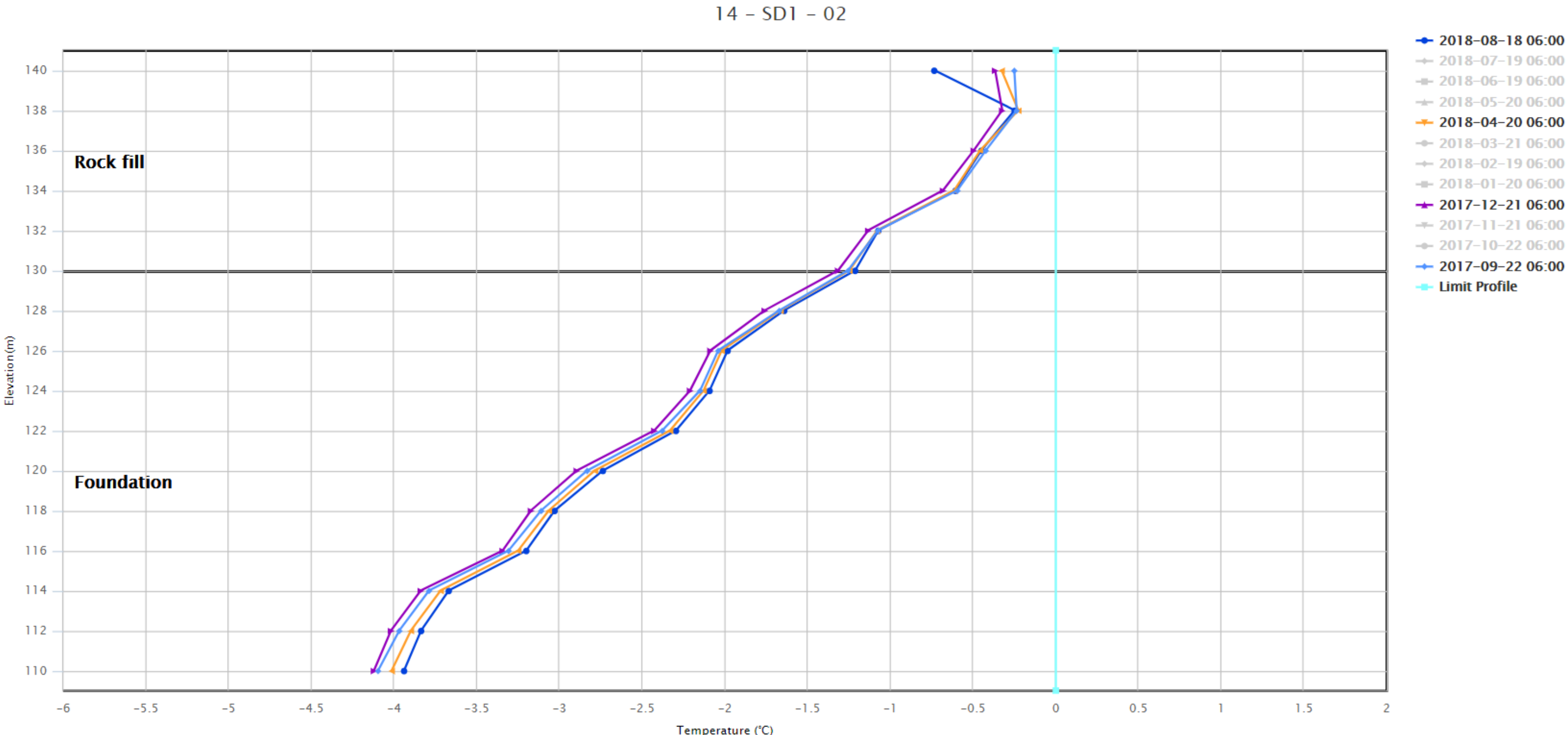
TAILING STORAGE FACILITIES INSTRUMENTATION 2018

1.1 NORTH CELL: SADDLE DAM 1

Thermistors 2 (T2)

- From Sept 22th, 2017 to Aug 18th, 2018
- Rock fill (slope) and foundation frozen all year long below elevation 140.0 (masl)



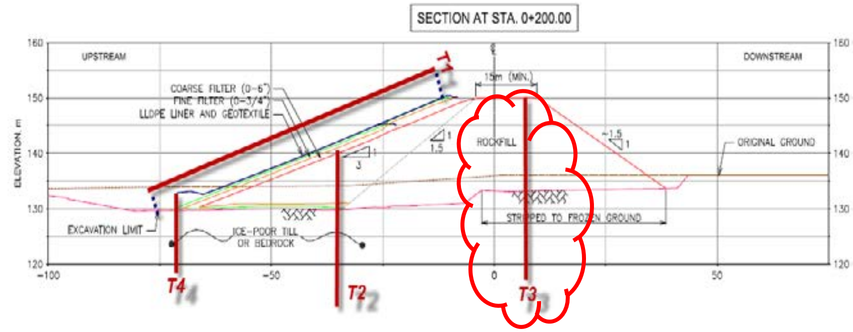


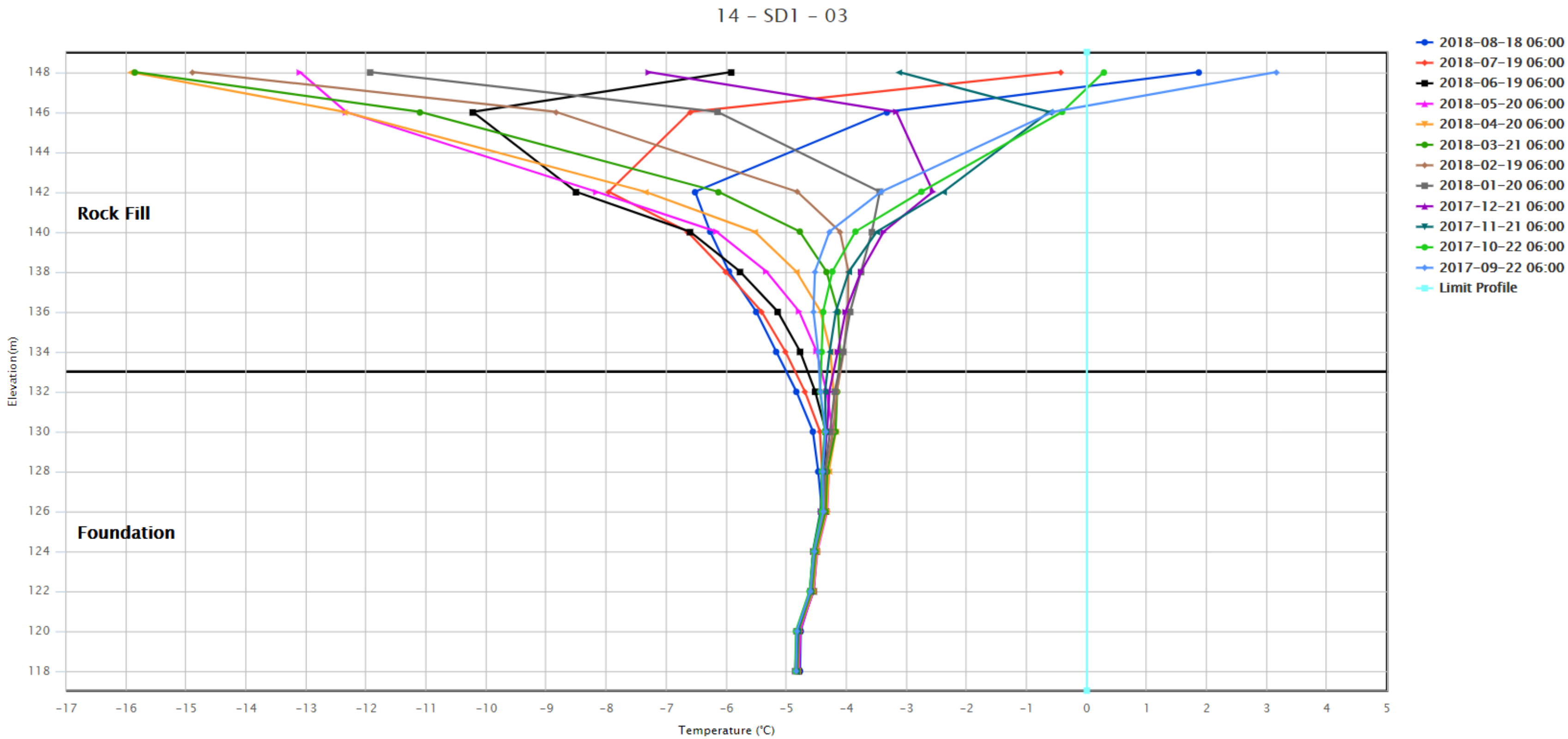
TAILING STORAGE FACILITIES INSTRUMENTATION 2018

1.1 NORTH CELL: SADDLE DAM 1

Thermistors 3 (T3)

- From Sept 22th, 2017 to Aug 18th, 2018
- Rock fill and foundation frozen all year long below elevation 146.0 (masl)





TAILING STORAGE FACILITIES INSTRUMENTATION 2018

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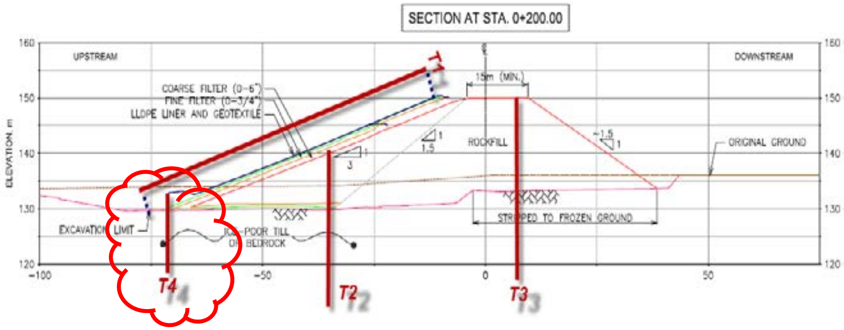
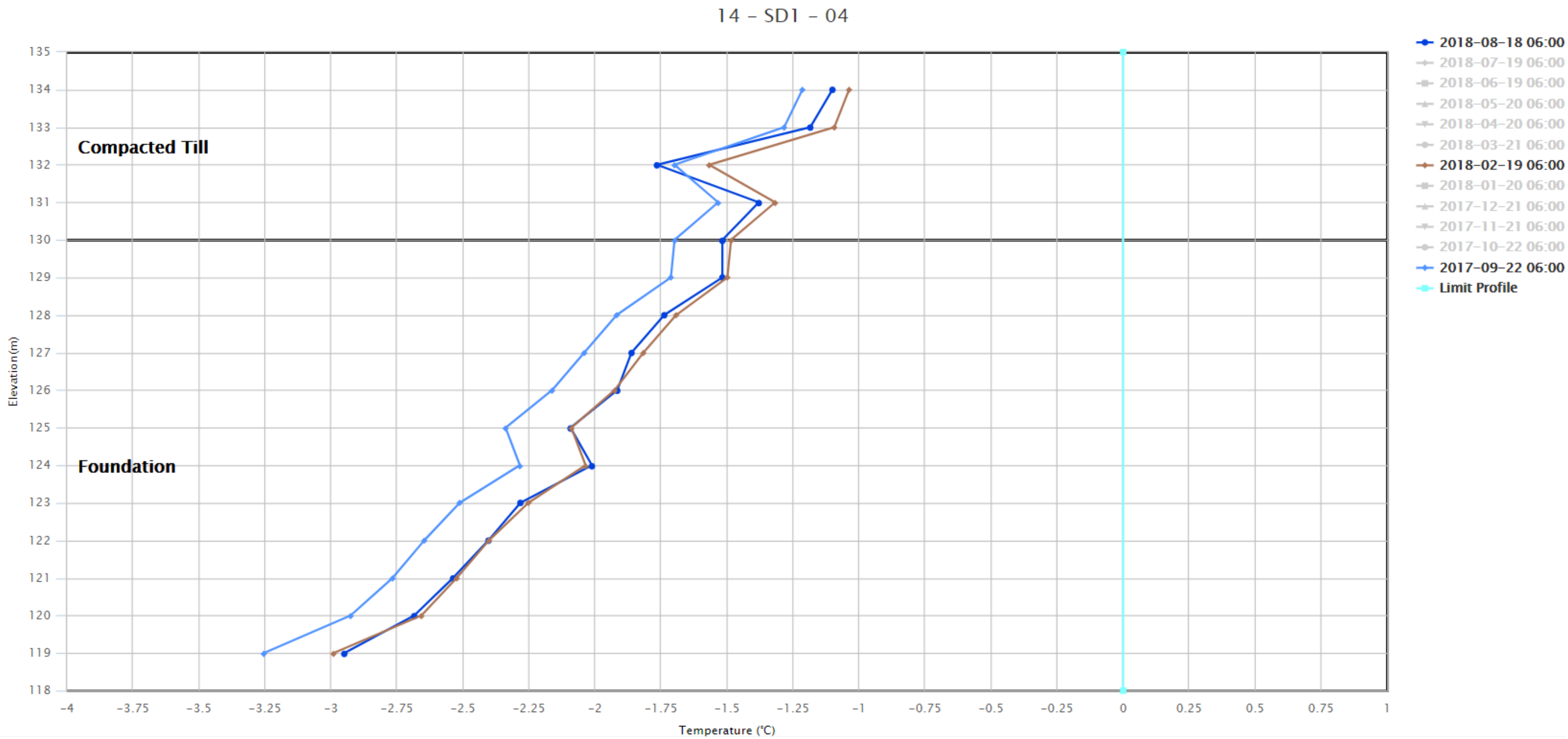
1.1 NORTH CELL: SADDLE DAM 1

Thermistors 4 (T4)

- From Sept 22th, 2017 to Aug 18th, 2018
- Compacted till and foundation frozen all year long below elevation 134.0 (masl)





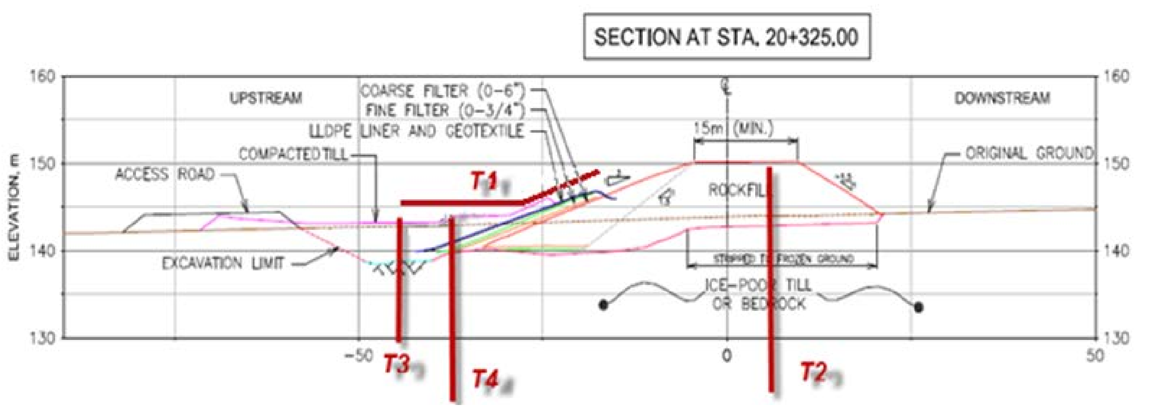
1. North Cell Operational Structures

(2018)

TAILING STORAGE FACILITIES INSTRUMENTATION 2018

1.2 NORTH CELL: SADDLE DAM 2

SD2 Thermistors Emplacement : T1, T2, T3 & T4

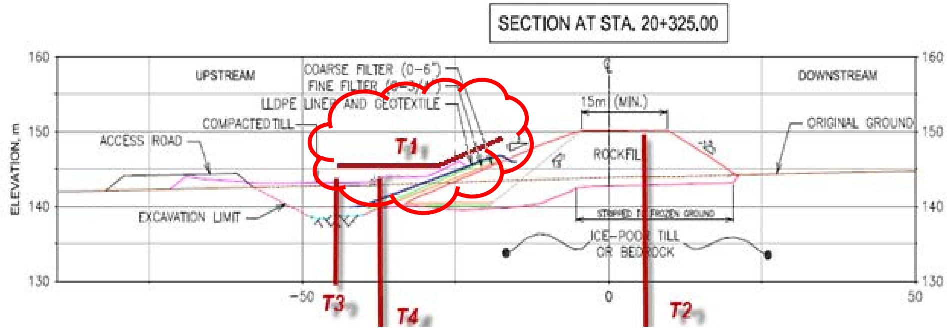


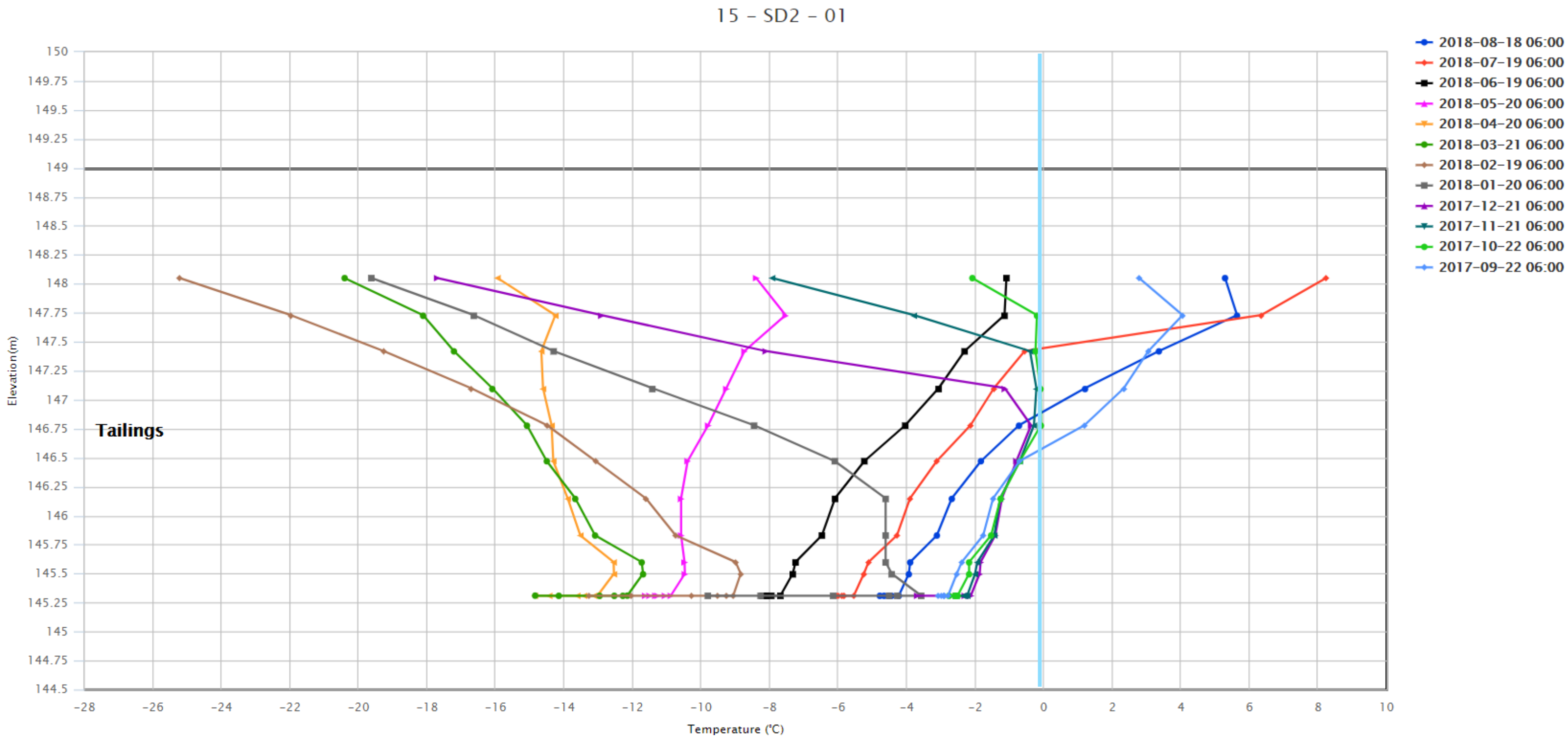
TAILING STORAGE FACILITIES INSTRUMENTATION 2018

1.2 NORTH CELL: SADDLE DAM 2

Thermistors 1 (T1)

- From Sept 22th, 2017 to Aug 18th, 2018
- Compacted till and foundation frozen all year long below elevation 146.5 (masl)



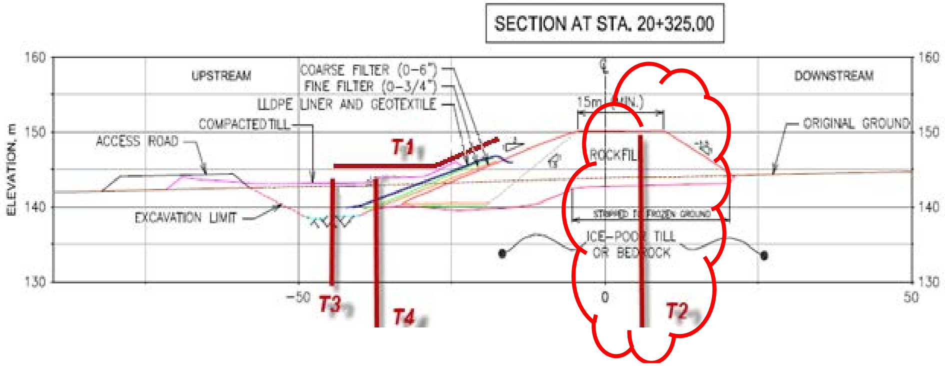


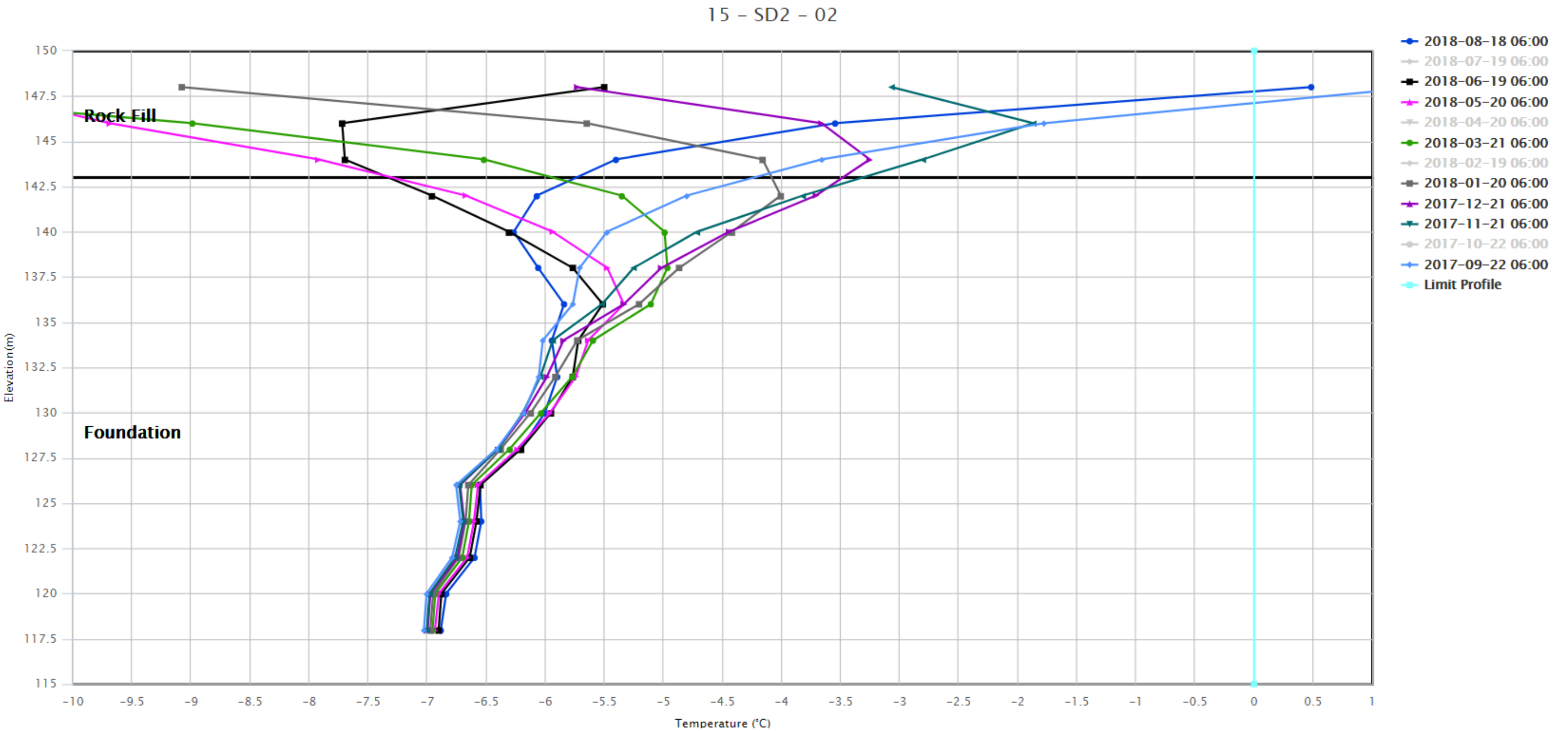
TAILING STORAGE FACILITIES INSTRUMENTATION 2018

1.2 NORTH CELL: SADDLE DAM 2

Thermistors 2 (T2)

- From Sept 22th, 2017 to Aug 18th, 2018
- Compacted till and foundation frozen all year long below elevation 146 (masl)



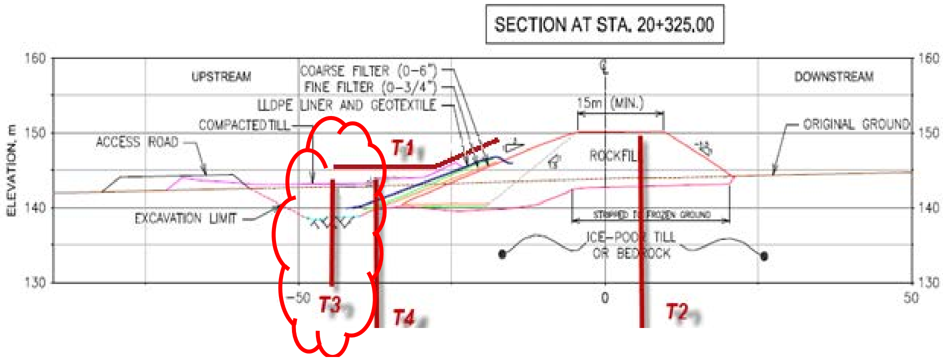


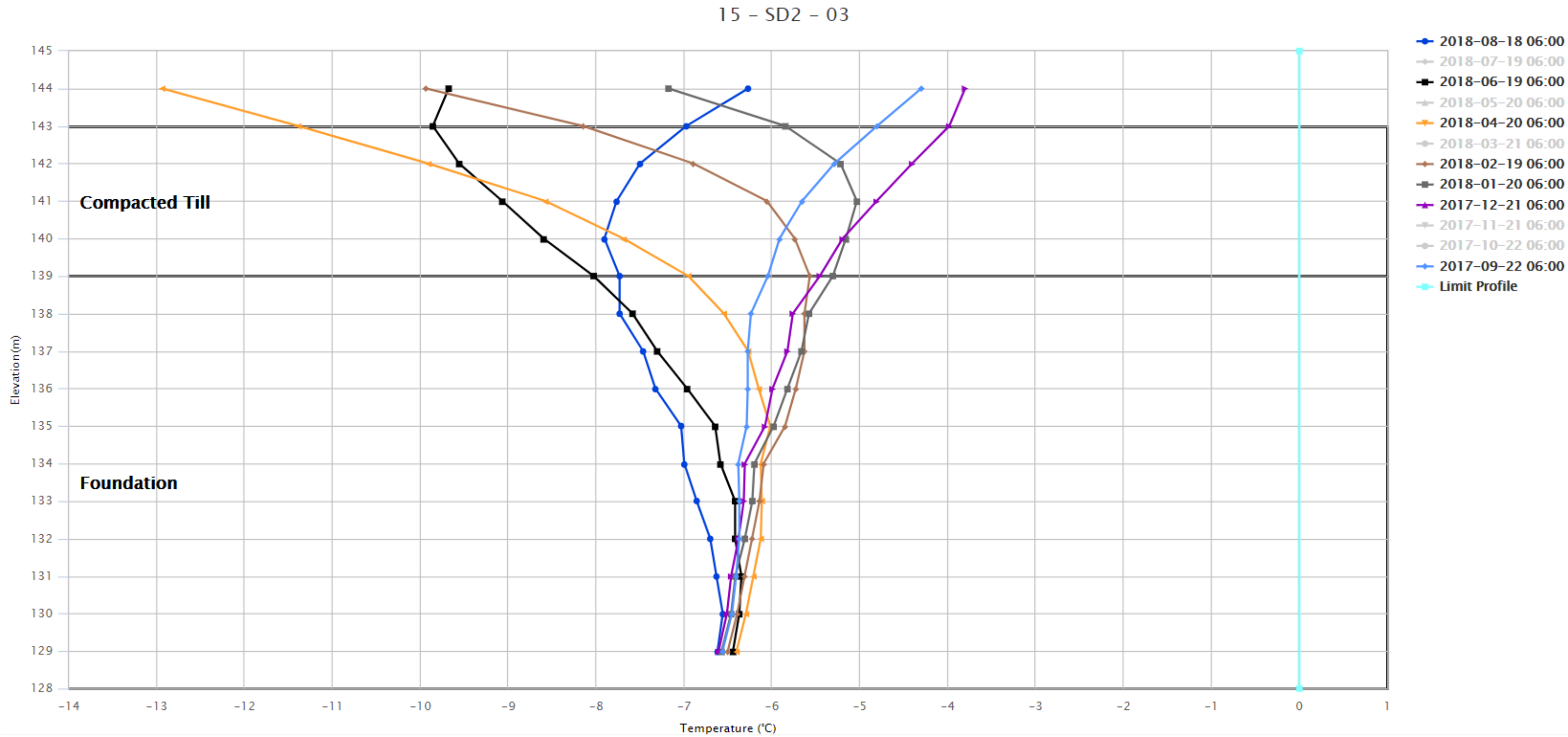
TAILING STORAGE FACILITIES INSTRUMENTATION 2018

1.2 NORTH CELL: SADDLE DAM 2

Thermistors 3 (T3)

- From Sept 22th, 2017 to Aug 18th, 2018
- Compacted till and foundation frozen all year long below elevation 144 (masl)





TAILING STORAGE FACILITIES INSTRUMENTATION 2018

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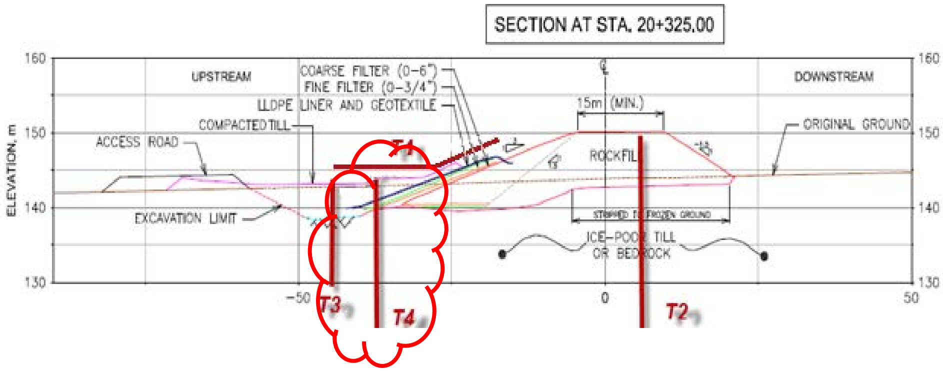
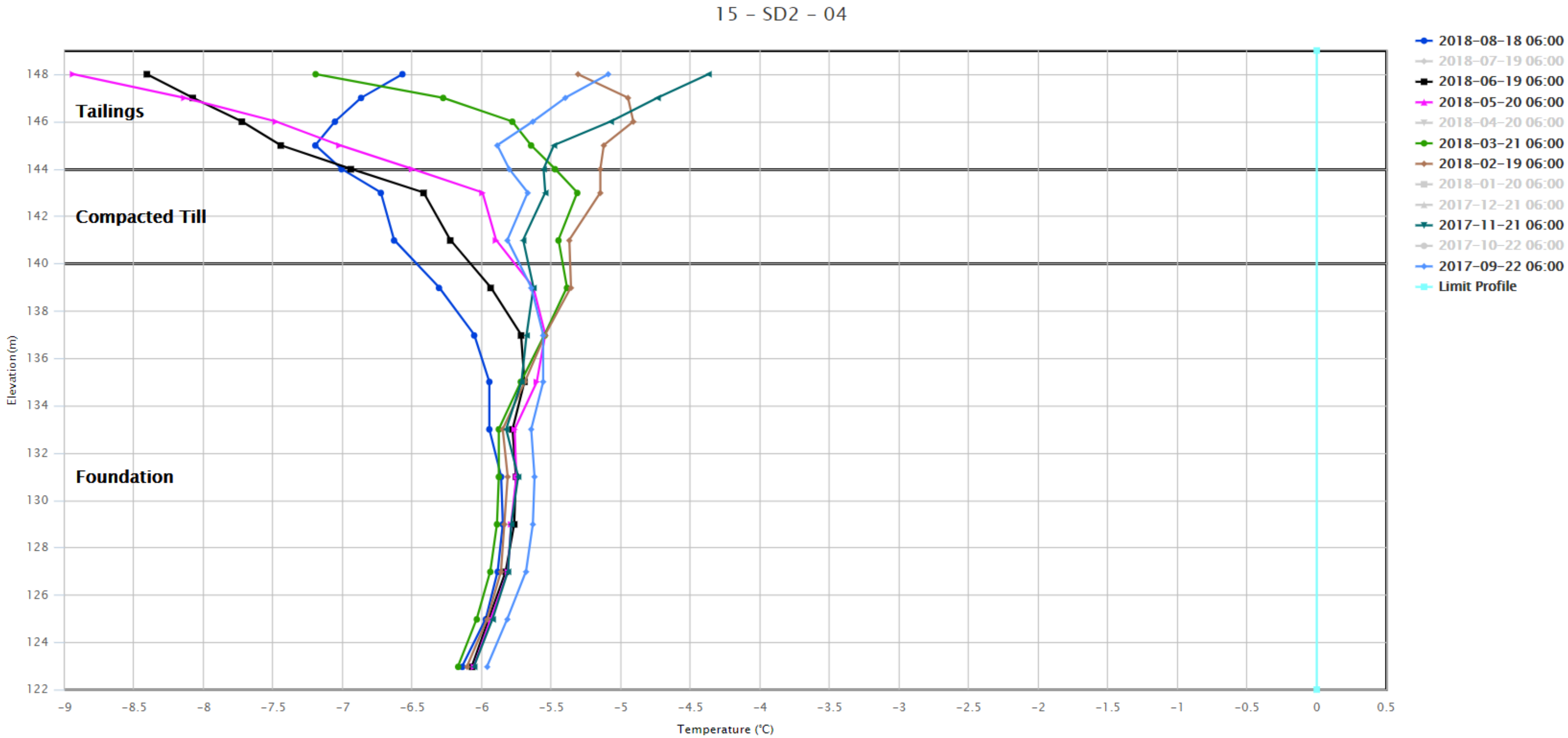
1.2 NORTH CELL: SADDLE DAM 2

Thermistors 4 (T4)

- From Sept 22th, 2017 to Aug 18th, 2018
- Compacted till and foundation frozen all year long below elevation 148 (masl)





1. North Cell Operational Structures

(2018)

TAILING STORAGE FACILITIES INSTRUMENTATION 2018

1.3 NORTH CELL TAILINGS

Thermistors installed inside the North Cell tailings storage facility during the 2017 instrumentation campaign

TAILING STORAGE FACILITIES INSTRUMENTATION 2018

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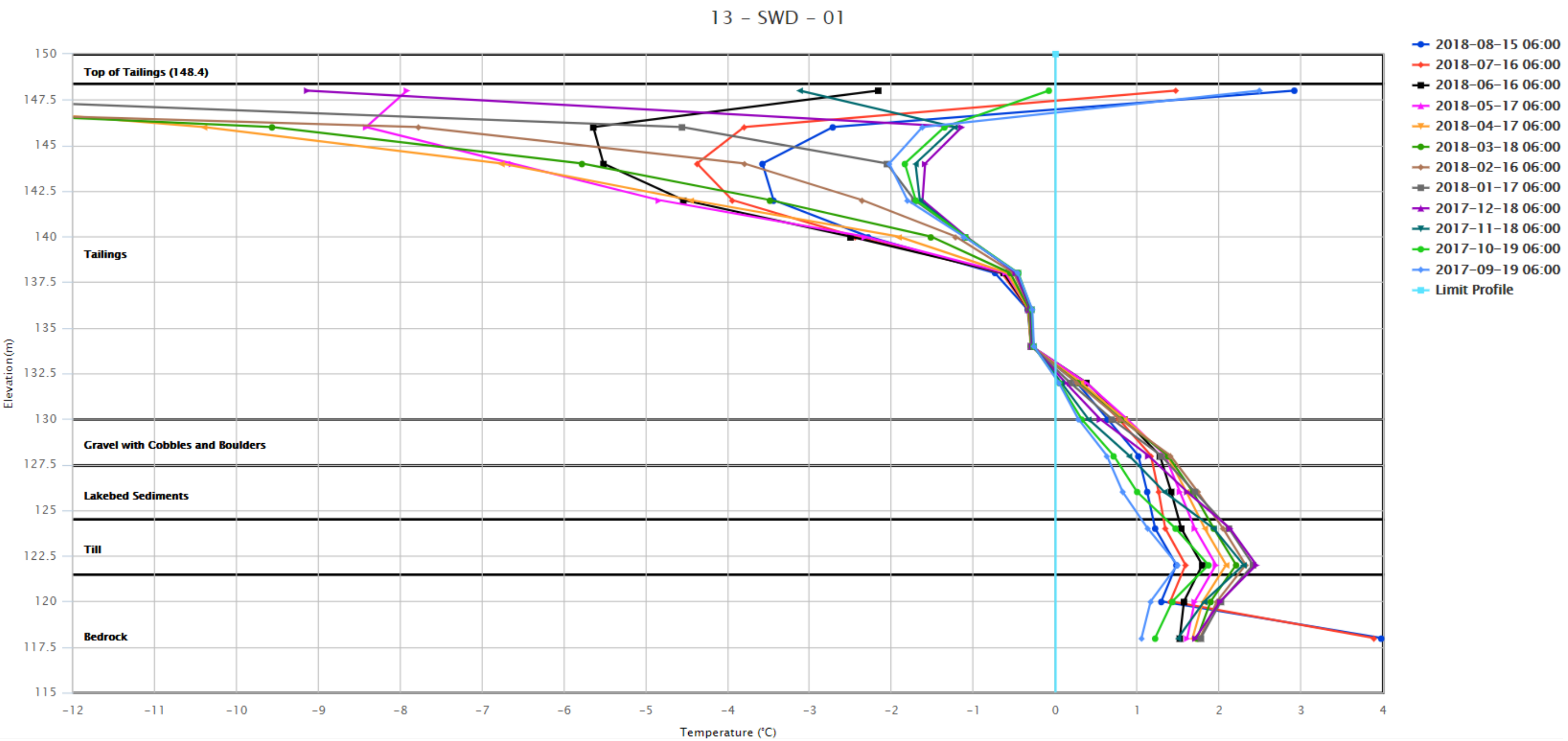
1.3 NORTH CELL TAILINGS

Thermistor SWD 01

- From Sept 19th, 2017 to Aug 18th, 2018
- Unfrozen below 132.5 m (Due to South Cell pond water)

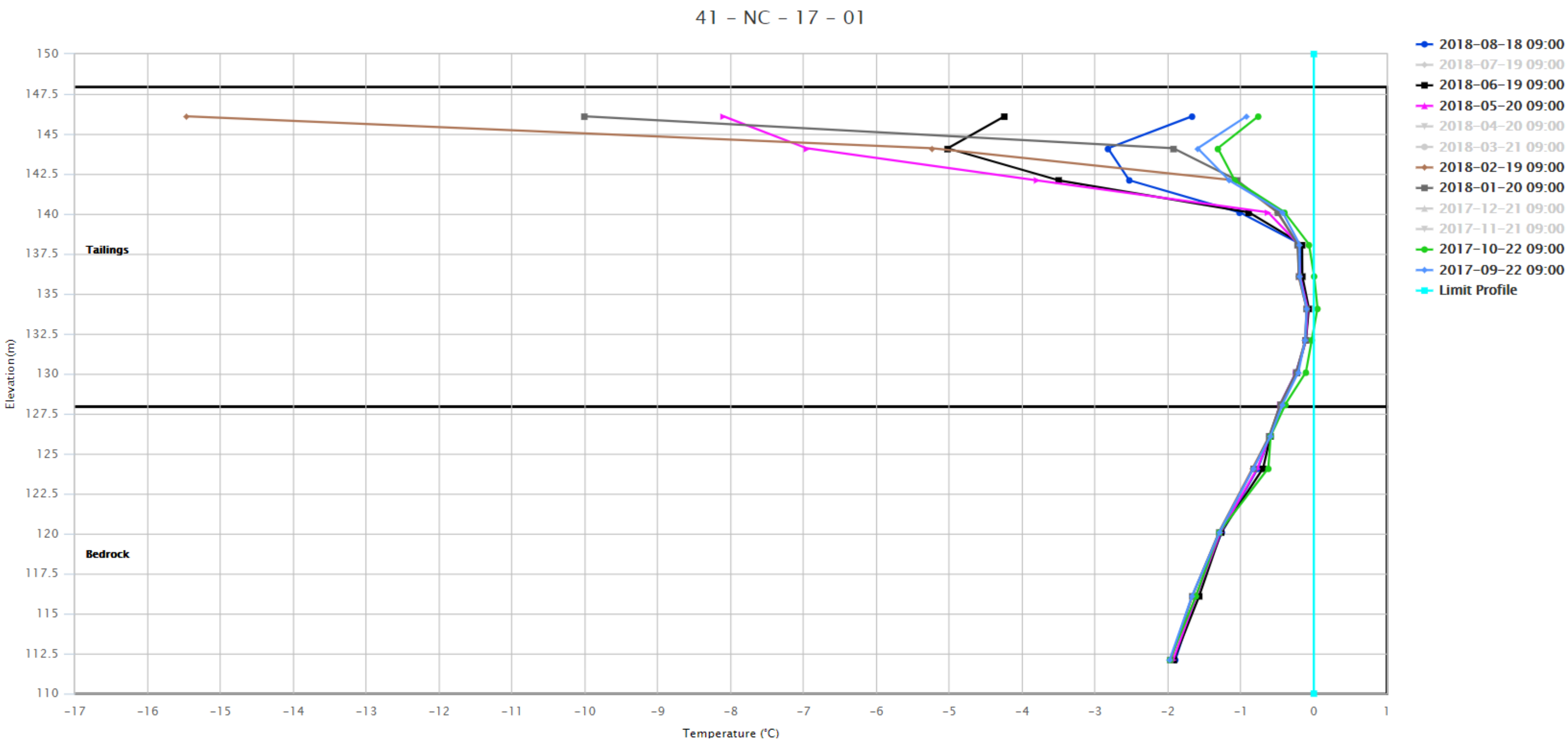


TAILING STORAGE FACILITIES INSTRUMENTATION 2018

1.3 NORTH CELL TAILINGS

Thermistor NC-17-01

- From Sept 22nd, 2017 to Aug 18th, 2018



TAILING STORAGE FACILITIES INSTRUMENTATION 2018

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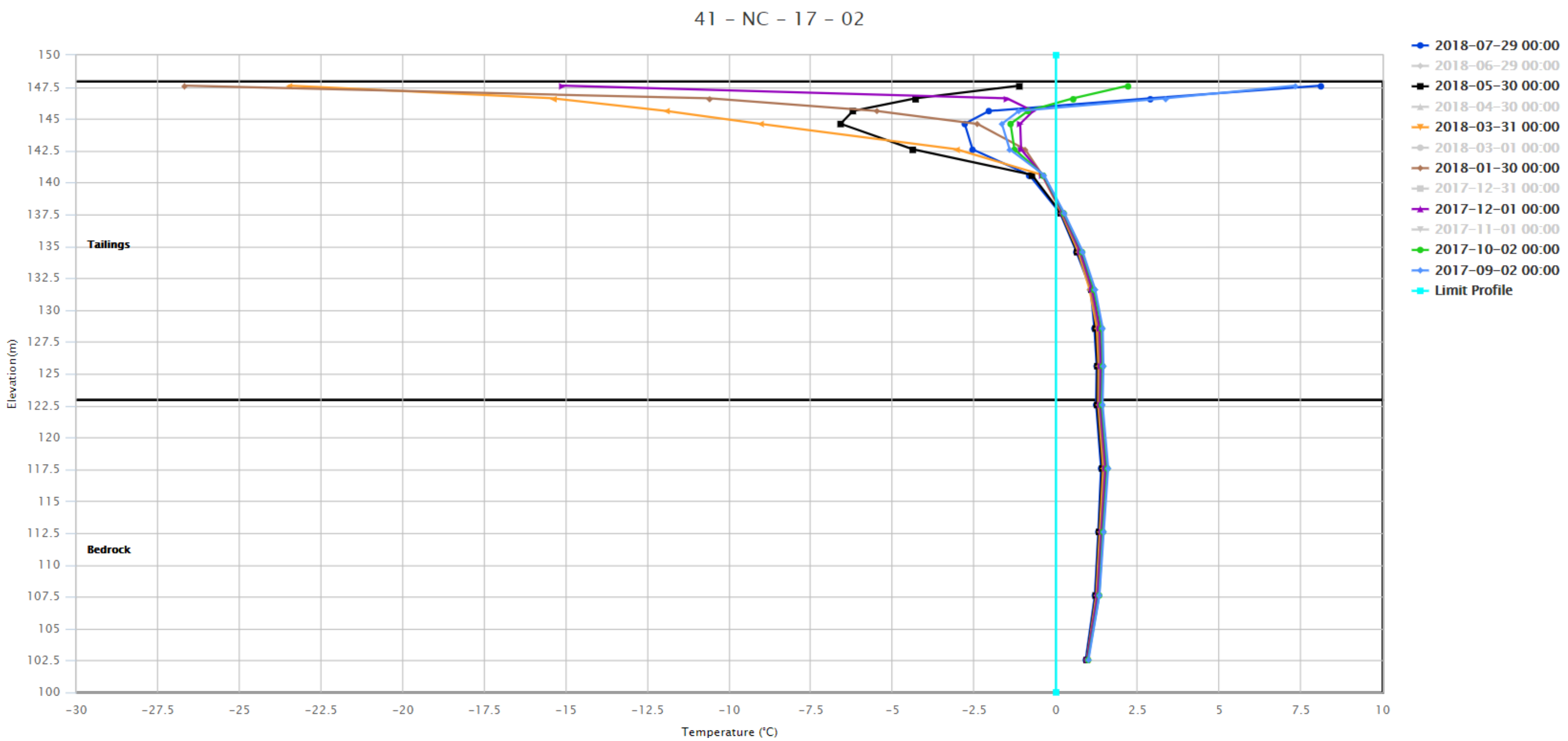
1.3 NORTH CELL TAILINGS

Thermistor NC-17-02

- From Sept 2nd, 2017 to July 29th, 2018
- Unfrozen below 137.5 m (Due to North Cell pond water)

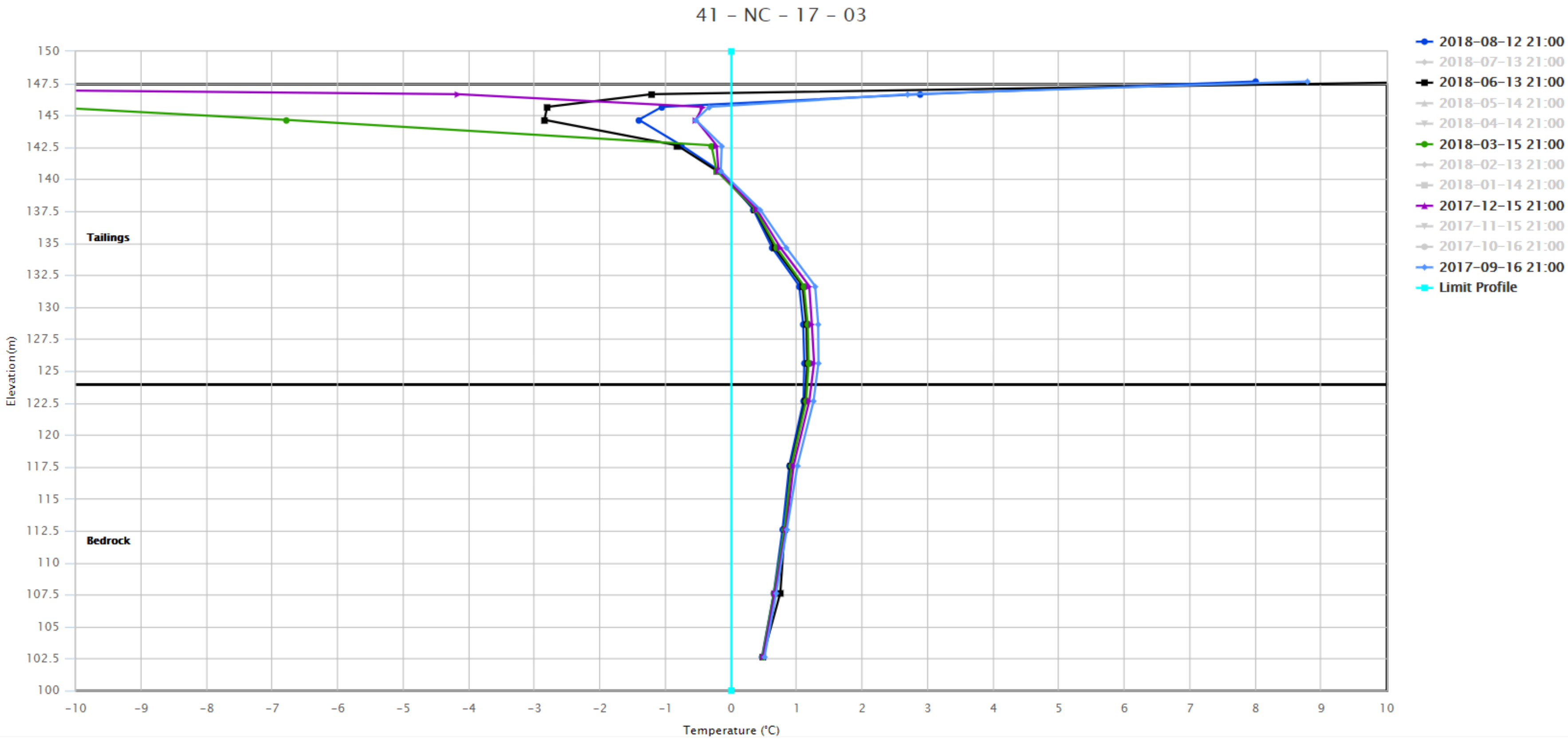


TAILING STORAGE FACILITIES INSTRUMENTATION 2018

1.3 NORTH CELL TAILINGS

Thermistor NC-17-03

- From Sept 16th, 2017 to Aug 12th, 2018
- Unfrozen below 140 m (Due to North Cell pond water)

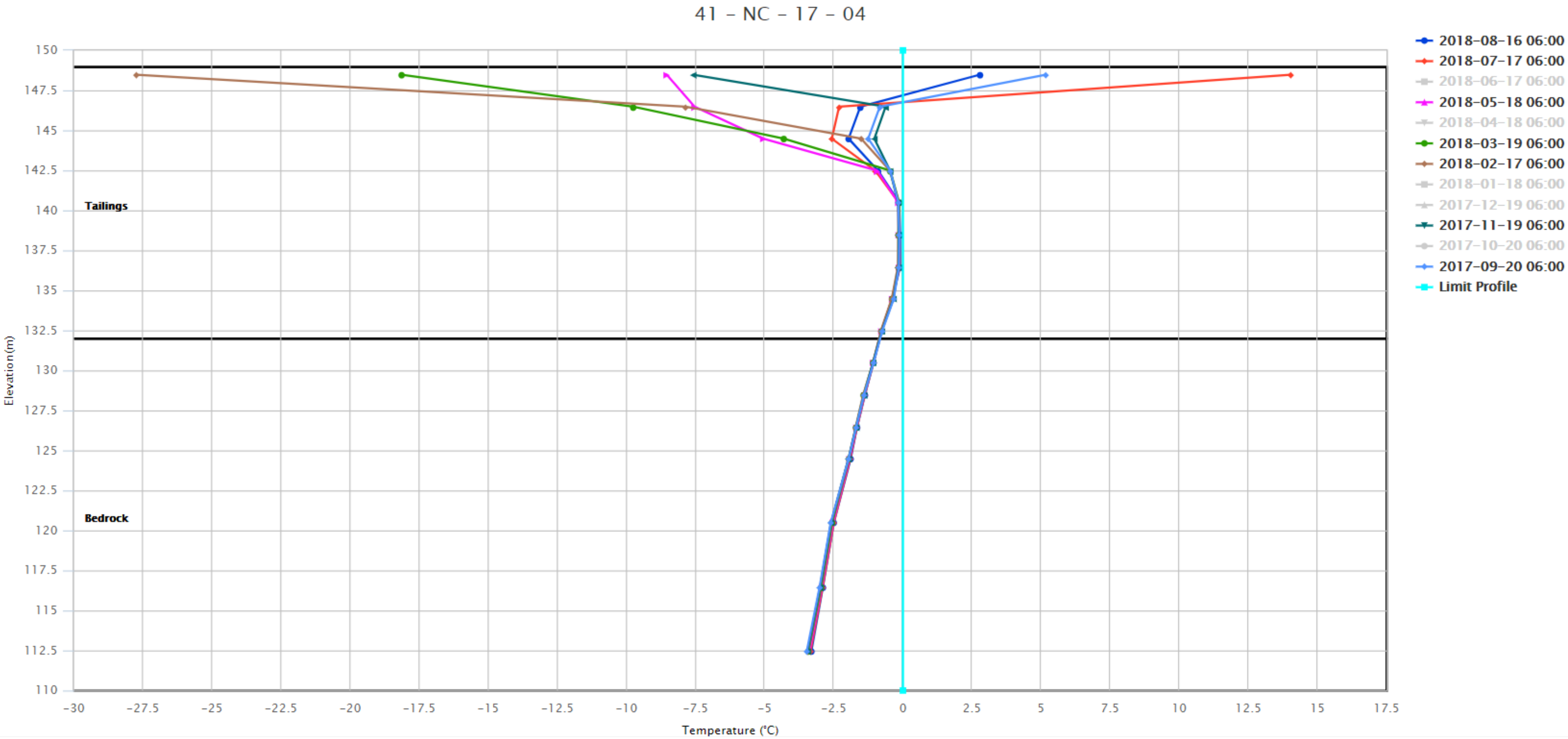


TAILING STORAGE FACILITIES INSTRUMENTATION 2018

1.3 NORTH CELL TAILINGS

Thermistor NC-17-04

- From Sept 20th, 2017 to Aug 16th, 2018
- Frozen below 147 m

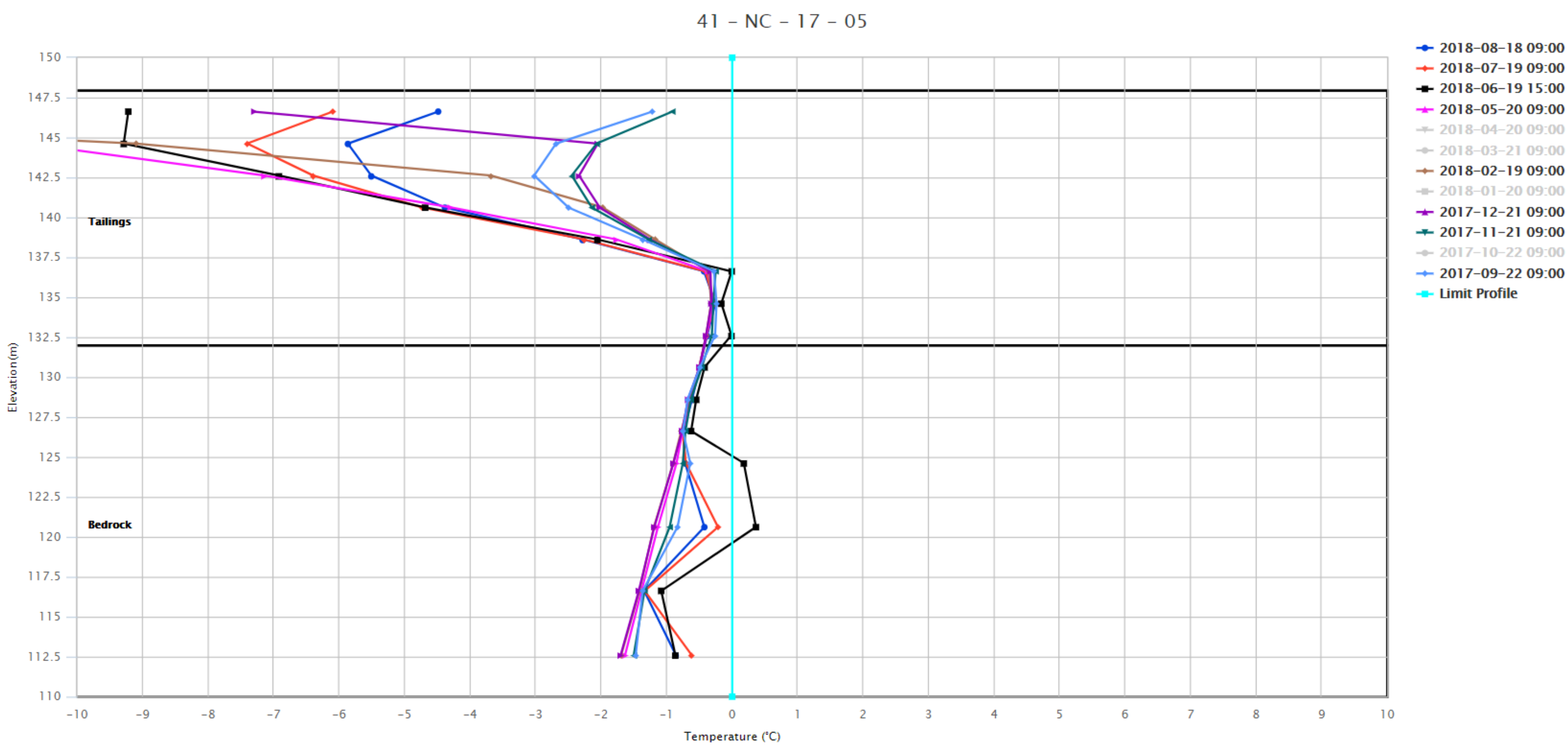


TAILING STORAGE FACILITIES INSTRUMENTATION 2018

1.3 NORTH CELL TAILINGS

Thermistor NC-17-05

- From Sept 22nd, 2017 to Aug 18th, 2018
- Frozen below 147 m

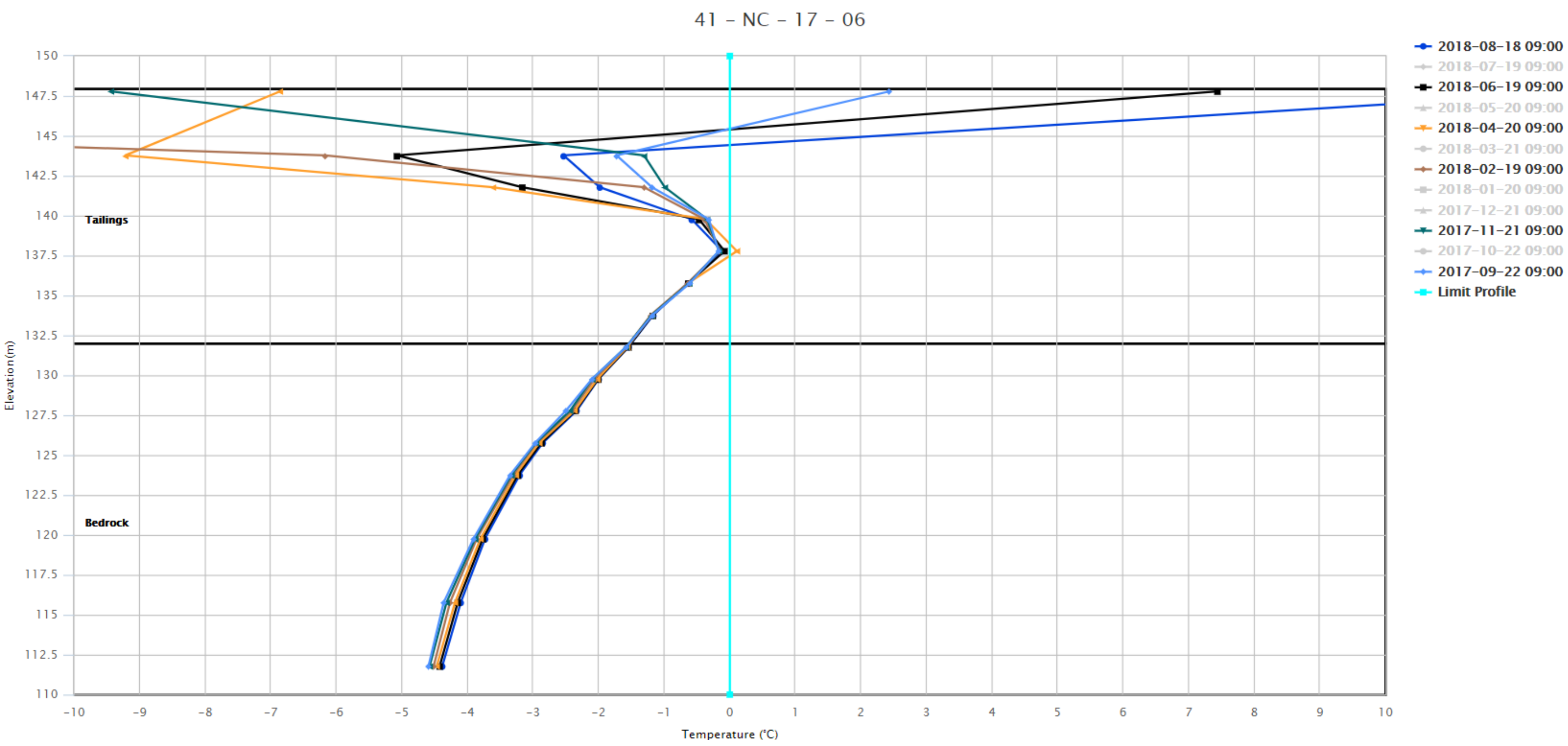


TAILING STORAGE FACILITIES INSTRUMENTATION 2018

1.3 NORTH CELL TAILINGS

Thermistor NC-17-06

- From Sept 22nd, 2017 to Aug 18th, 2018
- Frozen below 144 m

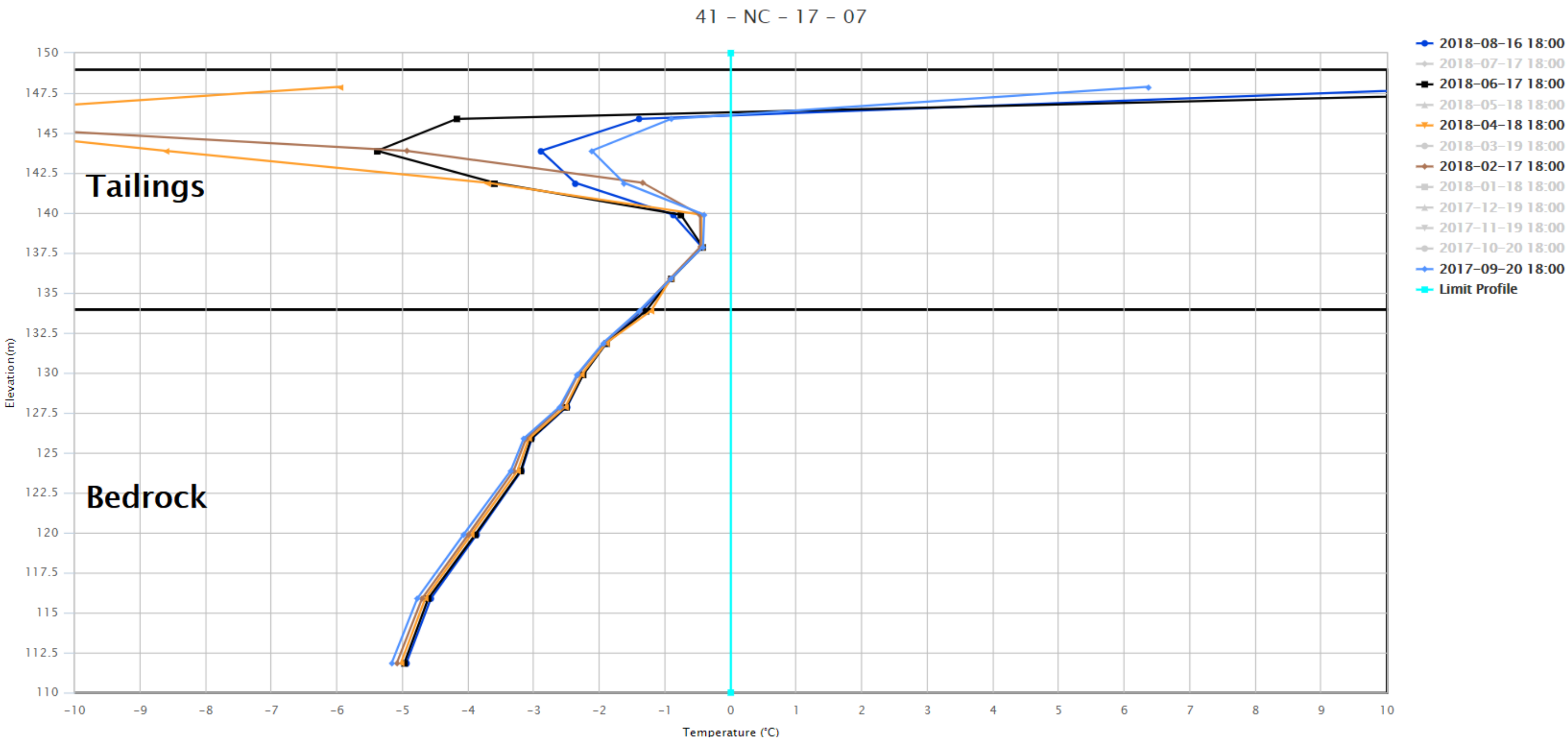


TAILING STORAGE FACILITIES INSTRUMENTATION 2018

1.3 NORTH CELL TAILINGS

Thermistor NC-17-07

- From Sept 20th, 2017 to Aug 16th, 2018
- Frozen below 146 m

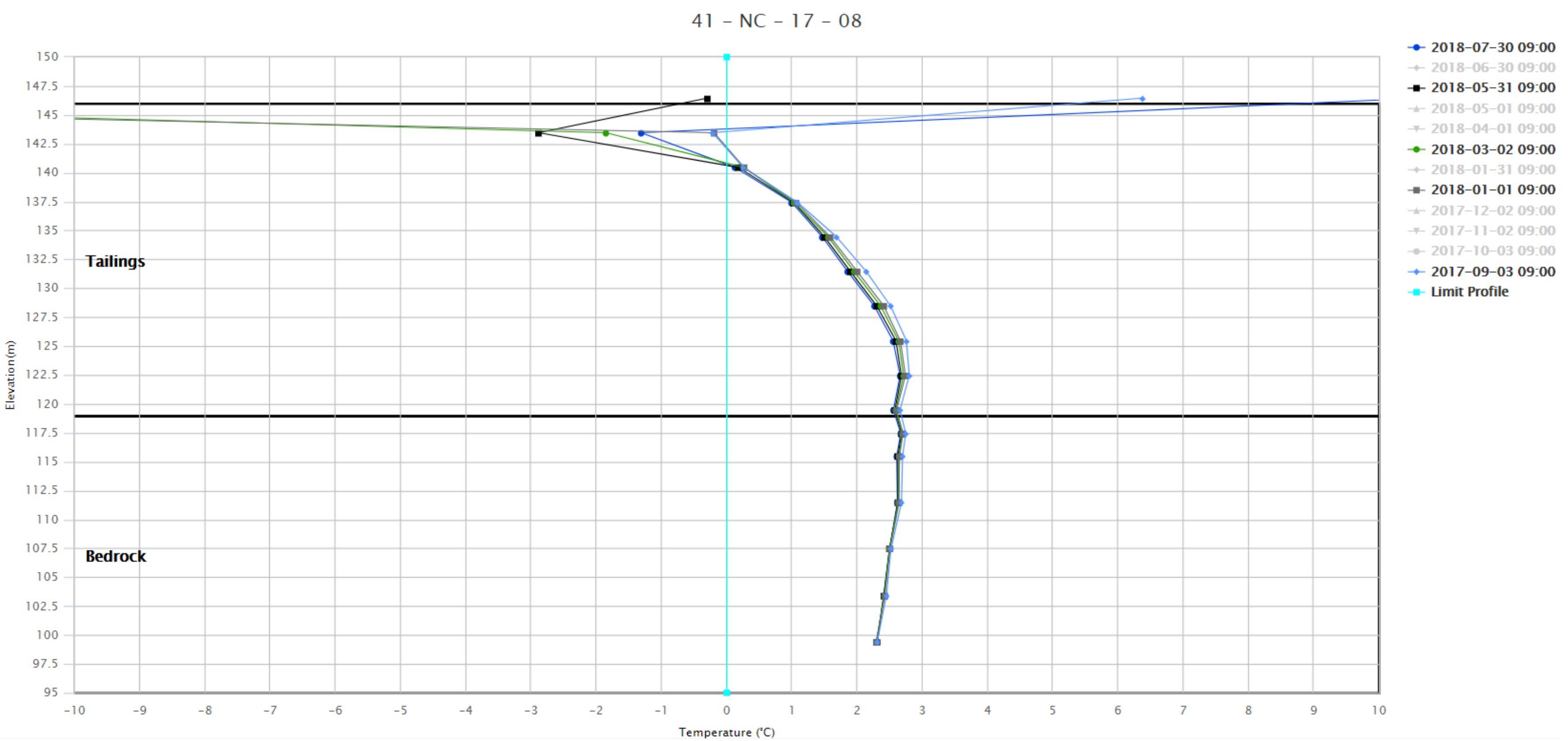


TAILING STORAGE FACILITIES INSTRUMENTATION 2018

1.3 NORTH CELL TAILINGS

Thermistor NC-17-08

- From Sept 3rd, 2017 to July 30th, 2018
- Unfrozen below 140 m (Due to North Cell pond water)



1. North Cell Operational Structures

(2018)

TAILING STORAGE FACILITIES INSTRUMENTATION 2018

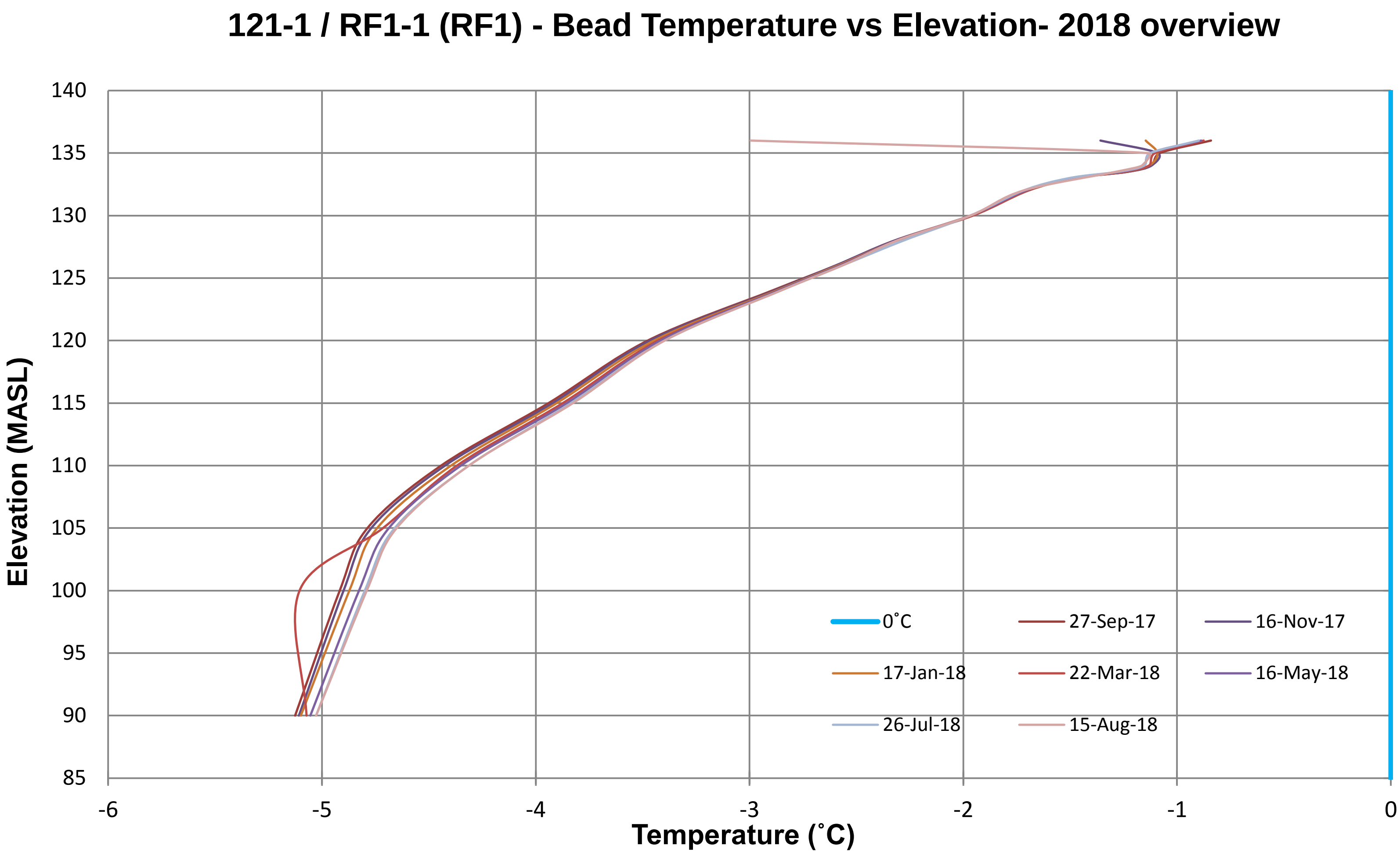
1.4 NORTH CELL – ROCK FILL (RF1&RF2)

- **RF1 Thermistors** – 3 Total (T121-1, RF1-3 and T73-6)
- **RF2 Thermistors** – 1 Total (T122-1)

TAILING STORAGE FACILITIES INSTRUMENTATION 2018

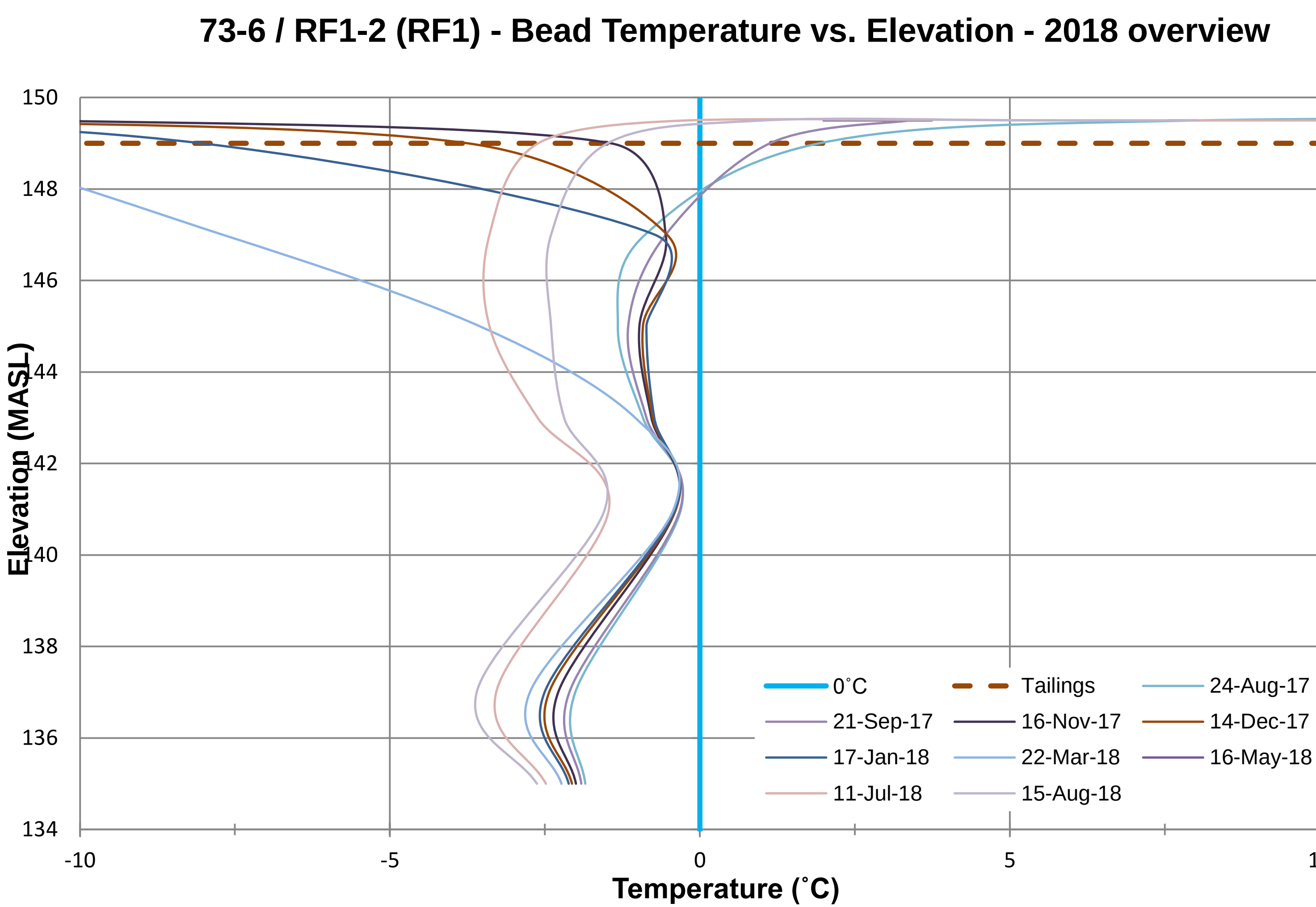
1.4 NORTH CELL – ROCK FILL

Thermistor RF1 - T121-1



1.4 NORTH CELL – ROCK FILL

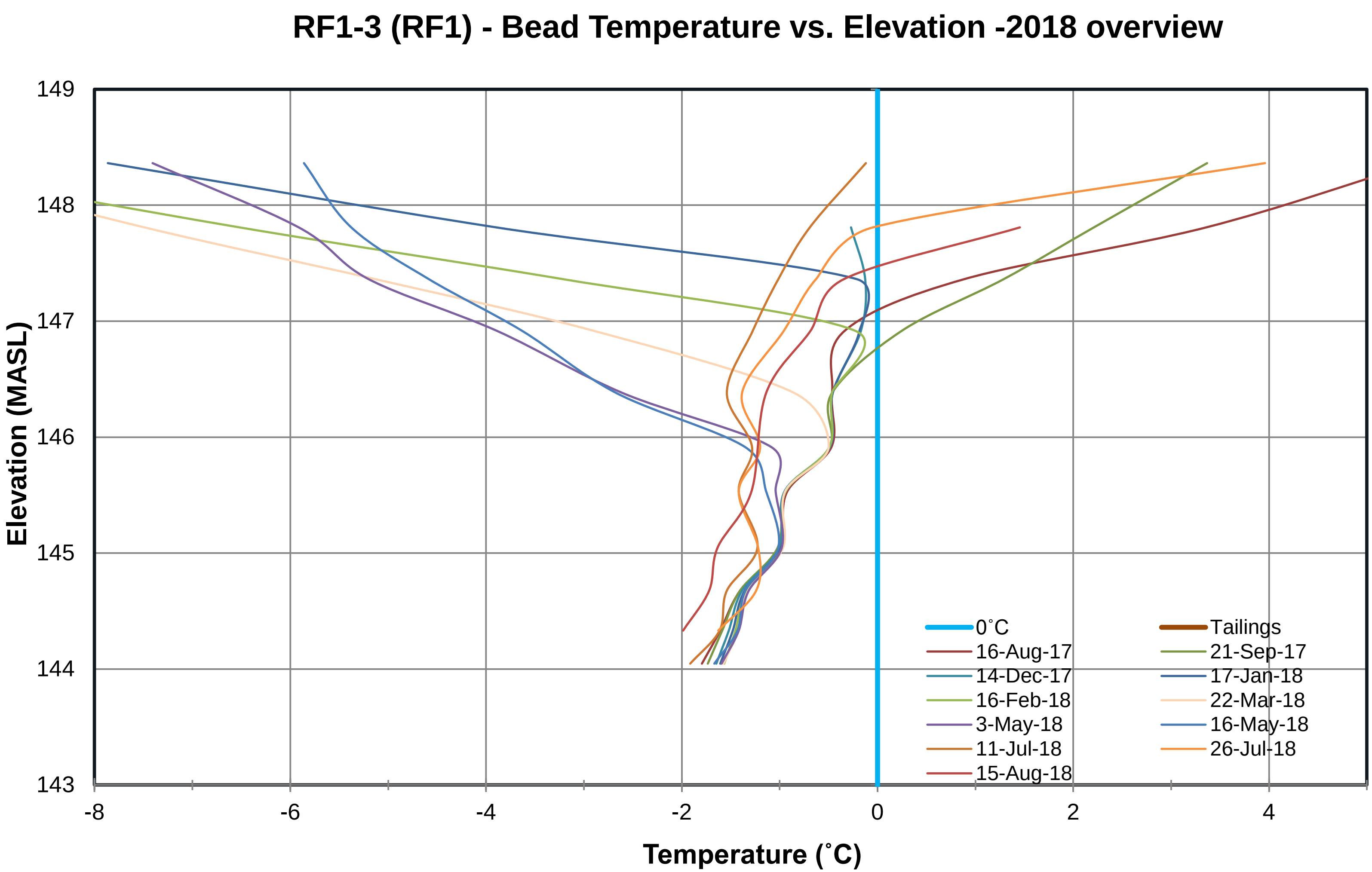
Thermistor RF1 – T73-6



TAILING STORAGE FACILITIES INSTRUMENTATION 2018

1.4 NORTH CELL – ROCK FILL

Thermistor RF1 – 3 (Along the slope)



TAILING STORAGE FACILITIES INSTRUMENTATION 2018

1.4 NORTH CELL – ROCK FILL

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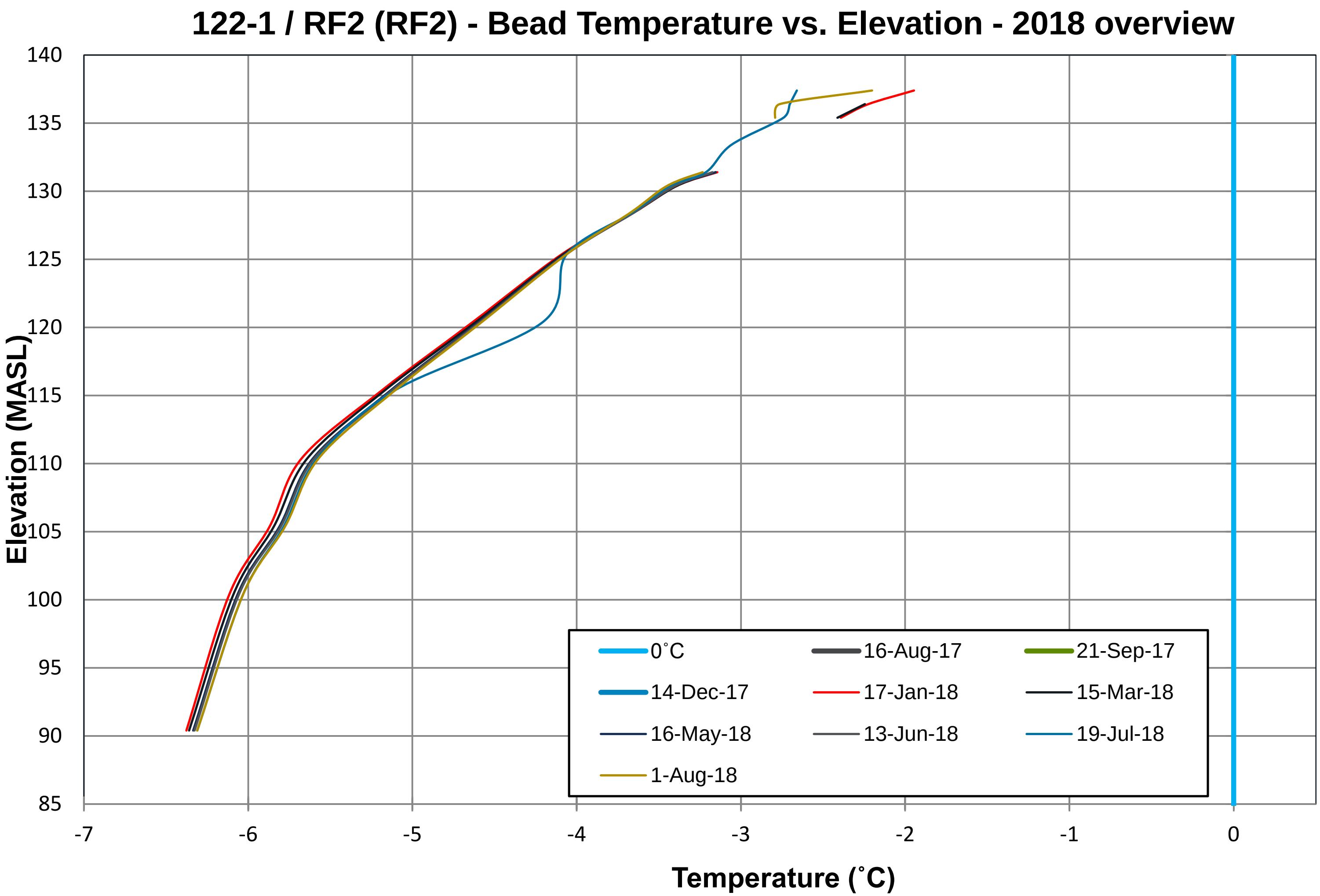
Thermistor RF2 – T122-1



1. North Cell Operational Structures

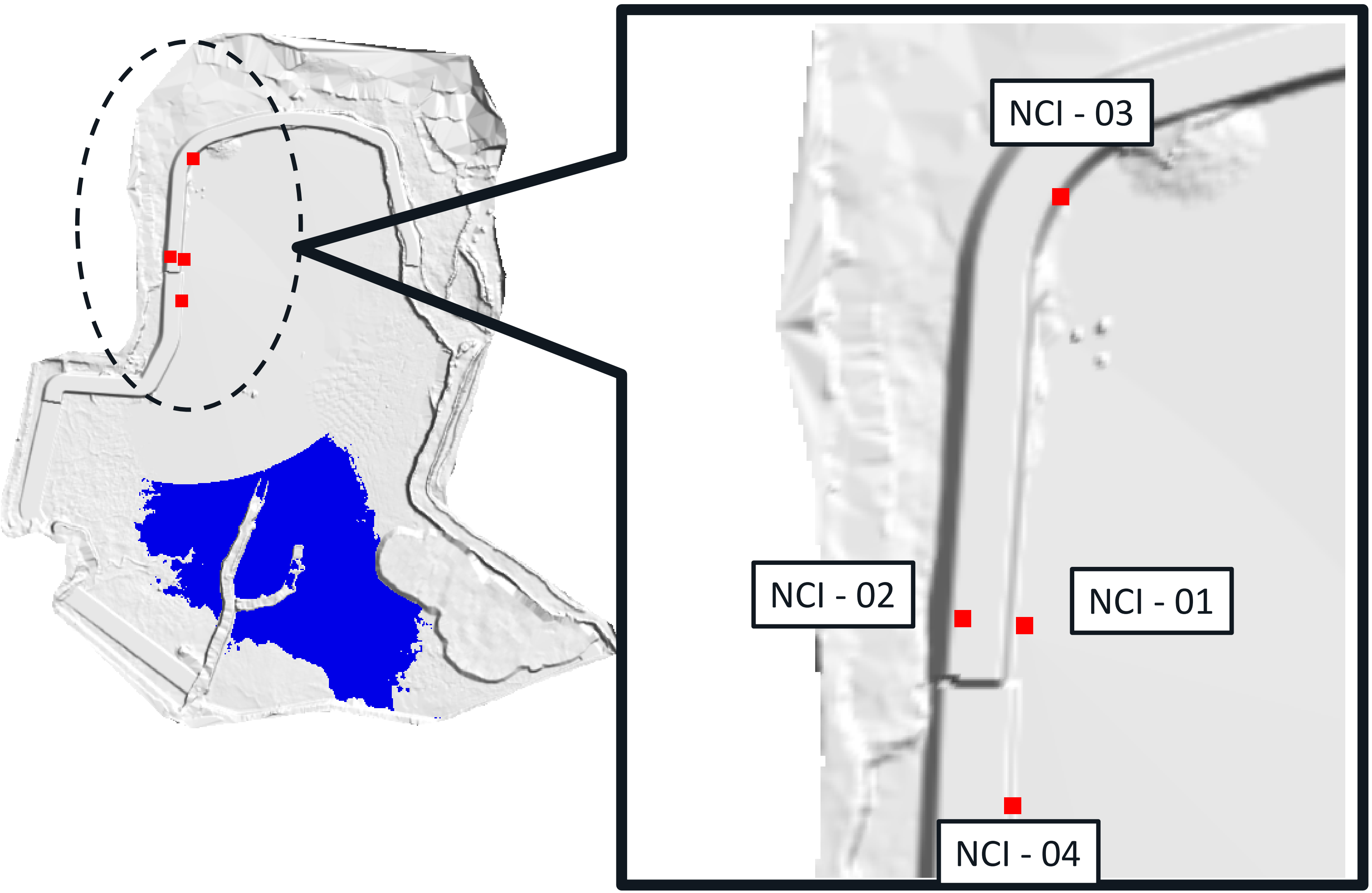
(2018)

Internal structure

Thermistor – 4 Total
NCIS-1 to NCIS-4

TAILING STORAGE FACILITIES INSTRUMENTATION 2018

1.5 NORTH CELL – INTERNAL STRUCTURE

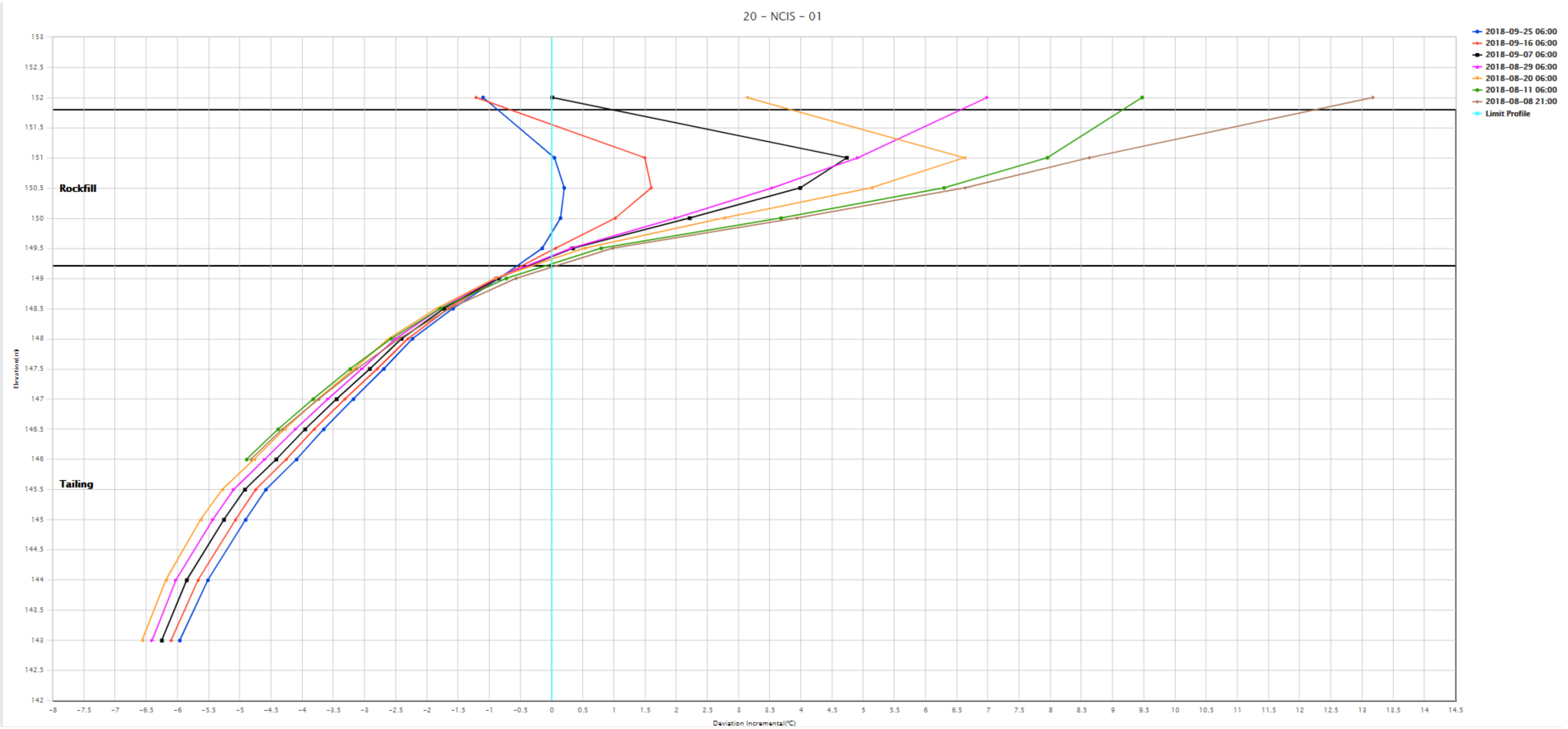


TAILING STORAGE FACILITIES INSTRUMENTATION 2018

1.5 NORTH CELL – INTERNAL STRUCTURE

Thermistor NCIS-01

- From Aug 8 to Sept 25, 2018
- 2 days interval since it was installed during the August 2018 instrumentation campaign .



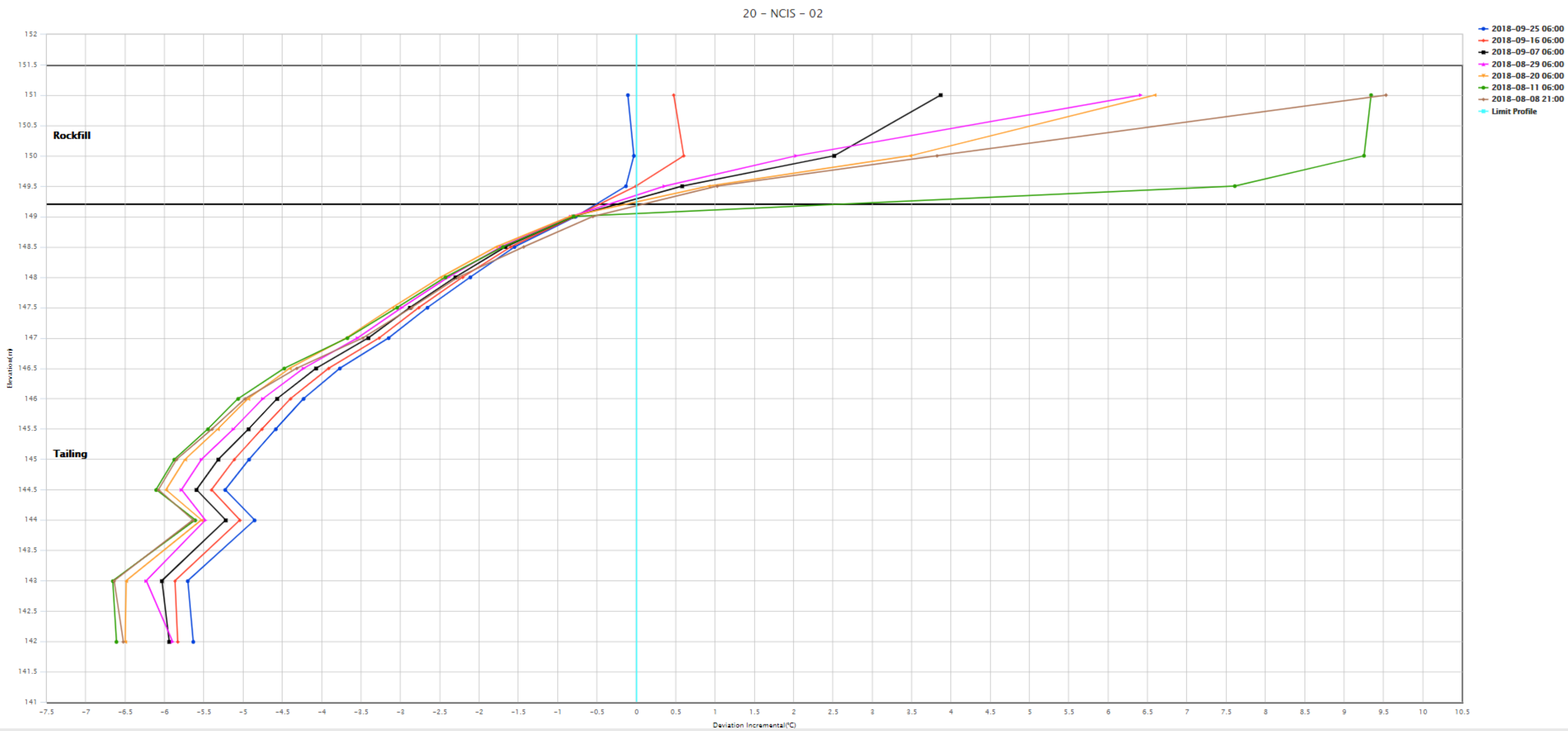
TAILING STORAGE FACILITIES INSTRUMENTATION 2018

1.5 NORTH CELL – INTERNAL STRUCTURE

AGNICO EAGLE

Thermistor NCIS-02

- From Aug 8 to Sept 25, 2018
- 2 days interval since it was installed during the August 2018 instrumentation campaign .



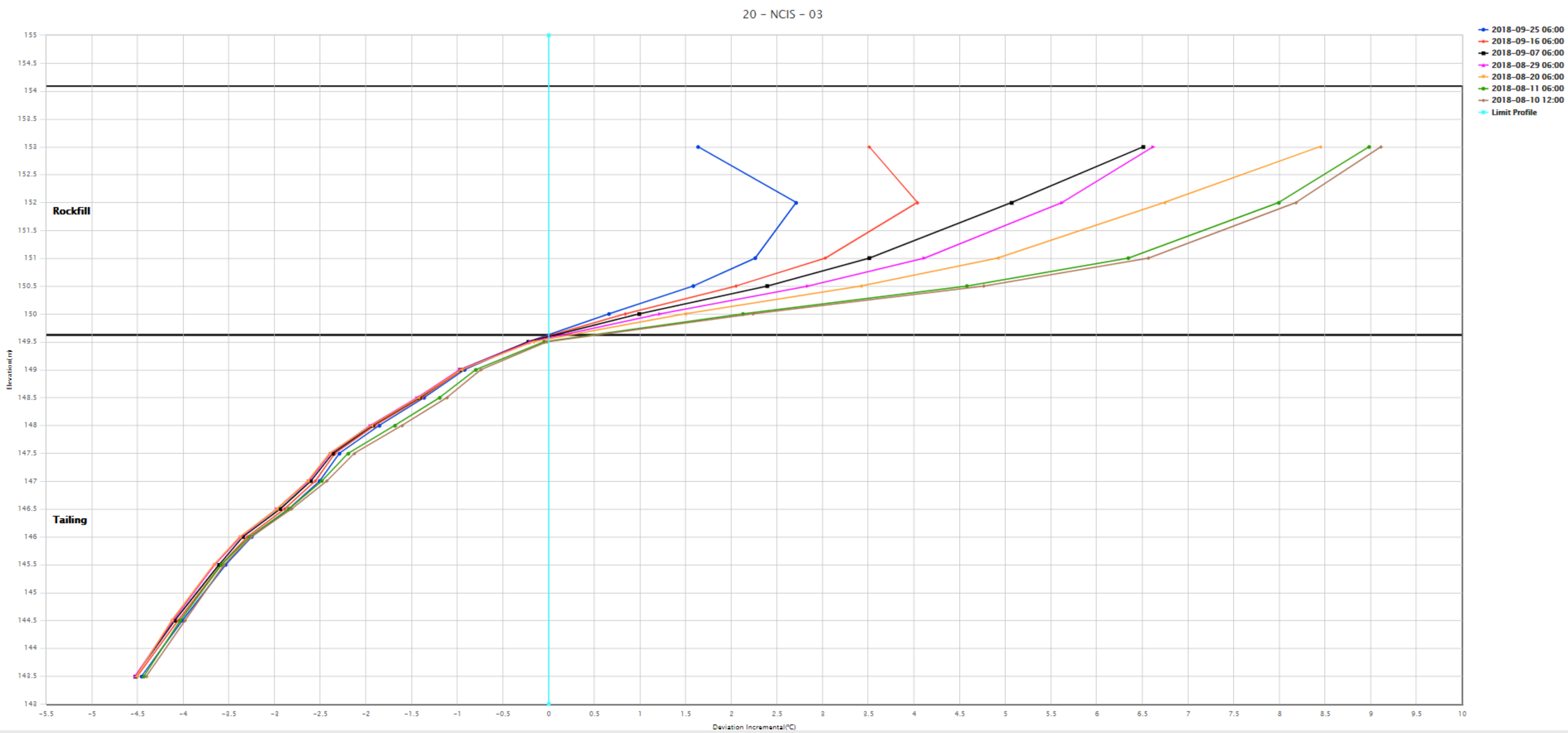
TAILING STORAGE FACILITIES INSTRUMENTATION 2018

1.5 NORTH CELL – INTERNAL STRUCTURE

Thermistor NCIS-03

- From Aug 10 to Sept 25, 2018

- 2 days interval since it was installed during the August 2018 instrumentation campaign .

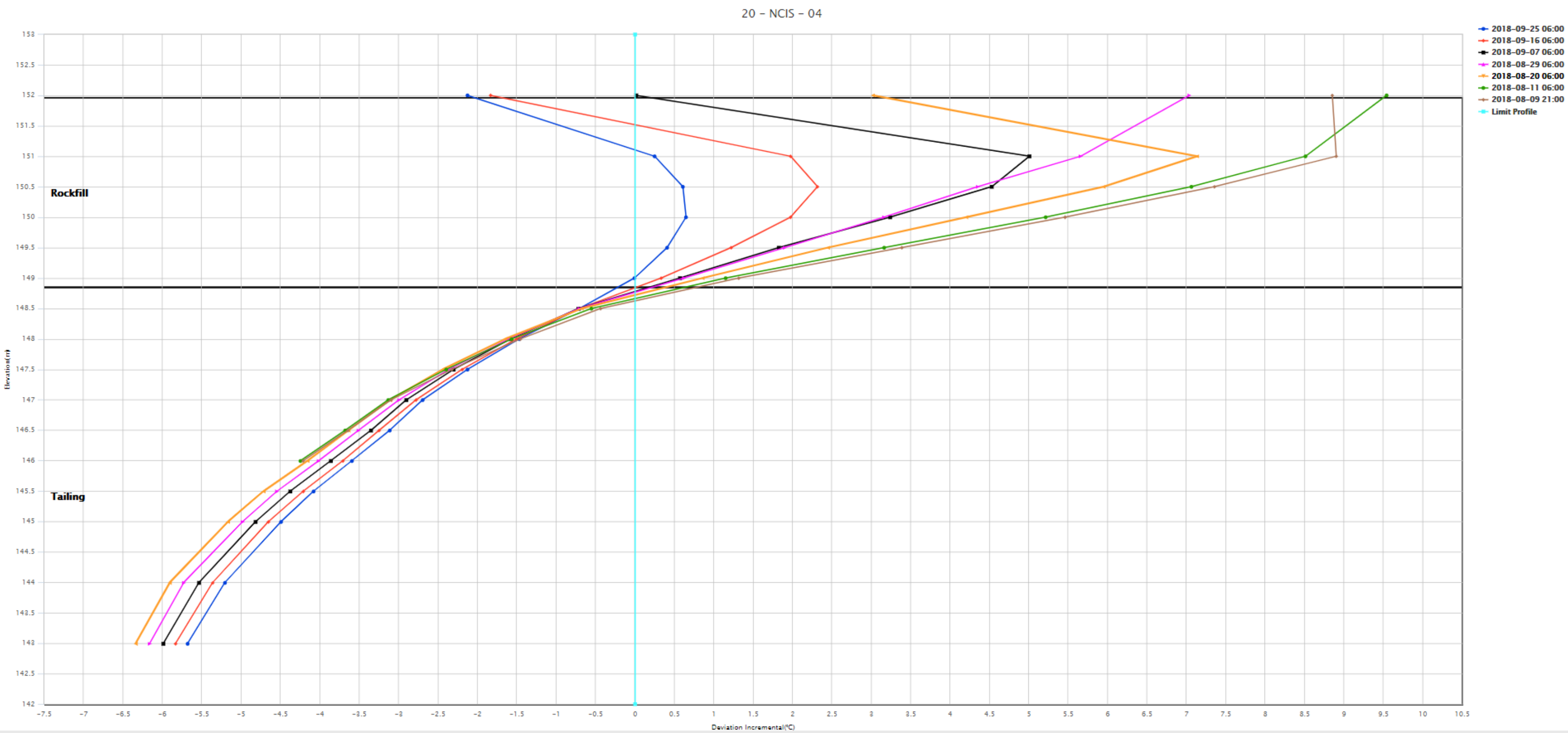


TAILING STORAGE FACILITIES INSTRUMENTATION 2018

1.5 NORTH CELL – INTERNAL STRUCTURE

Thermistor NCIS-04

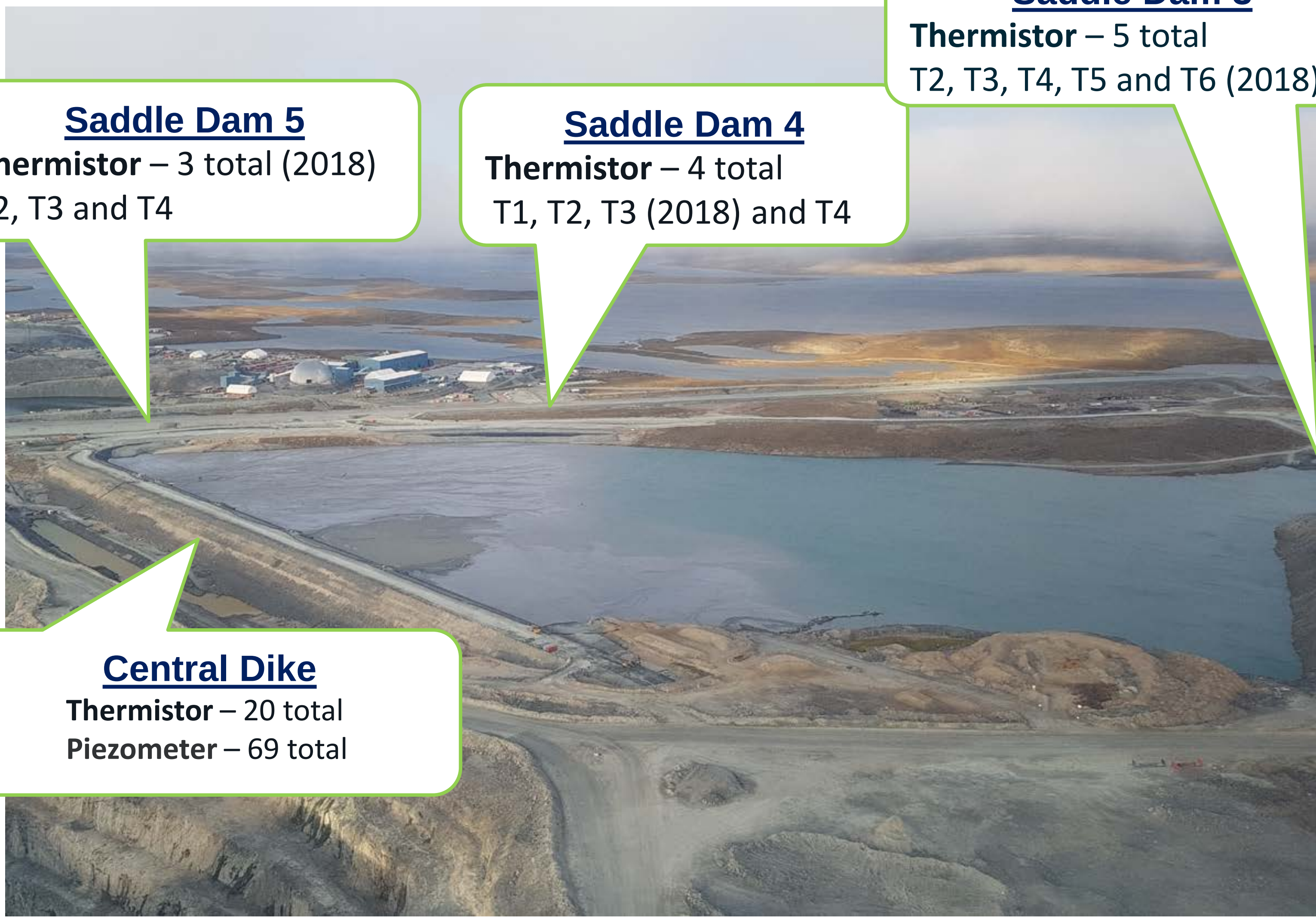
- From Aug 9 to Sept 25, 2018
- 2 days interval since it was installed during the August 2018 instrumentation campaign .



AGNICO EAGLE

1. South Cell Operational Structures

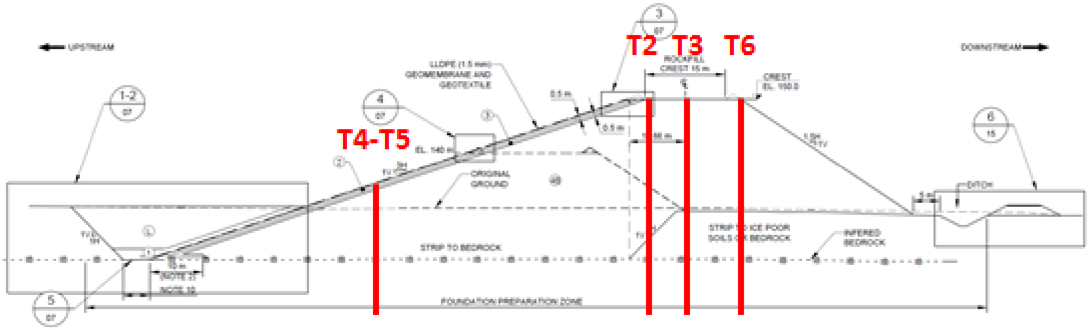
(2018)



TAILING STORAGE FACILITIES INSTRUMENTATION 2018

2.1 SOUTH CELL: SADDLE DAM 3

SD3 Thermistors Emplacement : T2, T3, T4, T5 & T6



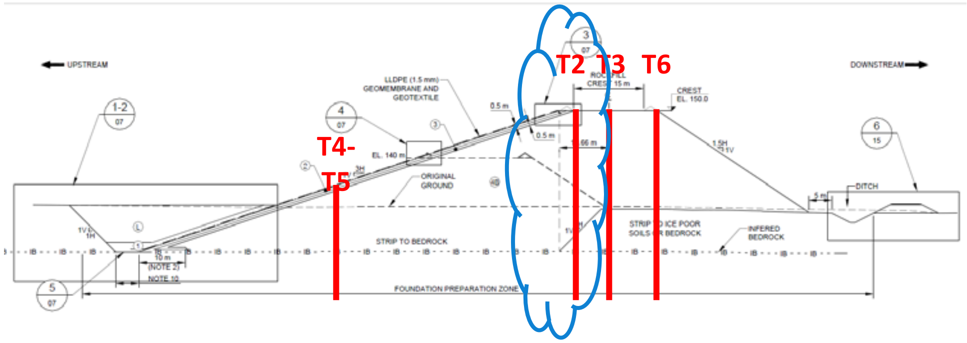
TAILING STORAGE FACILITIES INSTRUMENTATION 2018

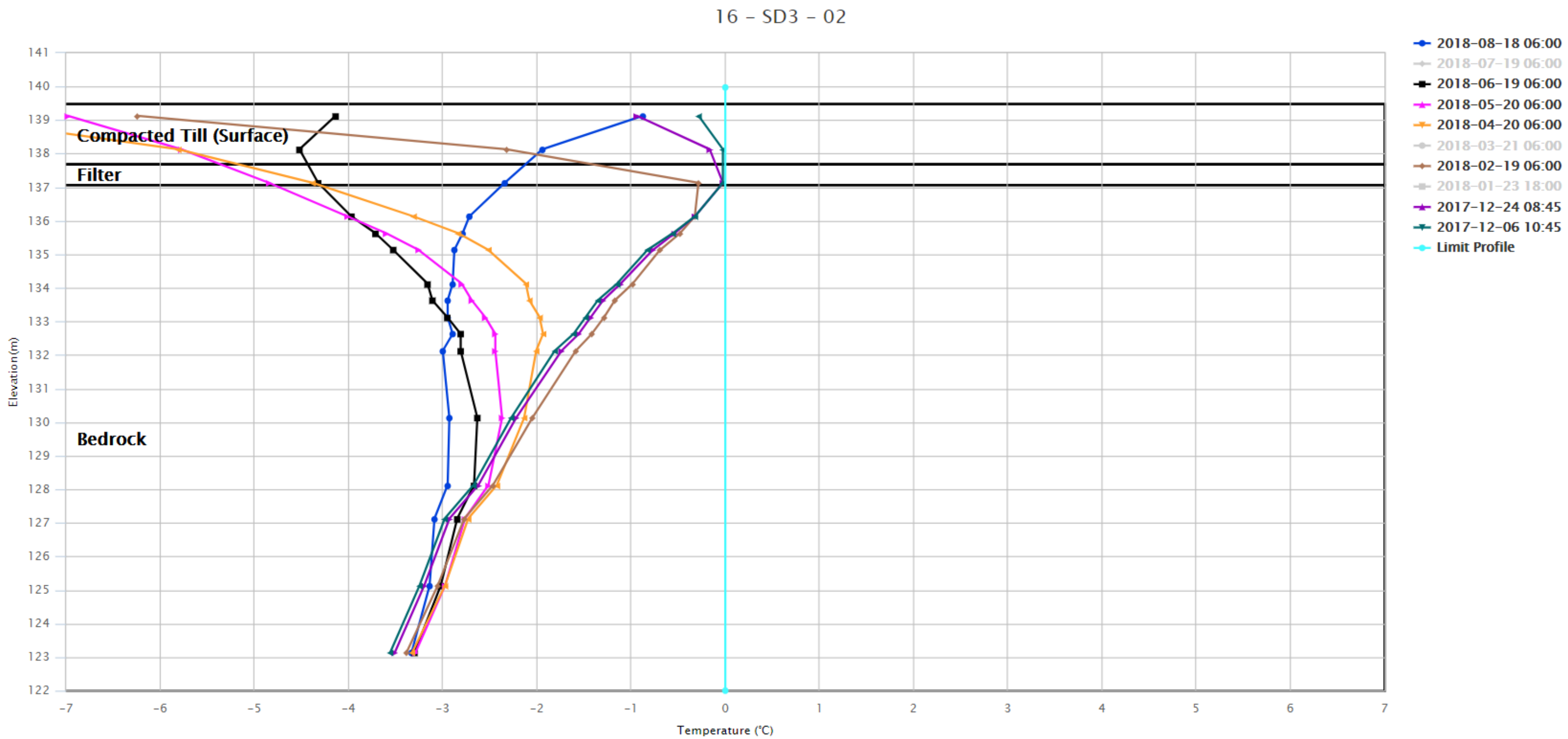
2.1 SOUTH CELL: SADDLE DAM 3

AGNICO EAGLE

SD3 Thermistors 2 (T2)

- From Dec 6th, 2017 to Aug 18th, 2018
- Compacted till, filters and bedrock frozen all year long below elevation 139 (masl)





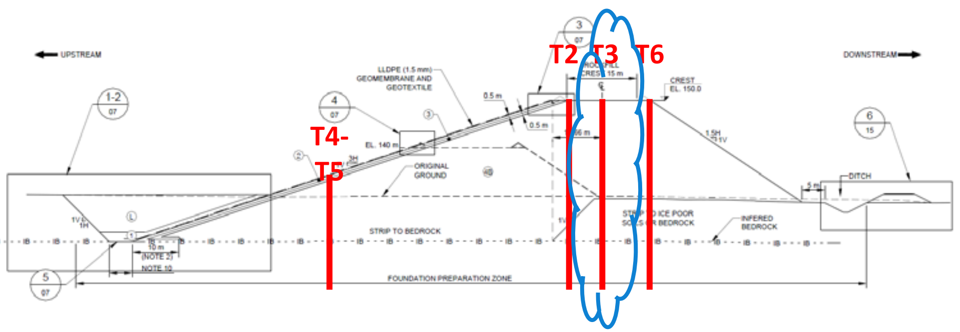
TAILING STORAGE FACILITIES INSTRUMENTATION 2018

2.1 SOUTH CELL: SADDLE DAM 3

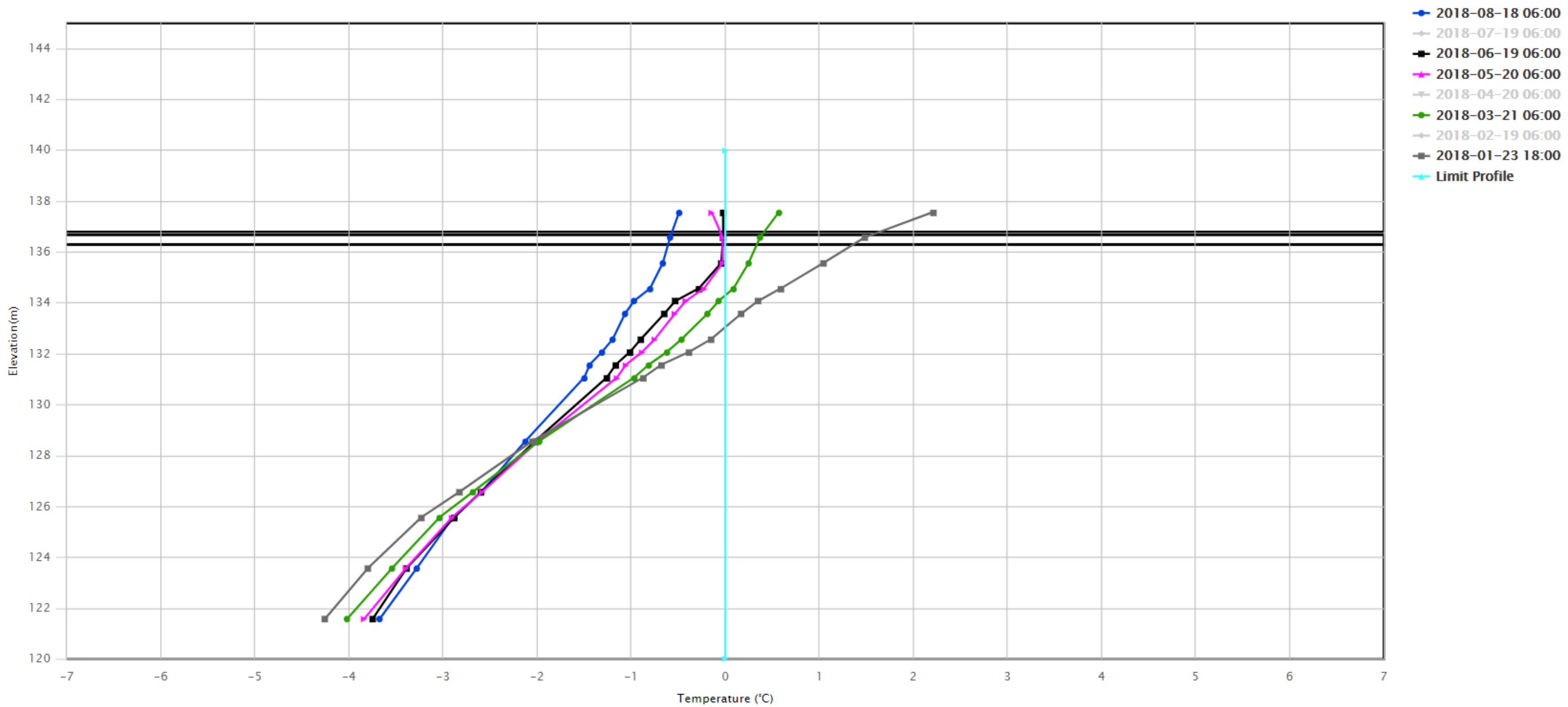
AGNICO EAGLE

SD3 Thermistors 3 (T3)

- From Jan 23rd, 2018 to Aug 18th, 2018
- Frozen all year long below elevation 132.5 (masl)



16 – SD3 – 03

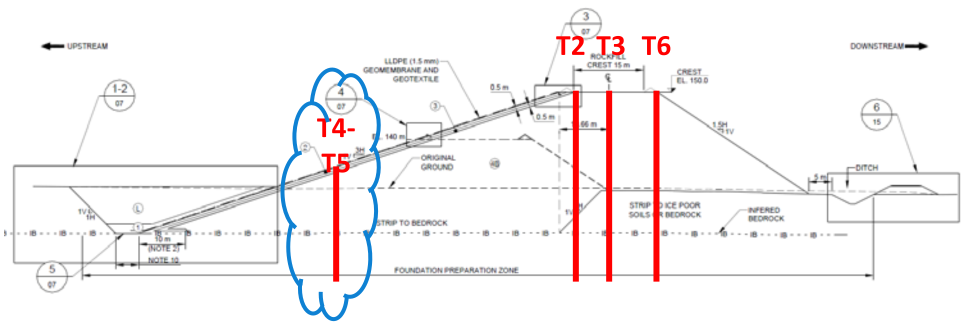


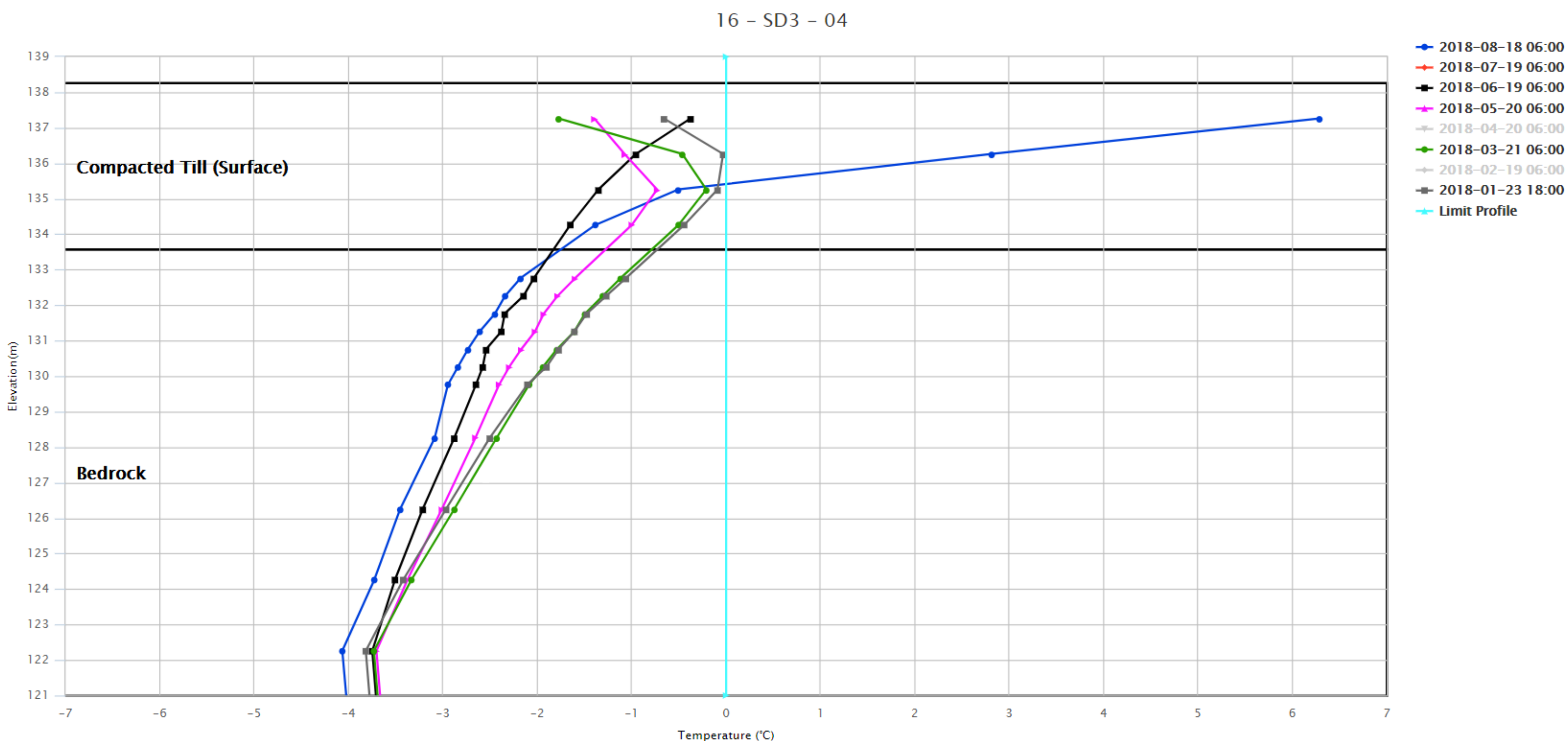
TAILING STORAGE FACILITIES INSTRUMENTATION 2018

2.1 SOUTH CELL: SADDLE DAM 3

SD3 Thermistors 4 (T4)

- From Jan 23rd, 2018 to Aug 18th, 2018
- Frozen all year long below elevation 135.5 (masl)



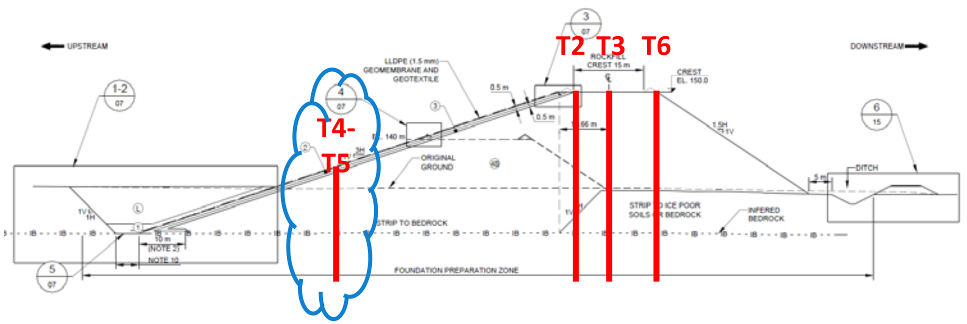


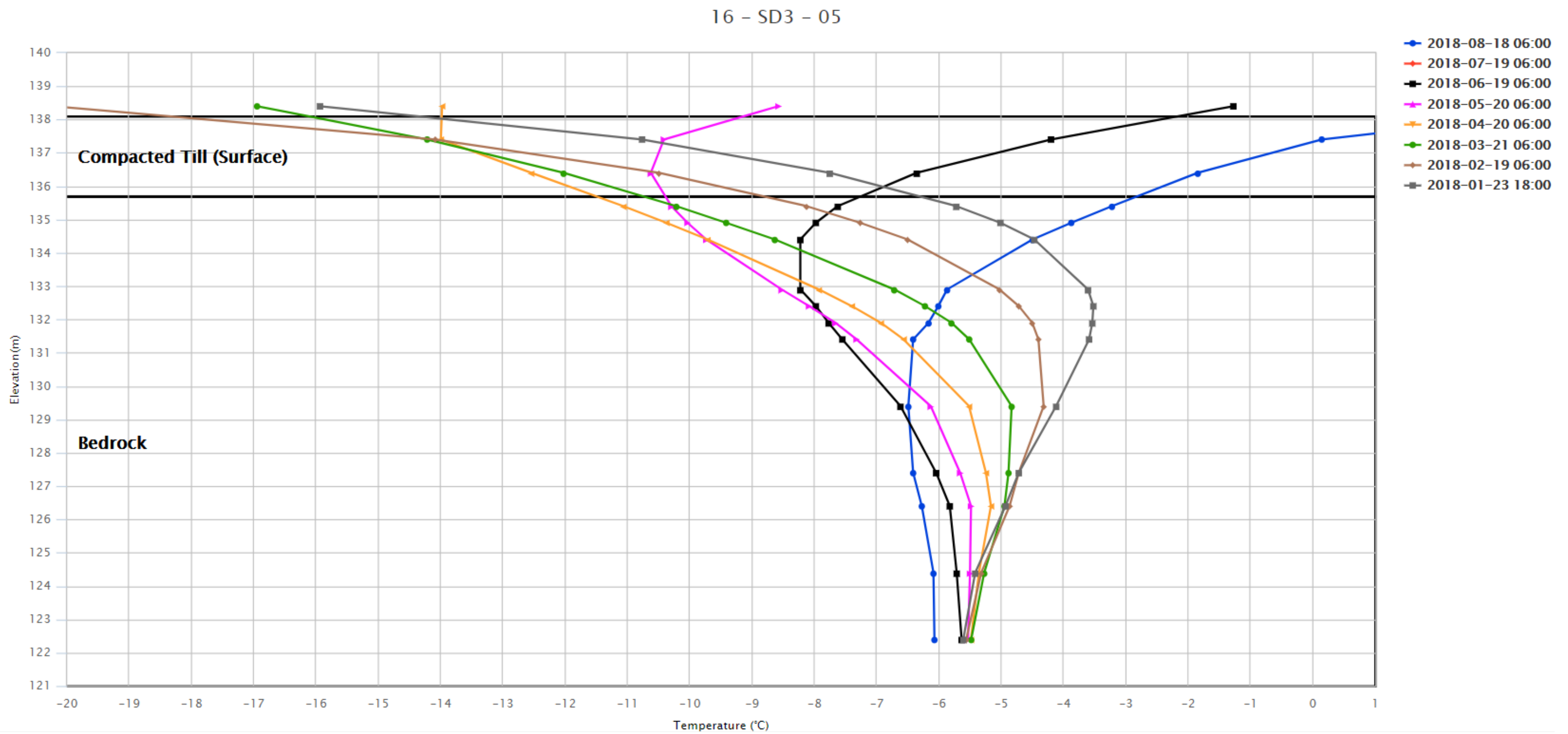
TAILING STORAGE FACILITIES INSTRUMENTATION 2018

2.1 SOUTH CELL: SADDLE DAM 3

SD3 Thermistors 5 (T5)

- From Jan 23rd, 2018 to Aug 18th, 2018
- Frozen all year long below elevation 137 (masl)



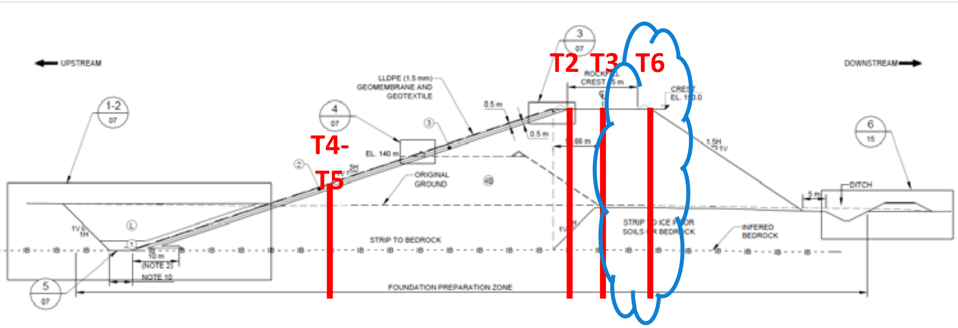


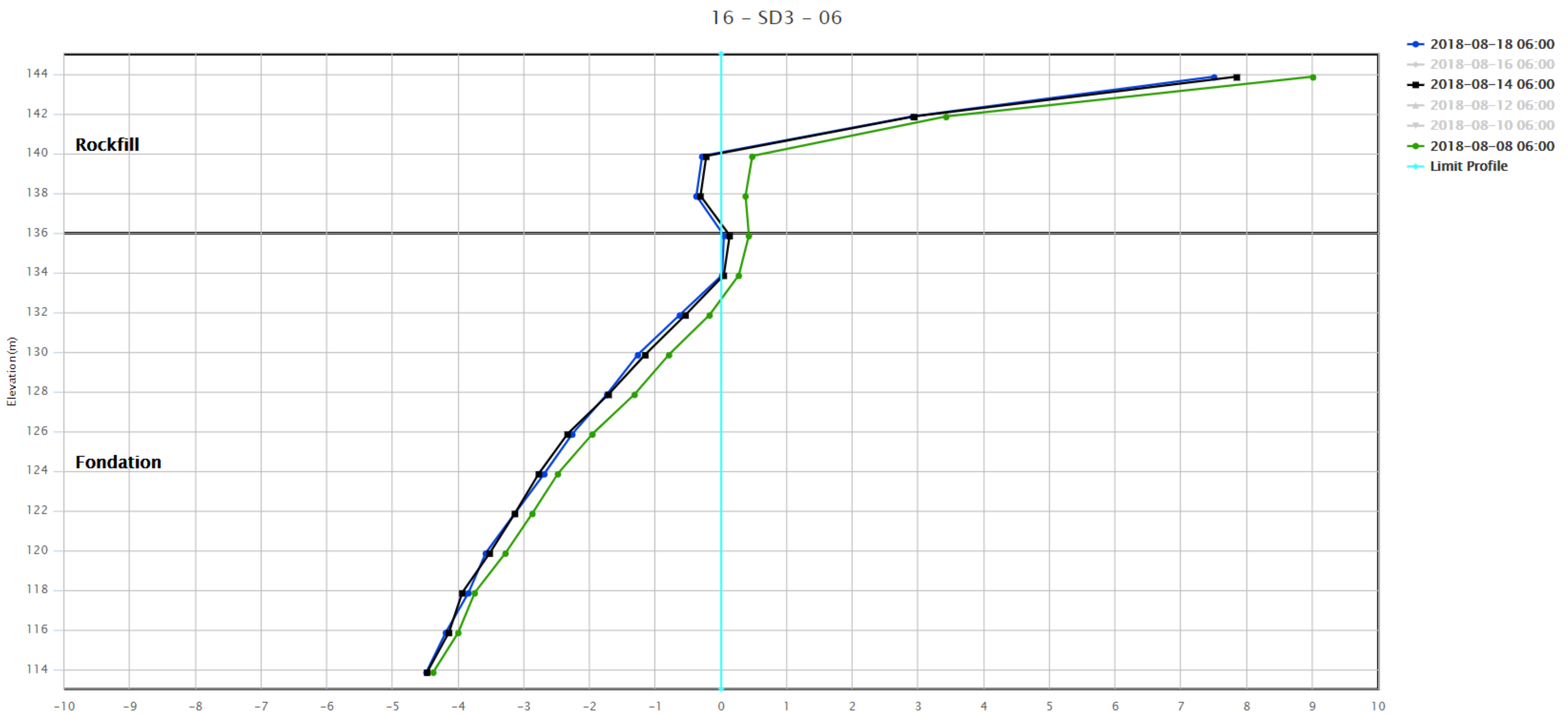
TAILING STORAGE FACILITIES INSTRUMENTATION 2018

2.1 SOUTH CELL: SADDLE DAM 3

SD3 Thermistors 6 (T6)

- From Aug 8th, 2018 to Aug 18th, 2018
- 2 days interval since SD3-T6 was installed during the August 2018 instrumentation campaign





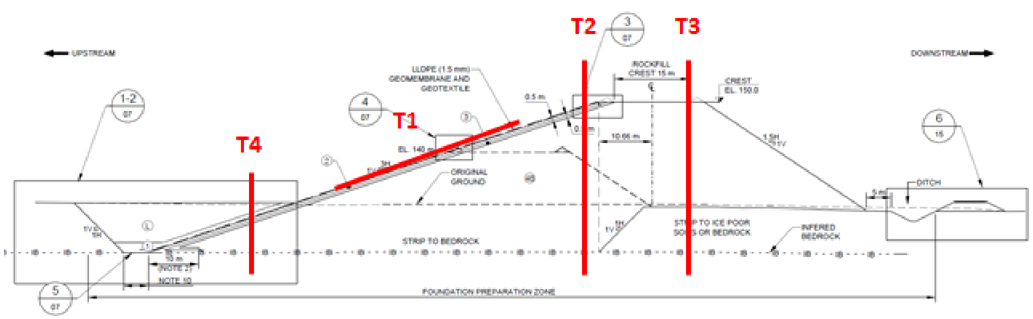
1. South Cell Operational Structures

(2018)

TAILING STORAGE FACILITIES INSTRUMENTATION 2018

2.2 SOUTH CELL: SADDLE DAM 4

Thermistors Emplacement : T1, T2, T3 & T4



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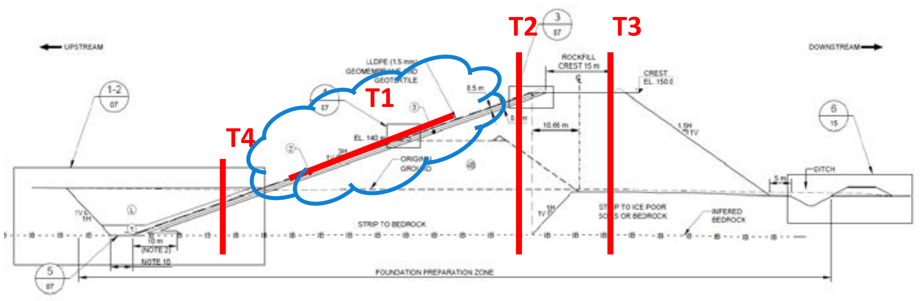
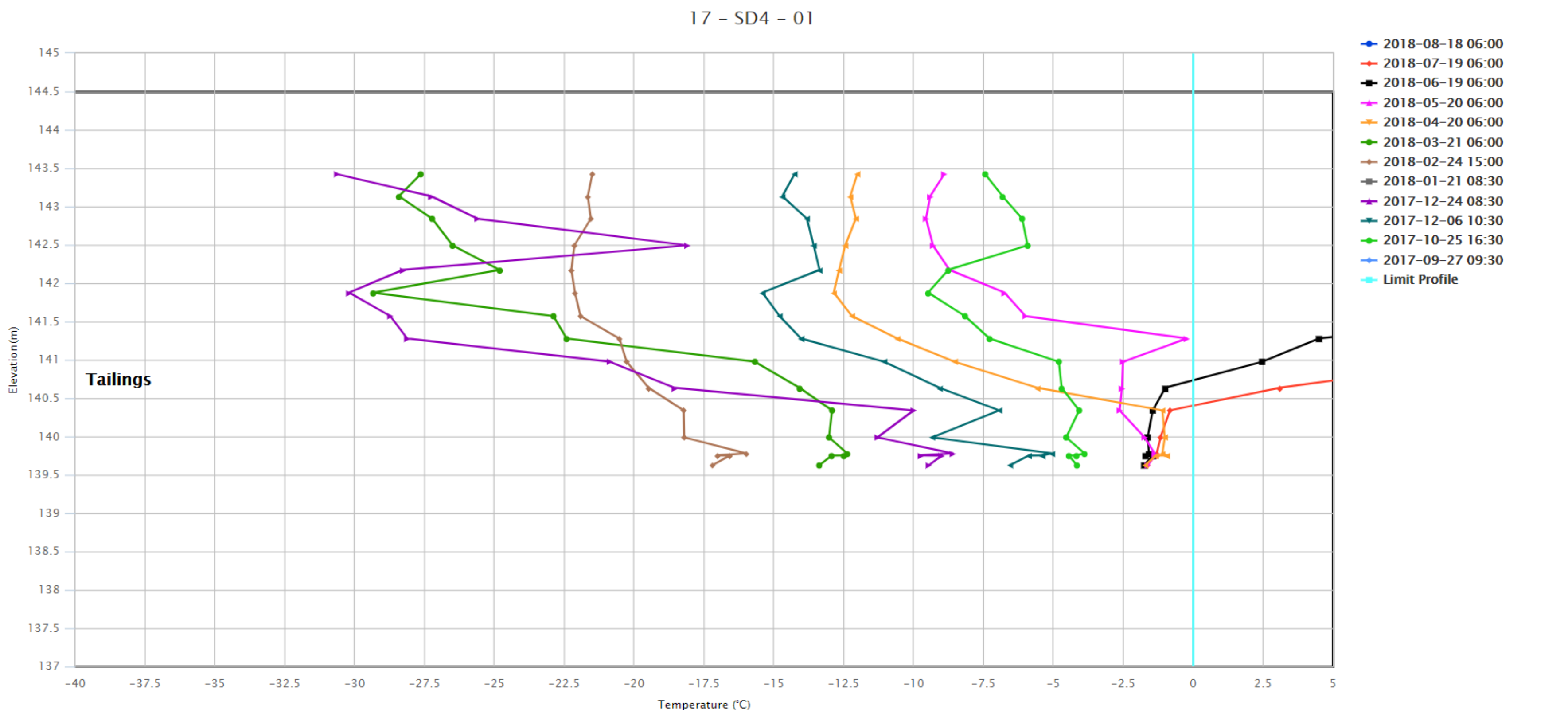
2.2 SOUTH CELL: SADDLE DAM 4



SD4 Thermistors 1 (T1)

- From Sept 27th, 2017 to Aug 18th, 2018
- Tailings frozen all year long below elevation 140 (masl)

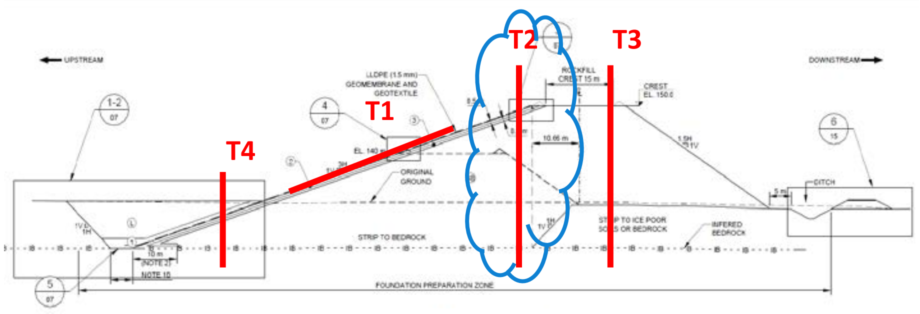


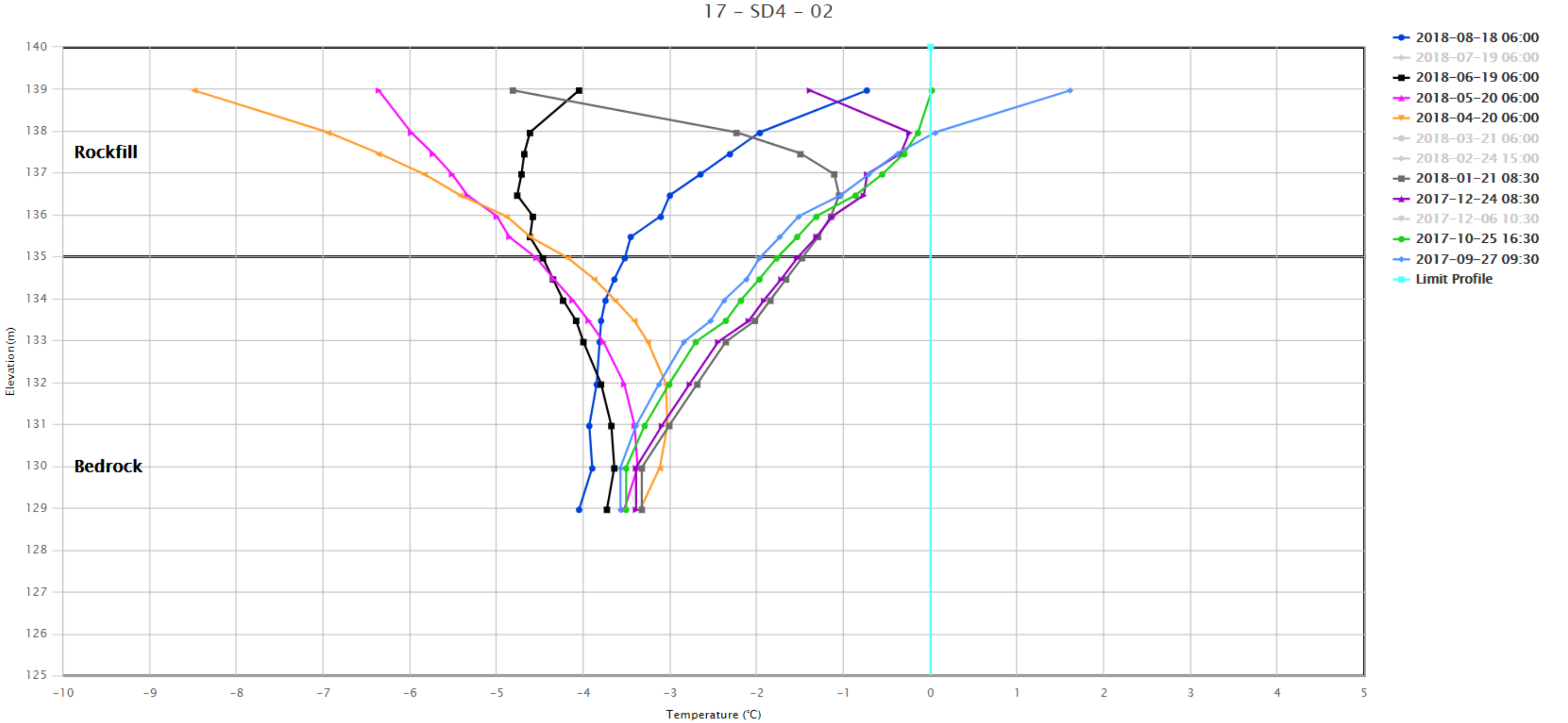
AGNICO EAGLE

2.2 SOUTH CELL: SADDLE DAM 4

SD4 Thermistors 2 (T2)

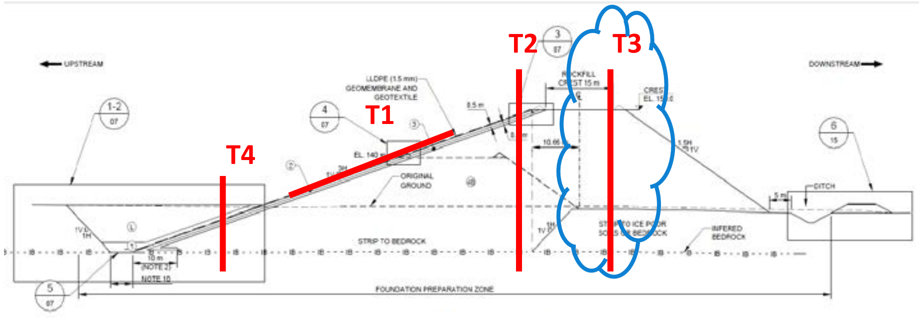
- From Sept 22th, 2017 to Aug 18th, 2018
- Rockfill and foundation frozen all year long below elevation 13
  7.5 (masl)





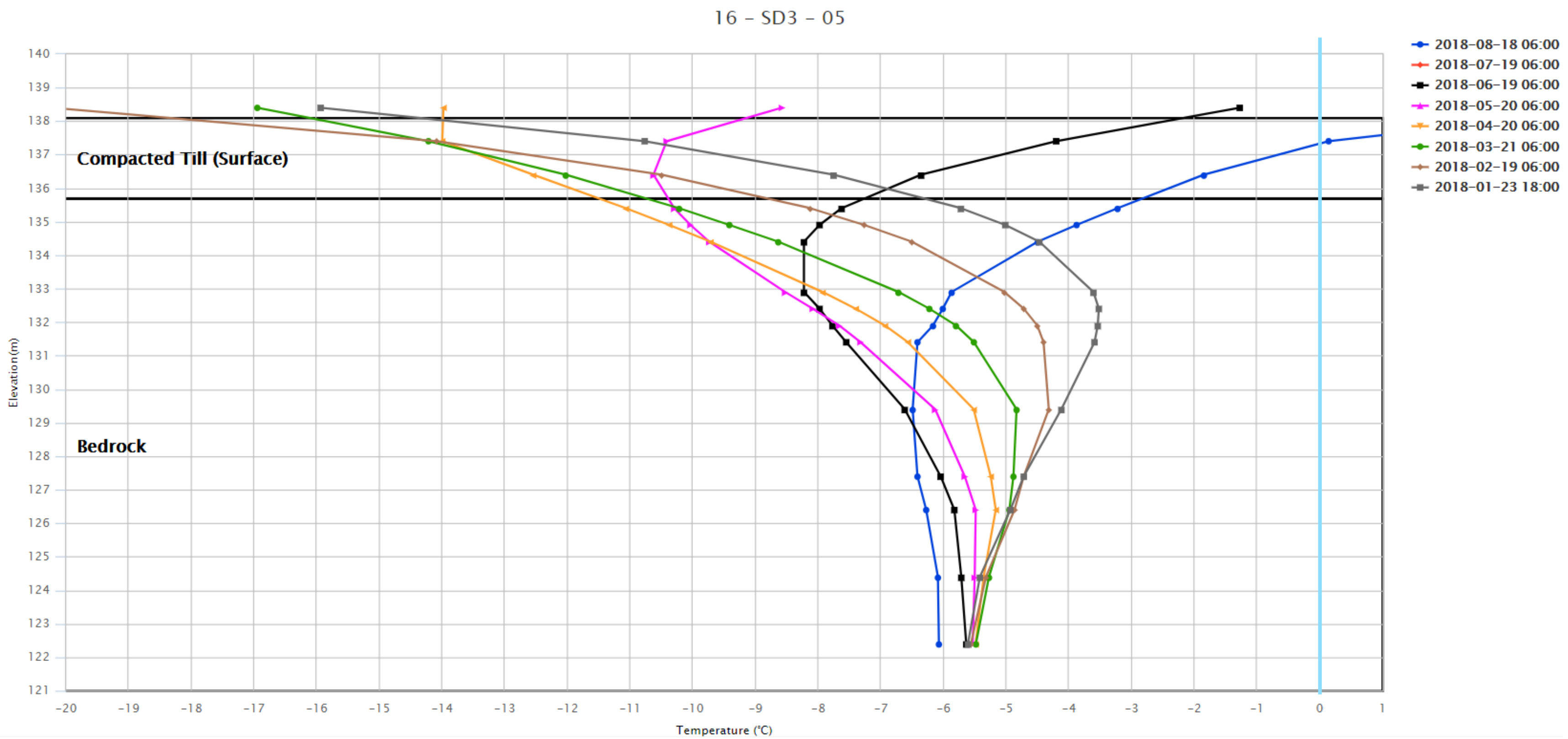
TAILING STORAGE FACILITIES INSTRUMENTATION 2018

2.2 SOUTH CELL: SADDLE DAM 4



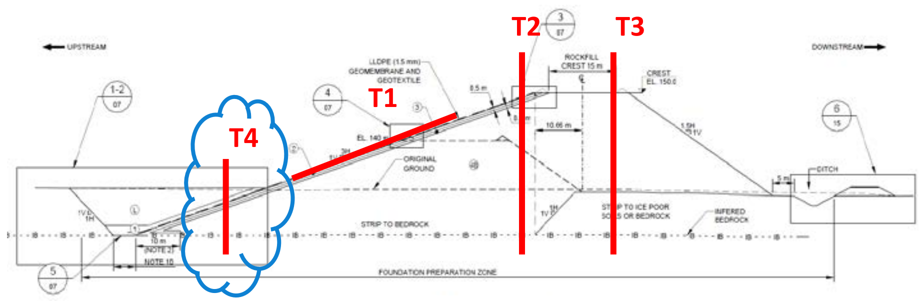
SD4 Thermistors 3 (T3)

- From Jan 23rd, 2018 to Aug 18th, 2018
- Compacted till and bedrock frozen all year long below elevation 136 .5 (masl)



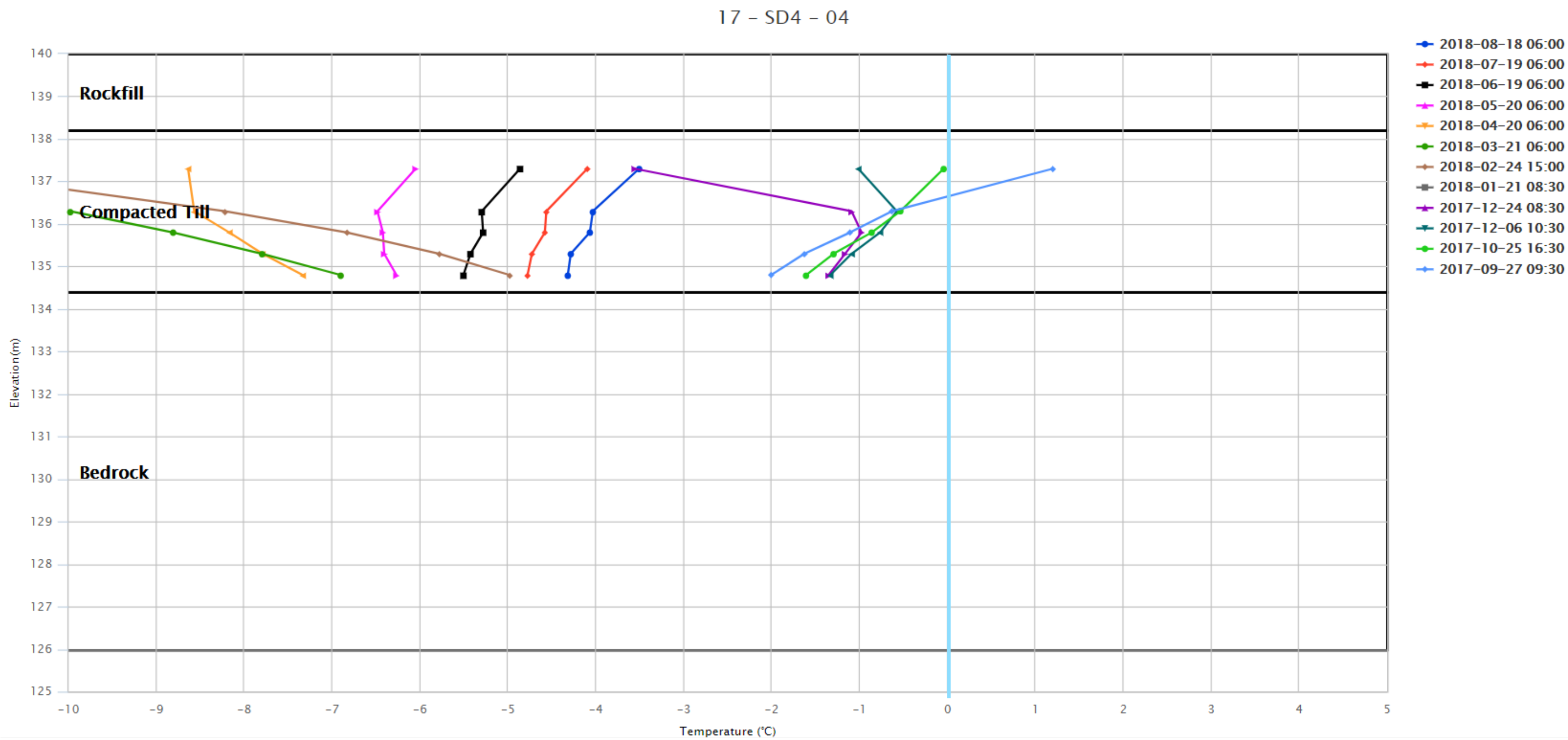
AGNICO EAGLE

2.2 SOUTH CELL: SADDLE DAM 4



SD4 Thermistors 4 (T4)

- From Sept 29th, 2017 to Aug 18th, 2018
- Compacted till frozen all year long below elevation 136.5 (masl)



1. South Cell Operational Structures

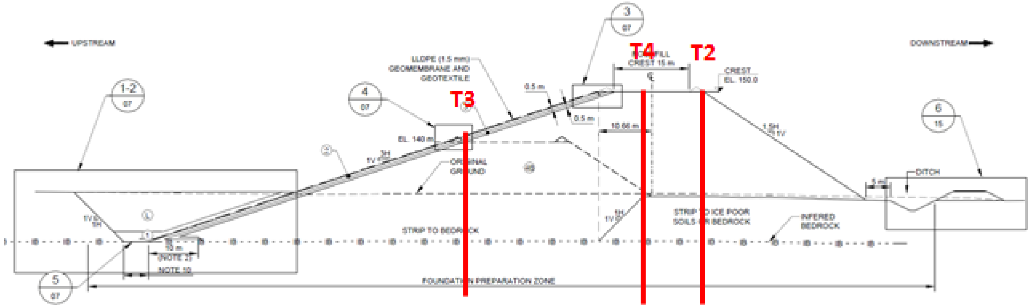
(2018)

Saddle Dam 5
Thermistor – 3 total (2018)
T2, T3 and T4

TAILING STORAGE FACILITIES INSTRUMENTATION 2018

2.3 SOUTH CELL: SADDLE DAM 5

Thermistors Emplacement : T1, T2, T3 & T4



TAILING STORAGE FACILITIES INSTRUMENTATION 2018

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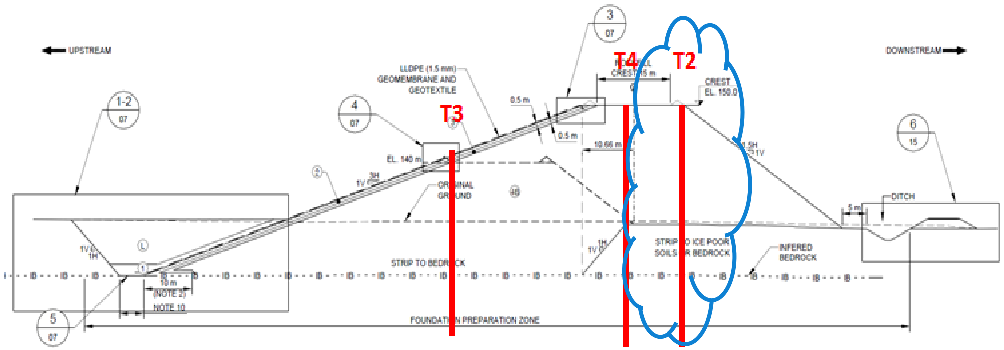
2.3 SOUTH CELL: SADDLE DAM 5

SD5 Thermistors 2 (T2)

- From Aug 12 to Sept 25, 2018
- 2 days interval since SD5-T2 was installed during the August 2018 instrumentation campaign.

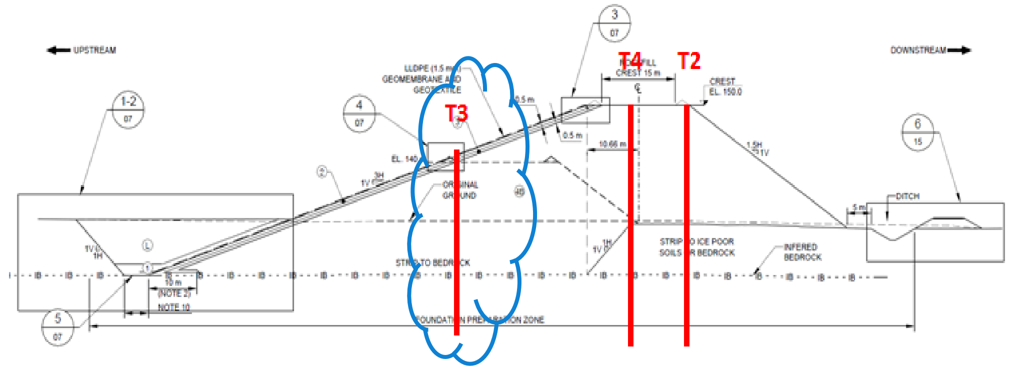


TAILING STORAGE FACILITIES INSTRUMENTATION 2018

2.3 SOUTH CELL: SADDLE DAM 5

SD5 Thermistors 3 (T3)

- From Aug 12 to Sept 25, 2018
- 2 days interval since SD5-T3 was installed during the August 2018 instrumentation campaign.

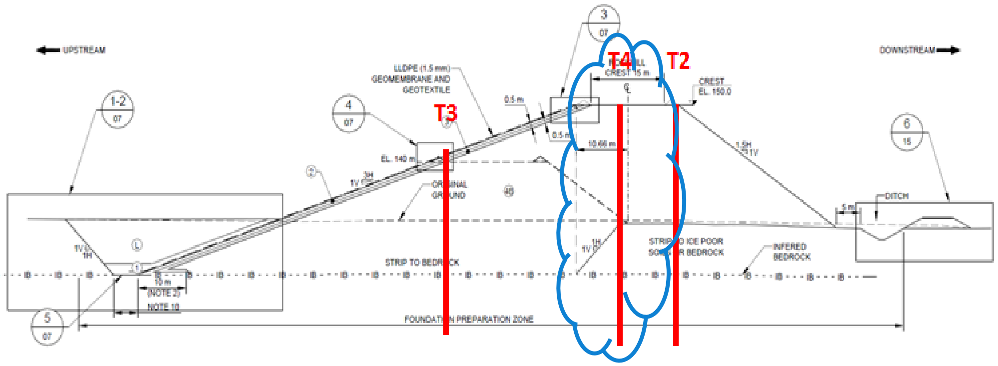


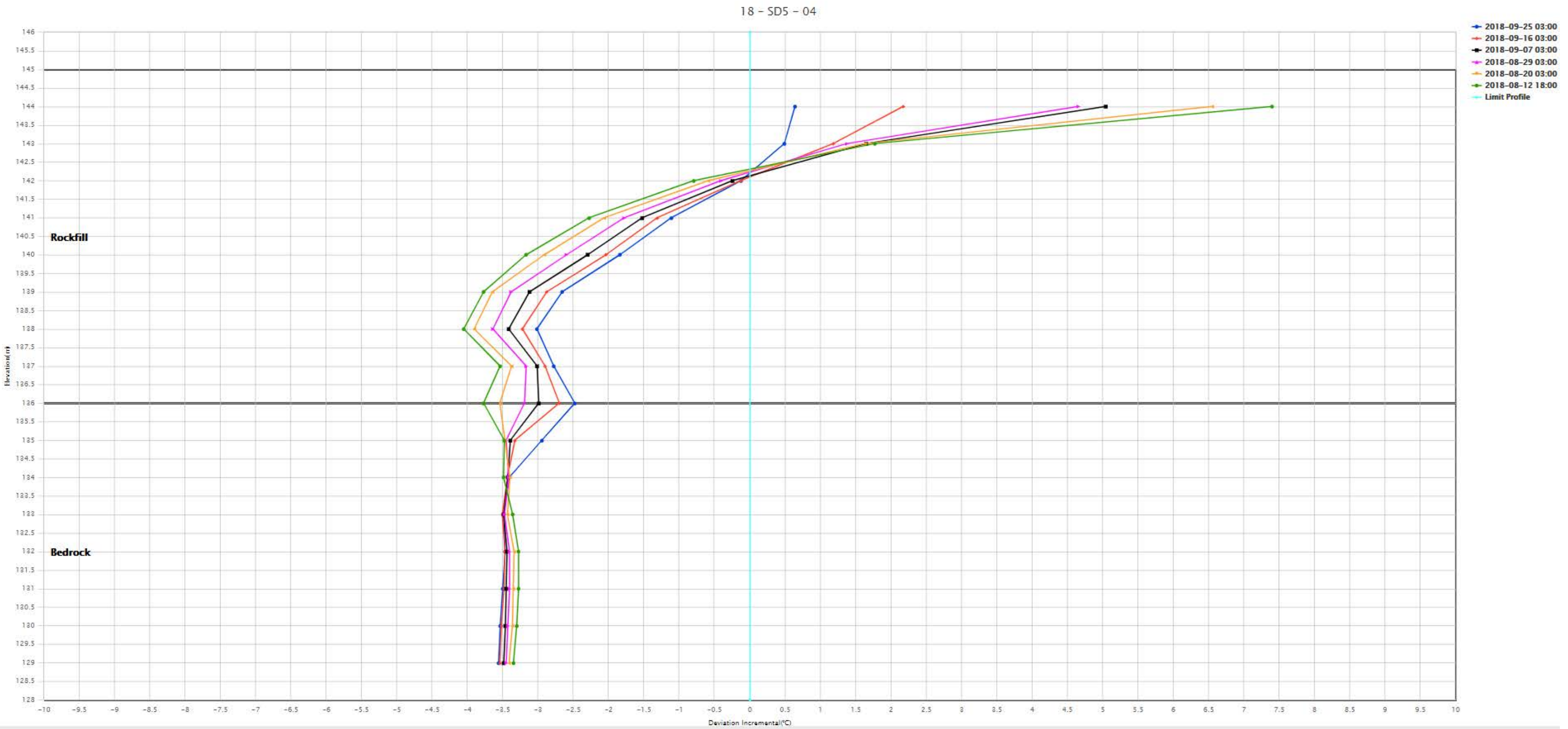
AGNICO EAGLE

2.3 SOUTH CELL: SADDLE DAM 5

SD5 Thermistors 4 (T4)

- From Aug 12 to Sept 25, 2018
- 2 days interval since SD5-T4 was installed during the August 2018 instrumentation campaign .





CONCLUSION

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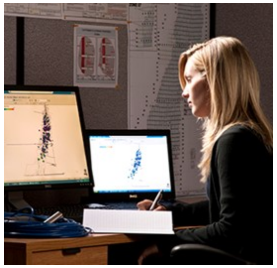
- The TSF instruments are read regularly and many have been automated this year. This allows more frequent readings and a better understanding of the temperature trend in the tailings and TSF structures.
- At the end of July and beguining of August 2018, new instruments were installed at SD3, SD4, SD5 and at the North Cell Internal Structure in order to follow the evolution of those structures.
- Most of the thermistances follow a normal behavior.
- Regular data review will be done to confirm the structures react as expected.



AGNICO EAGLE

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WORLD GOLD COUNCIL

APPENDIX D

All-Weather Private Road (AWPR)

APPENDIX D1

Culverts Along AWPR Photographic Log

Photograph D1-1: unnamed km 5+700

Date: August 28, 2018 **Photo Number**: 030

Description: View of the culvert inlet. Good condition, inlet is short in length as the road rolling surface is at the edge of the inlet.

Photograph D1-2: PC-17A km 8+830

Date: August 28, 2018 **Photo Number**: 033

Description: View of the culverts inlet. No sign of degradation since last year.

Photograph D1-3: PC-17A km 8+830

Date: August 28, 2018 **Photo Number**: 035

Description: View of the culverts outlet. No sign of degradation since last year.

Photograph D1-4: PC-17 km 8+850

Date: August 28, 2018 **Photo Number**: 034

Description: View of the culverts inlet. Good condition.

Photograph D1-5: PC-17 km 8+850

Date: August 28, 2018 **Photo Number**: 036

Description: View of the culverts outlet (right side of the picture). Good condition.

Photograph D1-6: R-04 km 12+050

Date: August 28, 2018 **Photo Number**: 038

Description: View of the culvert inlet. In good condition.

Photograph D1-7: R-04 km 12+050

Date: August 28, 2018 **Photo Number**: 037

Description: View of the culvert outlet. In good condition.

Photograph D1-8: R-05A km 15+745

Date: August 28, 2018 **Photo Number**: 042

Description: View of the culvert inlet. In good condition.

Photograph D1-9: R-05A km 15+745

Date: August 28, 2018 **Photo Number**: 041

Description: View of the culvert outlet. In good condition.

Photograph D1-10: R-07 km 25+900

Date: August 28, 2018 **Photo Number**: 050

Description: View of the culvert inlet. In good condition.

Photograph D1-11: R-07 km 25+900

Date: August 28, 2018 **Photo Number**: 049

Description: View of the culvert outlet. In good condition.

Photograph D1-12: PC-11 km 39+552

Date: August 28, 2018 **Photo Number**: 056

Description: View of the culvert inlet. The inlet is too high and water is flowing underneath.

Photograph D1-13: PC-11 km 39+552

Date: August 28, 2018 **Photo Number**: 055

Description: View of the culvert outlet. In good condition, almost submerged.

Photograph D1-14: R-14 km 67+840

Date: August 28, 2018 **Photo Number**: 075

Description: View of the outlet culverts. The middle and northern culverts show small signs of erosion at the outlet and these culverts are collapsed inside (hole in the middle). Expected to continue performing well.

Photograph D1-15: R-17 km 77+440

Date: August 28, 2018 **Photo Number**: 081

Description: View of the culvert inlet. In good condition.

Photograph D1-16: R-17 km 77+440

Date: August 28, 2018 **Photo Number**: 080

Description: View of the culvert outlet. In good condition.

Photograph D1-17: R-18A km 80+950

Date: August 28, 2018 **Photo Number**: 084

Description: View of the culverts inlet. In good condition. The southern culvert inlet is partially buried.

Photograph D1-18: R-18A km 80+950

Date: August 28, 2018 **Photo Number**: 085

Description: View of the culverts outlet. In good condition.

Photograph D1-19: R-20 km 85+490

Date: August 28, 2018 **Photo Number**: 088

Description: View of the culvert outlet. Outlet is a little bit twisted. The middle of the culvert is slightly collapsed. Water flows beneath the culvert. The culvert is in stable condition.

Photograph D1-20: R-21 km 87+300

Date: August 28, 2018 **Photo Number**: 090

Description: View of the culverts inlet. Both culverts are slightly collapsed in the middle. In stable condition, but should have been installed lower to avoid erosion issue.

Photograph D1-21: R-21 km 87+300

Date: August 28, 2018 **Photo Number**: 089

Description: View of the culverts outlet. Both culverts are slightly collapsed in the middle. In stable condition, but should have been installed lower to avoid erosion issue.

Photograph D1-22: R-23 km 93+600

Date: August 28, 2018 **Photo Number**: 093

Description: View of the culvert inlet. The culvert is installed too high and there is a low flow of water through the road rockfill. In good condition.

Photograph D1-23: R-23 km 93+600

Date: August 28, 2018 **Photo Number**: 094

Description: View of the culvert outlet. The culvert is installed too high and there is a low flow of water through the road rockfill. In good condition.

Photograph D1-24: R-24 km 98+100

Date: August 28, 2018 **Photo Number**: 096

Description: View of the culverts inlet. South inlet is installed too high. Both culverts show deformation in the upper part.

Photograph D1-25: R-24 km 98+100

Date: August 28, 2018 **Photo Number**: 095

Description: View of the culverts outlet. Both outlets are installed too high. The outlet of the southern culvert (left) shows signs of erosion. Both culverts show deformation in the upper part.

Photograph D1-26: R-26 km 104+400

Date: August 28, 2018 **Photo Number**: 099

Description: View of the culverts outlet. In good condition.

Photograph D1-27: R-26 km 104+400

Date: August 28, 2018 **Photo Number**: 100

Description: View of the culverts inlet. In good condition. In good condition.

APPENDIX D2

Bridges Along AWPR Photographic Log

Photograph D2-1 Bridges 1 – R02 km 8+750

Date: August 28, 2018 **Photo Number**: 032

Description: Looking at the north abutment.

Photograph D2-2 Bridges 1 – R02 km 8+750

Date: August 28, 2018 **Photo Number**: 031

Description: Looking at the south abutment.

Photograph D2-3 Bridges 2 – R05 km 17+600

Date: August 28, 2018 **Photo Number**: 044

Description: Looking at the north abutment.

Photograph D2-4 Bridges 2 – R05 km 17+600

Date: August 28, 2018 **Photo Number**: 042

Description: Looking at the south abutment. Minor damage to the bin wall.

Photograph D2-5 Bridges 3 – R06 km 23+100

Date: August 28, 2018 **Photo Number**: 046

Description: Looking at the north abutment.

Photograph D2-6 Bridges 3 – R06 km 23+100

Date: August 28, 2018 **Photo Number**: 045

Description: Looking at the south abutment.

Photograph D2-7 Bridges 5 – R13 km 62+060

Date: August 28, 2018 **Photo Number**: 067

Description: Looking at the bridge from the south abutment.

Photograph D2-8 Bridges 5 – R13 km 62+060

Date: August 28, 2018 **Photo Number**: 068

Description: Looking at the bridge (north abutment).

Photograph D2-9 Bridges 6 – R15 km 69+200

Date: August 28, 2018 **Photo Number**: 076

Description: Looking at the south abutment. Damage to the bin wall likely caused during snow removal activities. Bridge is tipping toward the west side on the abutment.

Photograph D2-10 Bridges 6 – R15 km 69+200

Date: August 28, 2018 **Photo Number**: 077

Description: Looking at the north abutment. Damage to the bin wall likely caused during snow removal activities. Bridge is tipping toward the west side on the abutment.

APPENDIX E

All-Weather Private Road (AWPR)

APPENDIX E1

Culverts along Amaruq Road Photographic Log

Photograph E1-1: Culvert #66 km 16+324

Date: September 1, 2018 **Photo Number**: 364

Description: View of culvert inlet, half buried.

Photograph E1-2: Culvert #73 km 18+850

Date: September 1, 2018 **Photo Number**: 363

Description: View of culvert outlet, in good condition.

Photograph E1-3: Culverts #208, #209 and #210, km 49+431 to 49+435

Date: September 1, 2018 **Photo Number**: 338

Description: View of culvert outlets, in good condition.

Photograph E1-4: Culverts #208, #209 and #210, km 49+431 to 49+435

Date: September 1, 2018 **Photo Number**: 337

Description: View of culvert inlets, in good condition.

Photograph E1-5: Culvert #283 km 62+965

Date: September 1, 2018 **Photo Number**: 330

Description: View of culvert outlet, in good condition.

Photograph E1-6: Culverts #284, #284-2 and #284-3, km 63+070 to 63+074

Date: September 1, 2018 **Photo Number**: 329

Description: View of culvert outlets, in good condition.

APPENDIX E2

Bridges Along AWPR Photographic Log

Photograph E2-1 Bridges 1 – km 3+400

Date: September 1, 2018 **Photo Number**: 377

Description: Looking at the north abutment from downstream.

Photograph E2-2 Bridges 1 – km 3+400

Date: September 1, 2018 **Photo Number**: 378

Description: Looking at the north abutment from upstream.

Photograph E2-3 Bridges 1 – km 3+400

Date: September 1, 2018 **Photo Number**: 376

Description: Looking at the south abutment from downstream.

Photograph E2-4 Bridges 1 – km 3+400

Date: September 1, 2018 **Photo Number**: 375

Description: Looking at the south abutment from upstream.

Photograph E2-5 Bridges 2 – km 10+700

Date: September 1, 2018 **Photo Number**: 371

Description: Looking at the north abutment from upstream.

Photograph E2-6 Bridges 2 – km 10+700

Date: September 1, 2018 **Photo Number**: 372

Description: Looking at the north abutment from downstream.

Photograph E2-7 Bridges 2 – km 10+700

Date: September 1, 2018 **Photo Number**: 370

Description: Looking at the south abutment from upstream.

Photograph E2-8 Bridges 2 – km 10+700

Date: September 1, 2018 **Photo Number**: 369

Description: Looking at the south abutment from downstream.

Photograph E2-9 Bridges 3 – km 16+000

Date: September 1, 2018 **Photo Number**: 368

Description: Looking at the north abutment from upstream.

Photograph E2-10 Bridges 3 – km 16+000

Date: September 1, 2018 **Photo Number**: 367

Description: Looking at the north abutment from downstream.

Photograph E2-11 Bridges 3 – km 16+000

Date: September 1, 2018 **Photo Number**: 365

Description: Looking at the south abutment from upstream.

Photograph E2-12 Bridges 3 – km 16+000

Date: September 1, 2018 **Photo Number**: 366

Description: Looking at the south abutment from downstream.

Photograph E2-13 Bridges 4 – km 20+000

Date: September 1, 2018 **Photo Number**: 362

Description: Looking at the north abutment from upstream.

Photograph E2-14 Bridges 4 – km 20+000

Date: September 1, 2018 **Photo Number**: 361

Description: Looking at the north abutment from downstream.

Photograph E2-15 Bridges 4 – km 20+000

Date: September 1, 2018 **Photo Number**: 359

Description: Looking at the south abutment from upstream.

Photograph E2-16 Bridges 4 – km 20+000

Date: September 1, 2018 **Photo Number**: 360

Description: Looking at the south abutment from downstream.

Photograph E2-17 Bridges 5 – km 23+900

Date: September 1, 2018 **Photo Number**: 358

Description: Looking at the north abutment from upstream.

Photograph E2-18 Bridges 5 – km 23+900

Date: September 1, 2018 **Photo Number**: 357

Description: Looking at the north abutment from downstream.

Photograph E2-19 Bridges 5 – km 23+900

Date: September 1, 2018 **Photo Number**: 355

Description: Looking at the south abutment from upstream.

Photograph E2-20 Bridges 5 – km 23+900

Date: September 1, 2018 **Photo Number**: 356

Description: Looking at the south abutment from downstream.

Photograph E2-21 Bridges 6 – km 26+100

Date: September 1, 2018 **Photo Number**: 353

Description: Looking at the north abutment from upstream.

Photograph E2-22 Bridges 6 – km 26+100

Date: September 1, 2018 **Photo Number**: 352

Description: Looking at the north abutment from downstream.

Photograph E2-23 Bridges 6 – km 26+100

Date: September 1, 2018 **Photo Number**: 350

Description: Looking at the south abutment from upstream.

Photograph E2-24 Bridges 6 – km 26+100

Date: September 1, 2018 **Photo Number**: 351

Description: Looking at the south abutment from downstream.

Photograph E2-25 Bridges 7 – km 32+300

Date: September 1, 2018 **Photo Number**: 347

Description: Looking at the north abutment from upstream.

Photograph E2-26 Bridges 7 – km 32+300

Date: September 1, 2018 **Photo Number**: 346

Description: Looking at the north abutment from downstream.

Photograph E2-27 Bridges 7 – km 32+300

Date: September 1, 2018 **Photo Number**: 345

Description: Looking at the south abutment from upstream.

Photograph E2-28 Bridges 7 – km 32+300

Date: September 1, 2018 **Photo Number**: 344

Description: Looking at the south abutment from downstream.

Photograph E2-29 Bridges 8 – km 43+500

Date: September 1, 2018 **Photo Number**: 342

Description: Looking at the north abutment.

Photograph E2-30 Bridges 8 – km 43+500

Date: September 1, 2018 **Photo Number**: 343

Description: Looking at the south abutment.

Photograph E2-31 Bridges 9 – km 44+800

<u>Date</u>: September 1, 2018 **<u>Photo Number</u>**: 340

<u>Description</u>: Looking at the north abutment.

Photograph E2-32 Bridges 9 – km 44+800

<u>Date</u>: September 1, 2018 **<u>Photo Number</u>**: 341

<u>Description</u>: Looking at the south abutment.

APPENDIX F

Amaruq Road Photographic Log

APPENDIX F1

Quarries along the AWPR Photographic Log

Photograph F1-1: Quarry 1 – km 5+200

Date: August 28, 2018 **Photo Number**: 028

Description: View of south and east walls.

Photograph F1-2: Quarry 1 – km 5+200

Date: August 28, 2018 **Photo Number**: 029

Description: View of south wall.

Photograph F1-3: Quarry 2 – km 13+250

Date: August 28, 2018 **Photo Number**: 039

Description: View of north and west walls.

Photograph F1-4: Quarry 2 – km 13+250

Date: August 28, 2018 **Photo Number**: 064

Description: View of north and east walls.

Photograph F1-5: Quarry 3 – km 23+700

Date: August 28, 2018 **Photo Number**: 047

Description: View of east wall.

Photograph F1-6: Quarry 3 – km 23+700

Date: August 28, 2018 **Photo Number**: 048

Description: View of west wall. Presence of loose rock along steep wall.

Photograph F1-7: Quarry 5 – km 34+650

Date: August 28, 2018 **Photo Number**: 052

Description: View of north and east walls.

Photograph F1-8: Quarry 5 – km 34+650

Date: August 28, 2018 **Photo Number**: 051

Description: View of north and west walls.

Photograph F1-9: Quarry 6 – km 36+470

Date: August 28, 2018 **Photo Number**: 054

Description: View of south and west walls.

Photograph F1-10: Quarry 6 – km 36+470

Date: August 28, 2018 **Photo Number**: 053

Description: View of south and east walls.

Photograph F1-11: Quarry 8 – km 42+950

Date: August 28, 2018 **Photo Number**: 057

Description: View of south wall. Presence of loose blocks.

Photograph F1-12: Quarry 8 – km 42+950

Date: August 28, 2018 **Photo Number**: 058

Description: View of west wall.

Photograph F1-13: Quarry 9 – km 44+600

Date: August 28, 2018 **Photo Number**: 059

Description: View of west and south walls. Presence of loose blocks at the base of the wall.

Photograph F1-14: Quarry 9 – km 44+600

Date: August 28, 2018 **Photo Number**: 060

Description: View of north and east walls. View of a pile of loose material.

Photograph F1-15: Quarry 10 – km 48+900

Date: August 28, 2018 **Photo Number**: 061

Description: View of the west wall. Presence of unstable blocks.

Photograph F1-16: Quarry 10 – km 48+900

Date: August 28, 2018 **Photo Number**: 062

Description: Overview of the quarry looking north at the east and north walls.

Photograph F1-17: Quarry 11 – km 53+500

Date: August 28, 2018 **Photo Number**: 063

Description: Overview of Quarry 11 looking at the west and north walls.

Photograph F1-18: Quarry 11 – km 53+500

Date: August 28, 2018 **Photo Number**: 064

Description: Overview of Quarry 11 looking at the north and east walls.

Photograph F1-19: Quarry 12 – km 58+300

Date: August 28, 2018 **Photo Number**: 065

Description: View of the south and east walls.

Photograph F1-20: Quarry 12 – km 58+300

Date: August 28, 2018 **Photo Number**: 066

Description: View of the west wall.

Photograph F1-21: Quarry 13 – km 62+350

Date: August 28, 2018 **Photo Number**: 070

Description: View of the west and north walls.

Photograph F1-22: Quarry 13 – km 62+350

Date: August 28, 2018 **Photo Number**: 069

Description: Looking at the south and east walls.

Photograph F1-23: Quarry 14 – km 65+700

Date: August 28, 2018 **Photo Number**: 071

Description: View of west and south walls. Quarry flooded.

Photograph F1-24: Quarry 14 – km 65+700

Date: August 28, 2018 **Photo Number**: 072

Description: View of north and west walls. Quarry flooded.

Photograph F1-25: Quarry 15 – km 67+600

Date: August 28, 2018 **Photo Number**: 073

Description: View of the south and west walls.

Photograph F1-26: Quarry 15 – km 67+600

Date: August 28, 2018 **Photo Number**: 074

Description: View of the north and west walls. Accumulation of water inside the quarry.

Photograph F1-27: Quarry 16 – km 70+400

Date: August 28, 2018 **Photo Number**: 078

Description: View of the south and west walls. Presence of loose rocks on steep wall.

Photograph F1-28: Quarry 16 – km 70+400

Date: August 28, 2018 **Photo Number**: 079

Description: View of the east wall. Presence of loose rocks on steep wall.

Photograph F1-29: Quarry 18 – km 80+200

Date: August 28, 2018 **Photo Number**: 082

Description: View of the south wall.

Photograph F1-30: Quarry 18 – km 80+200

Date: August 28, 2018 **Photo Number**: 083

Description: Looking at the north and west walls.

Photograph F1-31: Quarry 19 – km 84+300

<u>Date</u>: August 28, 2018 **<u>Photo Number</u>**: 086

<u>Description</u>: Looking at the north and west walls.

Photograph F1-32: Quarry 19 – km 84+300

<u>Date</u>: August 28, 2018 **<u>Photo Number</u>**: 087

<u>Description</u>: Looking at the north and east walls.

Photograph F1-33: Quarry 21 – km 93+400

Date: August 28, 2018 **Photo Number**: 091

Description: Looking at the south and east walls.

Photograph F1-34: Quarry 21 – km 93+400

Date: August 28, 2018 **Photo Number**: 092

Description: Looking at the north and the west walls.

Photograph F1-35: Quarry 22 – km 99+200

Date: August 28, 2018 **Photo Number**: 097

Description: View of the south and west walls.

Photograph F1-36: Quarry 22 – km 99+200

Date: August 28, 2018 **Photo Number**: 098

Description: Looking at the north and west walls.

Photograph F1-37: Quarry 23 (Airstrip Quarry)

Date: August 28, 2018 **Photo Number**: 101

Description: Looking at the north wall.

Photograph F1-38: Quarry 23 (Airstrip Quarry)

Date: August 28, 2018 **Photo Number**: 102

Description: Looking at the south wall.

Photograph F1-39: Quarry 23 (Airstrip Quarry)

Date: August 28, 2018 **Photo Number**: 103

Description: Looking at the north wall. Presence of loose rocks along steep wall.

Photograph F1-40: Quarry 23 (Airstrip Quarry)

Date: August 28, 2018 **Photo Number**: 104

Description: Looking at the north and east walls.

Photograph F1-41: Quarry 23 (Airstrip Quarry)

Date: August 28, 2018 **Photo Number**: 105

Description: Looking at the south and east walls.

APPENDIX F2

Bridges Along Amaruq Road Photographic Log

Photograph F2-1 Eskers and Quarries 1 – km 10+500

Date: August 28, 2018 **Photo Number**: 373

Description: View of Quarry 10.5. Loose rock is present on the steep wall.

Photograph F2-2 Eskers and Quarries 1 – km 10+500

Date: August 28, 2018 **Photo Number**: 374

Description: View of Quarry 10.5. Loose rock is present on the steep wall.

Photograph F2-3 Eskers and Quarries 2 – km 25+000

Date: August 28, 2018 **Photo Number**: 354

Description: View of esker #2. General good condition but some steep walls and loose rocks.

Photograph F2-4 Eskers and Quarries 3 – km 30+180

Date: August 28, 2018 **Photo Number**: 348

Description: View of Quarry 30.5. Most walls are in unstable condition.

Photograph F2-5 Eskers and Quarries 3 – km 30+180

Date: August 28, 2018 **Photo Number**: 349

Description: View of Quarry 30.5. Most walls are in unstable condition.

Photograph F2-6 Eskers and Quarries 4 – km 46+000

Date: August 28, 2018 **Photo Number**: 339

Description: View of esker #3. North access ramp along a steep slope that seems undercut at its toe.

Photograph F2-7 Eskers and Quarries 5 – km 52+000

Date: August 28, 2018 **Photo Number**: 335

Description: View of the rock quarry at km 52. In good conditions with loose blocks and cobbles on the north wall.

Photograph F2-8 Eskers and Quarries 5 – km 52+000

Date: August 28, 2018 **Photo Number**: 336

Description: View of the rock quarry at km 52. In good conditions with loose blocks and cobbles on the north wall.

Photograph F2-9 Eskers and Quarries 6 – km 62+500

Date: August 28, 2018 **Photo Number**: 331

Description: View of esker #6. The 2-m high steep soil slopes are unstable.

Photograph F2-10 Eskers and Quarries 6 – km 62+500

Date: August 28, 2018 **Photo Number**: 332

Description: View of esker #6. The 2-m high steep soil slopes are unstable.

APPENDIX G

Quarries and Eskers

APPENDIX G1

Baker Lake Tank Farm Photographic Log

Photograph G1-1 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 003

Description: From the south side of Tank 1, looking southeast at Tanks 1, 2, 3, and 4. Presence of water ponding.

Photograph G1-2 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 002

Description: Looking at the southwestern corner of Tank 1.

Photograph G1-3 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 001

Description: From the north side of Tank 1, looking southeast at Tanks 1, 2, 3, and 4.

Photograph G1-4 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 004

Description: Looking northwest toward the south side of Tank 1.

Photograph G1-5 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 005

Description: Looking northeast toward the south side of Tanks 2 and 3.

Photograph G1-6 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 006

Description: Looking southwest toward the south wall of the tank farm. Presence of animal burrows.

Photograph G1-7 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 008

Description: Looking northeast. The geomembrane between the south side of tank 2 and 3 is damaged.

Photograph G1-8 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 009

Description: From the southwestern corner of Tank 3 looking southeast. View of exposed LLDPE.

Photograph G1-9 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 010

Description: From the southeastern corner of Tank 3, looking northwest at the south side of Tank 3, 2 and 1. View of exposed LLDPE.

Photograph G1-10 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 011

Description: From the south portion of the site looking north at the south side of Tank 3, 4 and 5.

Photograph G1-11 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 012

Description: From the south portion of the site looking southeast.

Photograph G1-12 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 013

Description: From the northeastern corner of Tank 4 looking southwest toward Tank 4.

Photograph G1-13 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 014

Description: From the northern side of Tank 4, looking northeast toward Tanks 4, 3, 2, and 1. Presence of exposed liner.

Photograph G1-14 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 016

Description: From the northeastern corner of Tank 2 looking northwest towards the northeastern side of Tanks 1 and 2.

Photograph G1-15 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 015

Description: From the northwestern corner of Tank 3 looking southeast towards the northeastern side of Tanks 3 and 4.

Photograph G1-16 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 017

Description: Looking northwest at the southern and western sides of Tank 5.

Photograph G1-17 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 018

Description: Looking north between Tanks 5 and 6. Presence of water ponding.

Photograph G1-18 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 019

Description: Looking northeast at the southern side of Tank 6. Presence of water ponding.

Photograph G1-19 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 021

Description: Looking southeast at the northeastern side of Tank 6. Presence of water ponding.

Photograph G1-20 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 022

Description: Looking south between Tanks 5 and 6.

Photograph G1-21 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 020

Description: Looking west at the northeastern side of Tank 5.

Photograph G1-22 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 024

Description: From the northeastern corner of the Jet A fuel tanks looking south. Presence of exposed geomembrane.

Photograph G1-23 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 023

Description: From the northeastern corner of the Jet A fuel tanks looking west. Presence of exposed geomembrane.

Photograph G1-24 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 026

Description: From the southwestern corner of the Jet A fuel tanks looking east. Presence of exposed geomembrane and water ponding.

Photograph G1-25 Baker Lake Tank Farm

Date: August 28, 2018 **Photo Number**: 025

Description: From the southwestern corner of the Jet A fuel tanks looking north. Presence of exposed geomembrane and water ponding.

APPENDIX G2

Quarries and Eskers along Amaruq Road Photographic Log

Photograph G2-1 Meadowbank Tank Farm

Date: August 29, 2018 **Photo Number**: 126

Description: From the western corner, looking east at the tank.

Photograph G2-2 Meadowbank Tank Farm

Date: August 29, 2018 **Photo Number**: 125

Description: From the western corner, looking northeast at the tank.

Photograph G2-3 Meadowbank Tank Farm

Date: August 29, 2018 **Photo Number**: 131

Description: From the eastern side, looking northwest.

Photograph G2-4 Meadowbank Tank Farm

Date: August 29, 2018 **Photo Number**: 130

Description: From the eastern side looking southwest. Presence of water ponding. A pump is installed.

Photograph G2-5 Meadowbank Tank Farm

<u>Date</u>: August 29, 2018 **<u>Photo Number</u>**: 128

<u>Description</u>: Looking northeast from the southern corner. Accumulation of water in the eastern corner.

Photograph G2-6 Meadowbank Tank Farm

<u>Date</u>: August 29, 2018 **<u>Photo Number</u>**: 127

<u>Description</u>: Looking northwest from the southern corner.

Photograph G2-7 Meadowbank Tank Farm

Date: August 29, 2018 **Photo Number**: 129

Description: Looking northwest from the southern corner.

APPENDIX G2

Main Camp Tank Farm Photographic Log

Photograph G2-1 Meadowbank Tank Farm

Date: August 29, 2018 **Photo Number**: 126

Description: From the western corner, looking east at the tank.

Photograph G2-2 Meadowbank Tank Farm

Date: August 29, 2018 **Photo Number**: 125

Description: From the western corner, looking northeast at the tank.

Photograph G2-3 Meadowbank Tank Farm

Date: August 29, 2018 **Photo Number**: 131

Description: From the eastern side, looking northwest.

Photograph G2-4 Meadowbank Tank Farm

Date: August 29, 2018 **Photo Number**: 130

Description: From the eastern side looking southwest. Presence of water ponding. A pump is installed.

Photograph G2-5 Meadowbank Tank Farm

Date: August 29, 2018 **Photo Number**: 128

Description: Looking northeast from the southern corner. Accumulation of water in the eastern corner.

Photograph G2-6 Meadowbank Tank Farm

Date: August 29, 2018 **Photo Number**: 127

Description: Looking northwest from the southern corner.

Photograph G2-7 Meadowbank Tank Farm

Date: August 29, 2018 **Photo Number**: 129

Description: Looking northwest from the southern corner.

APPENDIX G3

Vault Tank Farm Photographic Log

Photograph G3-1 Vault Tank Farm

Date: August 29, 2018 **Photo Number**: 144

Description: From the southeast corner of the Tanks looking northwest toward the Vault Tank Farm.

Photograph G3-2 Vault Tank Farm

Date: August 29, 2018 **Photo Number**: 142

Description: From the northwest corner of the Tanks Looking northeast toward the Vault Tank Farm.

Photograph G3-3 Vault Tank Farm

Date: August 29, 2018 **Photo Number**: 145

Description: From the southwest corner of the Tanks Looking northeast toward the Vault Tank Farm.

Photograph G3-4 Vault Tank Farm

Date: August 29, 2018 **Photo Number**: 143

Description: From the northeast corner of the Tanks looking southwest toward the Vault Tank Farm.

APPENDIX H

Other Facilities

APPENDIX H1

Vault Road Culverts Photographic Log

Photograph H1-1 Vault Road Culverts

Date: August 29, 2018 **Photo Number**: 153

Description: Looking at the outlet of the three culverts located on Vault Road at 640964E/7217466N. All of them are deformed in the middle.

Photograph H1-2 Vault Road Culverts

Date: August 29, 2018 **Photo Number**: 154

Description: From the inlet side of the three culverts located on Vault Road at 640964E/7217466N. Looking inside the southern culvert. The culvert is slightly deformed on top in the middle.

Photograph H1-3 Vault Road Culverts

Date: August 29, 2018 **Photo Number**: 155

Description: From the inlet side of the three culverts located on Vault Road at 640964E/7217466N. Looking inside the central culvert. The culvert is slightly deformed on top in the middle.

Photograph H1-4 Vault Road Culverts

Date: August 29, 2018 **Photo Number**: 156

Description: From the inlet side of the three culverts located on Vault Road at 640964E/7217466N. Looking inside the northern culvert. The culvert is slightly deformed on top in the middle.

Photograph H1-5 Vault Road Culverts

Date: August 29, 2018 **Photo Number**: 157

Description: Culvert on the NP1 side at 639 214 E / 7 216 189 N on Vault Road.

APPENDIX H2

Diversion Ditch and its Erosion and Sediment Protection Structure Photographic Log

Photograph H2-1 Diversion Ditch and its Sediment and Erosion Protection Structure

<u>Date</u>: August 29, 2018 **<u>Photo Number</u>**: 158

<u>Description</u>: Looking south toward Lake NP1 at the sediment and erosion protection structure. Presence of 2 silt curtains and 3 wooden barrier.

Photograph H2-2 Diversion Ditch and its Sediment and Erosion Protection Structure

<u>Date</u>: August 29, 2018 **<u>Photo Number</u>**: 159

<u>Description</u>: Looking west toward the western diversion ditch.

Photograph H2-3 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: August 29, 2018 **Photo Number**: 165

Description: From the eastern diversion ditch looking south toward Lake NP2.

Photograph H2-4 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: August 29, 2018 **Photo Number**: 166

Description: From the eastern diversion ditch looking northwest.

Photograph H2-5 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: August 29, 2018 **Photo Number**: 167

Description: From the eastern diversion ditch, looking east.

Photograph H2-6 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: August 29, 2018 **Photo Number**: 168

Description: From the eastern diversion ditch, looking northwest.

Photograph H2-7 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: August 29, 2018 **Photo Number**: 169

Description: From the northern diversion ditch looking southeast.

Photograph H2-8 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: August 29, 2018 **Photo Number**: 170

Description: From the northern diversion ditch looking west.

Photograph H2-9 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: August 29, 2018 **Photo Number**: 171

From the northern diversion ditch looking east.

Photograph H2-10 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: August 29, 2018 **Photo Number**: 172

From the northern diversion ditch looking west.

Photograph H2-11 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: August 29, 2018 **Photo Number**: 173

Description: From the northern diversion ditch looking east.

Photograph H2-12 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: August 29, 2018 **Photo Number**: 174

Description: From the northern diversion ditch looking west.

Photograph H2-13 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: August 29, 2018 **Photo Number**: 175

Description: From 637281E/7216790N, looking north. View of the western diversion ditch.

Photograph H2-14 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: August 29, 2018 **Photo Number**: 176

Description: From 637281E/7216790N, looking south at the western diversion ditch.

Photograph H2-15 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: August 29, 2018 **Photo Number**: 177

Description: From 637251E/7216171N, looking north at the western diversion ditch.

Photograph H2-16 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: August 29, 2018 **Photo Number**: 178

Description: From 637251E/7216171N, looking west at the western diversion ditch and its retention basin.

Photograph H2-17 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: August 29, 2018 **Photo Number**: 179

Description: From 637074E/7216157N, looking east at the western diversion ditch.

Photograph H2-18 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: August 29, 2018 **Photo Number**: 180

Description: From 637074E/7216157N, looking west at the western diversion ditch.

APPENDIX H3

RSF Till Plug Photographic Log

Photograph H3-1 RSF Till Plug

Date: August 29, 2018 **Photo Number**: 161

Description: From the south side of NP2 Lake (north of the diversion ditch) looking west at the RSF till plug.

Photograph H3-2 RSF Till Plug

Date: August 29, 2018 **Photo Number**: 162

Description: From the south side of NP2 Lake (south of the diversion ditch) looking west at the RSF till plug.

Photograph H3-3 RSF Till Plug

Date: August 29, 2018 **Photo Number**: 163

Description: From the south side of NP2 Lake (south of the diversion ditch) looking southeast at the RSF till plug.

Photograph H3-4 RSF Till Plug

Date: August 29, 2018 **Photo Number**: 164

Description: From the south side of NP2 Lake (south of the diversion ditch) looking northwest at the RSF till plug.

APPENDIX H4

Diffusers Photographic Log

Photograph H4-1 Diffusers – Vault Diffuser

Date: August 29, 2018 **Photo Number**: 146

Description: Looking at the Diffuser at Vault. In good condition.

APPENDIX H5

Landfill Photographic Log

Photograph H5-1 Landfill

Date: August 29, 2018 **Photo Number**: 141

Description: From 638857E/7215767N, looking north at the landfill.

Photograph H5-2 Landfill

Date: August 29, 2018 **Photo Number**: 140

Description: From 638857E/7215767N, looking northwest at the landfill.

APPENDIX H6

Contaminated Soil Storage and Bioremedial Landfarm Facility Photographic Log

Photograph H6-1 Contaminated Soil Storage and Bioremedial Landfarm Facility

Date: August 29, 2018 **Photo Number**: 136

Description: From the northeast extremity of the South Cell, looking northwest at the Contaminated Soil Storage and Bioremedial Landfarm Facility located within the South Cell of the TSF, north of Central Dike.

Photograph H6-2 Contaminated Soil Storage and Bioremedial Landfarm Facility

Date: August 29, 2018 **Photo Number**: 137

Description: From the northeast extremity of the South Cell, looking northwest at the Contaminated Soil Storage and Bioremedial Landfarm Facility.

Photograph H6-3 Contaminated Soil Storage and Bioremedial Landfarm Facility

Date: August 29, 2018 **Photo Number**: 138

Description: From the northeast extremity of the South Cell, looking northwest at the Contaminated Soil Storage and Bioremedial Landfarm Facility.

Photograph H6-4 Contaminated Soil Storage and Bioremedial Landfarm Facility

Date: August 29, 2018 **Photo Number**: 139

Description: From the northeast extremity of the South Cell, looking southeast at the Contaminated Soil Storage and Bioremedial Landfarm Facility.

Photograph H6-5 Contaminated Soil Storage and Bioremedial Landfarm Facility

Date: August 29, 2018 **Photo Number**: 200

Description: From the northeast extremity of the South Cell, looking northwest at the Contaminated Soil Storage and Bioremedial Landfarm Facility. Sign of superficial slope failure.

Photograph H6-6 Contaminated Soil Storage and Bioremedial Landfarm Facility

Date: August 29, 2018 **Photo Number**: 201

Description: From Stormwater Dike, looking southeast at the Contaminated Soil Storage and Bioremedial Landfarm Facility. Rockfill was placed on overburden fill material which is probably founded on a steep natural slope.

APPENDIX H7

Stormwater Pond Photographic Log

Photograph H7-1 Stormwater Pond

Date: August 29, 2018 **Photo Number**: 121

Description: From the northwestern side of the pond, looking southeast at Stormwater Pond.

Photograph H7-2 Stormwater Pond

Date: August 29, 2018 **Photo Number**: 122

Description: From the northwestern side of the pond, looking southeast at Stormwater Pond.

APPENDIX H8

Airstrip Photographic Log

Photograph H8-1 Airstrip

Date: August 29, 2018 **Photo Number**: 135

Description: Looking west at the extremity of the airstrip located within Third Portage Lake.

Photograph H8-2 Airstrip

Date: August 29, 2018 **Photo Number**: 134

Description: From the extremity of the airstrip located within Third Portage Lake, looking southeast.

Photograph H8-3 Airstrip

Date: August 29, 2018 **Photo Number**: 133

Description: From the northeast side of the airstrip looking northwest.

Photograph H8-4 Airstrip

Date: August 29, 2018 **Photo Number**: 132

Description: From the northeast side of the airstrip looking southeast.

Photograph H8-5 Airstrip

Date: August 29, 2018 **Photo Number**: 124

Description: From the southeast side of the airstrip looking northwest.

Photograph H8-6 Airstrip

Date: August 29, 2018 **Photo Number**: 123

Description: From the southeast side of the airstrip looking east.

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