AGNICO EAGLE
HOPE BAY

April 27, 2021

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Sent via Email: licensing@nwb-oen.ca; ali.shaikh@nwb-oen.ca

Re: 2020 Annual Geotechnical Inspection Report for the Tailings Impoundment Area Hope Bay Project, Nunavut

Dear Mr. Shaikh,

In accordance with Part I, Item 9 of Type A Water Licence 2AM-DOH1335, please see Attachment #1 to this correspondence for the results of the Hope Bay Project 2020 Annual Geotechnical Inspection (AGI) of the Doris Tailings Impoundment Area (TIA), conducted by SRK Consulting (Canada) Inc.

TMAC Resources Inc. (TMAC) is pleased to present responses to recommendations made during the AGI for the TIA in Attachment #2.

Should you have any further questions please feel free to contact me at oliver.curran@agnicoeagle.com

Sincerely,

Oliver Curran
Senior Advisor Environment and Permitting, Western Nunavut

Cc:
Licencing (NWB)
John Roesch (KIA)
Sarah Warnock (TMAC)

Attachments:
Attachment 1 - 2019 TIA Annual Geotechnical Inspection Report (SRK, 2021)
Attachment 2 - Recommendations and TMAC Responses – TIA (TMAC, 2021)

Attachment 1

2019 TIA Annual Geotechnical Inspection Report (SRK, 2021)

2020 Annual Geotechnical Inspection – Doris Tailings Impoundment Area

Hope Bay Mine, Nunavut, Canada
Agnico Eagle Mines Limited

SRK Consulting (Canada) Inc. ▪ 1CT022.057 ▪ April 2021

srk consulting

2020 Annual Geotechnical Inspection – Doris Tailings Impoundment Area

Hope Bay Mine, Nunavut, Canada

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Cover Image(s):
Photo of the Doris TIA taken during the annual inspection.

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The opinions expressed in this document have been based on the information available to SRK at the time of preparation. SRK has exercised all due care in reviewing information supplied by others for use on this project. While SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information, except to the extent that SRK was hired to verify the data.

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Executive Summary

Hope Bay is a gold mining and milling operation of TMAC Resources Inc. Hope Bay comprises three distinct areas of known mineralization, Doris, Madrid (North and South), and Boston. Doris Mine (Phase 1) is currently being operated (as of December 2018) under Nunavut Water Board (NWB) Type A Water License 2AM-DOH1335 - Amendment No.2. This license covers the current Phase 1 and well as the Phase 2 mining developments. TMAC contracted SRK Consulting (Canada) Inc. to conduct an annual geotechnical inspection (AGI) for the Tailings Impoundment Area (TIA) in accordance with all stipulated license conditions.

On February 2, 2021 TMAC was purchased by Agnico Eagle Mines (AEM); TMAC continues to exist as a legal entity and is now a wholly owned subsidiary of AEM. All rights, obligations, liabilities of TMAC continue to reside with TMAC until or if an amalgamation with Agnico occurs. For the purposes of this report, all past, current and forward looking recommendations regarding the two entities will refer to TMAC or Hope Bay, unless explicitly requiring reference to AEM. All recommendations are intended for TMAC, AEM and the Hope Bay mine personnel as the responsible parties managing the TIA and should be interpreted as such in this document.

The TIA currently consists of a water retaining dam, the North Dam, and a tailings retaining dam, the South Dam. A second tailings retaining dam or saddle dam, the West Dam, will be built adjacent to the South Dam when the South Dam is raised. Subaerial tailings are currently retained by the South Dam, and the Reclaim Pond is impounded by the North Dam. The North Dam was constructed during the winters of 2011 and 2012, and Phase 1 of the South Dam was constructed in one season during the winter of the 2017 to 2018 season. In Phase 2, the South Dam will be raised to approximately 46 masl and the West Dam will be constructed. Construction of the Phase 2 South Dam raise is expected to commence, and be completed by the time the tailings beach against the South Dam reaches the full supply level of the existing dam (36.5 masl or approximately 2.64Mt of total tailings tonnage). . Following construction of the Phase 2 South Dam, construction of the West Dam is expected to start. The exact timing of the commencement of the South Dam Phase 2 raise and West Dam construction will be depending on mill processing rates and on-site development activities, however based on current projections construction is expected in the winter of 2022 or 2023.

Table A provides a summary of the 2020 AGI inspection components for the TIA, and the primary recommendations stemming from the site inspection and subsequent review of monitoring data. The recommendations from the previous 2019 AGI are included for reference. Based on the results of the 2020 AGI, the North Dam and South Dam are functioning as designed, and no concerns were identified regarding the ongoing performance of these structures. There are maintenance items that require attention, and suggestions for improvement of the performance monitoring system. The items in Table A are considered important to the ongoing performance and safety of the TIA and require attention by Hope Bay staff prior to the 2021 annual geotechnical inspection. Where appropriate, an update status of certain recommendations is provided in *red* text.

Table A: Summary of 2020 AGI Recommendations

Inspection Item	2019 Recommendations (for reference)	2020 Recommendations
	General TIA Management Recommendations	
Third Party Dam Safety Review	▪ Conduct an independent third-party Dam Safety Review for both the North and South Dams in the summer of 2021.	▪ Conduct an independent third-party Dam Safety Review (DSR) for both the North and South Dams in the summer of 2021. *Planning for this is in progress. An independent third-party Dam Safety Review is scheduled to be conducted for both the North and South Dams in summer of 2021 pending COVID-19 restrictions.*
Tailings Operating, Maintenance and Surveillance (OMS) Manual and Emergency Response Plan (ERP)	▪ An update to the OMS manual is in progress by SRK and will be submitted by Q4, 2020. This update is aimed to be a notable improvement to the current OMS. This noted, additional updates are expected in Q3 and Q4 2020. The focus of the OMS updates in Q3 and Q4 will be further refinement of the Trigger Action Response Plans (TARPs). The OMS for this facility will be a 'living' document that is expected to be reviewed annually. ▪ TMAC should ensure all staff are properly informed and trained on the contents of the OMS Manual. ▪ *At the time of writing this report, TMAC was in the process of developing a standalone 'Hope Bay Project Dam Emergency Plan', rather than updates to the ERP, to address dam emergencies. It will incorporate inundation mapping and dam break scenarios. The standalone dam emergency plan will be released upon completion of the OMS update to ensure alignment.* An Emergency Reponses Plan exists for the site; however, this document was lacking sufficient detail for a specific emergency at the TIA, if one were to occur. In 2019 SRK visited site and held a session with site personnel to go over preliminary dam break inundation maps completed by SRK and to provide inputs into what should be included in the site ERP updates to ensure the TIA is properly covered in this document. An update to the ERP is recommended in 2020 to provide additional details for the TIA.	▪ A draft version of the 'Hope Bay Project Dam Emergency Plan' was completed by Hope Bay staff in 2021. This Dam Emergency Plan should be finalized by site and integrated with the into the OMS and TARP framework ▪ Once integrated, the suite of OMS, TARPs, ERP and Dam Emergency Plan should reviewed with all site operations annually and updated as necessary. ▪ All of these components should be reviewed against AEM's corporate tailings management system and updated tailings standards through a gap analysis to identify required updates. ▪ *A revised OMS was issued in 2020* ▪ *TARPs were developed for the TIA in Q4 2020. Further refinement based on site input to the TARPs and integration with OMS manual should be completed in 2021*
TIA Roles and Responsibilities	▪ TMAC must agree on the roles and responsibilities for the TIA, train and inform personnel of their duties, and operate the facility accordingly. This will be an ongoing recommendation that is expected to be repeated annually. The roles and responsibilities for the TIA will be defined in the OMS update, to be released in 2020.	▪ The roles and responsibilities for the TIA are defined in the OMS update and must be updated with any changes in AEM's corporate structure.
Compliance with Monitoring Requirements	▪ Conduct monitoring in accordance with the Monitoring SOP, paying attention to those areas where conformance is not consistently met. ▪ Update the Monitoring SOP to include South Dam monitoring requirements. SRK is currently	▪ Conduct monitoring in accordance with the specified frequency in the Monitoring SOP and OMS. If changes in the monitoring frequency are required due to new operating schedules these must be proposed to and approved by the EOR.

Inspection Item	2019 Recommendations (for reference)	2020 Recommendations
	preparing a separate SOP for the South Dam, and one already exists for the North Dam. A draft version of the South Dam SOP was submitted to TMAC in June 2020 and a final version is expected in July 2020.	▪ The North and South Dam Monitoring SOPs were updated in 2020. An additional update should be completed following any notable updates to the Tailings Management System.
North Dam Inspection and Review of Monitoring Data		
Ground Temperature Cables (GTCs)	▪ There are no specific recommendations for the installed GTCs. However, TMAC should aim to improve performance tracking of the dataloggers at the South Dam and check to see if cables are being damaged by wildlife after spring melt in order to confirm that current cable protection is adequate.	▪ No recommendations. ▪ Consider implementing satellite telemetry for the North Dam data loggers to allow daily transmission of the measurements rather than manual downloads. This would be a more proactive approach rather than a requirement at this time.
Thermosyphons	▪ The 2018 recommendations were completed in 2019 and Arctic Foundations Canada (AFC) visited the site for an inspection. Additional details are provided in this 2019 AGI (see Appendix A).	▪ No recommendations.
CR1000 Datalogger Battery Voltage	▪ The external CR1000 datalogger batteries should continue to be monitored and recharged annually or replaced as needed.	▪ The external CR1000 datalogger batteries should continue to be monitored and recharged annually or replaced as needed. ▪ *The batteries have been recharged in March 2021*
Inclinometers	▪ The inclinometer and associated readout device should be recalibrated every 3 years as per recommended best practice. SRK was aware that TMAC sent this instrument for recalibration but due to COVID-19, the instrument calibration was unable to be performed and had to be returned from the out of country manufacturers. This recommendation should be revisited before the spring of 2021.	▪ The inclinometer probe and read-out were sent for recalibration and maintenance, but due to Covid-19 it was not possible to complete in 2020. The probe has and readout should be re-sent to the manufacturer for recalibration and maintenance in 2021. ▪ *Note that TMAC has informed SRK that the inclinometer probe has now been sent off site (sent off site Q1 2021) for recalibration and maintenance.*
Survey Monitoring Points	▪ Backfill the erosion around survey monitoring point ND−DSP−100 at the North Dam. ▪ Continue to carefully observe the North Dam downstream shell settlement points ND-SSP-080-3 and ND-SSP-110-3 to determine if thaw settlement of the toe is causing undue deformation.	▪ Backfill the erosion around survey monitoring point ND−DSP−100 at the North Dam. ▪ Continue to carefully observe the North Dam downstream shell settlement points ND-SSP-080-3 and ND-SSP-110-3 to monitor for increased thaw settlement of the toe and undue deformation. ▪ Installation of additional surficial survey points (SSP) on the upstream face of the North Dam to track deformation of the upstream face. These additional SSPs are recommended to better track the deformation of the upstream shell as foundation at the toe thaws due to elevated Reclaim Pond water levels. Note that this upstream foundation thaw is expected as per the original designs and there are no concerns with current thaw rate, however improved tracking of the displacement going forward will provide an early warning should adverse thaw conditions occur, and help ensure the dam design life is not being impacted.
Creep Displacement	▪ None.	▪ No recommendations.

Inspection Item	2019 Recommendations (for reference)	2020 Recommendations
Walkover Surveys	■ The required weekly walkover surveys at the North Dam are not being completed in accordance with the SOP. This is an important surveillance activity as defined in the OMS Manual and needs to be complied with.	■ Complete weekly walkover surveys at the North Dam in accordance with the Monitoring SOPs. This is an important surveillance activity as defined in the OMS Manual and needs to be complied with. *Since 2018 there has been an improvement in the frequency of the walk over surveys but additional surveys were still required to be in accordance with the SOPs.*
North Dam Seepage Monitoring	■ Continue water quality monitoring of North Dam seepage according to the methods outlined in SRK (2018b) (this was completed in 2019). ■ Conduct at least one additional frost probe survey along the same transects in early summer and early fall, following the same procedure as in 2018 and 2019. Based on current favourable results, SRK will revisit the requirements for the frost probe surveys as part of the 2020 AGI and determine if further surveys are required beyond 2020. ■	■ No recommendations. ■ Frost probe surveys are not required as part of the 2021 monitoring. If conditions change and a frost probe survey is required, the EOR will inform Hope Bay staff.
AGI Physical Inspection	■ None	■ No recommendations.
South Dam Inspection and Review of Monitoring Data		
Ground Temperature Cables (GTCs) and D405 Dataloggers	■ Complete a walk over survey of the South Dam after spring melt and look for any exposed or damaged ground temperature cables. This will allow for preventative maintenance to be done if exposed cables are observed, which will help to limit the potential for damage from wildlife. ■ SRK to further assess, if repairs are not possible, replacement of Ground Temperature Cables SD-VTS-155-US, SD-VTS-240-US and SD-VTS-240-DS will be required. ■ Manually download data from each datalogger once annually or as specified by the EOR.	■ GTCs provide thermal monitoring of the dam to ensure conditions remain within the intended design for safe operation and tailings containment. GTC replacement is recommended in some areas of the South Dam where recent instrument failure has occurred. Four replacement GTCs are suggested to be installed at this time (two upstream and two downstream). TMAC should work with the EOR to install these replacement GTCs as soon as practical. Priority should be given to the two upstream GTC replacements. ■ *Four replacement GTC strings are now on site (at the Doris North Camp). The exact timing of the installation of these cables has not yet been established due to current site limitations with available surface drill rigs.* ■ Beadedstream telemetry subscription requires annual renewal. TMAC should work with the EOR to ensure that the telemetry system operations are maintained. ■ Complete a walk over survey of the South Dam after spring melt and look for any exposed or damaged ground temperature cables. This will allow for preventative maintenance and placement of protective material to be done if exposed cables are observed, which will help to limit the potential for damage from wildlife. ■ Manually download data from each datalogger once annually in accordance with the monitoring SOP.
Survey Monitoring Points	■ None.	■ A monthly survey of the downstream toe is required as part of the Monitoring SOP. This monitoring requirement should be conducted at least once during August each year to track the lateral extent of ponding downstream of the dam.
Walkover Surveys	■ Start weekly walkover surveys of the South Dam in 2020. This is an important surveillance activity.	■ Complete weekly walkover surveys at the South Dam in accordance with the Monitoring SOPs. This is an important

Inspection Item	2019 Recommendations (for reference)	2020 Recommendations
	Additional details will be provided to TMAC in the South Dam SOP.	surveillance activity as defined in the OMS Manual and needs to be complied with.
South Dam Seepage and Ponded Water Monitoring	▪ Not part of the 2019 AGI	▪ No recommendations.
Annual Physical Inspection of the South Dam	▪ None	▪ Methods to limit tailings dispersion downstream of the dam should be considered in 2021. As the sub-aerial tailings beach grows, this is expected to become a more critical item. ▪ The initial phases of some permafrost degradation and increased ponding water has been observed at the downstream toe of the South Dam. This downstream area is near the area where snow access roads were constructed as part of the Phase 1 South Dam construction (and is within the ultimate Phase 2 dam footprint). Remediation of this area should be considered prior to construction of the Phase 2 raise (Phase 2 raise not expected to be completed in 2021 at this time). This remediation would be expected to consist of the placement of 1.5m thickness of ROQ material directly over these areas (and against the current downstream dam fill / shell).
▪ TIA-Wide Monitoring		
Tailings Deposition System	▪ TMAC should install the dedicated mine water discharge pipeline to the TIA as soon as possible to allow tailings deposition to recommence from the South Dam. It is critical that tailings deposition from South Dam recommence in order to maintain a beach length of at least 100 m at all times, for all TIA water levels. *UPDATE: this was addressed at the start of 2020 and is now complete. The Roberts Bay Discharge system is now operational.* ▪ Saline mine water may only be discharged together with tailings from, or within, 300 m of the South Dam provided the freezing point depression is less than 0.5ºC (around 4,500 mg/L Cl maximum equivalent). If the freezing point depression exceeds 0.5ºC, saline mine water may only be discharged with tailings at other designated tailings discharge points further than 300 m from the South Dam or directly into the Reclaim Pond. The freezing point depression calculation is provided in this AGI and will be incorporated by SRK into the updated OMS Manual (update currently in progress). ▪ The tailings discharge system must be operated in accordance with the designated tailings discharge plan. Primary spigot moves should be expected around, or shortly afterwards, spring melt and again prior to winter freeze up. ▪ Areas along the eastern shoreline of the TIA where tailings discharge has occurred at elevations above 36.5 m need to be carefully monitored to	▪ Saline mine water may only be discharged through the tailings pipeline from, or within, 300 m of the South Dam provided the freezing point depression is less than 0.5°C (less than 4,500 mg/L Cl maximum equivalent). While not current practice, this operational recommendation remains in place. ▪ The tailings discharge system must be operated in accordance with the designated tailings discharge plan. Primary spigot moves should be expected during, or shortly after, spring melt and again prior to winter freeze up. In the summer of 2021, it is expected that at least one additional spigot location will be required to be installed (north of the current spigot H location). ▪ No TIA bathymetric survey was conducted in 2020, as approved by the EOR. For 2020 deposition planning, conservative volume assumptions were used as part of the 2020 AGI tailings deposition plan (i.e. assuming larger deposited volumes or less available space). A bathymetry survey of the TIA reclaim pond should be completed in 2021 to allow for better determination of the tailings volume and available storage volume in the TIA. ▪ Plans should start to be made in 2021 for the Phase 2 raise of the South Dam; The raise is expected to be required once the tailings beach reaches against the existing dam reaches the full supply level for tailings (36.5 masl or approximately 2.64Mt of total tailings tonnage). The required timing is dependent on milling rates, but construction is expected in winter 2022 or 2023.

Inspection Item	2019 Recommendations (for reference)	2020 Recommendations
	determine if permafrost damage is occurring due to tailings flow and vegetation dieback. Should any damage be noted, appropriate proactive mitigation may be required.	
Emergency Dump Catch Basins	▪ Repair the Western Emergency Dump Catch Basin at the earliest opportunity to ensure liner movement does not occur and impact the as-built storage capacity of this Emergency Catch Basin.	▪ The Western Emergency Dump Catch Basin still requires repairs. These repairs should still be planned to be carried out.
Pipelines (Reclaim, Tailings Deposition and TIA Discharge)	▪ TMAC must carefully inspect all pipelines placed directly on the tundra for signs of vegetation dieback and associated flow path channeling. Where this is occurring, the pipeline must be relocated to follow existing all-weather road shoulders, and appropriate remediation needs to be put in place where damage has occurred. Going forward, TMAC should consider abandoning the practice of placing pipelines directly onto the tundra. ▪ The permafrost thermal erosion feature that has developed along the northern shore of the TIA was backfilled by TMAC in 2019. This area should continue to be monitored to ensure that additional thermal erosion does not result in this area.	▪ TMAC must carefully inspect all pipelines placed directly on the tundra for signs of vegetation dieback and associated flow path channeling. Where this is occurring, the pipeline must be relocated to follow existing all-weather road shoulders, and appropriate remediation needs to be put in place where damage has occurred. ▪ The permafrost thermal erosion feature that has developed along the northern shore of the TIA was backfilled by TMAC in 2019. This area should continue to be monitored to ensure that additional thermal erosion does not result in this area. ▪ Monitoring should continue at the repaired TIA Reclaim Jetty Pad (710 Pumphouse pad) following the recommended survey frequency of twice monthly from May to November.
TIA Reclaim Pumphouse (710) Pad	▪ Notable settlement was noted at the TIA Reclaim Jetty Pad (also referred to as the 710 Pumphouse pad). Upon visual inspection and from review of the as-built data, it looks like new ROQ material was placed off the edge of the pad in thick, end dumped lifts in order to widen the pad for the new 710 pumphouse. There are notable stability concerns with this pad as large settlements and notable cracking indicate that a failure of this pad (albeit slow) appears to be occurring. However, it should be noted that the rate of movement could increase suddenly causing a sudden failure, and this risk should not be ignored. Monitoring of this area (at least weekly during winter and daily during months with no ice cover on the lake) should be completed. It is recommended that remediation measures be completed for the pad in order to stabilize the fill and prevent further deformation. This is expected to consist of placing additional fill along the outside of the access road and pad to reduce the overall slope and provide additional confining stress at the toe of the pad (which is currently underwater). Rates of loading must be controlled and slow enough in order to avoid inducing excess pore pressures in the foundation. This means that it may take weeks to build this small additional fill and that the dumping faces should be spread out as much as possible. Material should be end dumped back from the working face and spread with an excavator with	▪ Settlement monitoring at the Reclaim Jetty should continue in 2021 (twice monthly, May to November). ▪ Major Jetty repairs were completed in 2020. There is still one area off the most WSW end of the reclaim jetty fill (i.e. by the area where the pipelines extend from the seacans into the TIA) that are still over steepened and should be carefully monitored. ▪ Additional (relatively minor) fills are recommended on the west side of the pad where the full fill extents, of the proposed reclaim jetty repairs, were not fully met. ▪ Once all repairs are complete, ensure the recommended survey monitoring points are reestablished.

Inspection Item	2019 Recommendations (for reference)	2020 Recommendations
	the largest reach on site (to limit loading at the crest).	
Shoreline Erosion	▪ None.	▪ No recommendations; Shoreline Erosion is no longer a formal monitoring requirement, and as-such will not be reported as a section in the 2021 AGI. Should shoreline erosion be observed throughout the year, or during the AGI it will be reported as part of the overall TIA condition assessment.
TIA Water Balance and Level Targets	▪ It is of paramount importance that the Roberts Bay Discharge System Pipeline be completed during the summer of 2019. Further delay of this may result in reduced operations. ▪ *UPDATE: this was addressed at the start of 2020 and is **now complete**. The Roberts Bay Discharge system is now operational.*	▪ It is of paramount importance that the RBDS be re-commissioned by May 2021 to manage water levels in the Reclaim Pond. Further delay of this may result in reduced operations. ▪ *During maintenance of the Roberts bay Discharge Line in the fall of 2020, portions of the submersed line became buoyant requiring the submersed line to be shortened. The end of the Roberts Bay Discharge line is now at around 20m depth in Roberts Bay compared to the previous 40 meters depth. In Q1 2021, TMAC made a submission to the Nunavut Impact Review Board indicating why the revised discharge location does not pose a significant modification to the Hope Bay Mine or the previously assessed environmental effects. It is expected that this discharge line will be able to be used again before freshet 2021.* ▪ If delays in approvals to use the Roberts Bay Discharge system are expected past the end of May 2021 then the EOR should be informed so additional plans can be made with site staff. Water levels in the TIA will continue to be carefully monitored (specifically during the periods where there is no discharge from the TIA to Roberts Bay). ▪ Continue discharge 2021 to reduce the water levels in the pond to within the target elevation range. ▪ Continue to monitor the South Dam beach length to maintain at least 100 meters separation between the Dam and the Reclaim Pond or any large pond.
TIA Water Quality	▪ No recommendations; however, the following comments are made below. ▪ The water treatment plant for the TIA is required to be maintained in good operational condition so that discharge of supernatant water can occur once the Roberts Bay Discharge System Pipeline is operational, and allow treated water to be discharged in order to maintain water levels in the TIA below the full supply level. ▪ *UPDATE: as of the start of 2020 the Roberts Bay Discharge system and the connected water treatment plant is now operational.*	▪ No recommendations. ▪ If water quality or water treatment capacity is expected to impact the ability to maintain the Reclaim Pond within the operational range, the EOR must be notified.
Climate Data	▪ None.	▪ No recommendations.

1 Introduction

1.1 General

Hope Bay is a gold mining and milling operation of TMAC Resources Inc (in 2020). The Operation is located 705 km northeast of Yellowknife and 153 km southwest of Cambridge Bay in Nunavut Territory, and is situated east of Bathurst Inlet (Figure 1). The Operation comprises three distinct areas of known mineralization, Doris, Madrid (North and South), and Boston.

On February 2, 2021 TMAC was purchased by Agnico Eagle Mines (AEM); TMAC continues to exist as a legal entity and is now a wholly owned subsidiary of AEM. All rights, obligations, liabilities of TMAC continue to reside with TMAC until or if an amalgamation with Agnico occurs. For the purposes of this report, all past, current and forward looking recommendations regarding the two entities will refer to TMAC or Hope Bay, unless explicitly requiring reference to AEM. All recommendations are intended for both TMAC and AEM and should be interpreted based on the specific context.

The Operation is currently in Phase 2; the Phase 1 TIA was operated under superseded Type A Water Licence (2AM-DOH1323 Amendment No. 1), while the Phase 1 and 2 of the TIA are now approved and operated under the Amended Water Licences (2AM DOH1335). Phase 1 included mining and infrastructure at Doris (Figure 2), while Phase 2 includes mining and infrastructure at Madrid and Boston located approximately 10 and 60 km south from Doris, respectively. The Doris Tailings Impoundment Area (TIA) (Figure 3) will ultimately contain both Phase 1 and 2 tailings.

Construction of Phase 1 infrastructure started in 2007, and underground development commenced in 2010. The North Dam, which provides containment for the TIA at its northern perimeter, was constructed over two winter seasons, 2011 and 2012 (Figure 3). In the fall of 2012, the Project was placed into Care and Maintenance prior to completing infrastructure development required to allow commercial production. Following an ownership change of the Project, Phase 1 was taken out of Care and Maintenance in 2015 and transitioned into commercial production in 2017. Construction of the South Dam, providing southern TIA containment, was carried out between January and June of 2018 (Figure 3).

To fulfill regulatory compliance requirements for an annual geotechnical inspection (AGI) for the TIA containment dams as well as any supplementary infrastructure pertaining to the TIA operations such as pipelines and emergency catch basins, TMAC contracted SRK Consulting (Canada) Inc., the Design Engineer, to conduct the 2020 inspection. This report provides a summary of the conditions observed, a review of monitoring data, and recommendations to ensure ongoing successful performance of the tailings management system. SRK has conducted each formal AGI of the TIA since 2012 (SRK 2012a, 2013a, 2014a, 2014b, 2016a, 2017a, 2018a, 2019a, 2020a).

John Kurylo, MSc, PEng, Senior Consultant with SRK and the Engineer of Record, conducted the on-site geotechnical inspection between August 18 to 22, 2020. Weather conditions during the inspection were overcast with periods of light rain and becoming sunny to partly cloudy around August 21. The detailed inspection of the dams and supporting infrastructure was carried out on foot, followed by an aerial survey of the TIA using a low altitude helicopter flyover. Kyle Conway, On-Site Environmental

Superintendent with TMAC, accompanied John during the walkover inspections. Photos detailing the inspection conditions are included as photologs, and comprehensive review and analysis of the monitoring data are provided in the appendices. A post inspection meeting was held on site with key personnel from relevant departments, where SRK presented the preliminary inspection findings.

1.2 Inspection Requirements

Under Type A Water License 2AM-DOH1335 – Amendment No. 2, dated December 7, 2018, the specific TIA inspection requirements are stated in Part I, items 9 and 10 of the license:

9. The Licensee shall undertake a geotechnical inspection of all surface infrastructure and earthworks, annually between July and September, by a Geotechnical Engineer. The inspection shall be conducted in accordance with applicable best practices including the Canadian Dam Association Guidelines for water and waste containment facilities.

10. The Licensee shall submit to the Board for review, within ninety (90) days of completion of the geotechnical inspection, a report in accordance with Part I Item 9 and/or the Annual Report. The report shall include a cover letter from the Licensee outlining an implementation plan addressing each of the Geotechnical Engineer's recommendations and shall include the following:

a. *All quantities in cubic meters of dike seepage from the North, West, and South Dams pumped back into the Tailings Impoundment Area;*
b. *As-built drawings and a summary of the mitigation works undertaken along the shoreline of the Tailings Impoundment Area in response to erosion; and*
c. *All data and information generated from the monitoring of all project geotechnical instrumentation.*

2 Site Conditions

2.1 Tailings Impoundment Area History

A summary of the TIA permitting, construction, and operations history is provided in Table 1.

Table 1: Summary of TIA Development History

Period	Comments
2003	Doris North Project preliminary economic assessment is completed with Tail Lake designated as the TIA, assuming subaqueous deposition and a maximum tailings quantity of about 0.4 Mt (SRK 2002a).
2002 – 2005	Geotechnical, geophysical, geohydrological and permafrost investigations of dam foundations (North, South and alternate internal locations), TIA shoreline perimeter, and TIA talik (SRK 2002b, 2003 and 2005a, 2005b and 2005c).
2005	Environmental Assessment for the Doris North Project is completed which includes rigorous alternatives assessment confirming Tail Lake as the preferred TIA.
2006	Project Certificate is issued for the Doris North Project.
2006	Application for Schedule 2 listing of Tail Lake as TIA in accordance with the Metal Mining Effluent Regulations (MMER).
2008	Tail Lake MMER Schedule 2 listing obtained.
Winter 2011 and Winter 2012	North Dam constructed (SRK 2012b).
Fall 2012	Project placed into Care and Maintenance before any tailings was ever produced.
2012 – 2015	Project in Care and Maintenance. Water within the TIA is managed in accordance with the Interim Water Management Plan (SRK 2012c) which includes pumping water from the Pollution Control Pond (PCP) to the TIA and discharging TIA water to Doris Creek.
2015 – 2016	TMAC submits application to amend the Water Licence and Project Certificate which amongst other things will result in a change from subaqueous tailings deposition to sub-aerial tailings deposition, increase the TIA capacity to 2.5 Mt, change the South Dam design to a frozen foundation dam, and construction of an Interim Dike. This amendment was approved November 4, 2016.
2017 – 2019	TMAC submits application to amend the Doris Water Licence and Project Certificate, and to obtain a new Water Licence in support of Phase 2 of the Hope Bay Mine. Amongst other things, this will result in increasing the TIA capacity to 18 Mt, constructing a South Dam raise, and the Interim Dike would no longer be required. The updated Project Certificate was issued in October 2018, and the amended and new Water Licence issued December 2018.
January 2017	Start of tailings deposition in TIA.
January – June 2018	Completion of Phase 1 South Dam construction.
August 2018	Additional installation of South Dam instrumentation, and cable extensions for the ground temperature cables.
May 2019	Instrumentation upgrades and additional data logger installations at the South Dam.

2.2 Tailings Management Strategy

2.2.1 Phase 1

Phase 1 tailings were subaerially deposited in the TIA (formerly Tail Lake), which was listed on Schedule 2 of the Metal Mining Effluent Regulations (MMER) specifically for use as a tailings facility. The TIA is located south-east of the Doris mill and mine (Figure 2). Containment for the TIA is provided through a water retaining frozen core dam (North Dam), and a geosynthetic clay liner (GCL) lined frozen foundation tailings dam (South Dam). Phase 1 tailings solids containment capacity is limited to 2.5 Mt. Previously permitted deposition planning included an Interim Dike near the mid-point of the TIA to provide solids containment.

2.2.2 Phase 2

Phase 2 tailings management increases the overall tailings solids containment capacity to approximately 18 Mt. The North Dam remains unchanged and is not planned to be raised; however, as part of Phase 2 the South Dam is raised and a new West Dam (also a frozen foundation GCL lined dam) is constructed (Figure 3). Note there is no plan or requirement to construct the Interim Dike under 2AM-DOH1335 Amendment No. 2 and as such is removed from this report.

2.3 Tailings Storage Requirements

The planned tailings production rates and associated tailings storage requirements for the Doris TIA are summarized in Table 2.

Table 2: TIA Containment Volume Design Criteria

Description	Value
Nominal Tailings Production Rate	2020 to 2023 → 2,000 tonnes per day (tpd)[1] 2024 → up to 3,500 tpd 2025 to End of Mine Life → up to 4,000 tpd
Tailings Specific Gravity	2.85
Deposited Tailings Dry Density	1.3 t/m^3
Tailings Solids Content	35% solids (by weight) initially, increasing to 65% *(somewhat dependent on if mine water inputs continue to TIA or if this water is treated and discharged directly to Roberts Bay before going to the TIA)*
Total Tailings Storage Requirement: By Mass By Volume	 20.0 Mt *(max., only 18.0 Mt outlined in TMAC 2020 Pre-Feasibility Study)* 15.4 Mm^3
Remaining Tailings Storage Requirement: By Mass By Volume	 18.8 Mt 14.5 Mm^3

Description	Value
Ice Entrainment Allowance:	
Percentage of Tailings Capacity	20%
By Volume	2.4 Mm^3
Tailings Beach Slope:	Between 0.5% and 1.0% (expected variability based on monitoring data and survey data)

Notes:

[1] 2021 to 2023 anticipated tailings production rates are 1,500 tpd

2.4 Tailings Impoundment Area Infrastructure

2.4.1 North Dam

The North Dam forms the northern boundary of the Doris TIA within a narrow natural valley, blocking the original Tail Lake outlet to Doris Lake (Figure 3). Complete North Dam geometric design parameters and design criteria are summarized in Table 3 and Table 4 respectively. Figure 4 through Figure 6 depict pertinent details of the North Dam and its instrumentation. Photolog 1 through Photolog 3 from the 2019 inspection show photos of the upstream and downstream slopes, and the installed instrumentation.

The North Dam impounds the Reclaim Pond and was designed as a water retaining structure. The dam has a central frozen core with a secondary upstream GCL. The dam is constructed from local quarry rock and consists of processed fines for the core, 150 mm nominal sized transition material, and a run of quarry (ROQ) outer shell. To ensure maintenance of frozen foundation and frozen core conditions, the key trench of the dam is equipped with 12 horizontal thermosyphon evaporators (SRK 2007, 2012a, 2013a, 2015a).

Construction of the North Dam started in February 2011 and was completed in April 2012, over two distinct winter seasons. Complete as-built details are provided in SRK (2012b).

2.4.2 South Dam

The South Dam is located at the southern end of the former Tail Lake, on the watershed divide to Ogama Lake (Figure 3). The South Dam is designed as a frozen foundation dam consisting of a compacted rock fill dam (sourced from a local quarry) with a GCL keyed into the permafrost overburden and bedrock foundation for seepage control. Complete geometric design parameters and design criteria are summarized in Table 3 and Table 4 respectively, with Figure 7 through Figure 9 presenting pertinent details of the South Dam design. The dam is designed to retain beached tailings as opposed to water. The dam is to be constructed in two phases, incorporating a single downstream raise between Phase 1 and Phase 2.

South Dam construction began in January 2018 and Phase 1 construction was completed in June 2018. The South Dam instrumentation was mostly completed in August 2018. Photolog 4 shows the South Dam Inspection photos.

2.4.3 West Dam

The West Dam has been designed as a frozen foundation dam with a key trench and a GCL liner keyed into permafrost, similar in design to the South Dam. It is intended to retain beached tailings along low-lying ground on the western perimeter of the TIA (Figure 3). Complete geometric design parameters and design criteria are provided in Table 3 and Table 4. This dam will be constructed in a single stage using local quarry rock. This dam has not yet been constructed.

Table 3: TIA Containment Dams Geometric Design Parameters

Description	North Dam	South Dam	West Dam
Structure Type	Frozen core rock fill dam with geomembrane	Frozen foundation rock fill dam with geomembrane	Frozen foundation rock fill dam with geomembrane
Secondary Seepage Barrier	GCL		
GCL Deployment Slope	2.5H:1V	Phase 1 – 3H:1V Phase 2 – 4H:1V	3H:1V
Thermosyphons	12 sloped	None	None
Crest Centerline Length	220 m	515 m	470 m
Maximum Height	11.0 m	Phase 1 – 6.0 m Phase 2 – 14.0 m	5.0 m
Crest Elevation	37.5 masl	Phase 1 – 38.0 masl Phase 2 – 46.0 masl	46.0 masl
Core/GCL Elevation	35.0 masl	Phase 1 – 37.0 masl Phase 2 – 45.0 masl	45.0 masl
Full Supply Level (FSL)	33.5 masl	Phase 1: Water – 33.5 masl Tailings – 36.5 masl Phase 2: Water – 33.5 masl Tailings – 44.5 masl	Water – 33.5 masl Tailings – 44.5 masl
Original Tail Lake Water Level	28.3 masl		
Total Actual Freeboard (Crest to FSL)	4.0 m	Phase 1: Water – 4.5 m Tailings – 1.5 m Phase 2: Water – 12.5 m Tailings – 1.5 m	Water – 12.5 m Tailings – 1.5 m

Description	North Dam	South Dam	West Dam
Total Actual Minimum Freeboard (Core/GCL to FSL)	1.5 m	Phase 1: Water – 3.5 m Tailings – 0.5 m Phase 2: Water – 11.5 m Tailings – 0.5 m	Water – 11.5 m Tailings – 0.5 m
Required Normal Freeboard (CDA 2013)	Wind setup (0.07 m) + Wave runup (1.06 m) = 1.13 m		
Required Minimum Freeboard (CDA 2013)	Wind setup (0.06 m) + Wave runup (1.16 m) = 1.22 m Inflow Design Flood (IDF) Freeboard = 2.1 m (at end of mine life when Reclaim Pond is at its minimum size)		
Thermal Protection above Frozen Core	2.5 m	n/a	n/a
Crest Width	13 m	10 m	10 m
Upstream Structure Slope	6H:1V	4H:1V	4H:1V
Downstream Structure Slope	4H:1V	2H:1V	2H:1V
Key Trench Depth	Varies (2.0 – 5.0 m)	Varies (2.0 – 4.0 m)	4.0 m
Key Trench Upstream Slope	0.5H:1V	2H:1V	2H:1V
Key Trench Downstream Slope	0.5H:1V	1H:1V	1H:1V

Table 4: TIA Containment Dams Design Criteria

Description	North Dam	South Dam	West Dam
Settlement Allowance	1.00 m		
Foundation thaw of 1 m (partial thaw)		0.47 – 0.67 m	0.40 – 0.60 m
Foundation thaw of 7 m (full thaw)		2.45 – 3.85 m	2.03 – 3.43 m
Deformation Allowance (Total Strain due to Creep)	<2%	n/a	n/a
Original Design Life:			
Active use as water retaining structure	17 years		
Design base as water retaining structure	22 years		
Design base until breach	30 years		
Active use as solids retaining structure		17 years	17 years
Design base as solids retaining structure		25 years	25 years
Annual Exceedance Probability (AEP) for Inflow Design Flood (IDF)			
Risk Based	1/2,475 (0.0004)		
Standards Based	1/3 between 1/1,000 and the PMF[(1)]		
Static Stability Factor of Safety: Long-term (Drained Conditions)	1.3 during construction 1.5 during operation and closure 1.2 to 1.3 partial or rapid drawdown		
Pseudo-Static Stability Factors of Safety	1.0 during earthquake 1.2 post earthquake		
AEP for Earthquake Design Ground Motion	1/2,500 (0.0004)		
Peak Ground Acceleration (PGA)	0.060g[(2)]	0.036g	0.043g

Description	North Dam	South Dam	West Dam
Mean Annual Air Temperature Climate Change	+6.8°C up to year 2100		
Thermal Design Freezing Point Depression (Normal Conditions)			
Tailings	n/a	0 to -1°C	0 to -1°C
Overburden	-8°C	-2°C	-2°C
Frozen core	-2°C	n/a	n/a
Thermal Design Freezing Point Depression (Upset Conditions)			
Tailings	n/a	0 to -1°C	0 to -1°C
Overburden	-7°C	-2°C	-2°C
Frozen core	-1°C	n/a	n/a
Seepage Allowance	78 m^3/day	50 m^3/day	<1 m^3/day

Notes:

[1] Value based on experiential engineered judgement.

[2] A peak ground acceleration for a 1/2475 return period was not available at the time of design of the North Dam, and therefore the PGA of 0.06 g was selected based on published data for Kugluktuk. This is further described in SRK (2007).

2.4.4 Spillway

As part of the Phase 2 TIA design (SRK 2017e) the water level was expected to be managed through annual discharges to Roberts Bay due to the substantive freeboard and design containment of the PMF. This removed the previous spillway requirement.

Review of the operational beach slopes and tailings deposition plan (Appendix L) indicates current deposition plan will eventually decrease the Reclaim Pond to a capacity of between 133,000 m^3 and 209,000 m^3. Until the North Dam is breached, the IDF storage volume is in excess of 640,000 m^3 and requires adequate control in accordance with (CDA 2019).

Based on the mine and operation plans, and corresponding dam design life, presented in the FEIS reports, a spillway was not originally planned for the Doris TIA. Based on ongoing global evolutions in dam safety and guidelines (specifically tailings dams), based on the change in EOR for the facility, and to ensure the TIA follows best practice, a reassessment for the need of a spillway is planned to be completed by SRK in 2021. Additional discussions on the timing for the spillway construction are expected to occur between AEM TMAC and SRK in 2021. Based on current plans, and assuming the Roberts Bay Discharge system continues to be operational, it is not until the last two to four years of the tailings deposition (depending on operational pond volumes) when the available pond storage in the TIA starts to approach the IDF storage volume requirement. At that point in time, it is expected that lowering the elevation of the TIA's normal operating water level (NOWL) will be required to help free up as much storage space as possible for the IDF storm event. To mitigate against the risk of an overtopping failure at the North Dam and to remove the dependency on an active management system (i.e. to have a passive outflow in the event pumps break down) an emergency spillway may be required prior to the end of mine life. A discharge from the spillway would only occur during an extreme (very low probability) emergency event and is not planned for routine use.

The potential spillway construction timeline is linked to the later stages of the mine life, as indicated by the deposition planning models. However, these timelines could easily be impacted by production rates, unexpected conditions or poor management practices i.e. storing additional water in the TIA or in particular if the Roberts Bay Discharge system was to fail and be offline for more than one normal discharge period.

2.4.5 Tailing Deposition System

The tailings discharge system is designed as a single heat-traced and insulated pipeline with end point (i.e. single spigot) discharge at predetermined locations. The tailings deposition pipeline consists of a combination of 6-inch internal diameter steel and High-Density Polyethylene (HDPE) pipelines with no redundancy. There are no double lined pipeline sections for environmental containment. The pipeline is placed directly on the ground, which consists of either engineered rockfill pads, the all-weather road shoulders, or in some areas directly on the tundra.

Actual tailings deposition started in February 2017 and there are currently eight tailings discharge locations. A plan overview of the tailings deposition history is illustrated in Figure 10. Photos of the tailings deposition are shown in Photologs 7 and 8 attached.

Table 5 summarizes the deposition status as of December 2020. Actual tailings deposition is behind what was previously planned (Table 2). Deposition rates were increased in 2019 but decreased after March 2020 due to COVID-19 mill shut-downs (Figure 11 and Figure 12). It should be noted that there is no evidence to suggest any significant entrained ice exists within the deposited tailings. The current deposition modelling and storage capacity assessment (see Appendix L) includes a 20% allowance for ice entrainment.

Table 5: Actual Tailings Deposition Between Start-up (February 2017) and December 2019

Period	Percent Solids (by Weight)	Tailings Solids (tpd)	Cumulative Tailings Solids (tonnes)	Cumulative Tailings Solids (m^3)
February 2017	39.0	212	5,936	2,120
March 2017	21.7	351	16,814	6,005
April 2017	32.5	635	35,864	12,809
May 2017	23.0	659	56,293	20,105
June 2017	41.7	662	76,153	27,198
July 2017	15.0	569	93,792	33,497
August 2017	20.8	741	116,778	41,706
September 2017	20.5	555	133,431	47,654
October 2017	19.5	733	156,139	55,764
November 2017	17.3	634	175,159	62,557
December 2017	22.0	841	201,234	71,869
January 2018	34.5	814	226,452	80,876
February 2018	33.0	966	253,489	90,532
March 2018	25.2	1,012	284,864	101,737

Period	Percent Solids (by Weight)	Tailings Solids (tpd)	Cumulative Tailings Solids (tonnes)	Cumulative Tailings Solids (m^3)
April 2018	39.2	1,073	317,066	113,238
May 2018	42.0	893	344,758	123,128
June 2018	16.9	818	369,285	131,888
July 2018	28.3	1,027	401,129	143,260
August 2018	44.6	1,386	444,101	158,607
September 2018	45.7	1,614	492,527	175,902
October 2018	48.6	1,851	549,905	196,395
November 2018	48.0	1,842	605,159	216,128
December 2018	44.0	1,555	653,367	233,345
January 2019	45.0	1,621	703,617	251,292
February 2019	36.7	1,696	751,094	268,248
March 2019	44.0	1,630	801,611	286,290
April 2019	45.0	1,292	840,362	300,129
May 2019	42.8	1,935	900,360	321,557
June 2019	50.0	1,819	954,924	341,044
July 2019	48.0	1,374	997,518	356,256
August 2019	44.0	1,784	1,052,819	376,007
September 2019	47.0	1,838	1,107,969	395,703
October 2019	41.2	1,723	1,161,396	414,784
November 2019	44.5	1,315	1,200,834	428,869
December 2019	28.0	1,091	1,234,664	440,951
January 2020	24.0	923	1,263,270	451,168
February 2020	25.0	951	1,290,839	461,014
March 2020	48.3	1,280	1,330,519	475,185
April 2020	30.0	1,286	1,369,099	488,964
May 2020	49.2	1,072	1,402,331	500,833
June 2020	37.0	1,566	1,449,311	517,611
July 2020	52.0	952	1,478,823	528,151
August 2020	50.0	736	1,501,639	536,300
September 2020	20.0	383	1,513,129	540,403
October 2020	31.0	1,037	1,545,274	551,884
November 2020	26.0	878	1,571,606	561,288
December 2020	45.0	1,018	1,603,157	572,556

2.4.6 Emergency Dump Catch Basins

Two Emergency Dump Catch Basins (EDCBs) have been constructed on either side of Doris Creek (Photolog 9). The EDCBs are lined cells constructed at a topographic low-point along the tailings and reclaim pipeline routes that allow for the pipelines to be drained during prolonged mill shutdowns or power failures to prevent pipeline freeze-up. They were designed to accommodate at least two

consecutive shutdowns plus direct precipitation over the basin areas. The EDCBs were constructed in 2017. Table 6summarizes their design and as-built containment capacities.

Table 6. EDCB Design and As-built Capacities

Component	Western EDCB	Eastern EDCB
Permitted Design Capacity	120 m^3	120 m^3
Required Design Capacity	97 m^3	85 m^3
As-Built Design Capacity	124 m^3	85 m^3

2.4.7 Reclaim Water System

Reclaim water is drawn from the TIA Reclaim Pond for re-use in the Process Plant. Reclaim water is drawn from a submerged suction line feeding a low suction head pump installed in an on-shore enclosure located at the Reclaim Pond (Figure 3). This heat-traced and insulated pipeline follows the TIA Access Road (aka Secondary Road) from the Reclaim Pond to the Doris mill and is placed directly on the ground (either tundra, all-weather road shoulder, or the engineered rockfill pads). There are no double-lined sections of this pipeline and there is no redundant pipeline.

Table 7 provides a summary of reclaim water volumes drawn from the TIA since tailings production started.

Table 7: Reclaim Water Volumes Between Start-up (February 2017) and December 2020

Date	Reclaim Volume (m^3/month)	Cumulative Reclaim Volume (m^3)
February 2017	94,080	94,080
March 2017	107,880	201,960
April 2017	100,800	302,760
May 2017	104,160	406,920
June 2017	100,800	507,720
July 2017	81,721	589,441
August 2017	96,586	686,027
September 2017	92,016	778,043
October 2017	92,181	870,224
November 2017	93,088	963,312
December 2017	93,900	1,057,212
January 2018	82,577	1,139,789
February 2018	69,744	1,209,533
March 2018	78,864	1,288,397
April 2018	74,638	1,363,035
May 2018	76,444	1,439,479

Date	Reclaim Volume (m³/month)	Cumulative Reclaim Volume (m³)
June 2018	69,120	1,508,599
July 2018	66,699	1,575,298
August 2018	71,186	1,646,484
September 2018	65,833	1,712,317
October 2018	64,395	1,776,712
November 2018	66,962	1,843,674
December 2018	65,565	1,909,239
January 2019	64,572	1,973,811
February 2019	57,207	2,031,018
March 2019	69,824	2,100,842
April 2019	60,912	2,161,754
May 2019	61,908	2,223,662
June 2019	57,603	2,281,265
July 2019	69,389	2,350,654
August 2019	79,005	2,429,659
September 2019	84,230	2,513,889
October 2019	82,918	2,596,807
November 2019	77,744	2,674,551
December 2019	76,670	2,751,221
January 2020	76,601	2,827,822
February 2020	64,317	2,892,139
March 2020	67,732	2,959,871
April 2020	68,825	3,028,696
May 2020	67,457	3,096,153
June 2020	62,787	3,158,939
July 2020	65,822	3,224,761
August 2020	60,015	3,284,776
September 2020	45,973	3,330,749
October 2020	71,946	3,402,695
November 2020	80,145	3,482,840
December 2020	86,495	3,569,335

2.4.8 TIA Water Discharge System

The Roberts Bay Discharge System (RBDS) was commissioned in February 2020 and was run until August 2020. Recommissioning issues during fall/winter 2020 has prevented discharge through RBDS,

specifically linked to the outlet in Roberts Bay; however, at the time of writing this report, discharge is expected to resume by around May to June 2021. The discharge pump is located adjacent to the reclaim pump on the reclaim jetty and will pump water in a pipeline following the same route as the reclaim water pipeline until it branches off to the Doris Contact Water Treatment Plant (Figure 13). The discharge to the Roberts Bay Discharge System are provided in Table 8. Historically, prior to tailings deposition, TIA water was discharged to Doris Creek (compliance monitoring station TL-2) during the open water seasons of 2014 and 2015, as summarized in Table 9.

Table 8: Discharge from Doris TIA to Roberts Bay Discharge System

Date	Discharge to RBDS (m^3/month)	Cumulative Discharge to RBDS (m^3)
January 2020	-	-
February 2020	154,211	154,211
March 2020	168,053	322,264
April 2020	165,578	487,842
May 2020	167,282	655,124
June 2020	147,624	802,748
July 2020	163,955	966,703
August 2020	67,957	1,034,660
September 2020	-	1,034,660
October 2020	-	1,034,660
November 2020	-	1,034,660
December 2020	-	1,034,660

Table 9: Historic TIA Discharge Water Volumes to Doris Creek (TL-2)

Date	Discharge to TL-2 (m^3/month)	Cumulative Discharge to TL-2 (m^3)
June 2014	104,634	104,634
July 2014	257,778	362,411
August 2014	194,405	556,816
September 2014	118,218	675,034
June 2015	3,095	678,129
July 2015	230,460	908,589
August 2015	233,603	1,142,192
September 2015	164,260	1,306,452

2.5 Tailings Impoundment Area Instrumentation

2.5.1 North Dam

Permanent performance monitoring instrumentation for the North Dam consists of:

- 11 vertical ground temperature cables (GTCs);
- 13 horizontal GTCs;
- 18 surficial survey monitoring points located throughout the downstream face of the dam;
- 14 crest survey monitoring points located along the upstream and downstream crest of the dam;
- 3 deep settlement points;
- 6 inclinometers located within the downstream face; and
- 12 single bead thermistors, measuring thermosyphon contact temperatures.

Figure 4 through Figure 6 illustrates the location of North Dam instrumentation. All GTCs are connected to dataloggers allowing continuous data collection. Slope inclinometers are recorded manually using a slope inclinometer instrument owned by TMAC. Settlement monitoring is done manually by ground survey. The North Dam Standard Operating Procedure (SOP) provides comprehensive details pertaining to this instrumentation (SRK 2020b).

2.5.2 South Dam

The active South Dam permanent performance monitoring instrumentation consists of:

- 9 horizontal GTCs;
- 12 vertical GTCs;
- 1 long GTC parallel to the top crest of the key trench;
- 19 surficial survey monitoring points (crest and downstream slope);
- 12 crest survey monitoring points; and
- 3 deep settlement points.

The monitoring instrument locations are shown on Figure 7 through Figure 9.

2.5.3 West Dam

Once constructed, this structure will have a similar monitoring plan to that of the South Dam.

2.5.4 Other TIA Instrumentation and Monitoring

Additional monitoring data collected for the TIA are summarized below:

- The water level in the TIA Reclaim Pond is monitored by an automated pressure transducer-datalogger installed at monitoring point TIA-2. The data is transmitted by a solar-powered iridium satellite transceiver to an online portal where it can be accessed remotely by TMAC and SRK. There is also a back-up datalogger installed to record pond levels should a problem occur with the primary data collection system. The secondary datalogger also records water temperature which is beneficial from a thermal review perspective.
- The primary datalogger is configured to collect a reading every 15 minutes in the summer and every 60 minutes during the winter. The data is transmitted to the online portal daily.
- On at least an annual basis, Environmental Resources Management (ERM) conducts a water level reference survey and bathymetry survey of the TIA basin. Based on communications from ERM and TMAC, the water level constant elevation was adjusted from 27.761 masl (ERM 2017) to 27.71 m on August 15, 2019 at 00:00, this constant remains unchanged for 2020.

Additional detail of the installed tailings monitoring system is described by ERM (2017) and SRK (2020b):

- Tailings deposition is a continuous operation and the volumes are monitored with a flowmeter and an automated data collection system;
- Reclaim water is measured using a flowmeter with an automated data collection system;
- Mine water is measured by means of a totalizer instrument, recorded manually twice daily; and
- Comprehensive climate data from the Doris meteorological station is provided for reference (Appendix I) and indicative use in this report.

2.6 Water Management

2.6.1 Water Management Plan and Water and Load Balance

The TIA is used as the overall collector for all site contact water, which is either pumped or trucked to the TIA. Saline underground water (i.e., mine water) may also be pumped to the TIA if it is not discharged directly to Roberts Bay. TIA water is stored in the Reclaim Pond which is recycled for processing make-up to the extent possible. Excess water in the TIA is discharged to Roberts Bay by the RBDS. Prior to discharge to Roberts Bay, all water must meet MDMER limits.

There are no non-contact surface water diversions upstream of the TIA. The TIA is in an isolated catchment measuring 461 ha, and the benefits of any diversions are outweighed by the relative cost and complexity of constructing them. A schematic of the TIA water management plan is presented in Figure 13.

A detailed review of the operational water and load balance is provided in a separate report (SRK 2021).

2.7 Dam Hazard Classification

Dam hazard classifications for the TIA containment dams were made in accordance with the Canadian Dam Safety Guidelines (CDA 2013), as well as the CDA Technical Bulletin on Application of Dam Safety Guidelines to Mining Dams (CDA 2014, CDA 2019), as summarized in Table 10. The designated dam hazard classifications assigned to each structure is listed in Table 11 (SRK 2015, 2016b, 2017e).

Table 10: Dam Hazard Classification (as defined in CDA 2013)

Dam Class	Population at Risk[1]	Incremental losses		
		Loss of Life[2]	Environmental and Cultural Values	Infrastructure and Economics
Low	None	0	Minimal short-term loss No long-term loss	Low economic losses; area contains limited infrastructure or services.
Significant	Temporary only	Unspecified	No significant loss or deterioration of fish or wildlife habitat Loss of marginal habitat only Restoration or compensation in kind highly possible	Losses to recreational facilities, seasonal workplaces, and infrequently used transportation routes.
High	Permanent	10 or fewer	Significant loss or deterioration of *important* fish or wildlife habitat Restoration or compensation in kind highly possible	High economic losses affection infrastructure, public transportation, and commercial facilities.
Very high	Permanent	100 or fewer	Significant loss or deterioration of *critical* fish or wildlife habitat Restoration or compensation in kind possible but impractical	Very high economic losses affecting important infrastructure or services (e.g., highway, industrial facility, storage facilities for dangerous substances).
Extreme	Permanent	More than 100	Major loss of *critical* fish or wildlife habitat Restoration or compensation in kind impossible	Extreme losses affecting critical infrastructure or services (e.g., hospital, major industrial complex, major storage facilities for dangerous substances).

Notes:

[1] Definitions for population at risk:

None – There is no identifiable population at risk, so there is no possibility of loss of life other than through unforeseeable misadventure.

Temporary – People are only temporarily in the dam-breach inundation zone (e.g., seasonal cottage use, passing through on transportation routes, participating in recreational activities).

Permanent – The population at risk is ordinarily located in the dam-breach inundation zone (e.g., as permanent residents); three consequence classes (high, very high, extreme) are proposed to allow for more detailed estimates of potential loss of life (to assist in decision-making if the appropriate analysis is carried out).

[2] Implications for loss of life:

Unspecified – The appropriate level of safety required at a dam where people are temporarily at risk depends on the number of people, the exposure time, the nature of their activity, and other conditions. A higher class could be appropriate, depending on the requirements. However, the design flood requirement, for example, might not be higher if the temporary population is not likely to be present during the flood season.

Table 11: Dam Hazard Classification of TIA Containment Structures

Structure	Population at Risk (PAR)	Loss of Life	Environmental and Cultural Values	Infrastructure and Economics	Overall Hazard Classification
North Dam	SIGNIFICANT	SIGNIFICANT	HIGH	LOW	HIGH
South Dam	SIGNIFICANT	SIGNIFICANT	HIGH	LOW	HIGH
West Dam (not constructed)	SIGNIFICANT	SIGNIFICANT	HIGH	LOW	HIGH

3 TIA Management System Review Findings

3.1 Third Party Dam Safety Review

In accordance with CDA Dam Safety Guidelines (CDA 2013, 2014, 2019), including the CDA Technical Bulletin on Dam Safety Reviews (CDA 2016), independent third-party dam safety reviews (DSRs) should be conducted in accordance with a frequency informed by the hazard classification of the structures. This frequency typically ranges between 5 and 10 years. It is recommended a dam with a HIGH hazard classification, such as the North Dam and South Dam, undergo a dam safety review every seven years. However, the hazard classification should be reviewed periodically to ensure that conditions remain valid.

SRK reviewed the hazard rating as part of the 2019 inspection and agrees that a hazard rating of HIGH is appropriate for the constructed North and South Dams.

Therefore, in accordance with CDA guidelines, the North and South Dams should have independent dam safety reviews (DSR) every seven years. The North Dam started impounding water in 2011, which means that a DSR should have been completed in 2018. As is illustrated in Figure 14, the North Dam generally retained about 0.7 m head of water (average water level of 29.0 m) until the summer of 2016. This is about 13% of the full supply level (FSL) head based on the original Tail Lake water level of 28.3 m. After that time the water level has been consistently rising to an elevation in 2018 of 30.7 m, which constitutes a head of 2.4 m, or 46% of the FSL head of 5.2 m. In early 2020, the water level rose to its all-time maximum of 32.0 m which is 71% of the FSL head, but was drawn down to 31.1 m in subsequent months with the commissioning of the RBDS.

Considering the dam performance to date, as well as the fact that considerable technical reanalysis of the dam was done in 2017 as part of the Phase 2 design, SRK is comfortable at this time to defer completion of a DSR to 2021, which is 10 years after initial impoundment started.

South Dam construction was completed in 2018, which means a DSR for that structure is due in 2025; however, since a DSR is needed for the North Dam in 2021, it is recommended that the South Dam DSR be completed at the same time.

Recommendations:

- Conduct an independent third-party dam safety review (DSR) for both the North and South Dams in the summer of 2021.

3.2 Tailings Operating, Maintenance and Surveillance Manual

Phase 1 tailings management is carried out under a Tailings Operation, Maintenance and Surveillance (OMS) Manual prepared in 2016 (TMAC 2016). Because tailings deposition in 2017 was inconsistent and less than the planned deposition rates due to mill commissioning challenges, a thorough review of OMS Manual procedures was not undertaken in 2017, although a minor update was completed (TMAC 2017). There were however significant operational changes in 2018, including significant personnel

changes, and as a result the OMS Manual became outdated. Although the OMS Manual was updated in 2017 (TMAC 2017), that update was centered around changes associated with Phase 2, and the necessary operational and personnel changes were not adequately captured. In 2019 and 2020, an updated OMS capturing input from site personnel, changes from the Phase 2 project, as well as the updated North and South Dam monitoring SOPs (SRK 2020b, 2020c) was submitted to TMAC. The full document has been rewritten to further improve the usability of the document. An updated set of Trigger Action Response Plans (TARPs) was submitted to TMAC and is under review. It is expected that the next revision of the OMS will integrate the dam monitoring SOPs, TARPs, Dam Emergency Plan as well as any changes to the tailings management system under AEM's corporate tailings management system.

Recommendation:

- A draft version of the 'Hope Bay Project Dam Emergency Plan' was completed by Hope Bay staff in 2021. This Dam Emergency Plan should be finalized by site and integrated with the into the OMS and TARP framework
- Once integrated, the suite of OMS, TARPs, ERP and Dam Emergency Plan should be reviewed with all site operations annually and updated as necessary.
- All of these components should be reviewed against AEM's corporate tailings management system and updated tailings standards through a gap analysis to identify required updates.

3.3 TIA Roles and Responsibilities

The roles and responsibilities for those involved in managing the TIA are defined in the current OMS Manual. The transition from TMAC to Agnico Eagle will require further updates to the 'responsible parties' section outlined in the TIA OMS are recommended. This will be documented in the next revision of the TIA OMS Manual (for Q2 2021). SRK understands the primary responsible party for the TIA remains with the Mill team, with some of the monitoring conducted by the Environmental team. COVID-19 required site staffing changes though the end of 2020, and subsequent changes are expected with the purchase of TMAC by AEM. SRK has provided monitoring support and continuity through some of these changes and notes effort to meet the monitoring requirements has continued to improve through 2020.

John Kurylo, MSc, Peng, a licenced professional engineer in Nunavut Territory, and a Senior Consultant is the EOR. All monitoring data for the North Dam and South Dam is submitted to the EOR monthly, and the EOR remains in constant communication with site staff regarding the overall operation of the TIA. TMAC has allowed free access to information and resources to allow the EOR to fulfill his duties.

Recommendation:

- The roles and responsibilities for the TIA are defined in the OMS update and must be updated with any changes in TMAC and AEM's corporate structure.

4 TIA Inspection and Monitoring Instrumentation Findings

4.1 Compliance with Monitoring Requirements

The North Dam monitoring frequency requirements were first outlined in the North Dam As-built Report (SRK 2012b) and subsequently finalized in the North Dam Monitoring Standard Operating Procedures (Monitoring SOP) which was updated in 2020 (SRK 2013b, 2018b, 2020b). The South Dam monitoring requirements are outlined in the South Dam Monitoring SOP (SRK 2020c).

Since transitioning to active tailings deposition in 2017, routine monitoring and inspections of the North Dam have been completed by site personnel. The monitoring frequency requirements and actual monitoring frequency for the 2020 monitoring year are summarized in Table 12 for the established instrumentation on the North Dam and within the TIA. The South Dam monitoring program has not yet been finalized as it is still under development at the time of the inspection; however, preliminary monitoring since construction is summarized in Table 13.

Table 12: North Dam Monitoring Requirements for the 2020 Monitoring Year[(1)]

Element	Item	Method	Resp.	Required Frequency	Conformance with SOP (SRK 2020b)[(1)(2)]	Comments
Thermal	Ground Temperature Cables	Datalogger	TMAC	Daily (automated)	Yes	Recorded four times daily
	Thermo-syphons				Yes	Record four times daily
	Datalogger downloads	Manual		Monthly	Yes	Data collected monthly
Deformation	Downstream Surface Settlement	Manual	TMAC	Monthly (May to Nov.)	Yes	Surveys received monthly
	Downstream Deep Settlement				Yes	
	Crest Settlement				Yes	
	Depressions				Yes	No changes observed
	Inclinometers			Monthly	Yes	Data collected monthly
Water Balance	Water Level	Datalogger Station	TMAC	Daily (automated)	Yes	Readings every 15 min and uploaded daily
	Water Level	Manual		Monthly	Yes	Water Level surveyed during installation of datalogger and must be surveyed once during open water season (2019)
	Seepage			Weekly when seepage is observed	Yes	Seepage documented at the toe of North Dam during spring 2018
Visual	Walkover Survey	Manual	TMAC	Weekly (below FSL[(3)])	No	51 inspections conducted between Nov. 2018 and Dec. 2019

Element	Item	Method	Resp.	Required Frequency	Conformance with SOP (SRK 2020b)[1][2]	Comments
				Daily (at or above FSL)		The inspection rate is slightly below the target (60 inspections)[4]
	Annual Geotechnical Inspection		Independent Qualified Licensed Geotechnical Engineer	Annually	Yes	Aug. 2018 (SRK 2019a) Aug. 2019 (This report)
Maintenance						
North Dam Thermal Datalogger	Datalogger Primary Batteries	Manually recharge	TMAC	Annually	No (acceptable)	Recharged Jun. 2019
	Datalogger Backup Batteries	Manually replace		5-year cycle	Yes	Replaced during datalogger recalibration
	Datalogger Recalibration	Manual			Yes	Completed Jan. 2018
	Desiccant Packs	Manually replace		As required	Not required	No action required
Water Level Datalogger Station (TIA-2)	Datalogger Transmission Subscription	Online		Annually	Yes (action required)	9% of the data subscription remains and should be renewed
	Physical Datalogger Station	Manually recalibrate or replace		As required	Not required	No action required

Note(s):

1 Data reporting period included in this report was January 1, 2020 to December 31, 2020 to December 31, 2019 which is a continuation of data from the last AGI (SRK 2020a)

2 This column lists if the monitoring frequency is compliant with the monitoring frequency requirements since the last AGI (SRK 2018a)

3 FSL: Full Supply Level

4 Due to COVID-19 and reduced personnel at site

Table 13: South Dam Preliminary Monitoring Requirements [1]

Element	Item	Method	Resp.	Required Frequency	Conformance with Preliminary Needs	Comments
Thermal	Ground Temperature Cables	Datalogger	TMAC	Daily (automated)	Yes	Data is transmitted every 12 hours.
Deformation	Downstream Surface Settlement	Manual	TMAC	Monthly (May – Nov.)		Surveys collected monthly
	Downstream Deep Settlement					
	Crest Settlement					
	Depressions					No issues observed
Water Balance	Seepage	Manual	TMAC	Weekly when seepage is observed	Yes	No seepage observed, samples collected at the downstream ponded areas

Element	Item	Method	Resp.	Required Frequency	Conformance with Preliminary Needs	Comments
Visual	Walkover Survey	Manual	TMAC	Weekly (below FSL[(2)]) Daily (at or above FSL)	No (Acceptable)	Since implementation of Walkover Surveys at the South Dam, 16 of 32 total weeks were received.
	Annual Geotechnical Inspection		Independent Qualified Licensed Geotechnical Engineer	Annually	Yes	August 2020 (This report)
Maintenance						
South Dam Thermal Datalogger	Datalogger Batteries	Solar recharge	TMAC	As needed	Yes	No maintenance required
	Datalogger Recalibration	Manual				
	Desiccant Packs	Manual				
	Data logger transmission subscription	Online	SRK/TMAC	Annually	Yes	Beaded stream subscription renewal required

Note(s):

[1] Data reporting period included in this report was January 1, 2020 to December 31, 2020 which is a continuation of data from the last AGI (SRK 2020a)

[2] FSL: Full Supply Level

[3] Due to COVID-19 and reduced personnel at site

Recommendations:

- Conduct monitoring in accordance with the specified frequency in the Monitoring SOP and OMS. If changes in the monitoring frequency are required due to new operating schedules these must be proposed to and approved by the EOR.
- The North and South Dam Monitoring SOPs were updated in 2020. An additional update should be completed following any notable update to the Tailings Management System.

4.2 North Dam Inspection and Monitoring

4.2.1 Ground Temperature Cables

To monitor long-term temperature of the frozen core and the dam foundation, a total of twenty-four GTCs were installed during the North Dam construction (SRK 2012b). Of the twenty-four installed GTCs, twenty-two are still functional. Since September 2012, GTC data for the North Dam is recorded every six hours by two Campbell Scientific CR1000 dataloggers (Photolog 3). Data is downloaded directly from the dataloggers by TMAC personnel.

The recorded temperature data is presented in Appendix A. In general, the data logger and GTC system is performing well. The complete status of all North Dam GTCs is summarized in Table 14.

Table 14: North Dam Ground Temperature Cable Status

GTC ID	Status	Comments
ND-VTS-040-KT	Active	Fully operational, except for recalibration January 1 to March 3, 2018
ND-HTS-040-31.5	Active	Fully operational, except for recalibration January 1 to March 3, 2018
ND-HTS-040-33.5	Active	Cable disconnected from datalogger October 10, 2013 to May 13, 2014
		Connection to datalogger more permanently repaired July 2014
		Disconnected for recalibration January 1 to March 3, 2018
ND-VTS-060-US	Inactive	Irreparably damaged between April 27 and August 8, 2012
ND-VTS-060-DS	Active	Fully operational, except for recalibration January 1 to March 3, 2018
ND-VTS-060-KT	Active	Spliced during construction. Fully operational, except for recalibration January 1 to March 3, 2018
ND-HTS-060-28.8	Active	Bead 7 – No readings February 11, 2012 to December 8, 2013
		Bead 7 – No readings since April 21, 2014
		Bead 7 – Readings between November 1, 2014 and April 19, 2015
		Bead 7 – Readings between October 2015 and April 2016
		Bead 7 – Readings between October 2016 and June 2017
		Bead 7 – Readings between September 2017 and May 2018 (excluding recalibration period), resuming at the end of October 2018. Occasional erratic readings continue (since fall 2016) and are attributed to instrument errors.
		Bead 9 – No readings October 10, 2013 to May 20, 2014 and July 2014 onward
		Disconnected for recalibration January 1 to March 3, 2018
ND-HTS-060-31.0	Active	Fully operational, except for recalibration January 1 to March 3, 2018
ND-HTS-060-33.5	Active	Fully operational, except for recalibration January 1 to March 3, 2018
ND-VTS-085-US	Active	Erratic data at most beads (excluding Beads 3, 6 and 9) between June 2016 and May 2017 with lower amplitude spikes between December 2016 and May 2017
		Erratic data subsided since May 2017
		Disconnected for recalibration January 1 to March 3, 2018
ND-VTS-085-DS	Active	Erratic data at most beads (excluding Beads 3, 6 and 9) between June 2016 and May 2017 with lower amplitude spikes between December 2016 and May 2017
		Erratic data subsided since May 2017
		Disconnected for recalibration January 1 to March 3, 2018
ND-VTS-085-KT	Active	Erratic data at most beads (excluding Beads 3, 6 and 9) between June 2016 and May 2017 with lower amplitude spikes between December 2016 and May 2017
		Erratic data subsided since May 2017
		Disconnected for recalibration January 1 to March 3, 2018

GTC ID	Status	Comments
ND-HTS-085-25.3	Active	Fully operational, except for recalibration January 1 to March 3, 2018
ND-HTS-085-29.4	Active	Fully operational, except for recalibration January 1 to March 3, 2018
ND-HTS-085-33.5	Inactive	Irreparably damaged during construction
ND-VTS-130-US	Active	Bead 9 – Readings erratic for periods since June 2016 (temperature dropping randomly to less than -15°C)
		Disconnected for recalibration January 1 to March 3, 2018
		Bead 1 offline since August 13, 2020
ND-VTS-130-DS	Active	Small magnitude temperature spikes during summer months between 2013 and 2017 (Bead 3, 7, 8, 9, 11), no spikes observed in 2018
		Beads 3 – 8 were offline after the connector at the datalogger housing was damaged on September 24, 2017. Repaired and reconnected on March 11, 2018 following datalogger recalibration
		Disconnected for recalibration January 1 to March 3, 2018. Beads 3 to 8 were disconnected and repaired between September 24, 2017 and March 3, 2018 (due to damaged cable connection)
ND-VTS-130-KT	Active	Fully operational, except for recalibration January 1 to March 3, 2018
ND-HTS-130-28.8	Active	All beads were offline after the connector at the datalogger housing was damaged on September 24, 2017. Repaired and reconnected on March 4, 2018 following datalogger recalibration
		Disconnected for recalibration January 1 to March 3, 2018
		Low temperature spikes and intermittent logging from Bead 2 in Summer 2018 to 2020
ND-HTS-130-31.0	Active	Fully operational, except for recalibration January 1 to March 3, 2018
ND-HTS-130-33.5	Active	Fully operational, except for cable repair and recalibration September 24, 2017 to March 3, 2018
ND-VTS-175-KT	Active	Spliced during construction
		Incorrectly connected to datalogger as ND-HTS-175-33.5 from August 9, 2012 to June 16, 2014
		Beads 9, 10 and 11 – No readings August 9, 2012 to June 16, 2014
		Disconnected for recalibration January 1 to March 3, 2018
ND-HTS-175-32.5	Active	Fully operational, except for recalibration January 1 to March 3, 2018
ND-HTS-175-33.5	Active	Spliced during construction
		Incorrectly connected to datalogger as ND-HTS-175-KT, from August 9, 2012 to June 16, 2014
		Disconnected for recalibration January 1 to March 3, 2018

Source: J:\01_SITES\Hope.Bay\!Project_Data (Not Job Specific)\06_NorthDamMonitoringData\[SiteMonitoringSummary.xlsx]ThermisorStatus

The North Dam GTCs were installed to ensure the dam core and key foundation section remain below the design temperatures of −2˚C and −8˚C, respectively under normal operating conditions. Under upset conditions these temperatures increase to −1˚C and −7˚C. In addition, ground temperature data along with thermosyphon monitoring data can be used to determine if the thermosyphons are functioning correctly. Observations related to a review of the data presented in Appendix A are summarized in Table 15.

Table 15: Summary of Core and Key Trench Ground Temperature Cable Observations

Zone	Horizontal GTCs	Vertical GTCs	Observation
Design Temperature	−2˚C	−8˚C	The minimum criteria required to ensure Dam is performing in accordance with design specifications
Station 0+040	Meets	Meets	Performing as expected with substantive safety buffer and slight trend suggesting ongoing cooling
Station 0+060	Meets	Meets	Performing as expected with substantive safety buffer and slight trend suggesting ongoing cooling In conjunction with the 2020 seepage review (Appendix ##), no evidence of seepage was noted at this station
Station 0+085	Meets	Meets	Generally performing as expected with substantive safety buffer and slight trend suggesting ongoing cooling in the core, foundation and downstream portions of the dam A rise in the temperature of the upstream-most beads of ND-HTS-085-29.4 (Bead 7, 8, 9, 10) and ND-HTS-085-25.3 (Bead 9 to 15) was observed. This is attributed to the elevated RCP water levels in 2019 and are in line with the expected thermal response. Seasonal variability in temperature continues to be observed and the temperatures remain below 0°C. Ground warming is expected in this area. In conjunction with Appendix J, no evidence of seepage was noted at the North Dam.
Station 0+130	Meets	Meets	Generally performing as expected with substantive safety buffer and stable or a slight cooling trend Short term temperature spikes are noted for all but the uppermost 2 beads of ND−VTS−130−DS in 2017 (and every year prior). In 2018, no temperature spikes were noted. Between 2013 and 2017, the temperature spikes were observed between May and November with the largest amplitudes in 2013 and 2016 (Appendix A.13) Erratic reading attributed to instrumentation error are noted in both ND-HTS-130-28.8 (Bead 2) and ND-VTS-130-US (Bead 9) in 2020. A slight rise in the upstream-most beads of ND-HTS-130-28.8 (Bead 10) and ND-HTS-130-31.0 (Bead 8) was observed. This is attributed to the elevated RCP water levels in 2019 and in line with the expected thermal response. In conjunction with Appendix J, no evidence of seepage was noted at the North Dam.
Station 0+175	Meets	Meets	Generally performing as expected with substantive safety buffer and stable or a slight cooling trend The annual maximum of the uppermost two beads remain slightly above the design temperature at -7˚C

Recommendations:

- No recommendations.
- Consider implementing satellite telemetry for the North Dam data loggers to allow daily transmission of the measurements rather than manual downloads. This would be a more proactive approach rather than a requirement at this time.

4.2.2 Thermosyphons

Passive thermosyphons assist in cooling the North Dam key trench foundation. They function when the ambient air temperature is colder than the ground temperature where the thermosyphon is located. This happens because of phase change of the carbon dioxide gas with which the thermosyphon is filled. Therefore, during the winter months the cold ambient air temperature is used to draw heat from the foundation, but during the summer period the thermosyphons remain dormant.

Thermosyphon temperature monitoring for the North Dam has been automated. Single bead thermistors connected to the datalogger system are attached to each thermosyphon evaporator pipe below the ground surface, and insulation has been placed around the thermistor beads to ensure the evaporator pipe temperature, and not the ambient air temperature, is measured (SRK 2012b). Additionally, air temperatures are recorded at the dataloggers every six hours. This data is downloaded as part of the monthly ground temperature cable datalogger downloads.

To monitor the performance of the thermosyphons, thermosyphon evaporator pipe contact temperatures and air temperatures are plotted against time. During the winter months, when the thermosyphons are working, the thermosyphon pipe temperature should be roughly 5˚C warmer than the air temperature. If the thermosyphon pipe temperature during the winter months is approximately the same as the air temperature, it indicates that the thermosyphon is not working correctly.

Thermistor data indicates all the south and north thermosyphons are functioning except for North 2 (Appendix B). Since 2012, the measured pipe temperature of North 2 was only slightly higher than the measured air temperature, which indicates a malfunction. Ground temperature readings near the North 2 thermosyphon pipe support the conclusion that the North 2 thermosyphon is not working correctly.

During the 2014 North Dam AGI, thermosyphon North 2 was inspected in detail to determine the cause of the elevated temperature readings. No damage or reason for the malfunction was observed (SRK 2014b). Previously, SRK recommended that Arctic Foundations of Canada Inc. (AFC) be contracted to investigate further and repair the thermosyphon. An initial inspection was conducted by AFC on April 10 and 11, 2017. No issues were identified at the time; however, monitoring data indicated North 2 continued to malfunction.

To address the issue, the best course of action was decided to discharge and recharge the thermosyphon, this was completed in 2019. More details are provided in the 2019 AGI (SRK 2020a).

TMAC has exhausted the practical repair options for the thermosyphon at this point, and performance monitoring will continue. Thermal modelling of the frozen core has considered loss of the North 2 thermosyphon. The result of this modelling shows that under conservative boundary conditions

(typically higher thermal inputs or temperatures), the North Dam performance will not be adversely impacted by a non-functional North 2 thermosyphon; however, the design redundancy is slightly reduced. Based on these checks there is no major concerns at this time from the loss of the North 2 thermosyphon.

Any additional measures will be taken as necessary based on the observed performance of the overall dam.

The thermosyphon radiator steel foundations are in good condition. The thermosyphons themselves do not show any physical damage; however, there is rust and peeling paint at the weld between the evaporator pipe and the twin radiators on most of the thermosyphons. AFC was not concerned about this surface rust during their inspection.

Recommendations:

- No recommendations.

4.2.3 CR1000 External Datalogger Battery Voltage

Each CR1000 data logger is powered by an external lead acid battery. Battery voltage is an important indicator of datalogger performance. If the battery voltage drops below 12 V, it is operating outside of the optimal range. At or below 9.6 V, voltage is outside of the operating range and the recorded readings could be incorrect, or the datalogger will shut down and readings would not be recorded at all. The dataloggers record the minimum battery voltage four times daily. A graph of battery voltage versus time is provided in Appendix C.

The batteries have been recharged on multiple occasions since the North Dam was commissioned. At no time has the voltage dropped low enough to cause any concerns with data integrity. The batteries should continue to be monitored to ensure they maintain their charge through the winter months.

Recommendations:

- The external CR1000 datalogger batteries should continue to be monitored and recharged annually or replaced as needed.

4.2.4 Inclinometers

Six inclinometers were installed within the downstream face of the North Dam. These inclinometers are used along with the survey monitoring points to monitor deformation within the dam and dam foundation. Inclinometer readings are taken by TMAC site personnel. As discussed in Section 3.1, inclinometer readings were collected intermittently prior to May 2014. Readings were collected monthly during the 2020 monitoring period.

Inclinometer measurements are provided in Appendix D. Data quality for the surveys has generally been good. The inclinometer profiles show only negligible displacements in the dam foundation, and small displacements over the portion of the inclinometer above the natural ground surface as

summarized in Table 16. Inclinometer ND-IN-120-3 is the only inclinometer that suggests a trend of downslope movement. All other inclinometers are showing virtually no movement, or the movement is oscillating seasonally which likely means there is some movement of the inclinometer tube itself, as opposed to actual deformation of the dam or foundation.

Table 16: Summary of Inclinometer Measurement Observations (Sep. 2012 through Dec. 2020)

Inclinometer	Maximum Overall Deformation			Maximum Foundation Deformation (m)	Observations
	Magnitude (m)	Location – Depth Below Dam Shell (m)	Location – Height Above Foundation (m)		
ND-IN-070-1	0.025	0.5	9.0	0.004	Deformation essentially constant since 2015
ND-IN-070-2	0.033	2.0	7.0	0.016	Seasonal oscillation, and overall trend suggest slight increase in deformation over time
ND-IN-070-3	0.013	3.5	4.0	0.013	Deformation essentially constant since 2015
ND-IN-120-1	0.012	0.5	7.0	0.002	Deformation essentially constant since May 2016
ND-IN-120-2	0.022	0.5	5.5	0.004	Deformation essentially constant since November 2017. Upper deformation oscillating somewhat
ND-IN-120-3	0.024	0.5	3.7	0.002	General trend of movement towards the south and downstream of the dam

Previous recommendations were made to send the inclinometer for re-calibration every three years. Although these do not have specified re-calibration intervals, the instruments are sensitive, and issues identified in February 2019 indicate one reason for this. TMAC sent the instrument to the manufacturer, in the United States, for recalibration in March 2020. Unfortunately, due to the global COVID-19 pandemic, this calibration was unable to be performed and was sent back to site for use in the spring and summer 2020 monitoring program. Agnico Eagle has been in communication with the manufacturer again in 2021 to coordinate recalibration.

Recommendations:

- The inclinometer probe and read-out were sent for recalibration and maintenance, but due to COVID-19 it was not possible to complete in 2020. The probe and readout should be re-sent to the manufacturer for recalibration and maintenance in 2021.

4.2.5 Survey Monitoring Points

A series of 14 crest survey monitoring points, 3 deep survey monitoring points, and 18 surficial survey points were installed in the North Dam upon completion. These survey monitoring points were installed

to monitor for any surface movement of the crest and downstream face, and deep settlement of the downstream foundation of the dam.

Survey monitoring of the North Dam occurred for six of seven occurrences between January and December 2020. The survey data should be collected monthly between May and November. Complete survey data is presented in Appendix E.

The overall vertical and horizontal displacement since completion of construction based on these readings are summarized in Table 17. Deep settlement and crest displacement have been very small and of similar magnitude, and has essentially been unchanged since September 2013, confirming that the measured displacement to date is all directly related to the period immediately following construction.

Downstream dam shell settlement follows the same general trends as the deep and crest settlement points; however, the total displacement magnitude is about twice as much. There is also an increasing trend in displacement in two points (ND-SSP-155-2 and ND-SSP-110-3) since June 2016. The measured vertical displacement of these points suggests no displacement change, but the horizontal displacement is increasing, which results in the overall increased displacement trend. Both these points are located near the downstream toe of the dam, and this increased displacement is likely a result of increased active layer thaw beneath the shallow rockfill toe of the dam. The displacement was reviewed in more detail (Appendix M), results of this review do not indicate any immediate concerns, but it should be carefully monitored going forward.

Table 17. Summary of Survey Monitoring Observations (2020 surveys relative to May 2012)

Location	No. of Stations	Vertical Displacement (m)			Horizontal Displacement (m)		
		Min.	Max.	Avg.	Min.	Max.	Avg.
Deep settlement points (DSP)	3	0.01	0.04	0.03	0.0	0.08	0.05
Crest settlement points (SMP)	14	0.01	0.08	0.05	0.0	0.10	0.05
Surficial settlement points – Downstream dam shell (SSP)	18	0.03	0.22	0.11	0.0	0.32	0.08

Notes:

Displacement values shown exclude surveys expected to have significant survey errors, indicated by a spike in the data.

Recommendations:

- Backfill the erosion around survey monitoring point ND−DSP−100 at the North Dam.
- Continue to carefully observe the North Dam downstream shell settlement points ND-SSP-080-3 and ND-SSP-110-3 to monitor for increased thaw settlement of the toe and undue deformation.
- Installation of additional surficial survey points (SSP) on the upstream face of the North Dam to track deformation of the upstream face. These additional SSPs are recommended to better track the deformation of the upstream shell as foundation at the toe thaws due to elevated Reclaim Pond water levels. Note that this upstream foundation thaw is expected as per the original designs and

there are no concerns with current thaw rate; however, improved tracking of the displacement going forward will provide an early warning should adverse thaw conditions occur, and help ensure the dam design life is not being impacted.

4.2.6 Creep Displacement

North Dam displacements as recorded by the inclinometers and survey points are expected to be caused primarily because of creep of the saline ice-rich permafrost foundation soils. Table 18 summarizes the predicted deformation as determined through rigorous numerical creep deformation modeling (SRK 2017c), as well as the allowable design values. Figure 15 presents a plot comparing predicted vertical displacement against measured vertical displacement along the crest of the dam near Station 1+20. This graph clearly demonstrates that the current displacement is less than predicted.

Table 18: Predicted North Dam Deformation Displacement

Period	Location	Max. Shear Strain Rate (year-1)	Max. Shear Strain (m/m)	Displacement (m)	
				Max. Horizontal	Max. Vertical
Overall allowable design values	Core	3.2E+02	2%	-	1.0
10 years post construction	Core crest	-	-	-	0.2
	Core	5.0E-08	5.0E-02	0.4	0.6
	Foundation	1.0E-07	~1.0E-01	0.4	0.6
30 years post construction	Core crest	-	-	-	1.0
	Core	2.0E-08	1.0E-01	0.8	1.0
	Foundation	4.0E-08	~2.0E-02	0.6	1.0

Recommendations:

- No recommendations.

4.2.7 Walkover Surveys

Walkover surveys of the North Dam are required weekly when tailings deposition is occurring, and when the TIA water level is below the FSL. During the 2020 monitoring period, 28 walkover surveys were completed, and the associated reports and photos are included in Appendix F.

The walkover survey reports and tracks all changes to the dam surface, visible damage to instrumentation, signs of erosion or seepage, or any other surface anomalies. To date, the primary observations of note from the walkover surveys include:

- Surface depressions in the upstream and downstream slopes of the dam;
- Minor cracking on the turn-around pad on the upstream side;
- Rust on the thermosyphons (Section 4.2.2);

- Erosion near the thermosyphons (Section 4.2.2); and
- Ponded or flowing water at the downstream toe of the dam (Section 4.2.8).

The surface depressions are located on the upstream and downstream faces of the dam. Six depressions have historically been classified as significant depressions requiring monitoring (D1, D2, D3, U1, U2 and U3), as illustrated in Appendix G. The Monitoring SOP requires a GPS location, photographs and estimated dimensions/extents of these large surface depressions on a continuous basis to track if they are increasing in size. No monitoring of the depressions was completed during this monitoring year. Based on the AGI physical inspection (see Photolog 1 and 2), SRK is satisfied that there were no substantial changes to these surface depressions since the 2017 AGI, and this observation is confirmed by the settlement data.

Some surficial cracking has been noted in past walk over inspections near the upstream face of the North Dam, especially as reclaim pond water levels were rising. A review of this area was completed and determined that this cracking was primarily on additional fill that was placed over steepened during care and maintenance to access temporary pumps. This fill was placed on top of the North Dam upstream slope and is not expected to be reflective of the underlying dam conditions. In addition, this temporary access route is no longer being used on site and is currently decommissioned. Review of the thermal monitoring data also confirms that any upstream foundation thawing rates are still below the original design criteria and predictions.

Recommendations:

- Complete weekly walkover surveys at the North Dam in accordance with the Monitoring SOPs. This is an important surveillance activity as defined in the OMS Manual and needs to be complied with.

4.2.8 North Dam Seepage Monitoring

Since completion of the North Dam construction, there has been evidence of surface water flow from or along the downstream toe of the dam. This flow has historically been reviewed by SRK, and a rigorous thermal assessment and water quality review was conducted in 2017 to establish whether the flow was in any way indicative of seepage originating from the TIA (SRK 2018a). The evaluation concluded that seepage originating from the TIA was unlikely but could not be definitively excluded. A seepage monitoring program was established in 2018 and is part of the Monitoring SOP (SRK 2020b). The program currently includes flow measurements, systematic water quality sampling, and frost probe data be collected. SRK's review of the 2020 monitoring data (Appendix J) confirms that currently there is no data to suggest the presence of TIA Reclaim Pond water in the flowing water at the toe of the North Dam, and therefore no evidence of seepage.

A V-notch weir was installed downstream of the North Dam in July 2017 and flow and water quality sampling were carried out in accordance with the Monitoring SOP (SRK 2020b).

As part of the monitoring program, limited flow measurements were collected in 2020; however, no flow above the typical range were observed (<2.5l/s) and was only present between late June and September.

No frost probe surveys of the active layer were conducted in 2020; however, 2019 results (SRK 2020a) indicated variation in the seasonal active layer thaw depth between July and November, typically varying by 0.2 – 0.6 m, but no increasing trend was observed and it was agreed that this monitoring practice could be stopped.

Based on all data reviewed in relation to the flowing water at the toe of the North Dam, there is currently no data to suggest TIA water is seeping from the North Dam.

Recommendations:

- No recommendations.
- Frost probe surveys are not required as part of the 2021 monitoring. If conditions change and a frost probe survey is required, the EOR will inform Hope Bay staff.

4.2.9 Physical Inspection of the North Dam

As part of the 2020 AGI an inspection of the North Dam was completed. No general issues of concern were observed.

Some uncompacted crush (approx. 3/4” minus) fill has been historically placed over the upstream face of the dam to allow to site staff to previously access pumps and pipelines existing during the short period of care and maintenance (before TMAC took ownership of the site). Due to fluctuating water levels (expected with normal TIA operation), due to the fines content in this material, and due to the uncompacted nature of this fill, some small ‘cracks; were noted in this fill in the dam inspection. This ‘cracking’ at the edges of this crush fill has been confirmed to not be related to the main North Dam structure itself and has no impact on stability. This noted, next time and excavator is in this area this material is suggested to be spread out, in place, over the upstream crest to assist with future visual inspections and to avoid potential ‘red herring’ (or misleading and distracting) ‘cracking’ that may be noted by others that may not be familiar with history of operational use in this area. This is not a technical point and is a point of housekeeping only.

The attached Photolog (Photolog 1 to 3) provides a general overview of conditions on the North Dam.

Recommendations:

- Spread out the uncompacted crush that currently exists over the upstream outer dam shell. This is a housekeeping point to assist with visual monitoring in this area.

4.3 South Dam Inspection and Monitoring

4.3.1 Ground Temperature Cables

To monitor long-term temperature of the frozen foundation dam, a total of twenty-seven GTCs were installed during South Dam construction (SRK 2018c). The GTCs are connected to Beaded Stream Dataloggers (D405) to allow continuous data capture. Summarized thermal data is shown in Appendix A. Table 19 provides a summary of the GTC status during the 2020 AGI inspection.

The design criteria for the dam requires a ground temperature of less than -2°C at the upstream base of the key trench (Figure 9). Based on the data review, the ground temperatures generally meet the design requirements and the dam is performing as expected.

Table 19: South Dam Ground Temperature Cable Status Summary

GTC ID	Station ID	Status	# of Sensors (Functional / As-built)	Comment
SD-VTS-065-KT	0+65	Active	11 / 11	▪ Damaged following construction (repaired)
SD-HTS-065-US	0+65	Active	5 / 5	▪ Damaged following construction (repaired)
SD-VTS-155-KT	1+55	Active	11 / 11	
SD-HTS-155-US	1+55	Active	5 / 5	
SD-VTS-155-US	1+55	Inactive	0 / 11	▪ Single sensor functioning until 11/8/2019
SD-VTS-155-DS	1+55	Active	11 / 11	
SD-HTS-155-KT	1+55	Inactive	0 / 11	▪ Damaged during construction (irreparable)
SD-HTS-240-KT	2+40	Active	11 / 11	
SD-VTS-240-KT	2+40	Active	11 / 11	
SD-HTS-240-US	2+40	Active	7 / 7	
SD-VTS-240-US	2+40	Inactive	0 / 11	▪ Measurements ended on 10/10/2019
SD-VTS-240-DS	2+40	Inactive	0 / 11	▪ Measurements ended on 10/22/2019
SD-VTS-365-KT	3+65	Inactive	0 / 11	▪ Damaged following construction (irreparable)
SD-HTS-365-KT	3+65	Active	11 / 11	▪ Damaged following construction (repaired)
SD-HTS-365-US	3+65	Active	11 / 11	
SD-VTS-365-US	3+65	Active	11 / 11	
SD-VTS-365-DS	3+65	Active	0 / 11	▪ Measurements ended on 8/3/2020
SD-VTS-US1	3+65	Active	2 / 13	▪ Installed in suspected ground ice wedge near upstream toe ▪ Bead 1 and 2 active
SD-VTS-US2	3+65	Active	1 / 15	▪ Installed in suspected ground ice wedge near upstream toe ▪ Bead 1 active
SD-VTS-460-KT	4+60	Active	11 / 11	

GTC ID	Station ID	Status	# of Sensors (Functional / As-built)	Comment
SD-HTS-460-KT	4+60	Active	11 / 11	
SD-VTS-460-US	4+60	Active	11 / 11	▪ Damaged following construction (repaired)
SD-VTS-460-DS	4+60	Active	11 / 11	
SD-HTS-460-US	4+60	Inactive	0 / 5	▪ Damaged following construction (irreparable)
SD-VTS-510-KT	5+10	Active	11 / 11	
SD-HTS-510-US	5+10	Active	5 / 5	▪ Damaged following construction (repaired)
SD-HTS-B1-KT	NA	Active	20 / 20	

As listed in Table 19, not all of the installed cables are operational due to issues related to cable damage from construction and/or wildlife. Wherever possible, repairs were completed on site by the mill instrumentation electrician to bring cables back online, and additional measures were put in place to improve protection of the cables.

GTCs provide thermal monitoring of the dam to ensure conditions remain within the intended design for safe operation and containment. SRK has assessed the remaining cables to determine which cables should be replaced to ensure the monitoring system integrity is upheld (Appendix K).

Recommendations:

- GTCs provide thermal monitoring of the dam to ensure conditions remain within the intended design for safe operation and tailings containment. GTC replacement is recommended in some areas of the South Dam where recent instrument failure has occurred. Four replacement GTCs are suggested to be installed at this time (two upstream and two downstream). TMAC should work with the EOR to install these replacement GTCs as soon as practical. Priority should be given to the two upstream GTC replacements.
- Four replacement GTC strings are now on site (at the Doris North Camp). The exact timing of the installation of these cables has not yet been established due to current site limitations with available surface drill rigs.
- Beadedstream telemetry subscription requires annual renewal. TMAC should work with the EOR to ensure that the telemetry system operations are maintained.
- Complete a walk over survey of the South Dam after spring melt and look for any exposed or damaged ground temperature cables. This will allow for preventative maintenance and placement of protective material to be done if exposed cables are observed, which will help to limit the potential for damage from wildlife.
- Manually download data from each datalogger once annually in accordance with the monitoring SOP.

4.3.2 Survey Monitoring Points

A series of 12 crest survey monitoring points, 3 deep settlement points, and 26 surficial survey monitoring points are proposed for the South Dam. Survey monitoring points were installed in August 2019. Surveys were collected monthly between May through October. The November survey was missed due to COVID19 restricted staffing on site. Complete survey data is presented in Appendix E.

Table 20: Summary of Survey Monitoring Observations (2020 surveys relative to August 2019)

Location	No. of Stations	Vertical Displacement (m)			Horizontal Displacement (m)		
		Min.	Max.	Last Survey Max.	Min.	Max.	Last Survey Max.
Deep settlement points (DSP)	3	0.00	0.03	0.03	0.00	0.14	0.14
Crest survey monitoring points (SMP)	14	0.00	0.03	0.03	0.01	0.13	0.13
Surficial survey settlement points - Downstream dam shell (SSP)	19	0.00	0.03	0.03	0.00	0.03	0.03

Notes:

SSP locations are surveyed by RTK GPS due to line of sight challenges, as such the accuracy of the measurements may be lower.

The overall vertical and horizontal displacement since August 2019 is limited in all survey locations. The relative increase in displacement in Fall 2020 appears to be a systematic error between the total station and RTK GPS survey methods for each survey location type, if actual horizontal or vertical displacement were occurring, it would be expected that each survey would follow a similar trend. Continued monitoring will provide a greater understanding of the dam's performance. At this point the limited displacements observed are not of concern.

Recommendation:

- A monthly survey of the downstream toe is required as part of the Monitoring SOP. This monitoring requirement should be conducted at least once during August each year to track the lateral extent of ponding downstream of the dam.

4.3.3 Walkover Surveys

Walkover surveys of the South Dam are required weekly when tailings deposition is occurring, and when the TIA water level is below the FSL. Formal weekly walkover inspection forms were rolled out in May 2020. Since then 16 of the possible 32 walkover surveys were completed and the associated reports and photos are included in Appendix F.

The walkover survey reports and tracks all changes to the dam surface, visible damage to instrumentation, signs of erosion or seepage, or any other surface anomalies. At the South Dam it also provides record of the active spigot locations. To date, the primary observations of note from the walkover surveys include:

- Instrumentation hardware issues or ice buildup on solar panels;
- Ponding or beach length encroachment on the dam; and
- Ponding on the downstream side of the dam.

Recommendation:

- Complete weekly walkover surveys at the South Dam in accordance with the Monitoring SOPs. This is an important surveillance activity as defined in the OMS Manual and needs to be complied with.

4.3.4 South Dam Seepage and Ponded Water Monitoring

As part of the seepage and ponded water monitoring program (SRK 2020c), samples of the ponded water downstream of the dam were collected to establish a geochemical baseline and monitor for potential changes in chemistry which could be an indication of seepage. SRK's review of the 2020 geochemical monitoring data (Appendix J) confirms that currently there is no data to suggest the presence of TIA Reclaim Pond water in the ponded water at the toe of the South Dam and no flowing water was observed, and therefore no evidence of seepage.

Recommendations:

No recommendations.

4.3.5 Physical Inspection of the South Dam

As part of the AGI, a walkover survey of the South Dam was completed. Overall the dam is performing as expected and there were no significant issues of concern.

One item that may be beneficial to address is the growing pond and thawing ground observed at the downstream toe of the dam. This area will ultimately be withing and covered by the Phase 2 South Dam raise. This area contained frost wedge polygons and standing water prior to construction, however more water has ponded in this area since 2018. In order to mitigate the risk of foundation thaw, prior to construction of the South Dam Phase 2 raise, placement of an ROQ apron over this area should be assessed. This would likely consist of at least 1.5 m of fill placed over this area (about 5 m in width). Along the downstream toe, limited amounts of tailings was visible on vegetation (i.e. a dust coating) and has been observed on the melting snow drifts early in the summer. It is hypothesized that this has been transported during periods of strong winds from the north. Monitoring such as water quality sampling as well as visual monitoring is ongoing and will inform if and when dust mitigation is required. As the subaerial tailings beach grows the potential for dust generation at the South Dam also increases. At this time the wind transported tailings is in a very small quantities and only observed on or immediate at the downstream South Dam toe and is not a concern. Tailings dust generation will be revisited as part of the 2021 AGI but at this time is not a critical issue and no action is suggested beyond ongoing monitoring. Photolog 4 provides a general overview of the South Dam conditions at the time of the AGI.

Recommendations:

- Methods to limit tailings dispersion downstream of the dam should be further monitored and assessed in 2021. As the sub-aerial tailings beach grows dust generation is expected to become a more critical item. TMAC has already sourced dust suppression agents for the TIA and should work with the EOR to determine when the dust suppression measures should be implemented. Based on the current beach arrangement and the plans for tailings beach freezeback off the upstream face of the South Dam, based on the water quality monitoring at the downstream of the South Dam, these dust suppression measures are not yet suggested to be required.
- The initial phases of permafrost degradation and increased ponding water has been observed at the downstream toe of the South Dam. This downstream area is near the area where snow access roads were constructed as part of the Phase 1 South Dam construction (and is within the ultimate Phase 2 dam footprint). Remediation of this area should be considered prior to construction of the Phase 2 raise (Phase 2 raise not expected to be completed in 2021 at this time). This remediation would be expected to consist of the placement of 1.5 m thickness of ROQ material directly over these areas (and against the current downstream dam fill / shell).

4.4 Tailings Deposition System

Table 5, Figure 10, and Figure 11 provide a summary of tailings deposition in the TIA to date. Generally, the tailings deposition rates to date have been lower than the planned rates. In 2020 tailings solids contents were highly variable as the mill was operated intermittently. Monthly averages ranged from 20% to 52% with an average around the target 35%.

Tailings deposition has occurred as single point discharge from approximately 5 separate locations in 2020; two locations along the eastern shoreline of the TIA, including one winter location just downstream of the developing tailings beach; and, three locations from the South Dam for summer deposition. At the time of the 2020 AGI tailings discharge from ‘Varley’s Corner’ was ongoing as variable milling conditions and good beach establishment in 2019 limited the utility of discharge from the dam. The well-established beach will now maintain a beach length over 200 m at the FSL of the North Dam (upper limit of the reclaim pond water levels). Though good progress has been made on beach establishment, it is possible to isolate a pond of water on the tailings beach which is hydraulically isolated from the reclaim pond and could present ice entrainment of beach length issues. Tailings deposition will need to continue from the South Dam in accordance with the tailings deposition plan (Figure 12 and Appendix L).

Saline mine water may be discharged to the TIA via the tailings pipeline or a dedicated pipeline. In past AGIs, SRK has advised against discharging saline mine water (greater than 4,500 mg/l Cl equivalent) with tailings into the TIA when beaching from the South Dam, because the saline pore water will depress the freezing point of the tailings. A depressed freezing point of the tailings could compromise the performance of the South Dam or the long-term freeze-back of the tailings. Saline mine water should be directed away from the TIA or discharged directly into the reclaim pond through a separate line whenever possible. While it is not current practice on site, if saline water must be directed to the TIA through the tailings pipeline, then it should be discharged from a spigot location that is at least

300 m away from the South Dam crest so that the freeze back of the tailings beach against the South Dam is not impacted.

TMAC has advised that, on occasion, they may dispose of propylene glycol from aircraft de-icing activities into the TIA. Glycol discharge must be in accordance with the OMS manual.

Recommendations:

- Saline mine water may only be discharged through the tailings pipeline from, or within, 300 m of the South Dam provided the freezing point depression is less than 0.5°C (less than 4,500 mg/L Cl maximum equivalent). While not current practice, this operational recommendation remains in place.
- The tailings discharge system must be operated in accordance with the tailings deposition plan (Appendix L). Primary spigot moves should be expected during, or shortly after, spring melt and again prior to winter freeze up. In the summer of 2021 it is expected that at least one additional spigot location will be required to be installed (north of the current spigot H location).
- No TIA bathymetric survey was conducted in 2020, as approved by the EOR. For 2020 deposition planning, conservative volume assumptions were used as part of the 2020 AGI tailings deposition plan (i.e. assuming larger deposited volumes or less available space). A bathymetry survey of the TIA reclaim pond should be completed in 2021 to allow for better determination of the tailings volume, sub-aqueous extent and available storage volume in the TIA.
- Plans should start to be made in 2021 for the Phase 2 raise of the South Dam; The raise is expected to be required once the tailings beach reaches against the existing dam reaches the full supply level for tailings (36.5 masl or approximately 2.64Mt of total tailings tonnage). The required timing is dependent on milling rates, but construction is expected in winter 2022 or 2023.

4.5 Emergency Dump Catch Basins

The Eastern Dump Catch Basin is in good condition as shown in Photolog 9. The Western Dump Catch Basin however has wrinkled liner that does not appear to be adequately anchored and may not perform as intended. Currently it appears this structure has the required containment volume, but some liner slippage has been noted and repairs at the earliest opportunity are suggested by SRK. TMAC has agreed to do this reconstruction at the earliest opportunity on site / when practical.

Recommendations:

- The Western Emergency Dump Catch Basin still requires repairs. These repairs should still be planned to be carried out.

4.6 Pipelines (Reclaim, Tailings Deposition and TIA Discharge)

Pipelines are placed directly on the ground, which could be either rockfill pads, road shoulders or directly on the tundra. There are signs of vegetation dieback because of pipelines placed directly on

the tundra along the northern shore of the TIA upstream of the Reclaim Pump Station. This is becoming a preferred flow path for surface runoff which could ultimately lead to rapid surface erosion and subsequent thermal erosion of permafrost

Recommendations:

- TMAC must carefully inspect all pipelines placed directly on the tundra for signs of vegetation dieback and associated flow path channeling. Where this is occurring, the pipeline must be relocated to follow existing all-weather road shoulders, and appropriate remediation needs to be put in place where damage has occurred. Going forward, Agnico Eagle should consider abandoning the practice of placing pipelines directly onto the tundra. Some old inactive piping that was on the tundra, downstream of the North Dam, was removed by site staff in 2020. This is a positive improvement. Additional pipelines (specifically any pipelines that are no longer in use) should be removed from the tundra where practical. Any pipeline removal should consider approaches to ensure that additional permafrost damage does not result from the removal activities.
- The permafrost thermal erosion feature that has developed along the northern shore of the TIA was backfilled by TMAC in 2019. This area should continue to be monitored to ensure that additional thermal erosion does not result in this area.

4.7 TIA Reclaim Pumphouse Pad

Settlement and tension cracking were previously noted at the TIA Reclaim Jetty Pad (also referred to as the 710 Pumphouse pad). Through 2020, major repairs were made to the Reclaim Jetty pad. There is still one area of the jetty (WSW end where the pipelines extend from the seacans into the reclaim pond) that is oversteepened and should be carefully monitored. Survey monitoring was completed on a regular basis and did not indicate any concerning levels of displacement once the repairs were complete. An as-built and monitoring overview of the recent TIA reclaim jetty / pumphouse pad is presented in Appendix N.

Recommendations:

- Continue settlement monitoring at the Reclaim Jetty should continue in 2021 (twice monthly, May to November).
- Additional (relatively minor) fills are recommended on the west side of the pad where the full fill extents, of the proposed reclaim jetty repairs, were not met.
- Once all repairs are complete, ensure the recommended survey monitoring points are reestablished.

4.8 Shoreline Erosion

The pre-mining water level in the pond is 28.3 m. Since the start of commercial production, the water level has risen to 32.0 m, which is 3.7 m above the original lake water level. Therefore, a large section

of shoreline has been flooded which has resulted in vegetation stress. At this time, there are no visible signs of shoreline erosion, and therefore no additional monitoring is required.

Recommendations:

- No recommendations.
- Shoreline Erosion is no longer a formal monitoring requirement, and as-such will not be reported as a section in the 2021 AGI. Should shoreline erosion be observed throughout the year, or during the AGI, it will be reported as part of the overall TIA condition assessment in the AGI.

4.9 TIA Operational Water Balance and Level Targets

The TIA operational water and load balance tool is used to predict water levels in the TIA and communicate water balance updates and projections monthly. The operational water level range for 2021 is 31.5 masl or less and therefore the Reclaim Pond should be maintained within this range to limit thermal loading on the North Dam. It is expected that during freshet the water levels may temporarily rise above 31.5 masl; however, the Reclaim Pond must be lowered into the range as soon as is practical.

In addition to the Reclaim Pond water level targets, the South Dam beach length must be maintained and no large ponding should occur within 100 m of the dam (SRK 2020c).

Recommendations:

- It is of paramount importance that the RBDS be re-commissioned by May 2021 to manage water levels in the Reclaim Pond. Further delay of this may result in reduced operations
- If delays in approvals to use the Roberts Bay Discharge system are expected past the end of May 2021 then the EOR should be informed so additional plans can be made with site staff. Water levels in the TIA will continue to be carefully monitored (specifically during the periods where there is no discharge from the TIA to Roberts Bay).
- Continue discharge 2021 to reduce the water levels in the pond to within the target elevation range.
- Continue to monitor the South Dam beach length to maintain at least 100 meters separation between the Dam and the Reclaim Pond or any large pond.

4.10 TIA Water Quality

The TIA water quality is monitored at compliance station TL-1 at the Reclaim Water pump station and will continue to be monitored to be compliant with MDMER and water treatment will be evaluated as needed. Details of the TIA water quality are provided in the annual water and load balance review (SRK 2021), no findings in this report are expected to have a significant impact on TIA operation over the next year.

Recommendations:

- No recommendations.
- If water quality or water treatment capacity is expected to impact the ability to maintain the Reclaim Pond within the operational range, the EOR must be notified.

4.11 Climate Data

For reference, the updated climate data received from the Doris meteorological station is provided in Appendix I. The data presented summarizes the historical climate record, the 2020 climate record and a comparison of 2020 air temperatures to all air temperature data since 2004. The climate data shown is sourced from monthly data submissions from Stantec, uploaded to the SRK Environmental Data Management System database.

Recommendations:

- No recommendations.

5 Recommendations and Conclusions

Based on the results of the 2020 AGI, the Doris TIA and associated structures (primarily the North Dam and South Dam) are functioning as designed. Some items were observed during the physical inspection and some anomalies were identified during the monitoring data review; however, these are either within expected performance or determined to be of no significant concern to dam performance. Improvements to the overall tailings management system (e.g. Conducting the DSR, or integration of the OMS Manual with the TARPS, ERP and Dam Emergency Plan) were also identified, and these are currently being actioned by TMAC with support from SRK where required. Table 21 presents a summary of the recommendations listed throughout this report.

Table 21: Summary of Recommendations

Inspection Item	2019 Recommendations (for reference)	2020 Recommendations
	General TIA Management Recommendations	
Third Party Dam Safety Review	▪ Conduct an independent third-party Dam Safety Review for both the North and South Dams in the summer of 2021.	▪ Conduct an independent third-party Dam Safety Review (DSR) for both the North and South Dams in the summer of 2021. *Planning for this is in progress. An independent third-party Dam Safety Review is scheduled to be conducted for both the North and South Dams in summer of 2021 pending COVID-19 restrictions.*
Tailings Operating, Maintenance and Surveillance (OMS) Manual and Emergency Response Plan (ERP)	▪ An update to the OMS manual is in progress by SRK and will be submitted by Q4, 2020. This update is aimed to be a notable improvement to the current OMS. This noted, additional updates are expected in Q3 and Q4 2020. The focus of the OMS updates in Q3 and Q4 will be further refinement of the Trigger Action Response Plans (TARPs). The OMS for this facility will be a 'living' document that is expected to be reviewed annually. ▪ TMAC should ensure all staff are properly informed and trained on the contents of the OMS Manual. ▪ *At the time of writing this report, TMAC was in the process of developing a standalone 'Hope Bay Project Dam Emergency Plan', rather than updates to the ERP, to address dam emergencies. It will incorporate inundation mapping and dam break scenarios. The standalone dam emergency plan will be released upon completion of the OMS update to ensure alignment.* An Emergency Reponses Plan exists for the site; however, this document was lacking sufficient detail for a specific emergency at the TIA, if one were to occur. In 2019 SRK visited site and held a session with site personnel to go over preliminary dam break inundation maps completed by SRK and to provide inputs into what should be included in the site ERP updates to ensure the TIA is properly covered in this document. An update to the ERP is	▪ A draft version of the 'Hope Bay Project Dam Emergency Plan' was completed by Hope Bay staff in 2021. This Dam Emergency Plan should be finalized by site and integrated with the into the OMS and TARP framework ▪ Once integrated, the suite of OMS, TARPs, ERP and Dam Emergency Plan should reviewed with all site operations annually and updated as necessary. ▪ All of these components should be reviewed against AEM's corporate tailings management system and updated tailings standards through a gap analysis to identify required updates. ▪ *A revised OMS was issued in 2020* ▪ *TARPs were developed for the TIA in Q4 2020. Further refinement based on site input to the TARPs and integration with OMS manual should be completed in 2021*

Inspection Item	2019 Recommendations (for reference)	2020 Recommendations
	recommended in 2020 to provide additional details for the TIA.	
TIA Roles and Responsibilities	▪ TMAC must agree on the roles and responsibilities for the TIA, train and inform personnel of their duties, and operate the facility accordingly. This will be an ongoing recommendation that is expected to be repeated annually. The roles and responsibilities for the TIA will be defined in the OMS update, to be released in 2020.	▪ The roles and responsibilities for the TIA are defined in the OMS update and must be updated with any changes in AEM's corporate structure.
Compliance with Monitoring Requirements	▪ Conduct monitoring in accordance with the Monitoring SOP, paying attention to those areas where conformance is not consistently met. ▪ Update the Monitoring SOP to include South Dam monitoring requirements. SRK is currently preparing a separate SOP for the South Dam, and one already exists for the North Dam. A draft version of the South Dam SOP was submitted to TMAC in June 2020 and a final version is expected in July 2020.	▪ Conduct monitoring in accordance with the specified frequency in the Monitoring SOP and OMS. If changes in the monitoring frequency are required due to new operating schedules these must be proposed to and approved by the EOR. ▪ The North and South Dam Monitoring SOPs were updated in 2020. An additional update should be completed following any notable updates to the Tailings Management System.
North Dam Inspection and Review of Monitoring Data		
Ground Temperature Cables (GTCs)	▪ There are no specific recommendations for the installed GTCs. However, TMAC should aim to improve performance tracking of the dataloggers at the South Dam and check to see if cables are being damaged by wildlife after spring melt in order to confirm that current cable protection is adequate.	▪ No recommendations. ▪ Consider implementing satellite telemetry for the North Dam data loggers to allow daily transmission of the measurements rather than manual downloads. This would be a more proactive approach rather than a requirement at this time.
Thermosyphons	▪ The 2018 recommendations were completed in 2019 and Arctic Foundations Canada (AFC) visited the site for an inspection. Additional details are provided in this 2019 AGI (see Appendix A).	▪ No recommendations.
CR1000 Datalogger Battery Voltage	▪ The external CR1000 datalogger batteries should continue to be monitored and recharged annually or replaced as needed.	▪ The external CR1000 datalogger batteries should continue to be monitored and recharged annually or replaced as needed. ▪ *The batteries have been recharged in March 2021*
Inclinometers	▪ The inclinometer and associated readout device should be recalibrated every 3 years as per recommended best practice. SRK was aware that TMAC sent this instrument for recalibration but due to COVID-19, the instrument calibration was unable to be performed and had to be returned from the out of country manufacturers. This recommendation should be revisited before the spring of 2021.	▪ The inclinometer probe and read-out were sent for recalibration and maintenance, but due to Covid-19 it was not possible to complete in 2020. The probe has and readout should be re-sent to the manufacturer for recalibration and maintenance in 2021. ▪ *Note that TMAC has informed SRK that the inclinometer probe has now been sent off site (sent off site Q1 2021) for recalibration and maintenance.*
Survey Monitoring Points	▪ Backfill the erosion around survey monitoring point ND−DSP−100 at the North Dam. ▪ Continue to carefully observe the North Dam downstream shell settlement points ND-SSP-080-3 and ND-SSP-110-3 to determine if thaw settlement of the toe is causing undue deformation.	▪ Backfill the erosion around survey monitoring point ND−DSP−100 at the North Dam. ▪ Continue to carefully observe the North Dam downstream shell settlement points ND-SSP-080-3 and ND-SSP-110-3 to monitor for increased thaw settlement of the toe and undue deformation.

Inspection Item	2019 Recommendations (for reference)	2020 Recommendations
		■ Installation of additional surficial survey points (SSP) on the upstream face of the North Dam to track deformation of the upstream face. These additional SSPs are recommended to better track the deformation of the upstream shell as foundation at the toe thaws due to elevated Reclaim Pond water levels. Note that this upstream foundation thaw is expected as per the original designs and there are no concerns with current thaw rate, however improved tracking of the displacement going forward will provide an early warning should adverse thaw conditions occur, and help ensure the dam design life is not being impacted.
Creep Displacement	■ None.	■ No recommendations.
Walkover Surveys	■ The required weekly walkover surveys at the North Dam are not being completed in accordance with the SOP. This is an important surveillance activity as defined in the OMS Manual and needs to be complied with.	■ Complete weekly walkover surveys at the North Dam in accordance with the Monitoring SOPs. This is an important surveillance activity as defined in the OMS Manual and needs to be complied with. *Since 2018 there has been an improvement in the frequency of the walk over surveys but additional surveys were still required to be in accordance with the SOPs.*
North Dam Seepage Monitoring	■ Continue water quality monitoring of North Dam seepage according to the methods outlined in SRK (2018b) (this was completed in 2019). ■ Conduct at least one additional frost probe survey along the same transects in early summer and early fall, following the same procedure as in 2018 and 2019. Based on current favourable results, SRK will revisit the requirements for the frost probe surveys as part of the 2020 AGI and determine if further surveys are required beyond 2020. ■	■ No recommendations. ■ Frost probe surveys are not required as part of the 2021 monitoring. If conditions change and a frost probe survey is required, the EOR will inform Hope Bay staff.
AGI Physical Inspection	■ None	■ No recommendations.
South Dam Inspection and Review of Monitoring Data		
Ground Temperature Cables (GTCs) and D405 Dataloggers	■ Complete a walk over survey of the South Dam after spring melt and look for any exposed or damaged ground temperature cables. This will allow for preventative maintenance to be done if exposed cables are observed, which will help to limit the potential for damage from wildlife. ■ SRK to further assess, if repairs are not possible, replacement of Ground Temperature Cables SD-VTS-155-US, SD-VTS-240-US and SD-VTS-240-DS will be required. ■ Manually download data from each datalogger once annually or as specified by the EOR.	■ GTCs provide thermal monitoring of the dam to ensure conditions remain within the intended design for safe operation and tailings containment. GTC replacement is recommended in some areas of the South Dam where recent instrument failure has occurred. Four replacement GTCs are suggested to be installed at this time (two upstream and two downstream). TMAC should work with the EOR to install these replacement GTCs as soon as practical. Priority should be given to the two upstream GTC replacements. ■ *Four replacement GTC strings are now on site (at the Doris North Camp). The exact timing of the installation of these cables has not yet been established due to current site limitations with available surface drill rigs.* ■ Beadedstream telemetry subscription requires annual renewal. TMAC should work with the EOR to ensure that the telemetry system operations are maintained.

Inspection Item	2019 Recommendations (for reference)	2020 Recommendations
		▪ Complete a walk over survey of the South Dam after spring melt and look for any exposed or damaged ground temperature cables. This will allow for preventative maintenance and placement of protective material to be done if exposed cables are observed, which will help to limit the potential for damage from wildlife. ▪ Manually download data from each datalogger once annually in accordance with the monitoring SOP.
Survey Monitoring Points	▪ None.	▪ A monthly survey of the downstream toe is required as part of the Monitoring SOP. This monitoring requirement should be conducted at least once during August each year to track the lateral extent of ponding downstream of the dam.
Walkover Surveys	▪ Start weekly walkover surveys of the South Dam in 2020. This is an important surveillance activity. Additional details will be provided to TMAC in the South Dam SOP.	▪ Complete weekly walkover surveys at the South Dam in accordance with the Monitoring SOPs. This is an important surveillance activity as defined in the OMS Manual and needs to be complied with.
South Dam Seepage and Ponded Water Monitoring	▪ Not part of the 2019 AGI	▪ No recommendations.
Annual Physical Inspection of the South Dam	▪ None	▪ Methods to limit tailings dispersion downstream of the dam should be considered in 2021. As the sub-aerial tailings beach grows, this is expected to become a more critical item. ▪ The initial phases of some permafrost degradation and increased ponding water has been observed at the downstream toe of the South Dam. This downstream area is near the area where snow access roads were constructed as part of the Phase 1 South Dam construction (and is within the ultimate Phase 2 dam footprint). Remediation of this area should be considered prior to construction of the Phase 2 raise (Phase 2 raise not expected to be completed in 2021 at this time). This remediation would be expected to consist of the placement of 1.5m thickness of ROQ material directly over these areas (and against the current downstream dam fill / shell).
▪ TIA-Wide Monitoring		
Tailings Deposition System	▪ TMAC should install the dedicated mine water discharge pipeline to the TIA as soon as possible to allow tailings deposition to recommence from the South Dam. It is critical that tailings deposition from South Dam recommence in order to maintain a beach length of at least 100 m at all times, for all TIA water levels. *UPDATE: this was addressed at the start of 2020 and is now complete. The Roberts Bay Discharge system is now operational.* ▪ Saline mine water may only be discharged together with tailings from, or within, 300 m of the South Dam provided the freezing point depression is less than 0.5ºC (around 4,500 mg/L Cl maximum equivalent). If the freezing point depression exceeds 0.5ºC, saline mine water may only be	▪ Saline mine water may only be discharged through the tailings pipeline from, or within, 300 m of the South Dam provided the freezing point depression is less than 0.5°C (less than 4,500 mg/L Cl maximum equivalent). While not current practice, this operational recommendation remains in place. ▪ The tailings discharge system must be operated in accordance with the designated tailings discharge plan. Primary spigot moves should be expected during, or shortly after, spring melt and again prior to winter freeze up. In the summer of 2021 it is expected that at least one additional spigot location will be required to be installed (north of the current spigot H location). ▪ No TIA bathymetric survey was conducted in 2020, as approved by the EOR. For 2020 deposition planning,

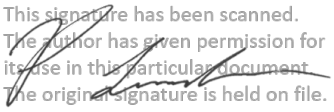
Inspection Item	2019 Recommendations (for reference)	2020 Recommendations
	discharged with tailings at other designated tailings discharge points further than 300 m from the South Dam or directly into the Reclaim Pond. The freezing point depression calculation is provided in this AGI and will be incorporated by SRK into the updated OMS Manual (update currently in progress). ▪ The tailings discharge system must be operated in accordance with the designated tailings discharge plan. Primary spigot moves should be expected around, or shortly afterwards, spring melt and again prior to winter freeze up. ▪ Areas along the eastern shoreline of the TIA where tailings discharge has occurred at elevations above 36.5 m need to be carefully monitored to determine if permafrost damage is occurring due to tailings flow and vegetation dieback. Should any damage be noted, appropriate proactive mitigation may be required.	conservative volume assumptions were used as part of the 2020 AGI tailings deposition plan (i.e. assuming larger deposited volumes or less available space). A bathymetry survey of the TIA reclaim pond should be completed in 2021 to allow for better determination of the tailings volume and available storage volume in the TIA. ▪ Plans should start to be made in 2021 for the Phase 2 raise of the South Dam; The raise is expected to be required once the tailings beach reaches against the existing dam reaches the full supply level for tailings (36.5 masl or approximately 2.64Mt of total tailings tonnage). The required timing is dependent on milling rates, but construction is expected in winter 2022 or 2023.
Emergency Dump Catch Basins	▪ Repair the Western Emergency Dump Catch Basin at the earliest opportunity to ensure liner movement does not occur and impact the as-built storage capacity of this Emergency Catch Basin.	▪ The Western Emergency Dump Catch Basin still requires repairs. These repairs should still be planned to be carried out.
Pipelines (Reclaim, Tailings Deposition and TIA Discharge)	▪ TMAC must carefully inspect all pipelines placed directly on the tundra for signs of vegetation dieback and associated flow path channeling. Where this is occurring, the pipeline must be relocated to follow existing all-weather road shoulders, and appropriate remediation needs to be put in place where damage has occurred. Going forward, TMAC should consider abandoning the practice of placing pipelines directly onto the tundra. ▪ The permafrost thermal erosion feature that has developed along the northern shore of the TIA was backfilled by TMAC in 2019. This area should continue to be monitored to ensure that additional thermal erosion does not result in this area.	▪ TMAC must carefully inspect all pipelines placed directly on the tundra for signs of vegetation dieback and associated flow path channeling. Where this is occurring, the pipeline must be relocated to follow existing all-weather road shoulders, and appropriate remediation needs to be put in place where damage has occurred. ▪ The permafrost thermal erosion feature that has developed along the northern shore of the TIA was backfilled by TMAC in 2019. This area should continue to be monitored to ensure that additional thermal erosion does not result in this area. ▪ Monitoring should continue at the repaired TIA Reclaim Jetty Pad (710 Pumphouse pad) following the recommended survey frequency of twice monthly from May to November.
TIA Reclaim Pumphouse (710) Pad	▪ Notable settlement was noted at the TIA Reclaim Jetty Pad (also referred to as the 710 Pumphouse pad). Upon visual inspection and from review of the as-built data, it looks like new ROQ material was placed off the edge of the pad in thick, end dumped lifts in order to widen the pad for the new 710 pumphouse. There are notable stability concerns with this pad as large settlements and notable cracking indicate that a failure of this pad (albeit slow) appears to be occurring. However, it should be noted that the rate of movement could increase suddenly causing a sudden failure, and this risk should not be ignored. Monitoring of this area (at least weekly during winter and daily during months with no ice cover on the lake) should be	▪ Settlement monitoring at the Reclaim Jetty should continue in 2021 (twice monthly, May to November). ▪ Major Jetty repairs were completed in 2020. There is still one area off the most WSW end of the reclaim jetty fill (i.e. by the area where the pipelines extend from the seacans into the TIA) that are still over steepened and should be carefully monitored. ▪ Additional (relatively minor) fills are recommended on the west side of the pad where the full fill extents, of the proposed reclaim jetty repairs, were not fully met. ▪ Once all repairs are complete, ensure the recommended survey monitoring points are reestablished.

Inspection Item	2019 Recommendations (for reference)	2020 Recommendations
	completed. It is recommended that remediation measures be completed for the pad in order to stabilize the fill and prevent further deformation. This is expected to consist of placing additional fill along the outside of the access road and pad to reduce the overall slope and provide additional confining stress at the toe of the pad (which is currently underwater). Rates of loading must be controlled and slow enough in order to avoid inducing excess pore pressures in the foundation. This means that it may take weeks to build this small additional fill and that the dumping faces should be spread out as much as possible. Material should be end dumped back from the working face and spread with an excavator with the largest reach on site (to limit loading at the crest).	
Shoreline Erosion	▪ None.	▪ No recommendations; Shoreline Erosion is no longer a formal monitoring requirement, and as-such will not be reported as a section in the 2021 AGI. Should shoreline erosion be observed throughout the year, or during the AGI it will be reported as part of the overall TIA condition assessment.
TIA Water Balance and Level Targets	▪ It is of paramount importance that the Roberts Bay Discharge System Pipeline be completed during the summer of 2019. Further delay of this may result in reduced operations. ▪ *UPDATE: this was addressed at the start of 2020 and is **now complete**. The Roberts Bay Discharge system is now operational.*	▪ It is of paramount importance that the RBDS be re-commissioned by May 2021 to manage water levels in the Reclaim Pond. Further delay of this may result in reduced operations. ▪ *During maintenance of the Roberts bay Discharge Line in the fall of 2020, portions of the submersed line became buoyant requiring the submersed line to be shortened. The end of the Roberts Bay Discharge line is now at around 20m depth in Roberts Bay compared to the previous 40 meters depth. In Q1 2021, TMAC made a submission to the Nunavut Impact Review Board indicating why the revised discharge location does not pose a significant modification to the Hope Bay Mine or the previously assessed environmental effects. It is expected that this discharge line will be able to be used again before freshet 2021.* ▪ If delays in approvals to use the Roberts Bay Discharge system are expected past the end of May 2021 then the EOR should be informed so additional plans can be made with site staff. Water levels in the TIA will continue to be carefully monitored (specifically during the periods where there is no discharge from the TIA to Roberts Bay). ▪ Continue discharge 2021 to reduce the water levels in the pond to within the target elevation range. ▪ Continue to monitor the South Dam beach length to maintain at least 100 meters separation between the Dam and the Reclaim Pond or any large pond.
TIA Water Quality	▪ No recommendations; however, the following comments are made below. ▪ The water treatment plant for the TIA is required to be maintained in good operational condition so	▪ No recommendations. ▪ If water quality or water treatment capacity is expected to impact the ability to maintain the Reclaim Pond within the operational range, the EOR must be notified.

Inspection Item	2019 Recommendations (for reference)	2020 Recommendations
	that discharge of supernatant water can occur once the Roberts Bay Discharge System Pipeline is operational, and allow treated water to be discharged in order to maintain water levels in the TIA below the full supply level. ■ *UPDATE: as of the start of 2020 the Roberts Bay Discharge system and the connected water treatment plant is now operational.*	
Climate Data	■ None.	■ No recommendations.

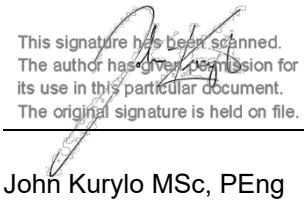
Closure

This report, 2020 Annual Geotechnical Inspection Tailings Impoundment Area, was prepared by



Peter Luedke, PEng
Consultant

and reviewed by



John Kurylo MSc, PEng
Senior Consultant

All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

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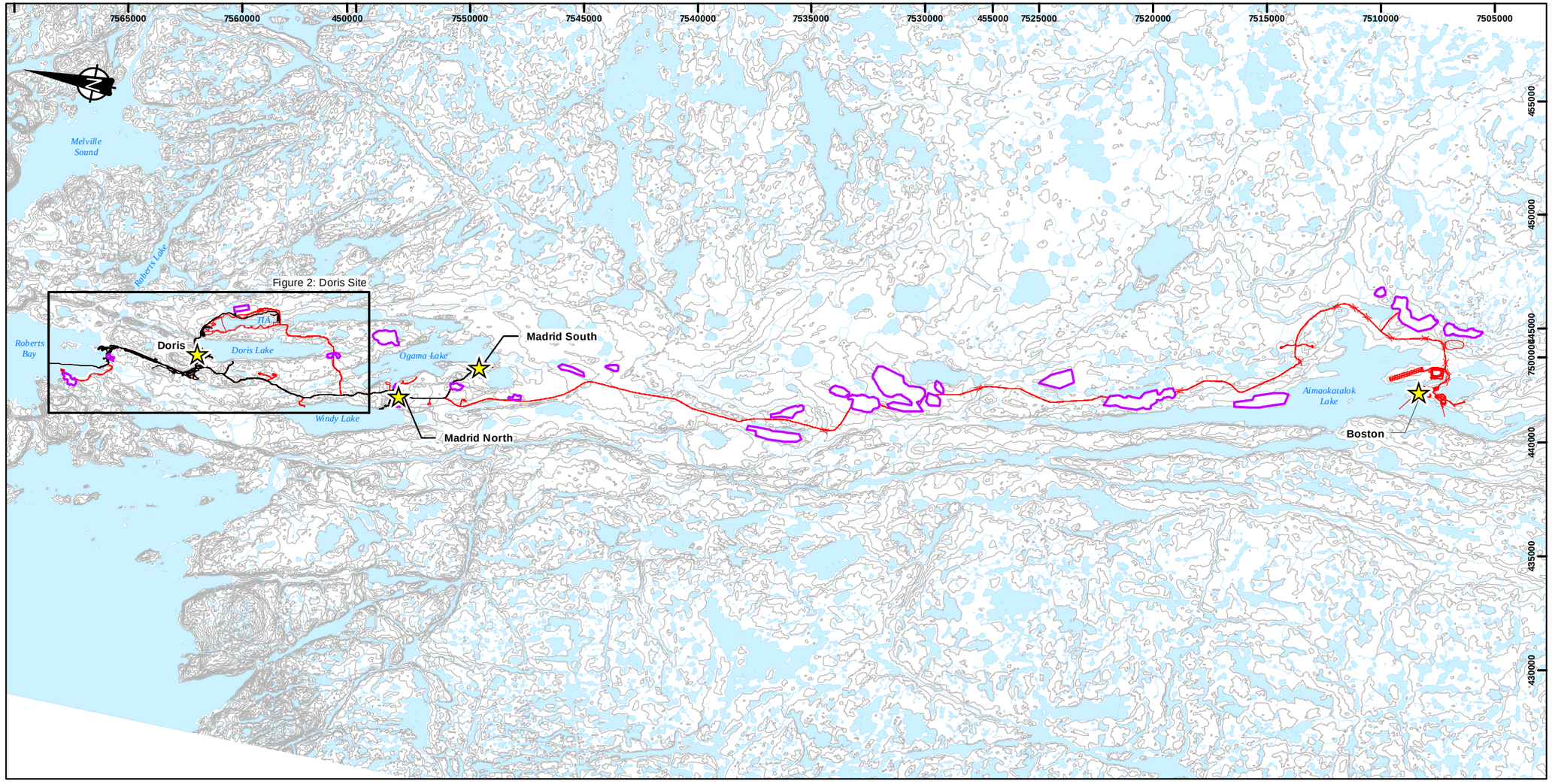
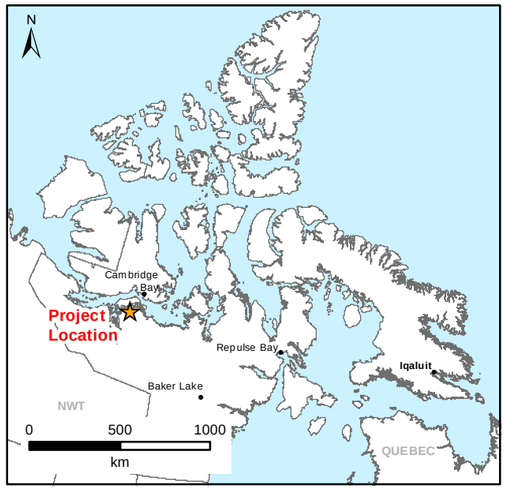
Figures





LEGEND

- Underground Mine Portal
- Existing/Permitted Infrastructure
- Proposed Infrastructure
- Contours
- Stream
- Future Quarries

NOTES

1. Contours shown at 10m intervals.
2. Coordinate System: NAD 1983 UTM Zone 13N.

REFERENCES

1. Base Topo Data: CanVec, Natural Resources Canada

0 2000 4000 6000 8000 10000
Meters

srk consulting

AGNICO EAGLE

2020 Annual Geotechnical Inspection

Project Location Map

Job No: 1CT022.038.400

Filename: 1CT022.038_Fig_1_SiteLocationMap_rev2

Doris TIA

Date:	Approved:	Figure:
Feb. 2021	PL	1

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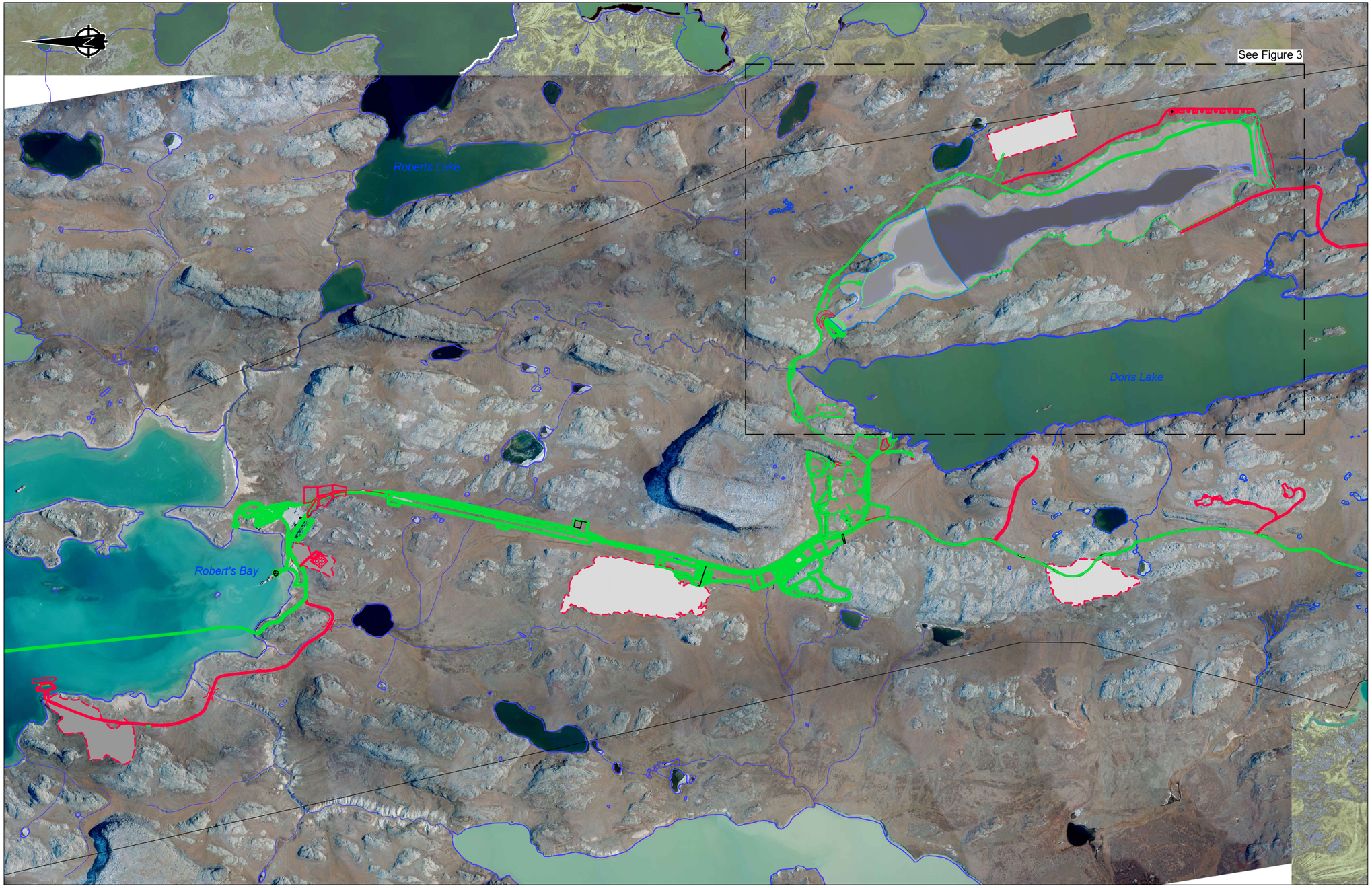

LEGEND

- As-Built Infrastructure
- Proposed Infrastructure
- Quarries

REFERENCE

NAD83 UTM Zone 13.
Aerial image captured in 2007, provided by client.

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srk consulting	AGNICO EAGLE	2020 Annual Geotechnical Inspection
SRK JOB NO.: 1CT022.038	Doris TIA	Doris Site Layout
FILE NAME: 1CT022.038 - PLM.dwg		DATE: Feb 2021 / APPROVED: PDL / FIGURE: 2

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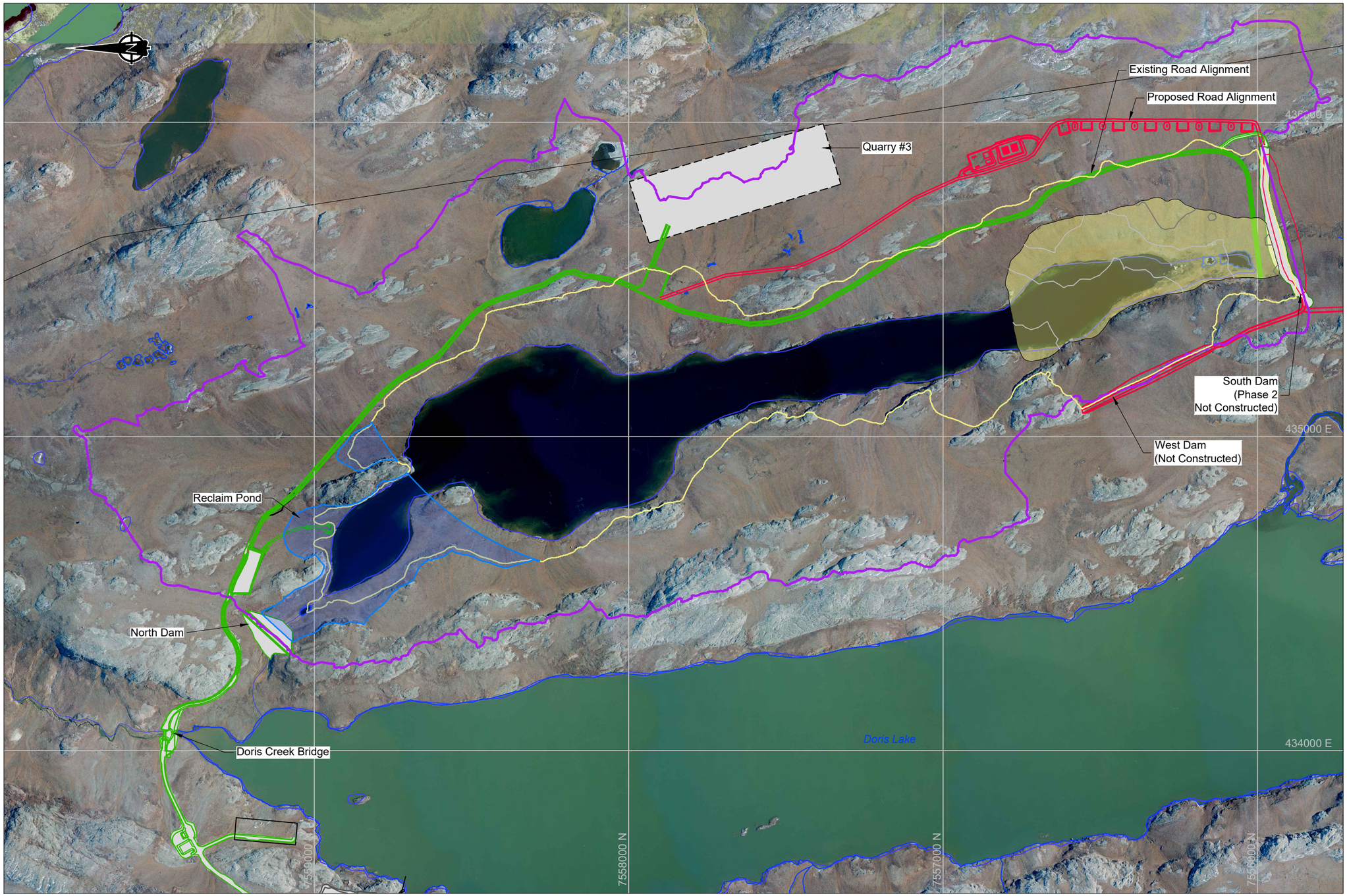


LEGEND

- Existing Infrastructure
- Proposed Road Realignment
- Ultimate Tailings Extent
- Dam / Dike
- Reclaim Pond
- Watershed Boundary
- Quarry
- 2020 Tailings Survey

REFERENCE

NAD83 UTM Zone 13.
Aerial image captured in 2007, provided by client.

0m 100 200 300 400 500

srk consulting

AGNICO EAGLE

2020 Annual Geotechnical Inspection

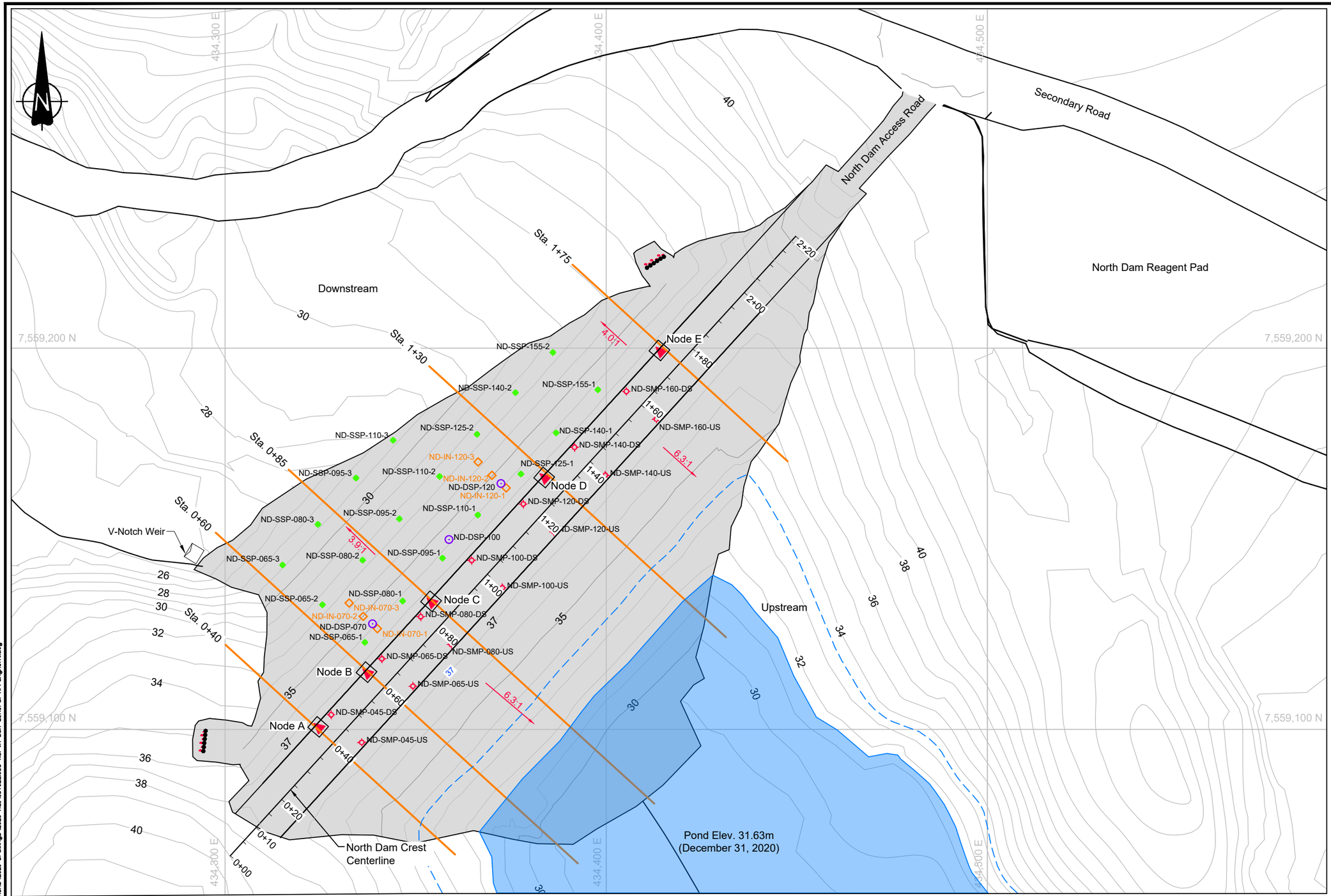
Doris TIA General Arrangement

SRK JOB NO.:	1CT022.038
FILE NAME:	1CT022.038 - Doris TIA.dwg

Doris TIA

DATE:	APPROVED:	FIGURE:
Feb. 2021	PDL	3

P:\Projects\01_SITES\Hope Bay\IACAD\2021 Drawings\2020 AG\1CT022.038 - Doris_TIA.dwg



LEGEND

- Survey Monitoring Point (Crest)
- Deep Settlement Point
- Surficial Survey Point
- Inclinometer Location
- Major Contour
- Full Supply Level (Elev. 31.63m)
- Datalogger Node
- Thermosyphon Radiator

NOTES

1. Topographic contour data was provided by the Client. As-Built contour data for the terrain model was provided by the Contractor.
2. Contours shown at 1.0m intervals.

REFERENCE

NAD83 UTM Zone 13.

0m 10 20 30 40

srk consulting

AGNICO EAGLE

Doris TIA

SRK JOB NO.: 1CT022.038

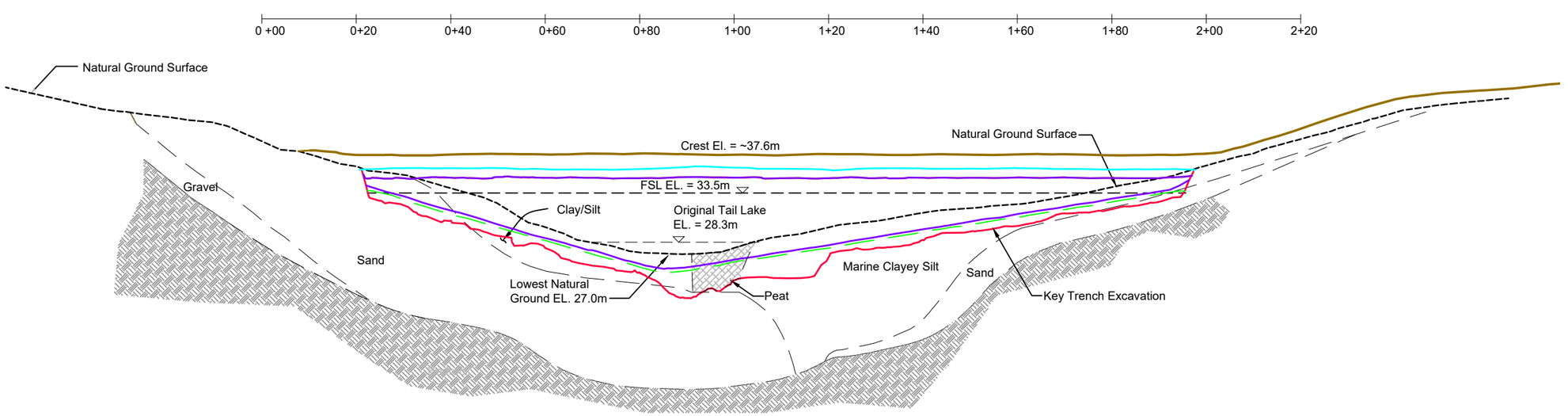
FILE NAME: 1CT022.038-North Dam General Arrangment.dwg

2020 Annual Geotechnical Inspection

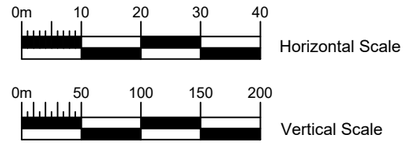
North Dam General Arrangement and Instrumentation

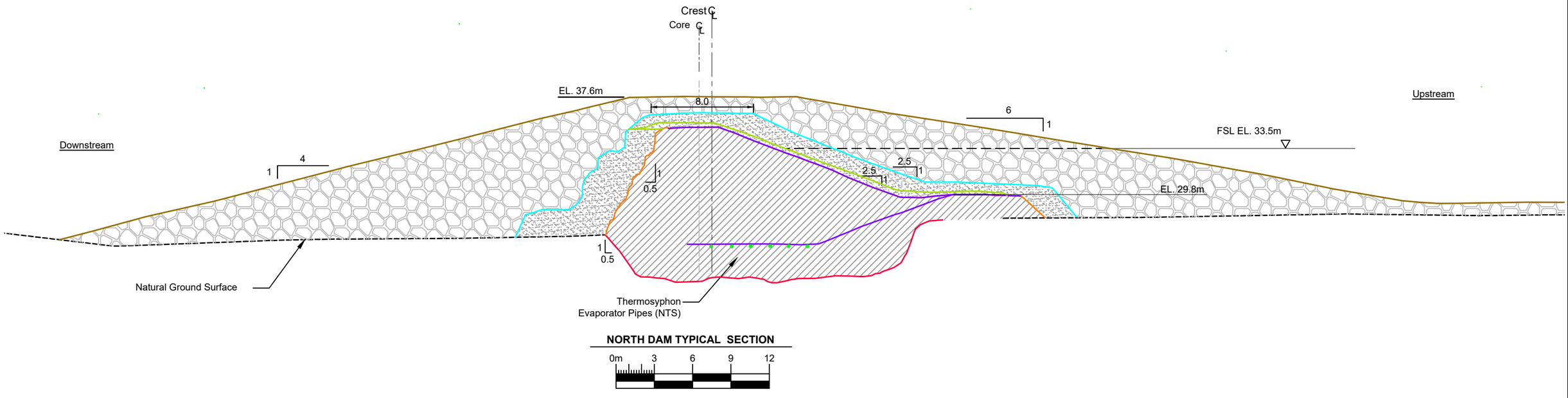
DATE: Feb. 2021 | APPROVED: PDL | FIGURE: 4

P:\Projects\01_SITES\Hope Bay\ACAD\2021 Drawings\2020 AGI\1CT022.038-North Dam General Arrangment.dwg



SECTION ALONG
NORTH DAM CREST CENTERLINE





NORTH DAM TYPICAL SECTION

LEGEND

- Natural Ground
- Stratigraphic Boundary
- Core Material
- Transition Material
- Run of Quarry (ROQ)
- Surfacing Material
- Bedrock
- Peat
- Thermosyphon Evaporator Pipe (NTS)
- Geosynthetic Clay Liner (GCL)
- Core Material
- Key Trench
- GCL Cover Material
- Transition Material
- ROQ Material
- Thermosyphon Evaporator Pipes
- Thermosyphon Evaporator Pipes

NOTES

1. The subsurface geology has been extrapolated from a series of geotechnical investigations consisting of drill holes, auger holes and shallow test pits. Bedrock contact and geological unit contacts are therefore likely to vary somewhat.

P:\Projects\01_SITES\Hope Bay\LACAD\2021 Drawings\2020 AG\1CT022.038-North Dam Typical Sections.dwg

srk consulting

SRK JOB NO.: 1CT022.038
FILE NAME: 1CT022.038-North Dam Typical Sections.dwg

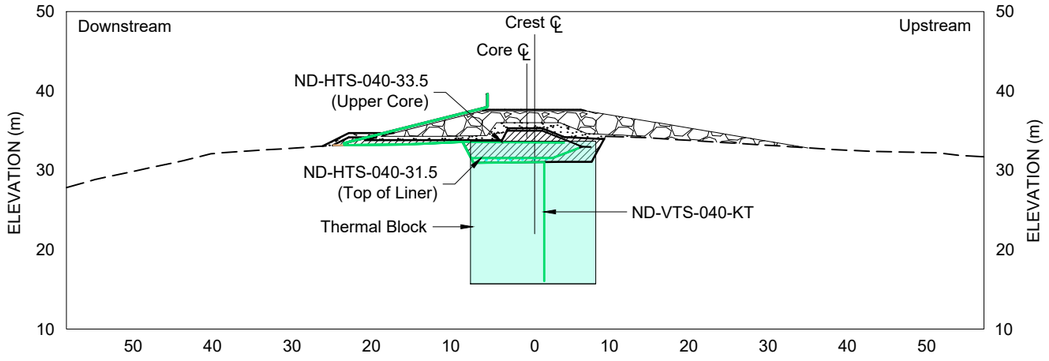
AGNICO EAGLE

Doris TIA

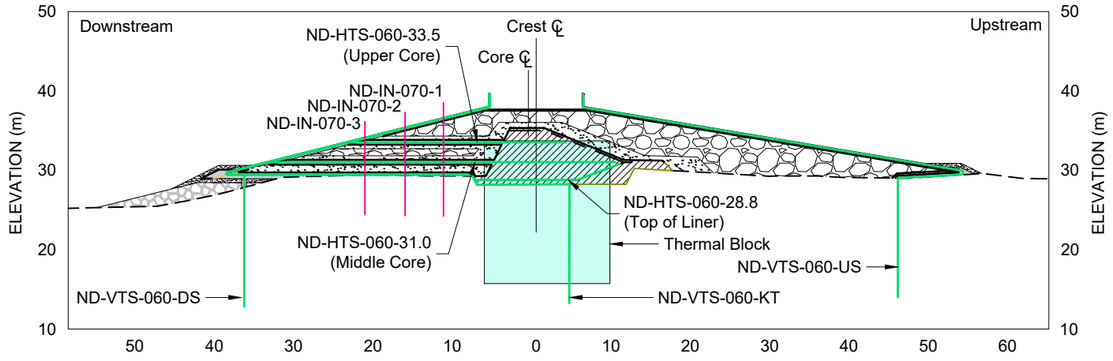
2020 Annual Geotechnical Inspection

North Dam Foundation Conditions and Typical As-Built Section

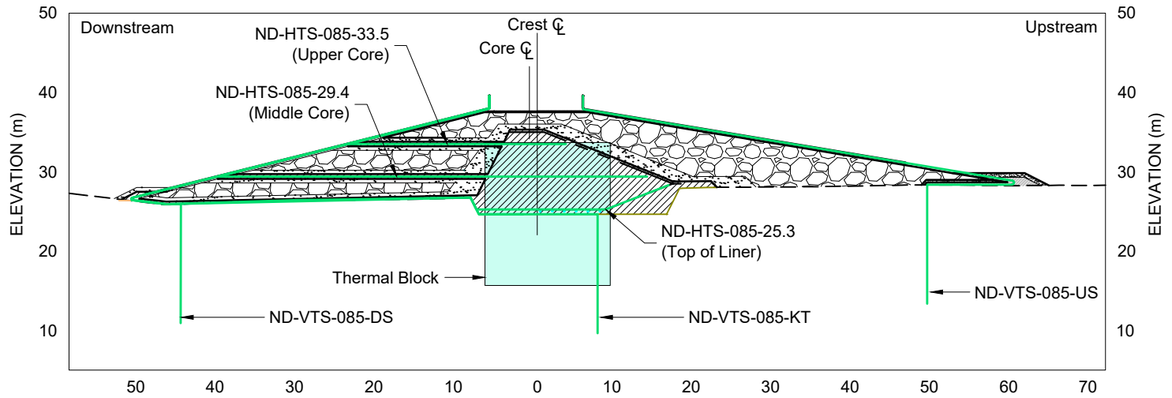
DATE:	APPROVED:	FIGURE:
Feb. 2021	PDL	5



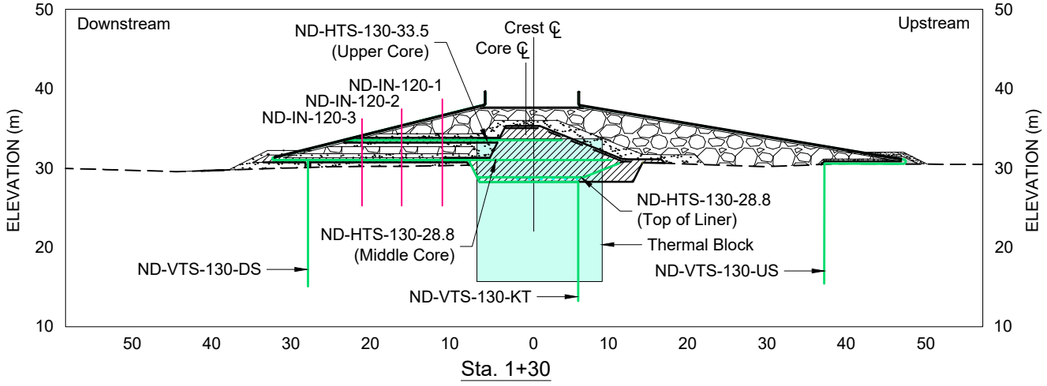
Sta. 0+40



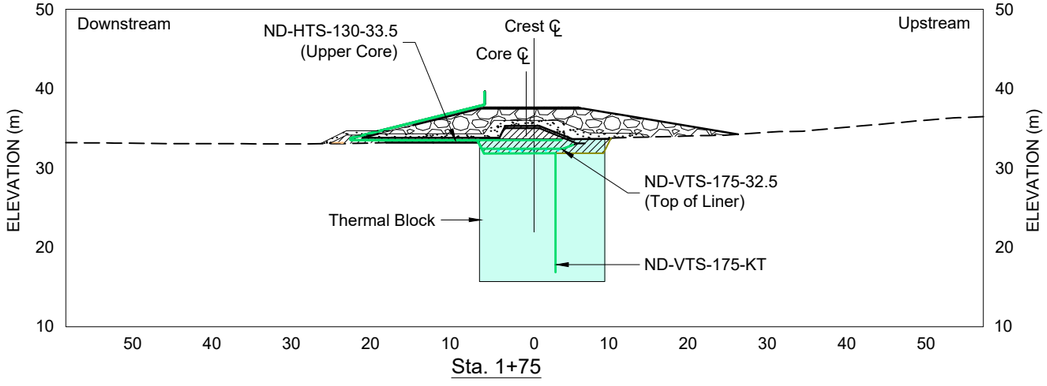
Sta. 0+60



Sta. 0+85



Sta. 1+30



Sta. 1+75

LEGEND

- Ground Temperature Cable
- Core Material
- Thermal Block
- Transition Material
- Run of Quarry (ROQ) Material
- Surfacing Material

NOTES

1. Topographic and as-built contour data from the terrain model was provided by the Client (TMAC).
2. All units shown are in meters unless otherwise stated.

0m 5 10 15 20 25 30

srk consulting

AGNICO EAGLE

Doris TIA

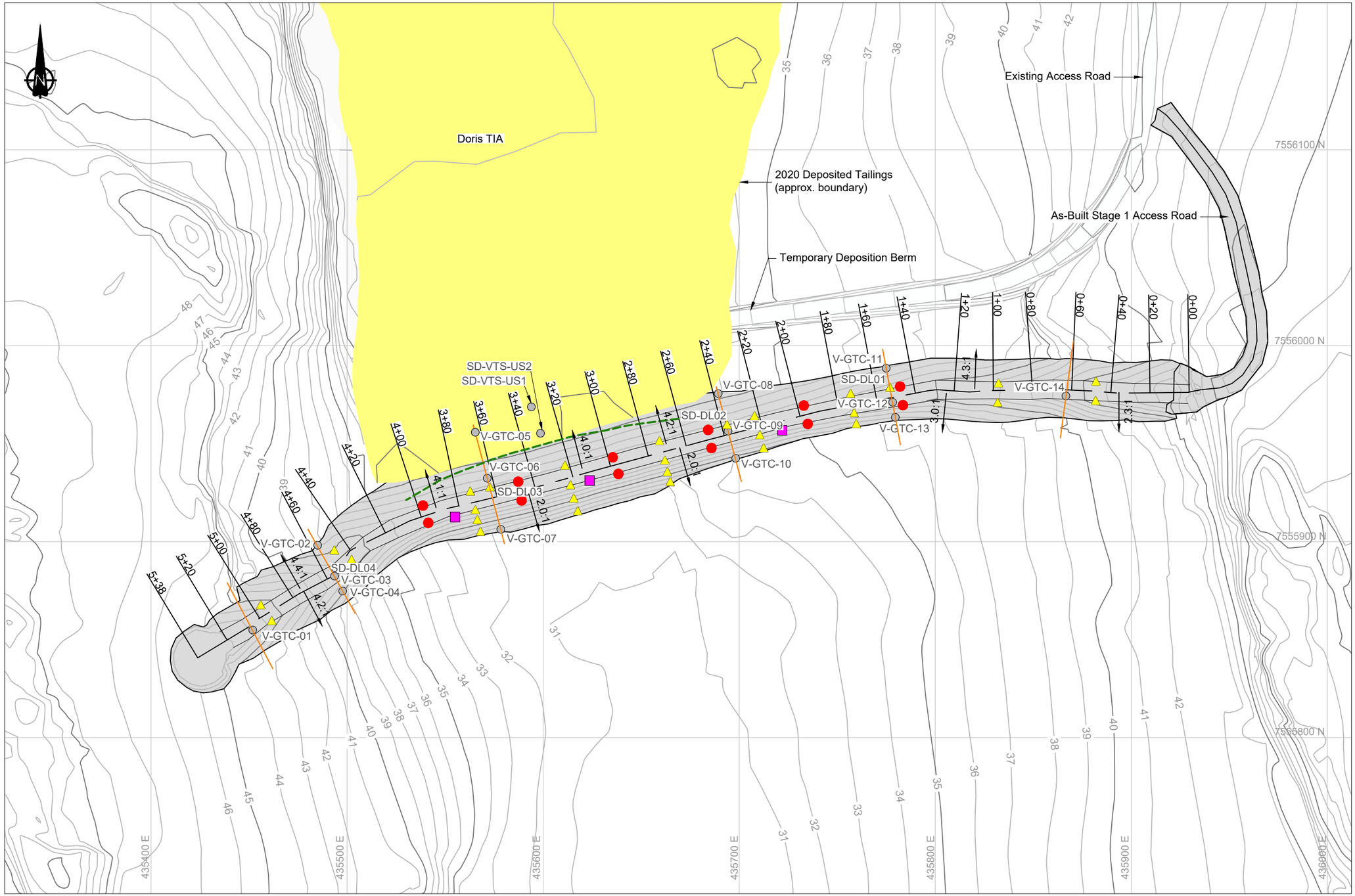
2020 Annual Geotechnical Inspection

North Dam Instrumentation
Cross Sections

SRK JOB NO.:	1CT022.038
FILE NAME:	1CT022.038 - Sections.dwg

DATE:	APPROVED:	FIGURE:
Feb. 2021	PDL	6

P:\Projects\01_SITES\Hope Bay\ACAD\2021 Drawings\2020 AGI\1CT022.038 - Sections.dwg



LEGEND

- Survey Monitoring Point (Crest)
- Surficial Survey Point
- Deep Settlement Point
- Datalogger Location
- Vertical Ground Temperature Cable
- Horizontal Key Trench Cable (SD-HTS-B1-KT)

NOTES

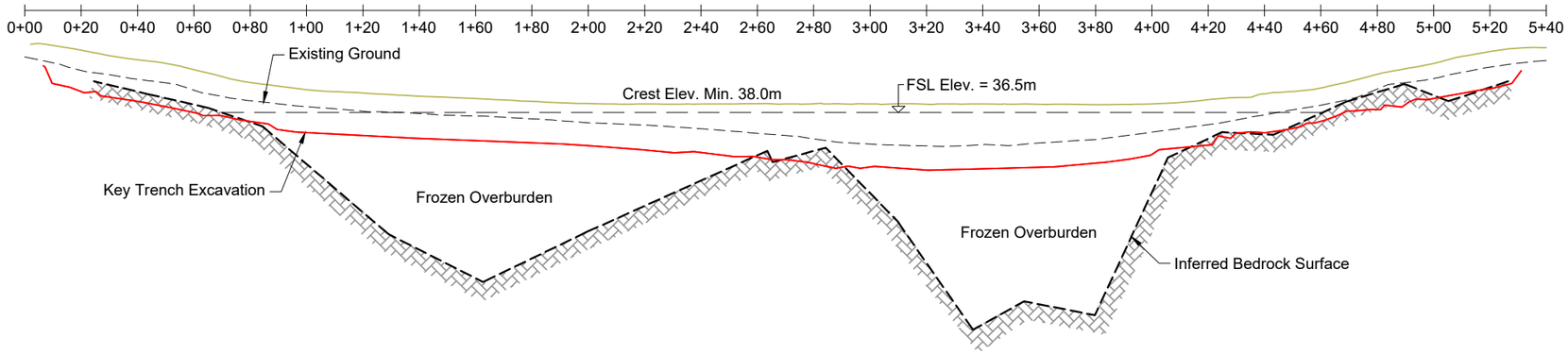
1. Topographic and As-built data was provided by the Client
2. Contours shown at 1.0m interval.
3. All units shown are in meters unless otherwise stated.

REFERENCES

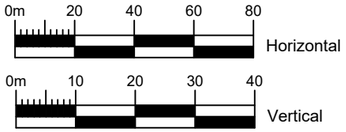
NAD83 UTM Zone 13.

srk consulting	AGNICO EAGLE	2020 Annual Geotechnical Inspection
SRK JOB NO.: 1CT022.038	Doris TIA	South Dam General Arrangement and Instrumentation
FILE NAME: 1CT022.038 - SD Instrumentation Plan.dwg		DATE: Feb. 2021 / APPROVED: PDL / FIGURE: 7

P:\Projects\01_SITES\Hope Bay\ACAD\2021 Drawings\2020 AGI\1CT022.038 - SD Instrumentation Plan.dwg



SECTION ALONG
SOUTH DAM CREST CENTERLINE

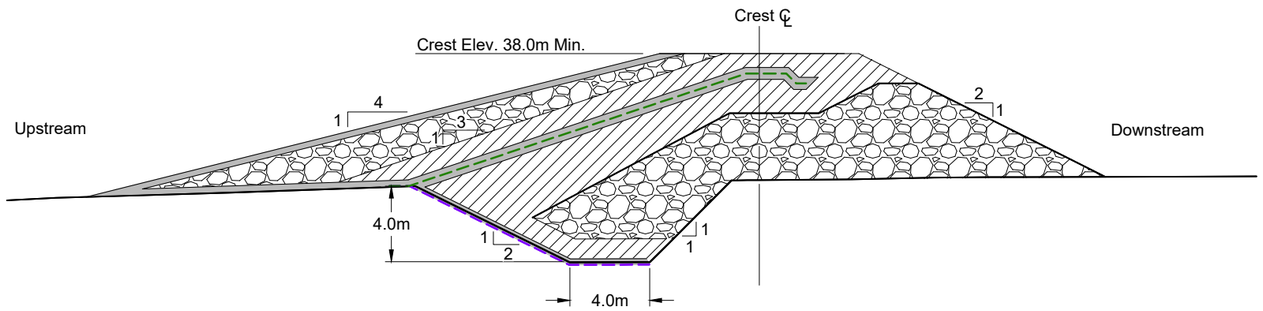


LEGEND

- Thermistor Bead Location
- Lower GCL Liner
- Upper GCL Liner
- Bedding Material
- Transition Material
- Run of Quarry Backfill

NOTES

1. Topographic and as-built contour data from the terrain model was provided by the Client (TMAC).
2. All units shown are in meters unless otherwise stated.



SOUTH DAM TYPICAL SECTION

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srk consulting

SRK JOB NO.: 1CT022.038

FILE NAME: 1CT022.038 - SD Instrumentation Plan.dwg

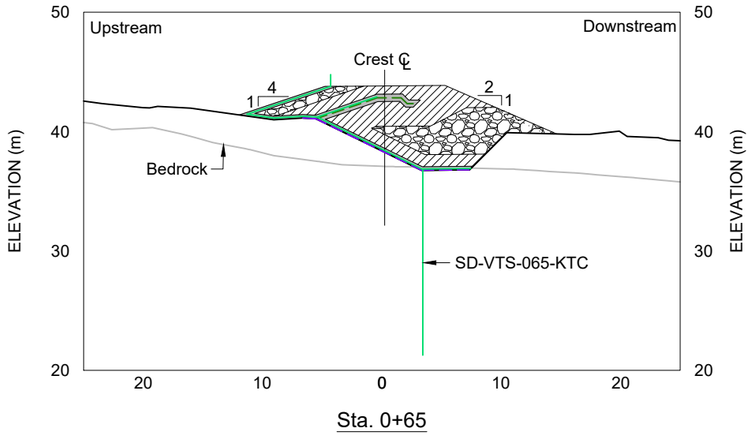
AGNICO EAGLE

Doris TIA

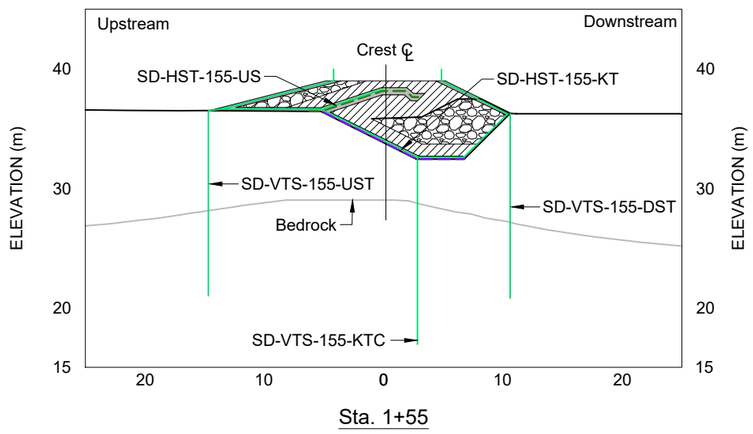
2020 Annual Geotechnical Inspection

South Dam Foundation Conditions and Typical As-Built Section

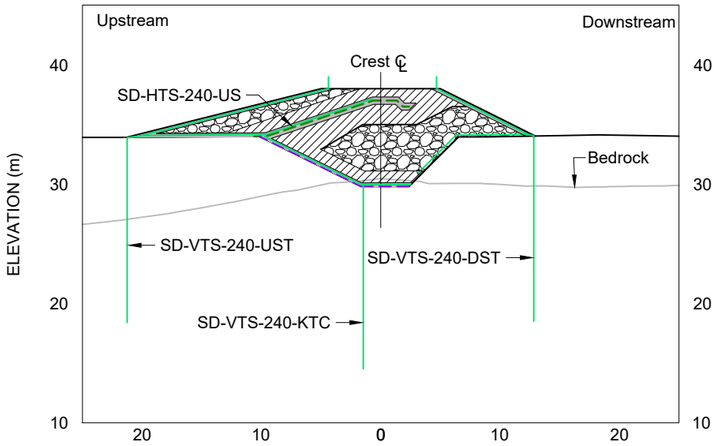
DATE:	APPROVED:	FIGURE:
Feb. 2021	PDL	8



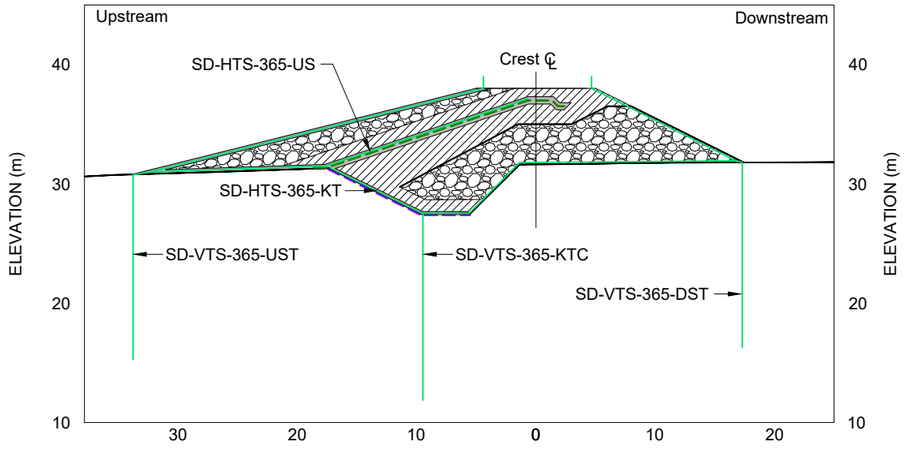
Sta. 0+65



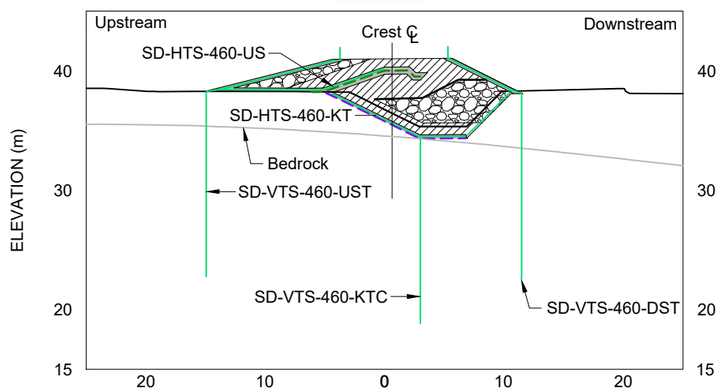
Sta. 1+55



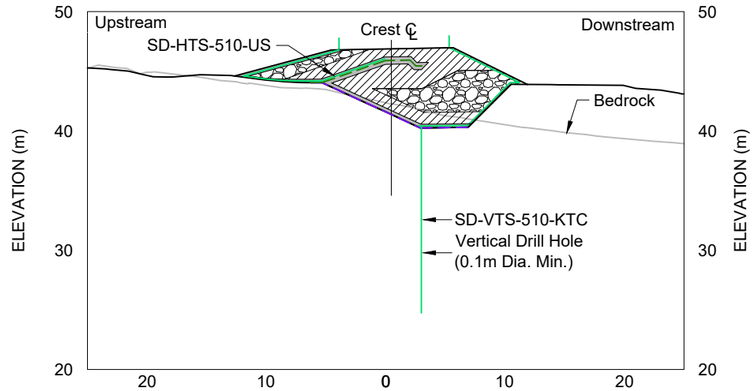
Sta. 2+40



Sta. 3+65



Sta. 4+60



Sta. 5+10

LEGEND

- Ground Temperature Cable
- Lower GCL Liner
- Upper GCL Liner
- Bedding Material
- Transition Material
- Run of Quarry Backfill

NOTES

1. Topographic and as-built contour data from the terrain model was provided by the Client (TMAC).
2. All units shown are in meters unless otherwise stated.

srk consulting

SRK JOB NO.: 1CT022.038

FILE NAME: 1CT022.038 - SD Instrumentation Plan.dwg

AGNICO EAGLE

Doris TIA

2020 Annual Geotechnical Inspection

South Dam Instrumentation
Cross Sections

DATE:	APPROVED:	FIGURE:
Feb. 2021	PDL	9

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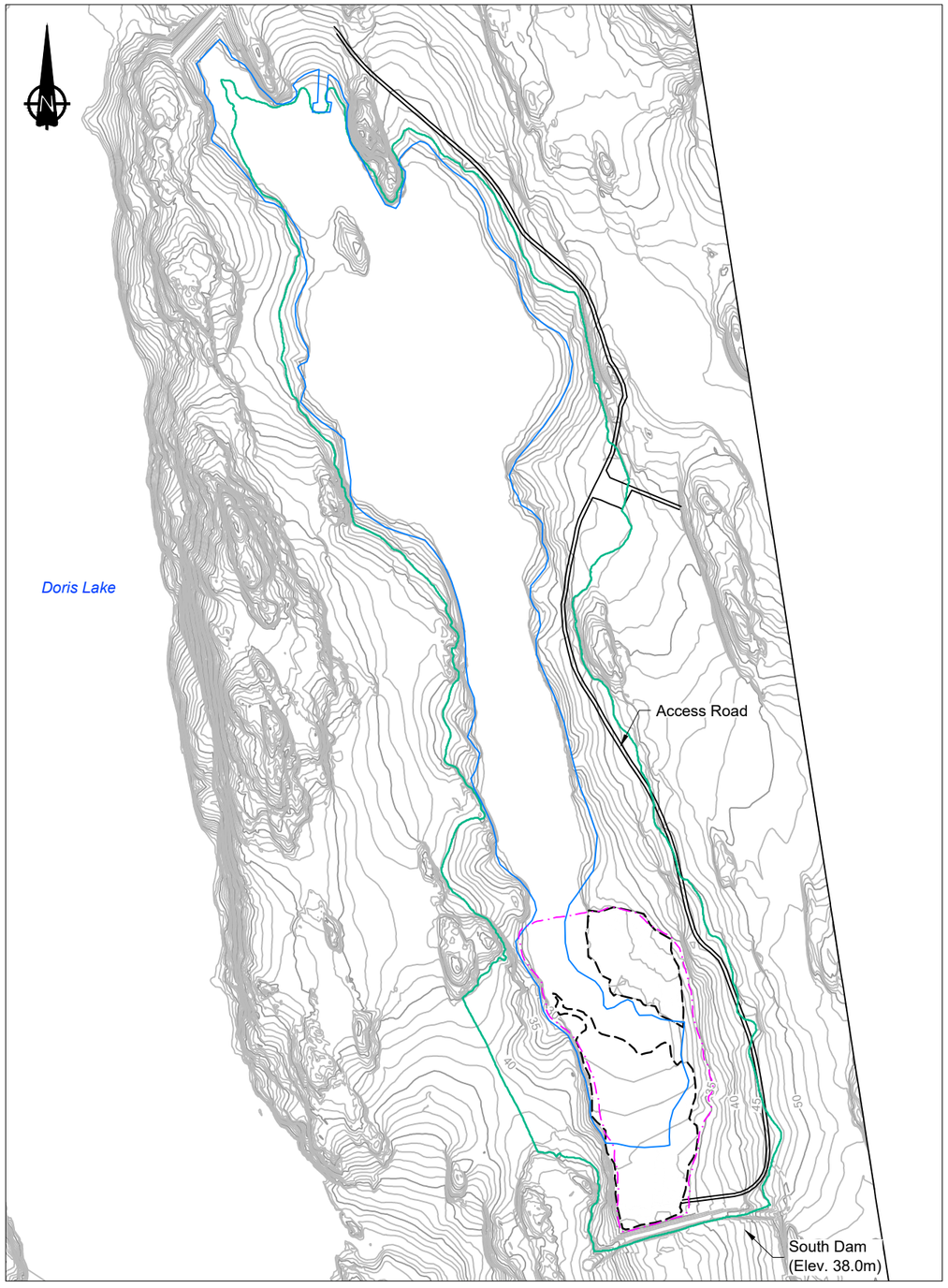
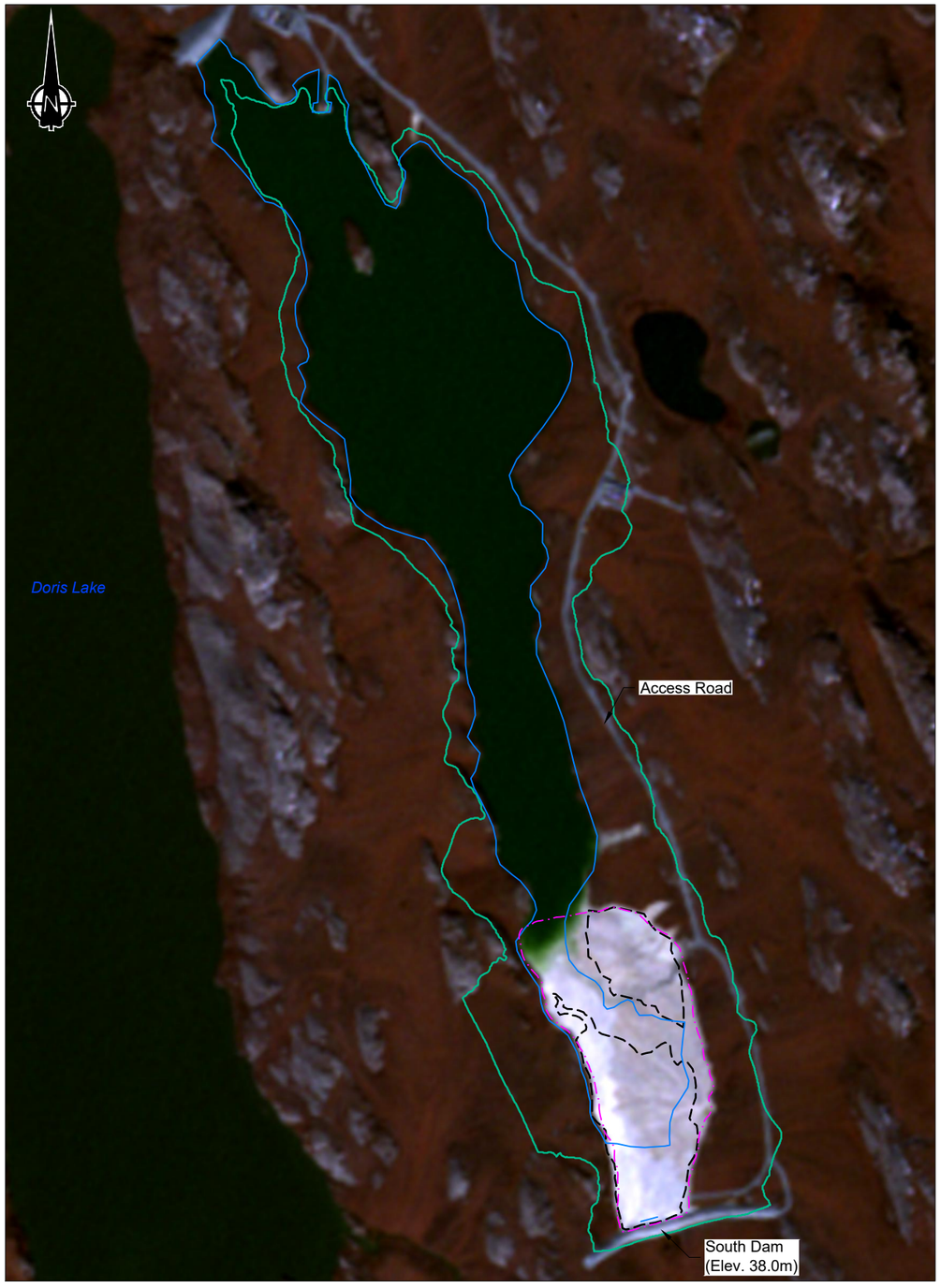




LEGEND

- Major Contour (5m)
- Minor Contour (1m)
- 2020 Surveyed Tailings Limit
- Ultimate Tailings Extent
- 2019 Surveyed Tailings Beach (See Reference 2)

NOTES

1. Topographic and As-built data was provided by the client.
2. Contours shown at 1.0m intervals.
3. All units shown are in meters unless otherwise stated.

REFERENCE

1. Sentinel 2 Satellite imagery captured August 11, 2019.
2. 2019 tailings surveys dated December 22 and 25, 2019.
3. 2020 tailings survey dated December 15-28, 2020.

0m 50 100 150 200

srk consulting

AGNICO EAGLE

SRK JOB NO.: 1CT022.038

FILE NAME: 1CT022.038 - 2020 Deposition History.dwg

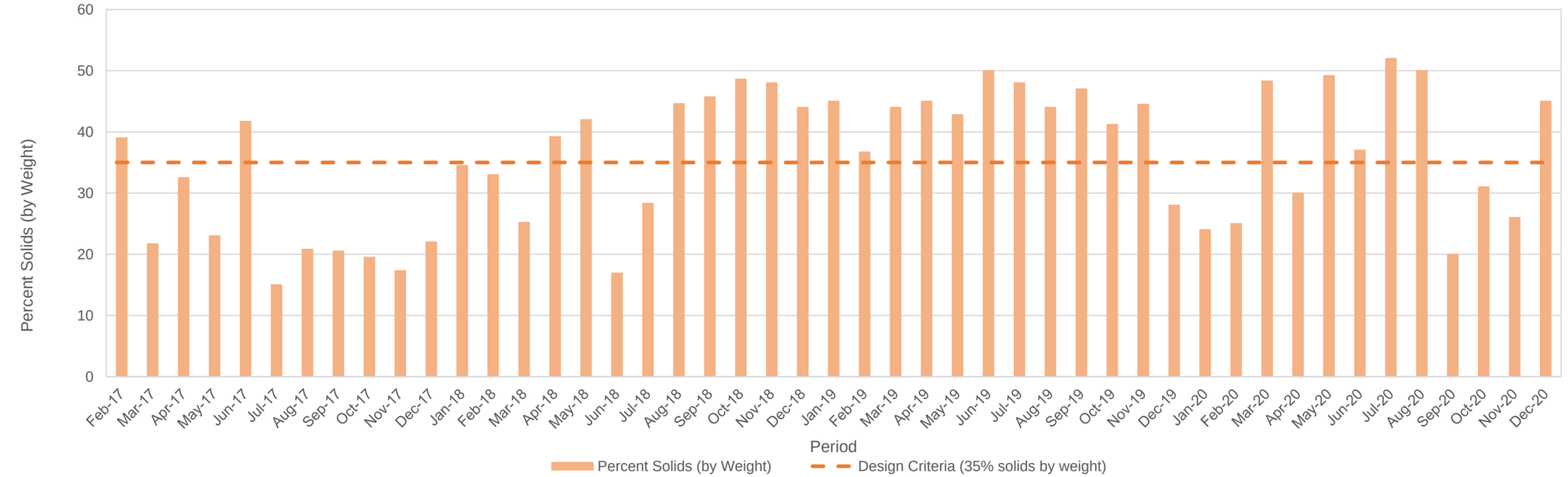
Doris TIA

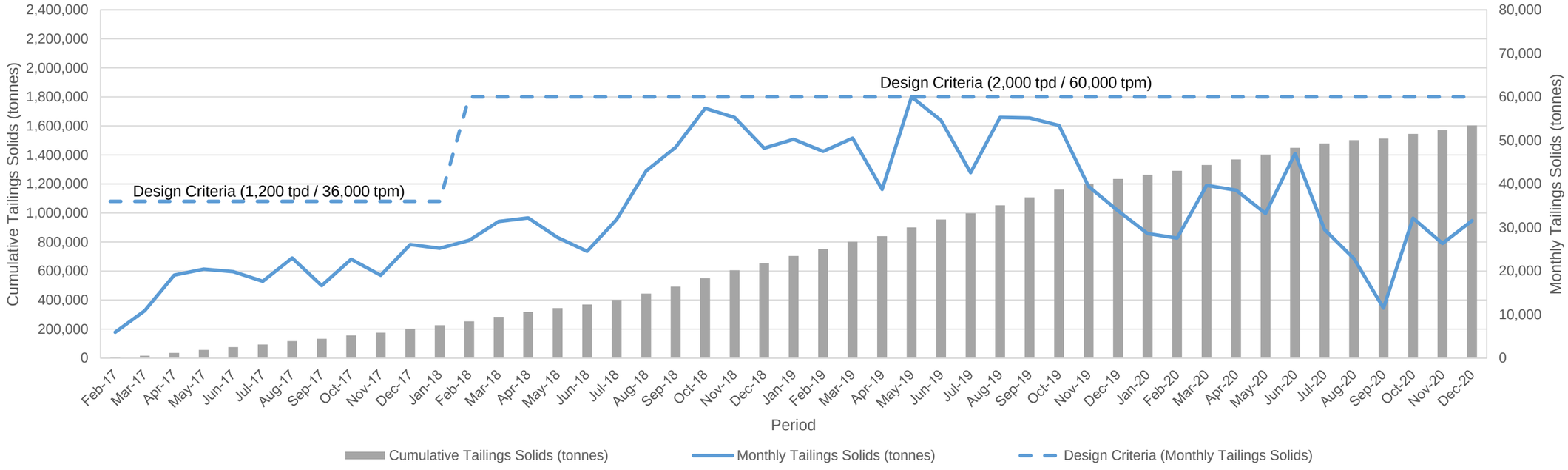
2020 Annual Geotechnical Inspection

Actual Tailings Deposition History

DATE: Feb. 2021 | APPROVED: PDL | FIGURE: 10

P:\Projects\01_SITES\Hope Bay\ACAD\2021 Drawings\2020 AGI\1CT022.038 - 2020 Deposition History.dwg





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AGNICO EAGLE

2020 Annual Geotechnical Inspection

Actual Tailings Deposition Values (Design / Actual)

Job No: 1CT022.057

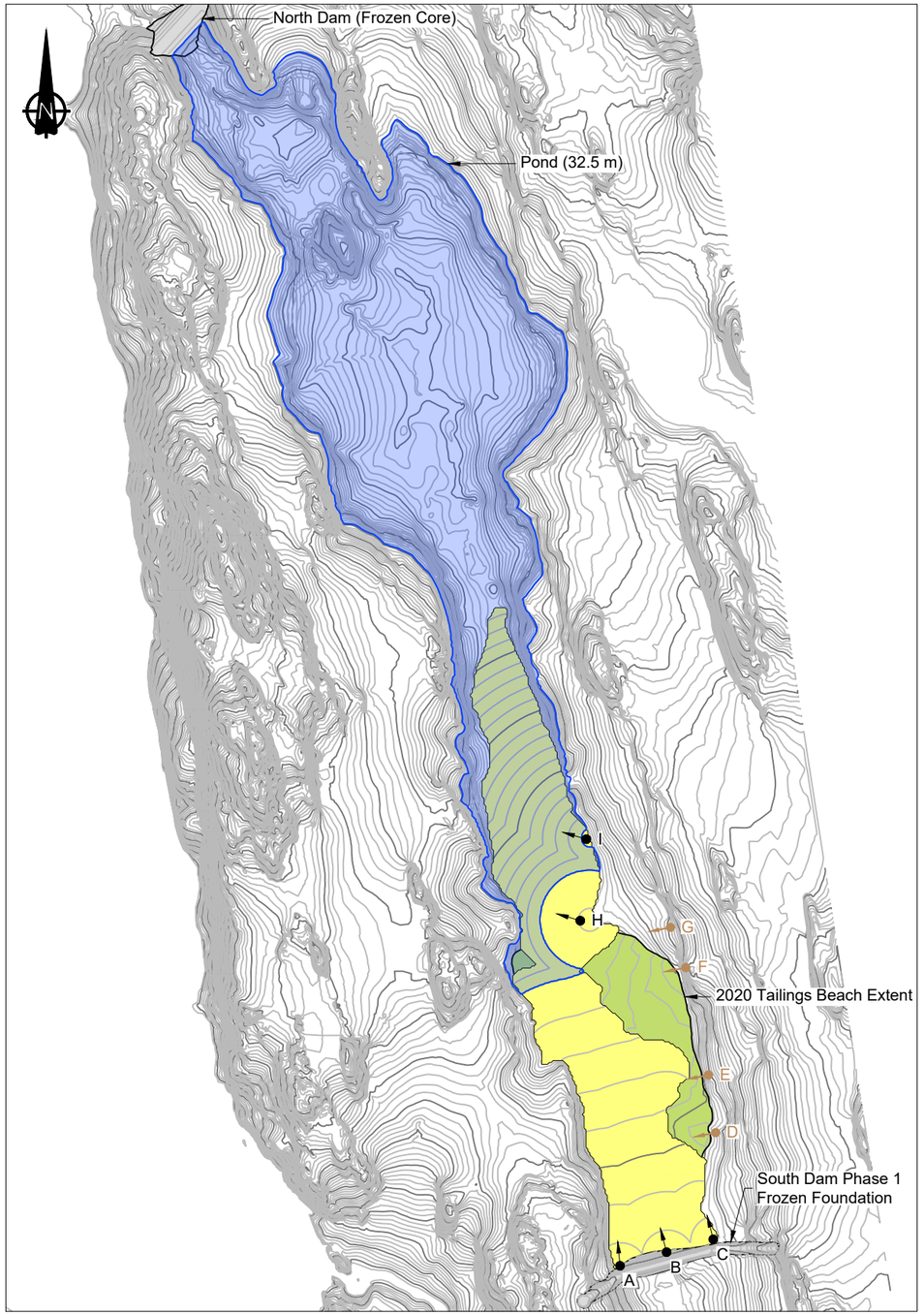
Filename: 11_TailingsDepositionHistory.pptx

DORIS TIA

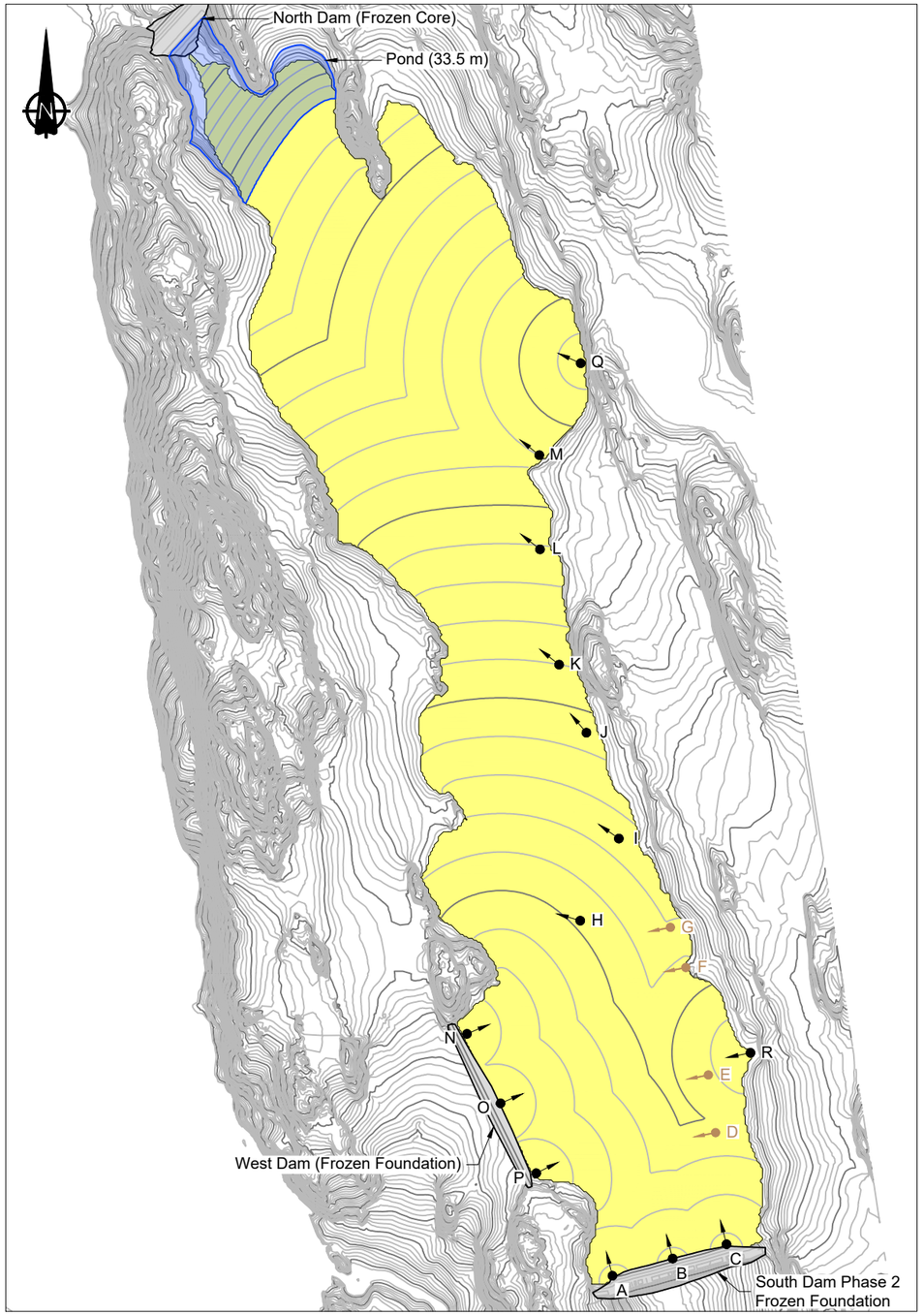
Date: Feb. 2021

Approved: PDL

Figure: **11**



Projected Tailings Deposition 2021 - 730,000 tonnes of Tailings Deposited (after Dec 2020)



Projected Tailings Deposition LOM - 18,240,000 tonnes of Tailings Deposited (after Dec 2020)

LEGEND

- Old Spigot Location
- Modeled Spigot Location
- Pond
- Dam Footprint
- Deposited Tailings
- Tailings Extent (2020)

NOTES

1. Scenario 1 production rates are assumed to be 2,000 t/day from 2021 to 2023, and 4,000 t/day from 2024 and onward. Sub-aerial and sub-aqueous slopes are assumed at 0.5% and 1.5%, respectively.
2. Deposition model scenario is based on the bathymetry survey completed in 2019 and tailings beach survey completed in December 2020 by TMAC. Sub-aqueous portion of 2020 tailings is assumed to be 1.5%.
3. A deposited tailings dry density of 1.3 t/m³ was used.
4. Topographic data and surveys were provided by the client.
5. Contours are shown every 0.5 m.

REFERENCE

1. NAD83 UTM Zone 13.
2. 2020 tailings survey dated December 2020.
3. Bathymetry survey dated August 2019.

0m 100 200 300 400 500 600

srk consulting

AGNICO EAGLE

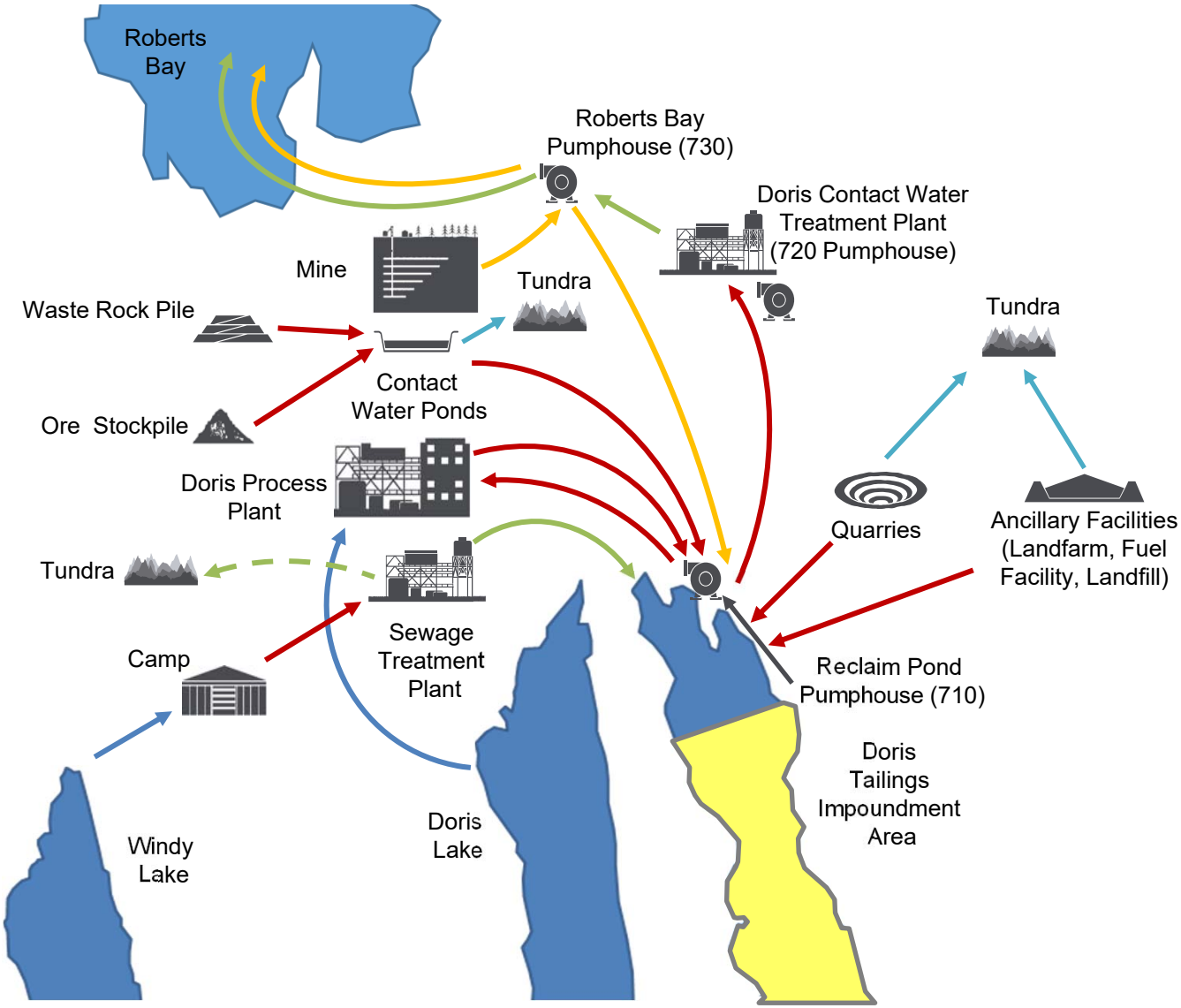
2020 Annual Geotechnical Inspection

Planned Tailings Deposition

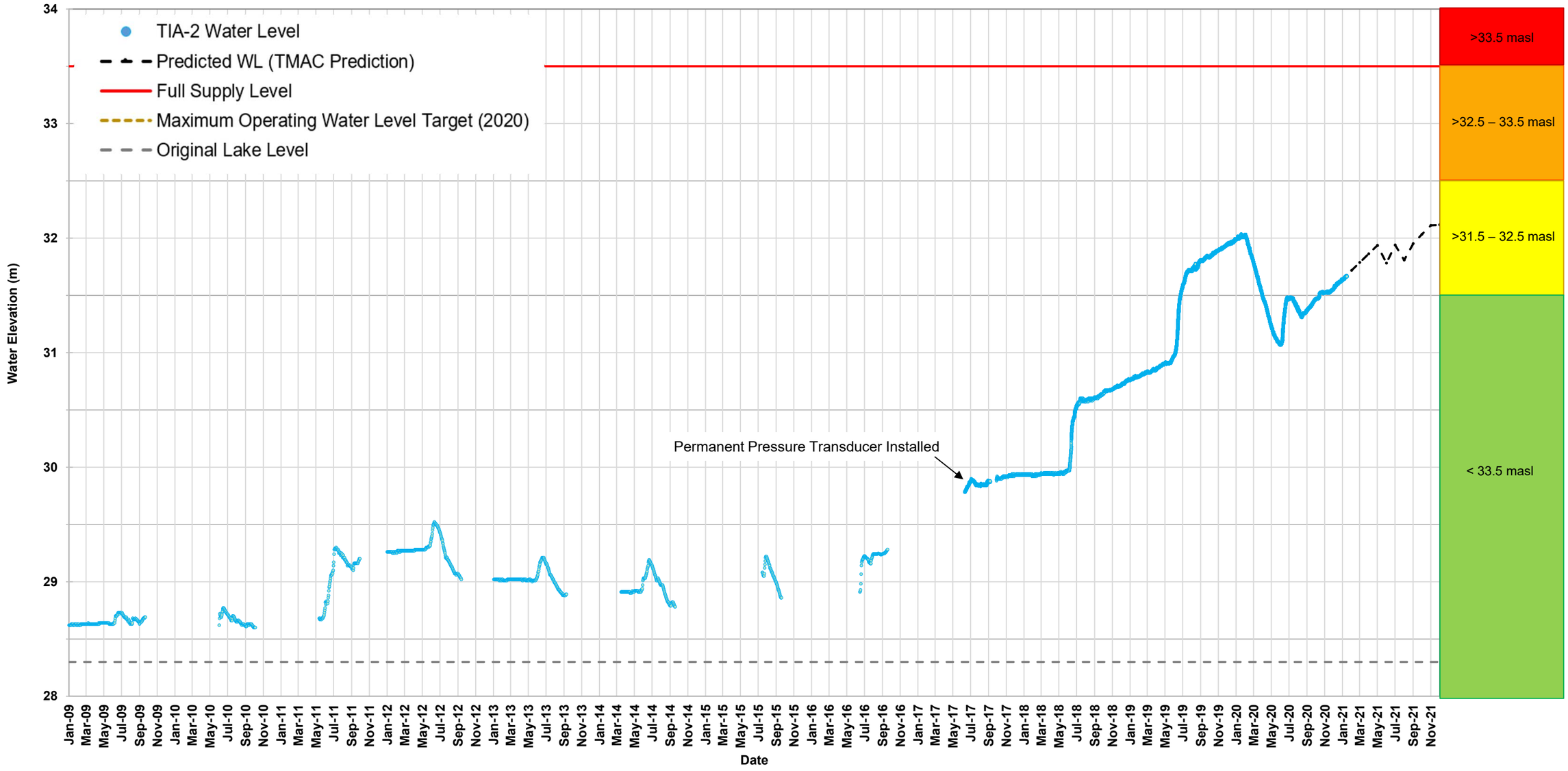
SRK JOB NO.:	1CT022.057
FILE NAME:	1CT022.057 - 2021 Tailings Deposition.dwg
	DORIS TIA

DATE:	APPROVED:	FIGURE:
March 2021	PDL	12

Z:\01_SITES\Hope Bay\ACAD\2021 Drawings\Deposition Plan Update\1CT022.057 - 2021 Tailings Deposition.dwg

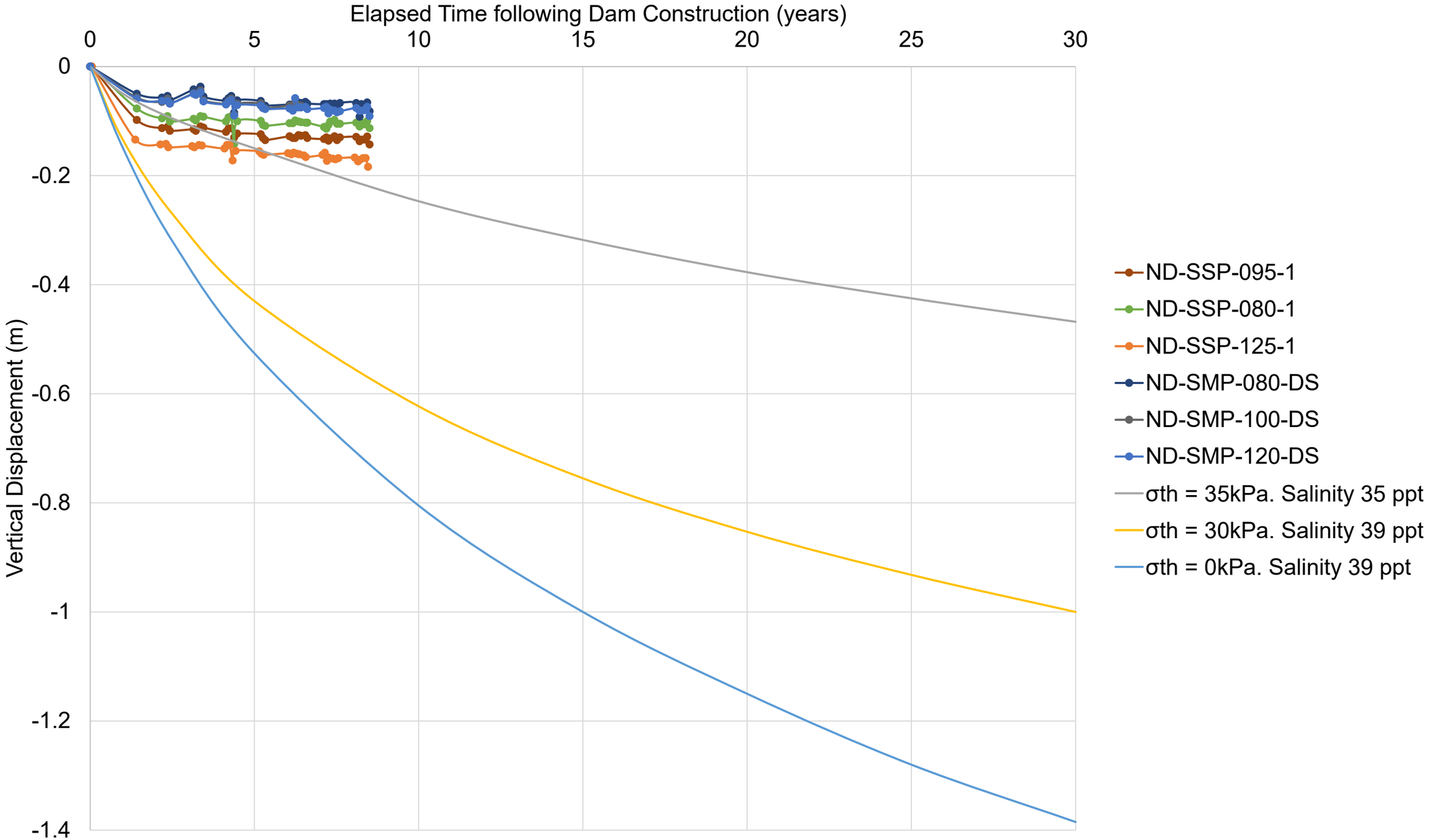


srk consulting	AGNICO EAGLE	2020 Annual Geotechnical Inspection
Job No: 1CT022.057 Filename: DorisTIA_WaterMgmtSchematic_1CT022.057.pptx	Doris TIA	**Schematic of TIA Water Management**
		Date: Feb. 2021 / Approved: PDL / Figure: 13



Notes:
1) The predicted water level presented here is based on the December 2020 detailed operational TIA water balance as discussed in the report. The forward-looking projections of the operational TIA water and load balance tool are speculative and for planning purposes only

srk consulting	AGNICO EAGLE	2020 Annual Geotechnical Inspection
		Actual and Predicted Water Level in TIA
Job No: 1CT022.057 Filename: 14_ActualsPredWaterLevel_20210228.pptx	Doris TIA	Date: Feb. 2021 | Approved: PDL | Figure: **14**



srk consulting	AGNICO EAGLE	2020 Annual Geotechnical Inspection
		Measured vs. Modelled Vertical Displacement at Station 1+20 (North Dam)
Job No: 1CT022.057 Filename: 15_CreepDisp_20210302.pptx	Doris TIA	Date: Mar 2021 · Approved: PL · Figure: **15**

Photo Logs

1

2

3

Photos:
Top: Aerial photos of the North Dam (2019 left, and 2020 right image)
Photo 1: View of western shoreline from the upstream face.
Photo 2: View of the upstream face of the dam and pumping pad, looking east.
Photo 3: View looking East along the dam crest.

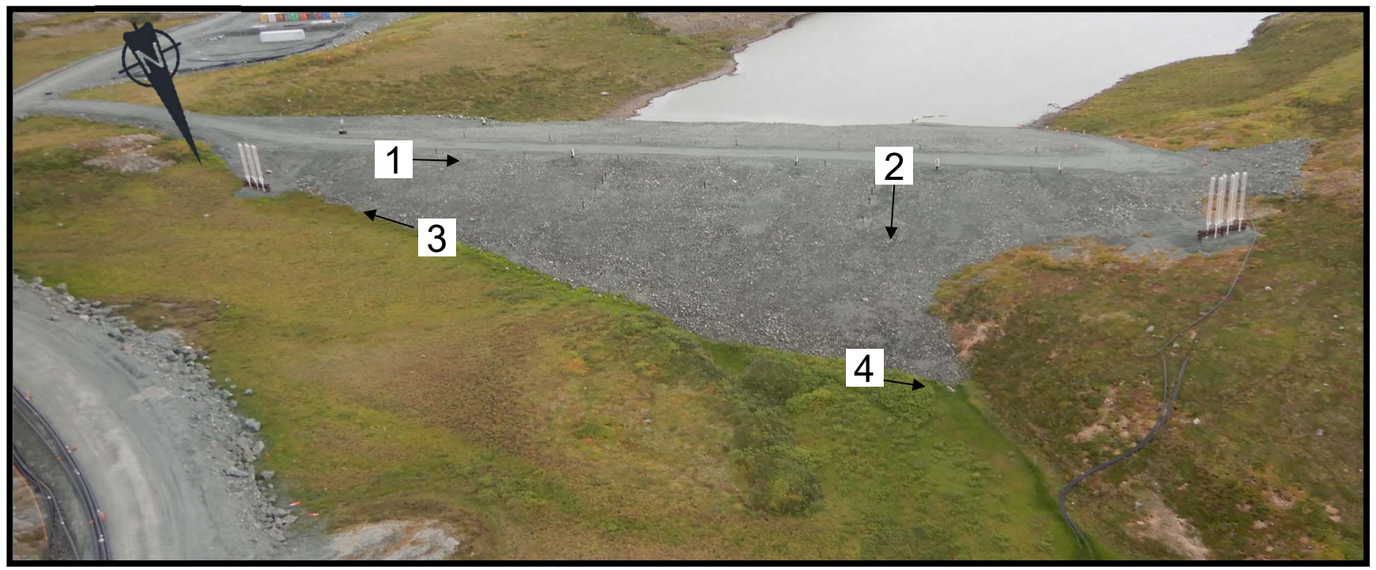
Note:
All photos from 2020 unless specifically noted

srk consulting	MAC RESOURCES	2020 Annual Geotechnical Inspection
		North Dam Upstream Face
Job No: 1CT022.057 Filename: 2020_TIA_AGI_PhotoLog_Rev01_PL.pptx	Doris TIA	Date: March 2021 / Approved: PL / JK / Photolog: **1**

1

2

3



4

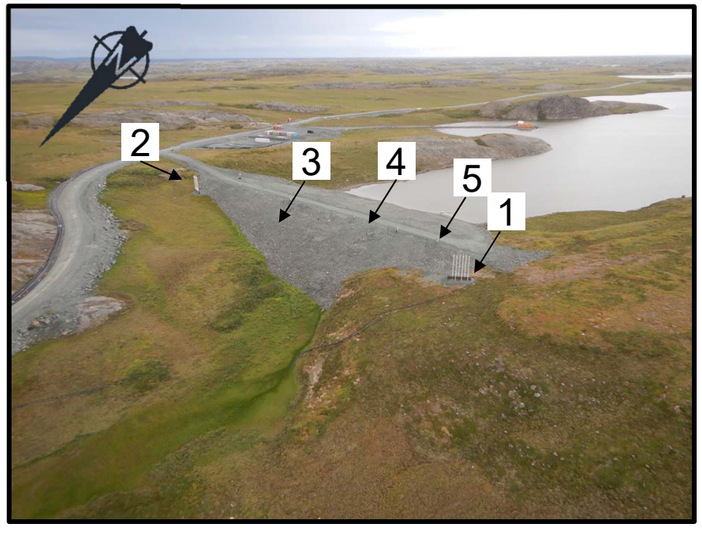
Photos:
Photo 1: View of the North Dam, looking west along the downstream dam face
Photo 2: View of the downstream dam face and primary drainage leading away from the downstream toe of North Dam. Inclinometer monuments are visible in the foreground.
Photo 3: Close-up view of surficial survey monitoring point near the toe of the downstream shell.
Photo 4: Close-up of the V-notch weir installed at the downstream toe
Middle: Aerial photo of the North Dam

srk consulting	TMAC RESOURCES	2020 Annual Geotechnical Inspection
		North Dam Downstream Face
Job No: 1CT022.057 Filename: 2020_TIA_AGI_PhotoLog_Rev01_PL.pptx	Doris TIA	Date: March 2021 / Approved: PL / JK / Photolog: **2**

1

2

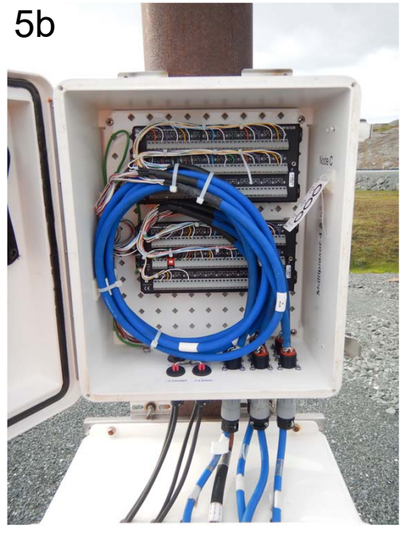
3



4

5a

5b



Photos:
Photo 1: View of South thermosyphon risers and radiators
Photo 2: View of the North thermosyphon radiators and risers
Photo 3: View of deep settlement points on the downstream shell
Photo 4: View inside the monument protecting one of the crest settlement monitoring points
Photo 5a and 5b: Example of ground temperature cable datalogger housing and wiring.
Bottom Left: Overview photo (south-southwest view) of North Dam. Photo locations shown on overview.

srk consulting	TMAC RESOURCES	2020 Annual Geotechnical Inspection
		North Dam Instrumentation and Thermosyphons
Job No: 1CT022.057 Filename: 2020_TIA_AGI_PhotoLog_Rev01_PL.pptx	Doris TIA	Date: March 2021 / Approved: PL / JK / Photolog: **3**

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Photos:
Photo 1: Aerial photo of the South Dam, looking north-northeast
Photo 2: Aerial photo of the East central tailings beach, looking west
Photo 3: Aerial photo of the South Dam, looking east
Photo 4: The upstream face of the South Dam, looking east, light colored dust on the downstream face appears to be tailings.
Photo 5: The downstream face of the South Dam, looking west, concentrated deposits of tailings (lumps) are visible in the foreground
Photo 6: Active tailings deposition off the South Dam crest (Spigot B active).

srk consulting	TMAC RESOURCES	2020 Annual Geotechnical Inspection
		South Dam Inspection
Job No: 1CT022.057 Filename: 2020_TIA_AGI_PhotoLog_Rev01_PL.pptx	Doris TIA	Date: March 2021 / Approved: PL / JK / Photolog: **4**

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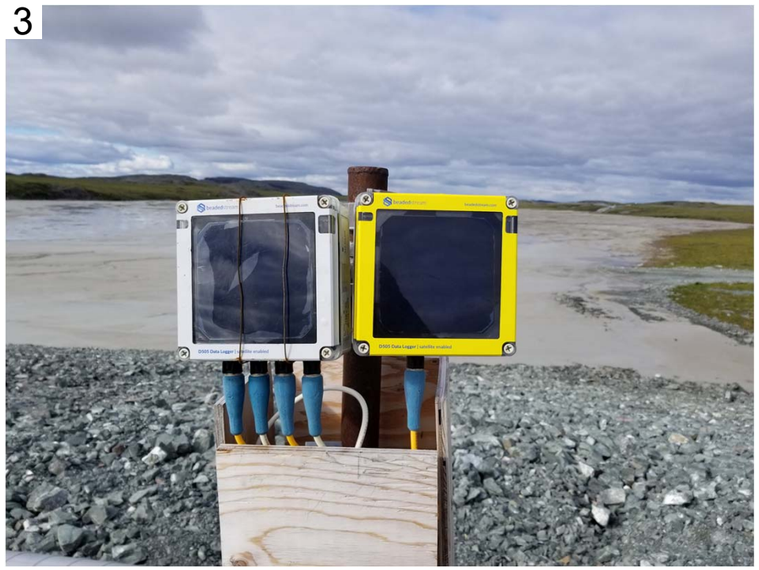

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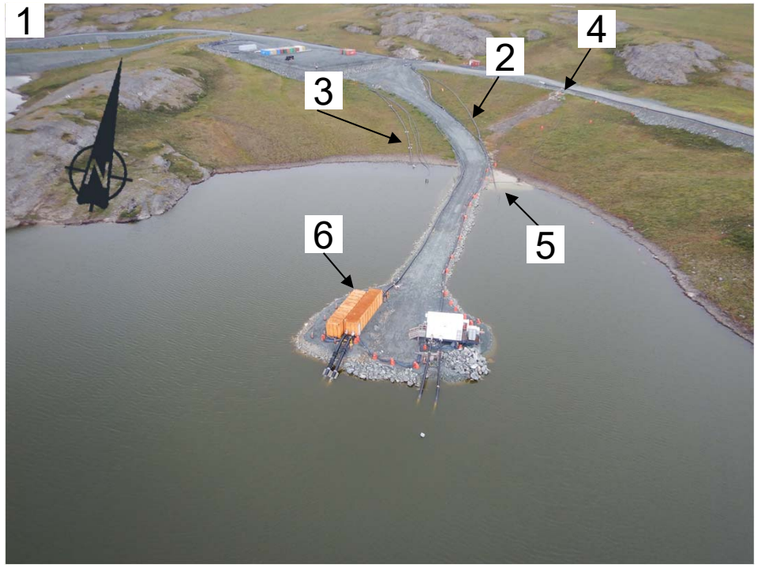
Photos:
Photo 1: View along the South Dam crest, looking east
Photo 2: One of the data logger nodes on the upstream crest. Plywood casing is used to prevent animal damage.
Photo 3: Close-up of the BeadedStream DL505 datalogger and solar panel units, wire on the face is used on this specific logger to fix this logger after its backing was delaminated.
Photo 4: Photo along the downstream dam crest showing the tailings and monitoring instrumentation
Photo 5: Example crest settlement monitoring point and other instruments, looking east
Photo 6: Close-up of a surficial settlement point on the downstream face

srk consulting	TMAC RESOURCES	2020 Annual Geotechnical Inspection
		South Dam Instrumentation
Job No: 1CT022.057 Filename: 2020_TIA_AGI_PhotoLog_Rev01_PL.pptx	Doris TIA	Date: March 2021 / Approved: PL / JK / Photolog: **5**



Photos:
Photo 1: Aerial photo of the Reclaim Pond Jetty, 710 Pumphouse
Photo 2: Reclaim pipelines on the south side of the jetty access road
Photo 3: Reclaim pipelines on the north side of the jetty access road
Photo 4: Remediated permafrost degradation near the reclaim jetty access road (backfilled with tailings and covered with overburden). Location noted in past inspections.
Photo 5: Tailings backfill fan at reclaim pond edge, along south side of reclaim jetty
Photo 6: Settlement and tension cracks on the north side of the Reclaim Jetty pad, prior to repairs in 2020

srk consulting	MAC RESOURCES	2020 Annual Geotechnical Inspection
		Reclaim Pond Jetty and Pumphouse (710)
Job No: 1CT022.057 Filename: 2020_TIA_AGI_PhotoLog_Rev01_PL.pptx	Doris TIA	Date: March 2021 / Approved: PL / JK / Photolog: **6**

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Photos:
Photo 1: East side of the TIA with the tailings beach and northern-most spigot
Photo 2: The South Dam and tailings beach, looking north
Photo 3: The South Dam and tailings beach, looking northwest
Photo 4: The reclaim pond looking northwest, Explosives storage and access to Quarry D visible
Photo 5: The reclaim pond shoreline on the east side of the TIA toward the reclaim jetty and North Dam, limited vegetation die-back visible up to the high-water mark.
Photo 6: The western shoreline of the TIA with the North Dam in the foreground, looking south

srk consulting	TMAC RESOURCES	2020 Annual Geotechnical Inspection
		Tailings Deposition and Reclaim Pond Shoreline
Job No: 1CT022.057 Filename: 2020_TIA_AGI_PhotoLog_Rev01_PL.pptx	Doris TIA	Date: March 2021 / Approved: PL / JK / Photolog: **7**

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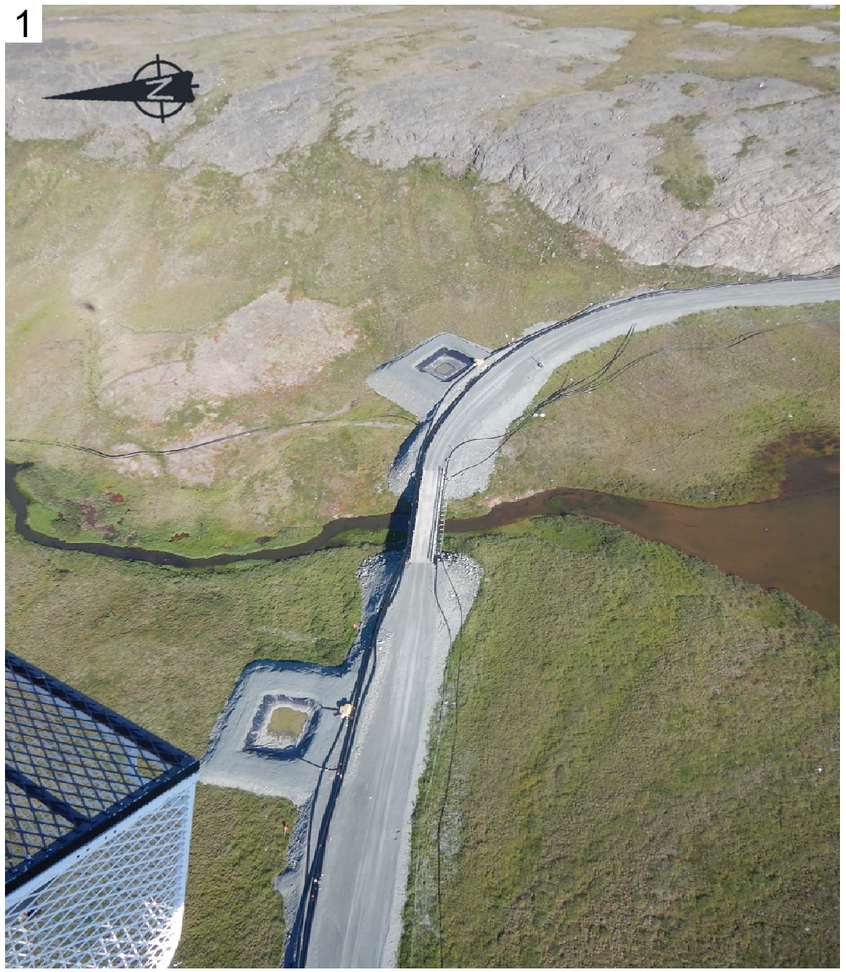
Photos (Timeseries):
Photo 1: Tailing beach development off the South Dam as of 2018
Photo 2: Tailings beach development off the South Dam as of 2019
Photo 3: Tailings beach development off the South Dam as of 2020, looking northwest
Photo 4: Tailings beach development off the South Dam as of 2020, looking southeast

srk consulting	MAC RESOURCES	2020 Annual Geotechnical Inspection
		Tailing Deposition Time-series
Job No: 1CT022.057 Filename: 2020_TIA_AGI_PhotoLog_Rev01_PL.pptx	Doris TIA	Date: March 2021 / Approved: PL / JK / Photolog: **8**

1



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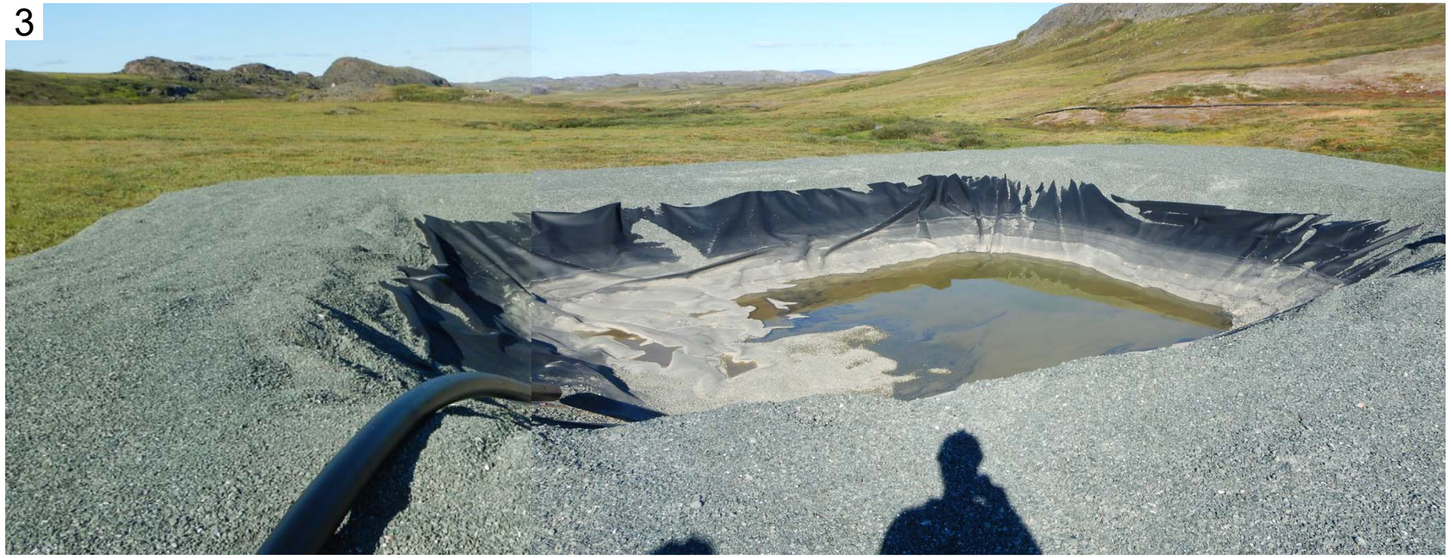

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Photos:
Photo 1: Aerial photo of the Emergency Dump Catch Basins
Photo 2: The Eastern EDCB looking east
Photo 3: The Western EDCB looking east
Photo 4: Close-up of the wrinkled liner in the Western EDCB
Photo 5: Evidence of tension cracks and settlement on the northern berm of the Westerns EDCB

srk consulting	MAC RESOURCES	2020 Annual Geotechnical Inspection
		Emergency Dump Catch Basins
Job No: 1CT022.057 Filename: 2020_TIA_AGI_PhotoLog_Rev01_PL.pptx	Doris TIA	Date: March 2021 / Approved: PL / JK / Photolog: **9**

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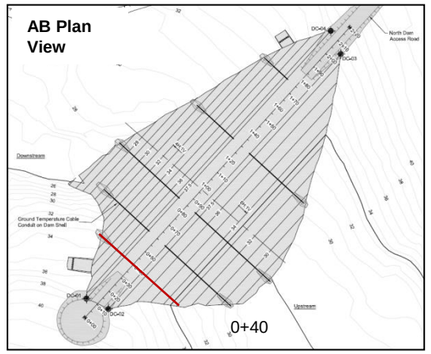
Photos:
Photo 1: Doris Creek Bridge (East Abutment) showing the electrical line, tailings pipelines and racking, looking south
Photo 2: Doris Creek Bridge (West Abutment) showing the electrical line, tailings pipelines and racking, looking southwest
Photo 3: Reclaim pipelines over the south pipe racking on the Doris Creek Bridge, looking east
Photo 4: Doris Creek crossing, looking north.
Photo 5: Tailings pipelines over the north pipe rack looking east. Damaged guardrail observed, which should be repaired
Photo 6: Tailings pipeline over the north pipe racking on the Doris Creek Bridge, looking west. The small grey box is the top of the DCB East GTC with a partially open enclosure (repairs required).

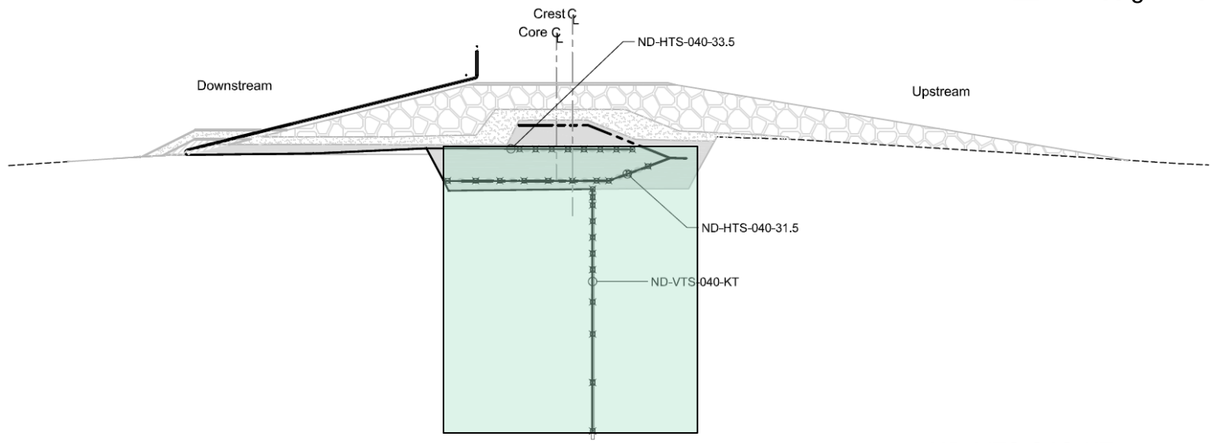
srk consulting	TMAC RESOURCES	2020 Annual Geotechnical Inspection
		Tailings Discharge and Reclaim Pipeline (Near TIA)
Job No: 1CT022.057 Filename: 2020_TIA_AGI_PhotoLog_Rev01_PL.pptx	Doris TIA	Date: March 2021 / Approved: PL / JK / Photolog: **10**

Appendix A Ground Temperature Cables

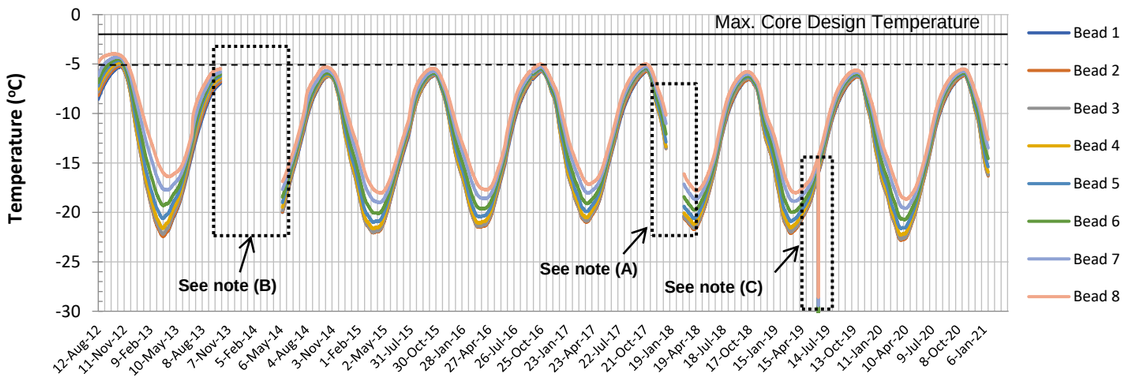


Legend:

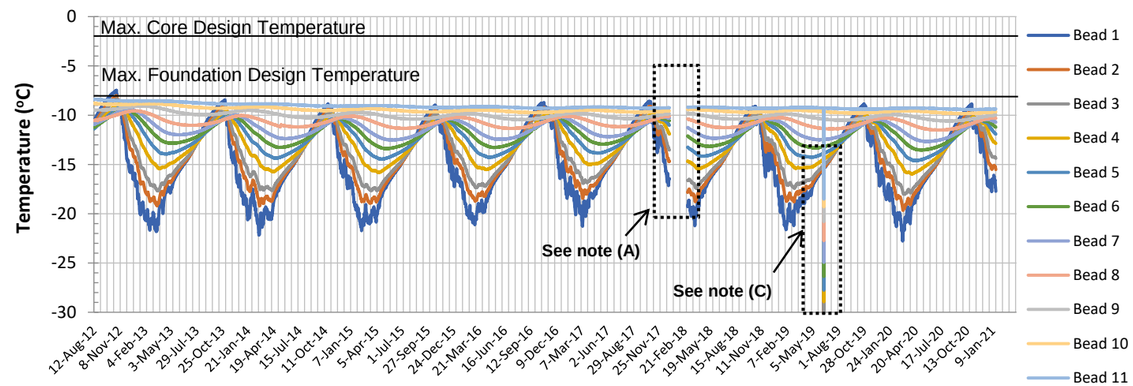
- GTC Status: Cable irreparably damaged
- GTC Status: Bead damaged or data missing
- Design Thermal Block



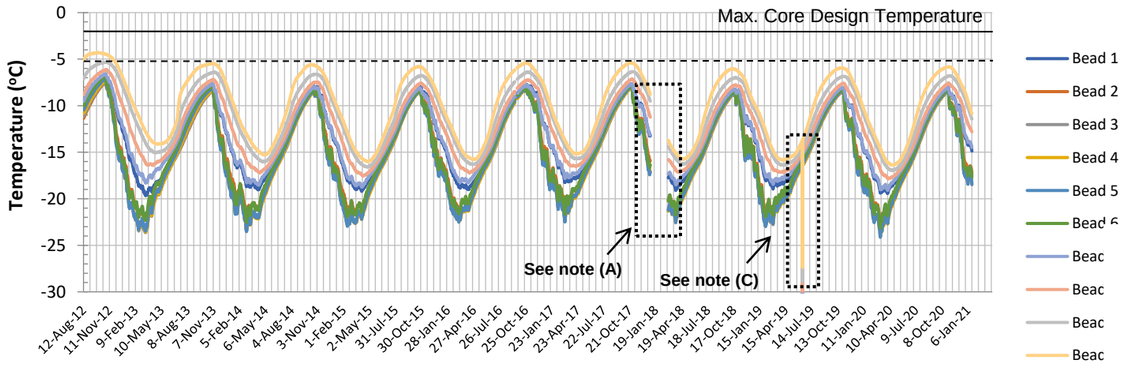
ND-HTS-040-33.5



ND-VTS-040-KT



ND-HTS-040-31.5

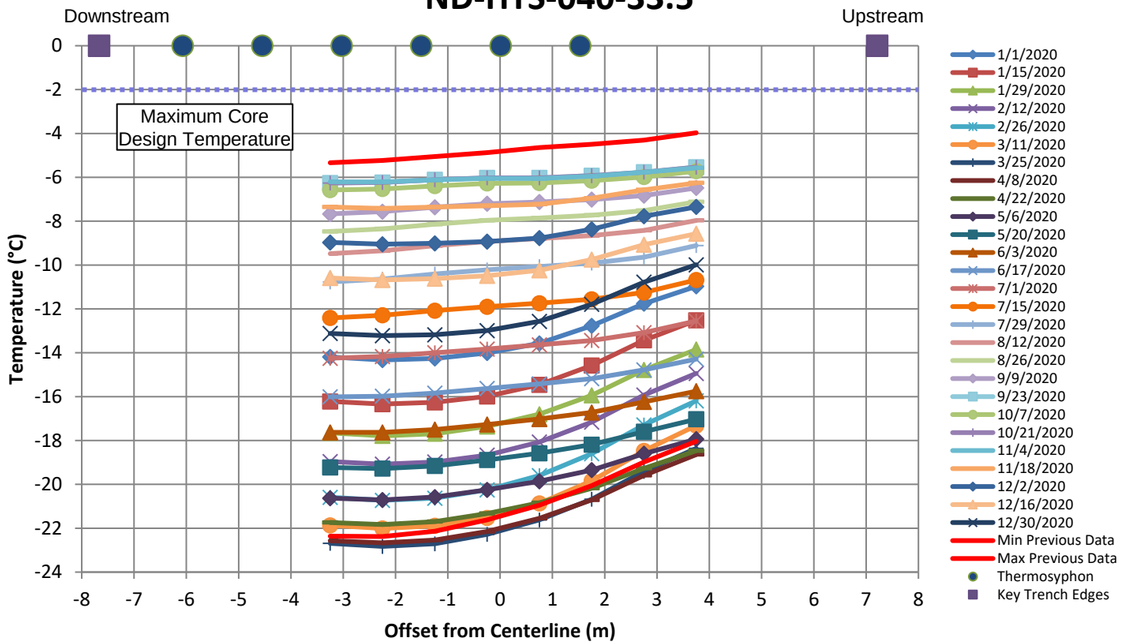


Notes:

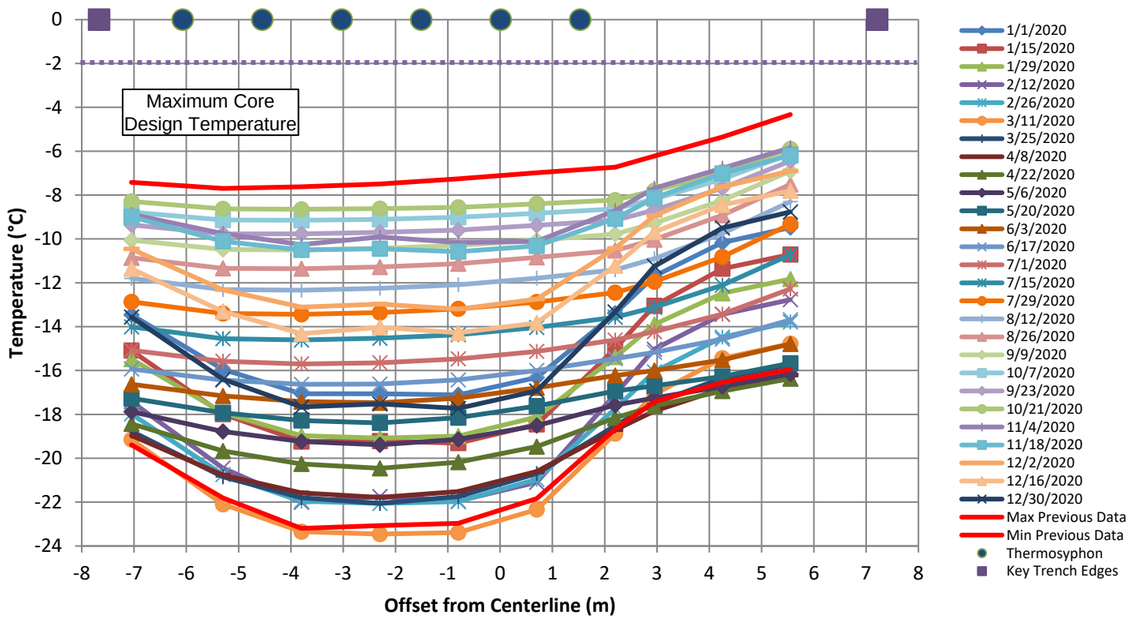
- Bead numbers increase from downstream to upstream (horizontal) and top to bottom (vertical)
- **(A)** Data logger was disconnected from January 1, 2018 to March 3, 2018 for recalibration
- **(B)** GTC was disconnected from datalogger
- **(C)** A low temperature spike for all beads was observed for a single reading on June 12, 2019 and is attributed to an instrumentation error

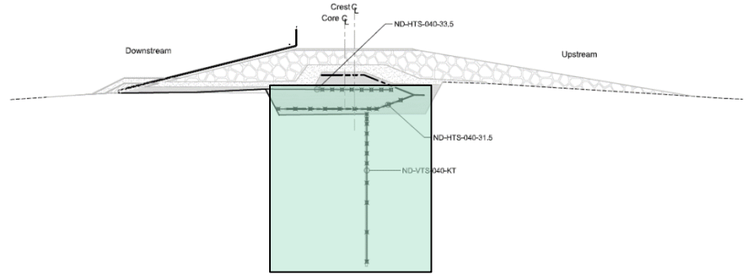
srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: 1_App_A_ND_GTC_PT2.pptx	DORIS TIA	**Station 0+40** **Ground Temperature Cable Temperature Vs. Time**
		Date: Feb. 2021 / Approved: PDL / Figure: **A.1**

ND-HTS-040-33.5



ND-HTS-040-31.5

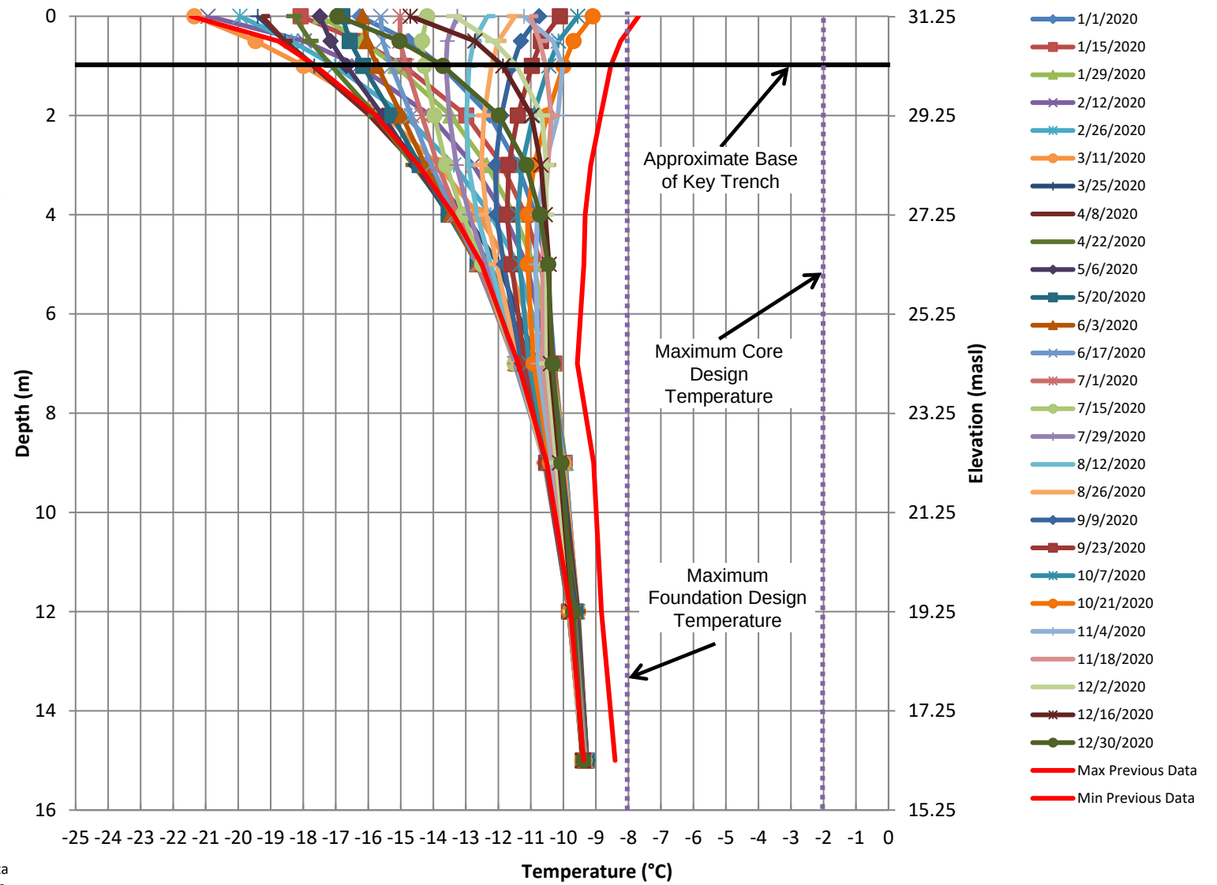




Legend:

- GTC Status: Cable irreparably damaged
- GTC Status: Bead damaged or data missing
- Design Thermal Block

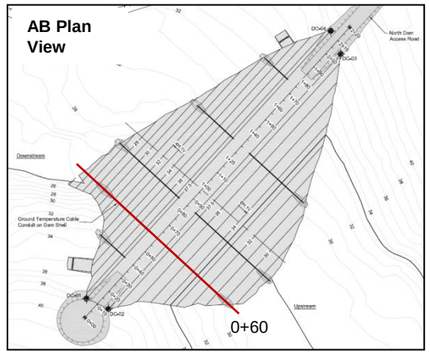
ND-VTS-040-KT

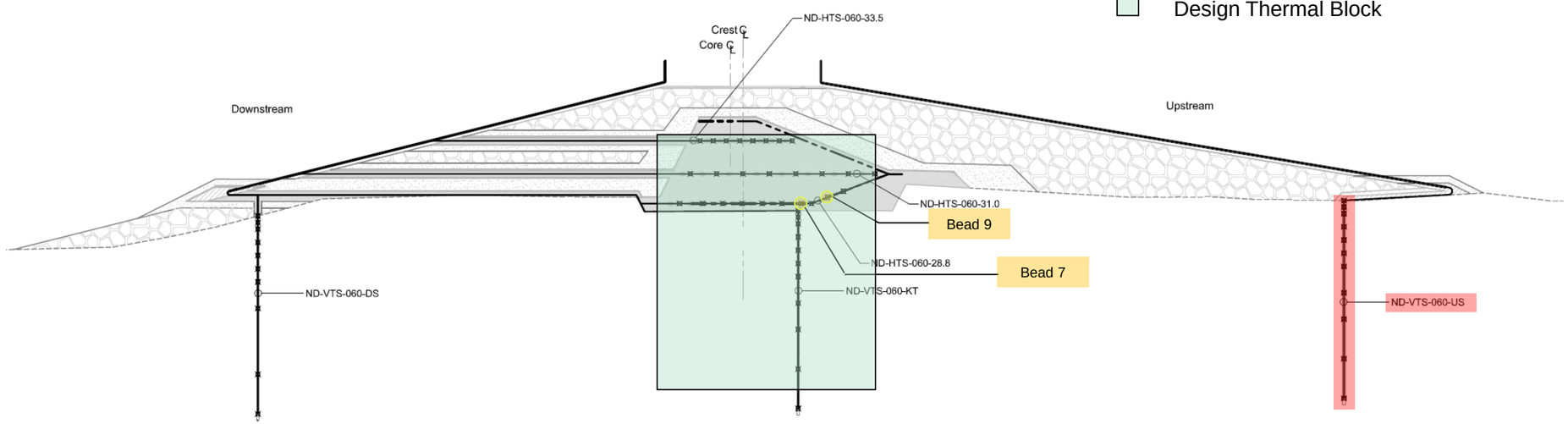


Note:

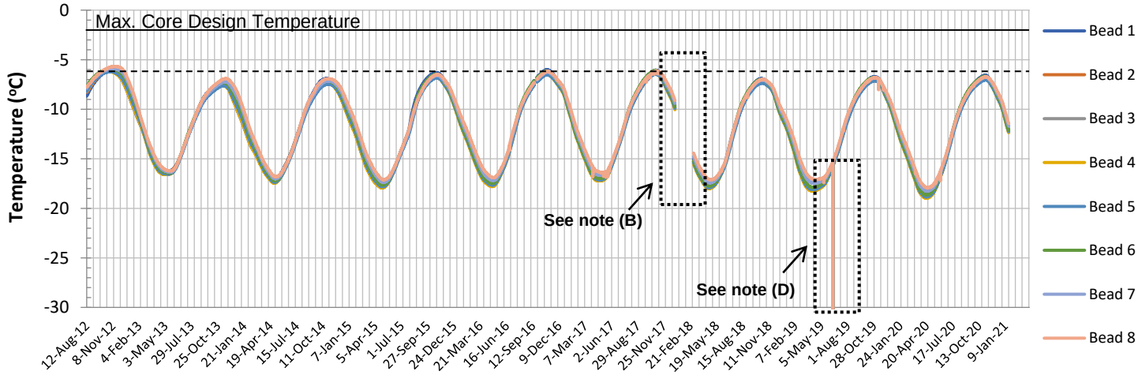
- Previous Data was recorded between August 2012 and December 2019

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
		Station 0+40 Ground Temperature Cable Readings by Location
Job No: 1CT022.057 Filename: 1_App_A_ND_GTC_PT1.pptx	DORIS TIA	Date: Feb. 2021 / Approved: PDL / Figure: **A.2**

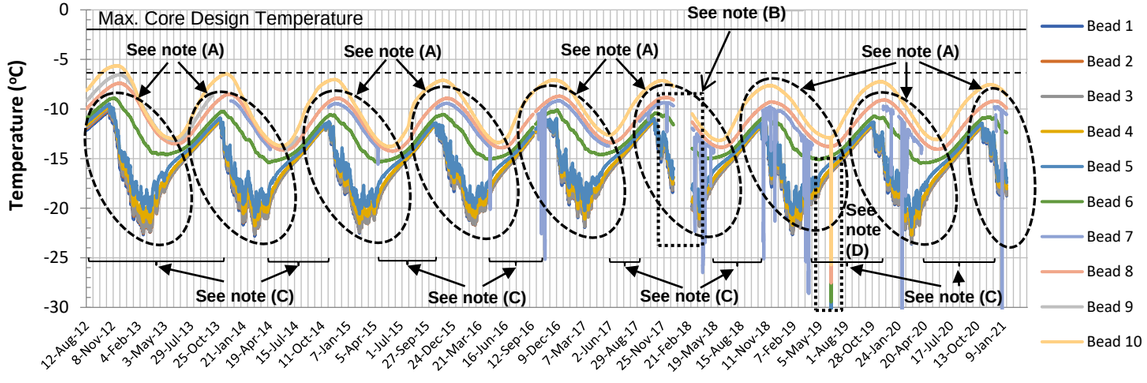




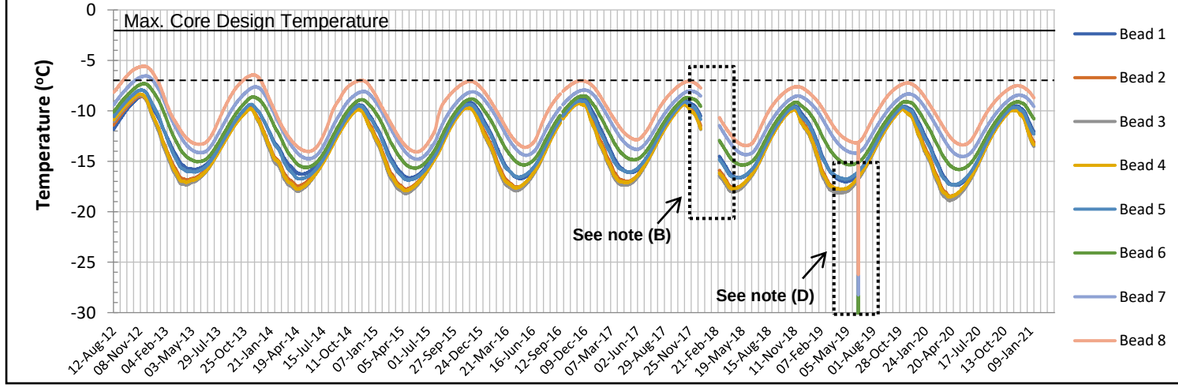
ND-HTS-060-33.5



ND-HTS-060-28.8



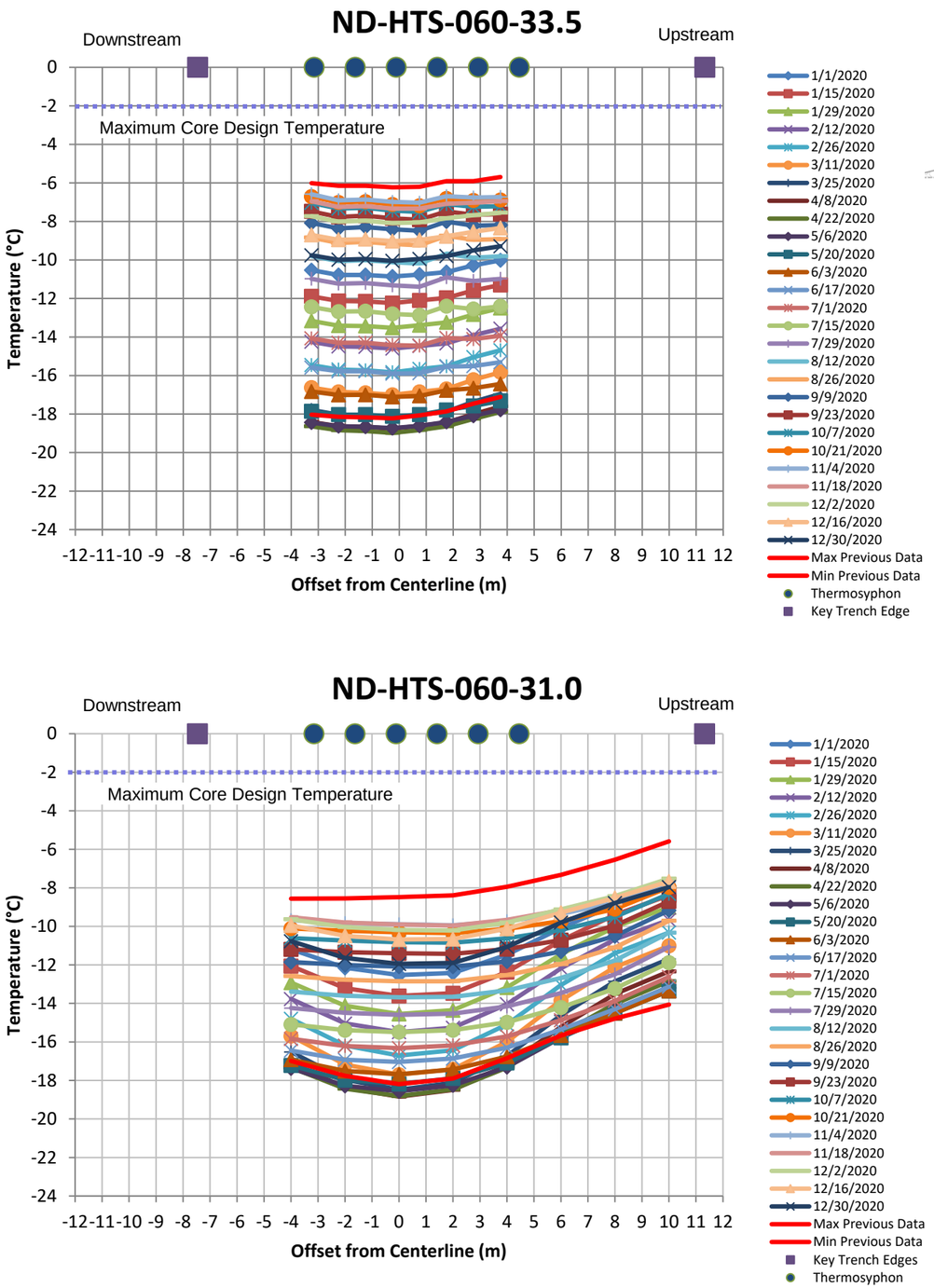
ND-HTS-060-31.0

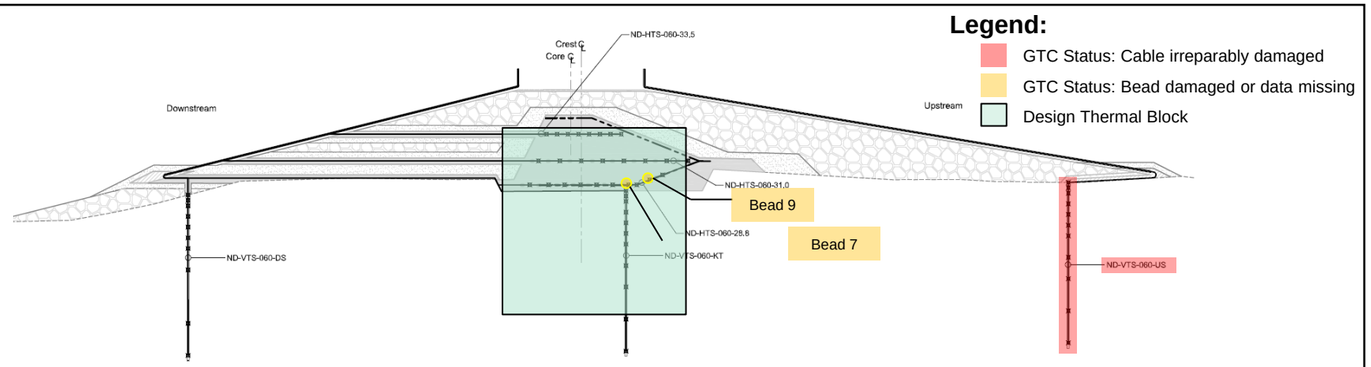


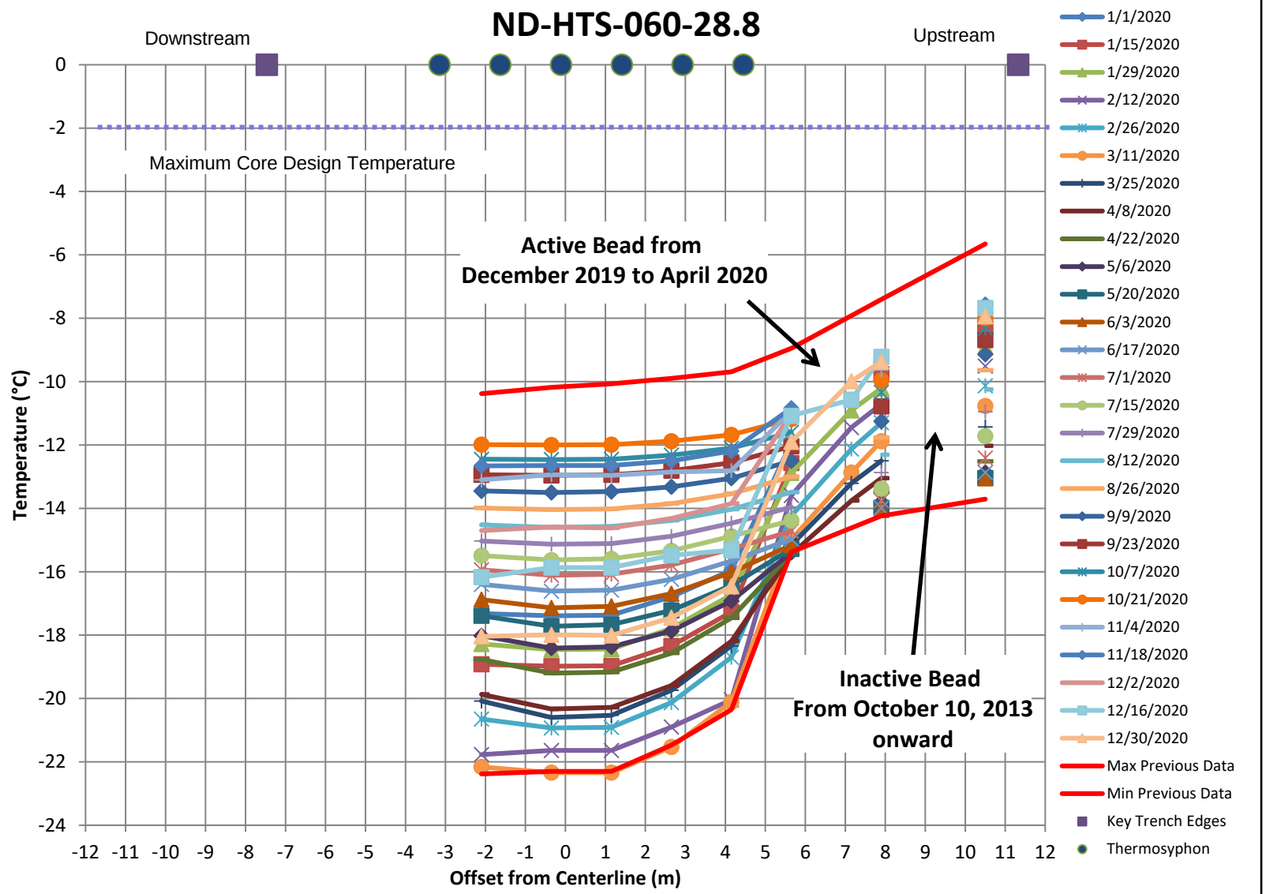
Notes:

- Bead numbers increase from downstream to upstream (horizontal) and top to bottom (vertical)
- **(A)** Variation in Ground Temperature Cable readings during winter months due to close proximity of Ground Temperature Cable beads to thermosyphon pipes
- **(B)** Data logger was disconnected from January 1, 2018 to March 3, 2018 for recalibration
- **(C)** No readings from Bead 7
- **(D)** A low temperature spike for all beads was observed for a single reading on June 12, 2019 and is attributed to an instrumentation error

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
		Station 0+60 Horizontal Temperature Cable Temperature Vs. Time
Job No: 1CT022.057 Filename: 1_App_A_ND_GTC_PT2.pptx	DORIS TIA	Date: Feb. 2021 / Approved: PDL / Figure: **A.3**



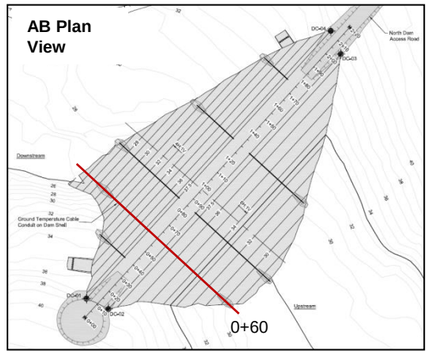


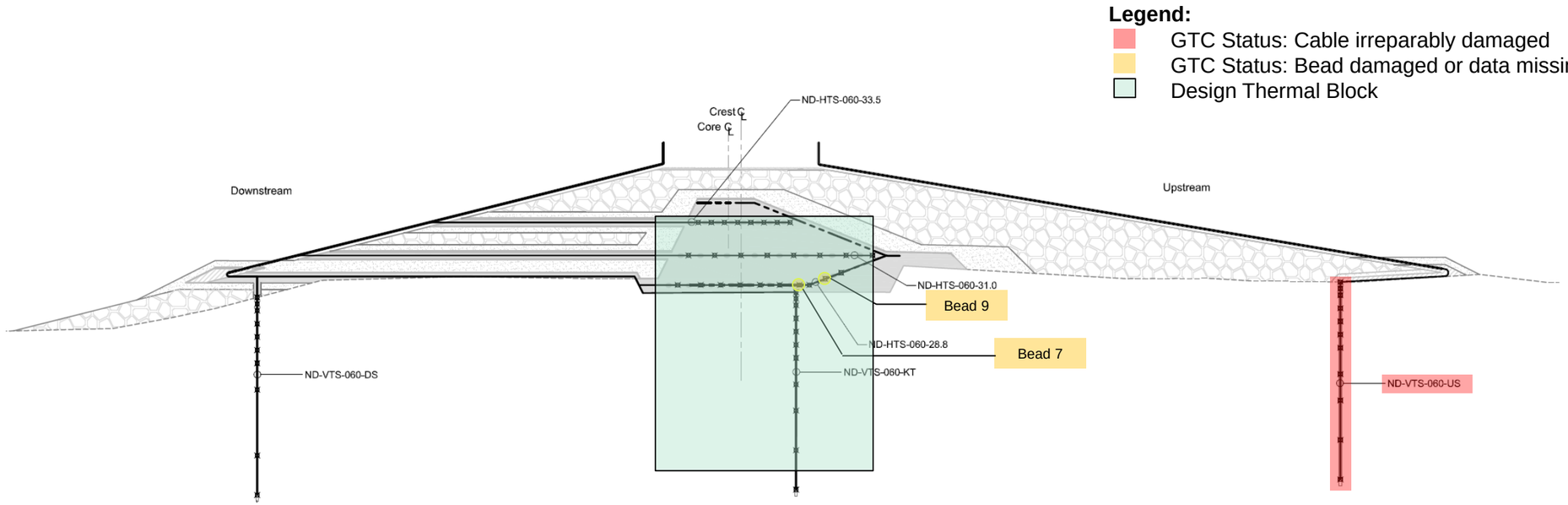


Note:

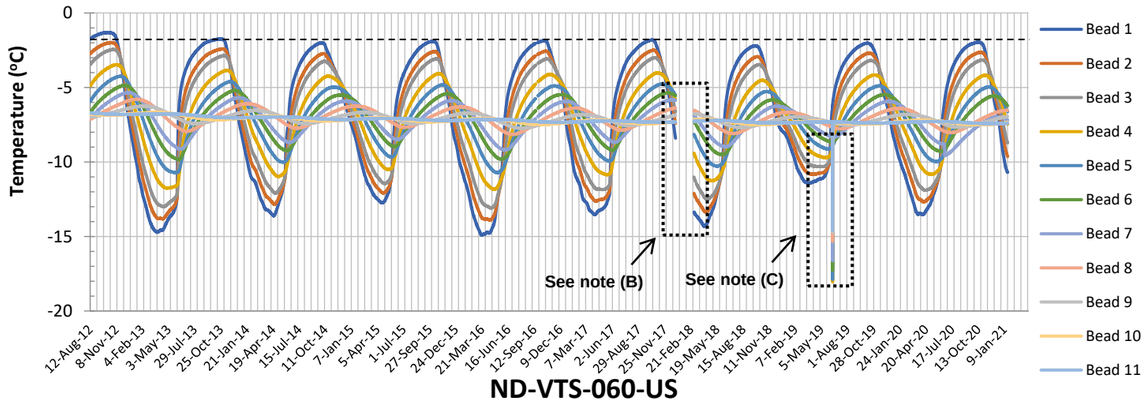
- Previous Data was recorded between August 2012 and December 2019

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
		Station 0+60 **Horizontal Ground Temperature** **Cable Readings by Location**
Job No: 1CT022.057 Filename: 1_App_A_ND_GTC_PT1.pptx	DORIS TIA	Date: Feb. 2021 · Approved: PDL · Figure: **A.4**

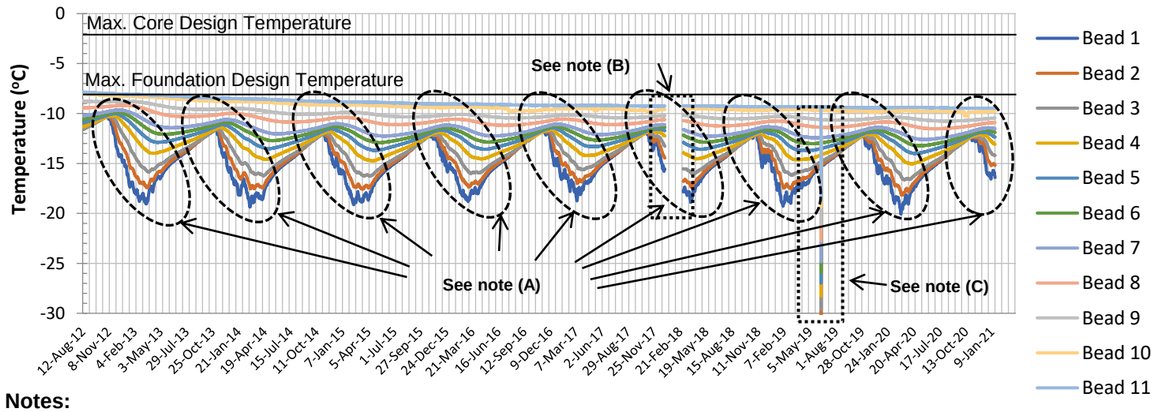




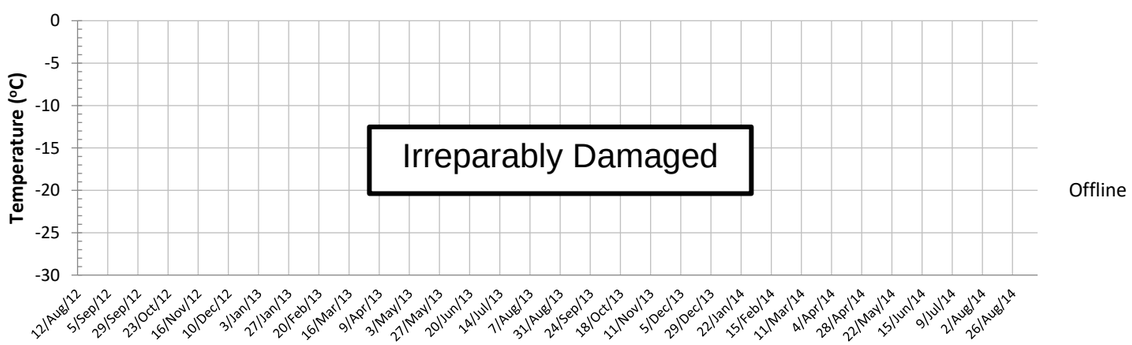
ND-VTS-060-DS



ND-VTS-060-KT



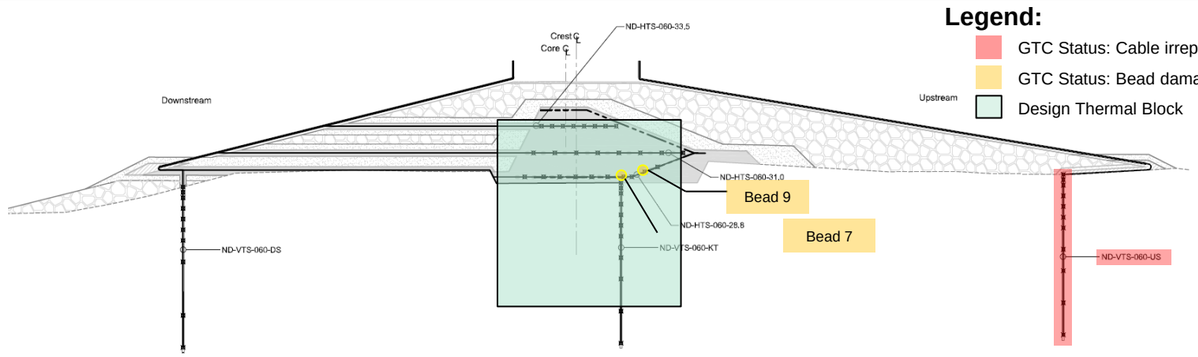
ND-VTS-060-US



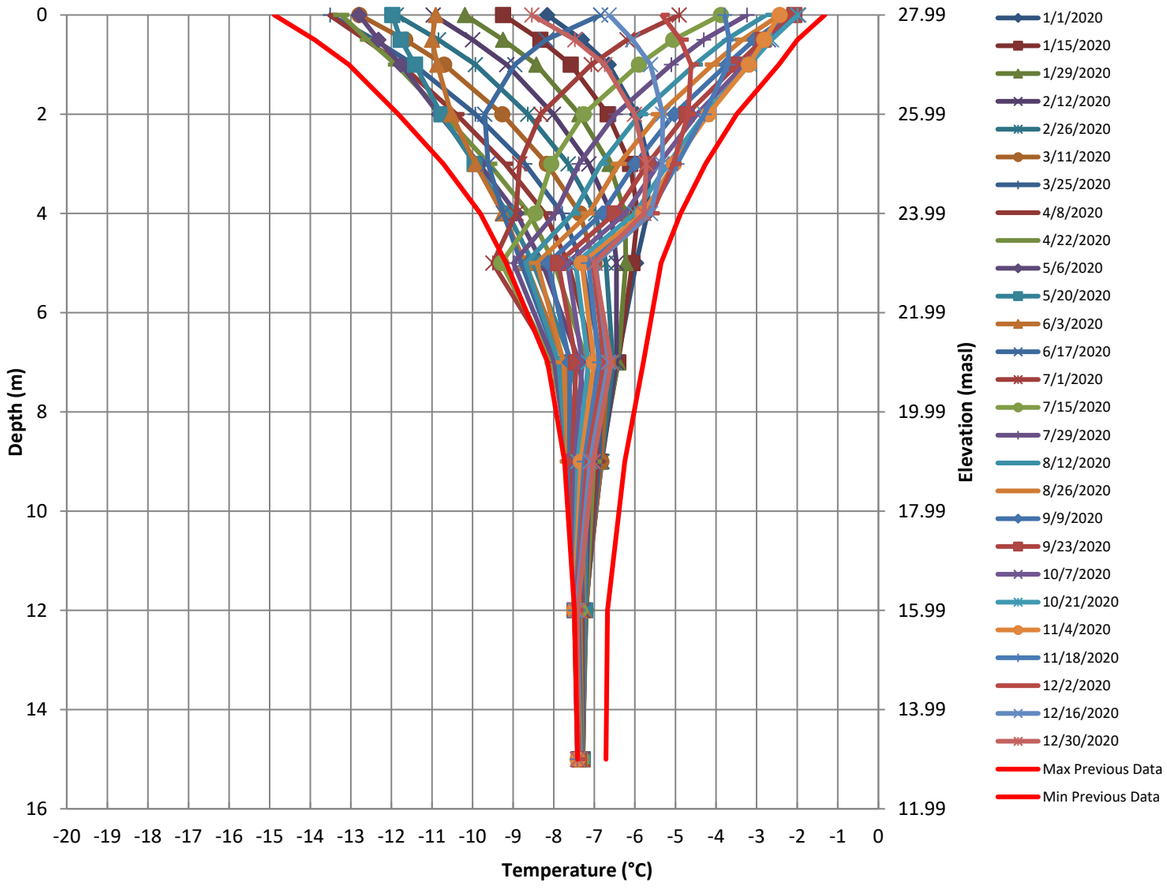
Notes:

- Bead numbers increase from downstream to upstream (horizontal) and top to bottom (vertical)
- **(A)** Variation in Ground Temperature Cable readings during winter months due to close proximity of Ground Temperature Cable beads to thermosyphon pipes
- **(B)** Data logger was disconnected from January 1, 2018 to March 3, 2018 for recalibration
- **(C)** A low temperature spike for all beads was observed for a single reading on June 12, 2019 and is attributed to an instrumentation error

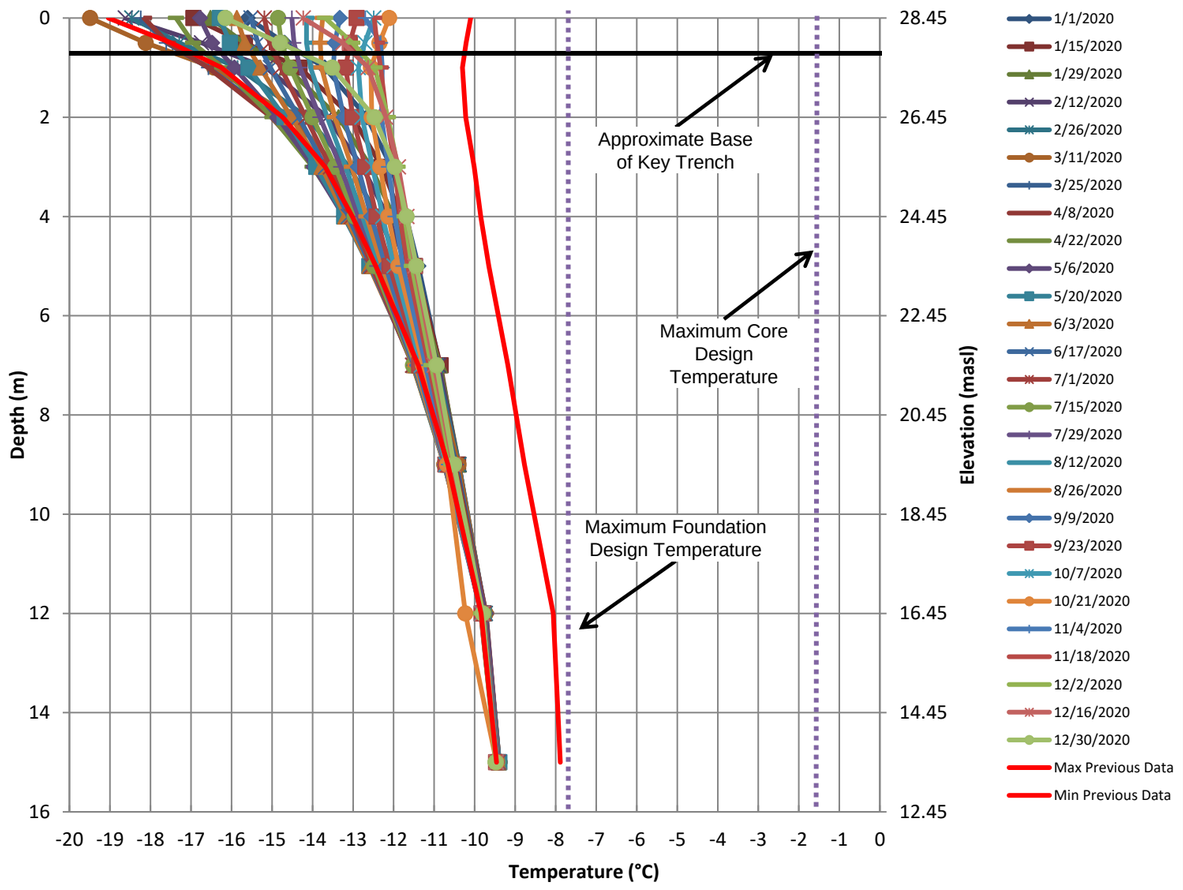
srk consulting	AGNICO EAGLE	2020 AGI – North Dam
		Station 0+60 Vertical Temperature Cable Temperature Vs. Time
Job No: 1CT022.057 Filename: 1_App_A_ND_GTC_PT2.pptx	DORIS TIA	Date: Feb. 2021 / Approved: PDL / Figure: **A.5**



ND-VTS-060-DS



ND-VTS-060-KT



Note:

- Previous Data was recorded between August 2012 and December 2019

srk consulting

Job No: 1CT022.057

Filename: 1_App_A_ND_GTC_PT1.pptx

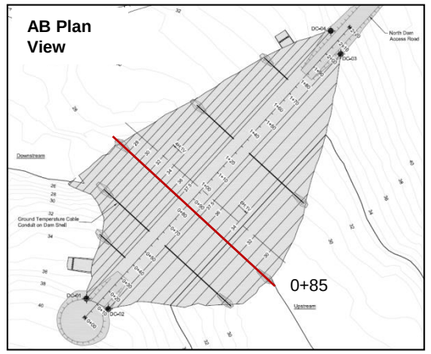
AGNICO EAGLE

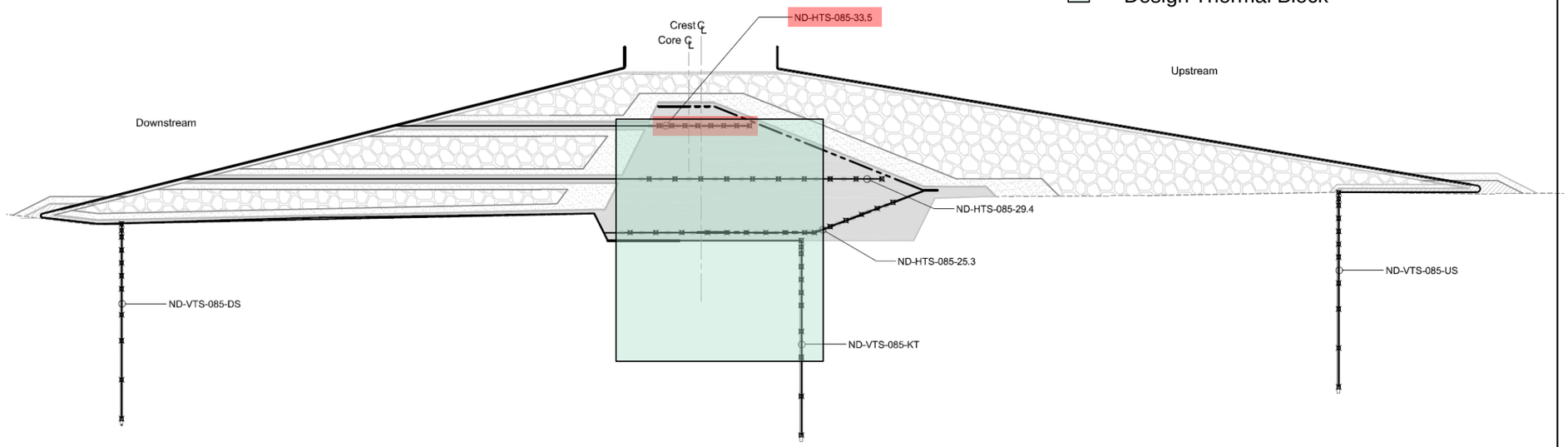
DORIS TIA

2020 AGI – North Dam

Station 0+60
Vertical Ground Temperature Cable Readings by Location

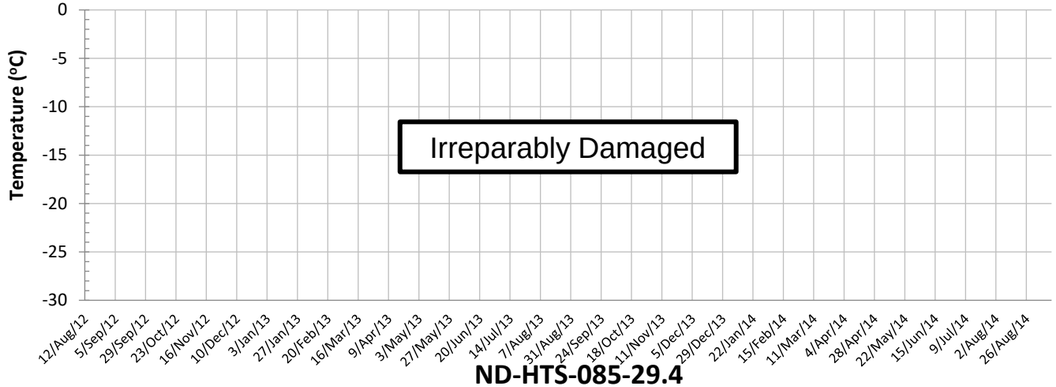
Date: Feb. 2021 | Approved: PDL | Figure: **A.6**





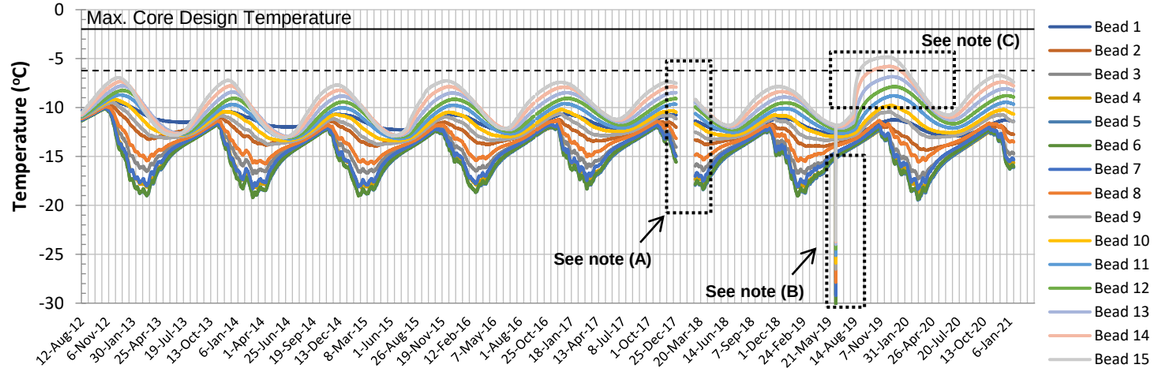
ND-HTS-085-33.5

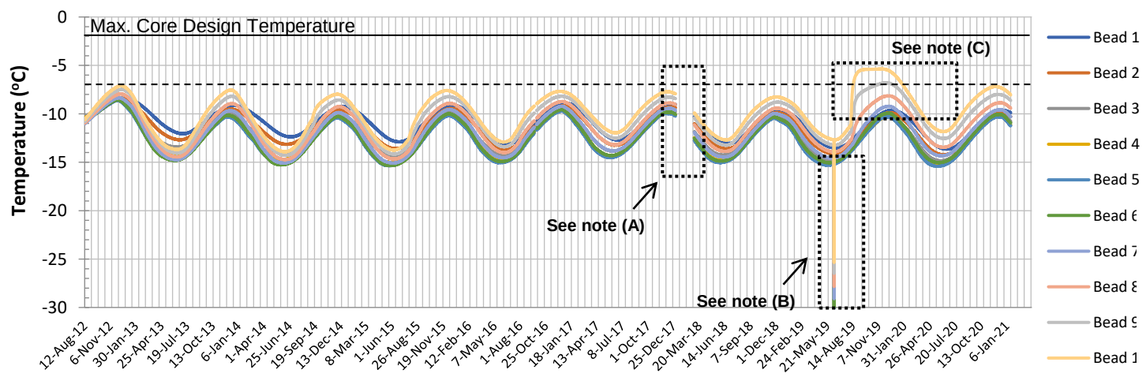
ND-HTS-085-25.3



ND-HTS-085-29.4

Offline

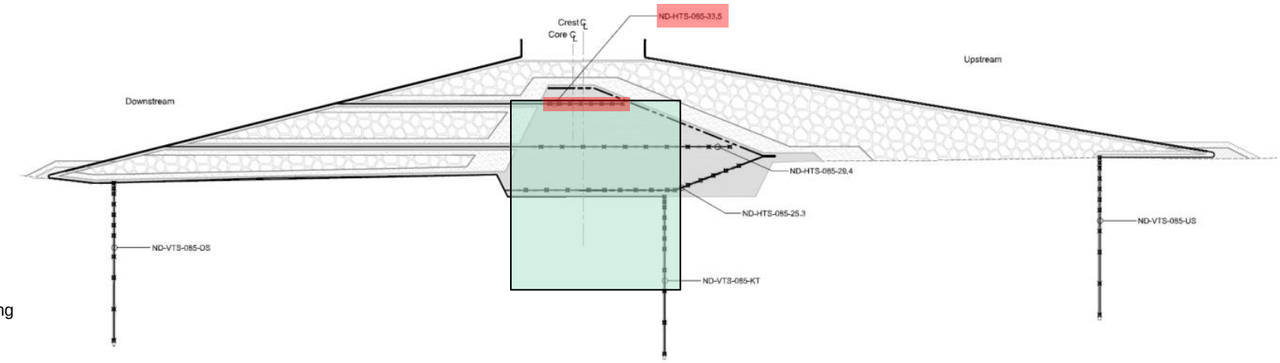




Notes:

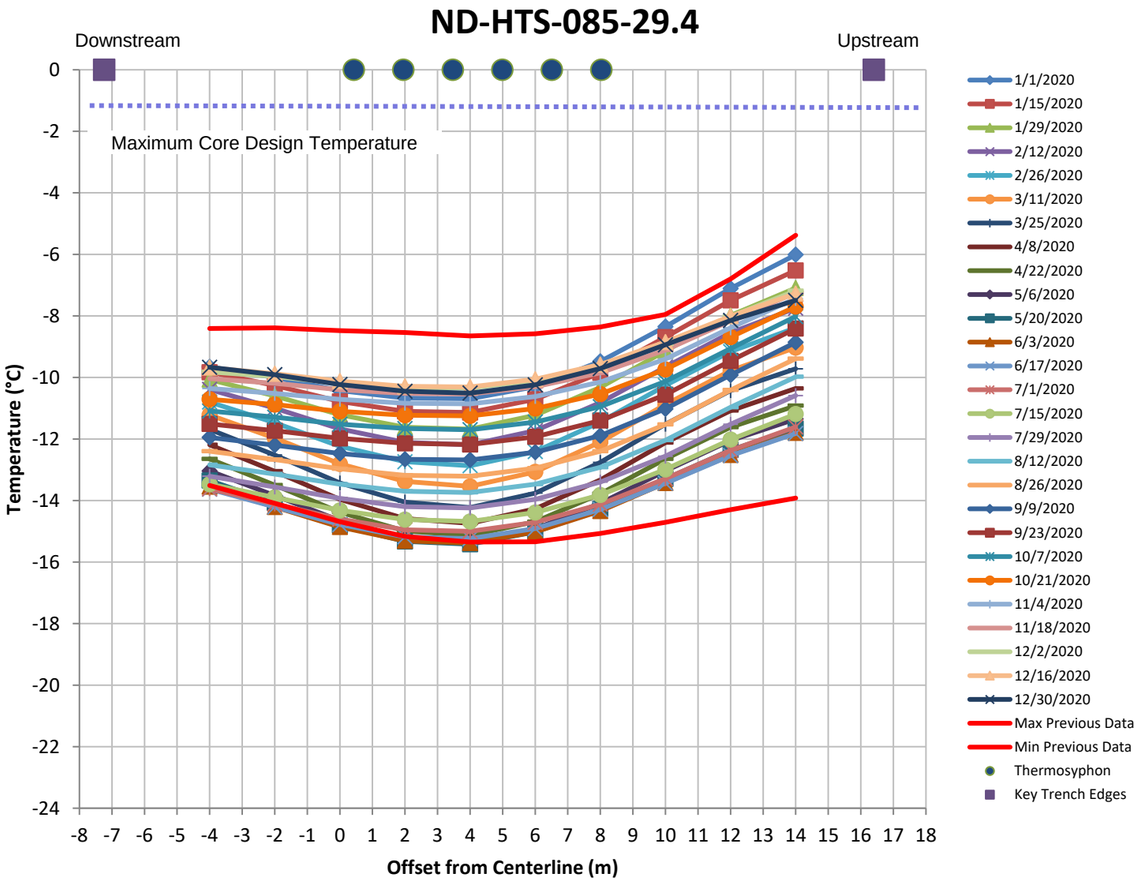
- Bead numbers increase from downstream to upstream (horizontal) and top to bottom (vertical)
- **(A)** Data logger was disconnected from January 1, 2018 to March 3, 2018 for recalibration
- **(B)** A low temperature spike for all beads was observed for a single reading on June 12, 2019 and is attributed to an instrumentation error
- **(C)** Temperature rise is expected to be a result of the rise in the reclaim pond water level

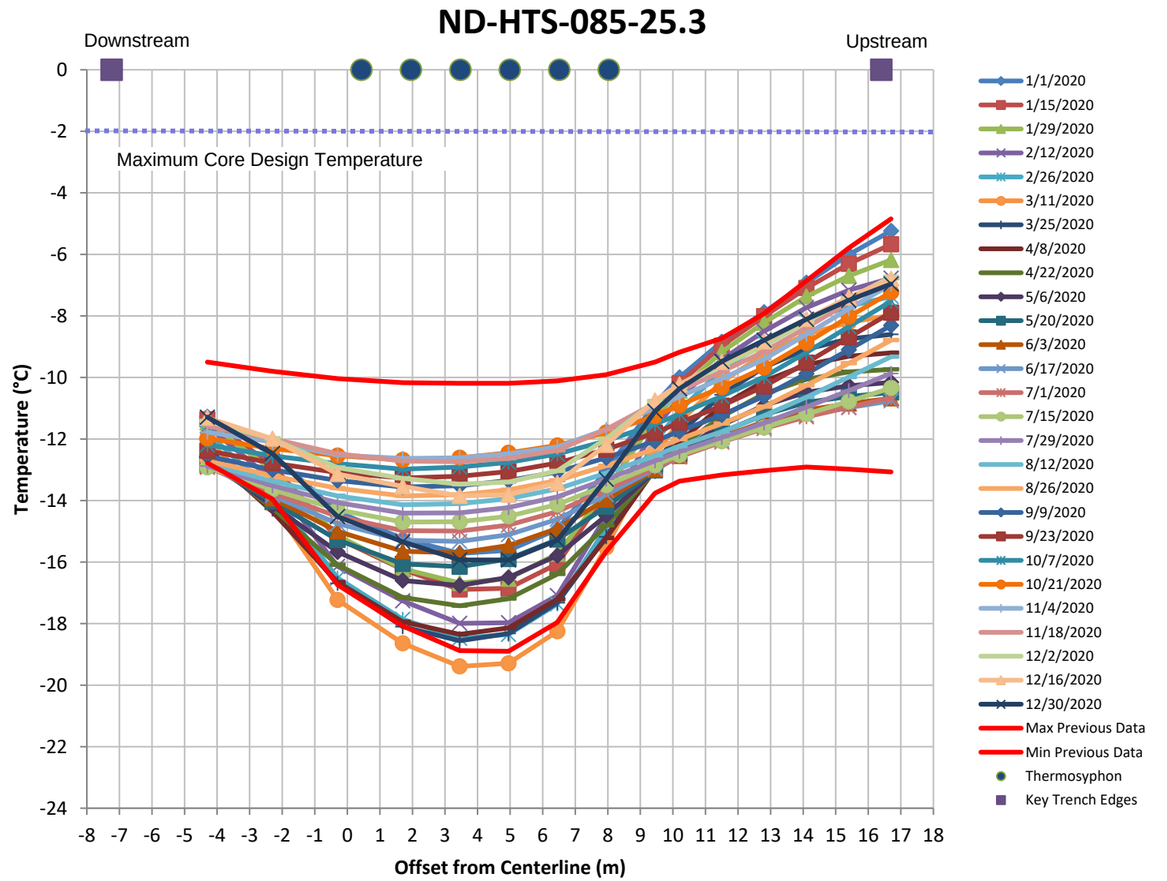
srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: 1_App_A_ND_GTC_PT2.pptx	DORIS TIA	**Station 0+85 Horizontal Temperature Cable Temperature Vs. Time**
		Date: Feb. 2021 | Approved: PDL | Figure: **A.7**



Legend:

- GTC Status: Cable irreparably damaged
- GTC Status: Bead damaged or data missing
- Design Thermal Block

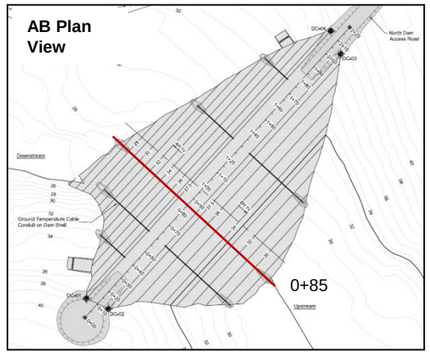


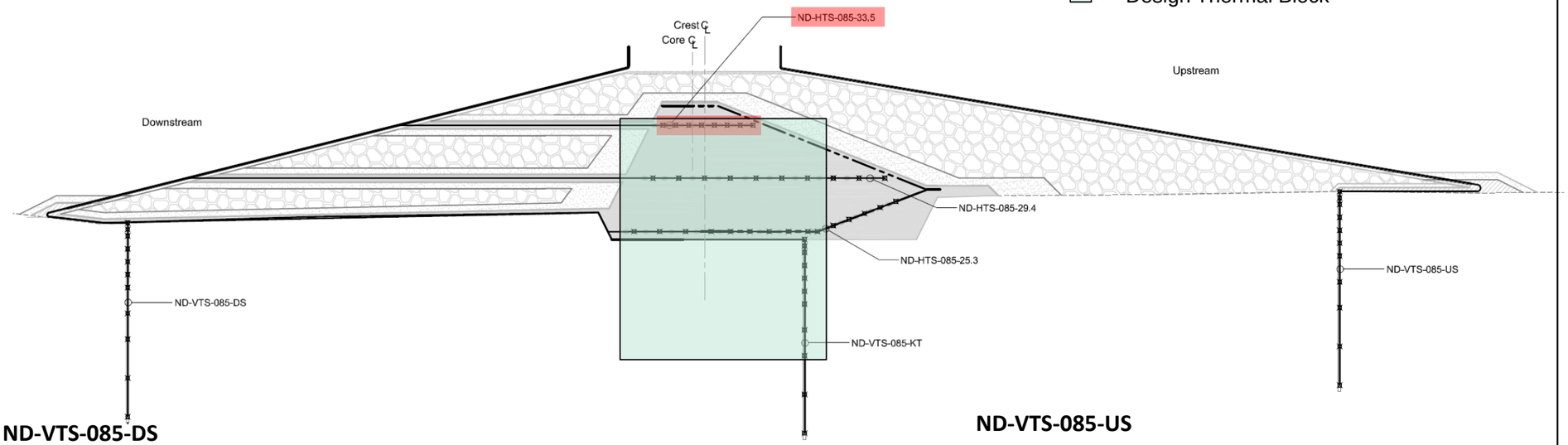


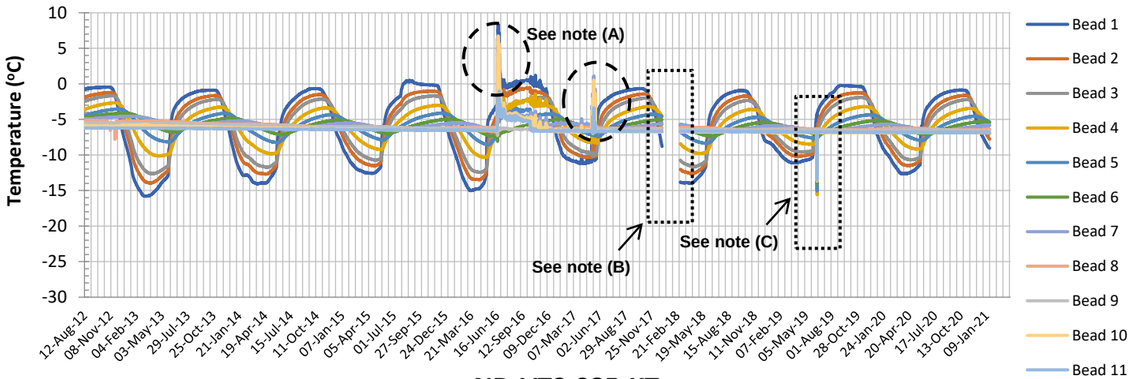
Note:

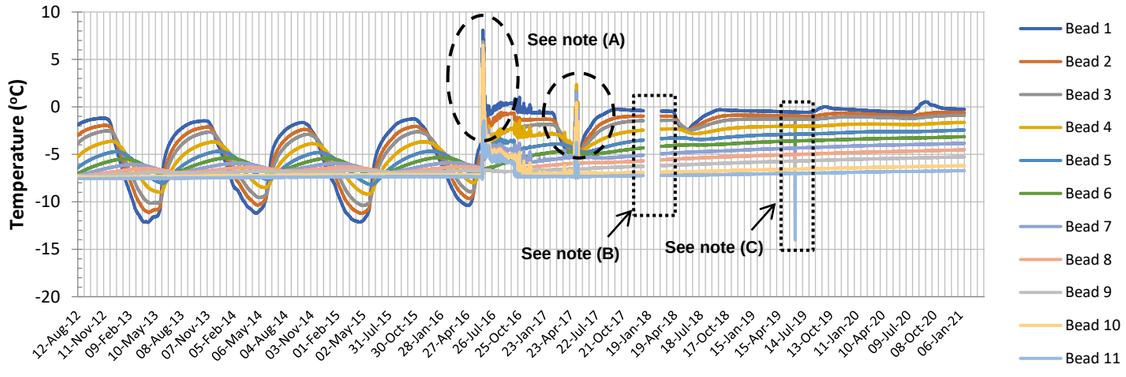
- Previous Data was recorded between August 2012 and December 2019

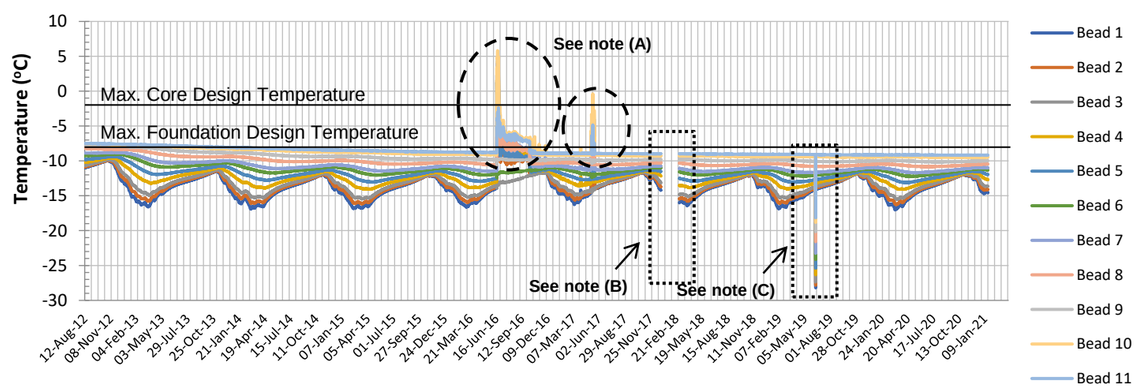
srk consulting	AGNICO EAGLE	2020 AGI – North Dam
		Station 0+85 Horizontal Ground Temperature Cable Readings by Location
Job No: 1CT022.057 Filename: 1_App_A_ND_GTC_PT1.pptx	DORIS TIA	Date: Feb. 2021 / Approved: PDL / Figure: **A.8**









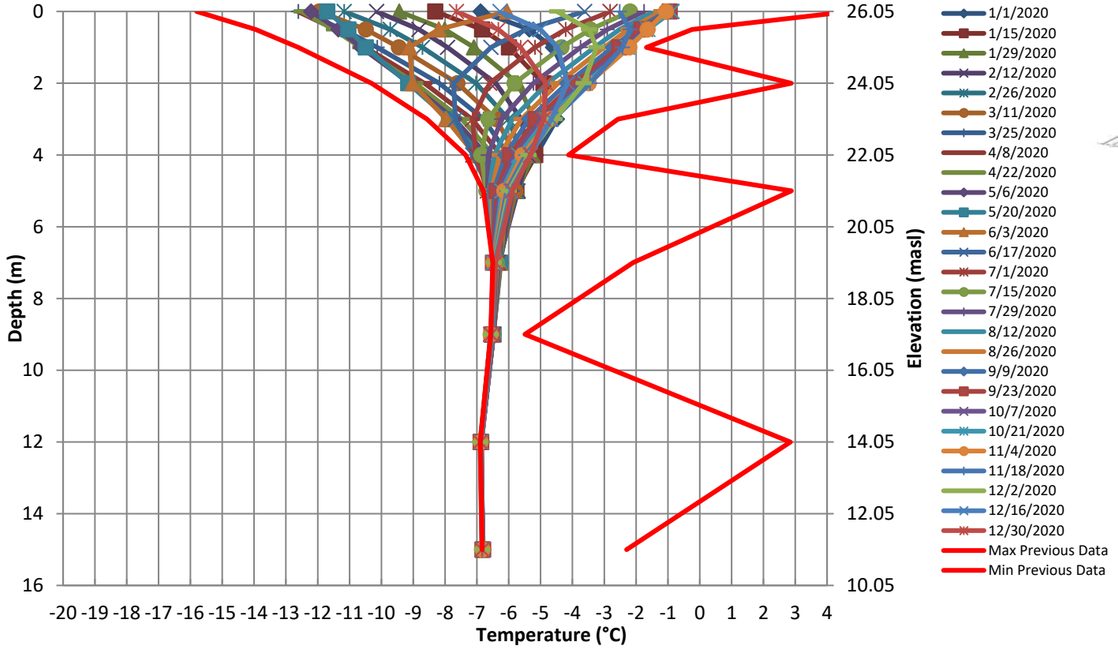


Notes:

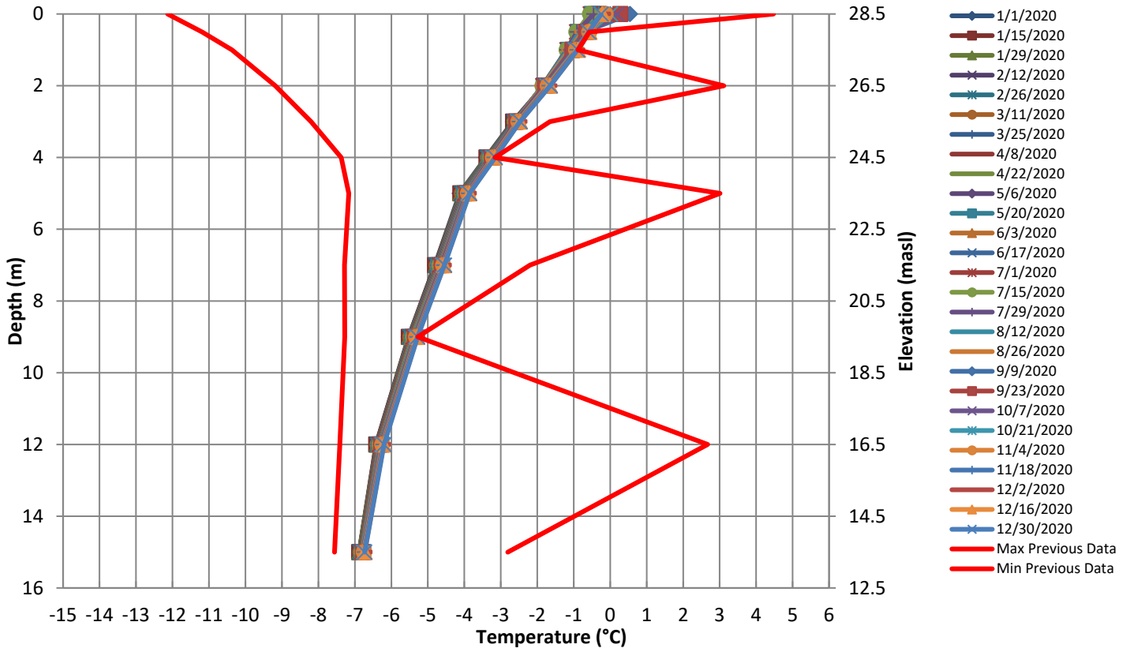
- Bead numbers increase from downstream to upstream (horizontal) and top to bottom (vertical)
- **(A)** Temperature in Bead 1, 2, 4, 5, 7, 8, 10, 11 spiked in the Spring of 2016 and 2017. Erratic readings in some elevations suggest a data logger issue. During the current monitoring period, the readings at ND-VTS-085-DS and ND-VTS-085-KT returned to normal. Along a similar timeline, the temperatures of ND-VTS-085-KT has risen to between 0 and -7 degrees from Bead 1 to Bead 11. The temperature rise is expected to be a result of the rise in the reclaim pond water level
- **(B)** Data logger was disconnected from January 1, 2018 to March 3, 2018 for recalibration.
- **(C)** A low temperature spike for all beads was observed for a single reading on June 12, 2019 and is attributed to an instrumentation error

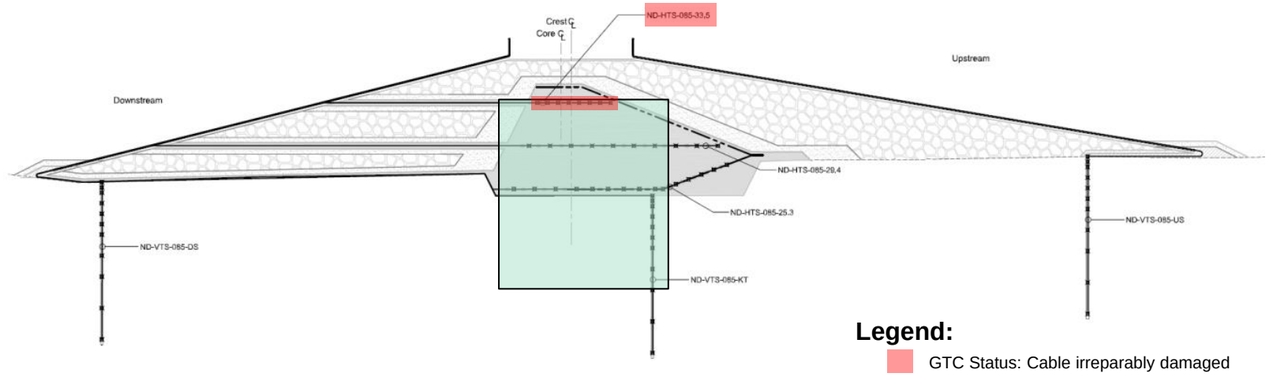
srk consulting	AGNICO EAGLE	2020 AGI – North Dam
		Station 0+85 Vertical Temperature Cable Temperature Vs. Time
Job No: 1CT022.057 Filename: 1_App_A_ND_GTC_PT2.pptx	**DORIS TIA**	Date: Feb. 2021 / Approved: PDL / Figure: **A.9**

ND-VTS-085-DS

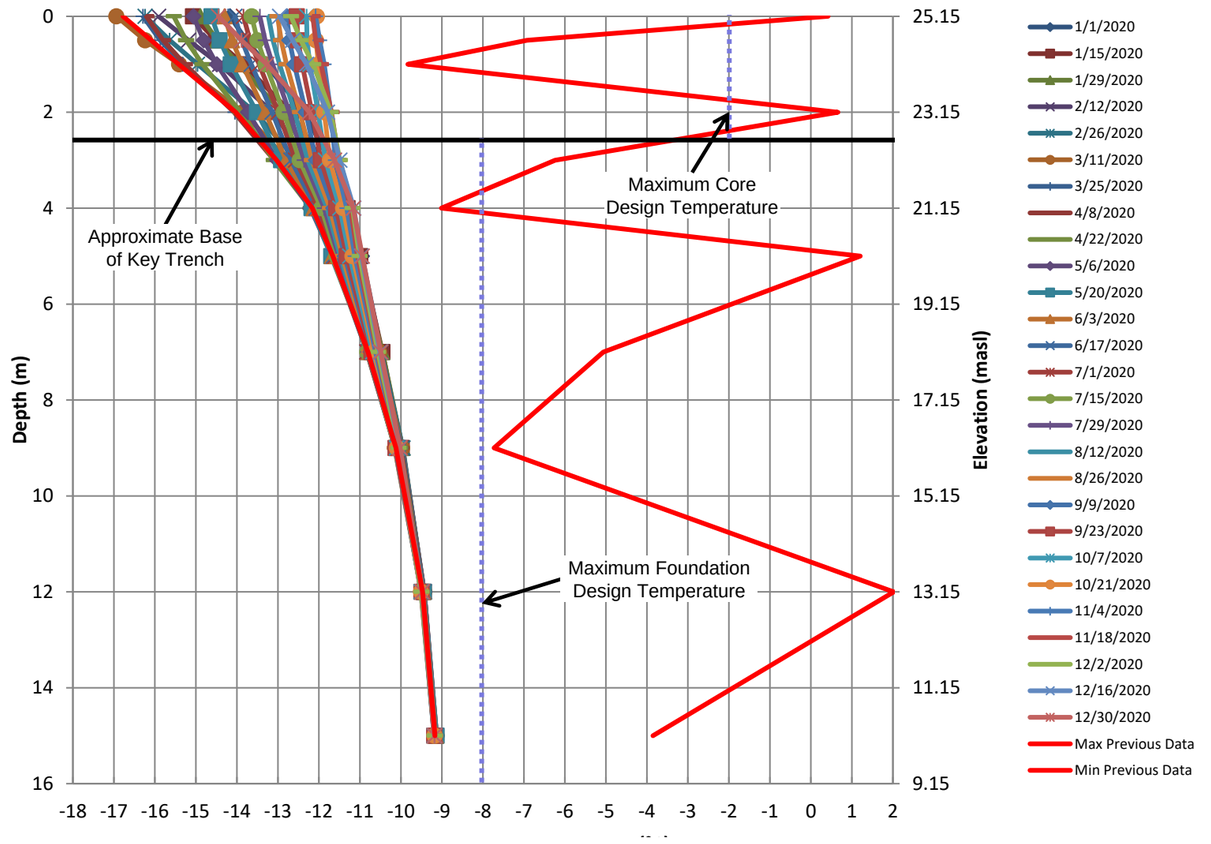


ND-VTS-085-US





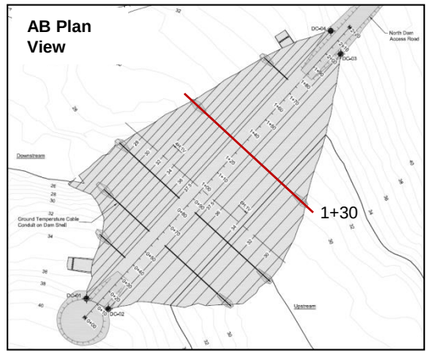
ND-VTS-085-KT

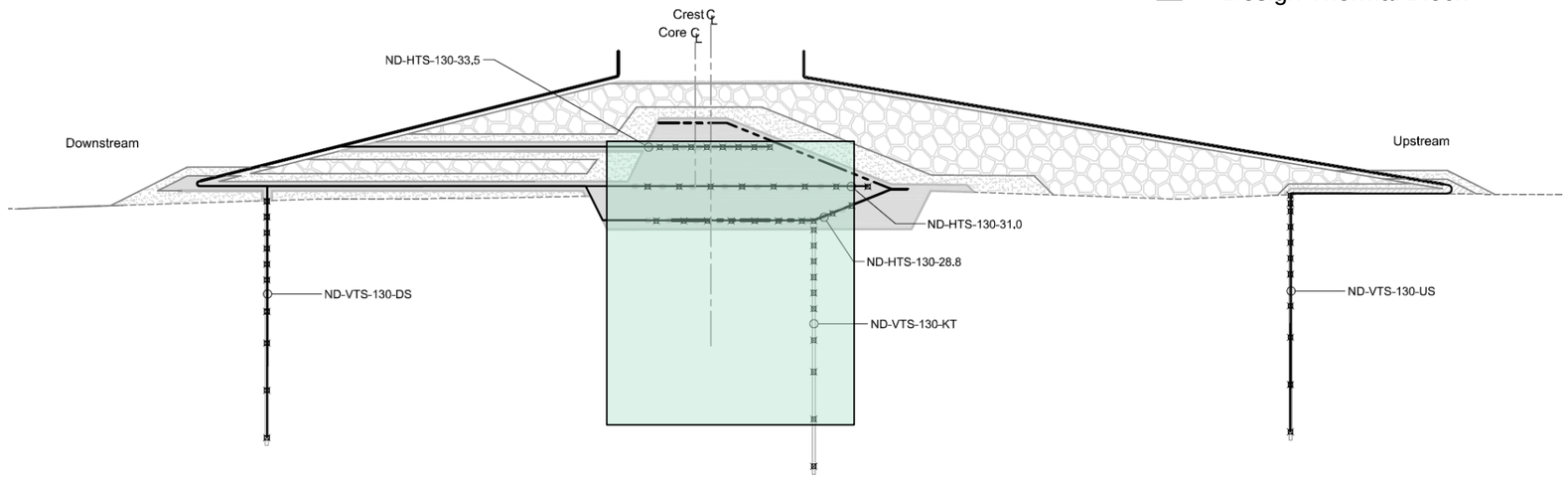


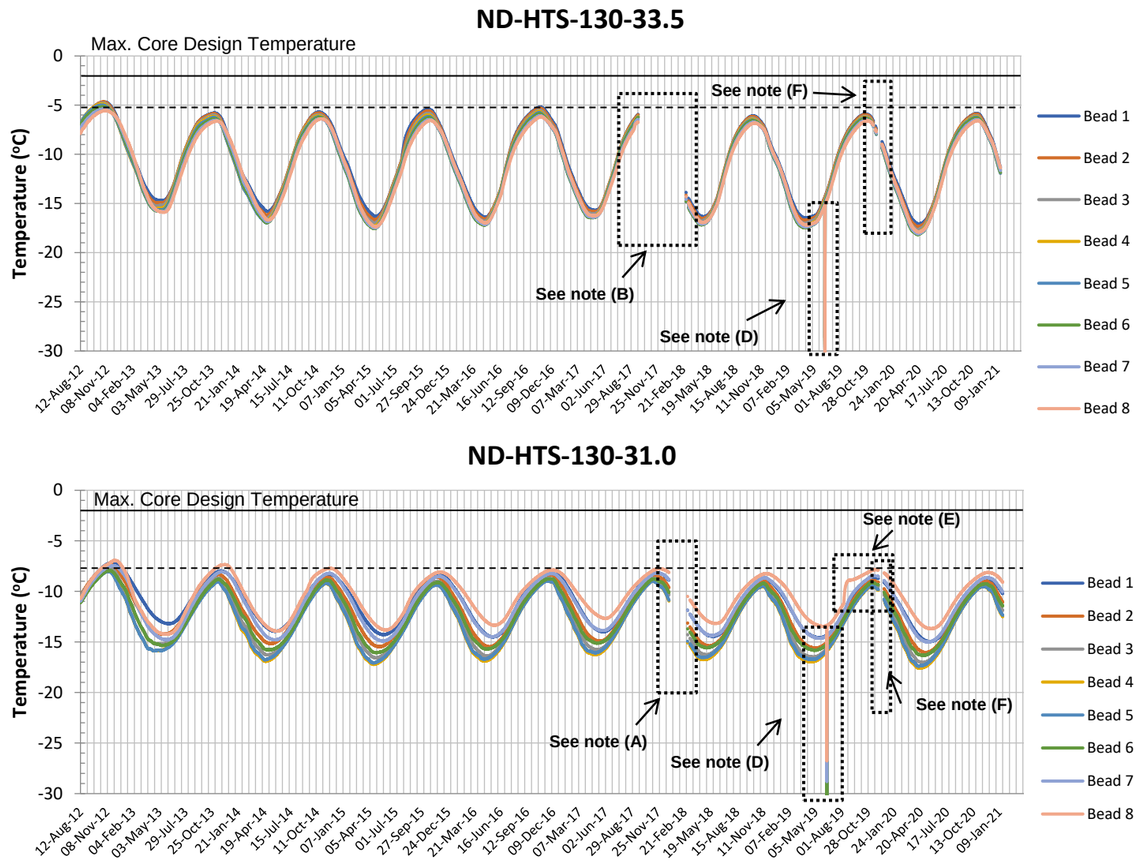
Note:

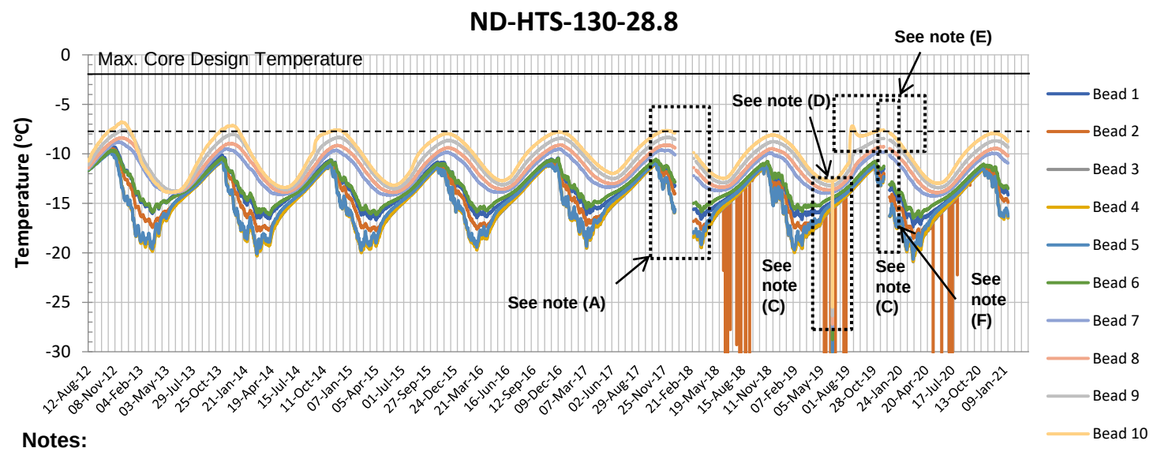
- Previous Data was recorded between August 2012 and December 2019

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
		Station 0+85 Vertical Ground Temperature Cable Readings by Location
Job No: 1CT022.057 Filename: 1_App_A_ND_GTC_PT1.pptx	DORIS TIA	Date: Feb. 2021 / Approved: PDL / Figure: **A.10**







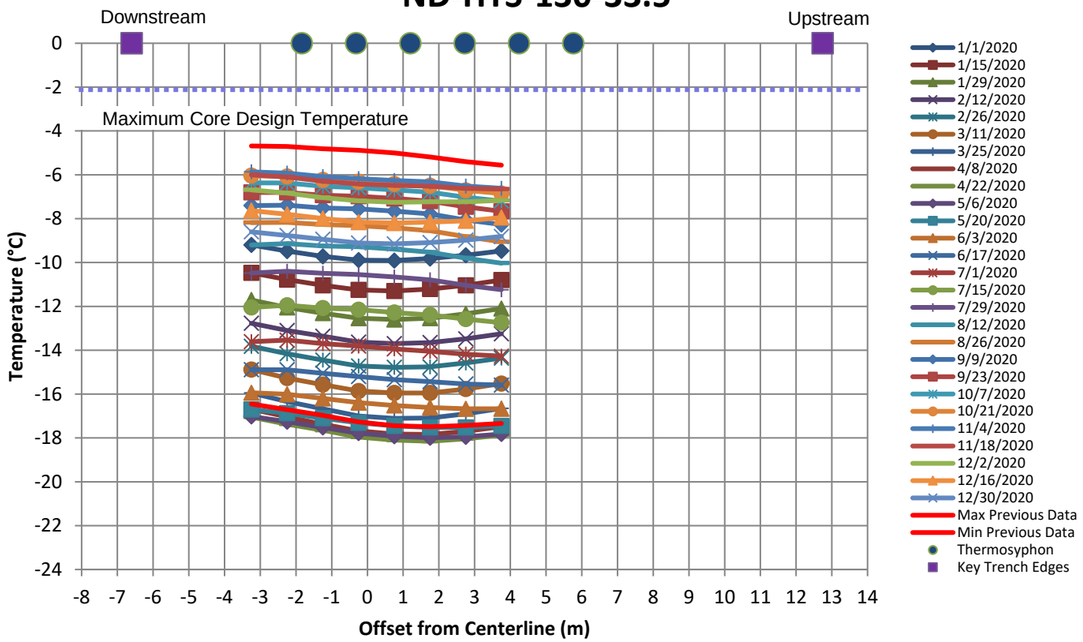


Notes:

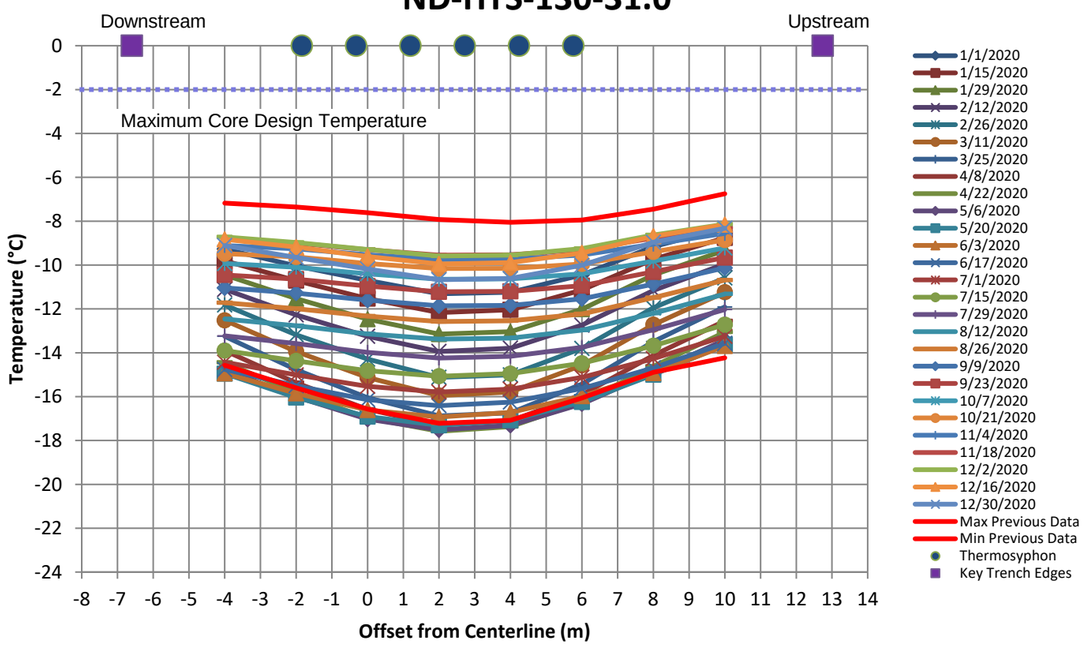
- Bead numbers increase from downstream to upstream (horizontal) and top to bottom (vertical)
- **(A)** Data logger was disconnected from January 1, 2018 to March 3, 2018 for recalibration
- **(B)** ND-HTS-130-33.5 was disconnected from September 24, 2018 to March 3, 2018 due to damage of the cable lead at the datalogger housing. The lead was repaired prior to the reconnection of the datalogger
- **(C)** Low temperature spikes and intermittent data logging from Bead 2 of ND-HTS-130-28.8 were observed in the Summer of 2018, 2019 and 2020. Likely a data logger issue, these spikes will be monitored
- **(D)** A low temperature spike for all beads was observed for a single reading on June 12, 2019 and is attributed to an instrumentation error
- **(E)** Temperature increase at the upstream most bead, this is related to the rise in reclaim pond water levels
- **(F)** Data collection gaps between November 21, 2019 and December 20, 2019

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
		Station 1+30 Horizontal Temperature Cable Temperature Vs. Time
Job No: 1CT022.057 Filename: 1_App_A_ND_GTC_PT2.pptx	DORIS TIA	Date: Feb. 2021 · Approved: PDL · Figure: **A.11**

ND-HTS-130-33.5



ND-HTS-130-31.0

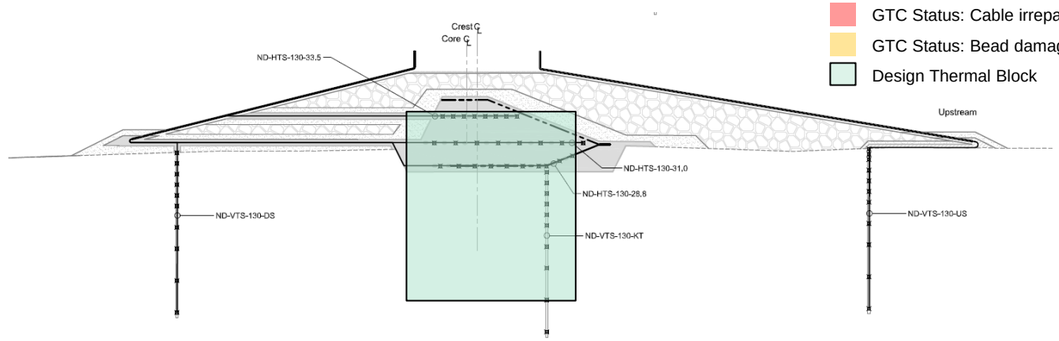


Note:

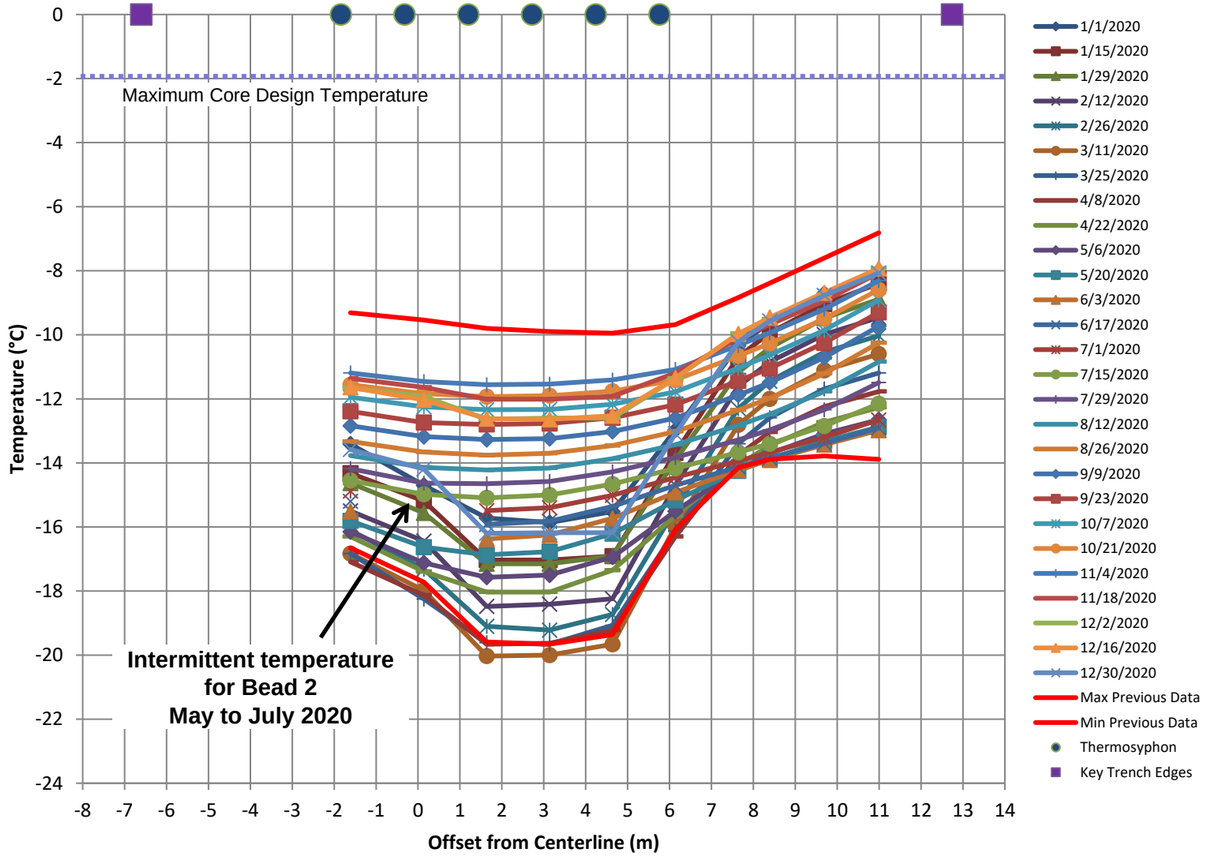
- Previous Data was recorded between August 2012 and December 2019

Legend:

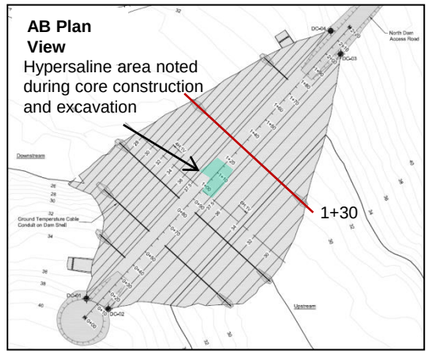
- GTC Status: Cable irreparably damaged
- GTC Status: Bead damaged or data missing
- Design Thermal Block



ND-HTS-130-28.8

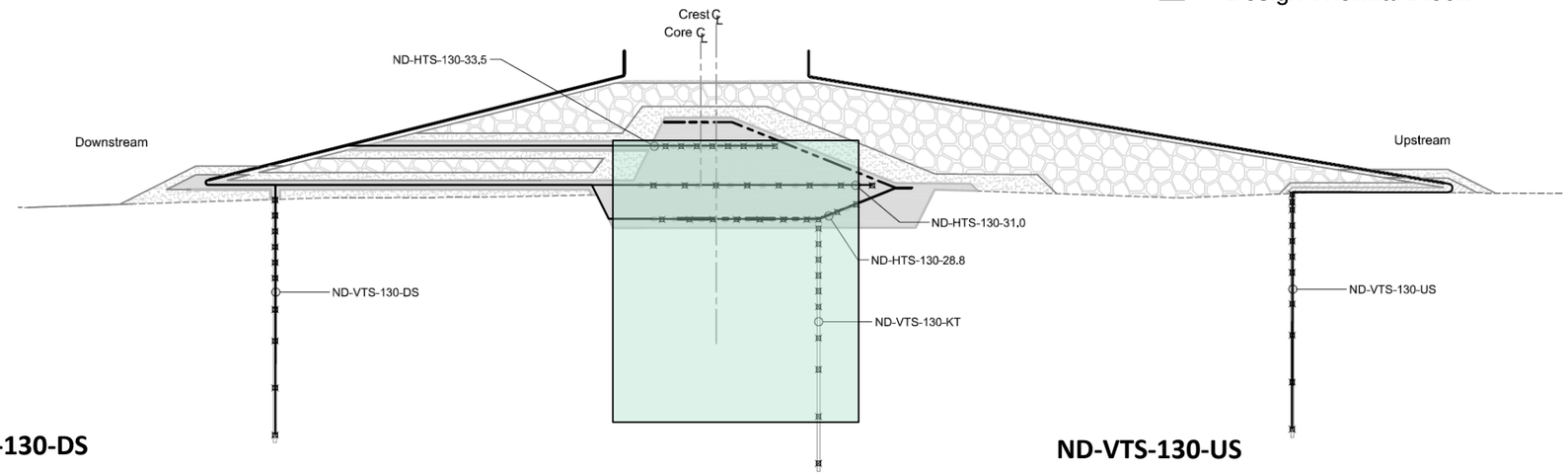


srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: 1_App_A_ND_GTC_PT1.pptx	DORIS TIA	**Station 1+30** **Horizontal Ground Temperature** **Cable Readings by Location**
		Date: Feb. 2021 / Approved: PDL / Figure: **A.12**

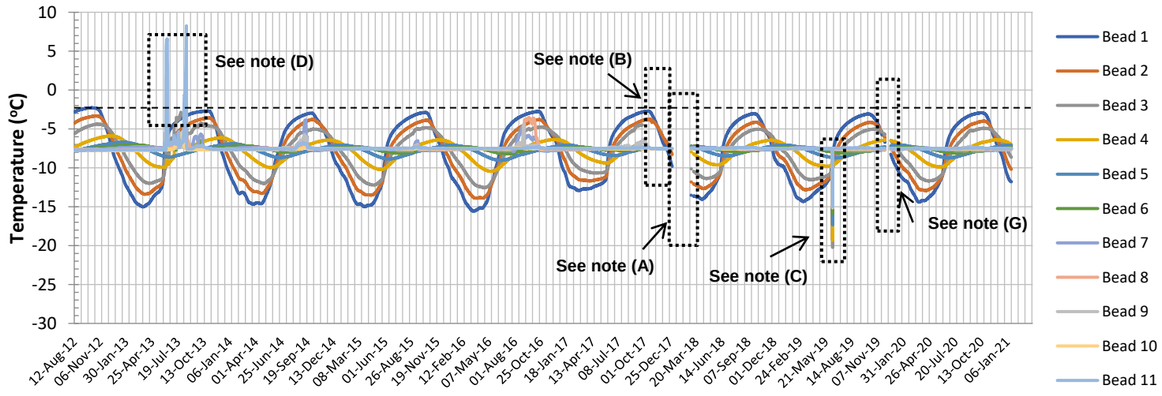


Legend:

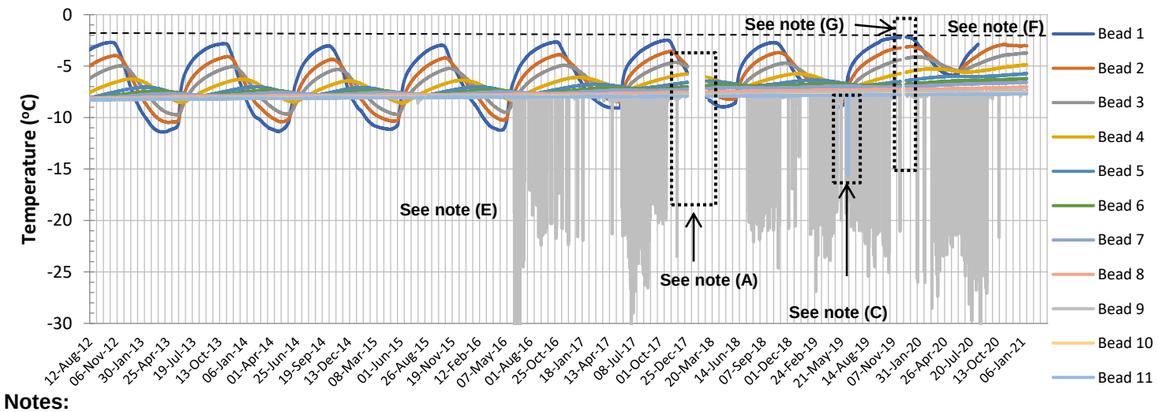
- GTC Status: Cable irreparably damaged
- GTC Status: Bead damaged or data missing
- Design Thermal Block



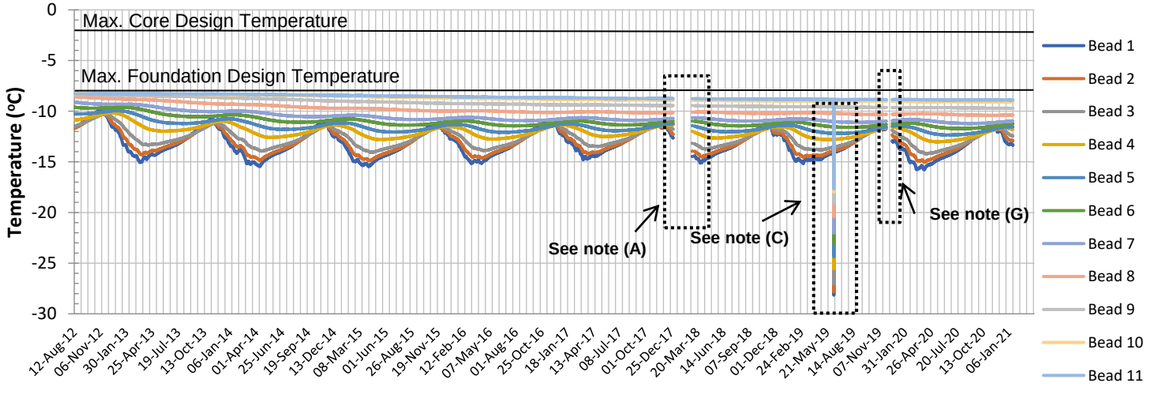
ND-VTS-130-DS



ND-VTS-130-US



ND-VTS-130-KT

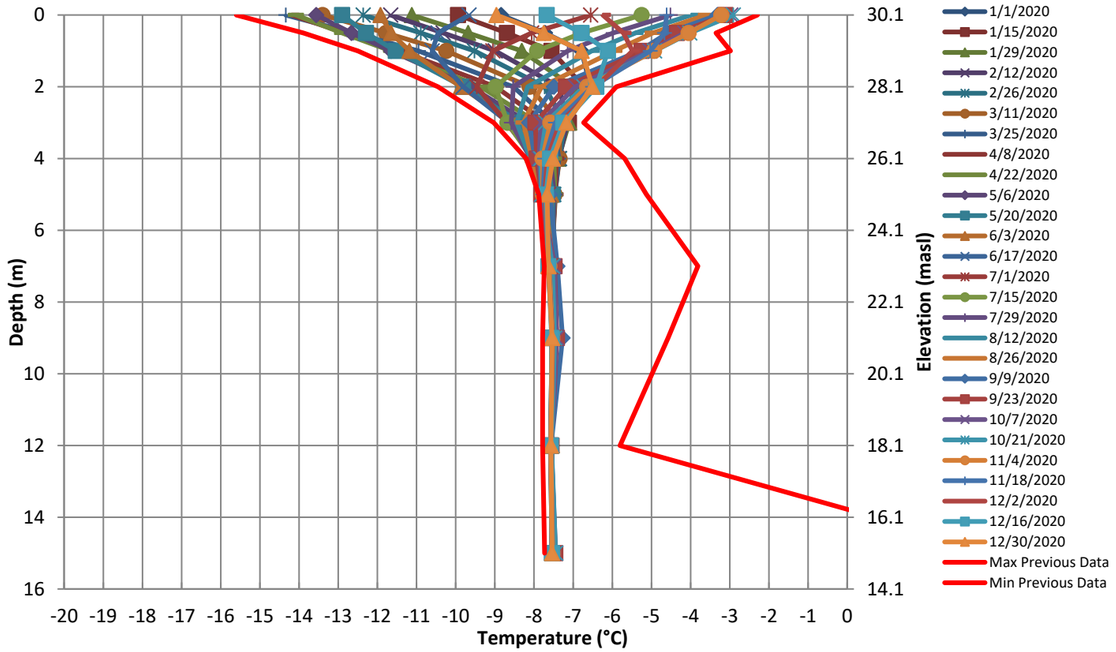


Notes:

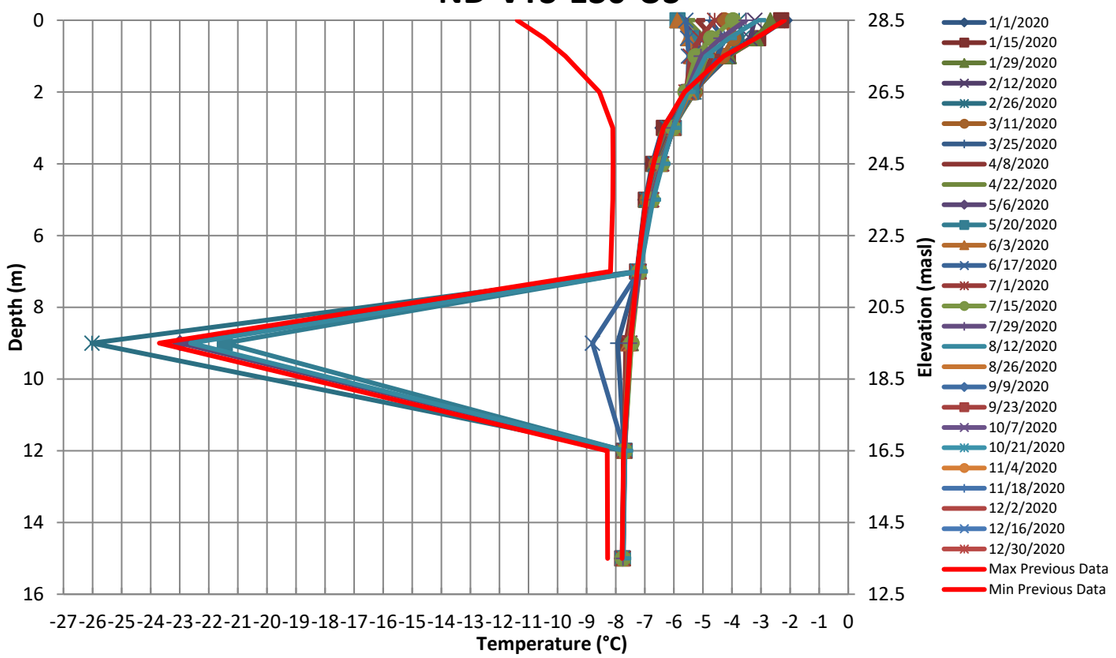
- Bead numbers increase from downstream to upstream (horizontal) and top to bottom (vertical)
- **(A)** Data logger was disconnected from January 1, 2018 to March 3, 2018 for recalibration
- **(B)** Beads 3 to 8 of ND-VTS-130-DS were disconnected from September 24, 2018 to March 3, 2018 due to damage of the cable lead at the datalogger housing. The lead was repaired prior to the reconnection of the datalogger
- **(C)** A low temperature spike for all beads was observed for a single reading on June 12, 2019 and is attributed to an instrumentation error
- **(D)** Temperature spike is attributed to an instrumentation error rather than a change in the ground temperature.
- **(E)** Reoccurring low temperature spikes in Bead 9 of ND-VTS-130-US began June 2016, around the same period when the Station 0+085 readings began to spike. These are expected to be an instrumentation issue rather than a change in the ground temperature regime
- **(F)** Bead 1 of ND-VTS-130-US became inactive on August 13, 2020
- **(G)** Data collection gaps between November 21, 2019 and December 20, 2019

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
		Station 1+30 **Vertical Temperature Cable** **Temperature Vs. Time**
Job No: 1CT022.057 Filename: 1_App_A_ND_GTC_PT2.pptx	DORIS TIA	Date: Feb. 2021 | Approved: PDL | Figure: **A.13**

ND-VTS-130-DS



ND-VTS-130-US

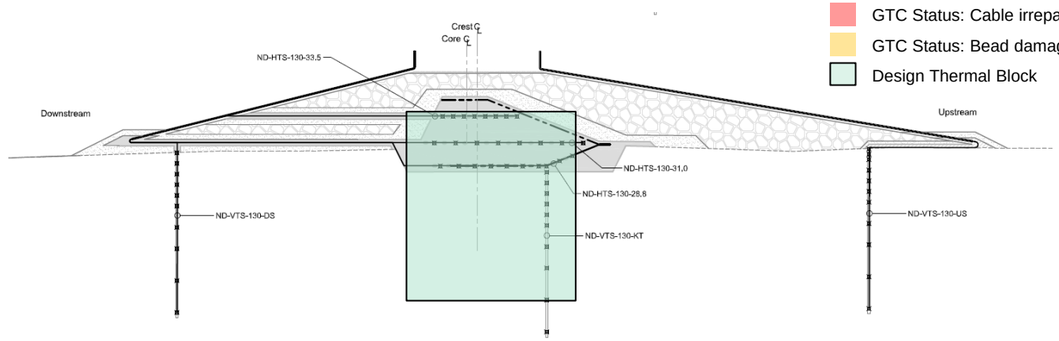


Note:

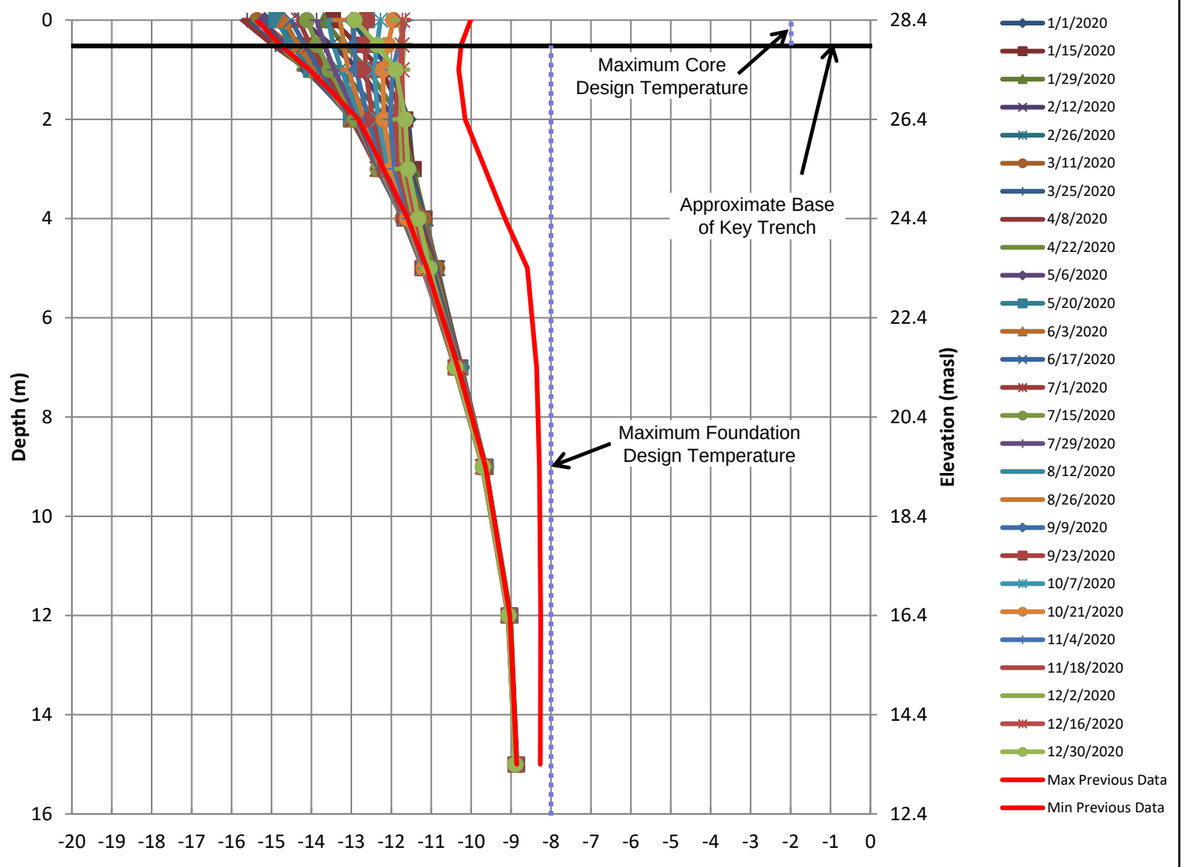
- Previous Data was recorded between August 2012 and December 2019

Legend:

- GTC Status: Cable irreparably damaged
- GTC Status: Bead damaged or data missing
- Design Thermal Block



ND-VTS-130-KT



srk consulting

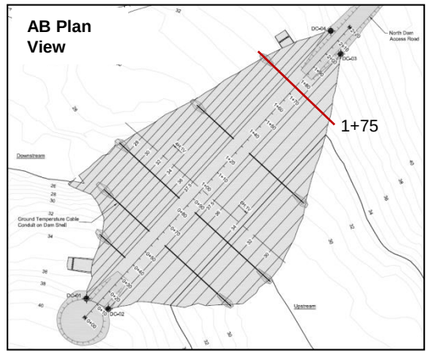
AGNICO EAGLE

2020 AGI – North Dam

Station 1+30
Vertical Ground Temperature Cable Readings by Location

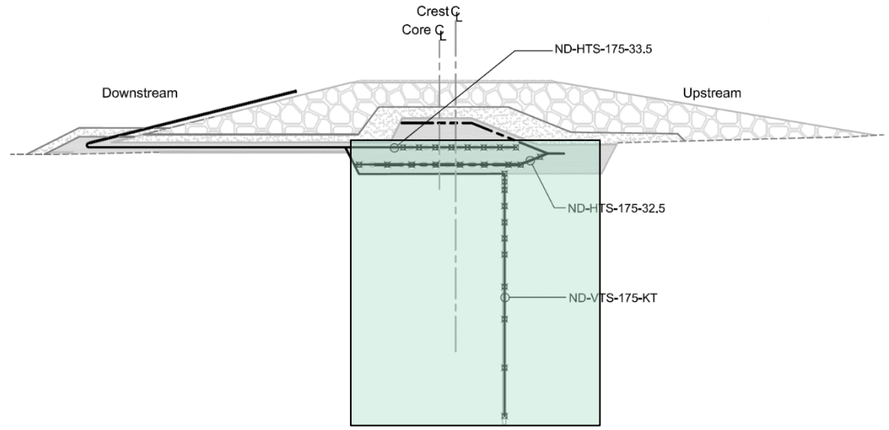
Job No:	1CT022.057	Date:	Approved:	Figure:
Filename:	1_App_A_ND_GTC_PT1.pptx	Feb. 2021	PDL	**A.14**

DORIS TIA

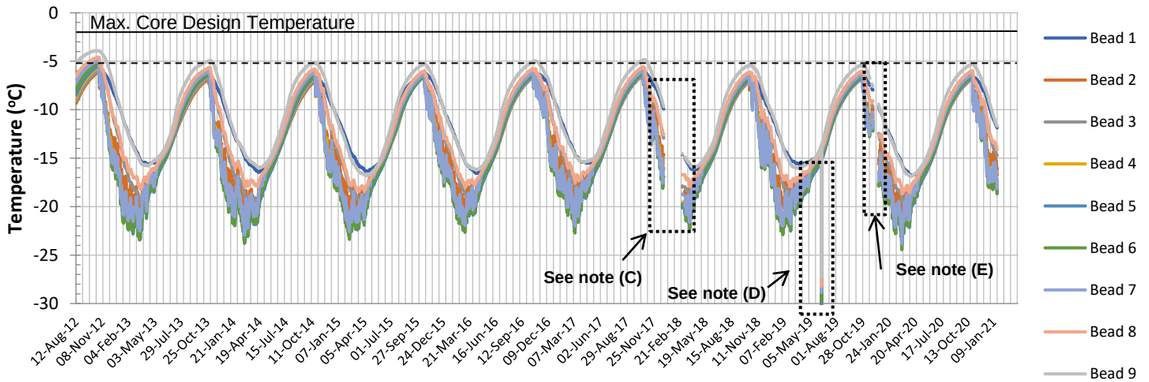


Legend:

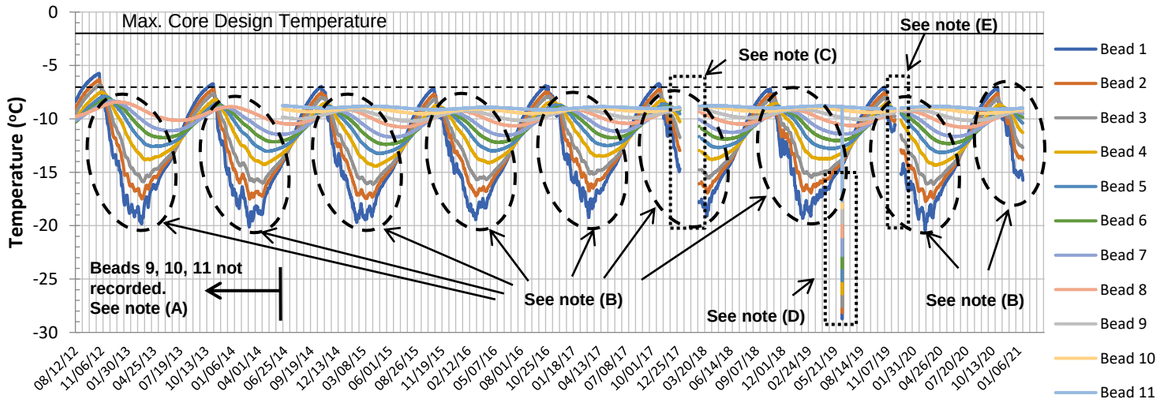
- GTC Status: Cable irreparably damaged
- GTC Status: Bead damaged or data missing
- Design Thermal Block



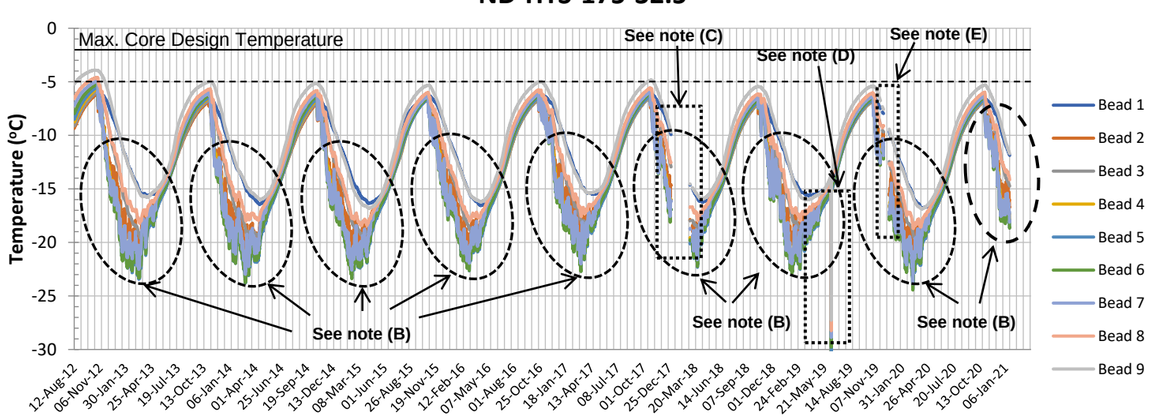
ND-HTS-175-33.5



ND-VTS-175-KT



ND-HTS-175-32.5

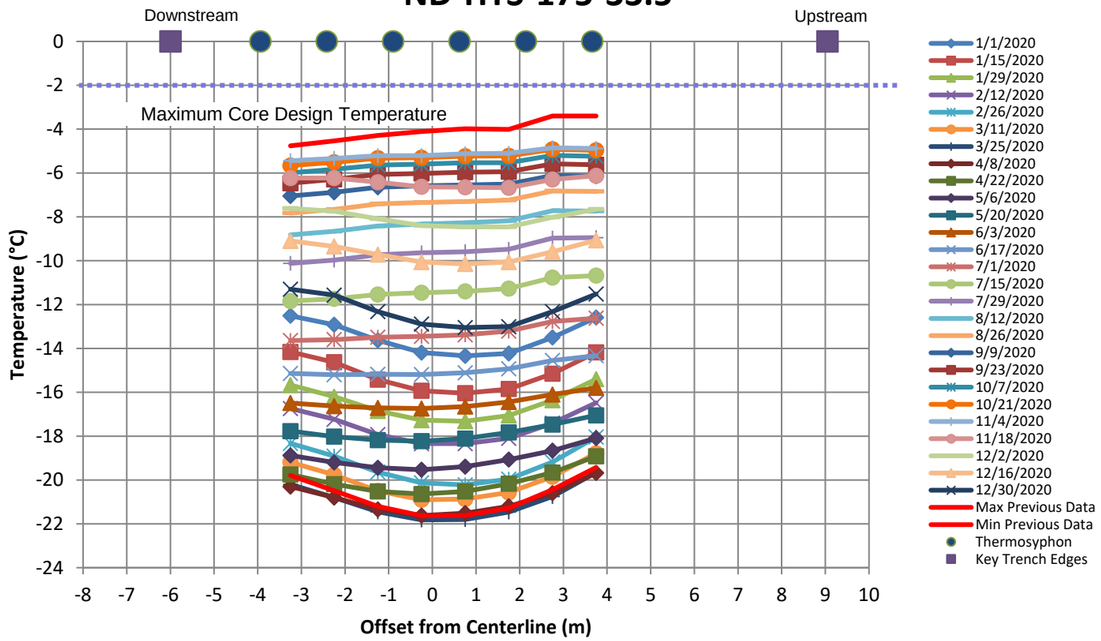


Notes:

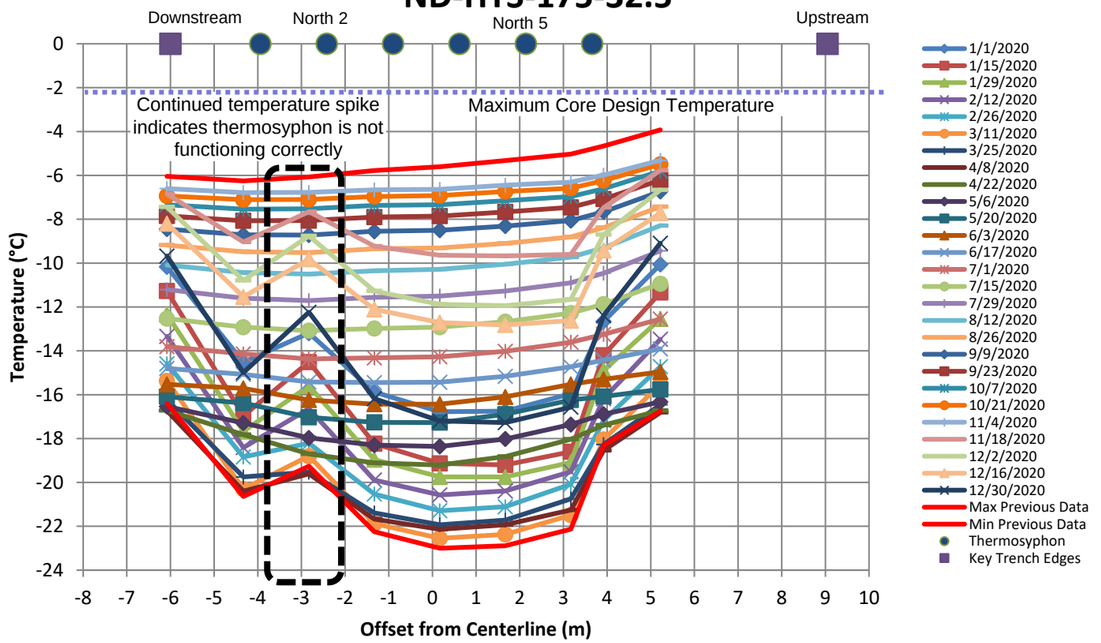
- Bead numbers increase from downstream to upstream (horizontal) and top to bottom (vertical)
- **(A)** Incorrectly connected to datalogger at ND-HTS-175-33.5; therefore, no readings for beads 9, 10 and 11.
- **(B)** Variation in Ground Temperature Cable readings during winter months due to close proximity of Ground Temperature Cable beads to thermosyphon pipes
- **(C)** Data logger was disconnected from January 1, 2018 to March 3, 2018 for recalibration
- **(D)** A low temperature spike for all beads was observed for a single reading on June 12, 2019 and is attributed to an instrumentation error
- **(E)** Data collection gaps between November 21, 2019 and December 20, 2019

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: 1_App_A_ND_GTC_PT2.pptx	DORIS TIA	**Station 1+75** **Ground Temperature Cable Temperature Vs. Time**
		Date: Feb. 2021 / Approved: PDL / Figure: **A.15**

ND-HTS-175-33.5



ND-HTS-175-32.5



1/1/2020
1/15/2020
1/29/2020
2/12/2020
2/26/2020
3/11/2020
3/25/2020
4/8/2020
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5/6/2020
5/20/2020
6/3/2020
6/17/2020
7/1/2020
7/15/2020
7/29/2020
8/12/2020
8/26/2020
9/9/2020
9/23/2020
10/7/2020
10/21/2020
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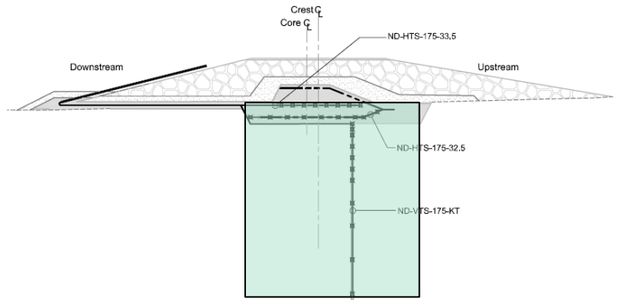
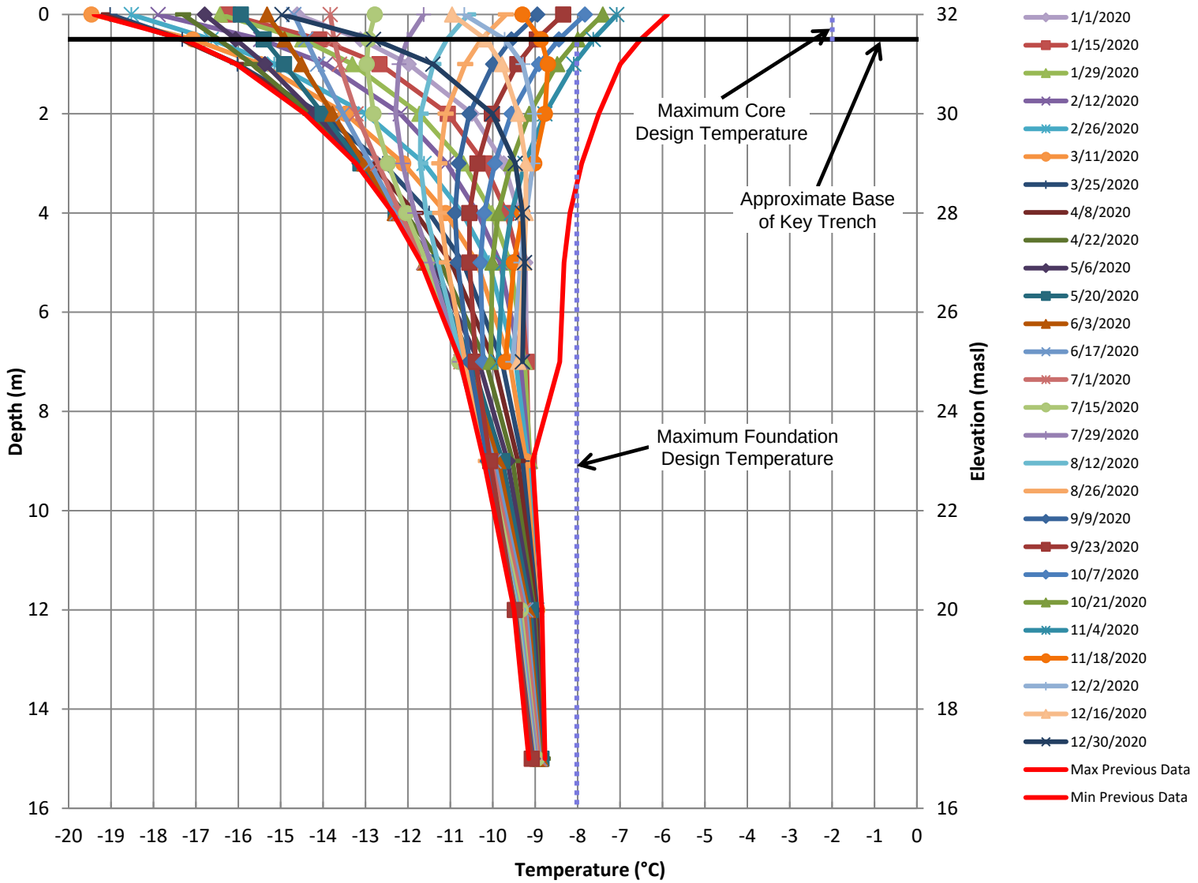
Max Previous Data
Min Previous Data
Thermosyphon
Key Trench Edges



Legend:

- GTC Status: Cable irreparably damaged
- GTC Status: Bead damaged or data missing
- Design Thermal Block

ND-VTS-175-KT



1/1/2020
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7/1/2020
7/15/2020
7/29/2020
8/12/2020
8/26/2020
9/9/2020
9/23/2020
10/7/2020
10/21/2020
11/4/2020
11/18/2020
12/2/2020
12/16/2020
12/30/2020
Max Previous Data
Min Previous Data

Note:

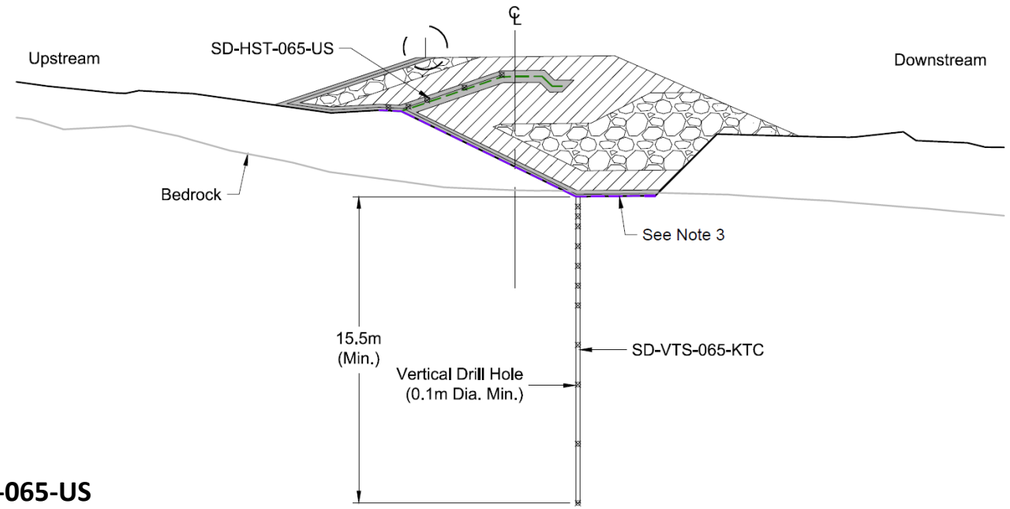
- Previous Data was recorded between August 2012 and December 2019

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
		Station 1+75 Ground Temperature Cable Readings by Location
Job No: 1CT022.057 Filename: 1_App_A_ND_GTC_PT1.pptx	DORIS TIA	Date: Feb. 2021 / Approved: PDL / Figure: **A.16**

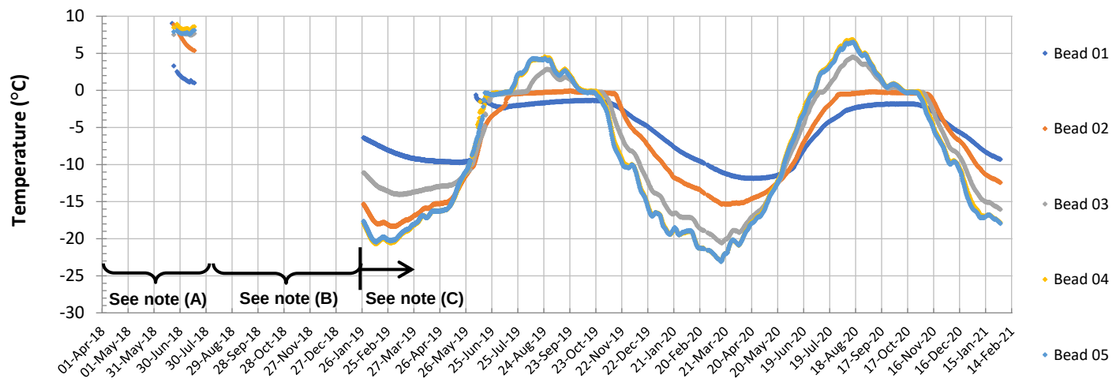
Legend:

GTC Status: Cable irreparably damaged

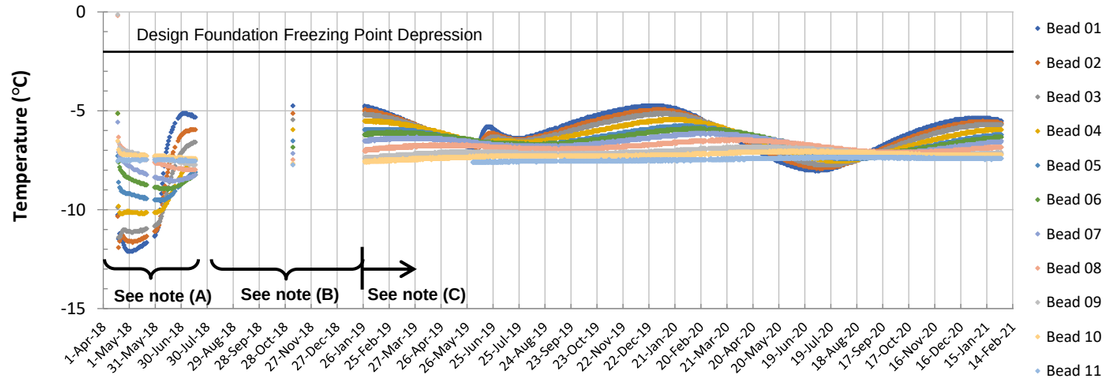
GTC Status: Bead damaged or data missing



SD-HTS-065-US



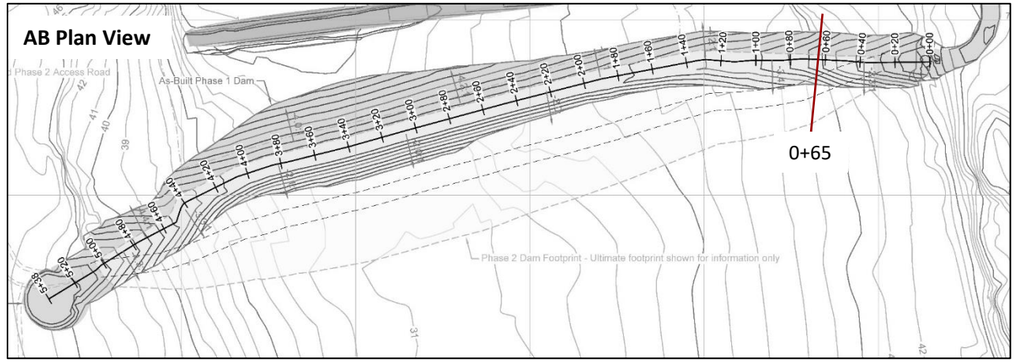
SD-VTS-065-KT

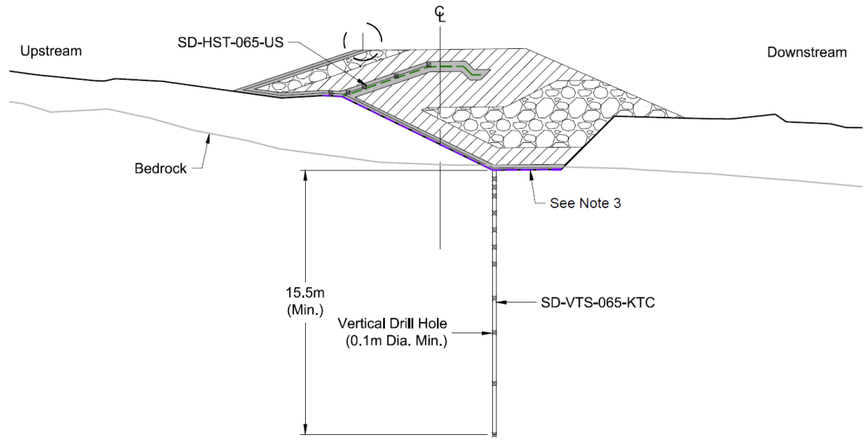


Notes:

- Bead numbers increase from upstream to downstream (horizontal) and top to bottom (vertical)
- Cables were damaged after construction but repaired.
- **(A)** Measurements collected between April and August 2018 were taken during construction
- **(B)** No measurements were collected between September 2018 to late January 2019 as the GTC's were extended and repaired, and the data loggers were set up on site. One set of manual spot measurements were collected in November 2018 to check interim dam performance
- **(C)** From the end of January 2019 onwards, data loggers were installed to provide higher resolution and more frequent data transmissions

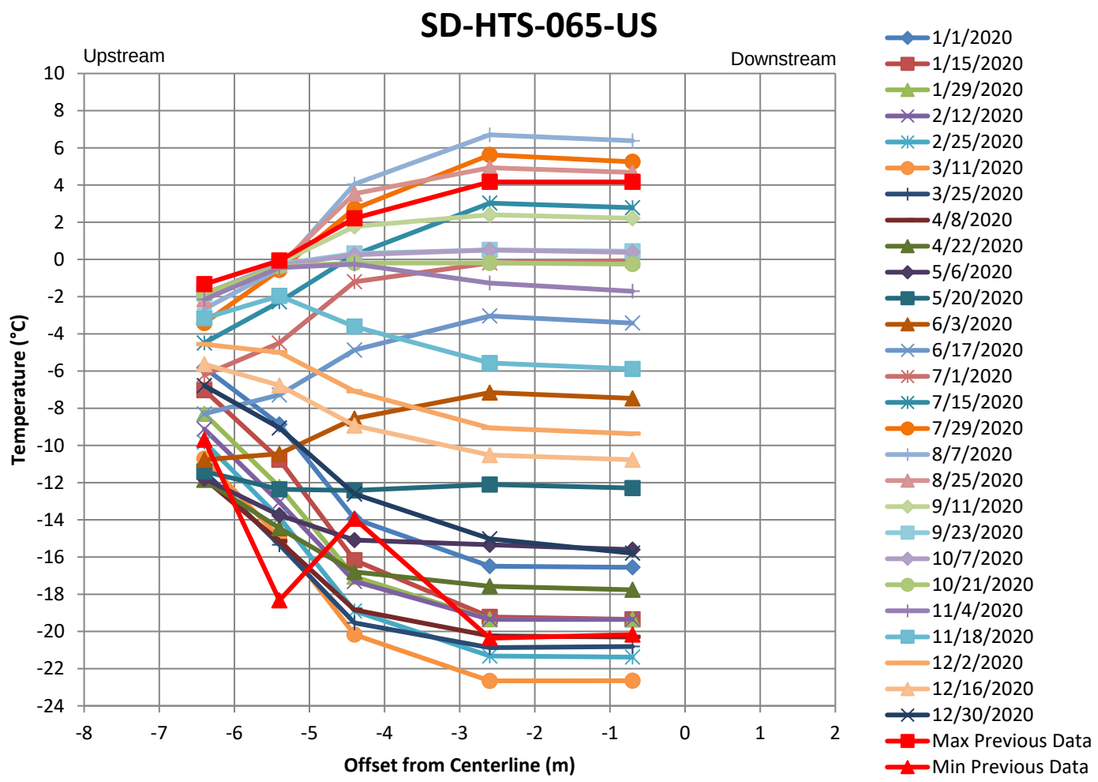
srk consulting	AGNICO EAGLE	2020 AGI – South Dam
Job No: 1CT022.057 Filename: 1_App_A_SD_GTC.pptx	DORIS TIA	**Station 0+65** **Ground Temperature Cable** **Temperature Vs. Time**
		Date: Feb. 2021 / Approved: PDL / Figure: **A.17**

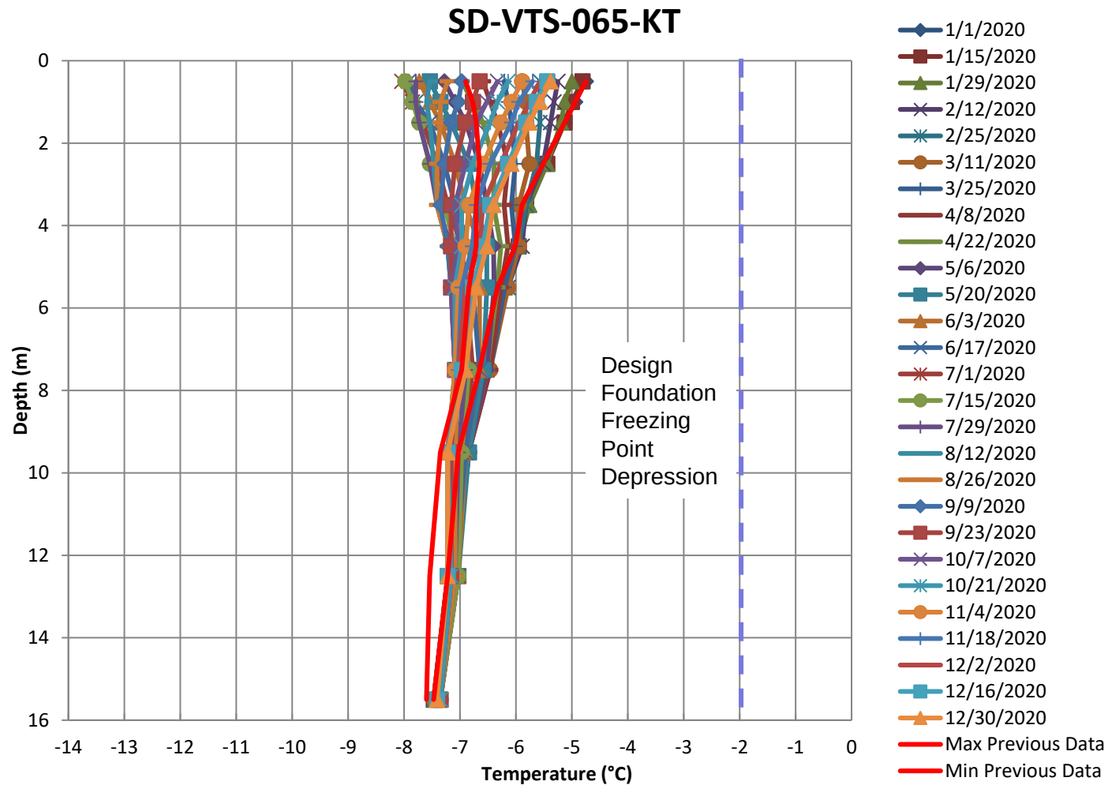




Legend:

- GTC Status: Cable irreparably damaged
- GTC Status: Bead damaged or data missing



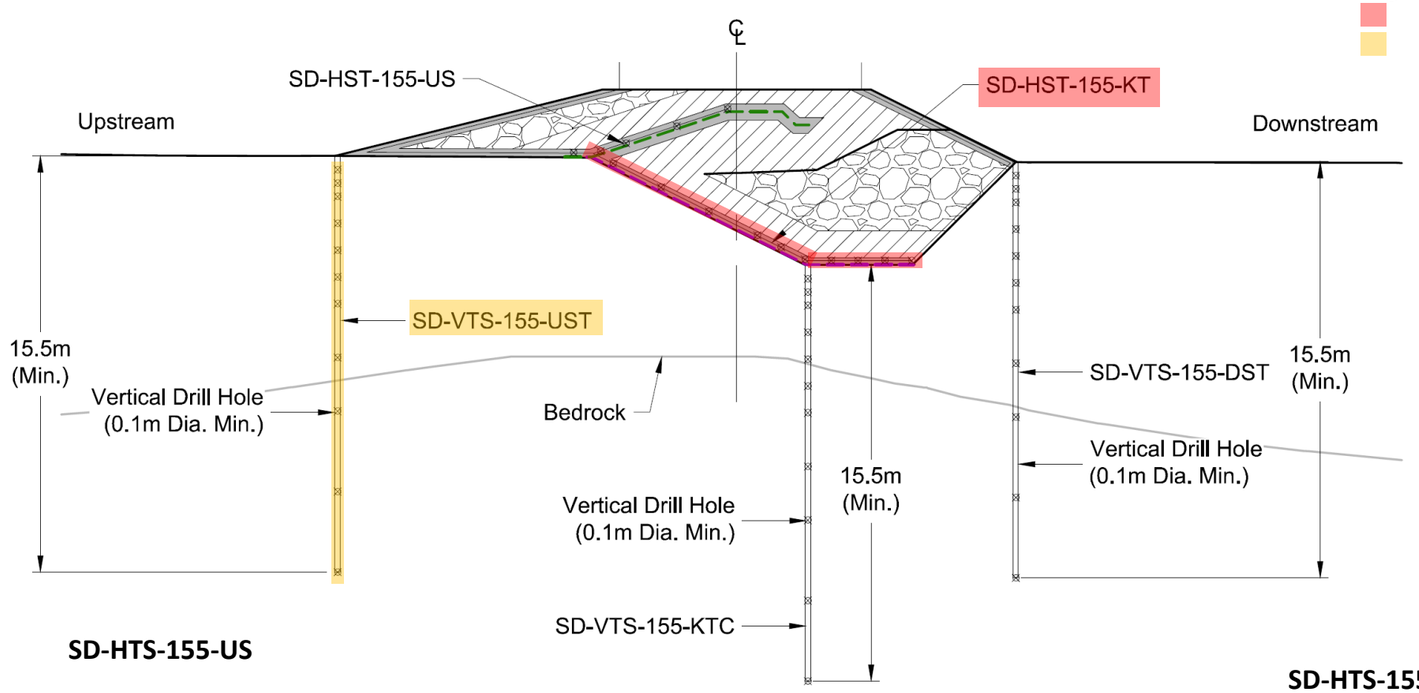


Note:

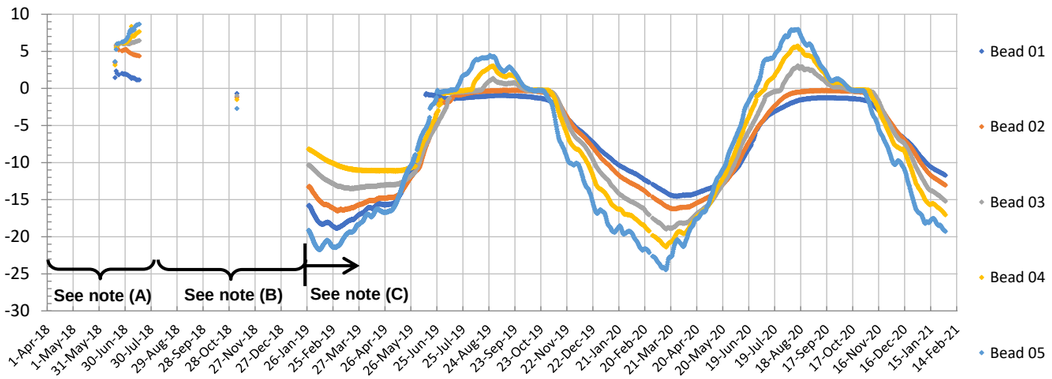
- Previous Data was recorded between January 2019 and December 2019

srk consulting	AGNICO EAGLE	2020 AGI – South Dam
		Station 0+65 **Ground Temperature Cable Readings by Location**
Job No: 1CT022.057 Filename: 1_App_A_SD_GTC.pptx	DORIS TIA	Date: Feb. 2021 | Approved: PDL | Figure: **A.18**

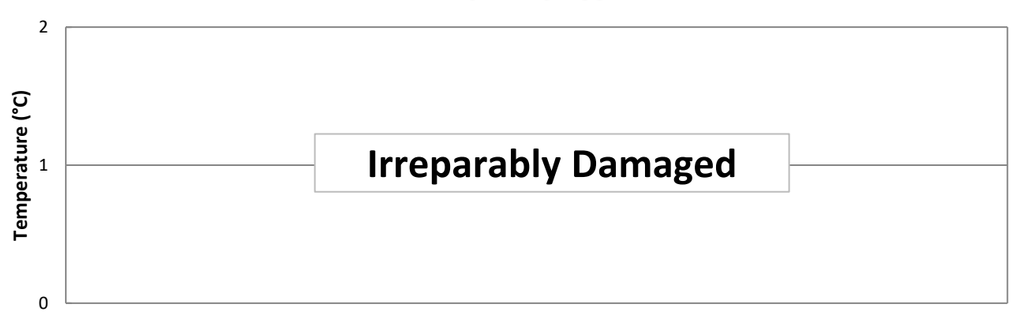
Legend:
- GTC Status: Cable irreparably damaged
- GTC Status: Bead damaged or data missing



SD-HTS-155-US

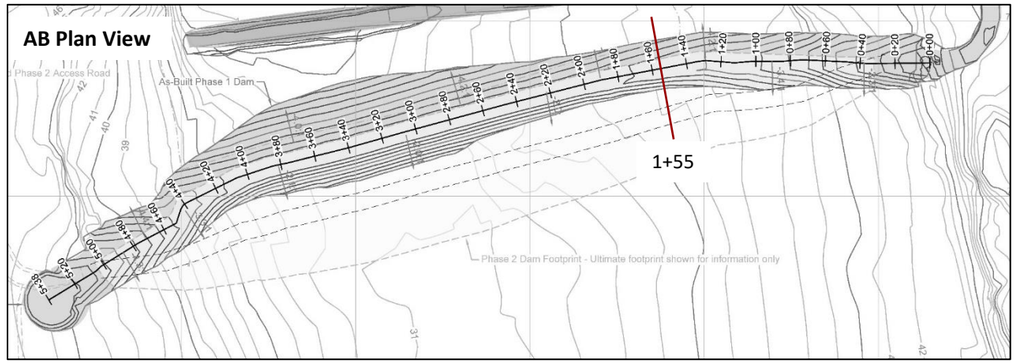


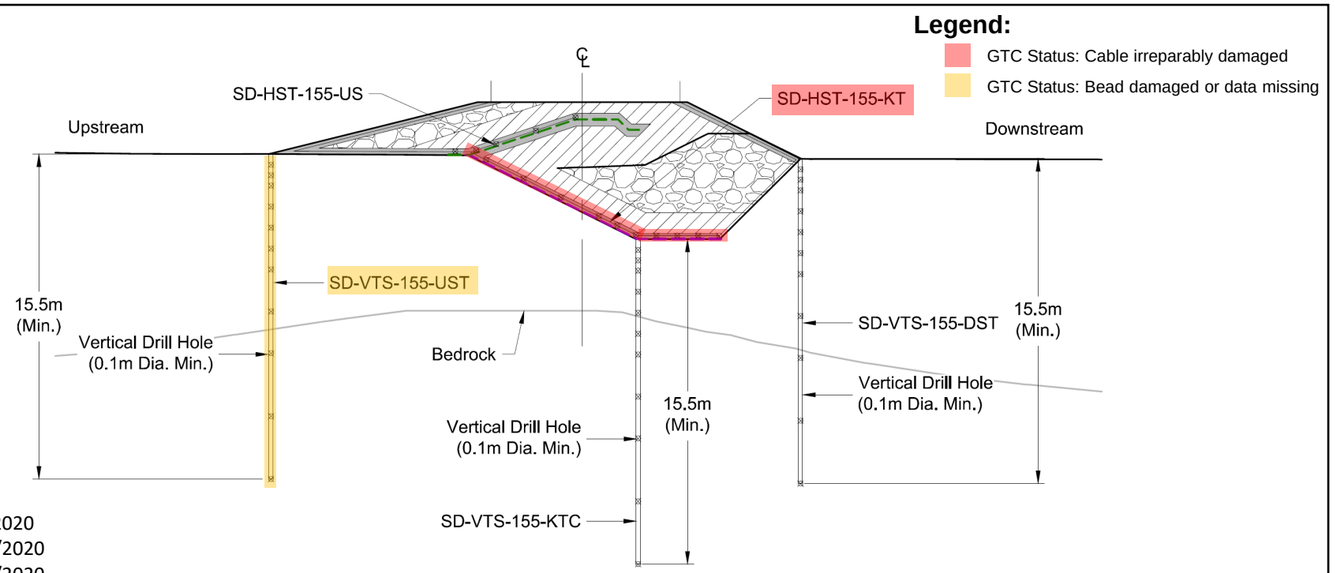
SD-HTS-155-KT

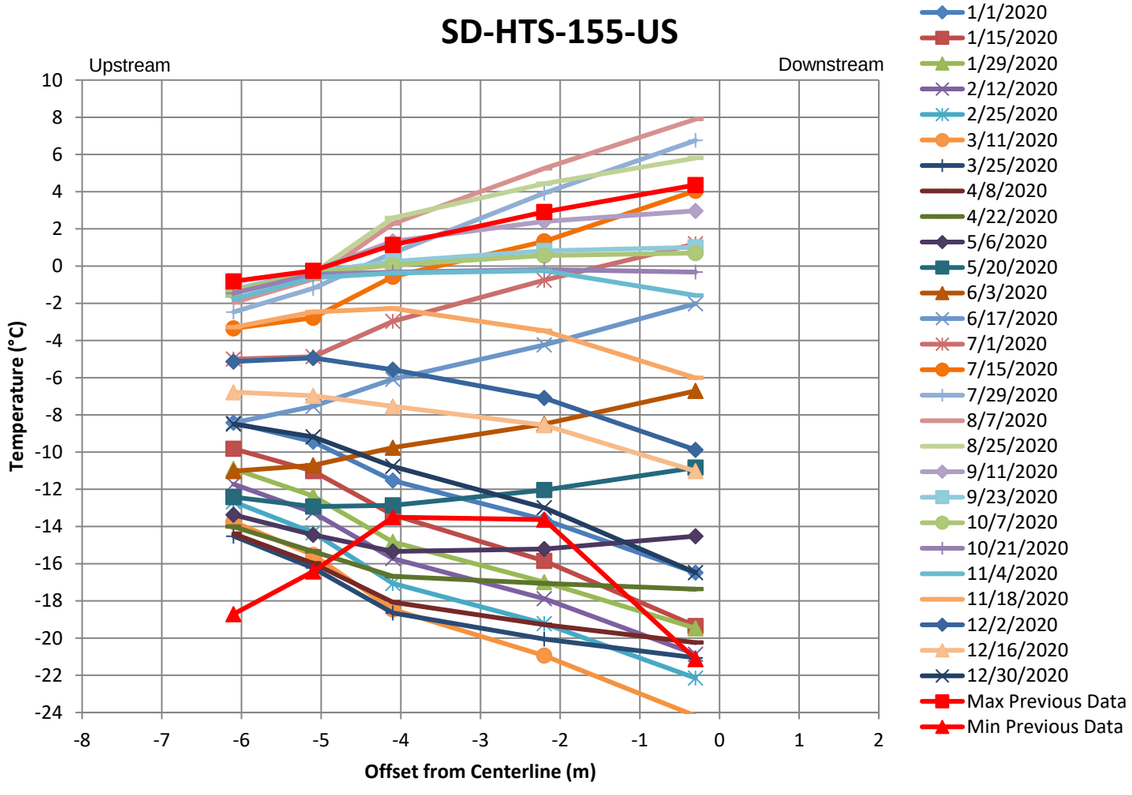


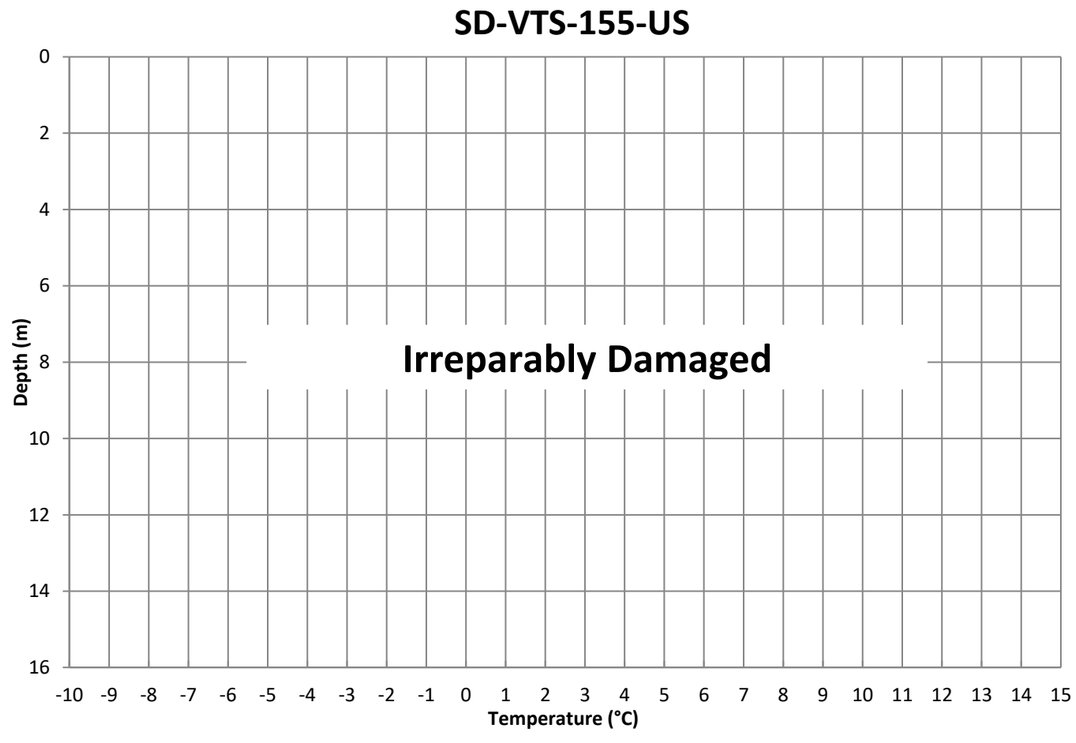
Notes:
- Bead numbers increase from upstream to downstream (horizontal) and top to bottom (vertical)
- SD-HTS-155-KT cable irreparably damaged during construction
- **(A)** Measurements collected between April and August 2018 were taken during construction
- **(B)** No measurements were collected between September 2018 to late January 2019 as the GTC's were extended and repaired, and the data loggers were set up on site. One set of manual spot measurements were collected in November 2018 to check interim dam performance
- **(C)** From the end of January 2019 onwards, data loggers were installed to provide higher resolution and more frequent data transmissions

srk consulting	AGNICO EAGLE	2020 AGI – South Dam
		Station 1+55 Horizontal Temperature Cable Temperature Vs. Time
Job No: 1CT022.057 Filename: 1_App_A_SD_GTC.pptx	DORIS TIA	Date: Feb. 2021 / Approved: PDL / Figure: **A.19**





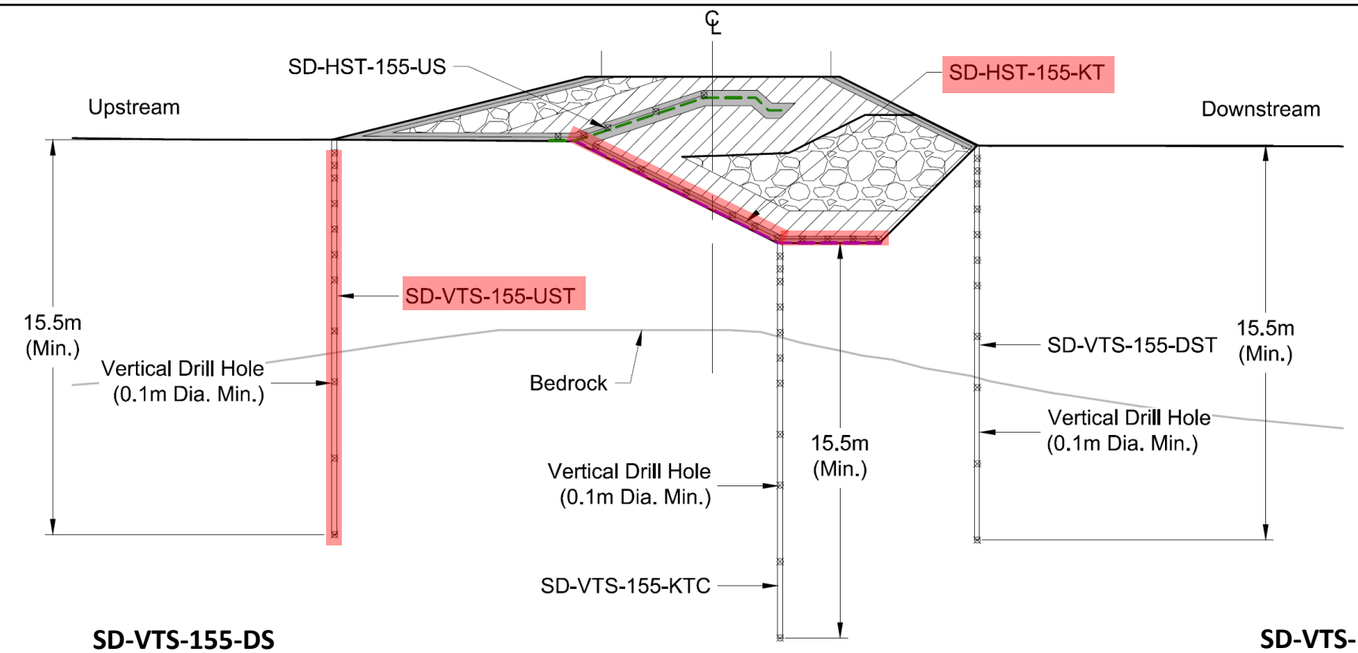




Notes:

- Previous Data was recorded between January 2019 and December 2019
- SD-HTS-155-KT irreparably damaged during construction
- No data collected after November 7, 2019 for SD-HTS-155-US. GTC assumed to be irreparably damaged

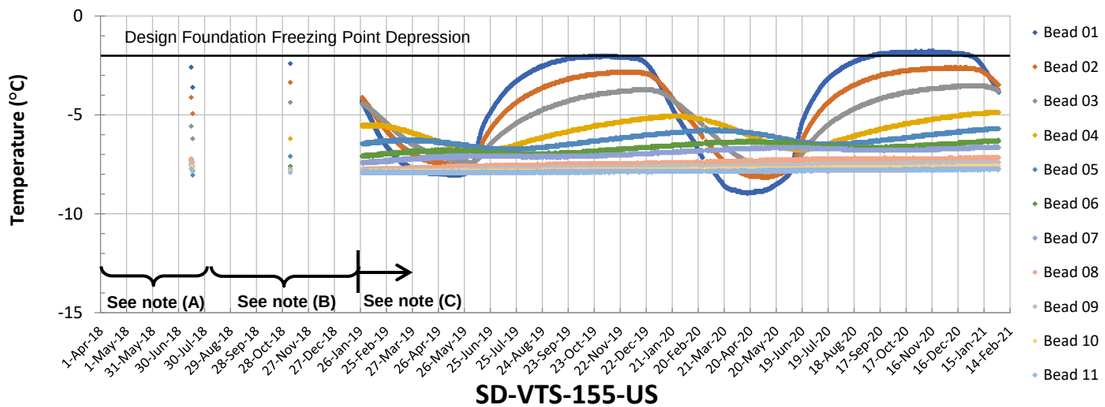
srk consulting	AGNICO EAGLE	2020 AGI – South Dam
Job No: 1CT022.057 Filename: 1_App_A_SD_GTC.pptx	DORIS TIA	**Station 1+55 Ground Temperature Cable Readings by Location** Date: Feb. 2021 · Approved: PDL · Figure: **A.20**



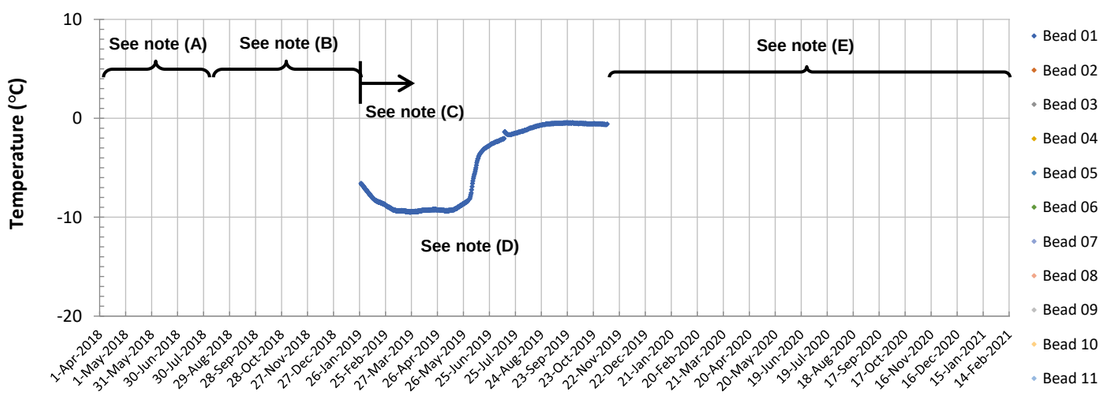
Legend:

- GTC Status: Cable irreparably damaged
- GTC Status: Bead damaged or data missing

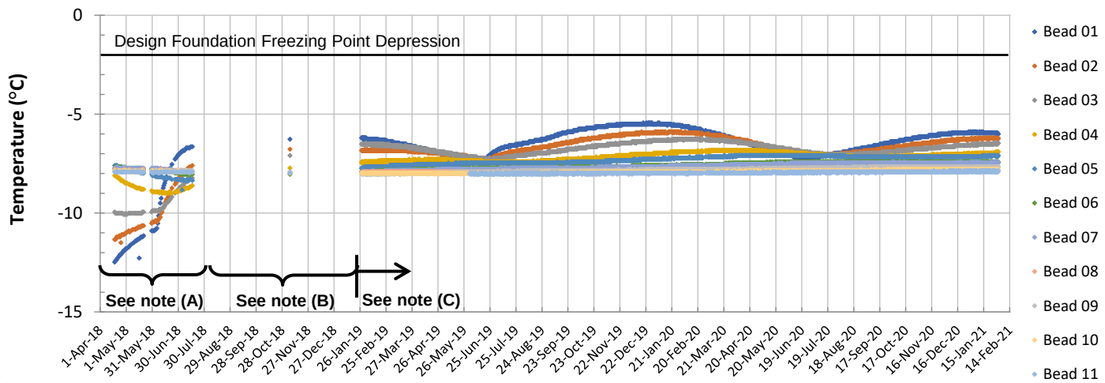
SD-VTS-155-DS



SD-VTS-155-US



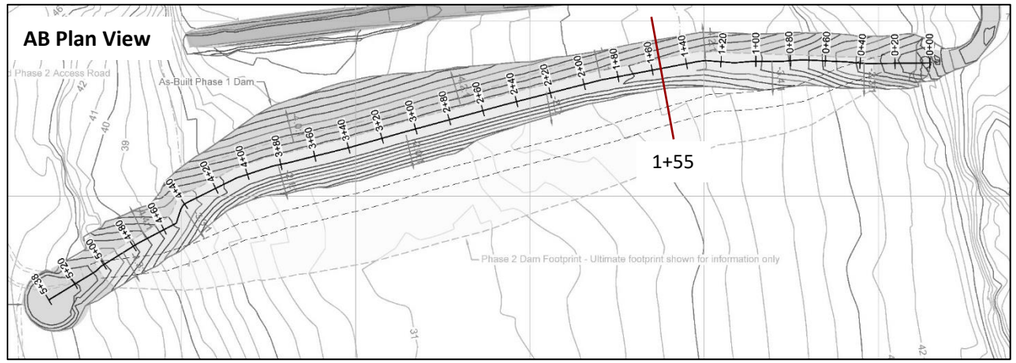
SD-VTS-155-KT

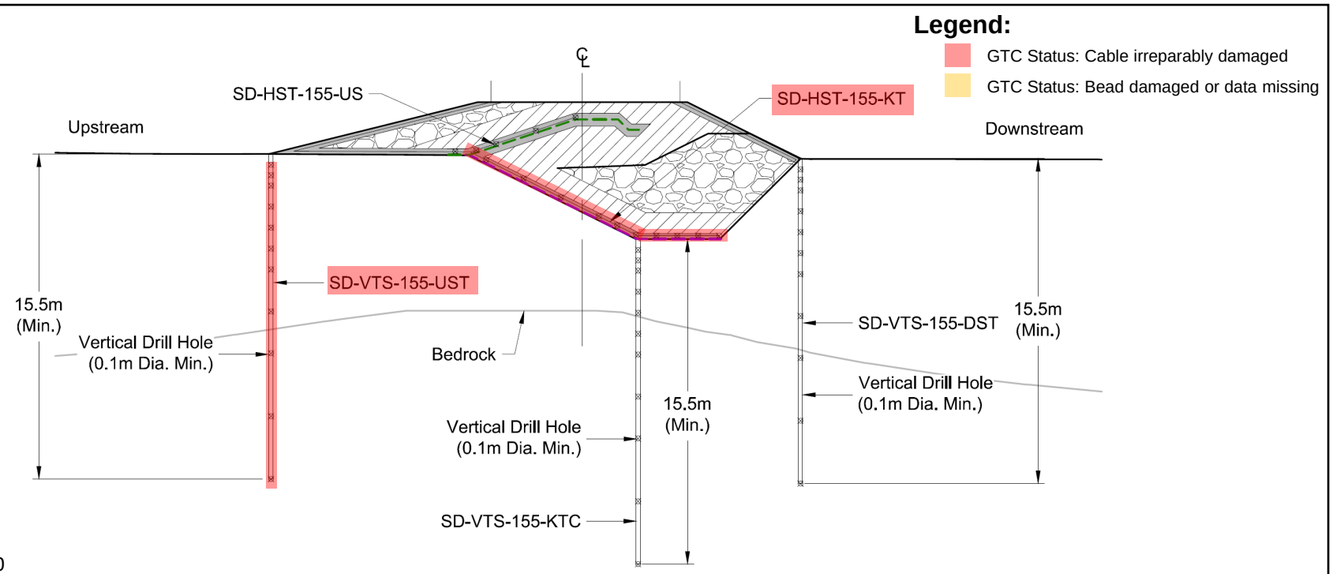


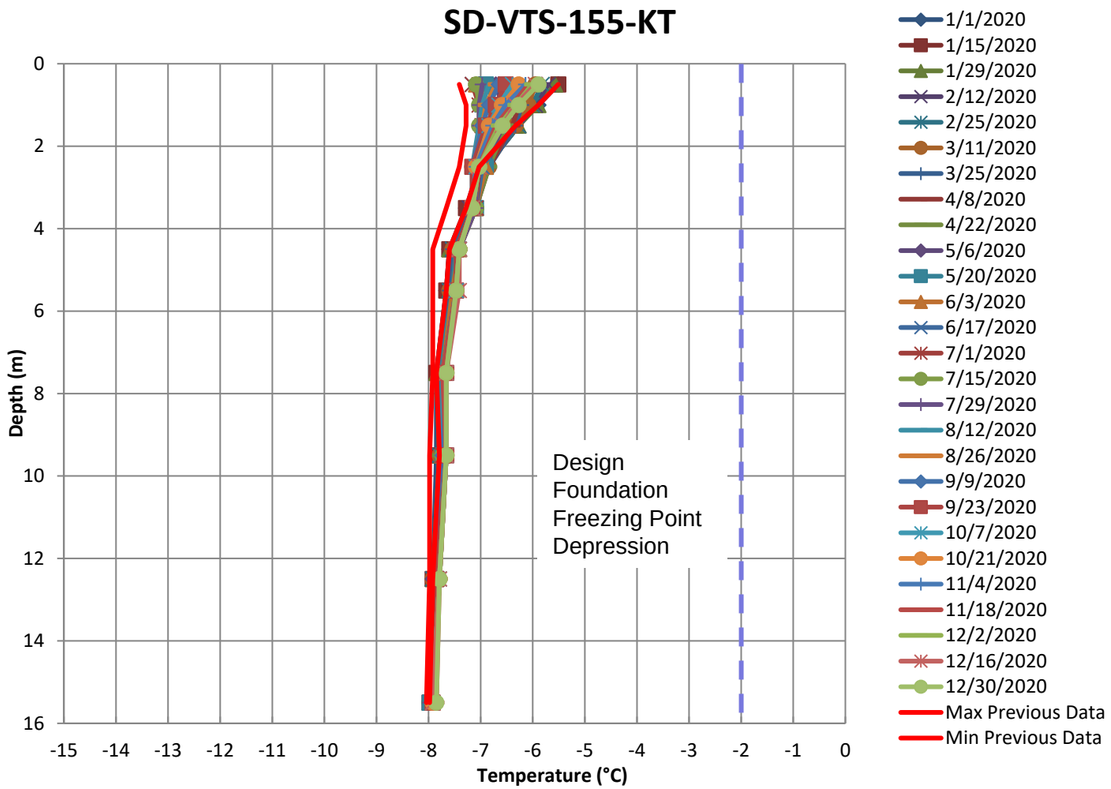
Notes:

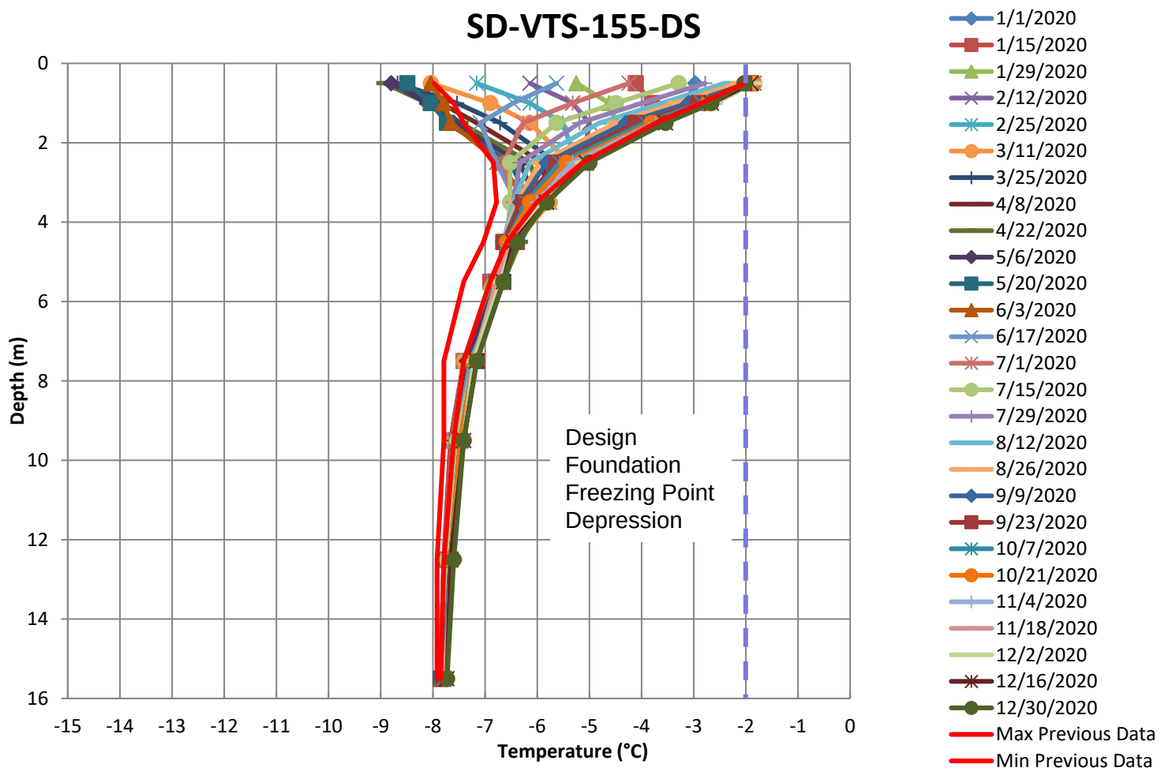
- Bead numbers increase from upstream to downstream (horizontal) and top to bottom (vertical)
- **(A)** Measurements collected between April and August 2018 were taken during construction
- **(B)** No measurements were collected between September 2018 to late January 2019 as the GTC's were extended and repaired, and the data loggers were set up on site. One set of manual spot measurements were collected for some cables in November 2018 to check interim dam performance
- **(C)** From the end of January 2019 onwards, data loggers were installed to provide higher resolution and more frequent data transmissions
- **(D)** Only top bead working. Beads 2-11 are damaged and not transmitting
- **(E)** No data collected after November 7, 2019 for SD-HTS-155-US. GTC assumed to be irreparably damaged

srk consulting	AGNICO EAGLE	2020 AGI – South Dam
Job No: 1CT022.057 Filename: 1_App_A_SD_GTC.pptx	DORIS TIA	**Station 1+55** **Vertical Temperature Cable** **Temperature Vs. Time**
		Date: Feb. 2021 / Approved: PDL / Figure: **A.21**





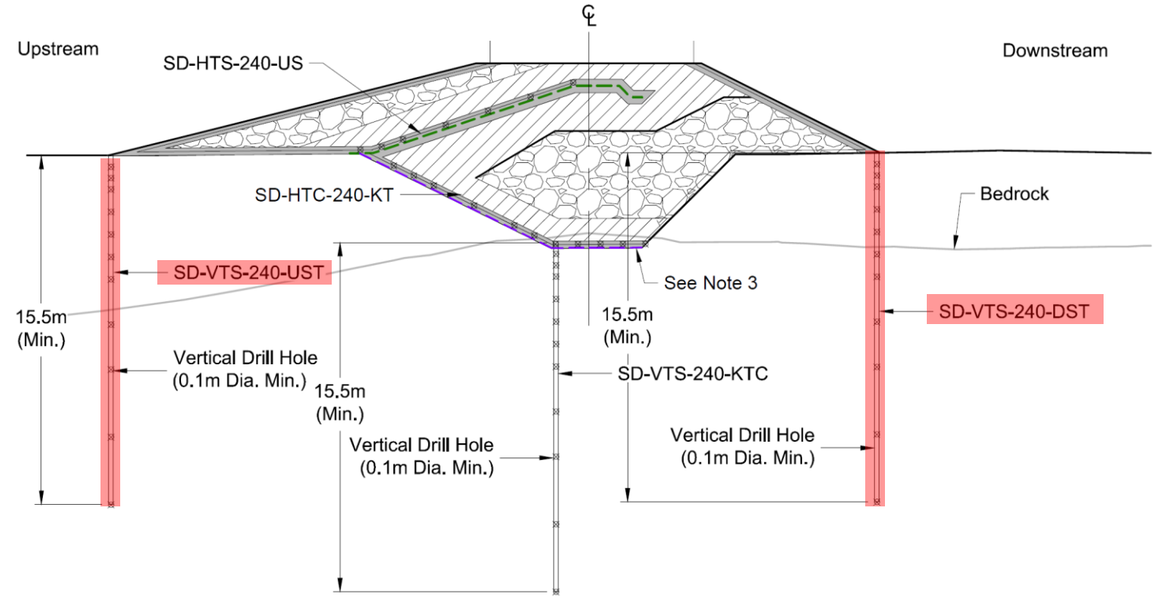




Note:

- Previous Data was recorded between January 2019 and December 2019

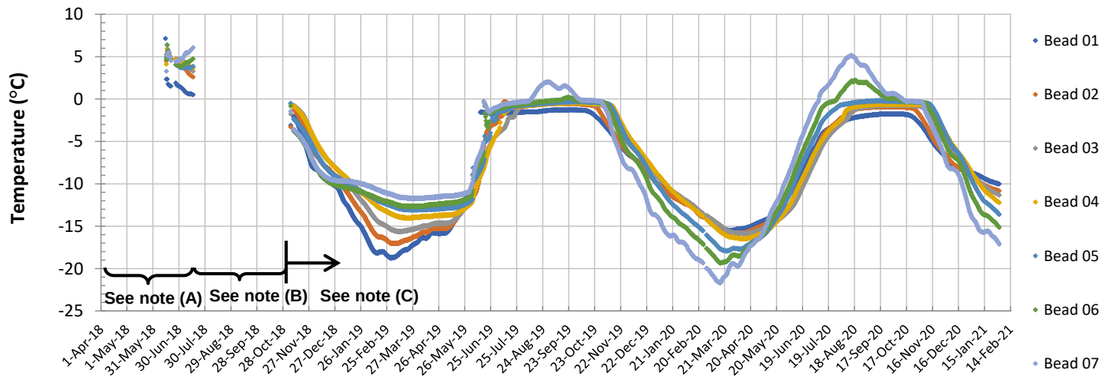
srk consulting	AGNICO EAGLE	2020 AGI – South Dam
		Station 1+55 Ground Temperature Cable Readings by Location
Job No: 1CT022.057 Filename: 1_App_A_SD_GTC.pptx	DORIS TIA	Date: Feb. 2021 · Approved: PDL · Figure: **A.22**



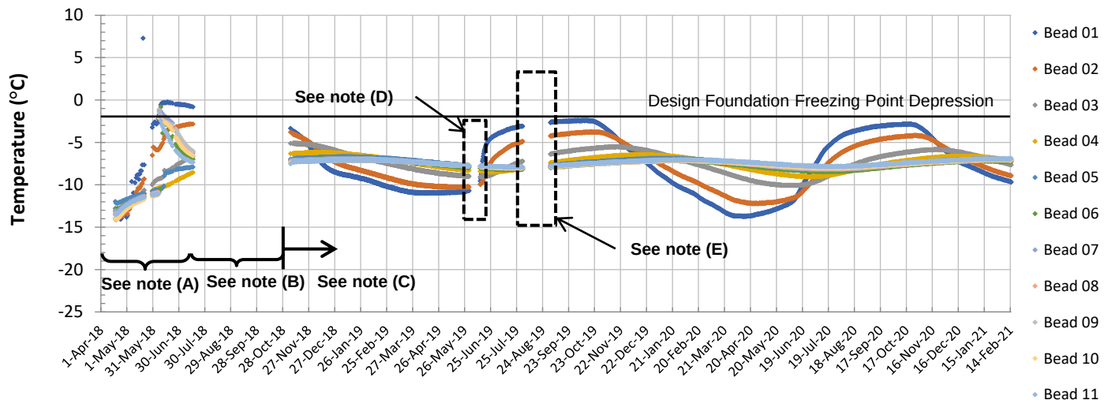
Legend:

- GTC Status: Cable irreparably damaged
- GTC Status: Bead damaged or data missing

SD-HTS-240-US



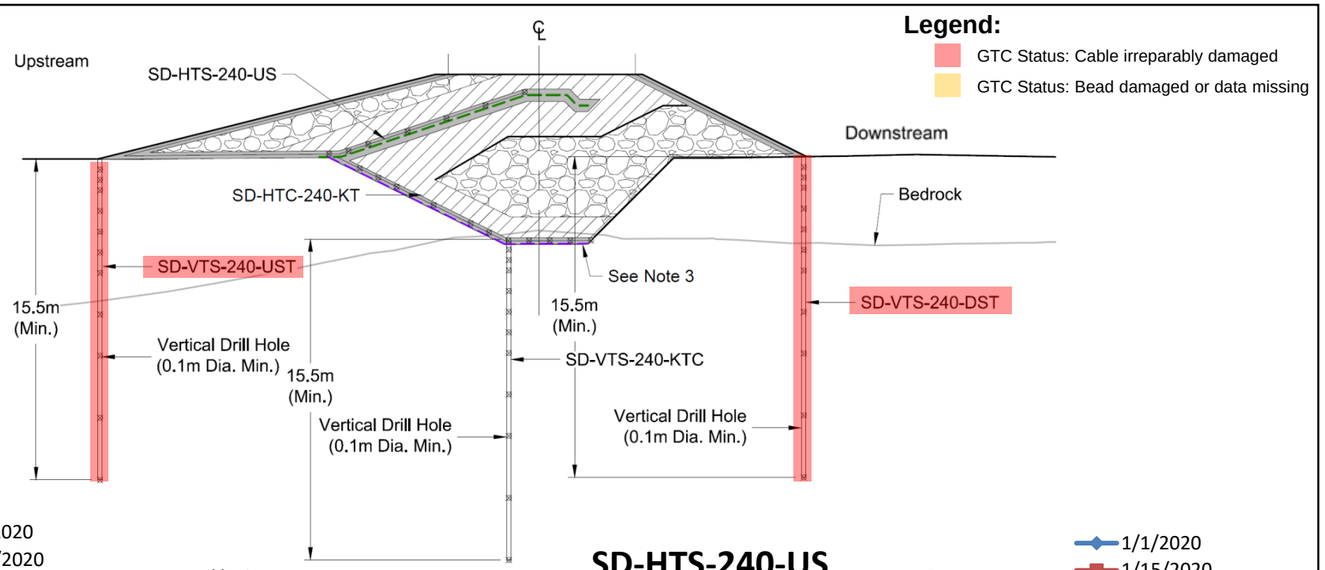
SD-HTS-240-KT

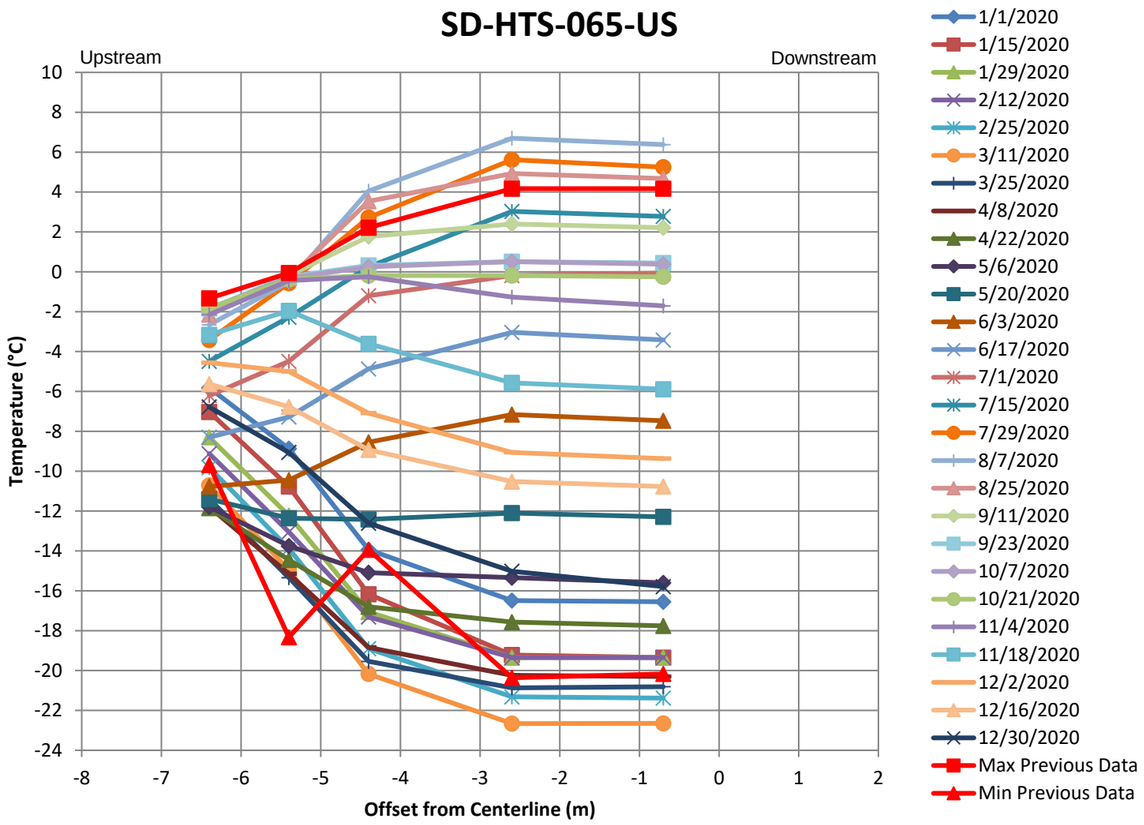


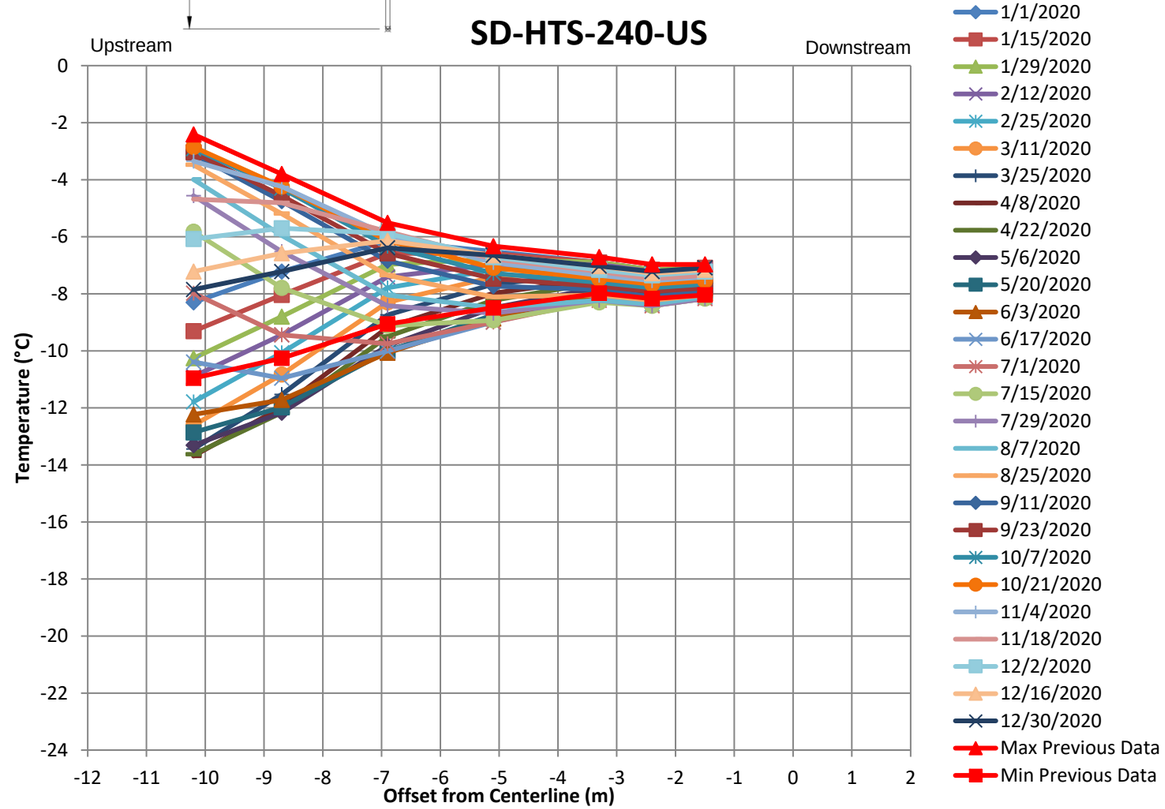
Notes:

- Bead numbers increase from upstream to downstream (horizontal) and top to bottom (vertical)
- **(A)** Measurements collected between April and August 2018 were taken during construction
- **(B)** No measurements were collected between September 2018 to November 2018 as the data loggers were set up on site.
- **(C)** From November 2018 onwards, data loggers were installed to provide higher resolution and more frequent data transmissions.
- **(D)** No data collected between May 31, 2019 and June 13, 2019 for SD-HTS-240-KT
- **(E)** No data collected between August 1, 2019 to September 2, 2019 for SD-HTS-240-KT

srk consulting	AGNICO EAGLE	2020 AGI – South Dam
Job No: 1CT022.057 Filename: 1_App_A_SD_GTC.pptx	DORIS TIA	**Station 2+40** **Horizontal Temperature Cable Temperature Vs. Time**
		Date: Feb. 2021 / Approved: PDL / Figure: **A.23**



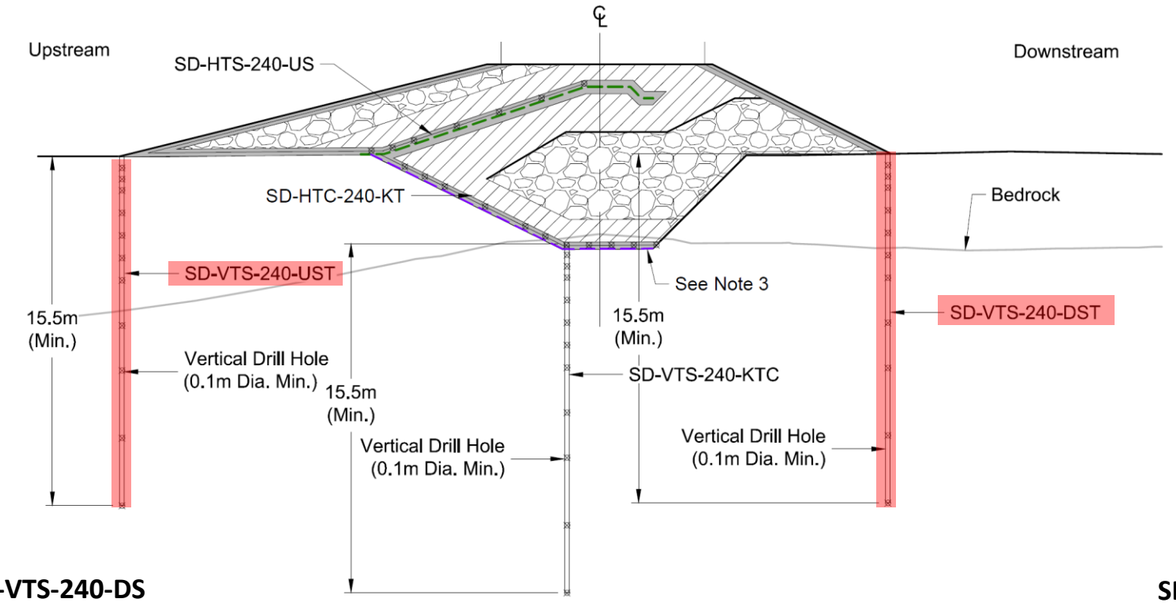




Note:

- Previous Data was recorded between January 2019 and December 2019
- No data collected after October 10, 2019 for SD-VTS-240-DS. GTC assumed to be irreparably damaged

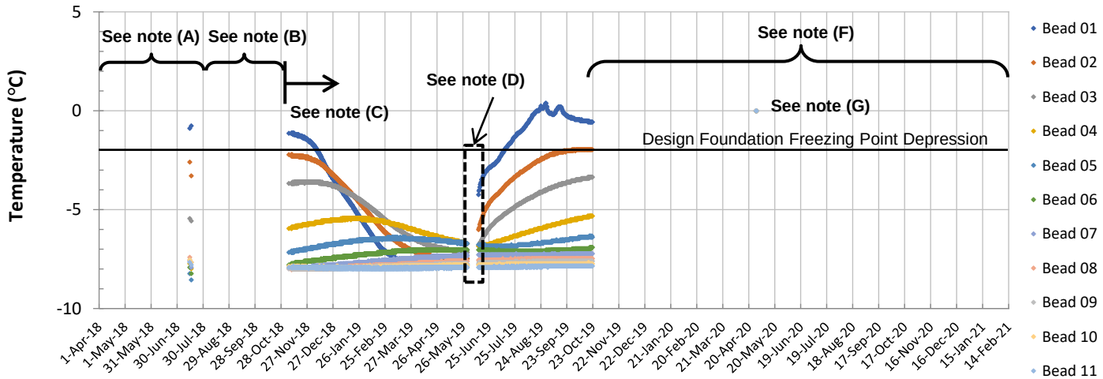
srk consulting	AGNICO EAGLE	2020 AGI – South Dam
		Station 2+40 Ground Temperature Cable Readings by Location
Job No: 1CT022.057 Filename: 1_App_A_SD_GTC.pptx	DORIS TIA	Date: Feb. 2021 / Approved: PDL / Figure: **A.24**



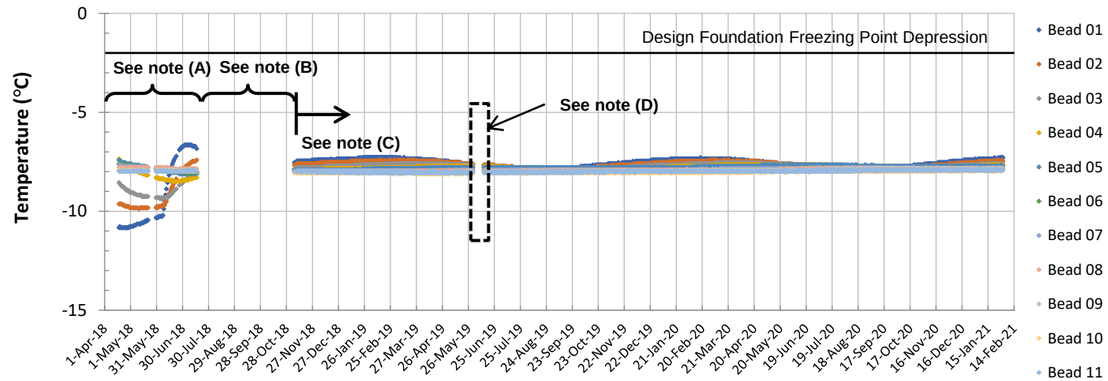
Legend:

- GTC Status: Cable irreparably damaged
- GTC Status: Bead damaged or data missing

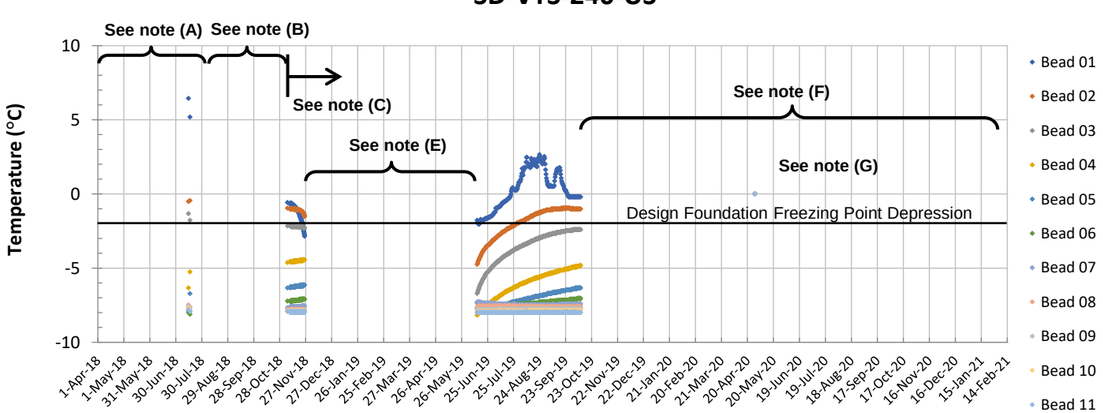
SD-VTS-240-DS



SD-VTS-240-KT



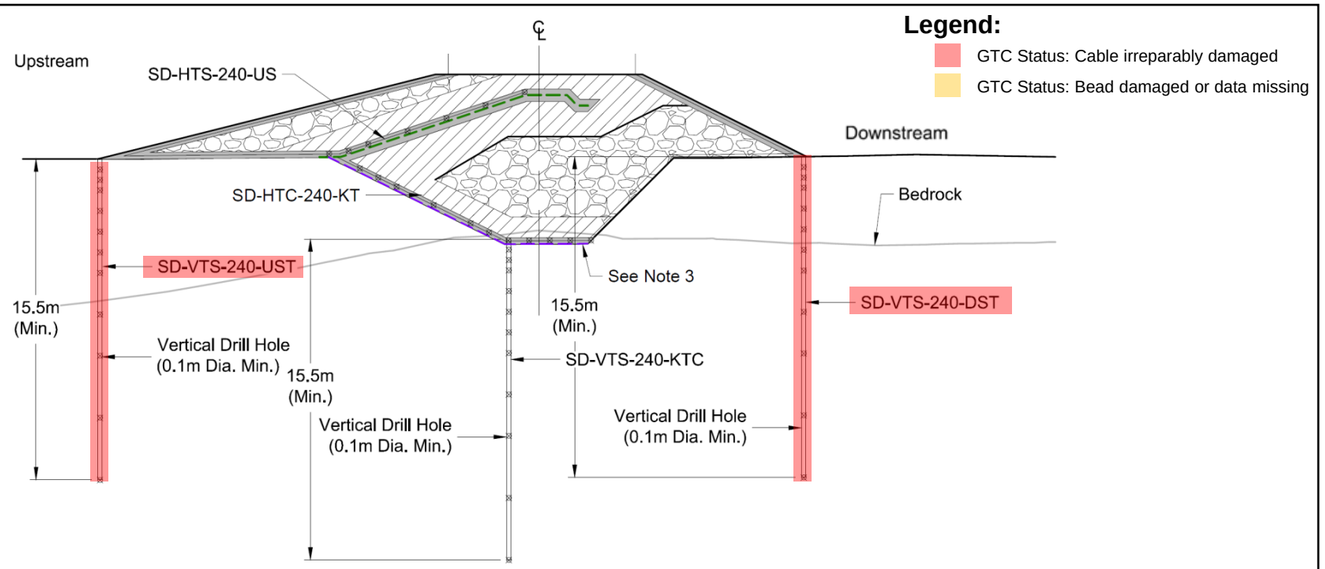
SD-VTS-240-US

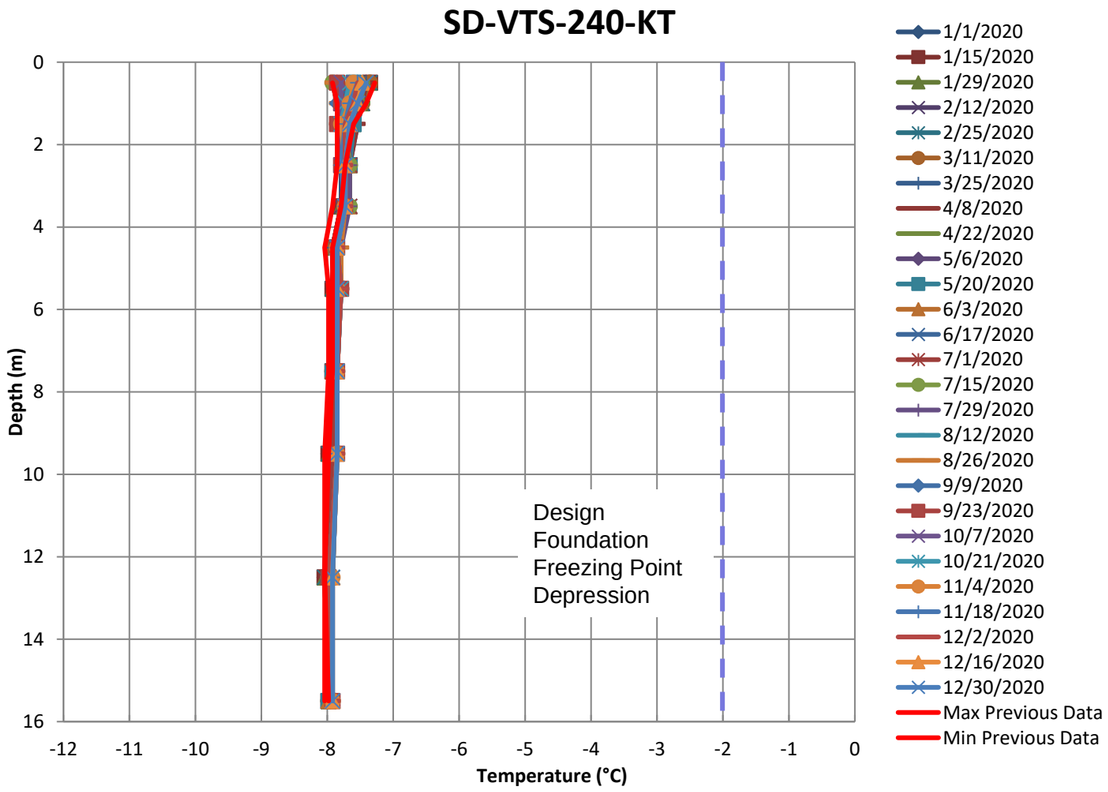


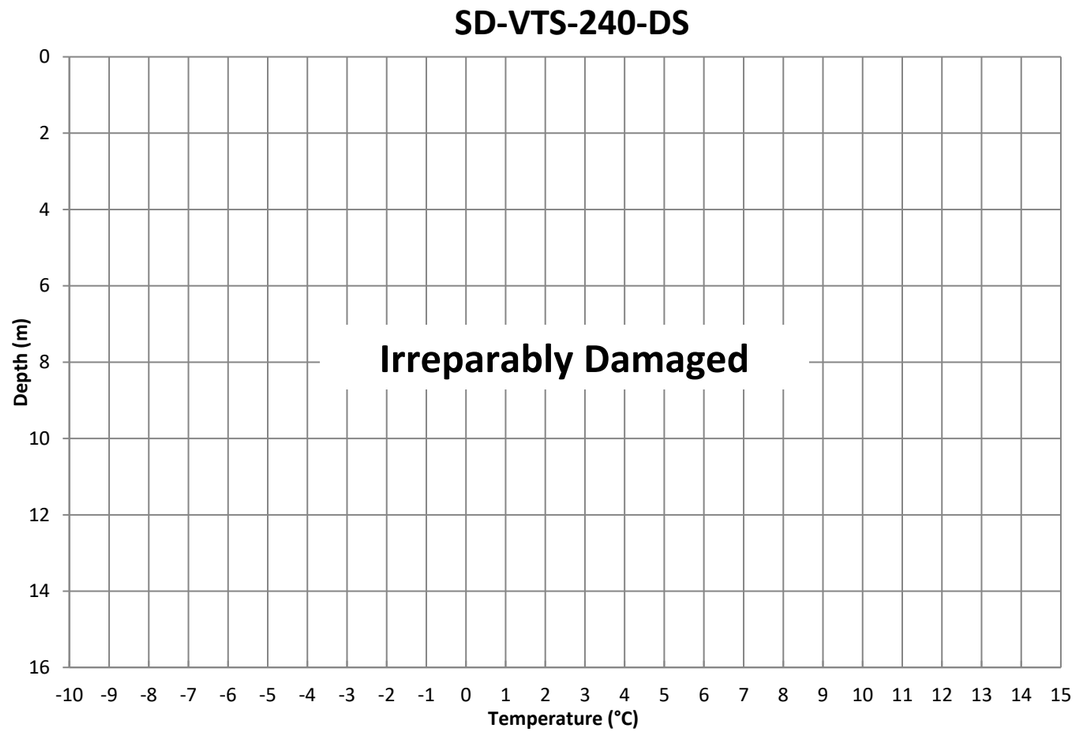
Notes:

- Bead numbers increase from upstream to downstream (horizontal) and top to bottom (vertical)
- **(A)** Measurements collected between April and August 2018 were taken during construction
- **(B)** No measurements were collected between September 2018 to November 2018 as the data loggers were set up on site
- **(C)** From November 2018 onwards, data loggers were installed to provide higher resolution and more frequent data transmissions
- **(D)** No data collected between May 31, 2019 and June 13, 2019
- **(E)** No readings, cable was damaged and repaired in June 2019
- **(F)** No data collected after October 10, 2019 for SD-HTS-240-US and after October 22, 2019 for SD-HTS-240-DS. Both cables are assumed to be inactive and damaged beyond repair
- **(G)** Incorrect 0ºC readings on April 28, 2020 for SD-HTS-240-US and SD-HTS-240-DS

srk consulting	AGNICO EAGLE	2020 AGI – South Dam
Job No: 1CT022.057 Filename: 1_App_A_SD_GTC.pptx	DORIS TIA	**Station 2+40** **Vertical Temperature Cable Temperature Vs. Time**
		Date: Feb. 2021 / Approved: PDL / Figure: **A.25**



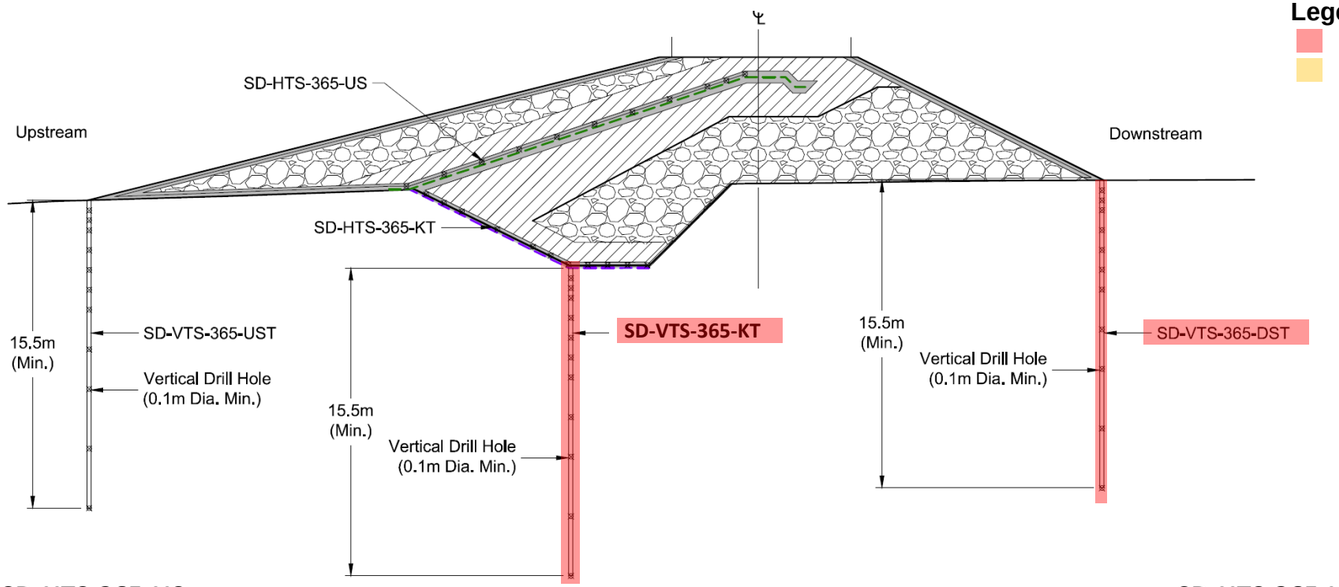




Note:

- Previous Data was recorded between January 2018 and December 2019
- No data collected between May 31, 2019 and June 13, 2019 for SD-VTS-240-KT
- No data collected after October 22, 2019 for SD-VTS-240-DS. GTC assumed to be irreparably damaged

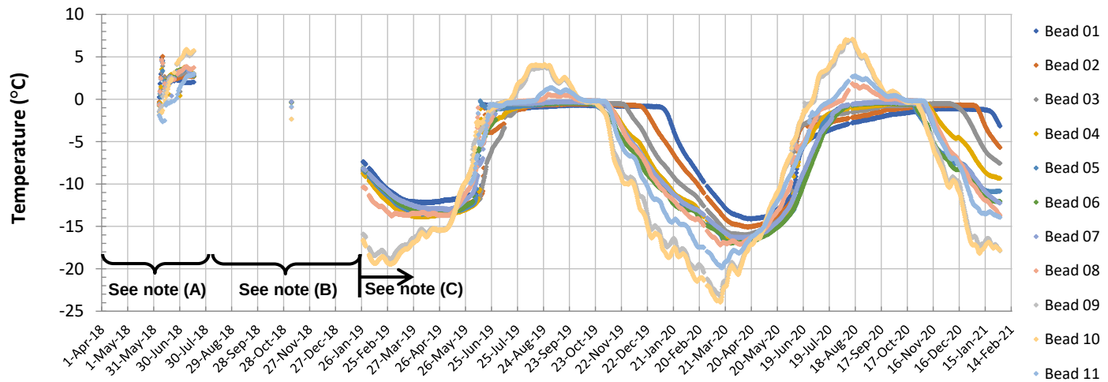
srk consulting	AGNICO EAGLE	2020 AGI – South Dam
		Station 2+40 Ground Temperature Cable Readings by Location
Job No: 1CT022.057 Filename: 1_App_A_SD_GTC.pptx	DORIS TIA	Date: Feb. 2021 / Approved: PDL / Figure: **A.26**



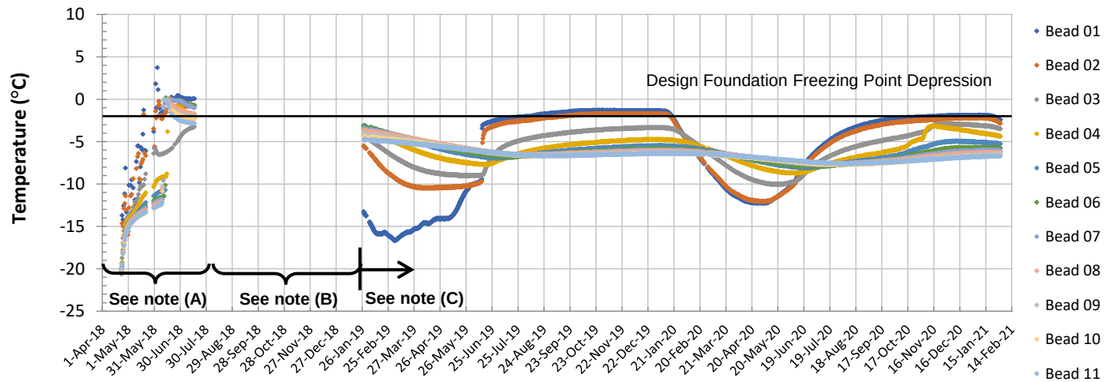
Legend:

- GTC Status: Cable irreparably damaged
- GTC Status: Bead damaged or data missing

SD-HTS-365-US



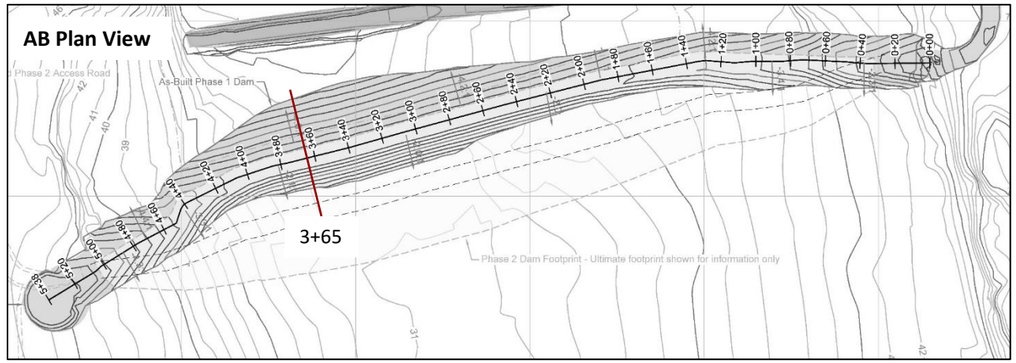
SD-HTS-365-KT

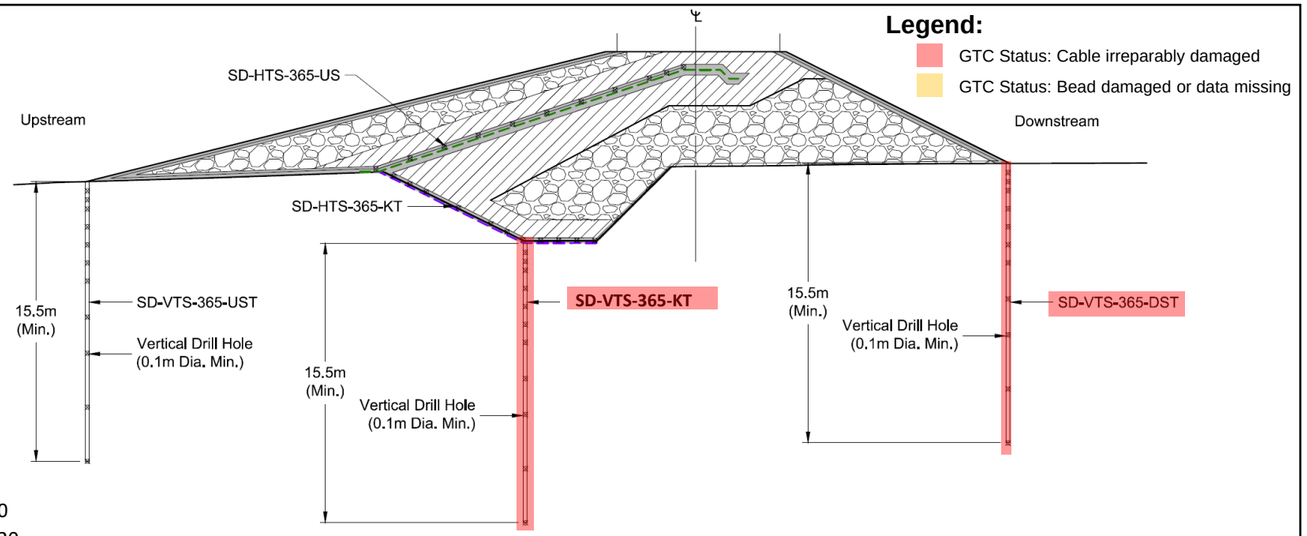


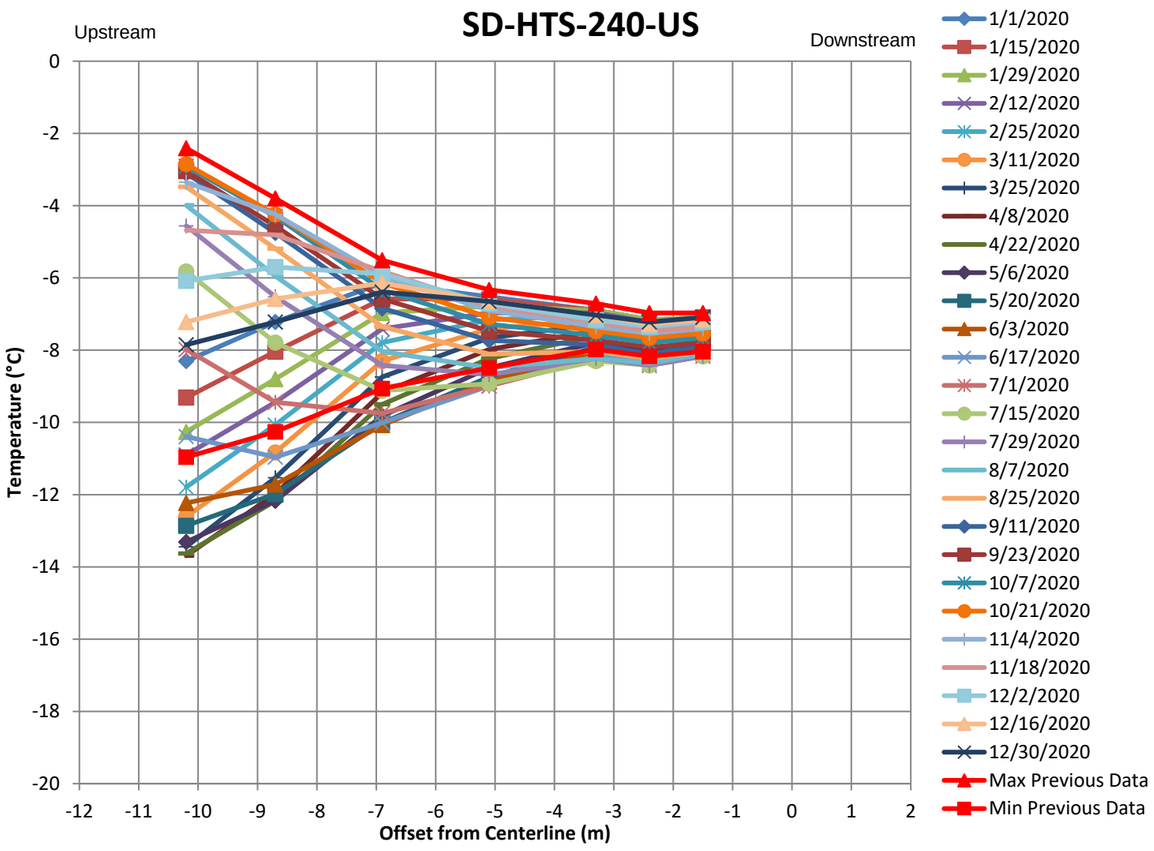
Notes:

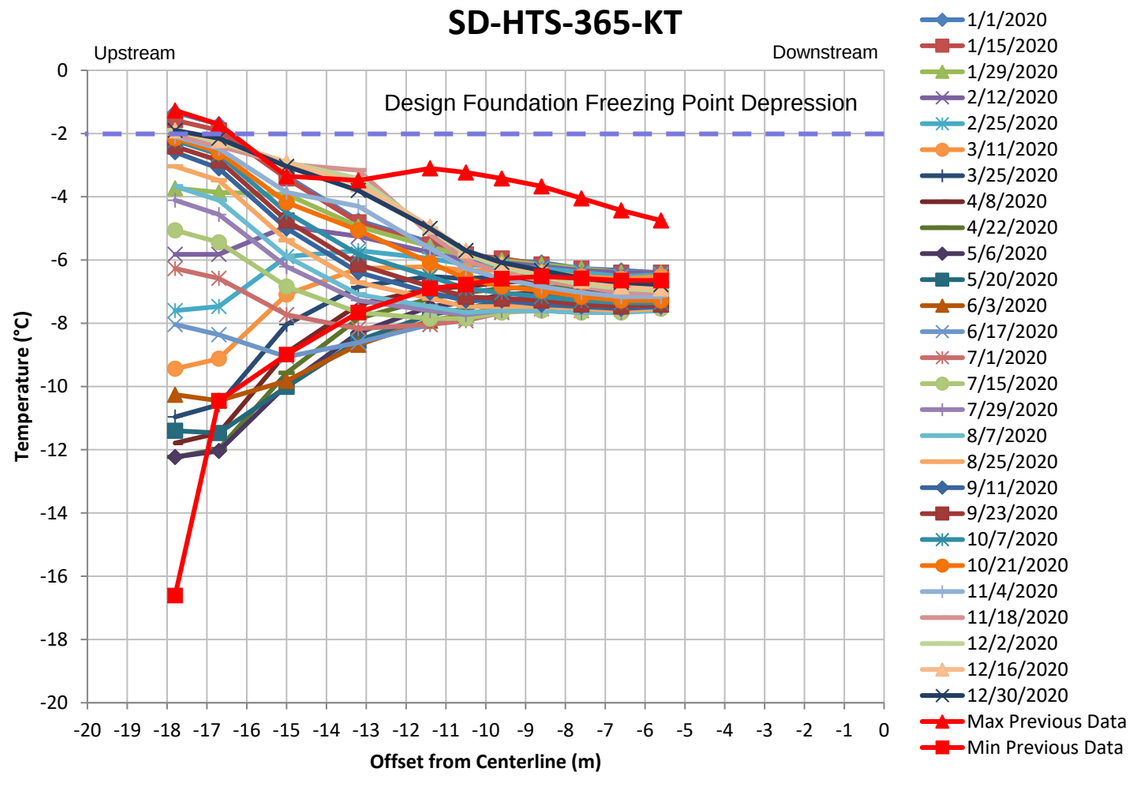
- Bead numbers increase from upstream to downstream (horizontal) and top to bottom (vertical)
- **(A)** Measurements collected between April and August 2018 were taken during construction
- **(B)** No measurements were collected between September 2018 to late January 2019 as the GTC's were extended and repaired, and the data loggers were set up on site. One set of manual spot measurements were collected for some cables in November 2018 to check interim dam performance
- **(C)** From the end of January 2019 onwards, data loggers were installed to provide higher resolution and more frequent data transmissions

srk consulting	AGNICO EAGLE	2020 AGI – South Dam
		Station 3+65 **Horizontal Temperature Cable** **Temperature Vs. Time**
Job No: 1CT022.057 Filename: 1_App_A_SD_GTC.pptx	**DORIS TIA**	Date: Feb. 2021 / Approved: PDL / Figure: **A.27**









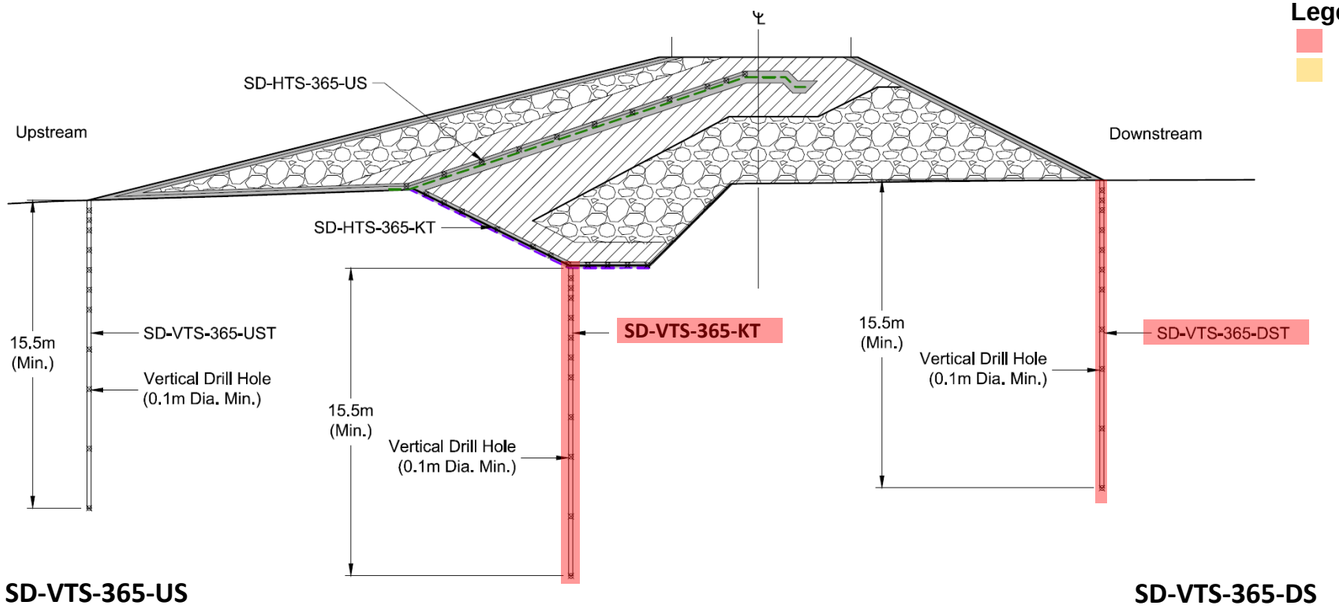
Note:

- Previous Data was recorded between January 2019 and December 2019

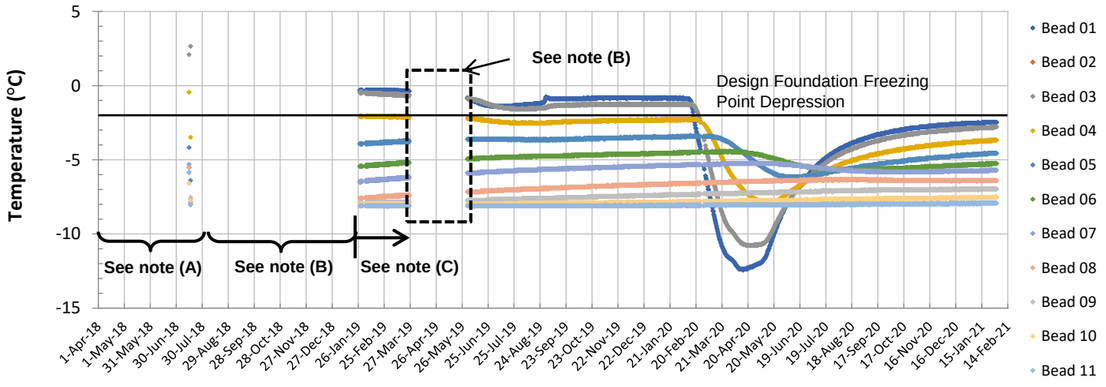
srk consulting	AGNICO EAGLE	2020 AGI – South Dam
		Station 3+65 Horizontal Temperature Cable Readings by Location
Job No: 1CT022.057 Filename: 1_App_A_SD_GTC.pptx	DORIS TIA	Date: Feb. 2021 / Approved: PDL / Figure: **A.28**

Legend:

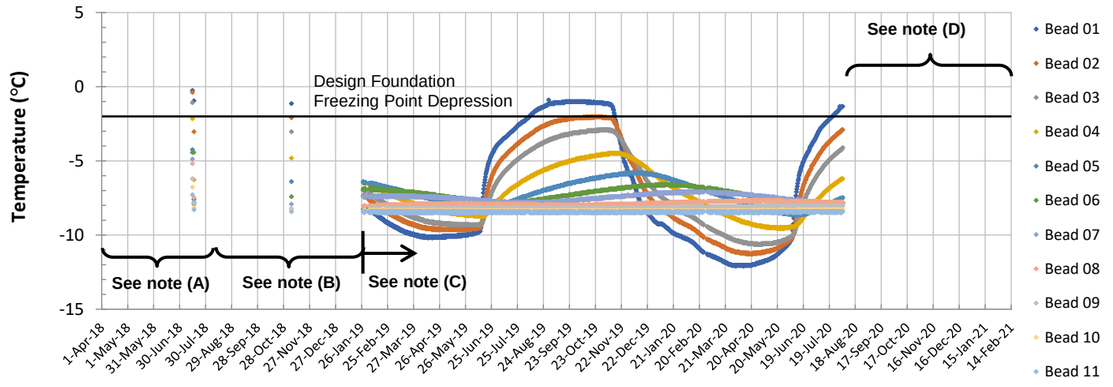
- GTC Status: Cable irreparably damaged
- GTC Status: Bead damaged or data missing



SD-VTS-365-US



SD-VTS-365-DS

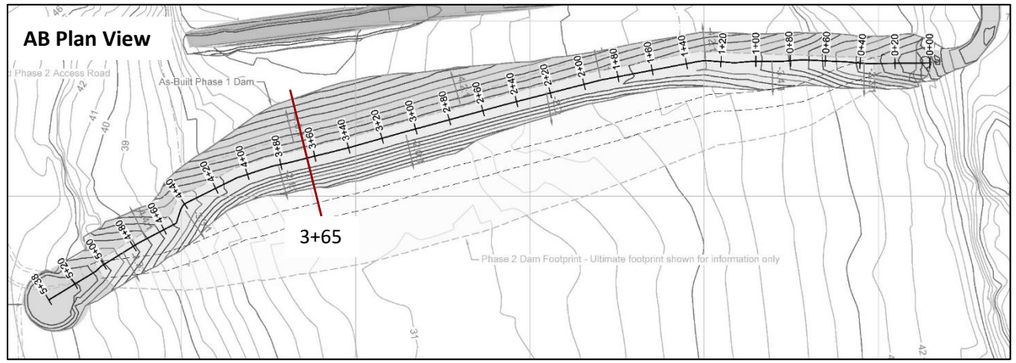


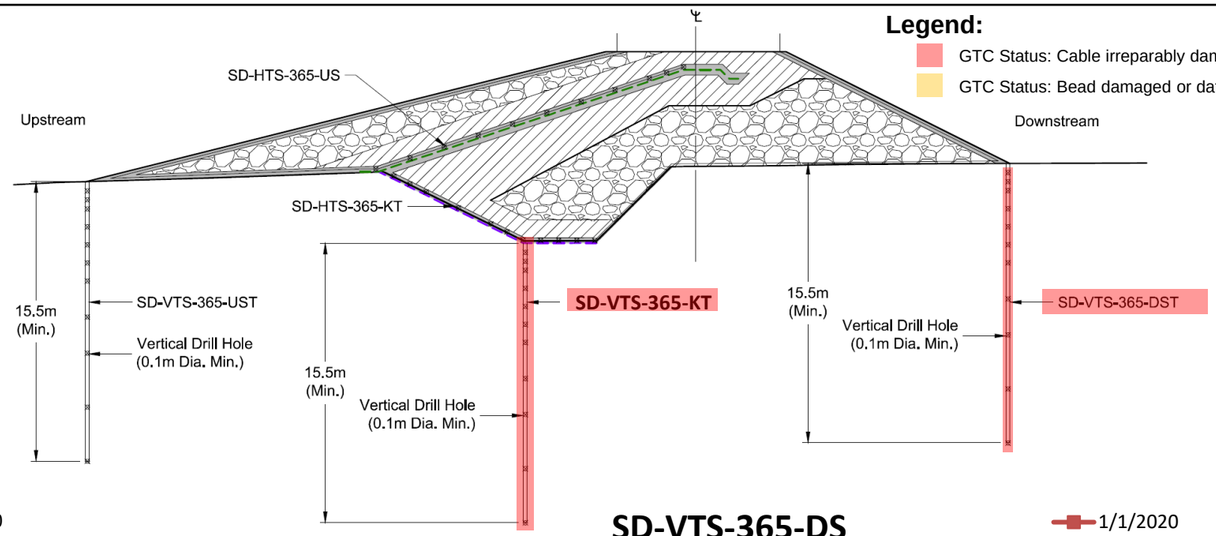
SD-VTS-365-KT

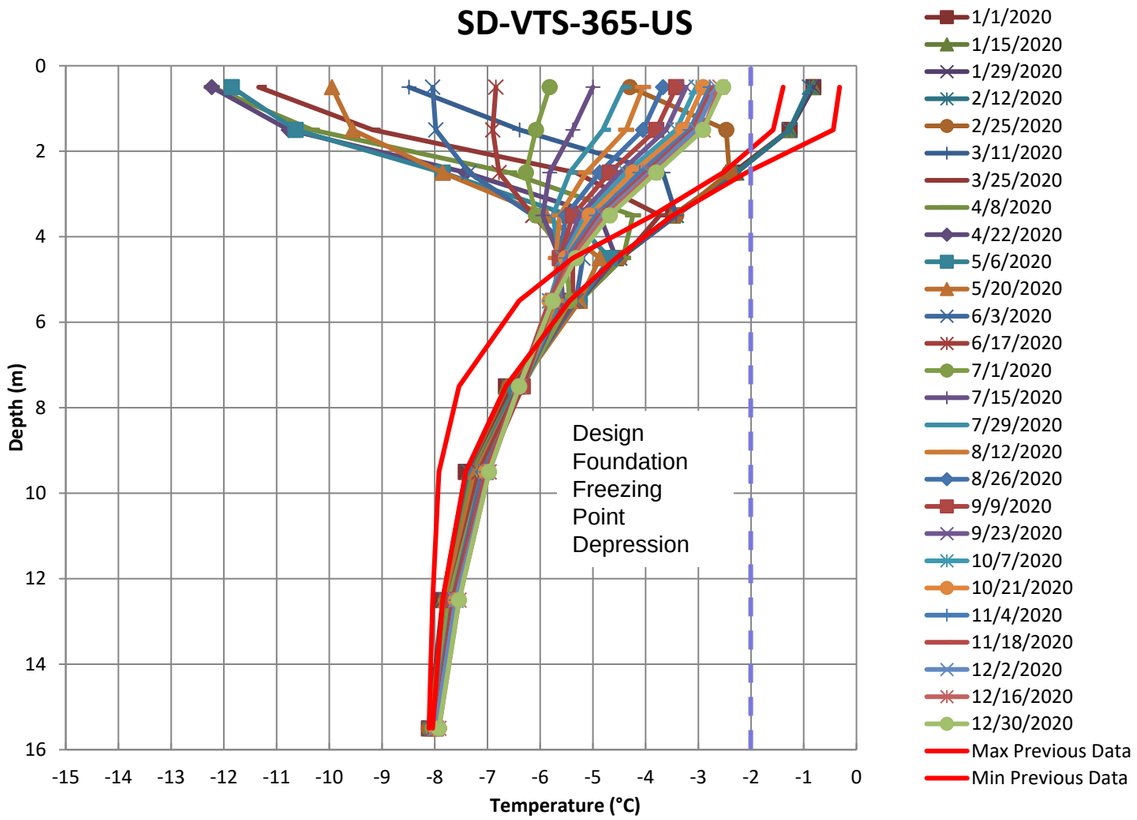
Notes:

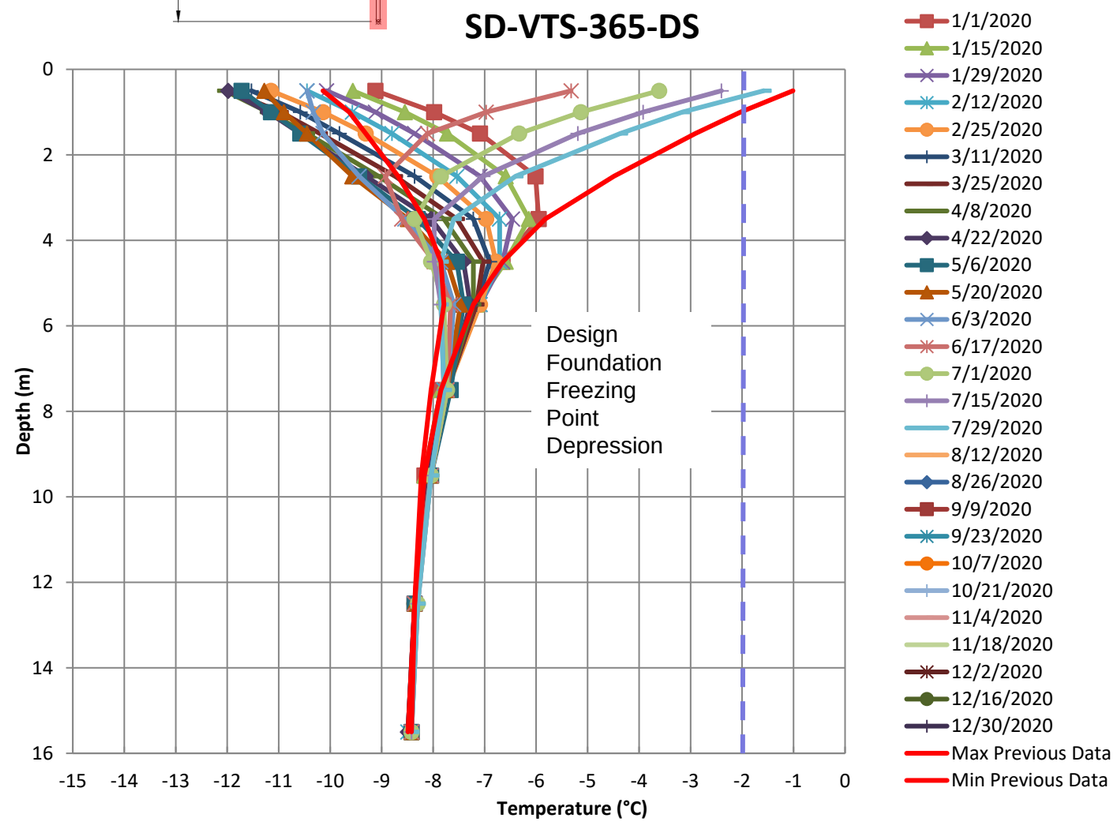
- Bead numbers increase from upstream to downstream (horizontal) and top to bottom (vertical)
- SD-VTS-365-US cable damaged after construction but repaired
- SD-VTS-365-KT irreparably damaged after construction
- **(A)** Measurements collected between April and August 2018 were taken during construction
- **(B)** No measurements were collected between September 2018 to late January 2019 as the GTC's were extended and repaired, and the data loggers were set up on site. One set of manual spot measurements were collected for some cables in November 2018 to check interim dam performance
- **(C)** From the end of January 2019 onwards, data loggers were installed to provide higher resolution and more frequent data transmissions
- **(D)** No data collected after August 3, 2020 SD-VTS-365-DS. GTC assumed to be irreparably damaged

srk consulting	AGNICO EAGLE	2020 AGI – South Dam
		Station 3+65 Vertical Temperature Cable Temperature Vs. Time
Job No: 1CT022.057 Filename: 1_App_A_SD_GTC.pptx	DORIS TIA	Date: Feb. 2021 / Approved: PDL / Figure: **A.29**





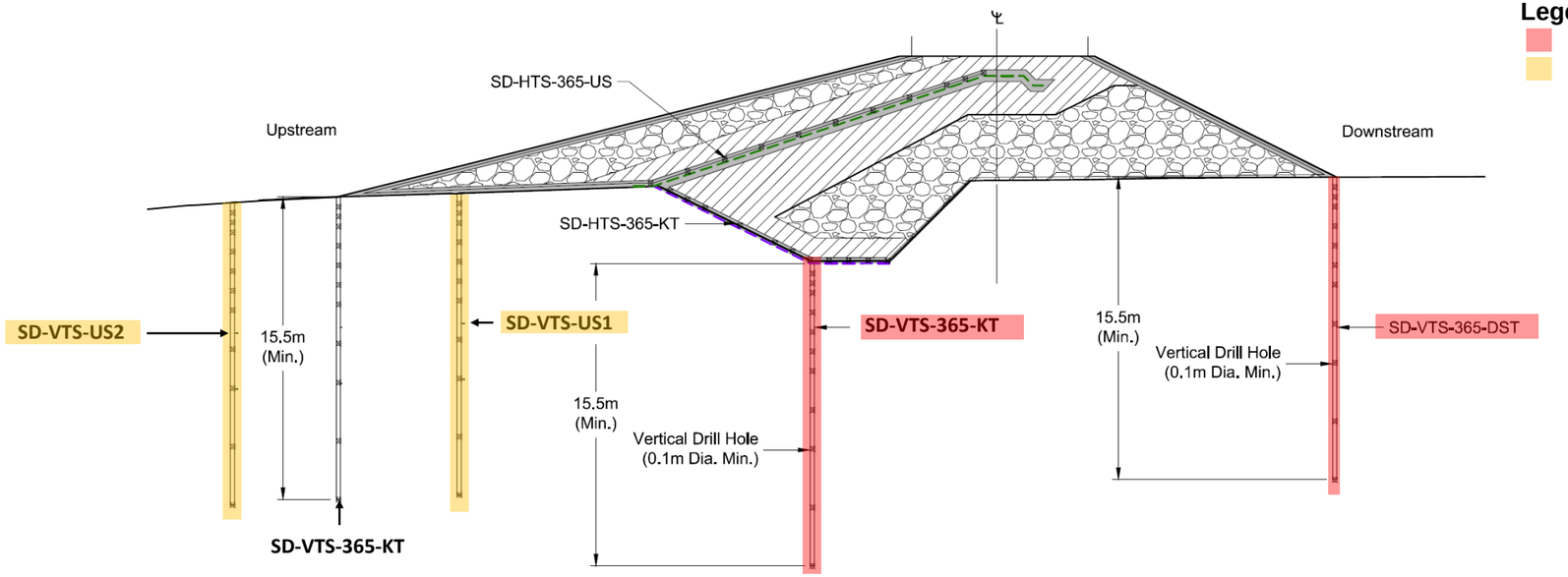




Note:

- Previous Data was recorded between January 2019 and December 2019
- No data collected after August 3, 2020 SD-VTS-365-DS. GTC assumed to be irreparably damaged

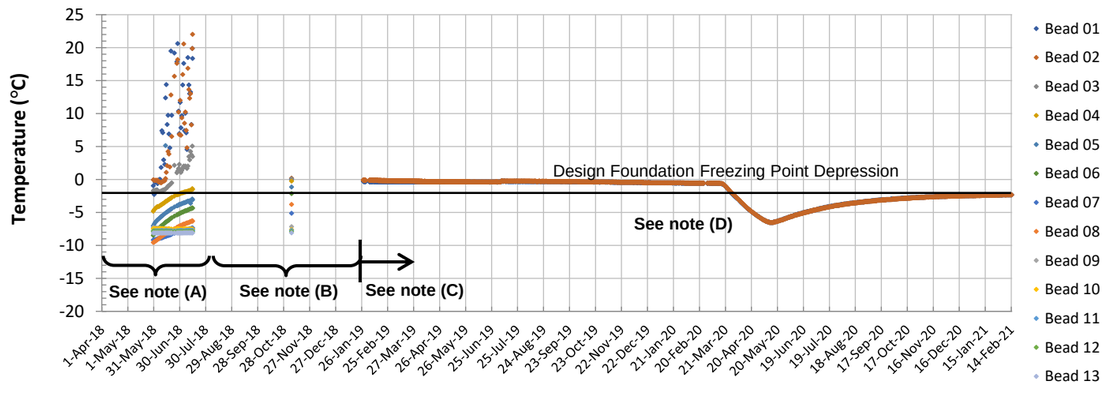
srk consulting	AGNICO EAGLE	2020 AGI – South Dam
		Station 3+65 Ground Temperature Cable Readings by Location
Job No: 1CT022.057 Filename: 1_App_A_SD_GTC.pptx	**DORIS TIA**	Date: Feb. 2021 / Approved: PDL / Figure: **A.30**



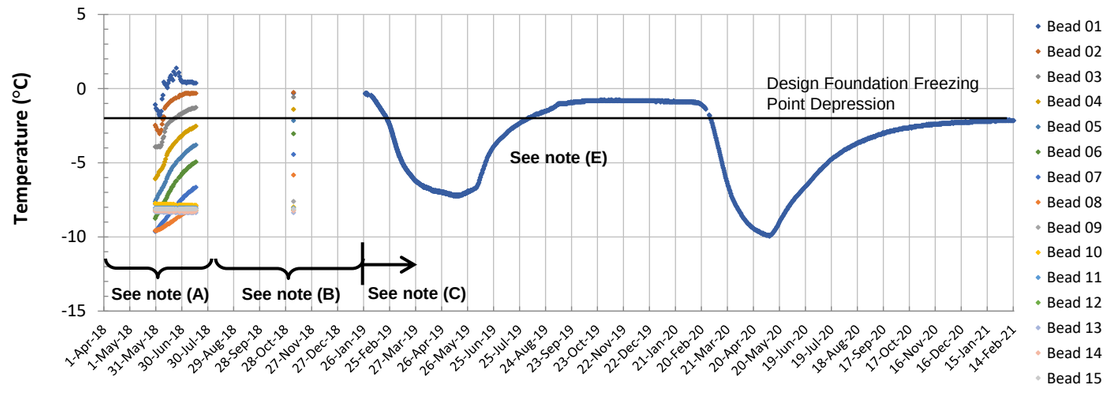
Legend:

- GTC Status: Cable irreparably damaged
- GTC Status: Bead damaged or data missing

SD-VTS-US1



SD-VTS-US2

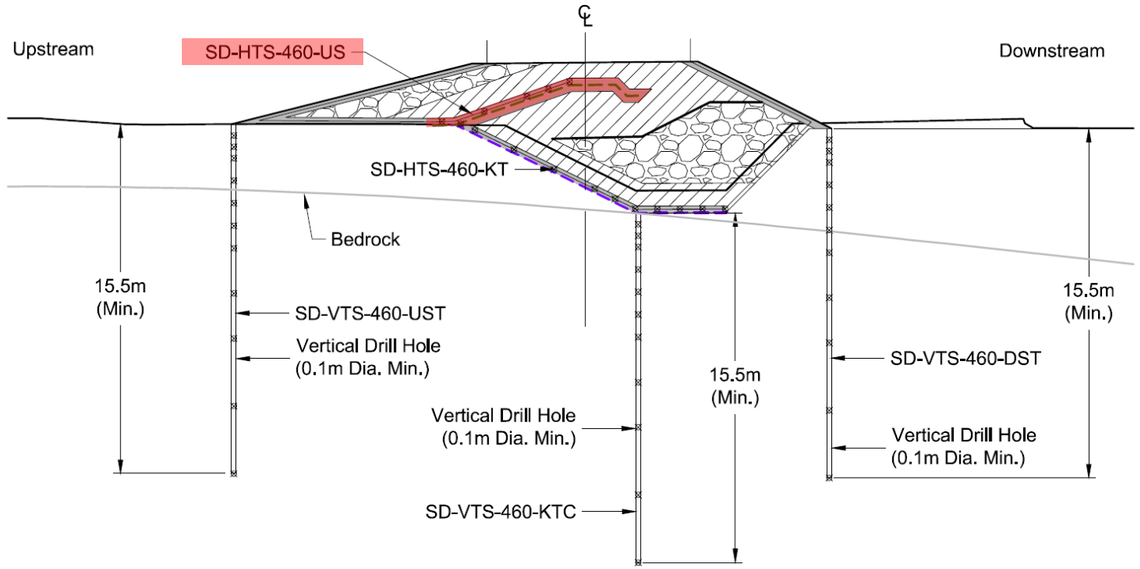


Notes:

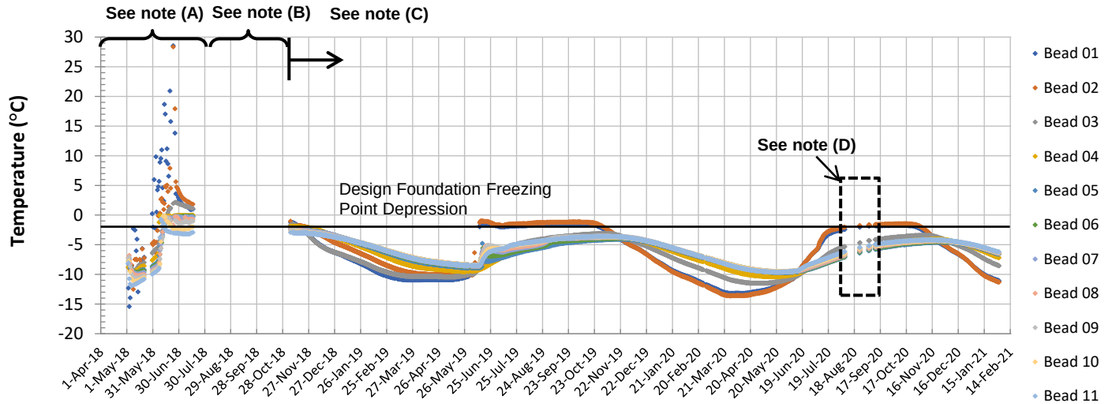
- Bead numbers increase from upstream to downstream (horizontal) and top to bottom (vertical)
- **(A)** Measurements collected between April and August 2018 were taken during construction
- **(B)** No measurements were collected between September 2018 to late January 2019 as the GTC's were extended and repaired, and the data loggers were set up on site. One set of manual spot measurements were collected in November 2018 to check interim dam performance
- **(C)** From the end of January 2019 onwards, data loggers were installed to provide higher resolution and more frequent data transmissions
- **(D)** Only top two beads are working (Bead 01 and Bead 02) for SD-VTS-US1
- **(E)** Only top bead working (Bead 01) for SD-VTS-US2

srk consulting	AGNICO EAGLE	2020 AGI – South Dam
		Station 3+65 **Vertical Temperature Cable** **Temperature Vs. Time**
Job No: 1CT022.057 Filename: 1_App_A_SD_GTC.pptx	DORIS TIA	Date: Feb. 2021 / Approved: PDL / Figure: **A.31**

Legend:
- GTC Status: Cable irreparably damaged
- GTC Status: Bead damaged or data missing



SD-HTS-460-KT



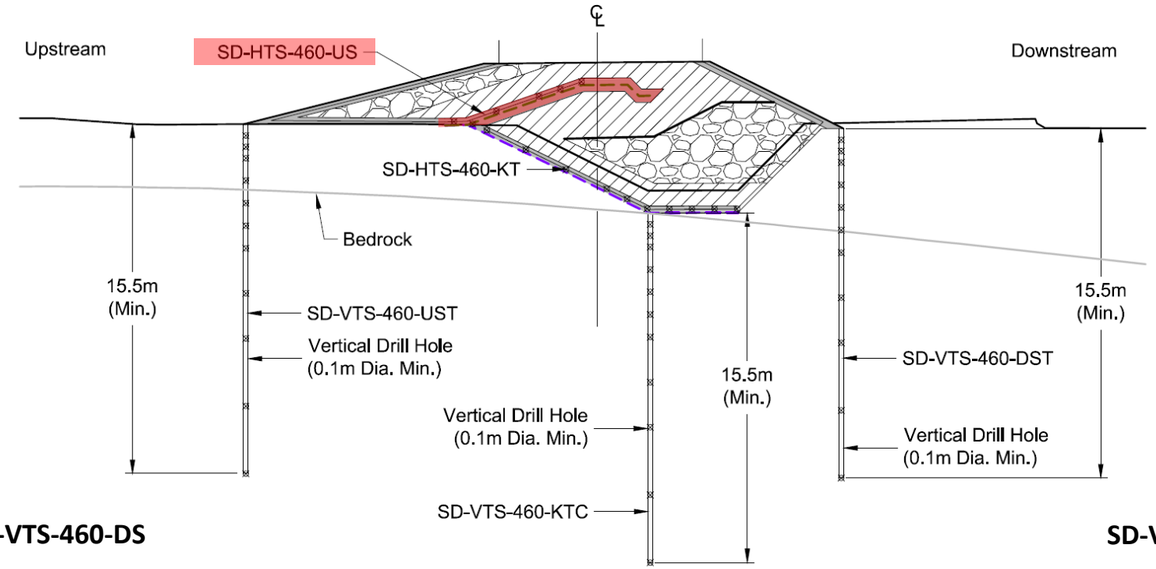
SD-HTS-460-US

Notes:
- Bead numbers increase from upstream to downstream (horizontal) and top to bottom (vertical)
- **(A)** Measurements collected between April and August 2018 were taken during construction
- **(B)** No measurements were collected between September 2018 to November 2018 as the GTC's were extended and repaired, and the data loggers were set up on site.
- **(C)** From November 2018 onwards, data loggers were installed to provide higher resolution and more frequent data transmissions
- **(D)** Data collection gaps between August 7, 2020 and September 11, 2020 for SD-HTS-460-KT

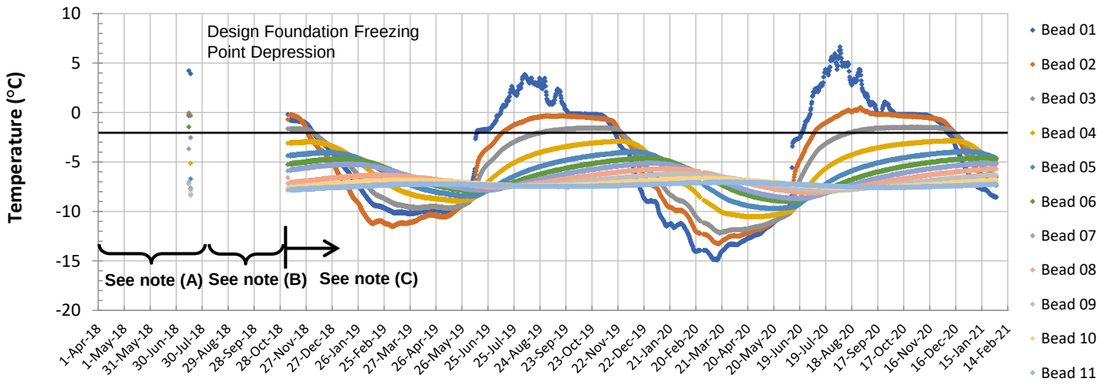
srk consulting	AGNICO EAGLE	2020 AGI – South Dam
		Station 4+60 **Horizontal Temperature Cable** **Temperature Vs. Time**
Job No: 1CT022.057 Filename: 1_App_A_SD_GTC.pptx	**DORIS TIA**	Date: Feb. 2021 | Approved: PDL | Figure: **A.32**

Legend:

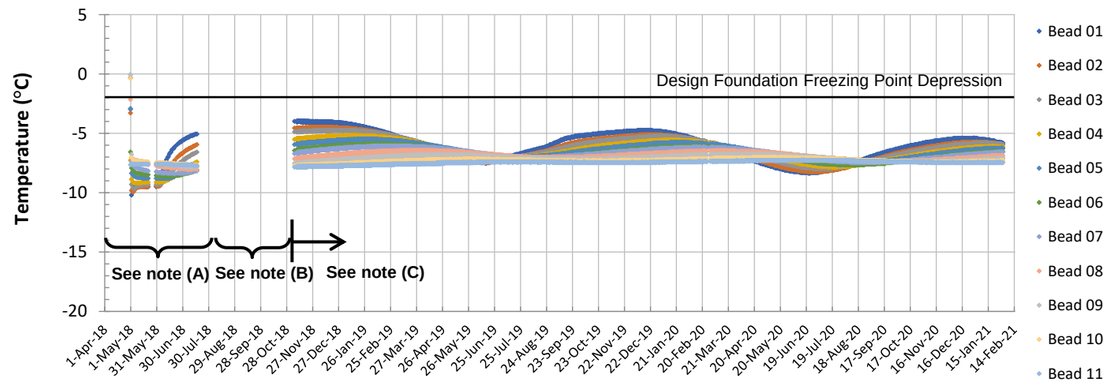
- GTC Status: Cable irreparably damaged
- GTC Status: Bead damaged or data missing



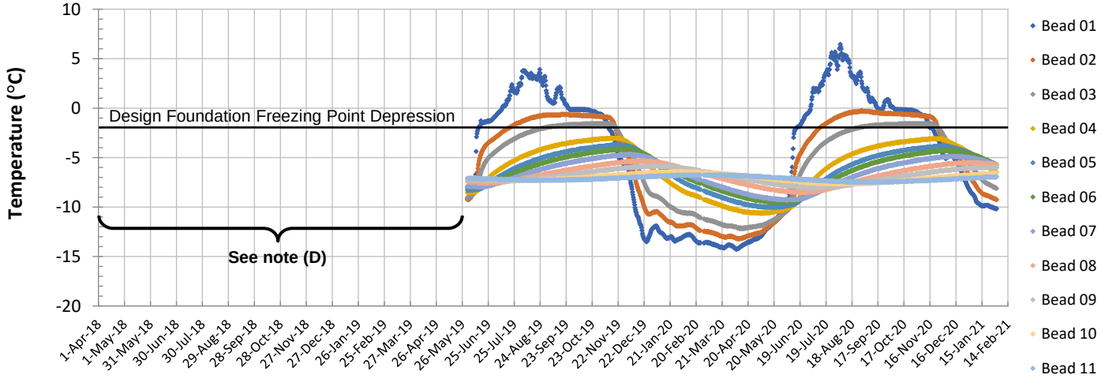
SD-VTS-460-DS



SD-VTS-460-KT



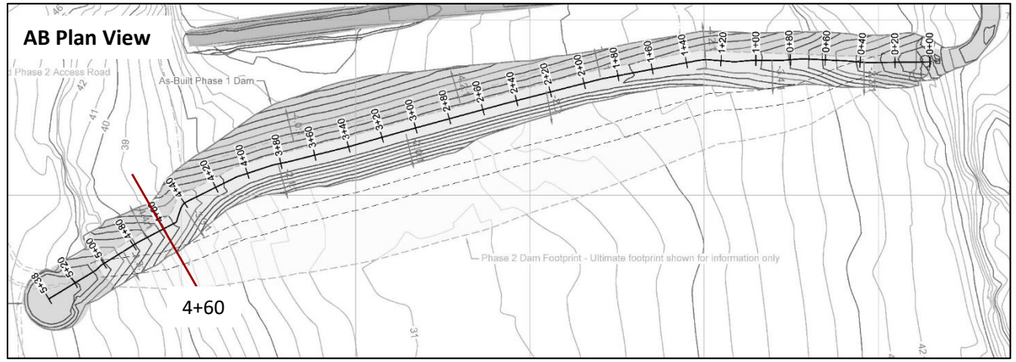
SD-VTS-460-US

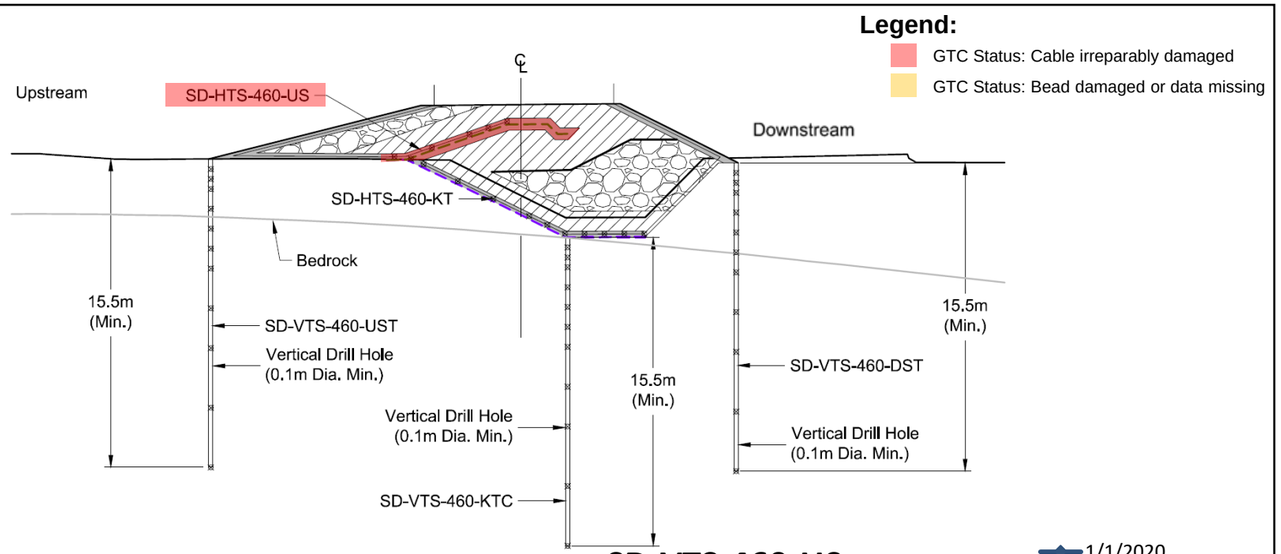


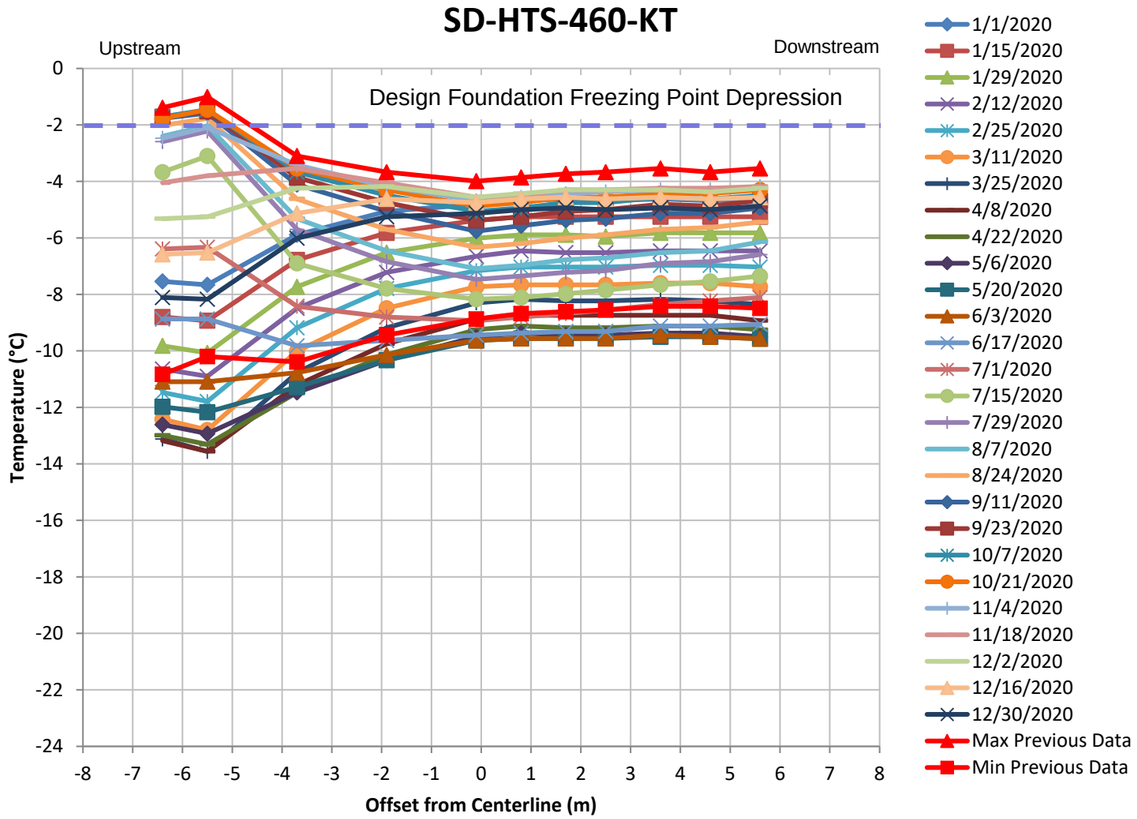
Notes:

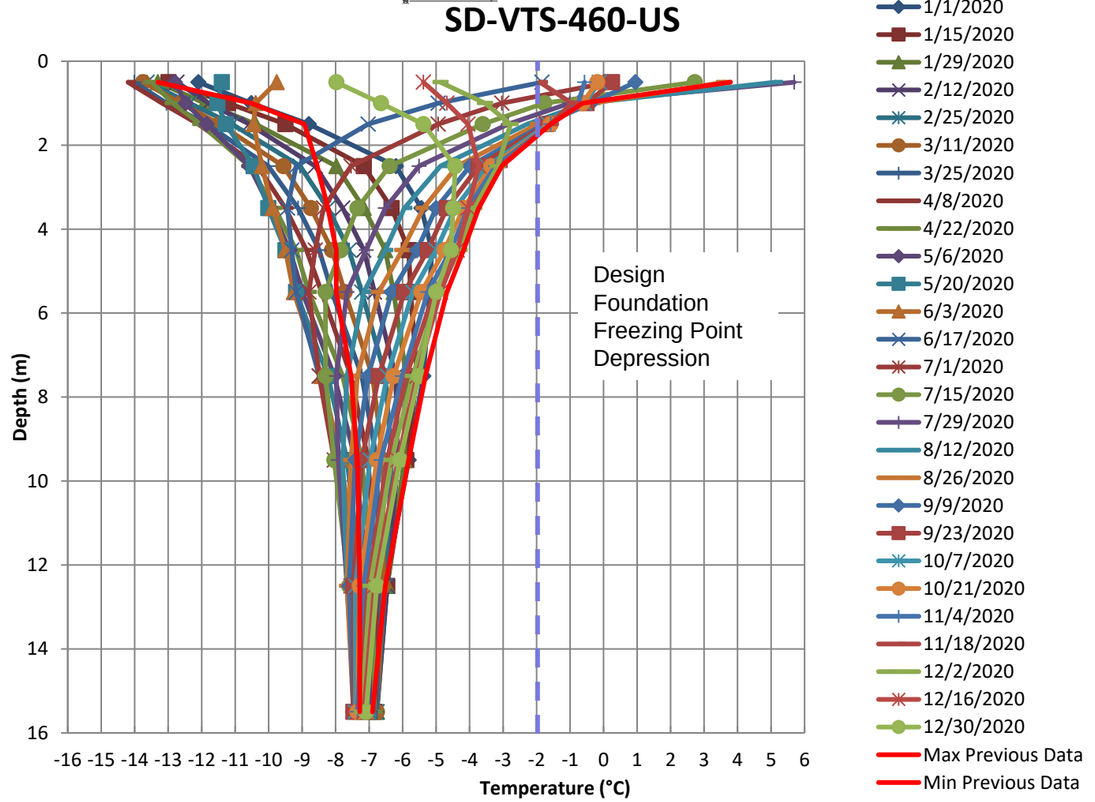
- Bead numbers increase from upstream to downstream (horizontal) and top to bottom (vertical)
- **(A)** Measurements collected between April and August 2018 were taken during construction
- **(B)** No measurements were collected between September 2018 to November 2018 as the GTC's were extended and repaired, and the data loggers were set up on site.
- **(C)** From November 2018 onwards, data loggers were installed to provide higher resolution and more frequent data transmissions
- **(D)** SD-VTS-460-US cable was damaged after construction but repaired, started transmitting late August 2019.

srk consulting	AGNICO EAGLE	2020 AGI – South Dam
		Station 4+60 Vertical Temperature Cable Temperature Vs. Time
Job No: 1CT022.057 Filename: 1_App_A_SD_GTC.pptx	DORIS TIA	Date: Feb. 2021 / Approved: PDL / Figure: **A.33**





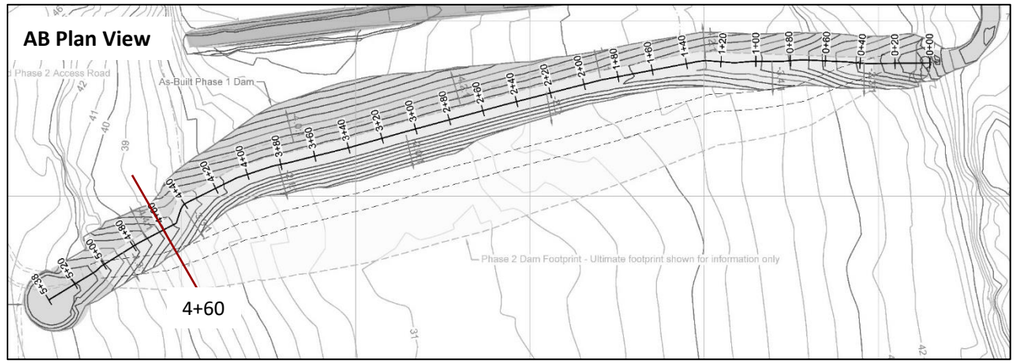


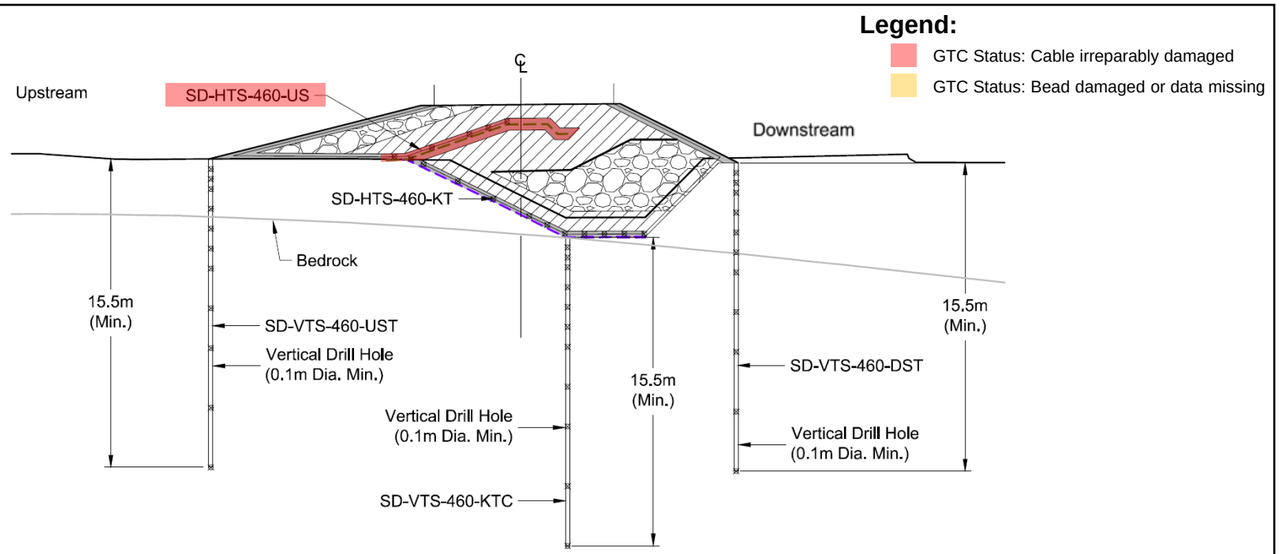


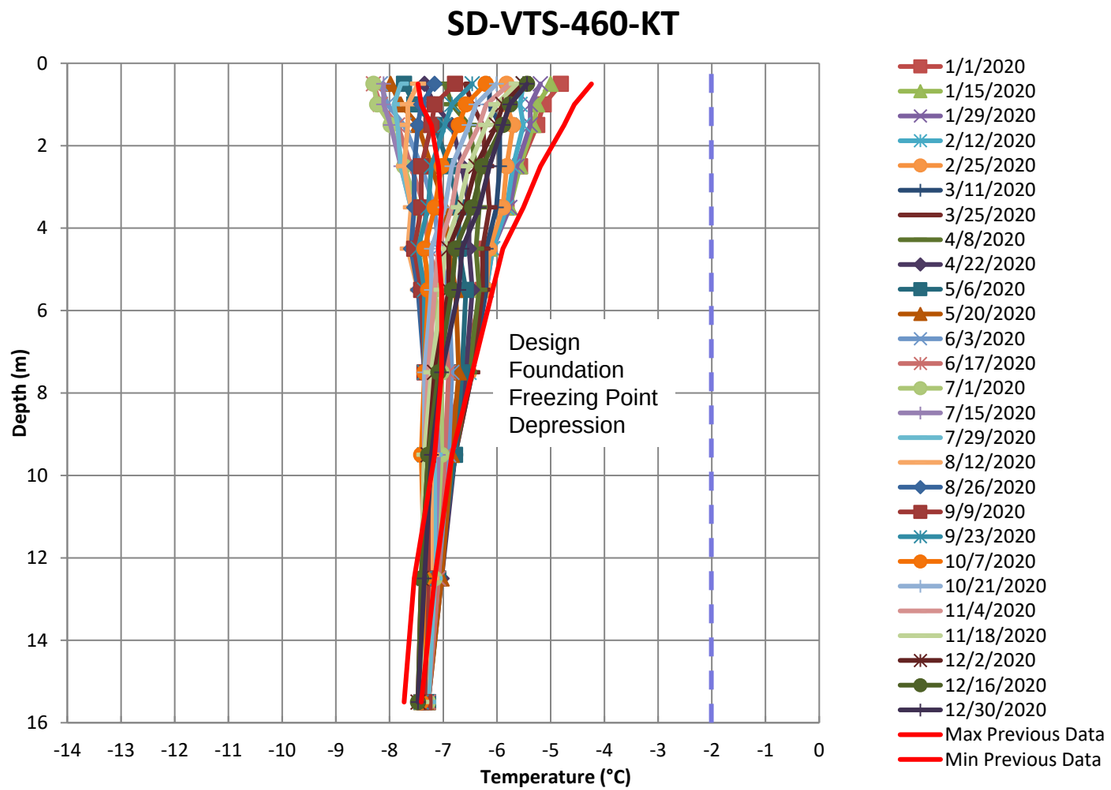
Note:

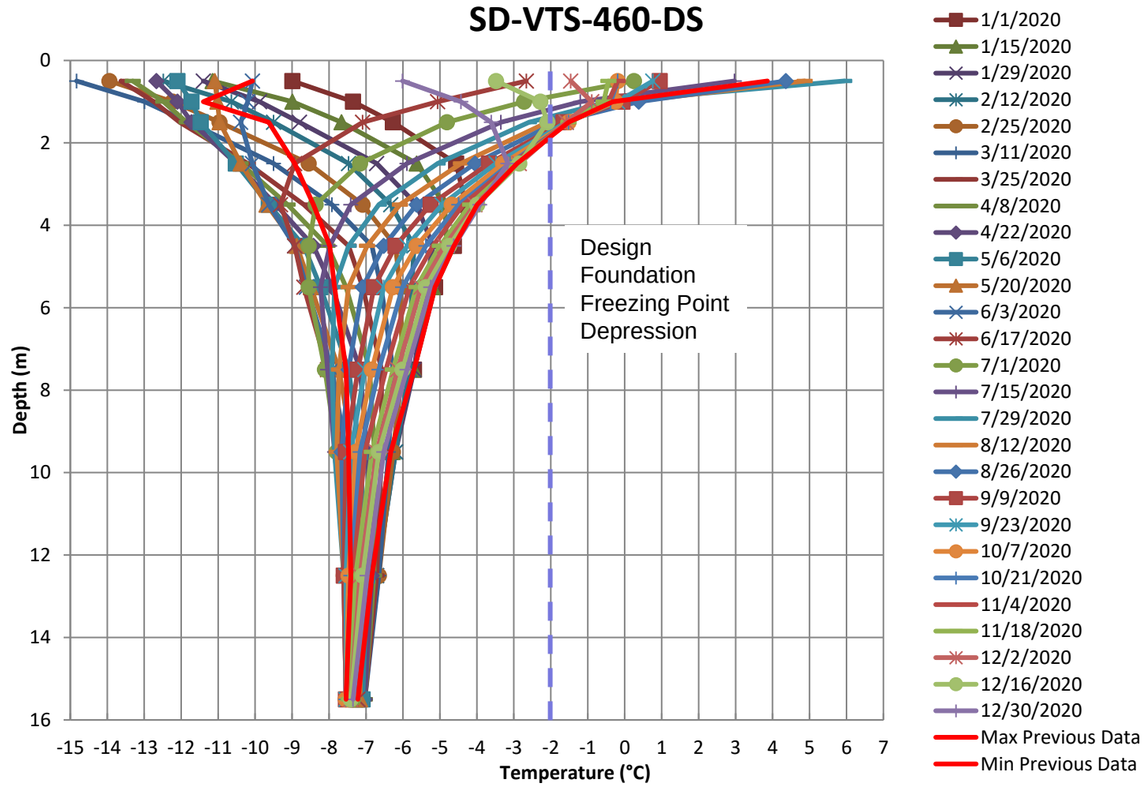
- Previous Data was recorded between January 2019 and December 2019
- Bead offset from centerline for SD-HTS-460-US is approximate.
- Data collection gaps between August 7, 2020 and September 11, 2020 for SD-HTC-460-KT

srk consulting	AGNICO EAGLE	2020 AGI – South Dam
Job No: 1CT022.057 Filename: 1_App_A_SD_GTC.pptx	DORIS TIA	**Station 4+60 Ground Temperature Cable Readings by Location**
		Date: Feb. 2021 / Approved: PDL / Figure: **A.34**









Note:

- Previous Data was recorded between January 2019 and December 2019

srk consulting

AGNICO EAGLE

2020 AGI – South Dam

Station 4+60
Ground Temperature Cable Readings by Location

Job No: 1CT022.057
Filename: 1_App_A_SD_GTC.pptx

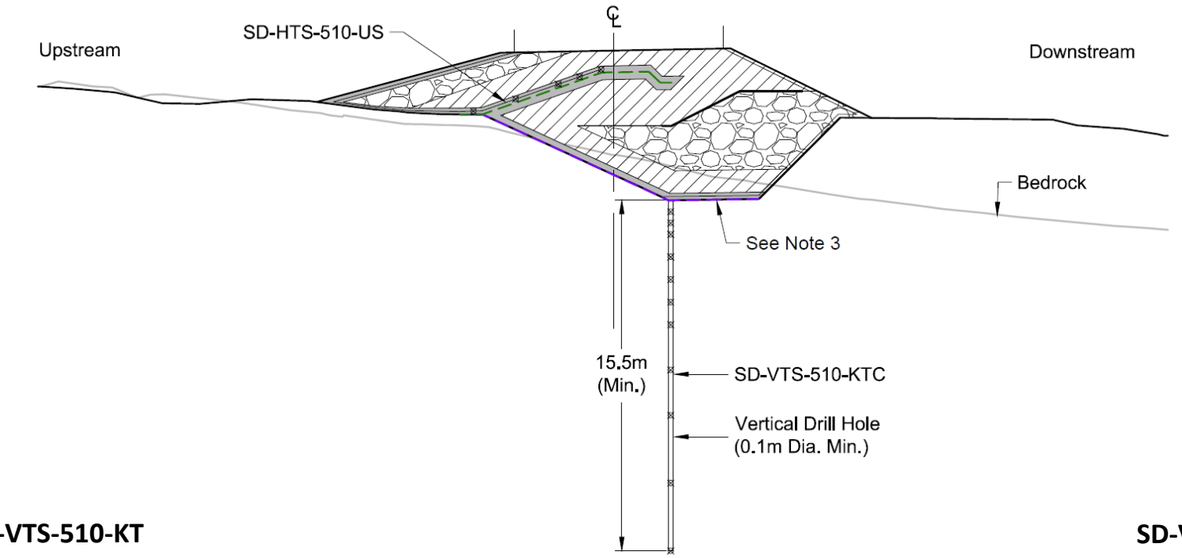
DORIS TIA

Date: Feb. 2021
Approved: PDL
Figure: **A.35**

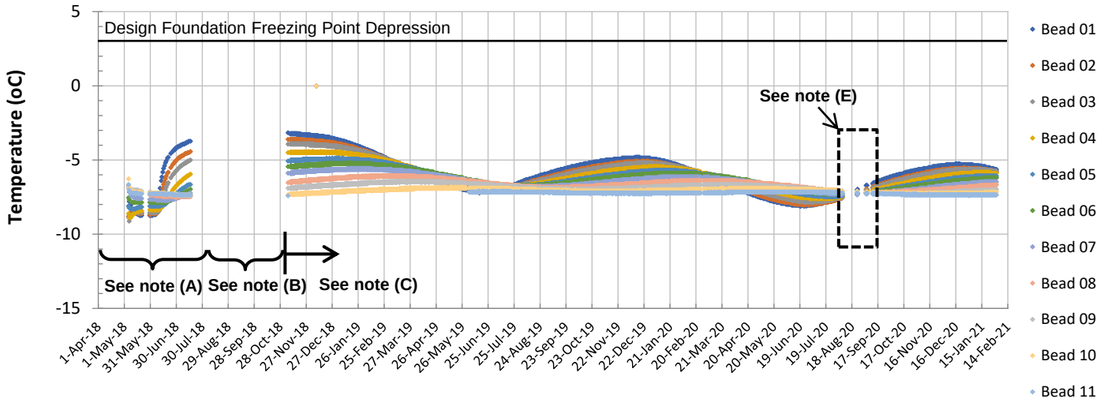
Legend:

GTC Status: Cable irreparably damaged

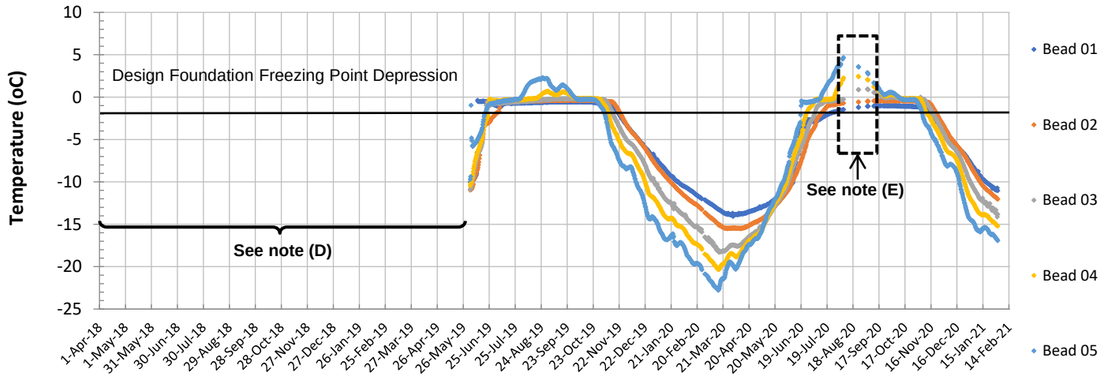
GTC Status: Bead damaged or data missing



SD-VTS-510-KT



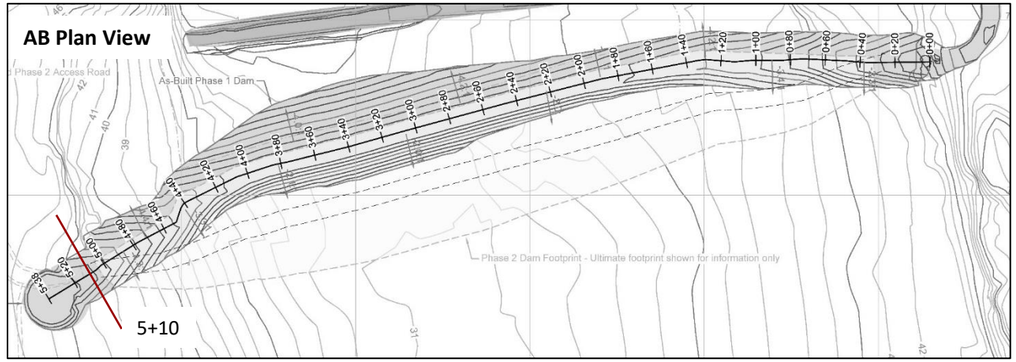
SD-VTS-510-KT

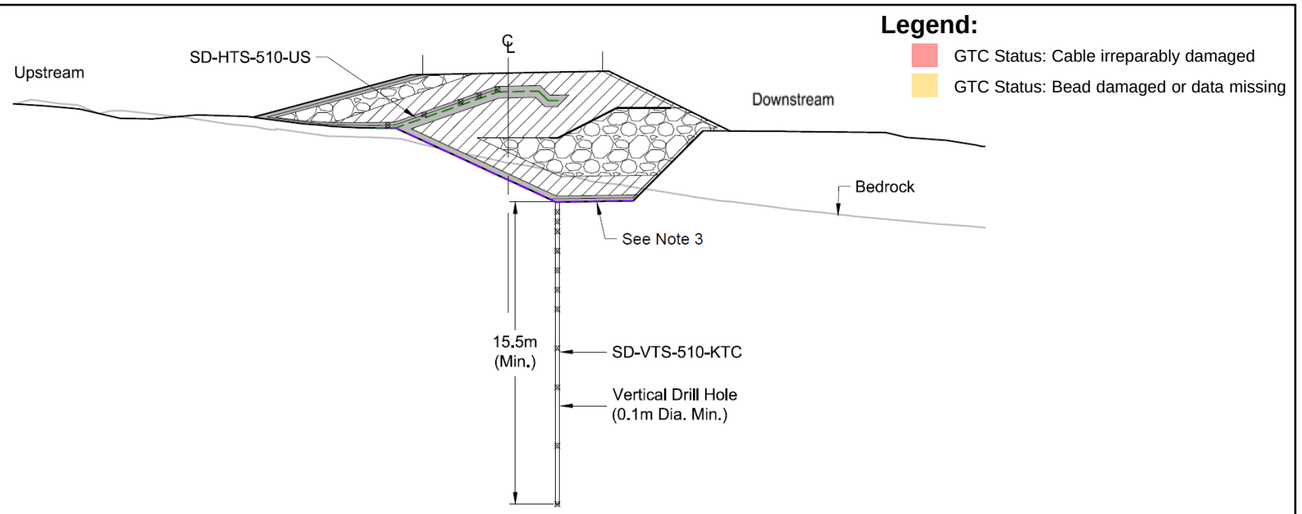


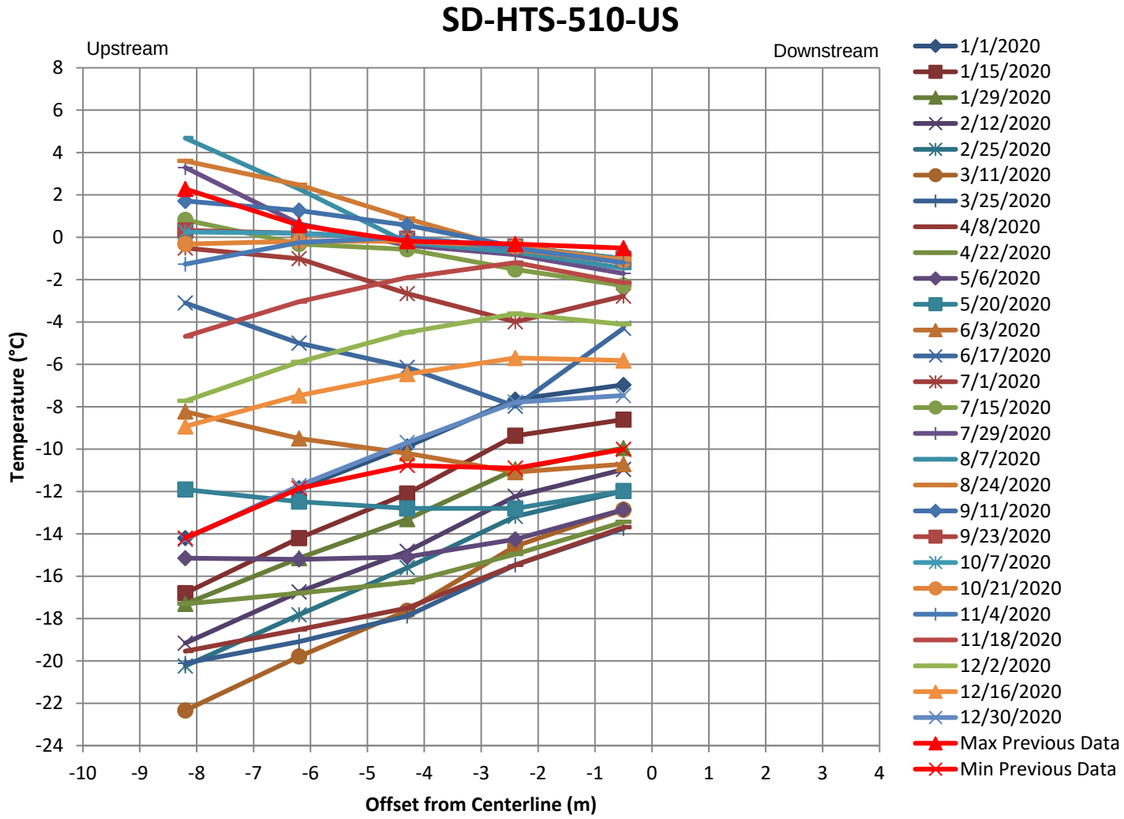
Notes:

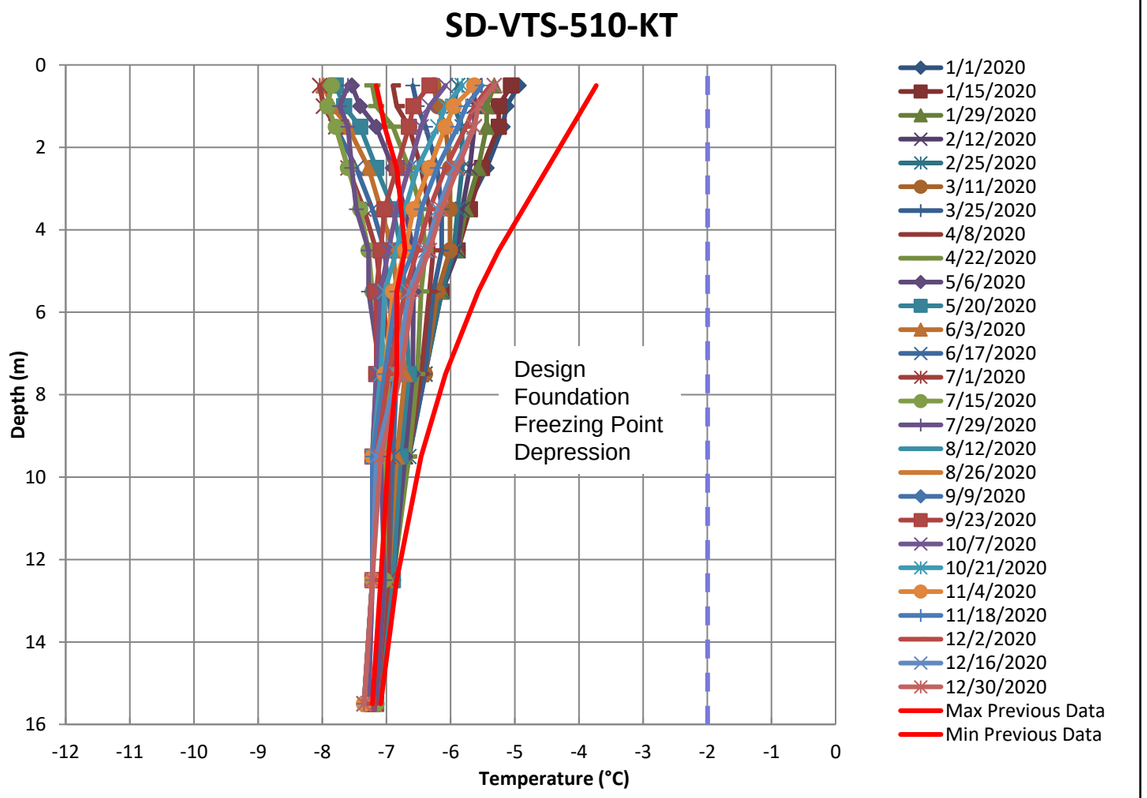
- Bead numbers increase from upstream to downstream (horizontal) and top to bottom (vertical)
- **(A)** Measurements collected between April and August 2018 were taken during construction
- **(B)** No measurements were collected between September 2018 to November 2018 as the GTC's were extended and repaired, and the data loggers were set up on site.
- **(C)** From November 2018 onwards, data loggers were installed to provide higher resolution and more frequent data transmissions
- **(D)** SD-HTS-510-US cable was damaged after construction but repaired, started transmitting in May 2019
- **(E)** Data collection gaps between August 7, 2020 and September 11, 2020

srk consulting	AGNICO EAGLE	2020 AGI – South Dam
Job No: 1CT022.057 Filename: 1_App_A_SD_GTC.pptx	DORIS TIA	**Station 5+10 Ground Temperature Cable Temperature Vs. Time**
		Date: Feb. 2021 / Approved: PDL / Figure: **A.36**





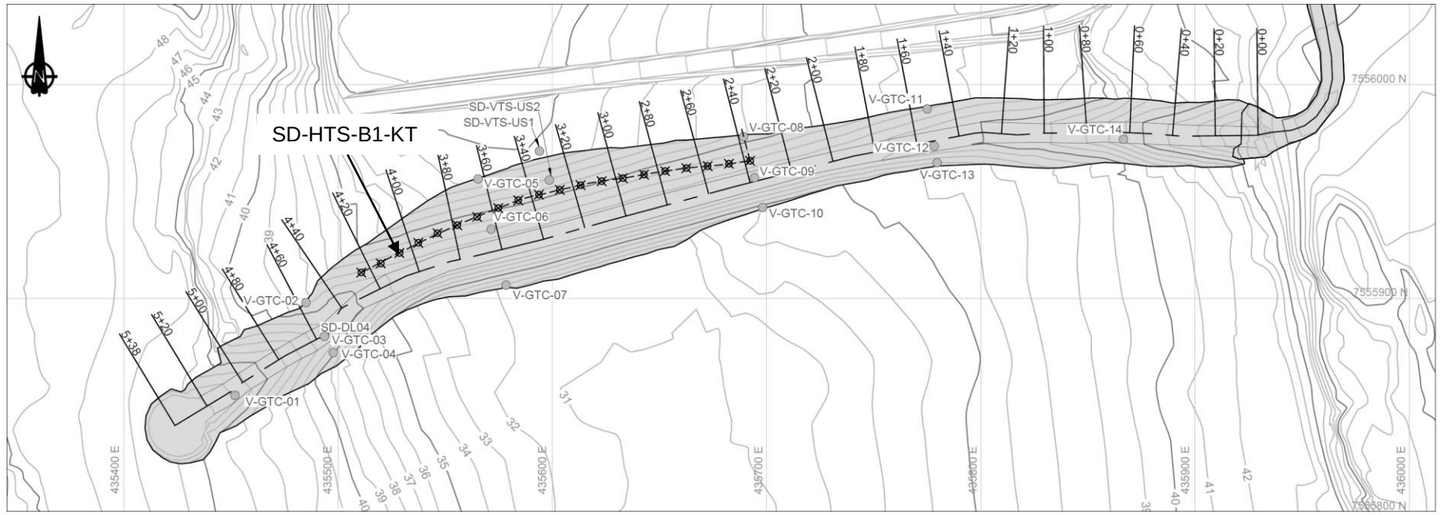




Note:

- Previous Data was recorded between January 2019 and December 2019
- Data collection gaps between August 7, 2020 and September 11, 2020 for SD-HTC-460-KT

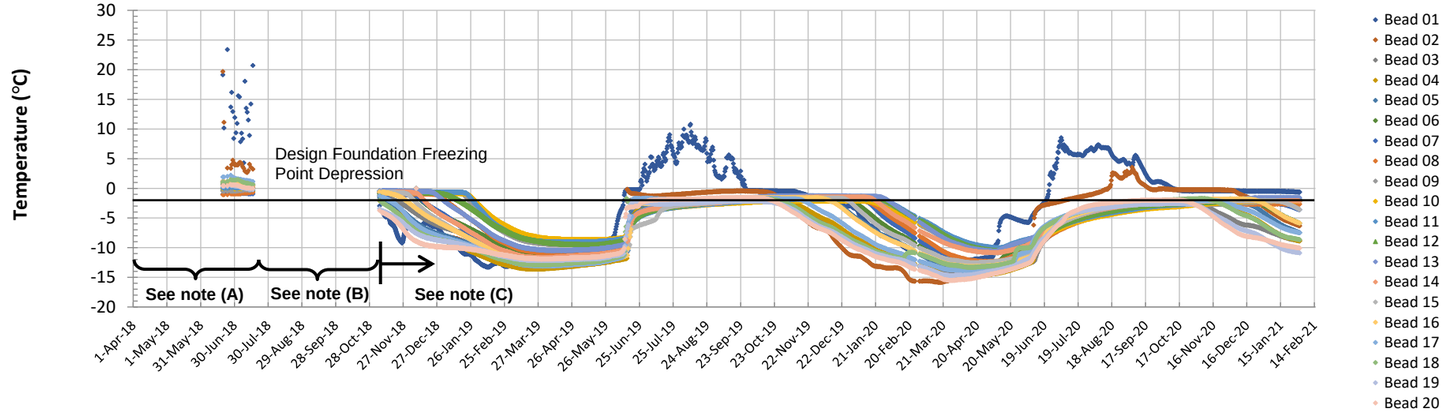
srk consulting	AGNICO EAGLE	2020 AGI – South Dam
Job No: 1CT022.057 Filename: 1_App_A_SD_GTC.pptx	DORIS TIA	**Station 5+10 Ground Temperature Cable Readings by Location**
		Date: Feb. 2021 / Approved: PDL / Figure: **A.37**



Legend:

- GTC Status: Cable irreparably damaged
- GTC Status: Bead damaged or data missing

SD-HTS-B1-KT



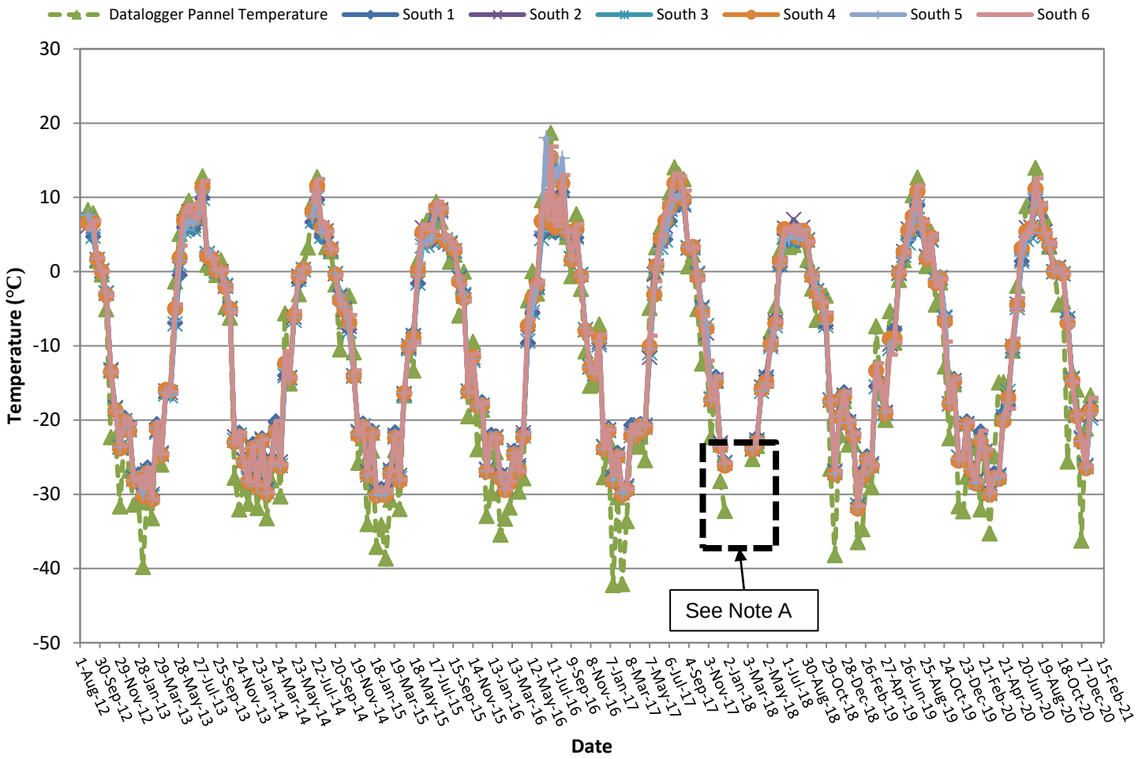
Notes:

- Bead numbers increase from East to West
- SD-HTS-B1-KT is located along upstream crest of key trench (not shown in drawing)
- **(A)** Measurements collected between April and August 2018 were taken during construction
- **(B)** No measurements were collected between September 2018 to November 2018 as the GTC's were extended and repaired, and the data loggers were set up on site.
- **(C)** From November 2018 onwards, data loggers were installed to provide higher resolution and more frequent data transmissions

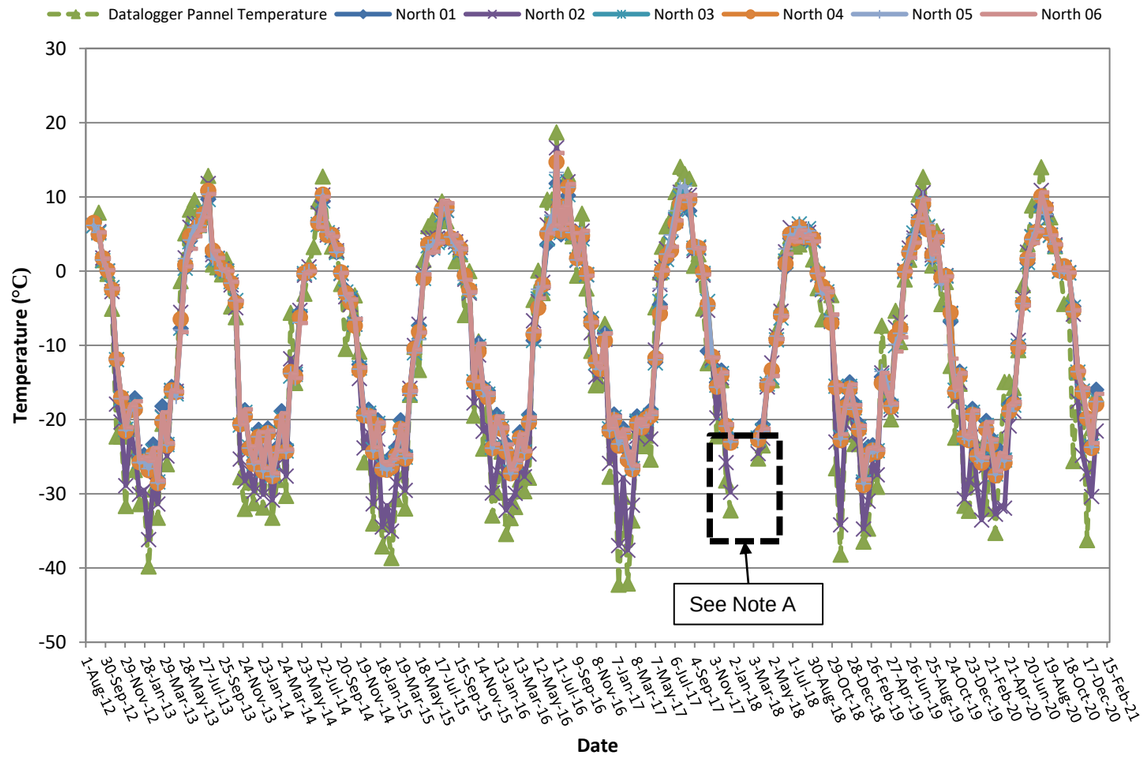
srk consulting	AGNICO EAGLE	2020 AGI – South Dam
		Key Trench Horizontal Temperature Cable Temperature Vs. Time
Job No: 1CT022.057 Filename: 1_App_A_SD_GTC.pptx	**DORIS TIA**	Date: Feb. 2021 | Approved: PDL | Figure: **A.38**

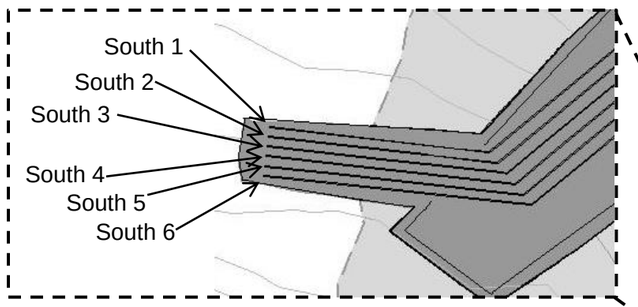
Appendix B Thermosyphons

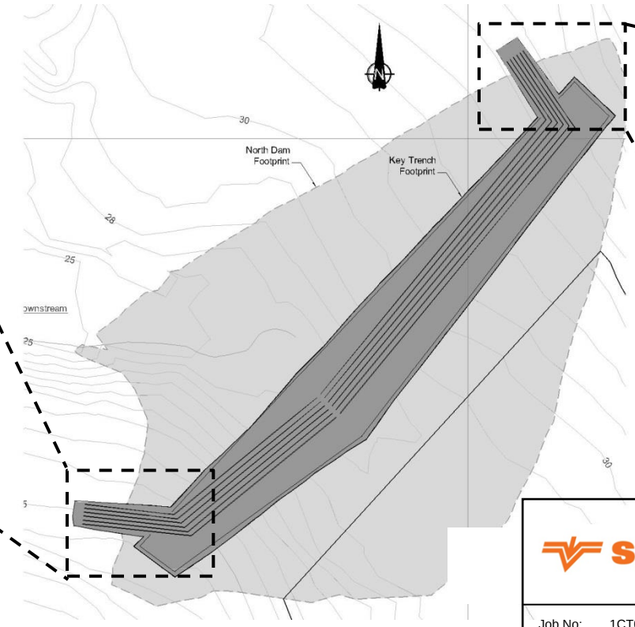
South Thermosyphon Monitoring

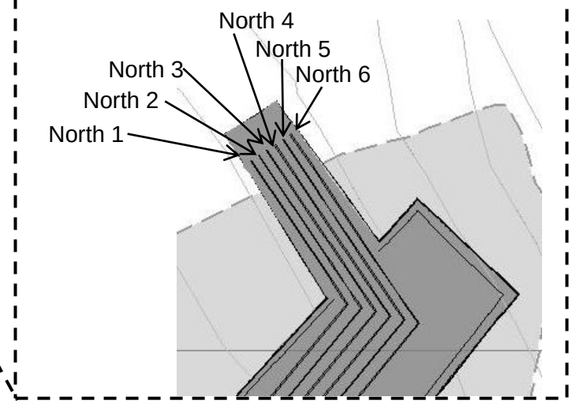


North Thermosyphon Monitoring







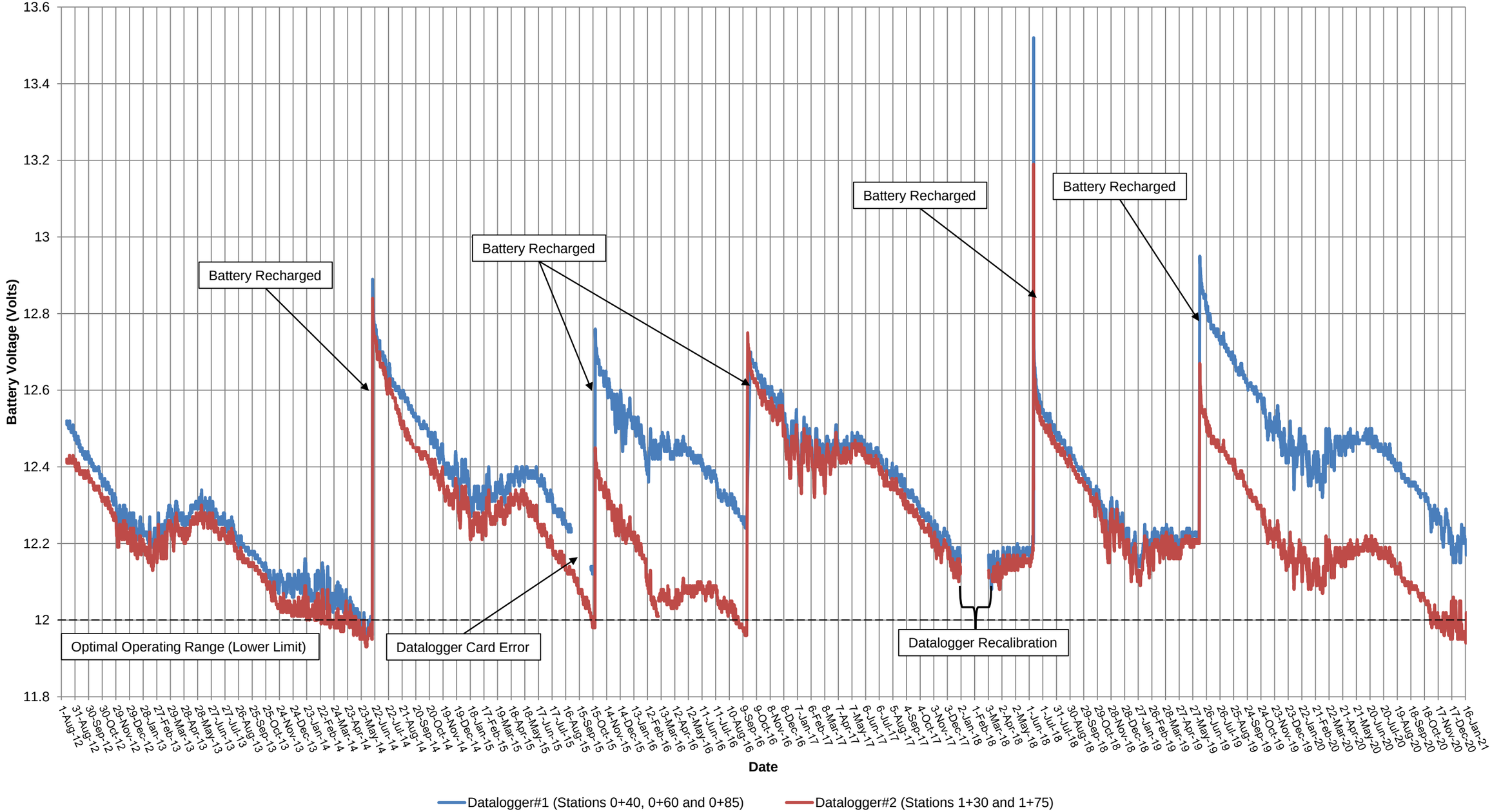


Notes:

- A) Datalogger was disconnected (Jan 1, 2018 – Mar 3, 2018) for recalibration

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: App_E_Thermosyphons.pptx	DORIS TIA	**North Dam Thermosyphon Monitoring**
		Date: Feb. 2021 / Approved: PDL / Figure: **B.1**

Appendix C Datalogger Battery Levels



Notes:

1. Operating voltage range is 9.6 to 16 V
2. Optimal operating voltage is 12 to 14 V
3. Data logger will shut down if voltage drops below 9.6 V

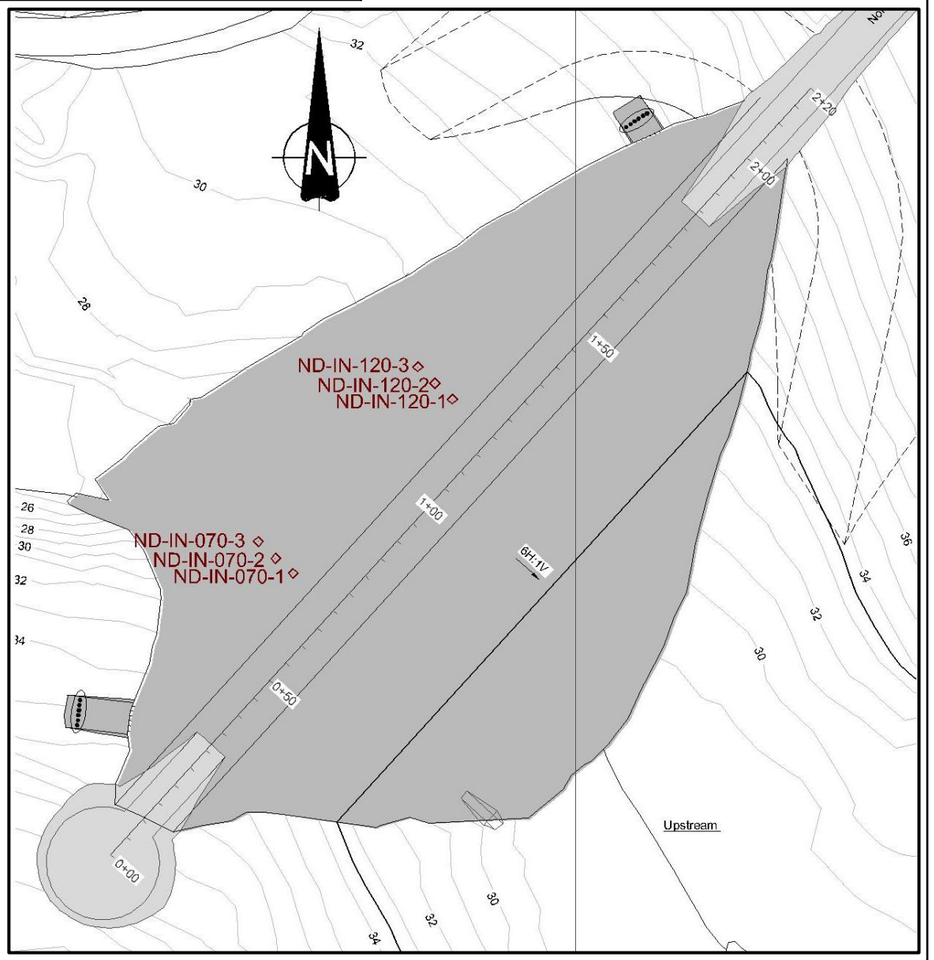
srk consulting	AGNICO EAGLE	2020 AGI – North Dam
		North Dam Datalogger Battery Voltage with Time
Job No: 1CT022.057 Filename: App_C_Batteries.pptx	**DORIS TIA**	Date: Feb. 2021 / Approved: PDL / Figure: **C.1**

Appendix D Inclinometers

	Inclinometers Measured						
Date	**070-1**	**070-2**	**070-3**	**120-1**	**120-2**	**120-3**	**Data Quality**
20-Jan-2020	x	x	x	x	x	x	
18-Feb-2020	x	x	x	x	x	x	
13-Mar-2020	x	x	x	x	x	x	
6-Jun-2020	x	x	x	x	x	x	070-2 multiple duplicate readings, excluded from graph
12-Jul-2020	x	x	x	x	x	x	
8-Aug-2020	x	x	x	x	x	x	070-1 multiple duplicate readings, excluded from graph
11-Sep-2020	x	x	x	x	x	x	070-3 multiple duplicate readings, excluded from graph
20-Oct-2020	x	x	x	x	x	x	070-2 multiple duplicate readings, excluded from graph
19-Nov-2020	x	x	x	x	x	x	
23-Dec-2020	x	x	x	x	x	x	December survey performed over two days. 070-3 and 120-2 resurveyed on Dec 24, due to poor quality survey data

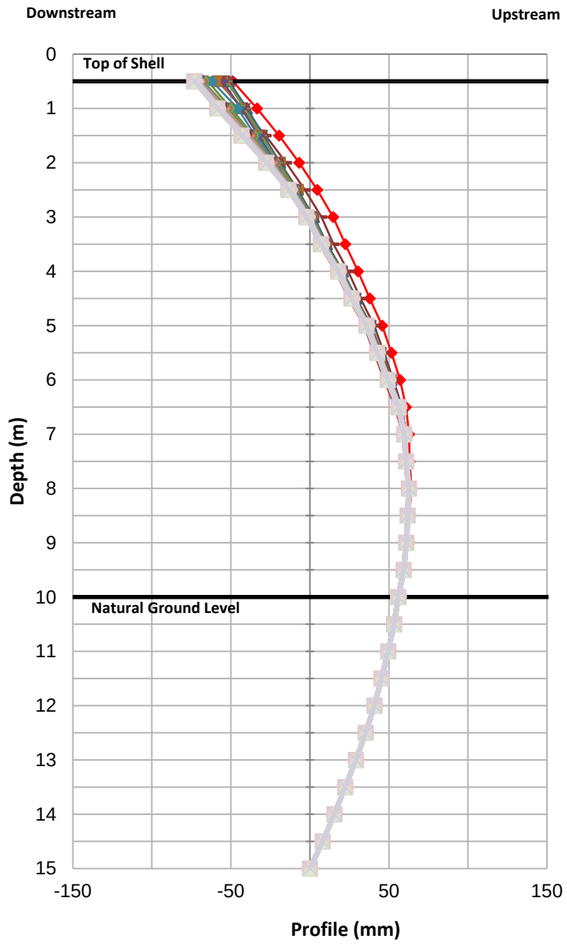
Notes:

1. Green marks good quality survey data
2. Orange marks poor quality survey data (excluded from graphs or modified)
3. No survey data was collected in April and June of 2020

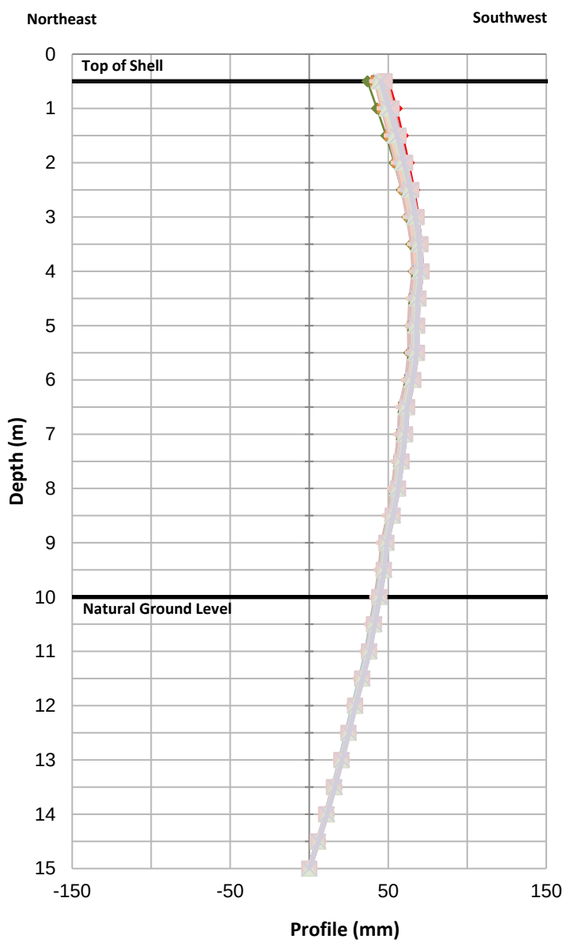


srk consulting	AGNICO EAGLE	2020 AGI – North Dam	
		Inclinometer Data Summary	
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	**DORIS TIA**	Date: Feb. 2021	Approved: PDL	Figure: **D.1**

Profile Perpendicular to Centerline



Profile Parallel to Centerline



LEGEND:

- Initial Reading (9/8/2012)
- 10/1/2013
- 7/12/2014
- 9/1/2014
- 2/2/2015
- 4/8/2015
- 5/18/2015
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- 3/21/2018
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- 1/25/2019
- 4/14/2019
- 6/11/2019
- 8/25/2019
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- 9/11/2020
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- 7/26/2013
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- 4/16/2015
- 6/25/2015
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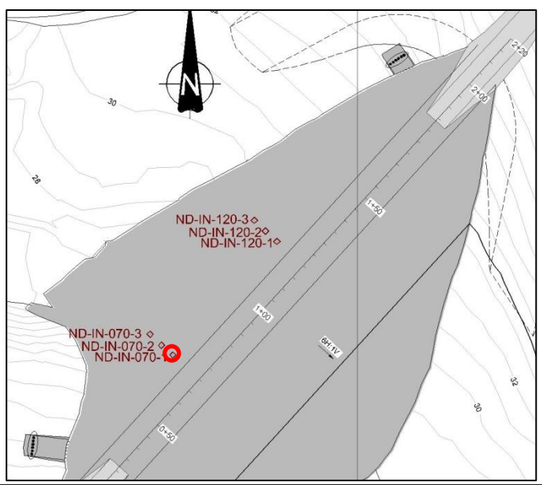
- 6/6/2020
- 8/8/2020
- 10/20/2020
- 12/23/2020

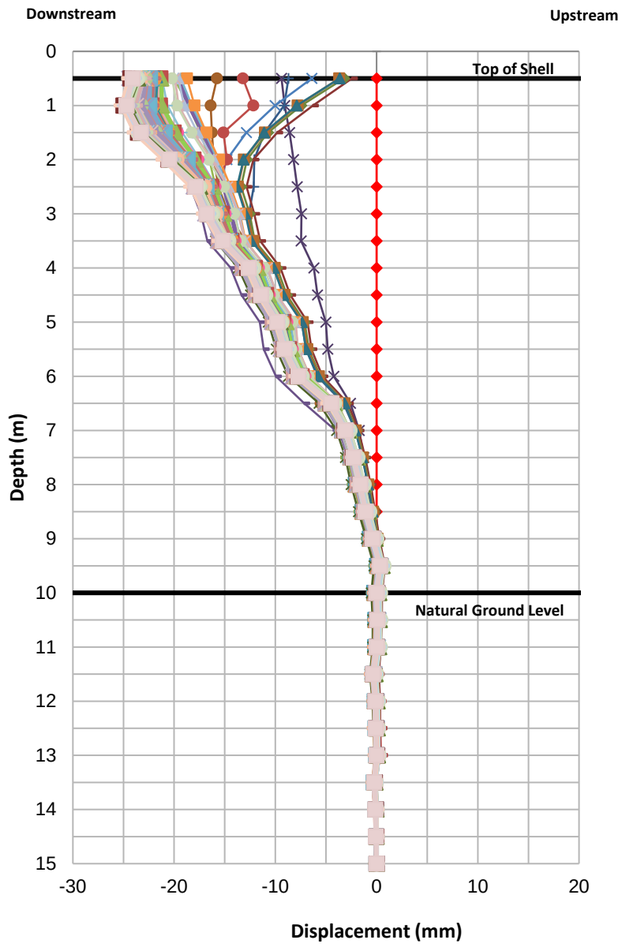


Notes:

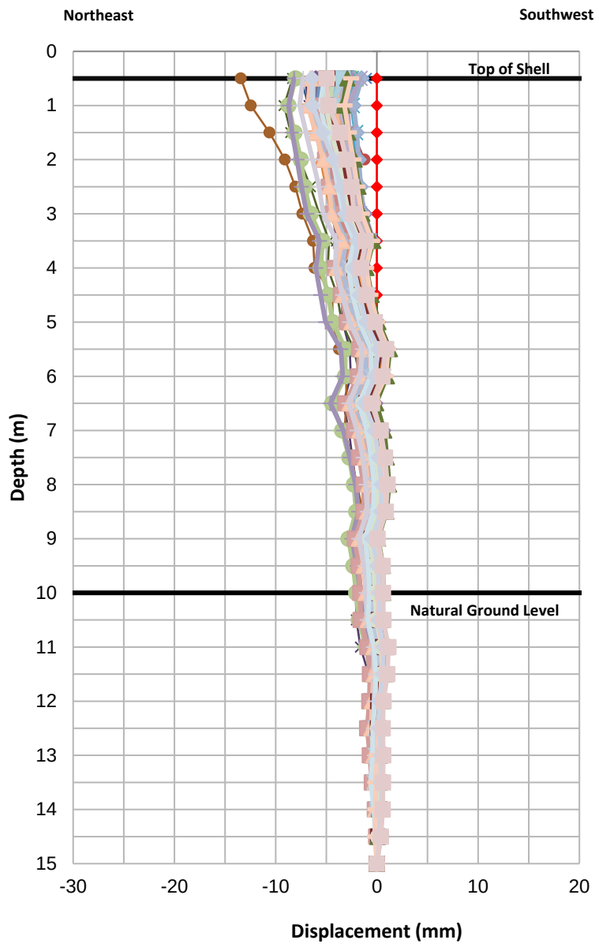
1. Manufacture's accuracy is +/- 0.25 mm per location
2. Survey data excluded from the charts is noted on Figure D.1

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	DORIS TIA	**Inclinometer 070-1 Profiles** Date: Feb. 2021 / Approved: PDL / Figure: **D.2**

Displacement Perpendicular to Centerline



Displacement Parallel to Centerline



LEGEND:

- Initial Reading (9/8/2012)
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- 5/18/2014
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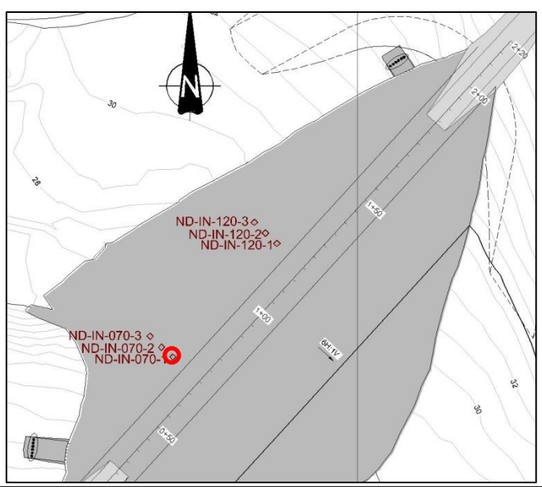
- 12/23/2020

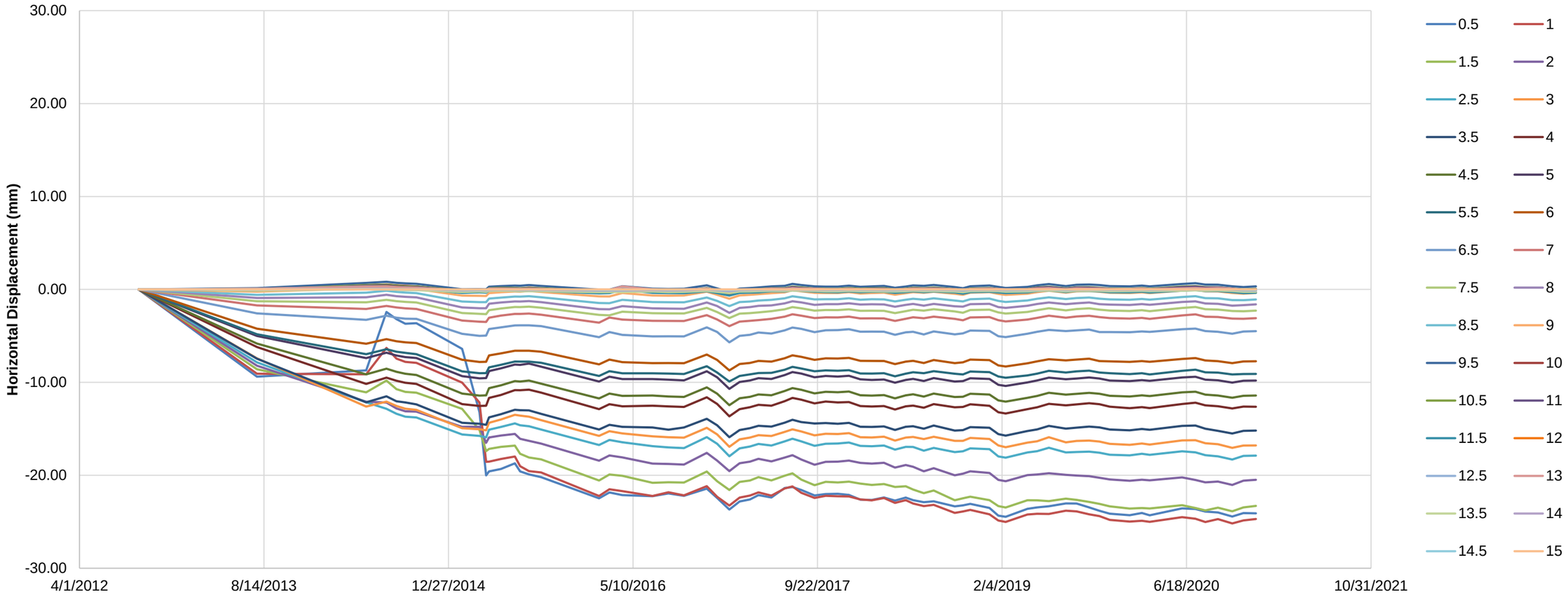


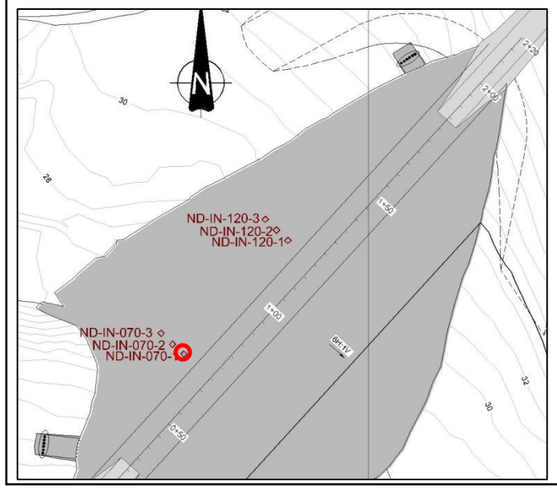
Notes:

1. Manufacture's accuracy is +/- 0.25 mm per location
2. Survey data excluded from the charts is noted on Figure D.1

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	DORIS TIA	**Inclinometer 070-1 Displacements** Date: Feb. 2021 / Approved: PDL / Figure: **D.3**

Inclinometer 070-1A Timeseries



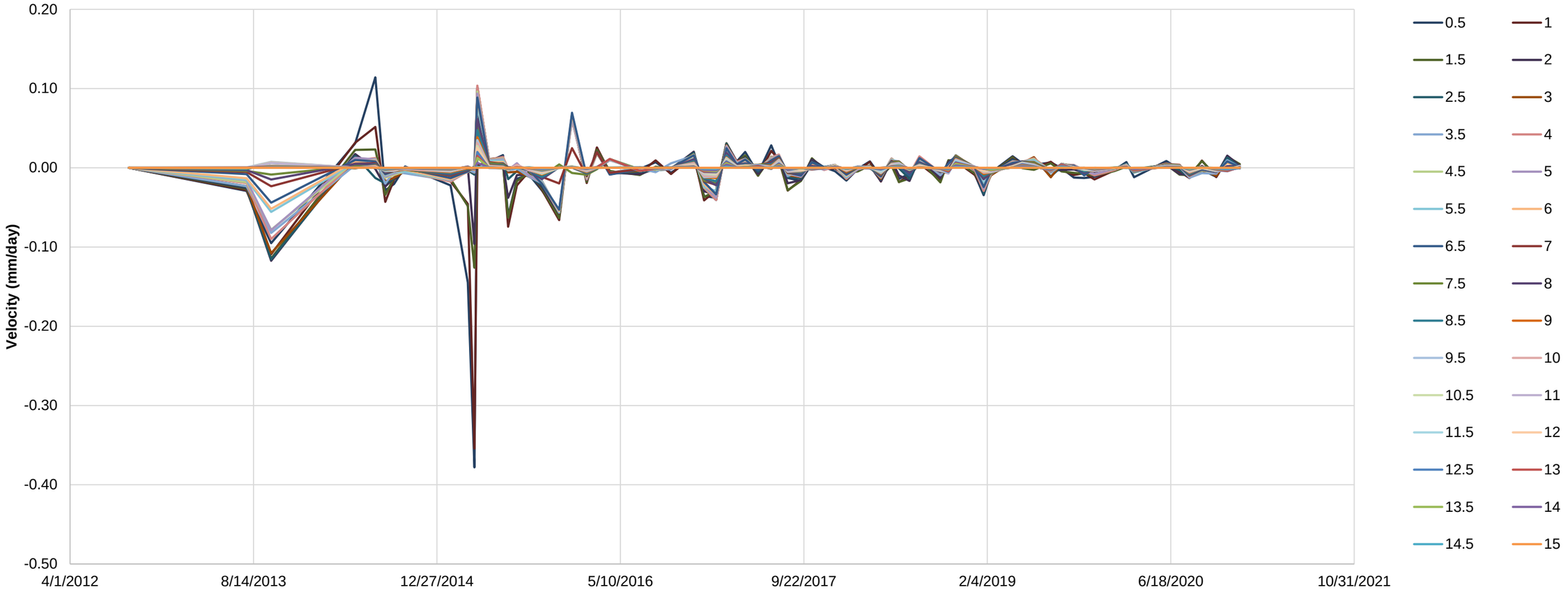


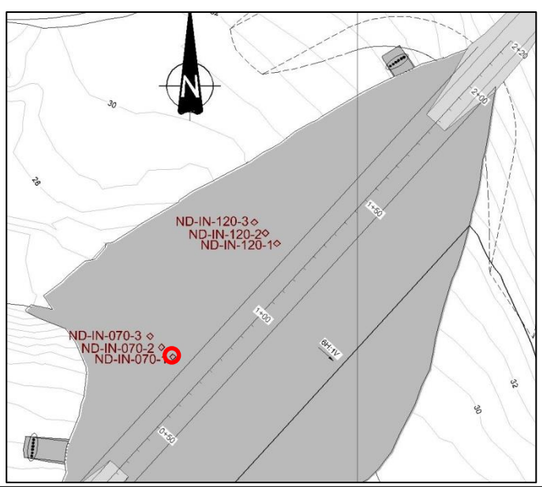
Notes:

1. Manufacture's accuracy is +/- 0.25 mm per location
2. Survey data excluded from the charts is noted on Figure D.1

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	DORIS TIA	**Inclinometer 070-1A Displacement Time Series**
		Date: Feb. 2021 / Approved: PDL / Figure: **D.4**

Inclinometer 070-1A Timeseries

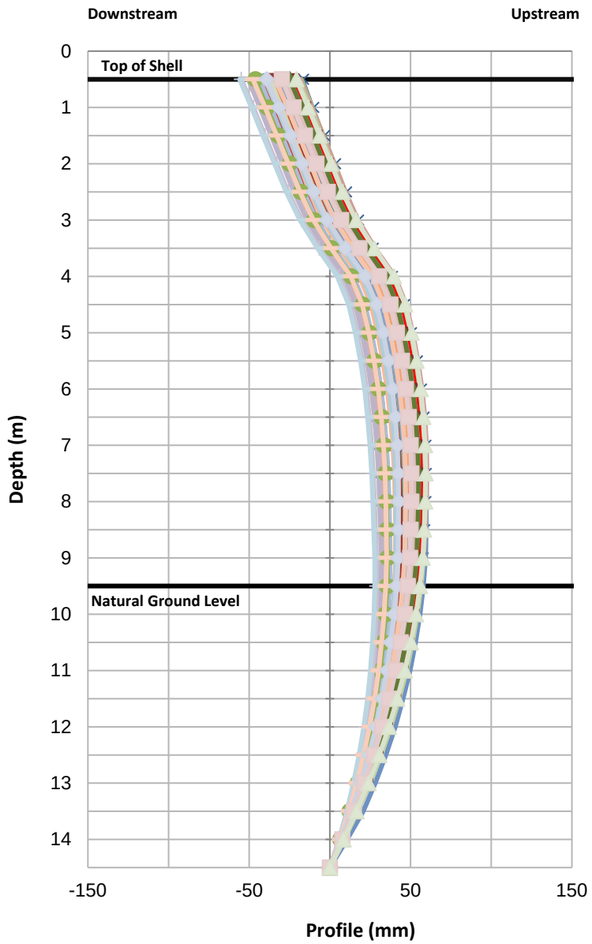




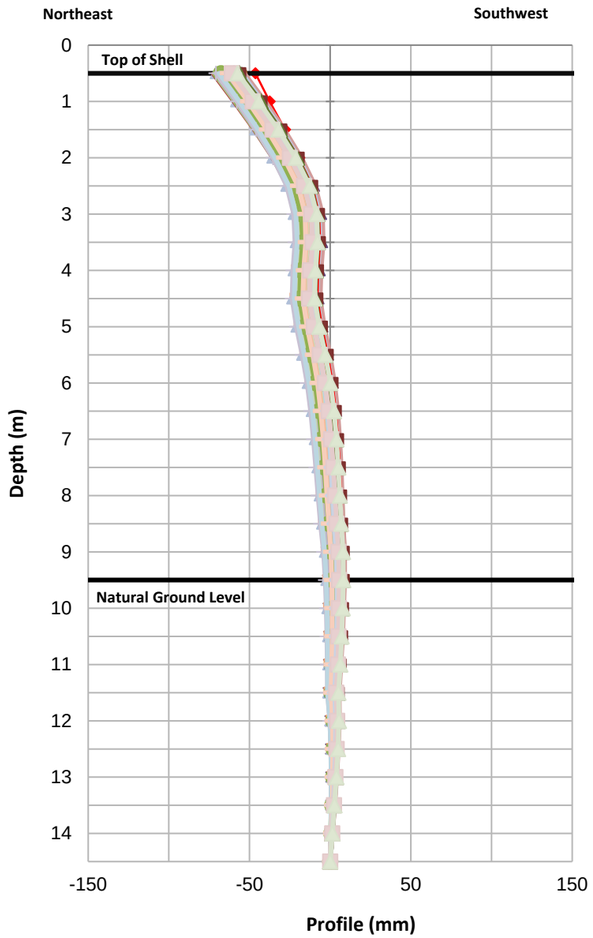
Notes:
1. Manufacture's accuracy is +/- 0.25 mm per location
2. Survey data excluded from the charts is noted on Figure D.1

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	DORIS TIA	**Inclinometer 070-1A Velocity Time Series**
		Date: Feb. 2021 | Approved: PDL | Figure: **D.5**

Profile Perpendicular to Centerline



Profile Parallel to Centerline



LEGEND:

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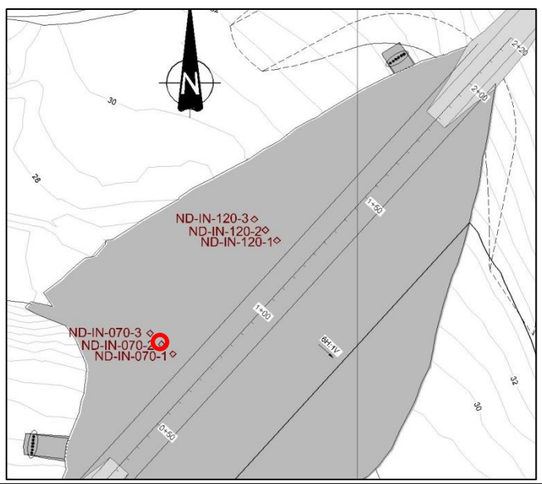
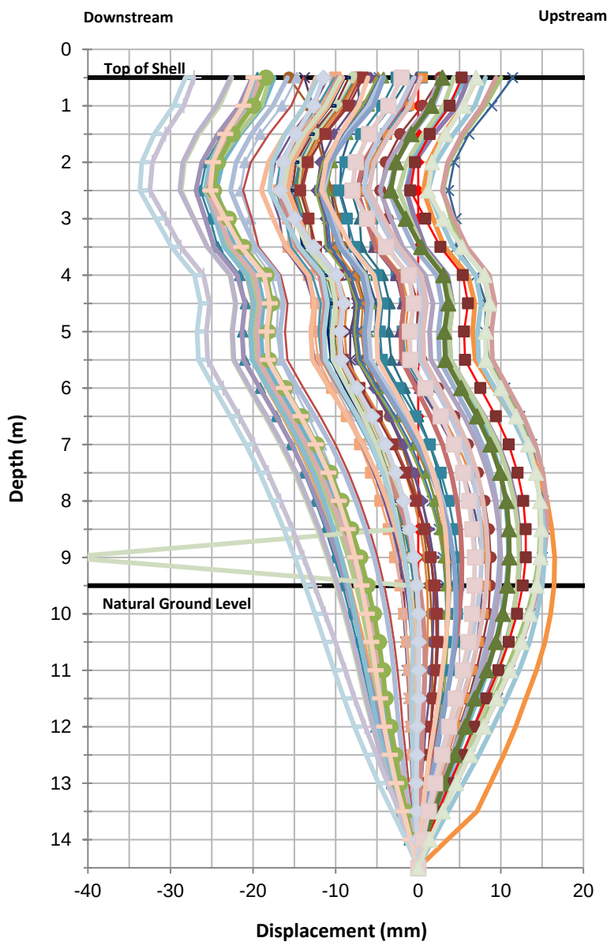


Notes:

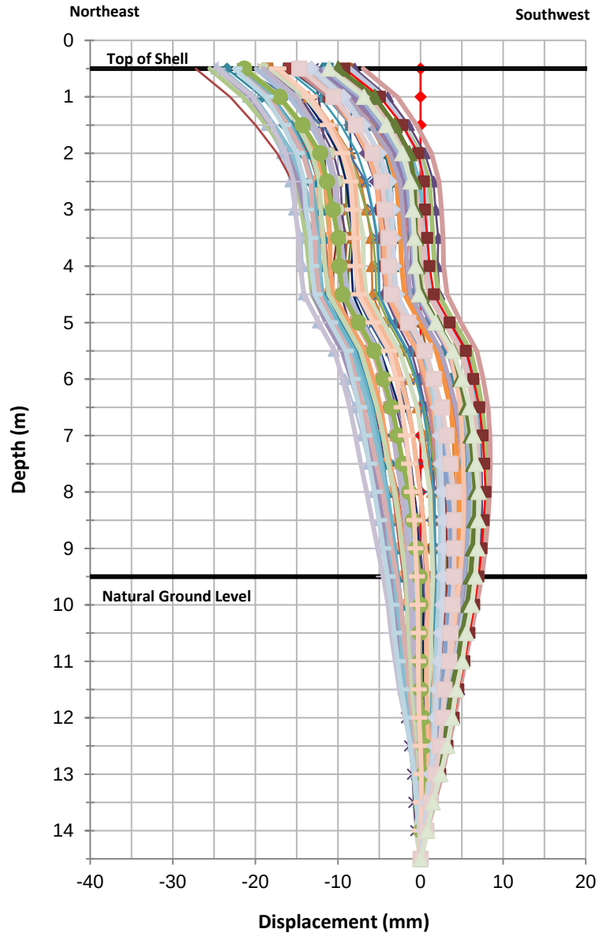
1. Manufacture's accuracy is +/- 0.25 mm per location
2. Survey data excluded from the charts is noted on Figure D.1

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
		Inclinometer 070-2 Profiles
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	**DORIS TIA**	Date: Feb. 2021 / Approved: PDL / Figure: **D.6**

Displacement Perpendicular to Centerline



Displacement Parallel to Centerline



LEGEND:

- Initial Reading (9/8/2012)
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- 2/1/2015
- 4/16/2015
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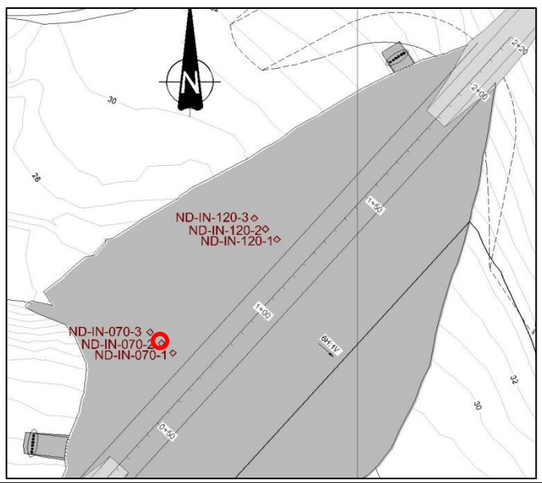
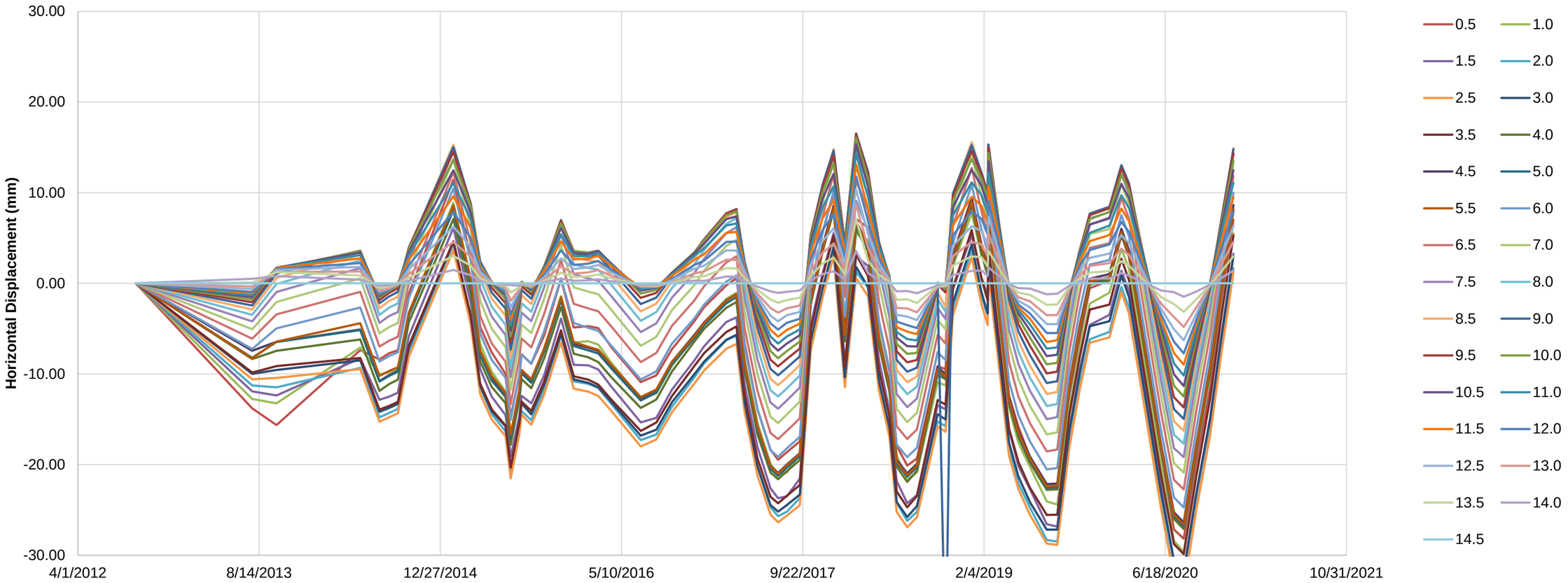


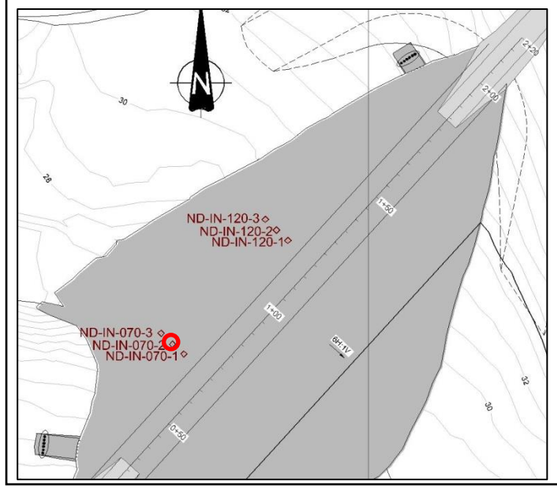
Notes:

1. Manufacture's accuracy is +/- 0.25 mm per location
2. Survey data excluded from the charts is noted on Figure D.1

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
		Inclinometer 070-2 Displacements
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	**DORIS TIA**	Date: Feb. 2021 / Approved: PDL / Figure: **D.7**

Inclinometer 070-2A Timeseries



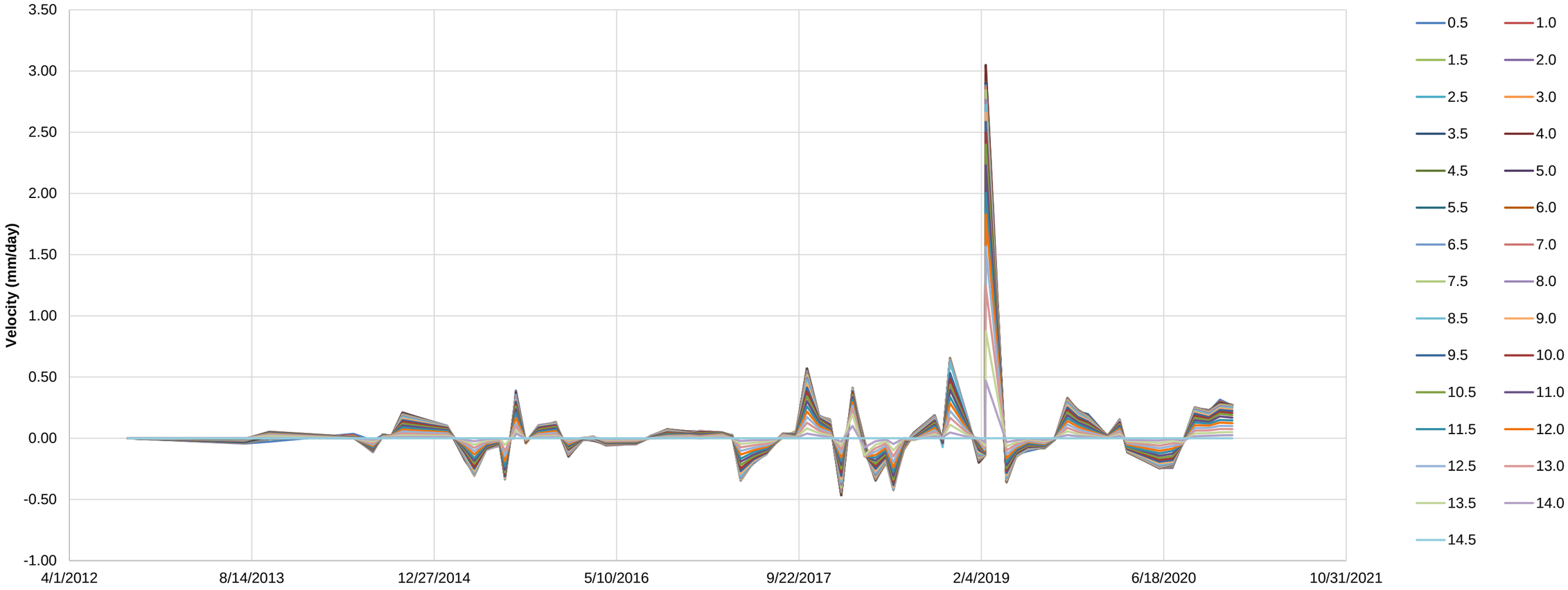


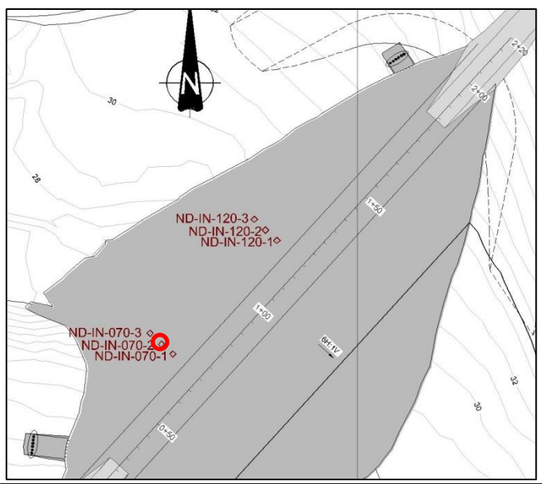
Notes:

1. Manufacture's accuracy is +/- 0.25 mm per location
2. Survey data excluded from the charts is noted on Figure D.1

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	DORIS TIA	**Inclinometer 070-2A Displacement Time Series**
		Date: Feb. 2021 / Approved: PDL / Figure: **D.8**

Inclinometer 070-2A Velocity Timeseries



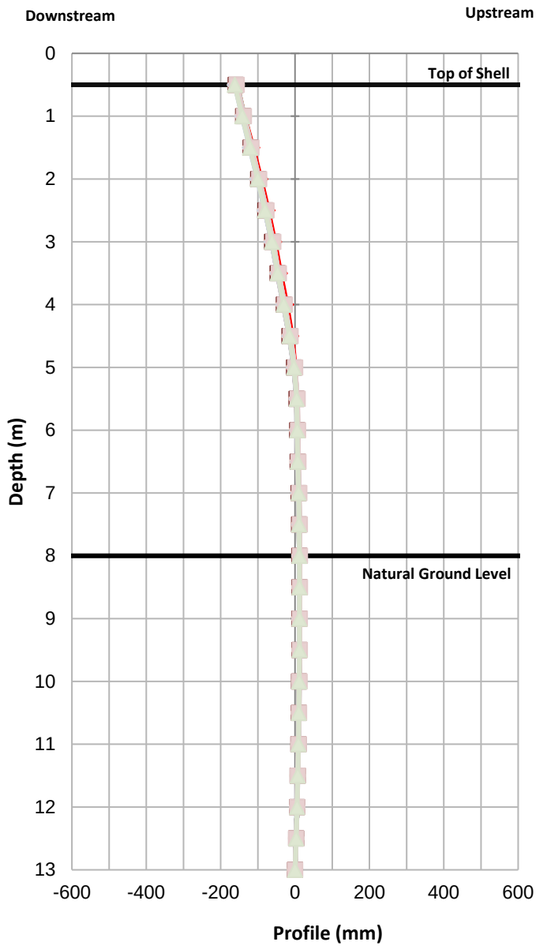


Notes:

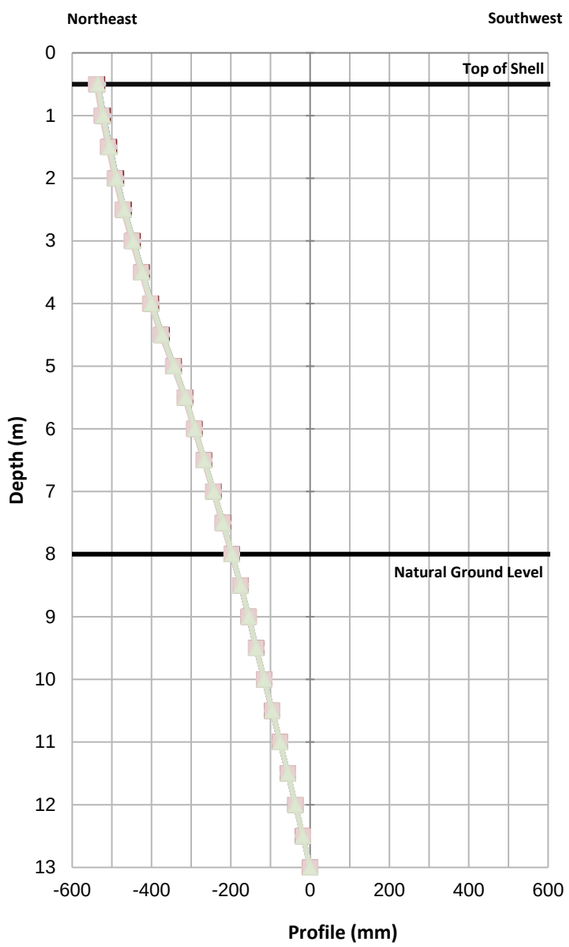
1. Manufacture's accuracy is +/- 0.25 mm per location
2. Survey data excluded from the charts is noted on Figure D.1

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	DORIS TIA	**Inclinometer 070-2A Velocity Time Series**
		Date: Feb. 2021 / Approved: PDL / Figure: **D.9**

Profile Perpendicular to Centerline



Profile Parallel to Centerline



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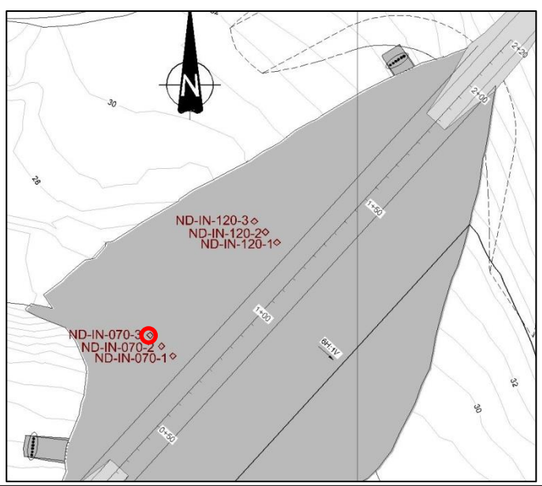
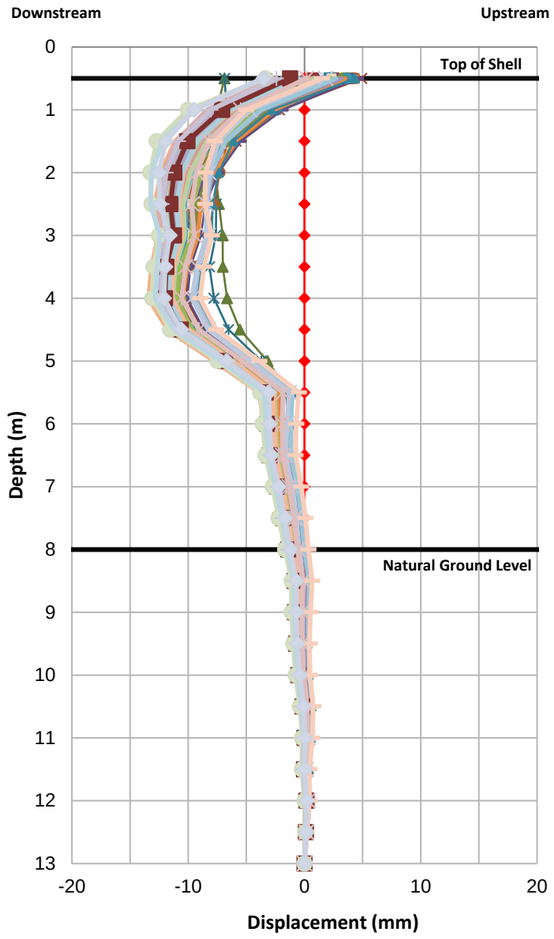


Notes:

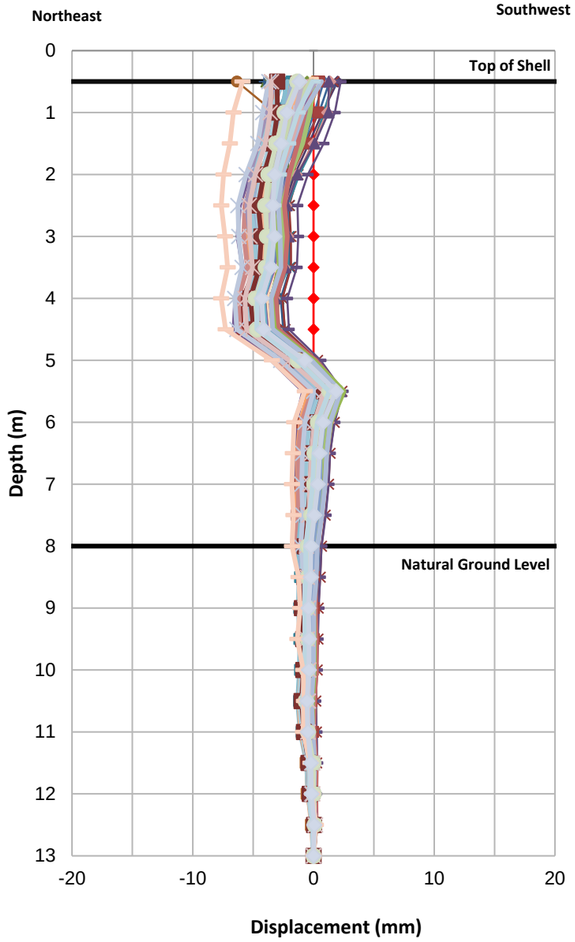
1. Manufacture's accuracy is +/- 0.25 mm per location
2. Survey data excluded from the charts is noted on Figure D.1

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	DORIS TIA	**Inclinometer 070-3 Profiles**
		Date: Feb. 2021 / Approved: PDL / Figure: **D.10**

Displacement Perpendicular to Centerline

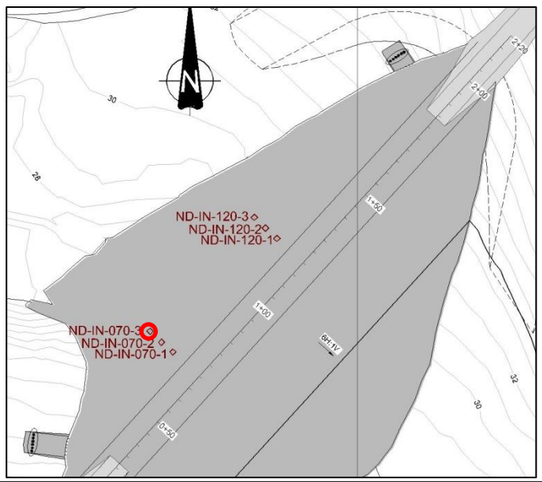


Displacement Parallel to Centerline



LEGEND:

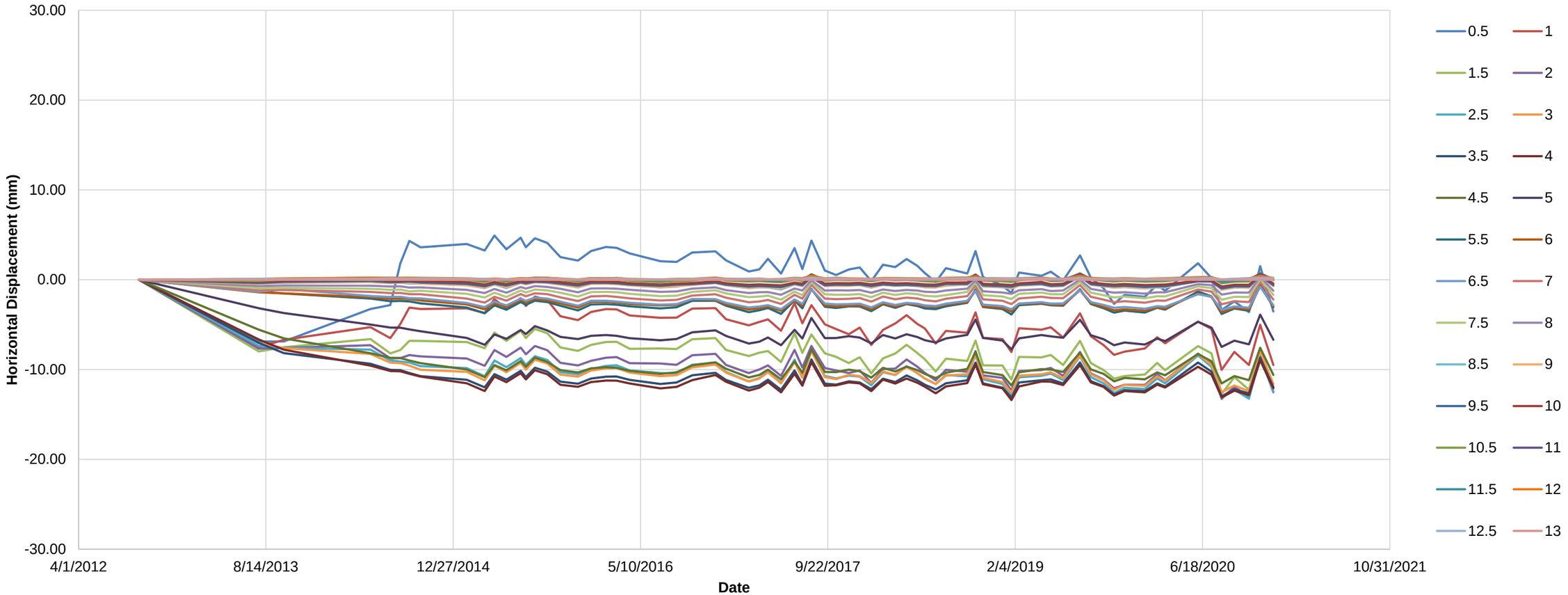
- Initial Reading (9/9/2012)
- 10/1/2013
- 7/12/2014
- 9/1/2014
- 2/1/2015
- 4/16/2015
- 6/25/2015
- 8/2/2015
- 10/9/2015
- 12/30/2015
- 3/7/2016
- 7/2/2016
- 9/25/2016
- 12/24/2016
- 3/23/2017
- 5/20/2017
- 7/16/2017
- 9/14/2017
- 11/17/2017
- 1/16/2018
- 3/21/2018
- 5/19/2018
- 7/7/2018
- 9/29/2018
- 11/10/2018
- 1/25/2019
- 4/15/2019
- 6/12/2019
- 8/25/2019
- 10/26/2019
- 1/16/2020
- 3/10/2020
- 7/12/2020
- 9/11/2020
- 11/19/2020
- 7/26/2013
- 5/20/2014
- 8/8/2014
- 10/1/2014
- 3/21/2015
- 5/18/2015
- 7/9/2015
- 9/4/2015
- 11/25/2015
- 2/8/2016
- 4/11/2016
- 8/14/2016
- 11/26/2016
- 2/23/2017
- 4/15/2017
- 6/25/2017
- 8/9/2017
- 10/14/2017
- 12/16/2017
- 2/16/2018
- 4/20/2018
- 6/8/2018
- 8/3/2018
- 10/21/2018
- 1/1/2019
- 2/14/2019
- 5/10/2019
- 7/27/2019
- 9/28/2019
- 11/23/2019
- 2/18/2020
- 6/6/2020
- 8/8/2020
- 10/20/2020
- 12/24/2020

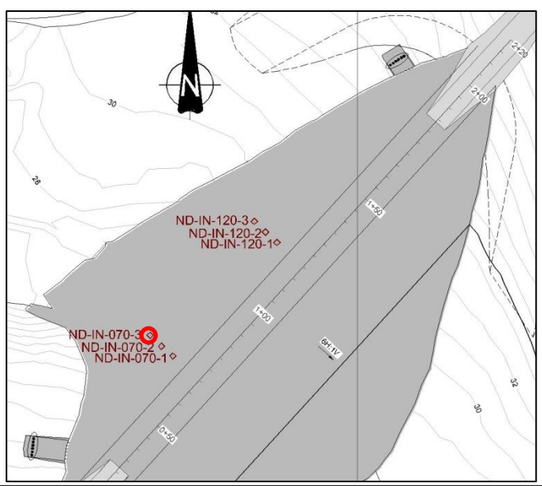


Notes:

1. Manufacture's accuracy is +/- 0.25 mm per location
2. Survey data excluded from the charts is noted on Figure D.1

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	DORIS TIA	**Inclinometer 070-3 Displacements**
		Date: Feb. 2021 / Approved: PDL / Figure: **D.11**

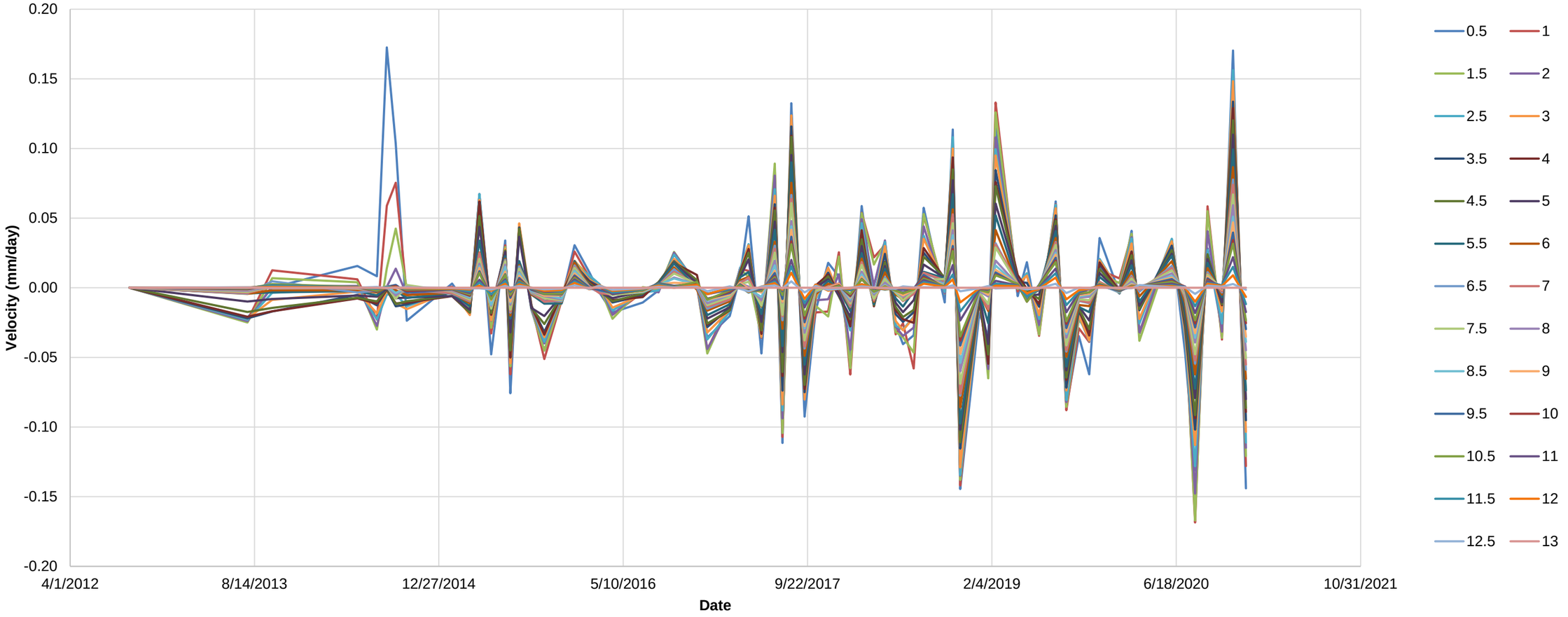


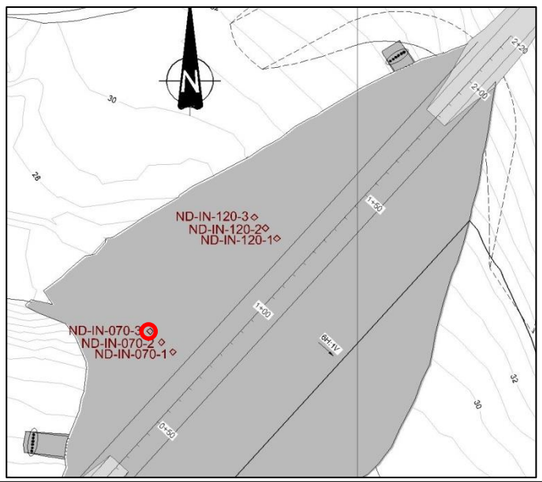


Notes:
1. Manufacture's accuracy is +/- 0.25 mm per location
2. Survey data excluded from the charts is noted on Figure D.1

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	DORIS TIA	**Inclinometer 070-3A Displacement Time Series**
		Date: Feb. 2021 / Approved: PDL / Figure: **D.12**

Inclinometer 070-3A Velocity Timeseries

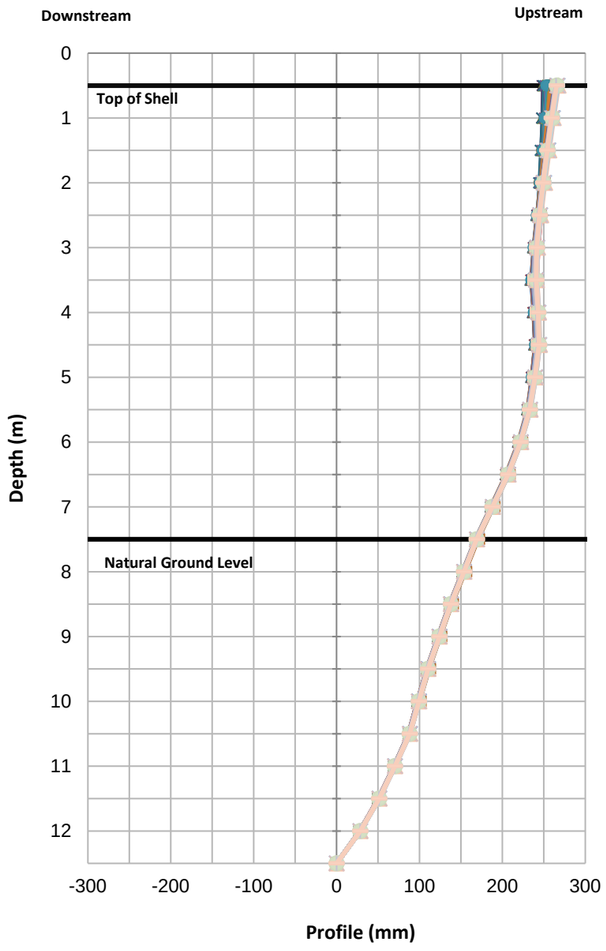




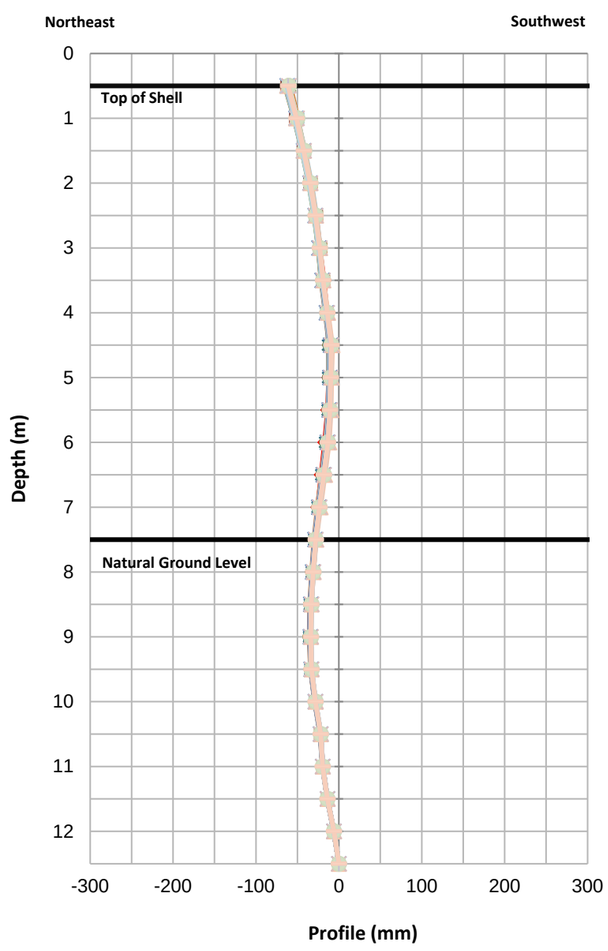
Notes:
1. Manufacture's accuracy is +/- 0.25 mm per location
2. Survey data excluded from the charts is noted on Figure D.1

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	DORIS TIA	**Inclinometer 070-3A Velocity Time Series**
		Date: Feb. 2021 / Approved: PDL / Figure: **D.13**

Profile Perpendicular to Centerline



Profile Parallel to Centerline



LEGEND:

- Initial Reading (9/8/2012)
- 8/28/2013
- 5/20/2014
- 8/8/2014
- 10/1/2014
- 3/21/2015
- 5/18/2015
- 7/9/2015
- 9/4/2015
- 11/25/2015
- 3/7/2016
- 7/2/2016
- 9/25/2016
- 12/24/2016
- 3/23/2017
- 5/20/2017
- 7/16/2017
- 9/14/2017
- 11/17/2017
- 1/16/2018
- 3/21/2018
- 5/19/2018
- 7/7/2018
- 9/29/2018
- 11/10/2018
- 1/28/2019
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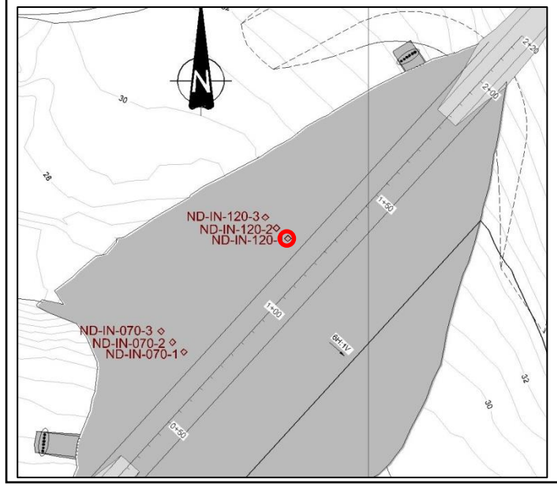
- 7/27/2019
- 9/28/2019
- 1/20/2020
- 3/12/2020
- 7/12/2020
- 9/11/2020
- 11/19/2020
- 7/26/2013
- 10/1/2013
- 7/12/2014
- 9/1/2014
- 2/2/2015
- 4/16/2015
- 6/25/2015
- 8/2/2015
- 10/9/2015
- 12/30/2015
- 4/11/2016
- 8/14/2016
- 11/26/2016
- 2/23/2017
- 4/15/2017
- 6/25/2017
- 8/9/2017
- 10/14/2017
- 12/16/2017
- 2/16/2018
- 4/20/2018
- 6/8/2018
- 8/3/2018
- 10/21/2018
- 1/1/2019
- 4/15/2019
- 6/12/2019
- 8/25/2019
- 11/24/2019
- 2/18/2020
- 6/6/2020
- 8/8/2020
- 10/20/2020
- 12/23/2020

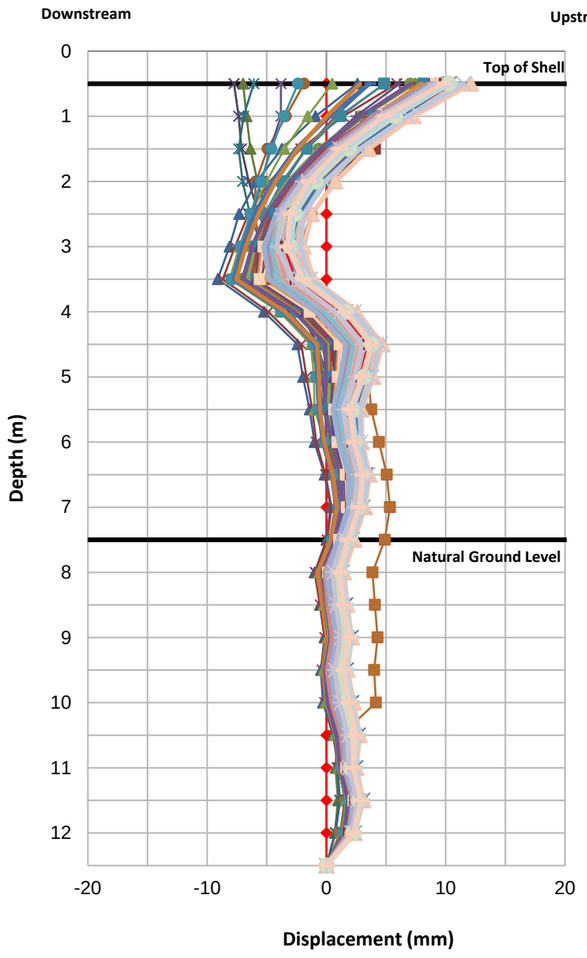


Notes:

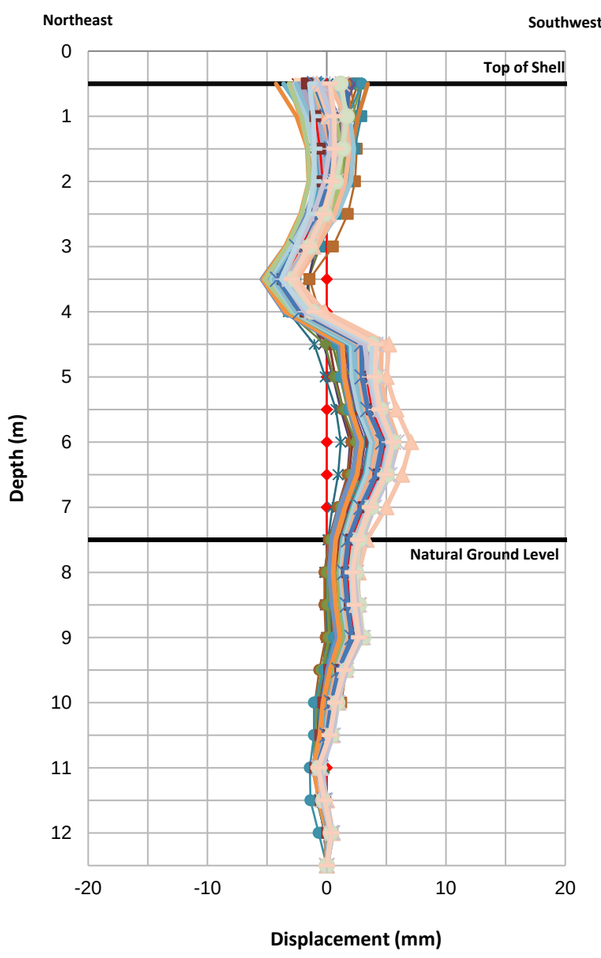
1. Manufacture's accuracy is +/- 0.25 mm per location
2. Survey data excluded from the charts is noted on Figure D.1

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	DORIS TIA	**Inclinometer 120-1 Profiles**
	Date: Feb. 2021 / Approved: PDL	Figure: **D.14**

Displacement Perpendicular to Centerline



Displacement Parallel to Centerline



LEGEND:

- Initial Reading (9/8/2012)
- 8/28/2013
- 5/20/2014
- 8/8/2014
- 10/1/2014
- 3/21/2015
- 5/18/2015
- 7/9/2015
- 9/4/2015
- 11/25/2015
- 3/7/2016
- 7/2/2016
- 9/25/2016
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- 10/9/2015
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- 6/25/2017
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- 10/14/2017
- 12/16/2017
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- 6/8/2018
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- 1/1/2019
- 4/15/2019
- 6/12/2019
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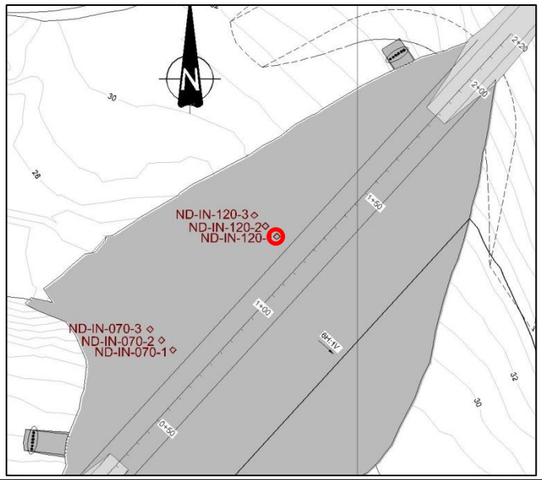
- 8/8/2020
- 10/20/2020
- 12/23/2020

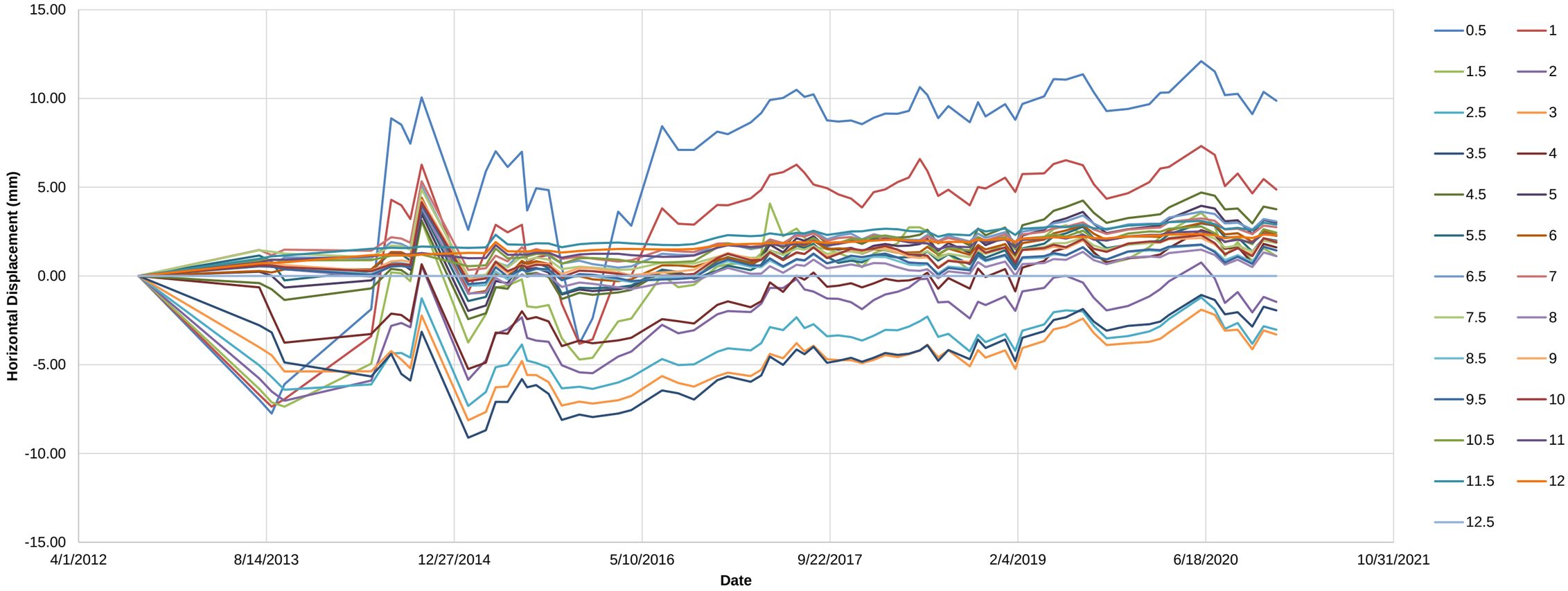


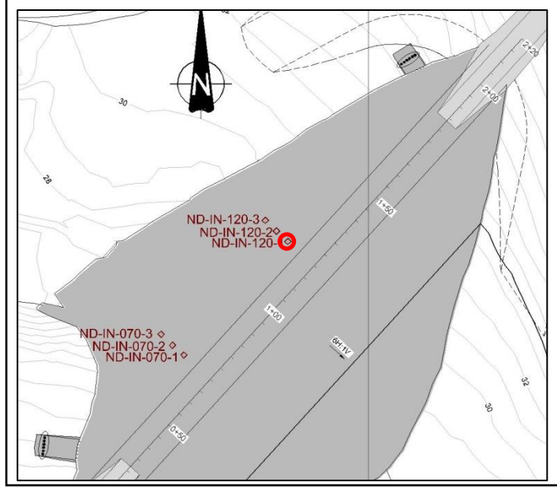
Notes:

1. Manufacture's accuracy is +/- 0.25 mm per location
2. Survey data excluded from the charts is noted on Figure D.1

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	DORIS TIA	**Inclinometer 120-1 Displacements** Date: Feb. 2021 / Approved: PDL / Figure: **D.15**

Inclinometer 120-1A Timeseries



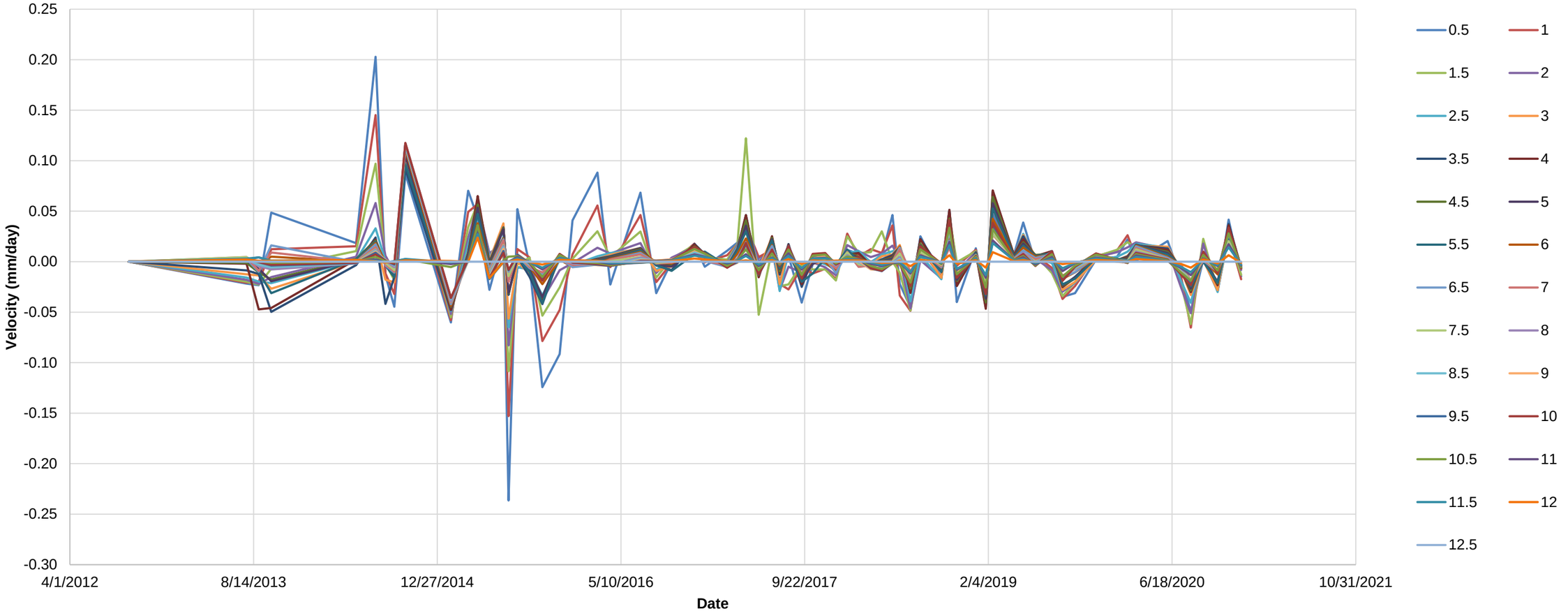


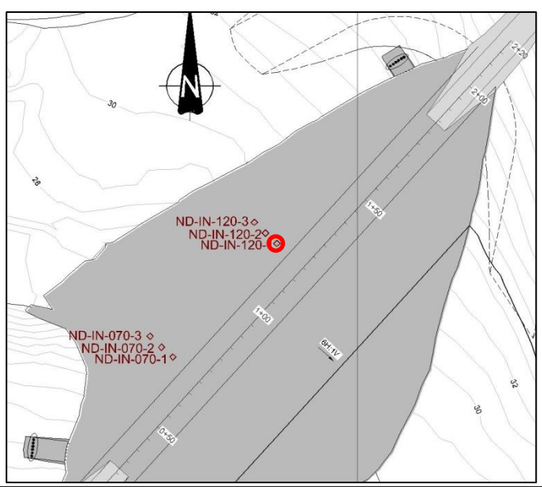
Notes:

1. Manufacture's accuracy is +/- 0.25 mm per location
2. Survey data excluded from the charts is noted on Figure D.1

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	DORIS TIA	**Inclinometer 120-1A Displacement Time Series** Date: Feb. 2021 | Approved: PDL | Figure: **D.16**

Inclinometer 120-1A Velocity Timeseries

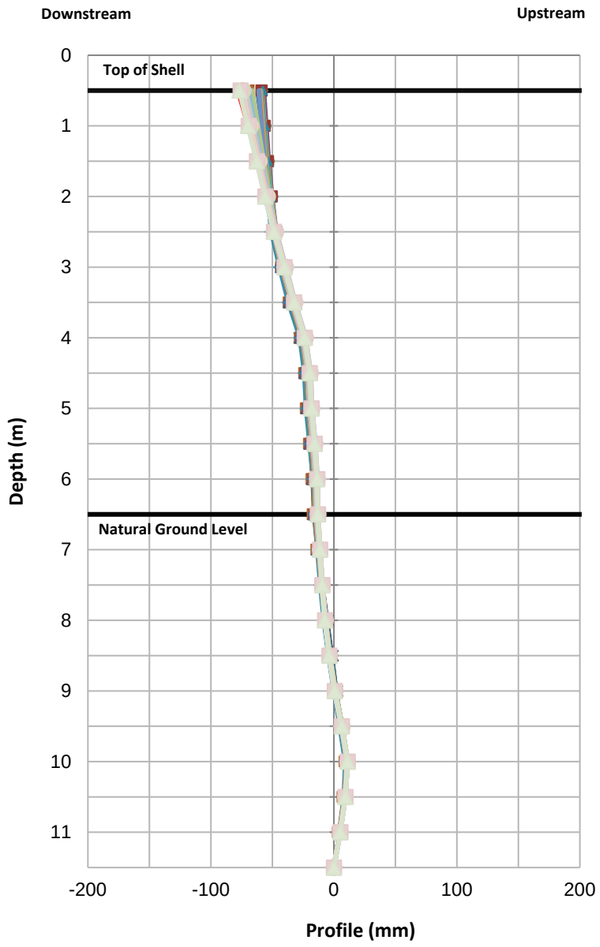




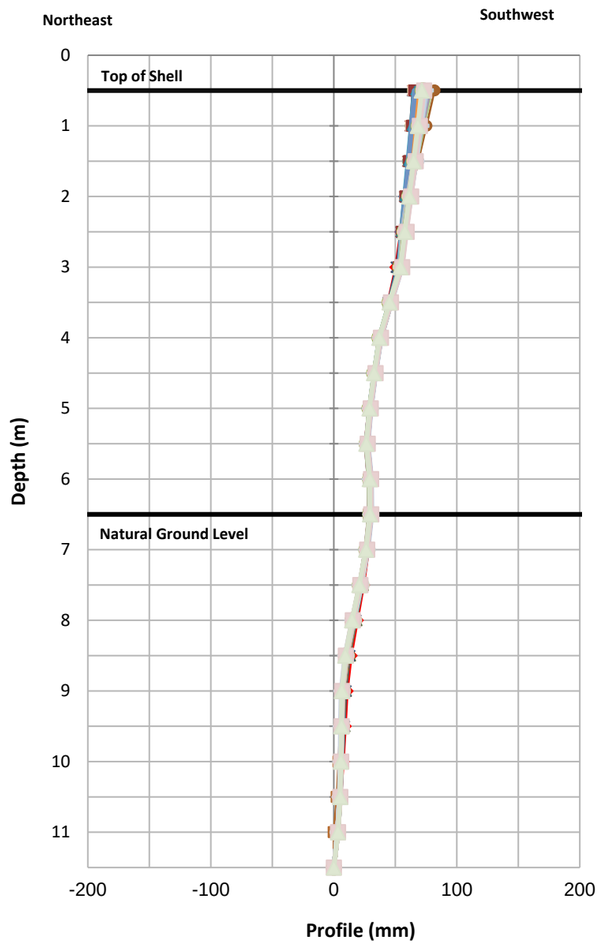
Notes:
1. Manufacture's accuracy is +/- 0.25 mm per location
2. Survey data excluded from the charts is noted on Figure D.1

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	DORIS TIA	**Inclinometer 120-1A Velocity Time Series**
		Date: Feb. 2021 / Approved: PDL / Figure: **D.17**

Profile Perpendicular to Centerline



Profile Parallel to Centerline



LEGEND:

- Initial Reading (9/8/2012)
- 8/28/2013
- 5/20/2014
- 8/8/2014
- 10/1/2014
- 3/21/2015
- 4/20/2015
- 6/26/2015
- 8/2/2015
- 10/9/2015
- 12/30/2015
- 3/7/2016
- 7/2/2016
- 9/25/2016
- 11/26/2016
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- 5/20/2017
- 7/16/2017
- 9/14/2017
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- 7/7/2018
- 9/30/2018
- 11/10/2018
- 1/25/2019
- 5/10/2019
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- 6/6/2020
- 8/8/2020
- 10/20/2020
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- 7/26/2013
- 10/1/2013
- 7/12/2014
- 9/1/2014
- 2/2/2015
- 4/16/2015
- 5/19/2015
- 7/9/2015
- 9/4/2015
- 11/25/2015
- 2/8/2016
- 4/11/2016
- 8/14/2016
- 12/24/2016
- 2/23/2017
- 4/15/2017
- 6/25/2017
- 8/9/2017
- 10/14/2017
- 12/16/2017
- 2/17/2018
- 4/20/2018
- 6/8/2018
- 8/3/2018
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- 1/1/2019
- 4/15/2019
- 6/12/2019
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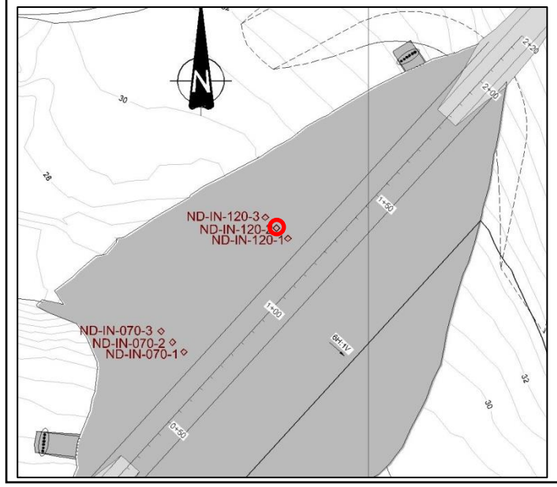
- 1/20/2020
- 3/12/2020
- 7/12/2020
- 9/11/2020
- 11/19/2020

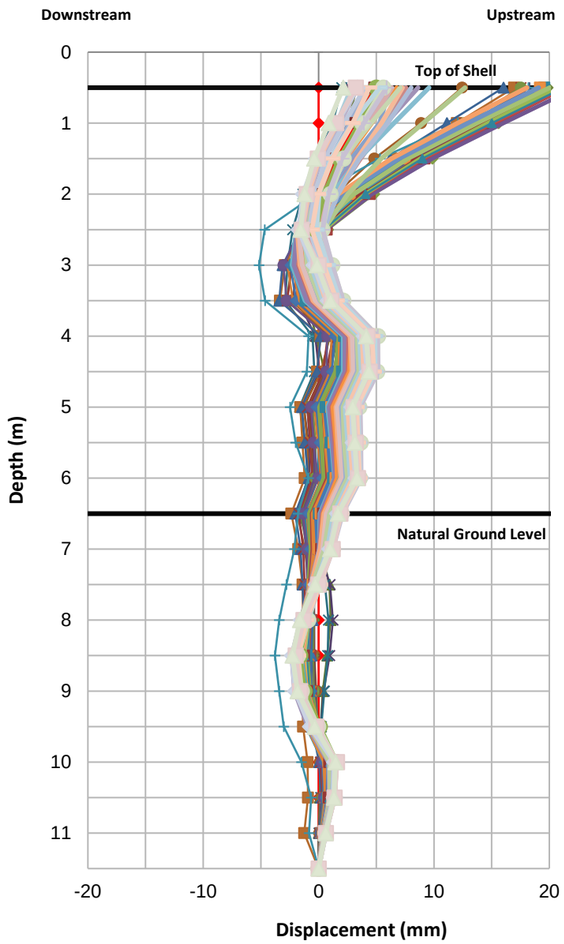


Notes:

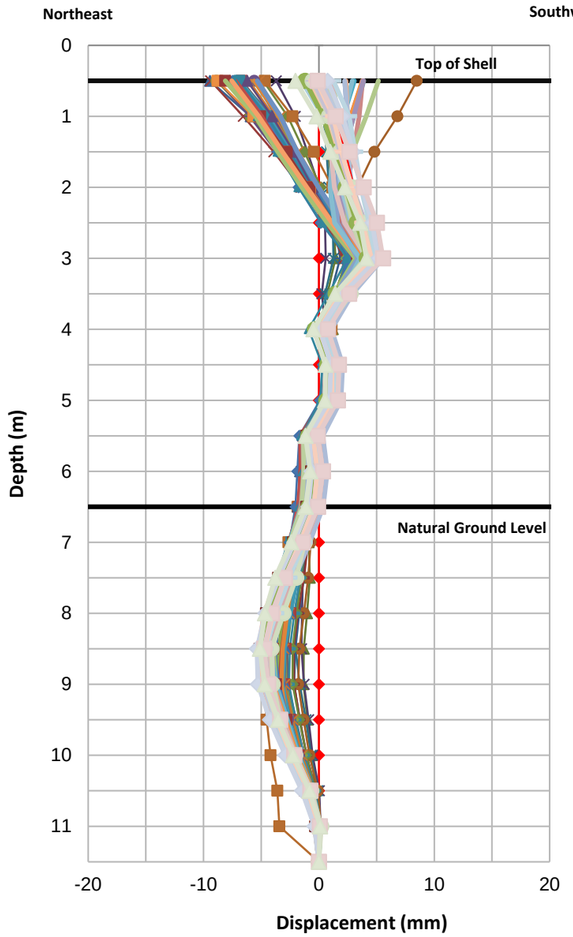
1. Manufacture's accuracy is +/- 0.25 mm per location
2. Survey data excluded from the charts is noted on Figure D.1

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	DORIS TIA	**Inclinometer 120-2 Profiles** Date: Feb. 2021 · Approved: PDL · Figure: **D.18**

Displacement Perpendicular to Centerline



Displacement Parallel to Centerline



LEGEND:

- Initial Reading (9/8/2012)
- 8/28/2013
- 5/20/2014
- 8/8/2014
- 10/1/2014
- 3/21/2015
- 4/20/2015
- 6/26/2015
- 8/2/2015
- 10/9/2015
- 12/30/2015
- 3/7/2016
- 7/2/2016
- 9/25/2016
- 12/24/2016
- 3/23/2017
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- 7/16/2017
- 9/14/2017
- 11/17/2017
- 1/16/2018
- 3/21/2018
- 5/19/2018
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- 9/30/2018
- 11/10/2018
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- 5/10/2019
- 7/27/2019
- 9/28/2019
- 11/24/2019
- 2/18/2020
- 6/6/2020
- 8/8/2020
- 10/20/2020
- 12/24/2020
- 7/26/2013
- 10/1/2013
- 7/12/2014
- 9/1/2014
- 2/2/2015
- 4/16/2015
- 5/19/2015
- 7/9/2015
- 9/4/2015
- 11/25/2015
- 2/8/2016
- 4/11/2016
- 8/14/2016
- 11/26/2016
- 2/23/2017
- 4/15/2017
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- 8/9/2017
- 10/14/2017
- 12/16/2017
- 2/17/2018
- 4/20/2018
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- 1/1/2019
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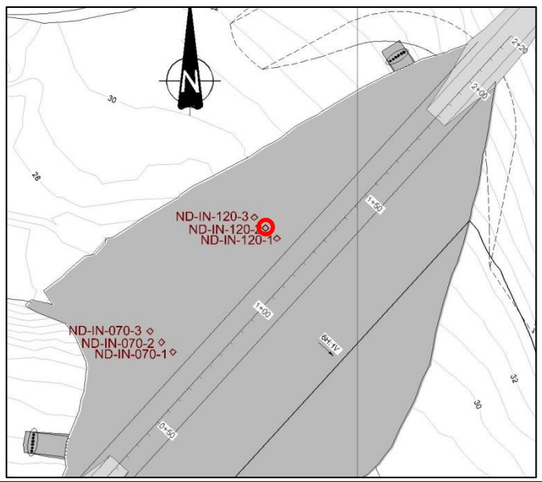
- 11/19/2020

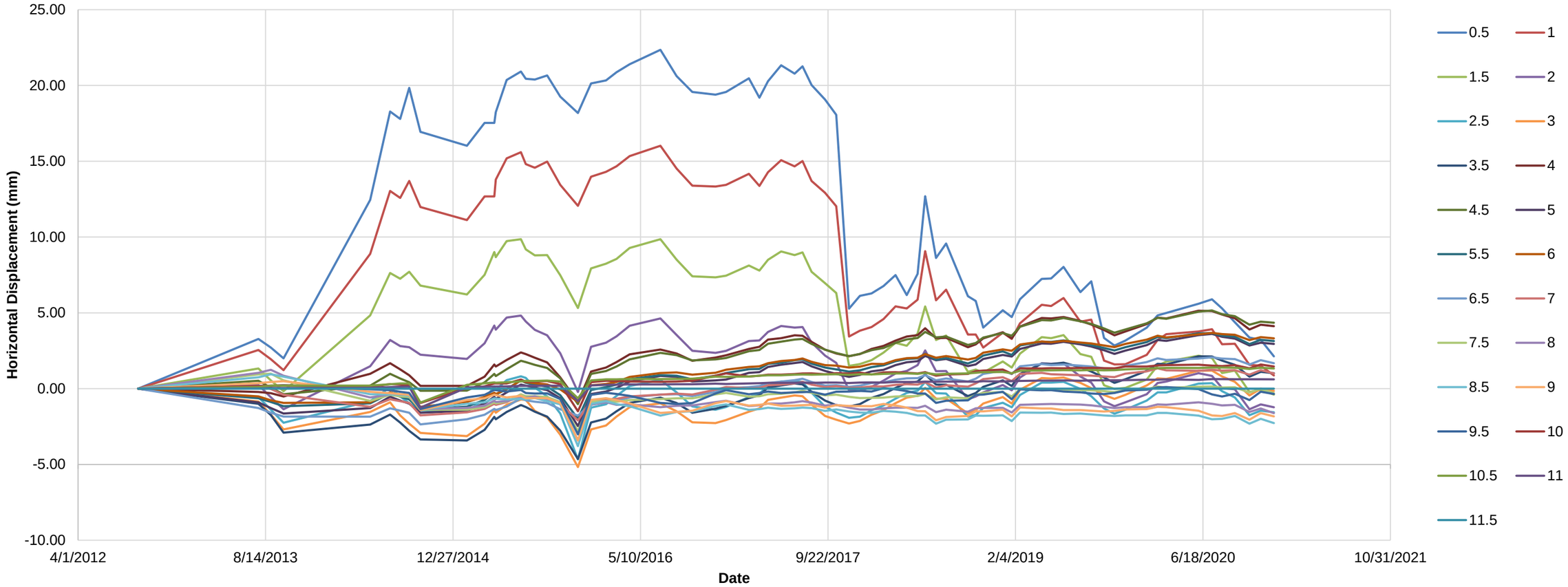


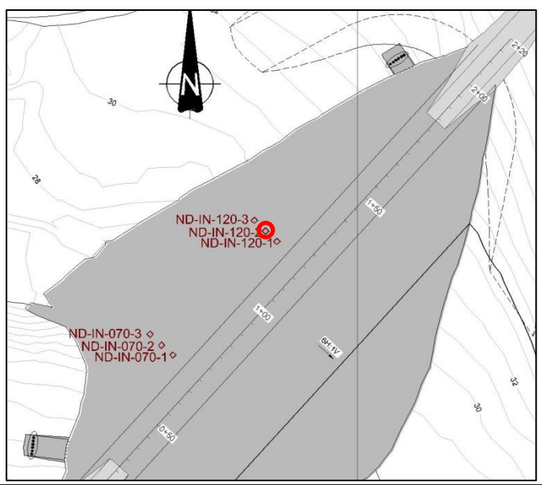
Notes:

1. Manufacture's accuracy is +/- 0.25 mm per location
2. Survey data excluded from the charts is noted on Figure D.1

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	DORIS TIA	**Inclinometer 120-2 Displacements** Date: Feb. 2021 | Approved: PDL | Figure: **D.19**

Inclinometer 120-2A Timeseries

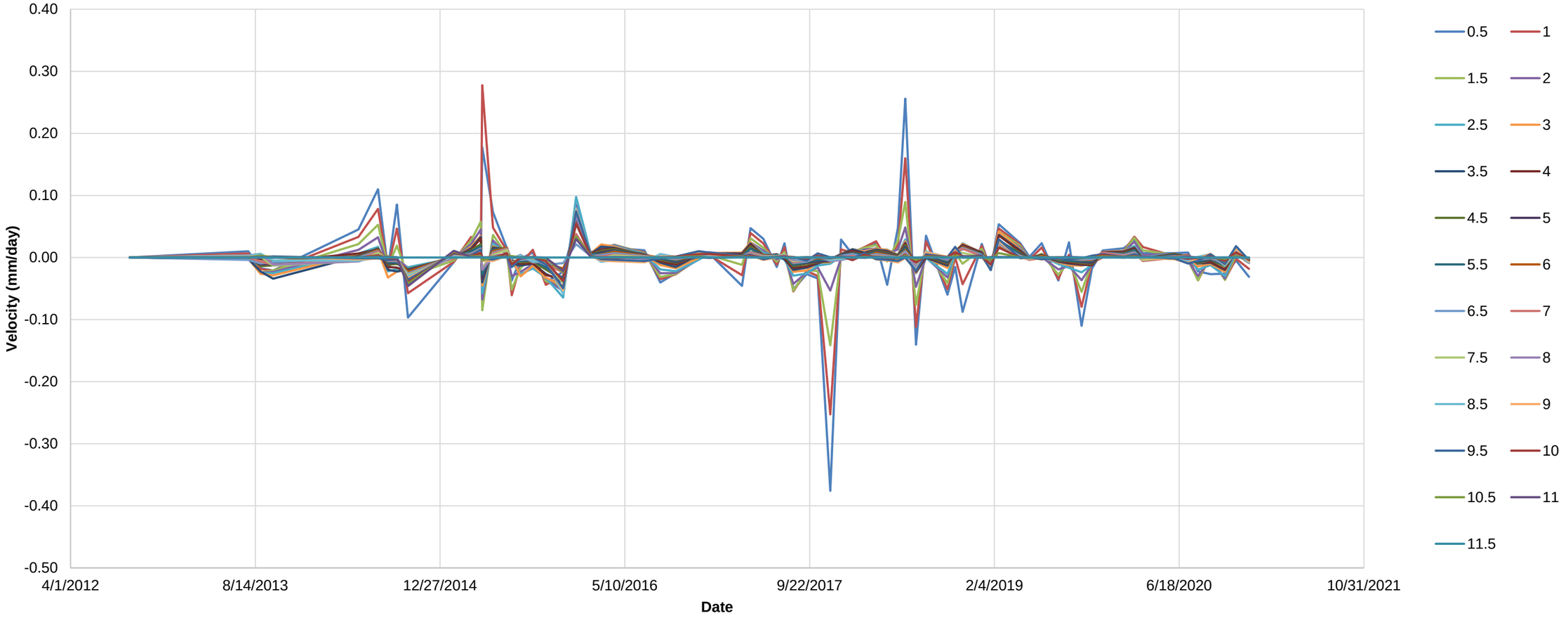


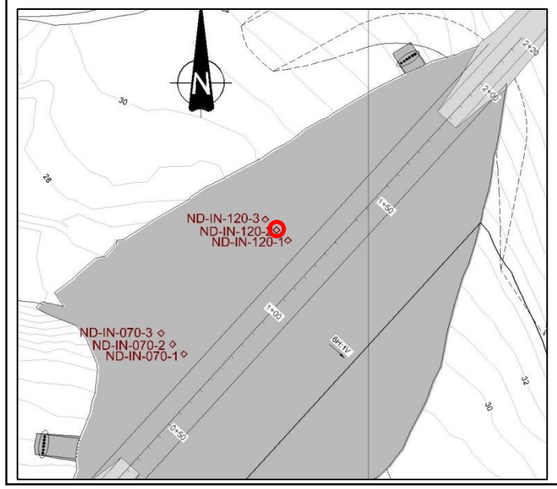


Notes:
1. Manufacture's accuracy is +/- 0.25 mm per location
2. Survey data excluded from the charts is noted on Figure D.1

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	DORIS TIA	**Inclinometer 120-2A Displacement Time Series**
		Date: Feb. 2021 / Approved: PDL / Figure: **D.20**

Inclinometer 120-2A Velocity Timeseries

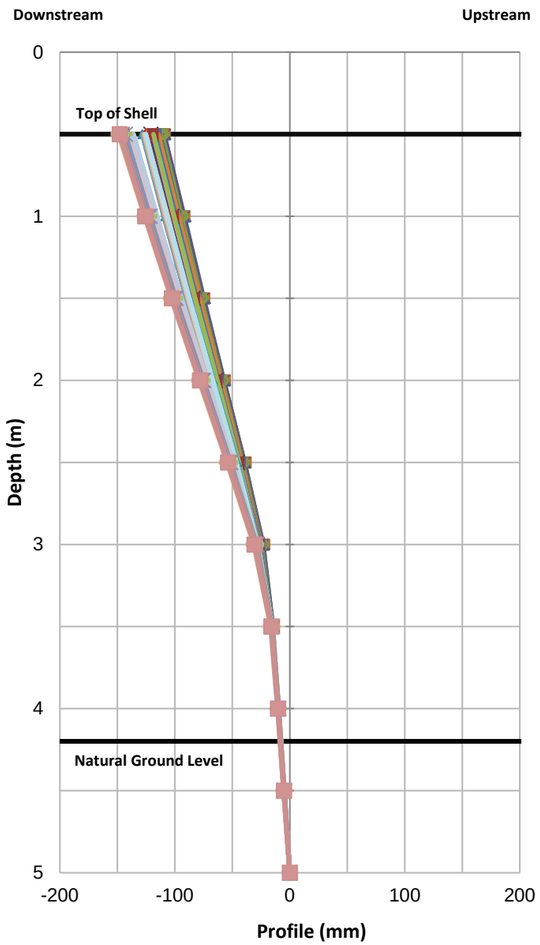




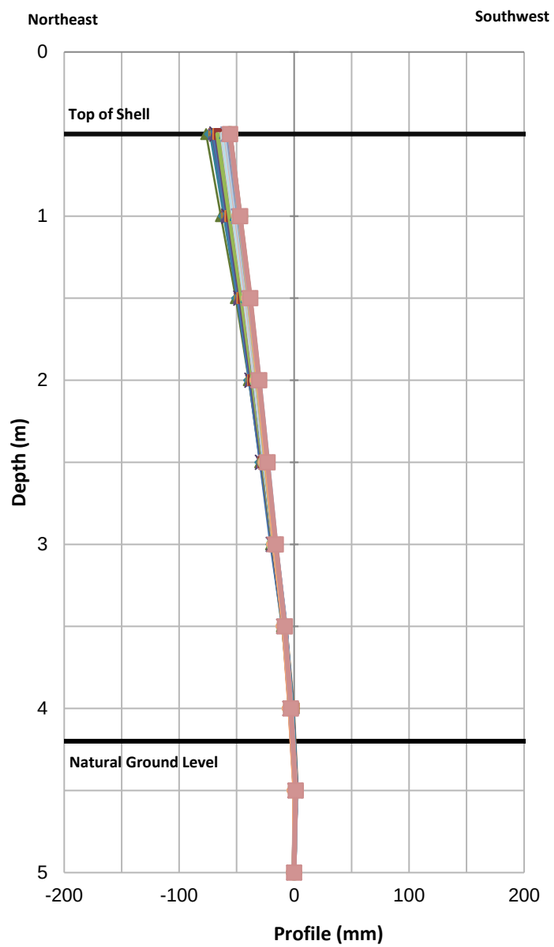
Notes:
1. Manufacture's accuracy is +/- 0.25 mm per location
2. Survey data excluded from the charts is noted on Figure D.1

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	DORIS TIA	**Inclinometer 120-2A Velocity Time Series**
		Date: Feb. 2021 / Approved: PDL / Figure: **D.21**

Profile Perpendicular to Centerline

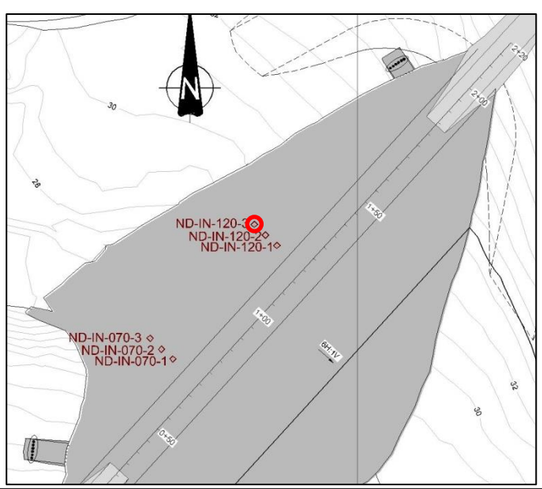


Profile Parallel to Centerline



LEGEND:

- Initial Reading (9/8/2012)
- 5/20/2014
- 7/6/2014
- 8/8/2014
- 10/1/2014
- 3/21/2015
- 5/20/2015
- 7/9/2015
- 8/28/2015
- 10/9/2015
- 12/30/2015
- 3/7/2016
- 7/2/2016
- 9/25/2016
- 1/3/2017
- 2/23/2017
- 4/15/2017
- 6/25/2017
- 8/9/2017
- 10/14/2017
- 12/16/2017
- 2/17/2018
- 4/20/2018
- 6/8/2018
- 8/3/2018
- 10/21/2018
- 1/1/2019
- 4/15/2019
- 6/12/2019
- 8/25/2019
- 10/26/2019
- 1/20/2020
- 3/12/2020
- 7/12/2020
- 9/11/2020
- 11/19/2020
- 7/26/2013
- 6/18/2014
- 7/12/2014
- 9/1/2014
- 2/2/2015
- 4/20/2015
- 6/26/2015
- 8/2/2015
- 9/4/2015
- 11/25/2015
- 2/8/2016
- 4/11/2016
- 8/14/2016
- 11/26/2016
- 1/26/2017
- 3/23/2017
- 5/20/2017
- 7/16/2017
- 9/14/2017
- 11/17/2017
- 1/17/2018
- 3/21/2018
- 5/19/2018
- 7/7/2018
- 9/29/2018
- 11/10/2018
- 1/25/2019
- 5/10/2019
- 7/27/2019
- 9/28/2019
- 11/24/2019
- 2/18/2020
- 6/6/2020
- 8/8/2020
- 10/20/2020
- 12/23/2020

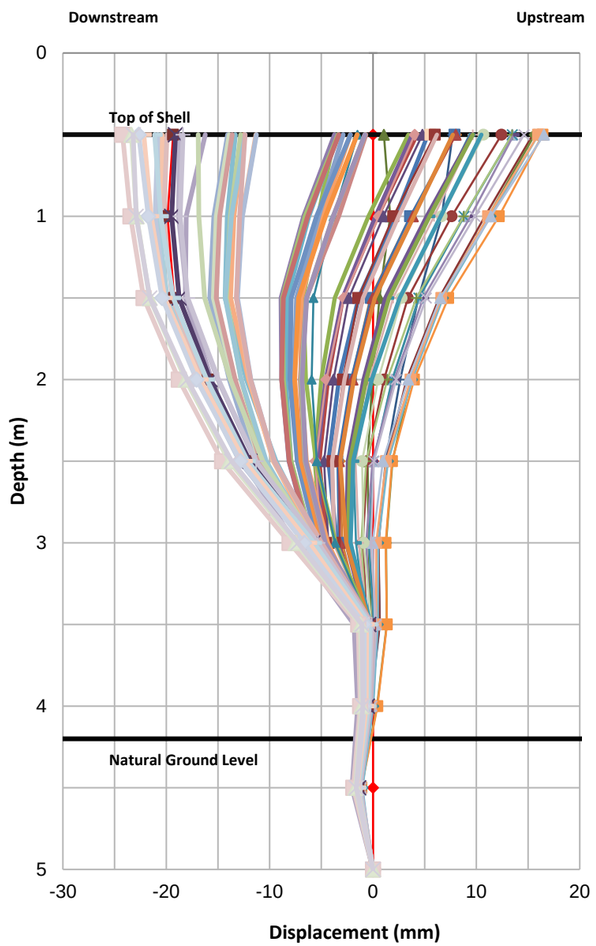


Notes:

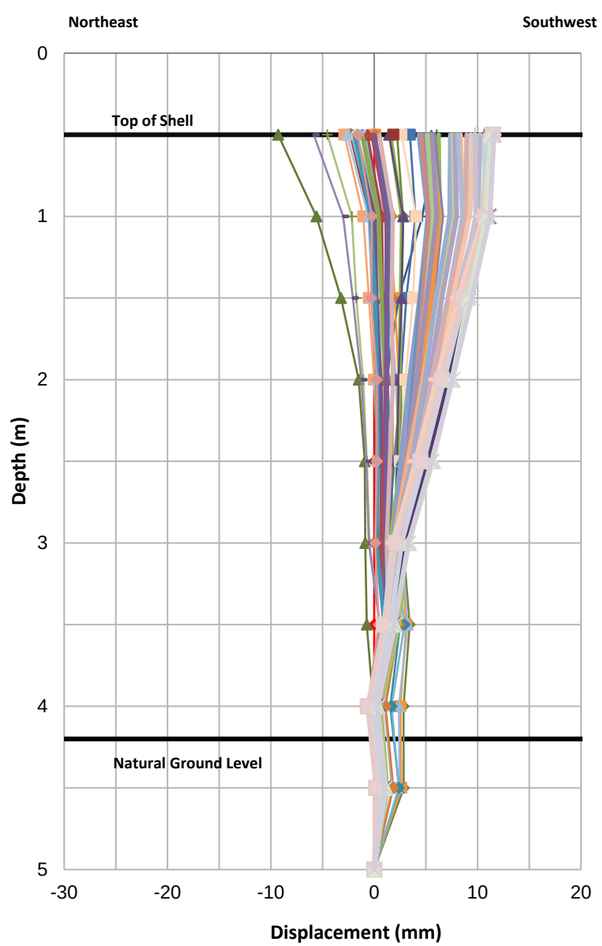
1. Manufacture's accuracy is +/- 0.25 mm per location
2. Survey data excluded from the charts is noted on Figure D.1

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	DORIS TIA	**Inclinometer 120-3 Profiles**
		Date: Feb. 2021 / Approved: PDL / Figure: **D.22**

Displacement Perpendicular to Centerline

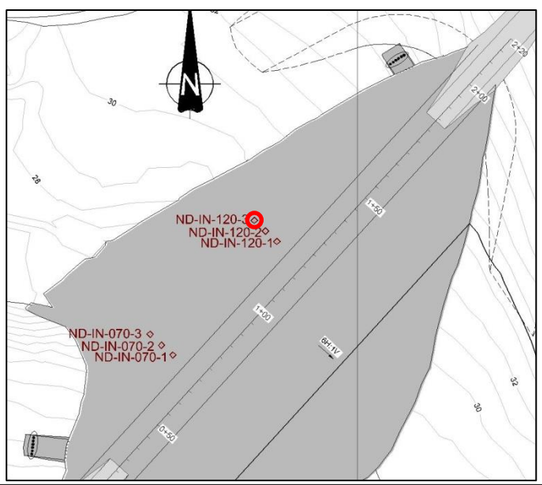


Displacement Parallel to Centerline



LEGEND:

- Initial Reading (9/8/2012)
- 5/20/2014
- 7/6/2014
- 8/8/2014
- 10/1/2014
- 3/21/2015
- 5/20/2015
- 7/9/2015
- 8/28/2015
- 10/9/2015
- 12/30/2015
- 3/7/2016
- 7/2/2016
- 9/25/2016
- 1/3/2017
- 2/23/2017
- 4/15/2017
- 6/25/2017
- 8/9/2017
- 10/14/2017
- 12/16/2017
- 2/17/2018
- 4/20/2018
- 6/8/2018
- 8/3/2018
- 10/21/2018
- 1/1/2019
- 4/15/2019
- 6/12/2019
- 8/25/2019
- 10/26/2019
- 1/20/2020
- 3/12/2020
- 7/12/2020
- 9/11/2020
- 11/19/2020
- 7/26/2013
- 6/18/2014
- 7/12/2014
- 9/1/2014
- 2/2/2015
- 4/20/2015
- 6/26/2015
- 8/2/2015
- 9/4/2015
- 11/25/2015
- 2/8/2016
- 4/11/2016
- 8/14/2016
- 11/26/2016
- 1/26/2017
- 3/23/2017
- 5/20/2017
- 7/16/2017
- 9/14/2017
- 11/17/2017
- 1/17/2018
- 3/21/2018
- 5/19/2018
- 7/7/2018
- 9/29/2018
- 11/10/2018
- 1/25/2019
- 5/10/2019
- 7/27/2019
- 9/28/2019
- 11/24/2019
- 2/18/2020
- 6/6/2020
- 8/8/2020
- 10/20/2020
- 12/23/2020

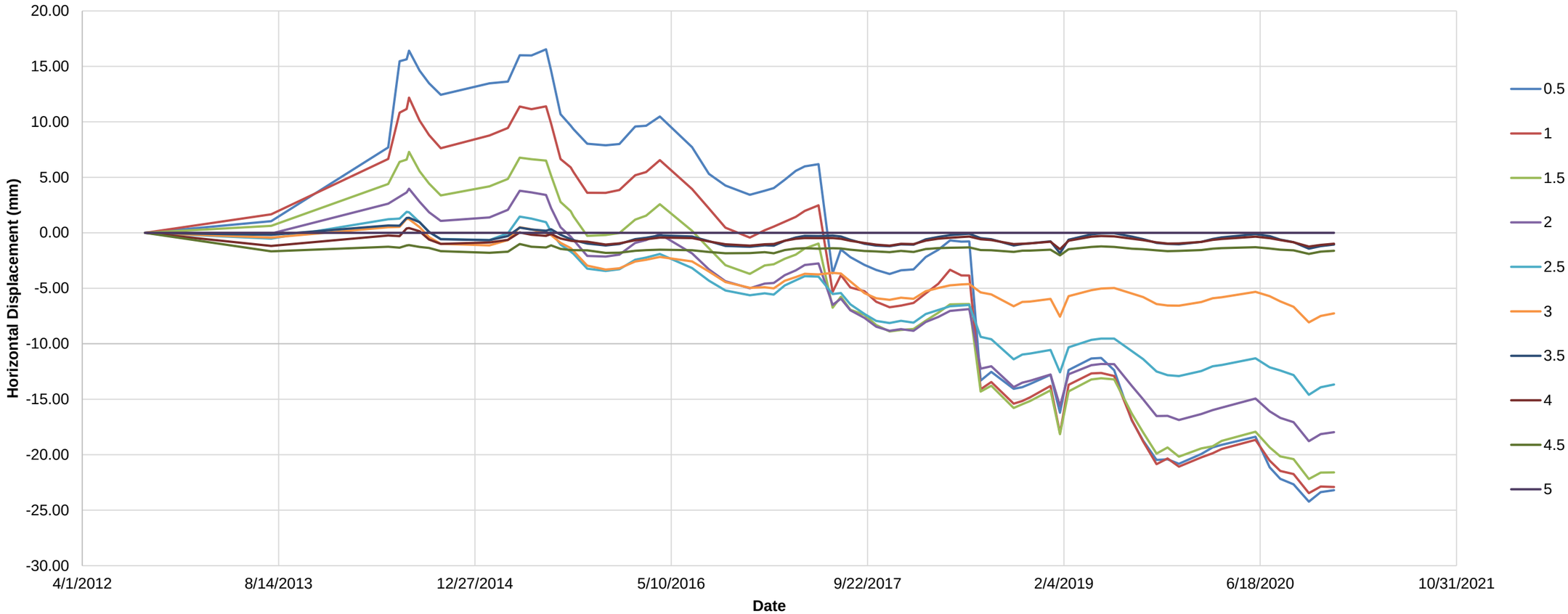


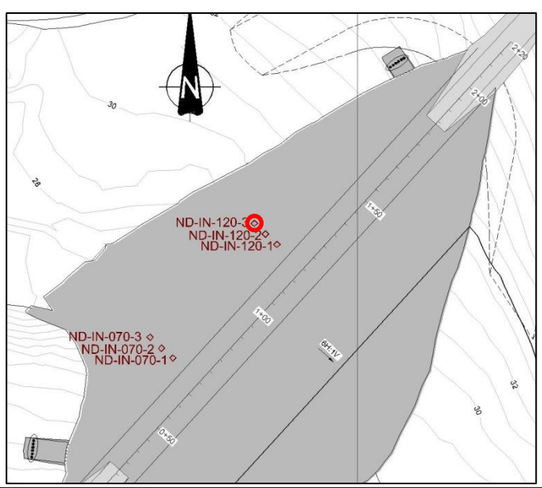
Notes:

1. Manufacture's accuracy is +/- 0.25 mm per location
2. Survey data excluded from the charts is noted on Figure D.1

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	DORIS TIA	**Inclinometer 120-3 Displacements** Date: Feb. 2021 | Approved: PDL | Figure: **D.23**

Inclinometer 120-3A Timeseries



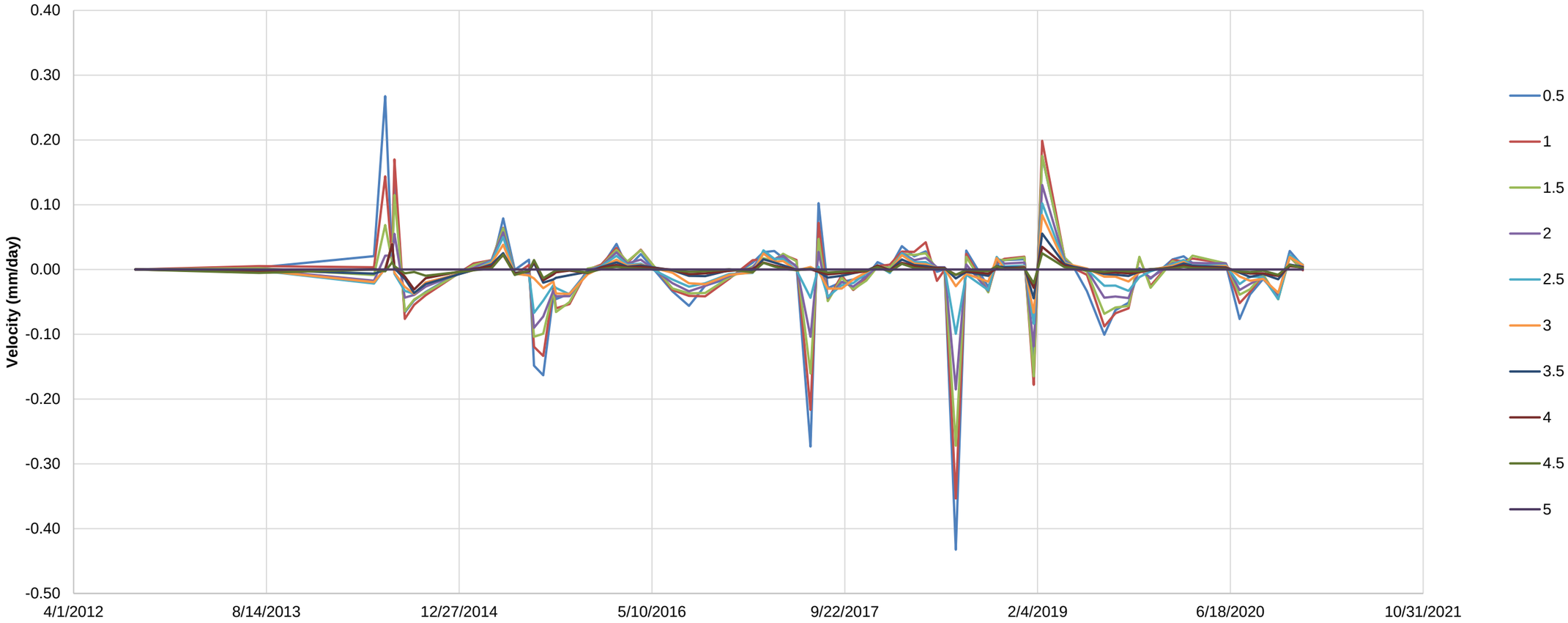


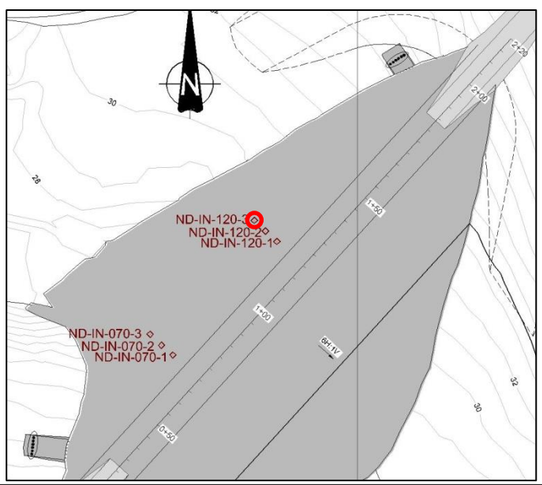
Notes:

1. Manufacture's accuracy is +/- 0.25 mm per location
2. Survey data excluded from the charts is noted on Figure D.1

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	DORIS TIA	**Inclinometer 120-3A Displacement Time Series**
		Date: Feb. 2021 / Approved: PDL / Figure: **D.24**

Inclinometer 120-3A Velocity Timeseries



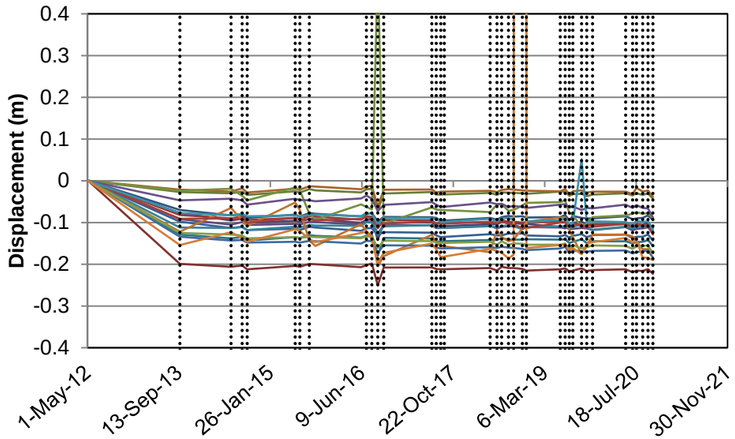


Notes:
1. Manufacture's accuracy is +/- 0.25 mm per location
2. Survey data excluded from the charts is noted on Figure D.1

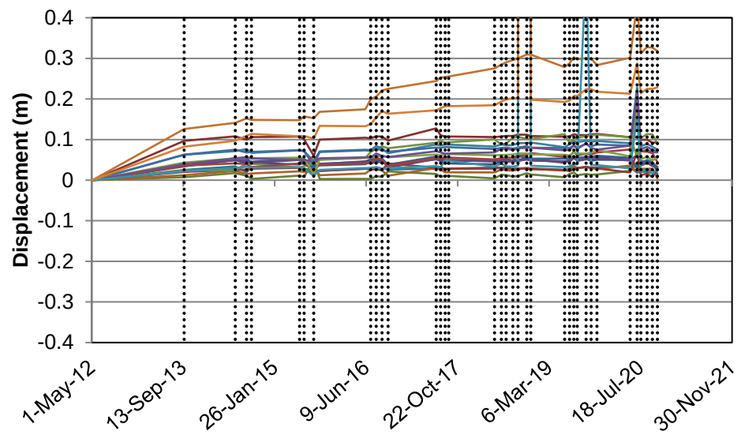
srk consulting	AGNICO EAGLE	2020 AGI – North Dam
		Inclinometer 120-3A Velocity Time Series
Job No: 1CT022.057 Filename: App_D_Inclinometers.pptx	**DORIS TIA**	Date: Feb. 2021 | Approved: PDL | Figure: **D.25**

Appendix E Survey Monitoring

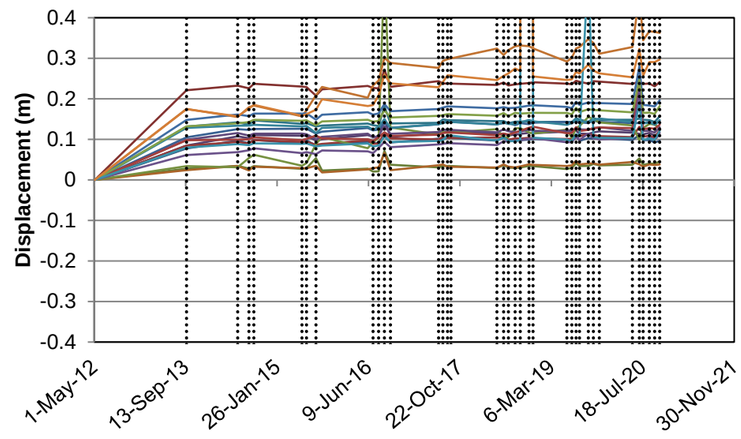
Vertical Displacement



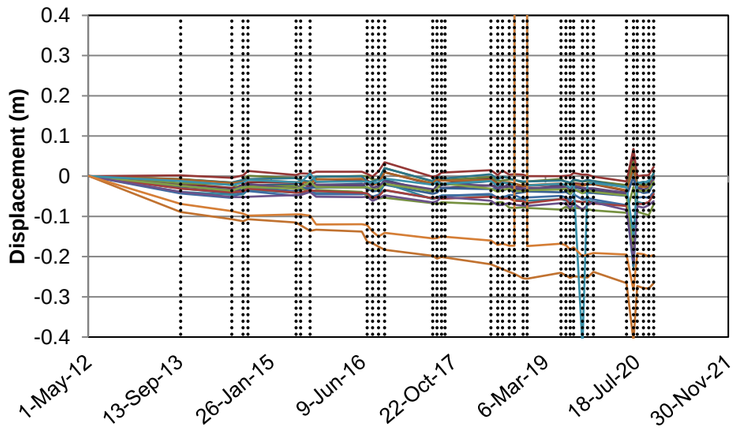
Horizontal Displacement



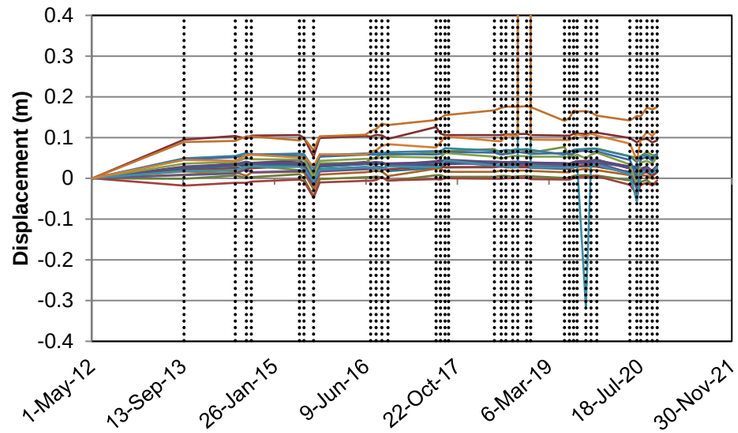
Total Displacement

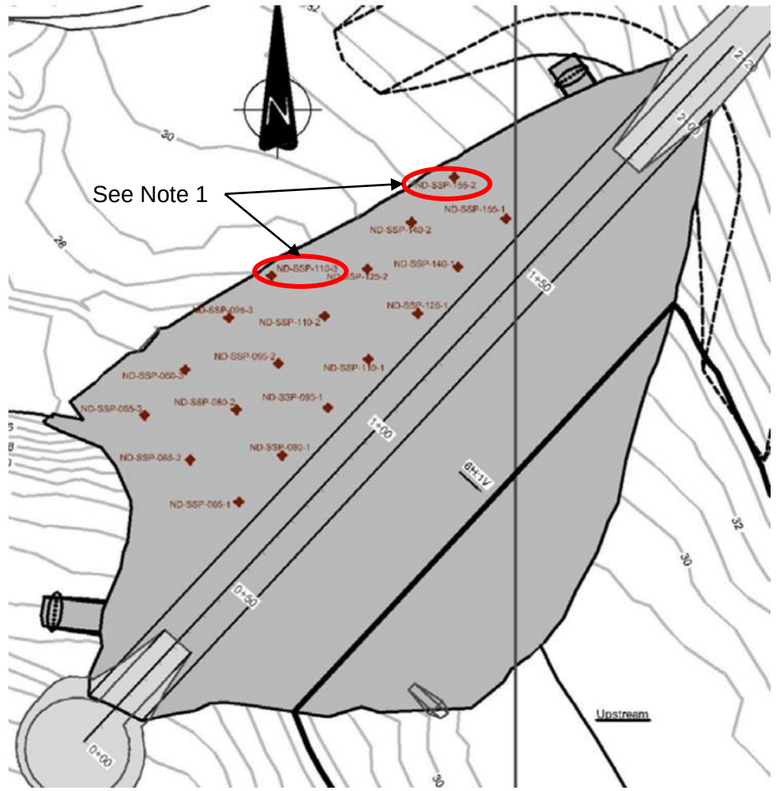


Change in Easting



Change in Northing





LEGEND:

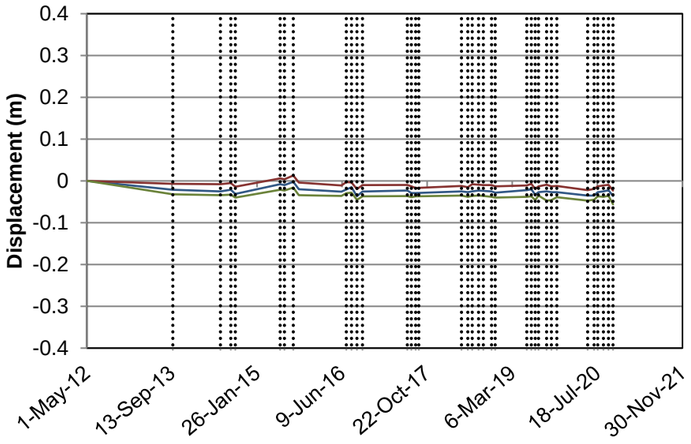
- ND-SSP-065-1
- ND-SSP-065-2
- ND-SSP-065-3
- ND-SSP-080-1
- ND-SSP-080-2
- ND-SSP-080-3
- ND-SSP-095-1
- ND-SSP-095-2
- ND-SSP-095-3
- ND-SSP-110-1
- ND-SSP-110-2
- ND-SSP-110-3
- ND-SSP-125-1
- ND-SSP-125-2
- ND-SSP-140-1
- ND-SSP-140-2
- ND-SSP-155-1
- ND-SSP-155-2
- Survey Date

NOTES:

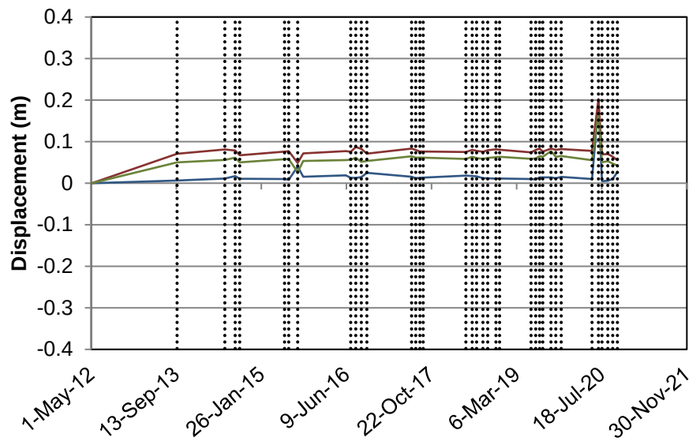
1. The anomalous increased horizontal displacement is observed at ND-SSP-110-3 and ND-SSP-115-2 near the downstream toe.

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
		Surface Survey Monitoring Points Displacement Timeseries
Job No: 1CT022.057 Filename: App_E_SurveyMonitoring.pptx	**DORIS TIA**	Date: Feb. 2021 | Approved: PDL | Figure: **F.1**

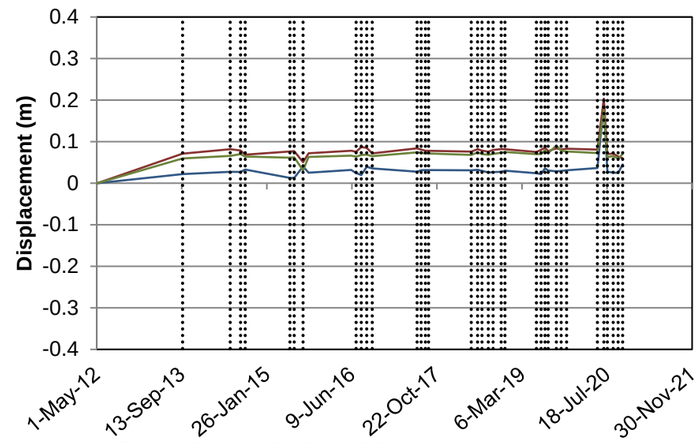
Vertical Displacement



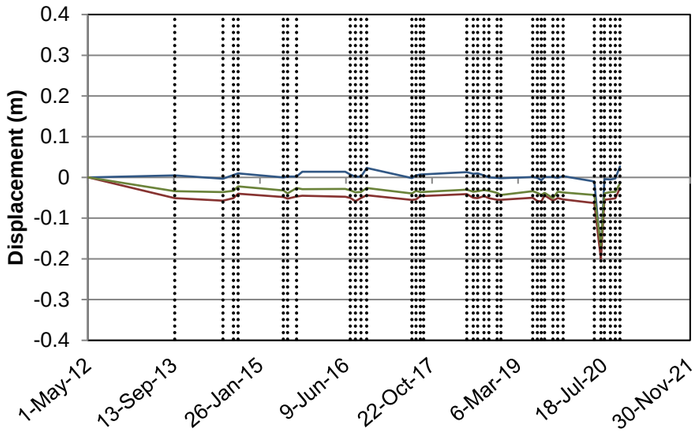
Horizontal Displacement



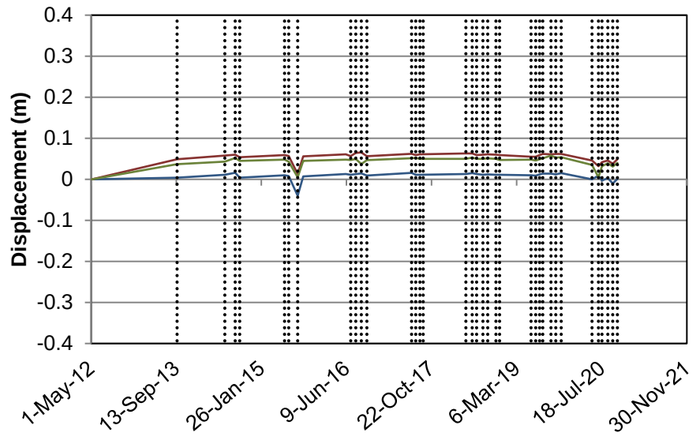
Total Displacement

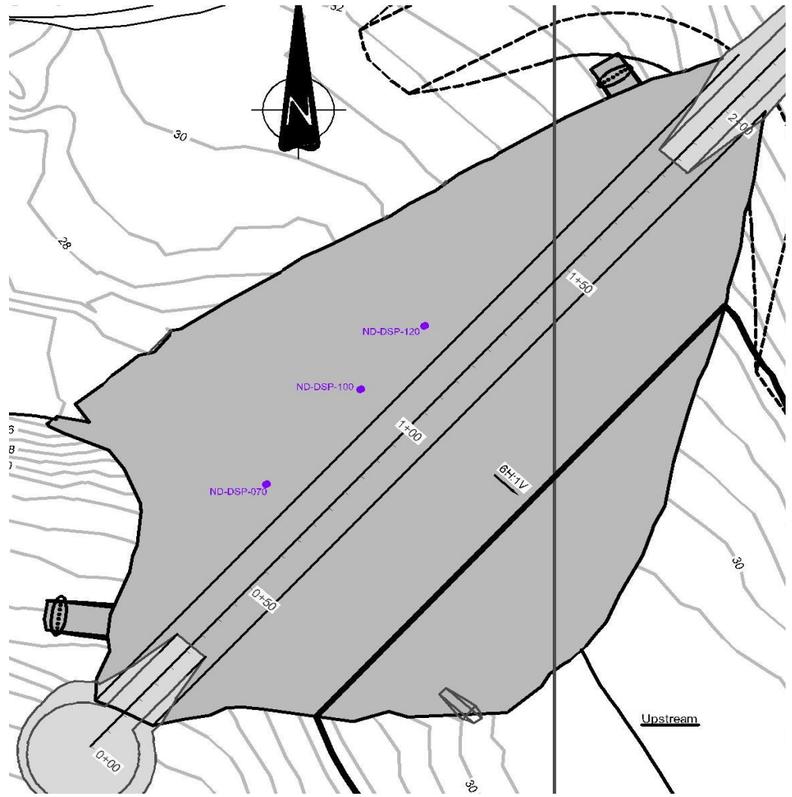


Change in Easting



Change in Northing





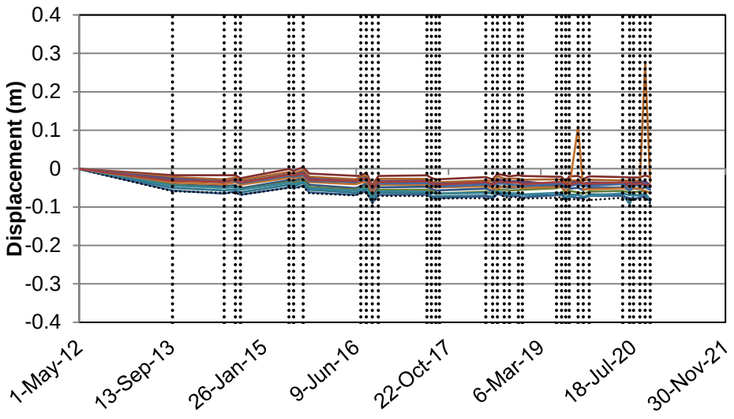
LEGEND:

- ND-DSP-070
- ND-DSP-100
- ND-DSP-120
- Survey Date

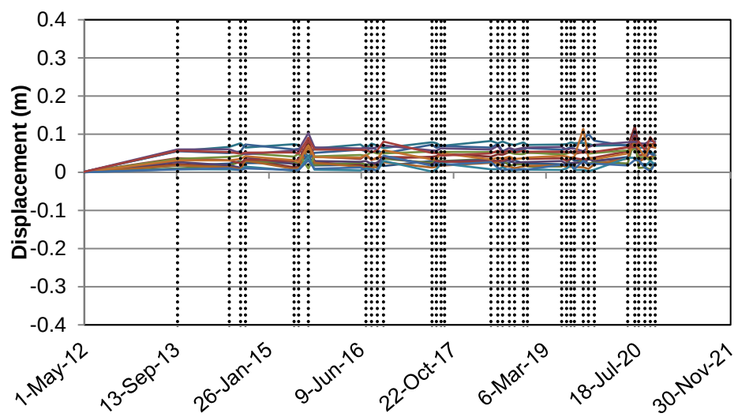
NOTES:

srk consulting	AGNICO EAGLE	2020 AGI – North Dam	
Job No: 1CT022.057 Filename: App_E_SurveyMonitoring.pptx	DORIS TIA	Deep Survey Monitoring Points Displacement Timeseries	
		Date: Feb. 2021	Approved: PDL
		Figure: F.2	

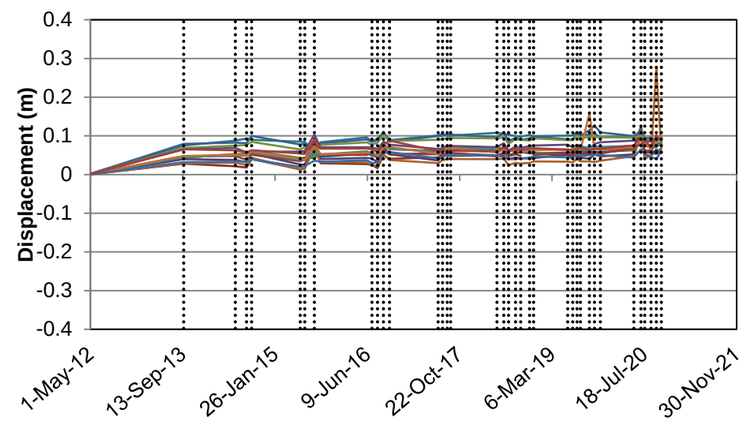
Vertical Displacement



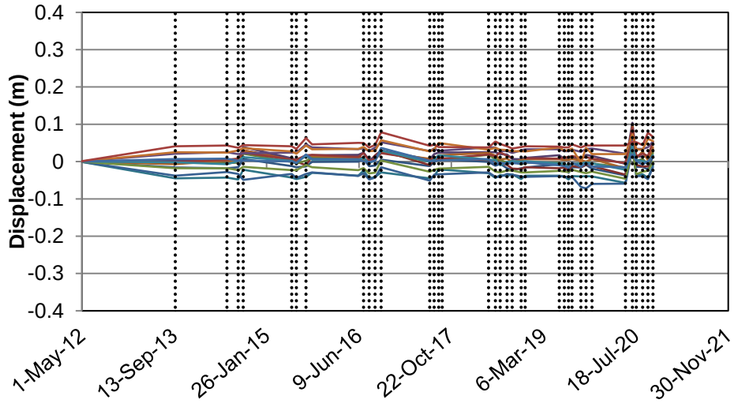
Horizontal Displacement



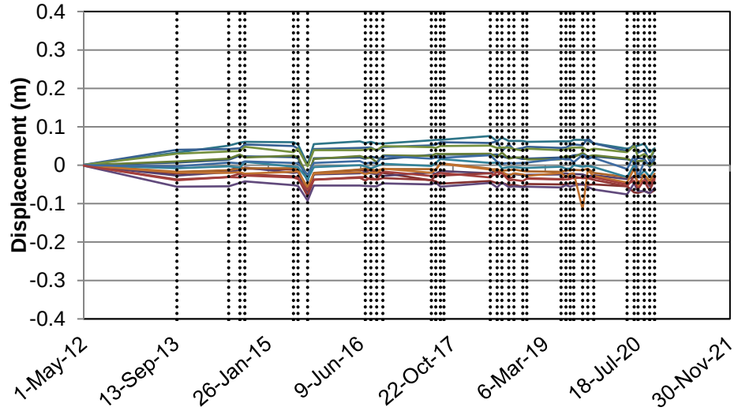
Total Displacement

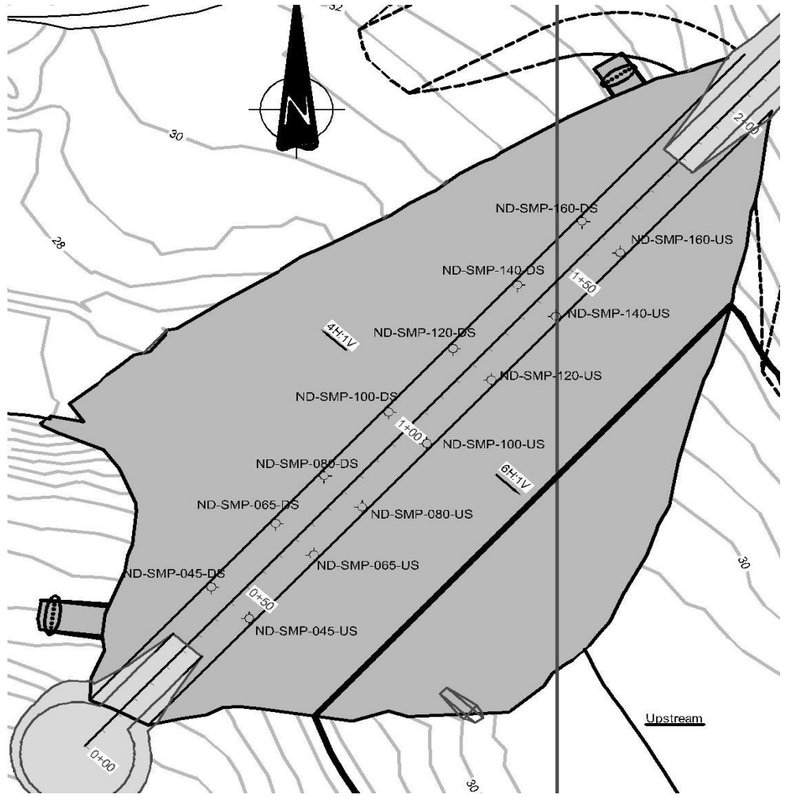


Change in Easting



Change in Northing





LEGEND:

- ND-SMP-045-DS
- ND-SMP-045-US
- ND-SMP-065-DS
- ND-SMP-065-US
- ND-SMP-080-DS
- ND-SMP-080-US
- ND-SMP-100-DS
- ND-SMP-100-US
- ND-SMP-120-DS
- ND-SMP-120-US
- ND-SMP-140-DS
- ND-SMP-140-US
- ND-SMP-160-DS
- ND-SMP-160-US
- Survey Date

NOTES:

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AGNICO EAGLE

2020 AGI – North Dam

Crest Survey Monitoring Points Displacement Timeseries

Job No: 1CT022.057

Filename: App_E_SurveyMonitoring.pptx

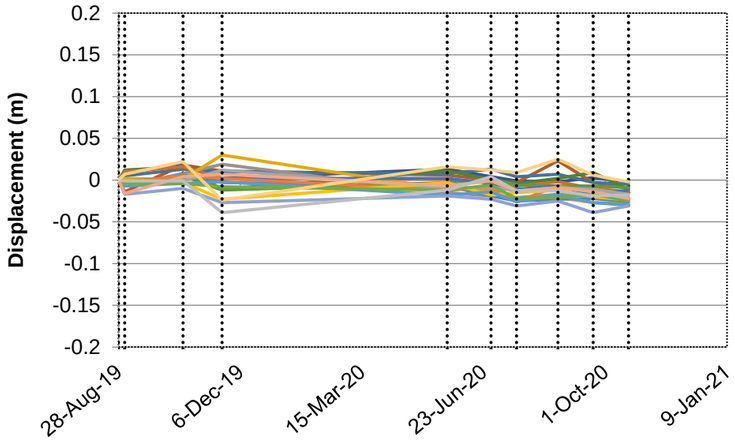
DORIS TIA

Date: Feb. 2021

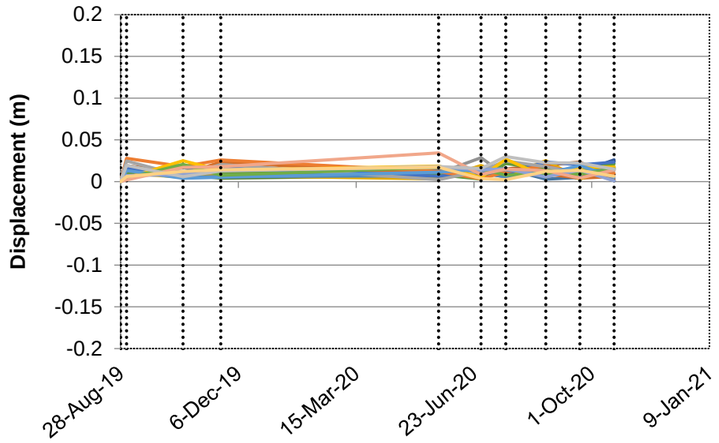
Approved: PDL

Figure: **F.3**

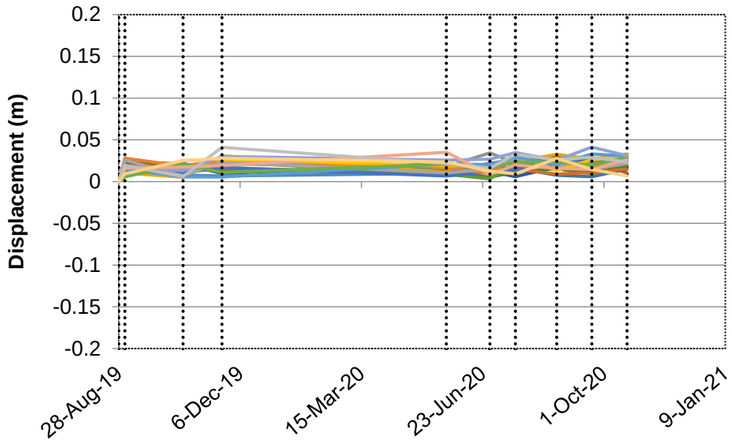
Vertical Displacement



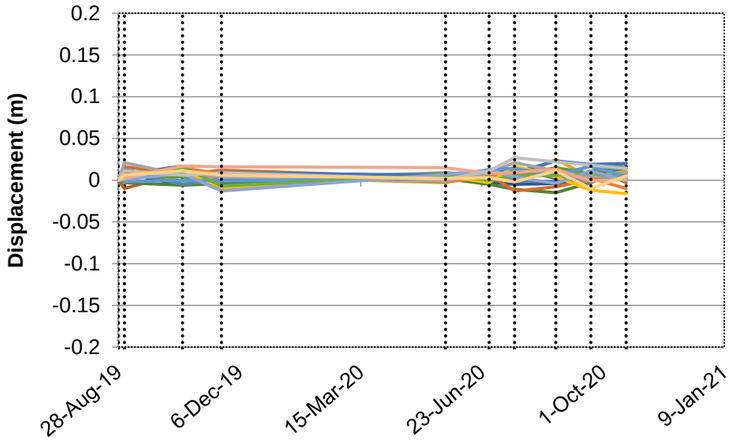
Horizontal Displacement



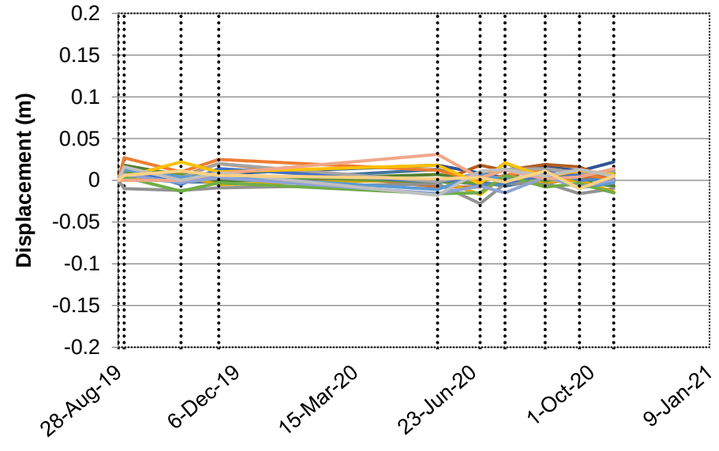
Total Displacement



Change in Easting



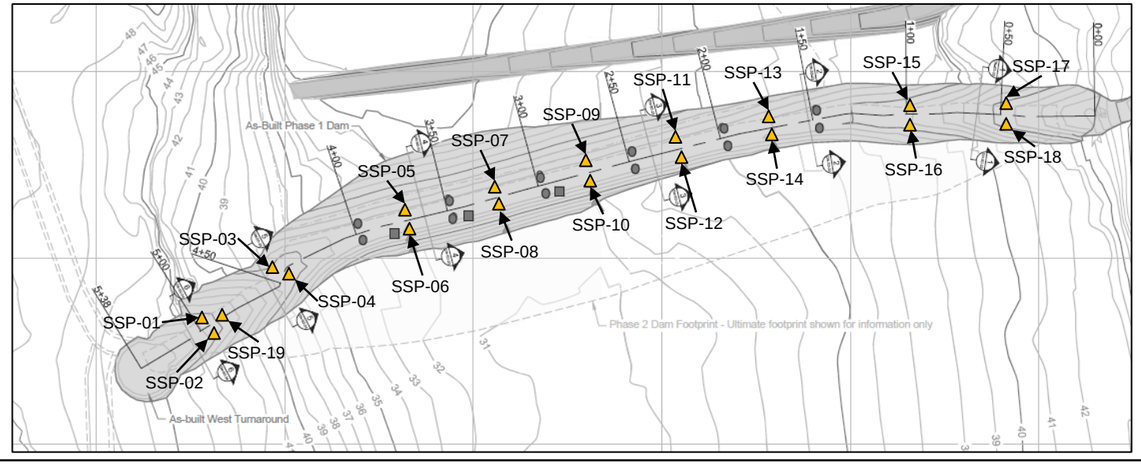
Change in Northing



LEGEND:

- SD-SSP-01
- SD-SSP-02
- SD-SSP-03
- SD-SSP-04
- SD-SSP-05
- SD-SSP-06
- SD-SSP-07
- SD-SSP-08
- SD-SSP-09
- SD-SSP-10
- SD-SSP-11
- SD-SSP-12
- SD-SSP-13
- SD-SSP-14
- SD-SSP-15
- SD-SSP-16
- SD-SSP-17
- SD-SSP-18
- SD-SSP-19

NOTES:



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AGNICO EAGLE

2020 AGI – South Dam

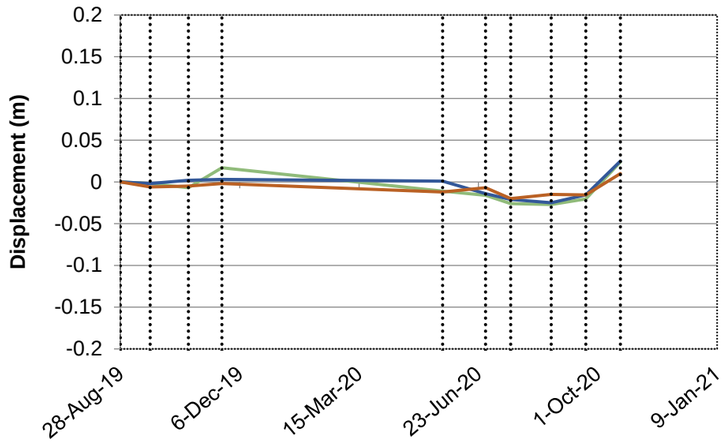
Surficial Survey Monitoring Points Displacement Timeseries

Job No: 1CT022.057
Filename: App_E_SurveyMonitoring.pptx

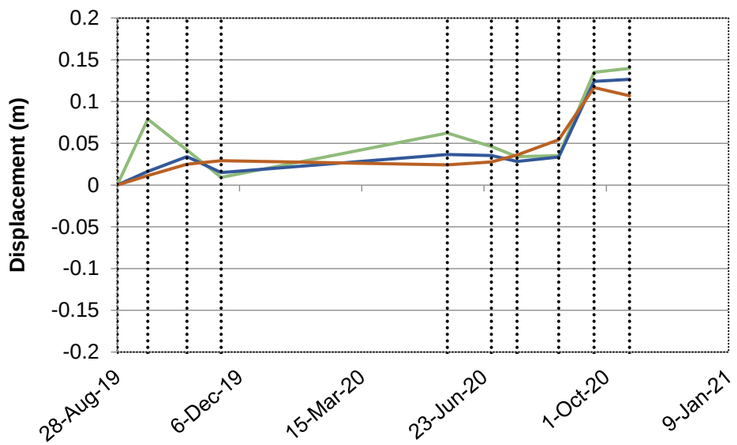
DORIS TIA

Date: Feb. 2021
Approved: PDL
Figure: **F.4**

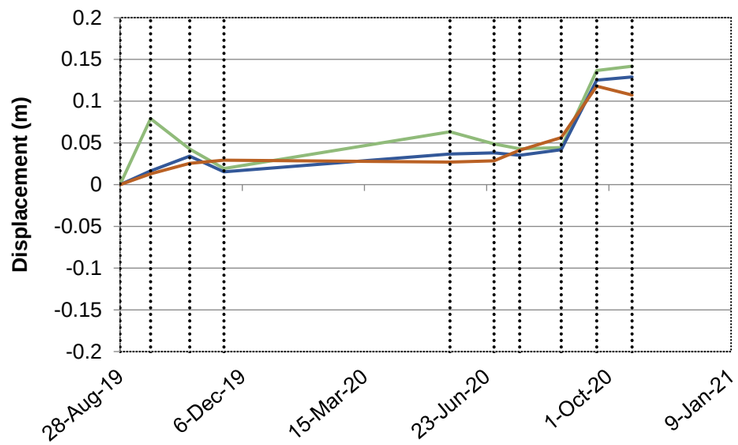
Vertical Displacement



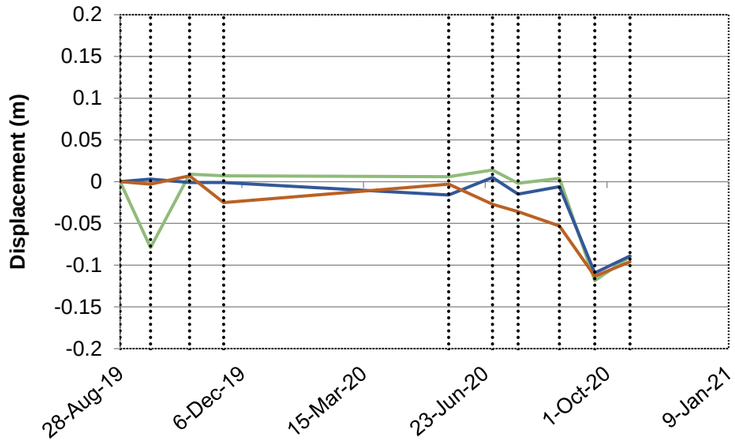
Horizontal Displacement



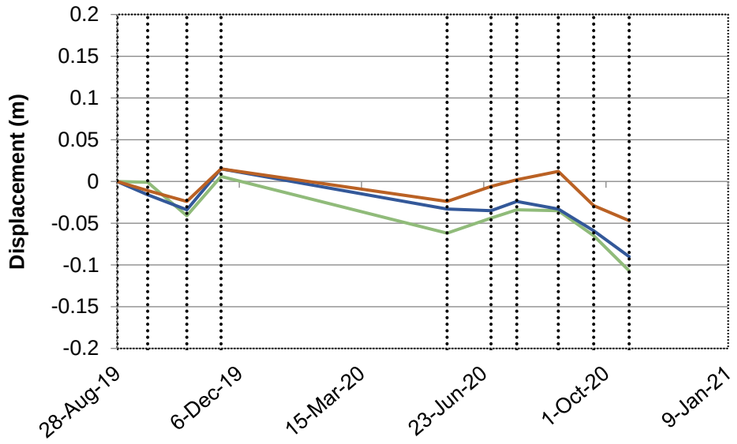
Total Displacement



Change in Easting



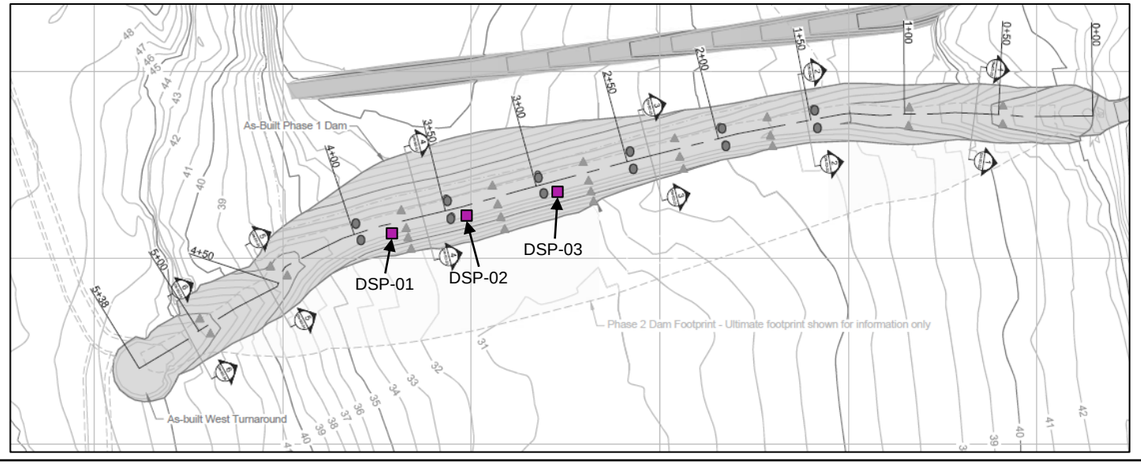
Change in Northing



LEGEND:

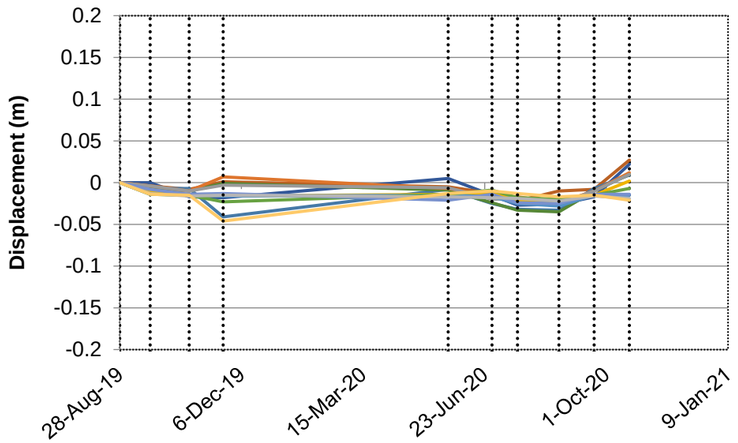
- SD-DSP-01
- SD-DSP-02
- SD-DSP-03

NOTES:

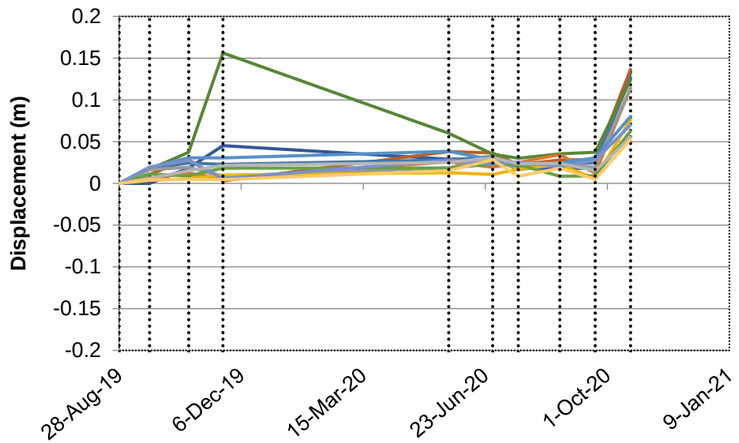


srk consulting	AGNICO EAGLE	2020 AGI – South Dam
		Deep Settlement Points Displacement Timeseries
Job No: 1CT022.057 Filename: App_E_SurveyMonitoring.pptx	**DORIS TIA**	Date: Feb. 2021 / Approved: PDL / Figure: **F.5**

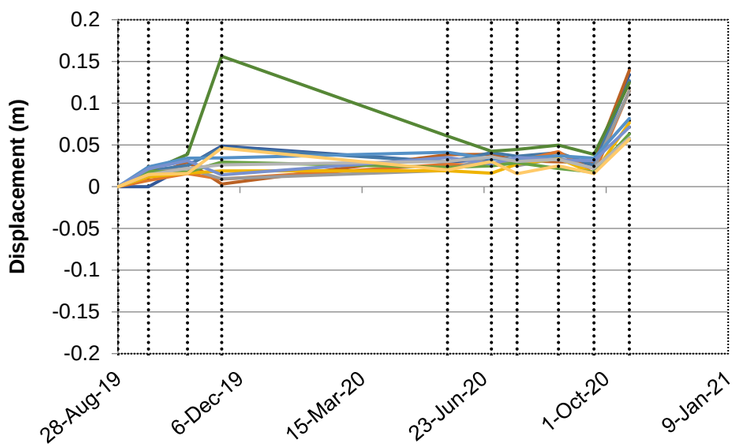
Vertical Displacement



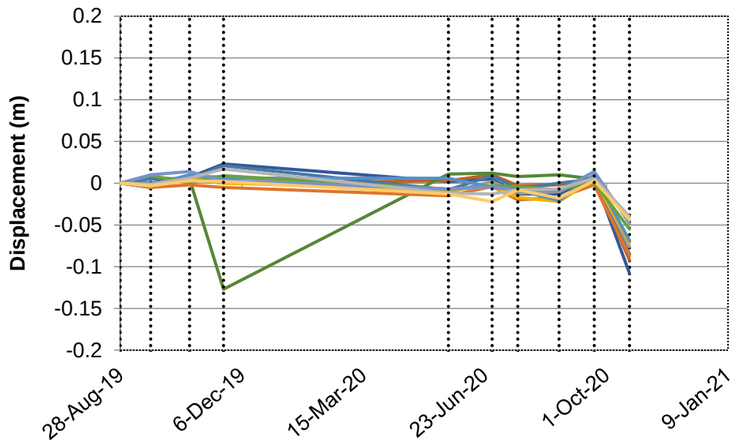
Horizontal Displacement



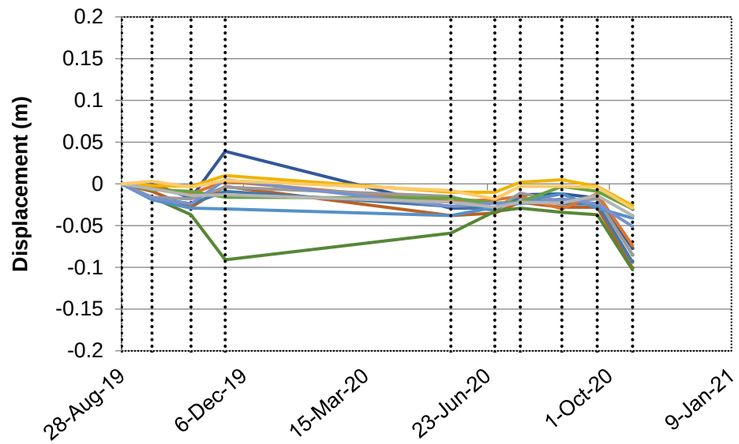
Total Displacement



Change in Easting



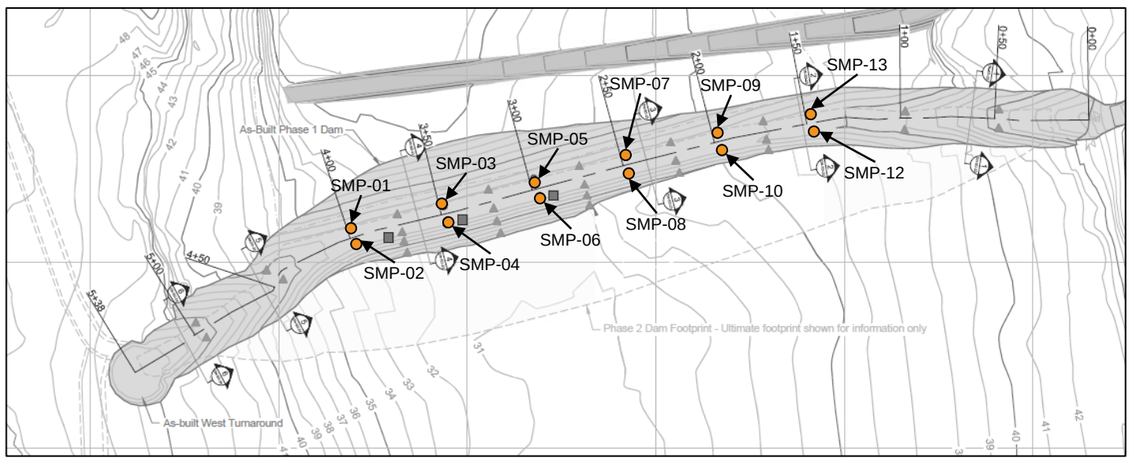
Change in Northing



LEGEND:

- SD-SMP-01
- SD-SMP-02
- SD-SMP-03
- SD-SMP-04
- SD-SMP-05
- SD-SMP-06
- SD-SMP-07
- SD-SMP-08
- SD-SMP-09
- SD-SMP-10
- SD-SMP-11
- SD-SMP-12
- SD-SMP-13

NOTES:



srk consulting	AGNICO EAGLE	2020 AGI – South Dam
Job No: 1CT022.057 Filename: App_E_SurveyMonitoring.pptx	DORIS TIA	**Crest Survey Monitoring Points Displacement Timeseries** Date: Feb. 2021 · Approved: PDL · Figure: **F.6**

Appendix F Walk Over Surveys

North Dam Weekly Walkover Survey Report

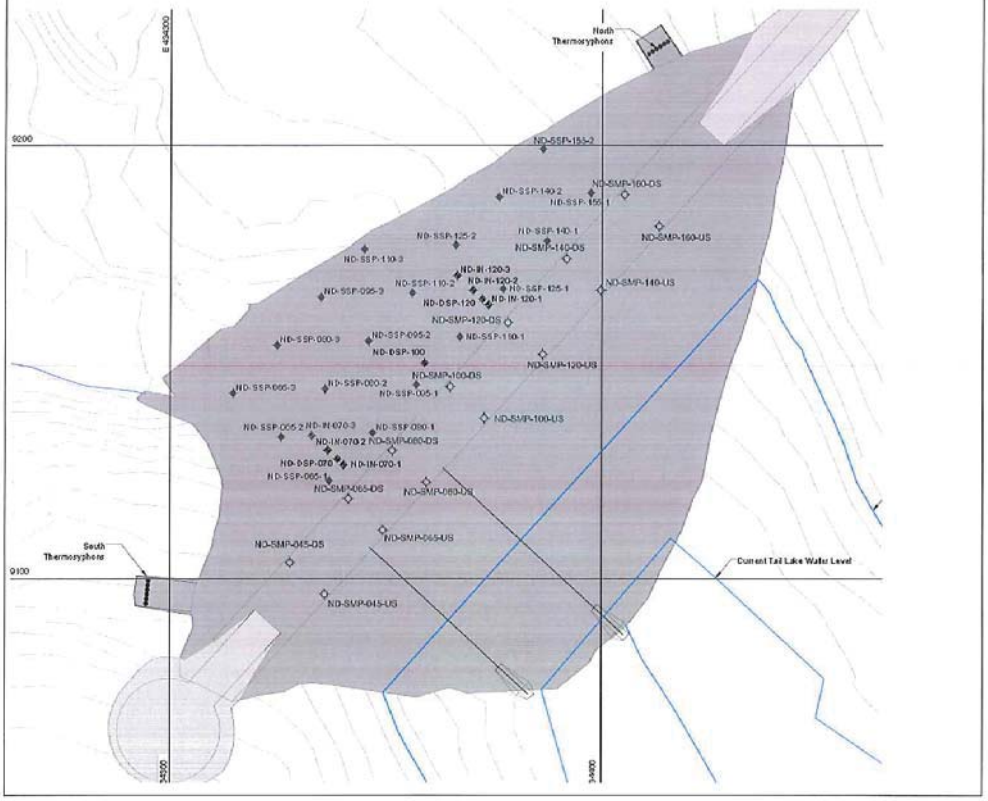
Date:	January 05, 2020
Inspected By:	Mike Tanasa
Conditions:	(ie. snow on ground, clear) Snow

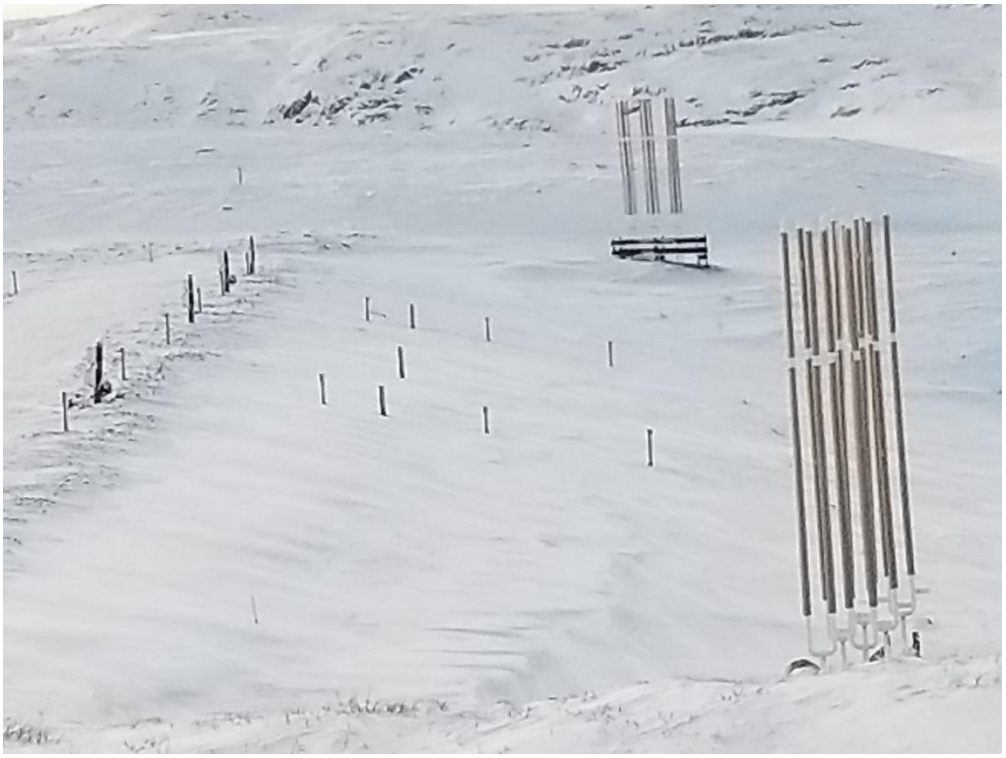
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	(No)
Downstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	(No)
Crest of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	(No)
Thermosyphons North Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	(No)
Thermosyphons South Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	(No)
Instrumentation (on crest and downstream side)		
Any visible concerns? (bent, rusted, cracked, etc.)	Yes	(No)
Thermistors and Dataloggers		
Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	(No)
Suspended Sediment in TIA (When not frozen)		
Any suspended sediment in Tail Lake?	Yes	(No)
Water at the Toe of the Downstream Side of the Dam (If yes refer to Doris North – North Dam and Tail Lake Outflow Seepage Monitoring Work Plan 2015)	Yes	(No)
If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.		

Please provide any other observations you have made or items that did not fit in the space above





North Dam Weekly Walkover Survey Report

Date:	Jan 18, 2020
Inspected By:	Josh Fris
Conditions:	(ie. snow on ground, clear) Snow.

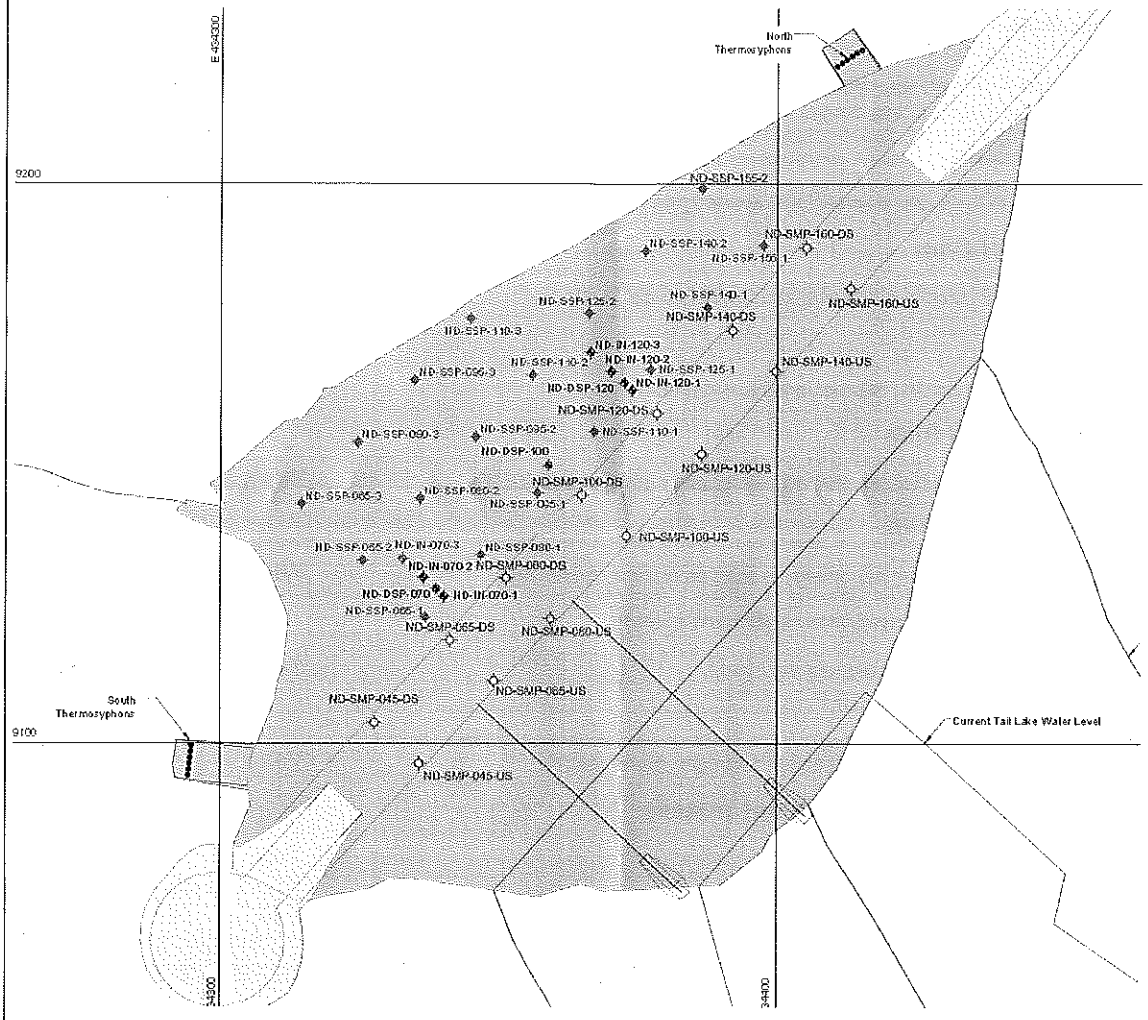
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	(No)
Downstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	(No)
Crest of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	(No)
Thermosyphons North Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	(No)
Thermosyphons South Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	(No)
Instrumentation (on crest and downstream side)		
Any visible concerns? (bent, rusted, cracked, etc.)	Yes	(No)
Thermistors and Dataloggers		
Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	(No)
Suspended Sediment in TIA (When not frozen)		
Any suspended sediment in Tail Lake?	Yes	(No)
Water at the Toe of the Downstream Side of the Dam (If yes refer to Doris North – North Dam and Tail Lake Outflow Seepage Monitoring Work Plan 2015)	Yes	(No)

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made or items that did not fit in the space above



Photos:

Please collect the following photos: Photo from north end looking south along the dam Photo from south end looking north along the dam
Other photos, please describe – Photos taken

North Dam Weekly Walkover Survey Report

Date:	Feb. 10. 2020
Inspected By:	MIKE TAMASA
Conditions:	(ie. snow on ground, clear) SNOW -40°C. @

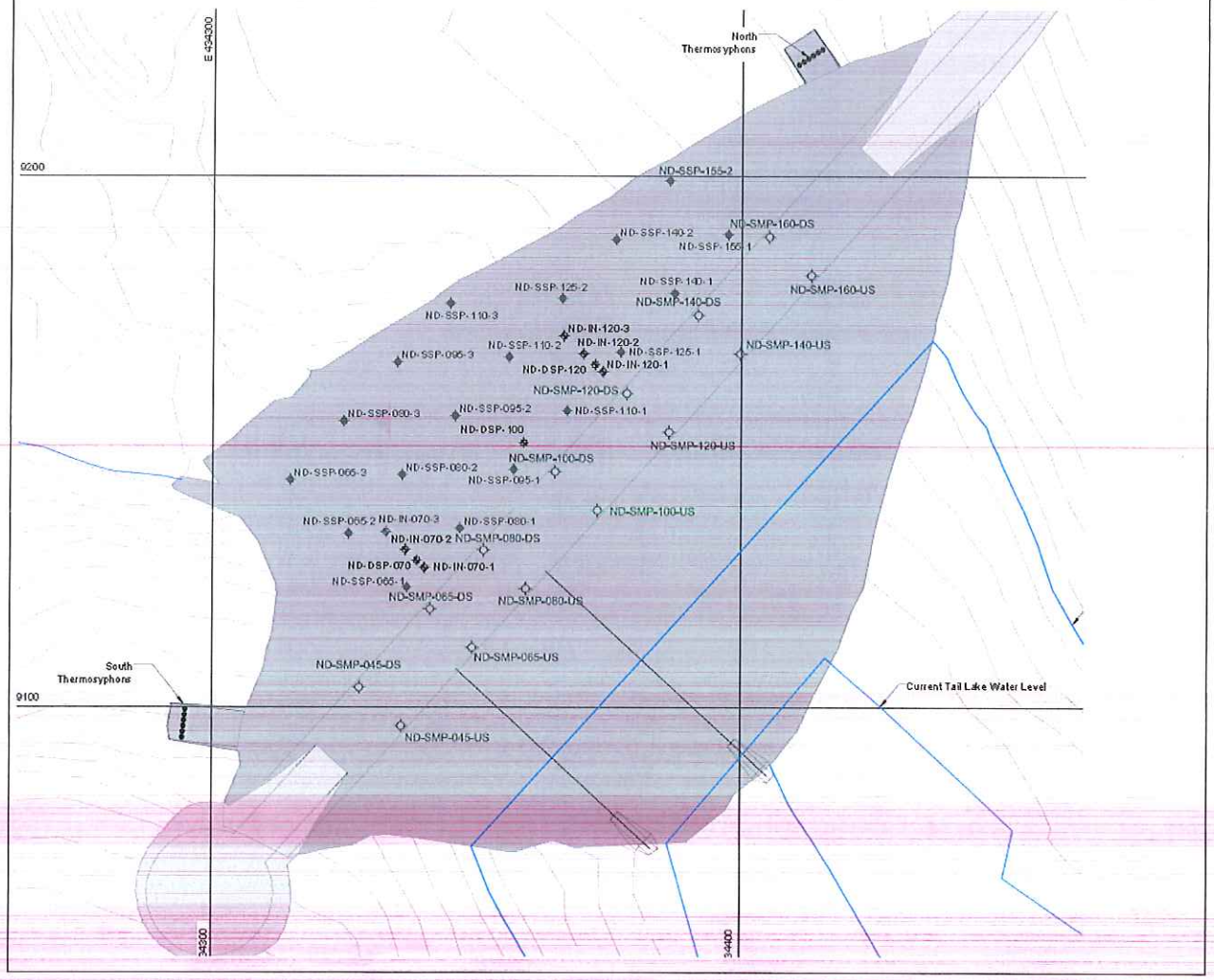
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	~~No~~
Downstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	~~No~~
Crest of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	~~No~~
Thermosyphons North Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	~~No~~
Thermosyphons South Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	~~No~~
Instrumentation (on crest and downstream side)		
Any visible concerns? (bent, rusted, cracked, etc.)	Yes	~~No~~
Thermistors and Dataloggers		
Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	~~No~~
Suspended Sediment in TIA (When not frozen)		
Any suspended sediment in Tail Lake?	Yes	~~No~~
Water at the Toe of the Downstream Side of the Dam (If yes refer to Doris North – North Dam and Tail Lake Outflow Seepage Monitoring Work Plan 2015)	Yes	~~No~~

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made or items that did not fit in the space above



Photos:

Please collect the following photos:

Photo from north end looking south along the dam

Photo from south end looking north along the dam

Other photos, please describe – Photos taken

North Dam Weekly Walkover Survey Report

Date:	Feb 19, 2020
Inspected By:	Josh Fors
Conditions:	(ie. snow on ground, clear) Snow

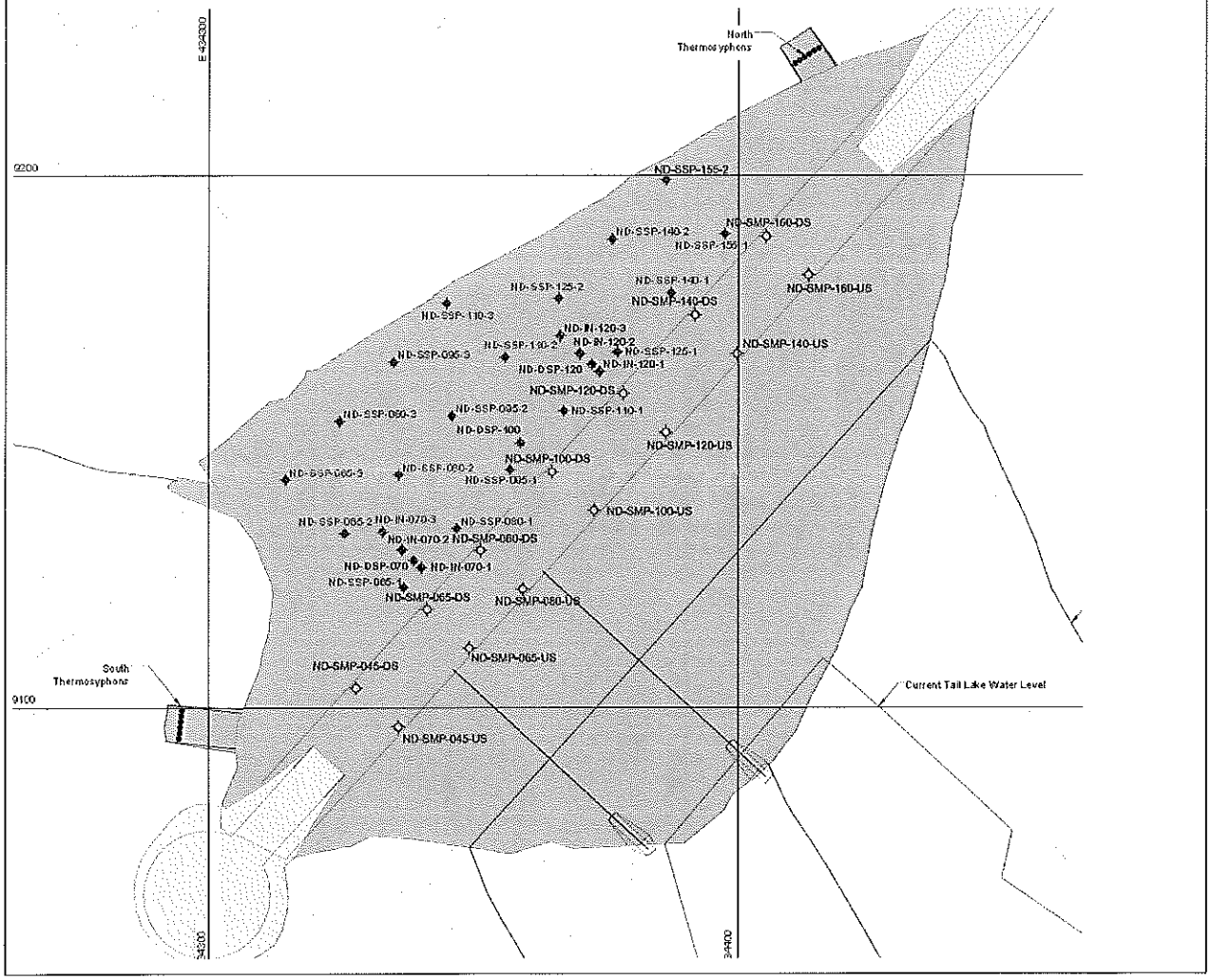
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	(No)
Downstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	No
Crest of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Thermosyphons North Side Minor Rust		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Thermosyphons South Side Minor Rust.		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Instrumentation (on crest and downstream side)		
Any visible concerns? (bent, rusted, cracked, etc.)	Yes	No
Thermistors and Dataloggers		
Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	No
Suspended Sediment in TIA (When not frozen)		
Any suspended sediment in Tail Lake?	Yes	No
Water at the Toe of the Downstream Side of the Dam (If yes refer to Doris North – North Dam and Tail Lake Outflow Seepage Monitoring Work Plan 2015)	Yes	No

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made or items that did not fit in the space above



Photos:

Please collect the following photos: Photo from north end looking south along the dam Photo from south end looking north along the dam	
Other photos, please describe – Photos taken	

North Dam Weekly Walkover Survey Report

Date:	March 1, 2020
Inspected By:	J. Power
Conditions:	-36, Clear, Snow Covered

Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have Developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam		
Any visible concerns? (Cracks, depressions, erosion, etc.)	Yes	No
Downstream Side of Dam		
Any visible concerns? (Cracks, depressions, erosion, seepage, etc.)	Yes	No
Crest of Dam		
Any visible concerns? (Cracks, depressions, erosion, etc.)	Yes	No
Thermosyphons North Side		
Any visible concerns? (Cracks, punctures, peeling paint, birds' nests, etc.)	Yes	No
Thermosyphons South Side		
Any visible concerns? (Cracks, punctures, peeling paint, birds' nests, etc.)	Yes	No
Instrumentation (on crest and downstream side)		
Any visible concerns? (Bent, rusted, cracked, etc.)	Yes	No
Thermistors and Data loggers		
Any visible concerns? (Frayed or cut cables, damaged boxes, etc.)	Yes	No
Suspended Sediment in the TIA (When not frozen)		
Any suspended sediment visible in the reclaim pond?	Yes	No
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	No

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Comments: Unfamiliar with condition of instrumentation prior to this inspection. Did not observe anything of note this week.

North Dam Weekly Walkover Survey Report

Date:	March 8, 2020
Inspected By:	J.Power/B.Kelly
Conditions:	(ie. snow on ground, clear) Snow covered, Clear, -50

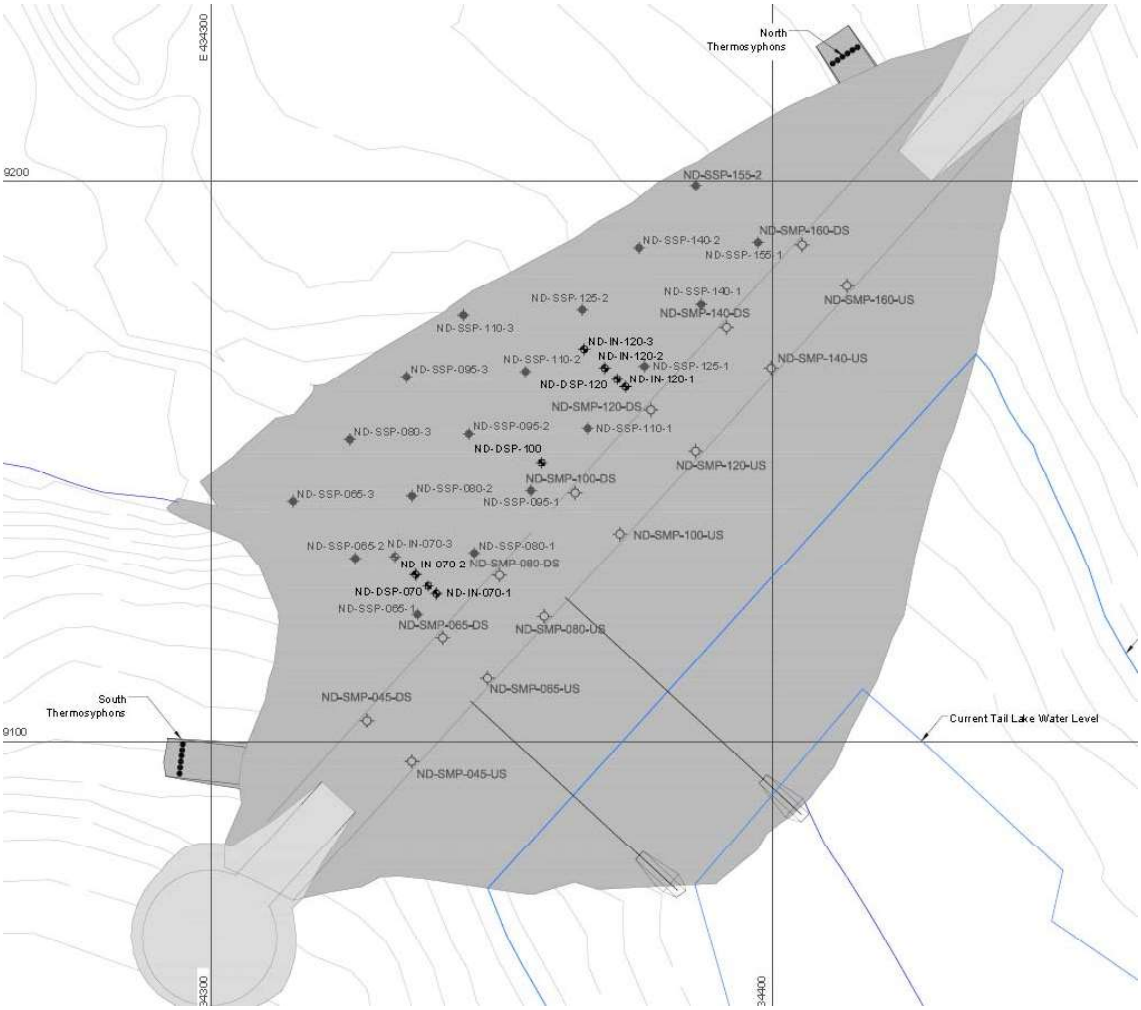
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Downstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	No
Crest of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Thermosyphons North Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Thermosyphons South Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Instrumentation (on crest and downstream side)		
Any visible concerns? (bent, rusted, cracked, etc.)	Yes	No
Thermistors and Dataloggers		
Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	No
Suspended Sediment in the TIA (When not frozen)		
Any suspended sediment visible in the reclaim pond?	Yes	No
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	No

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made



Photos:

Please collect the following photos:	
Photo from north end looking south along the dam	☑
Photo from south end looking north along the dam	☑

Other photos, please describe.

Dam photos included in the email.

North Dam Weekly Walkover Survey Report

Date:	March 16, 2020
Inspected By:	Brett Kelly
Conditions:	(ie. snow on ground, clear) Snow Covered, Clear, -27

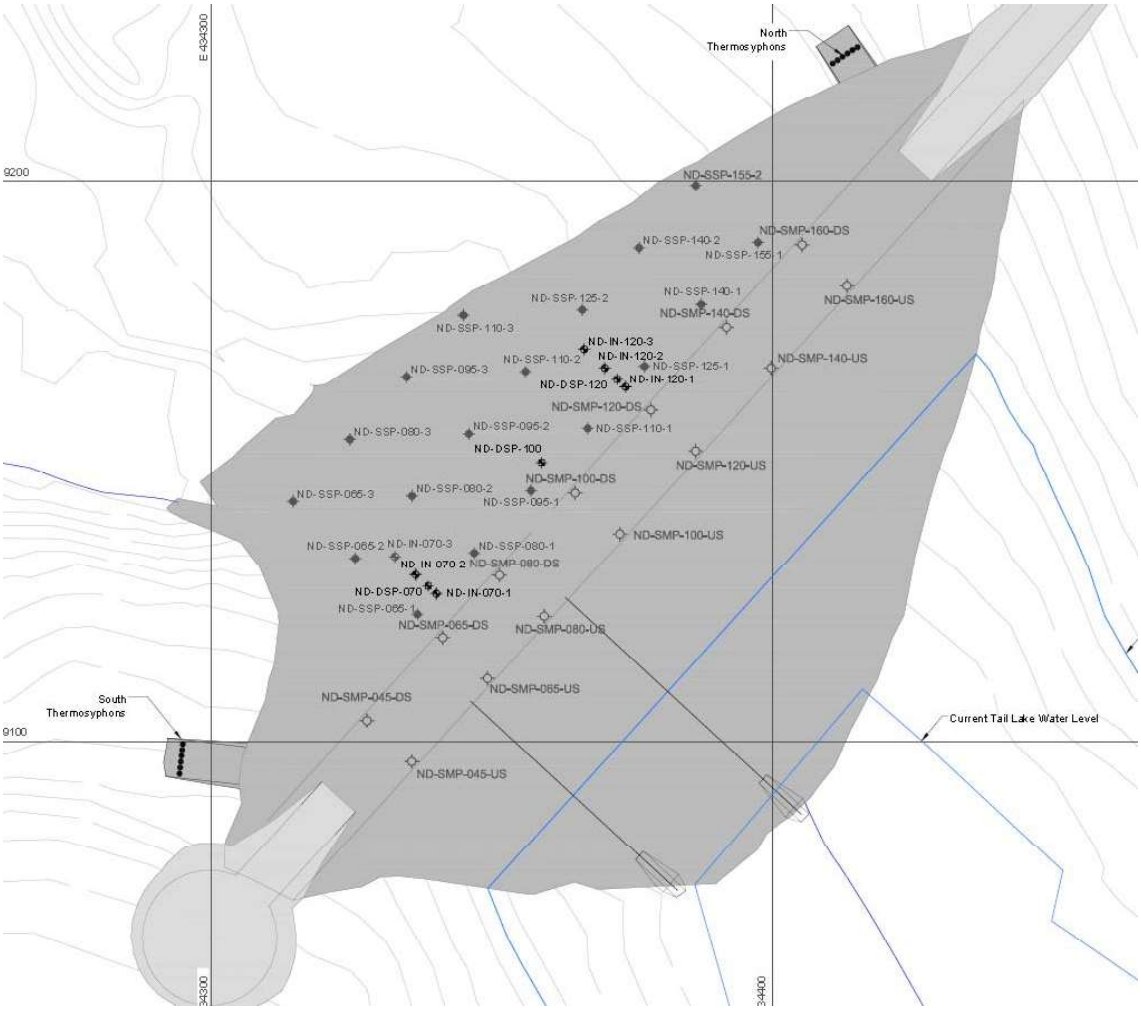
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Downstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	No
Crest of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Thermosyphons North Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Thermosyphons South Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Instrumentation (on crest and downstream side)		
Any visible concerns? (bent, rusted, cracked, etc.)	Yes	No
Thermistors and Dataloggers		
Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	No
Suspended Sediment in the TIA (When not frozen)		
Any suspended sediment visible in the reclaim pond?	Yes	No
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	No

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made



Photos:

Please collect the following photos:	
Photo from north end looking south along the dam	☑
Photo from south end looking north along the dam	☑

Other photos, please describe.

Dam photos included in the email.

Brett Kelly

North Dam Weekly Walkover Survey Report

Date:	March 23, 2020
Inspected By:	Brett Kelly
Conditions:	(ie. snow on ground, clear) Snow Covered, Clear, 26

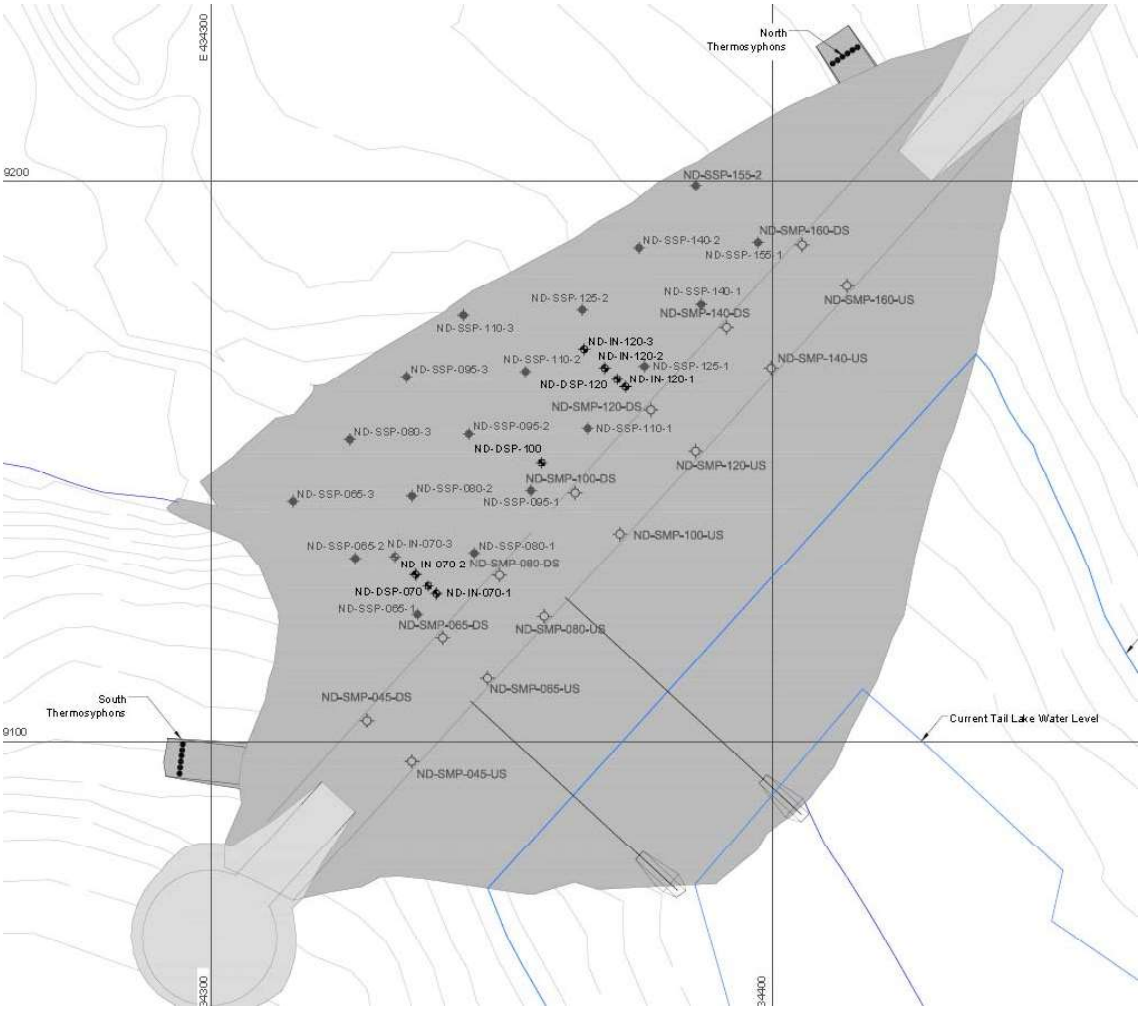
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Downstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	No
Crest of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Thermosyphons North Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Thermosyphons South Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Instrumentation (on crest and downstream side)		
Any visible concerns? (bent, rusted, cracked, etc.)	Yes	No
Thermistors and Dataloggers		
Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	No
Suspended Sediment in the TIA (When not frozen)		
Any suspended sediment visible in the reclaim pond?	Yes	No
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	No

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made



Photos:

Please collect the following photos:

Photo from north end looking south along the dam	☐
Photo from south end looking north along the dam	☐

Other photos, please describe.

Brett Kelly

North Dam Weekly Walkover Survey Report

Date:	April 12, 2020
Inspected By:	J.Power
Conditions:	(ie. snow on ground, clear) Snow Covered, Clear, -17.9

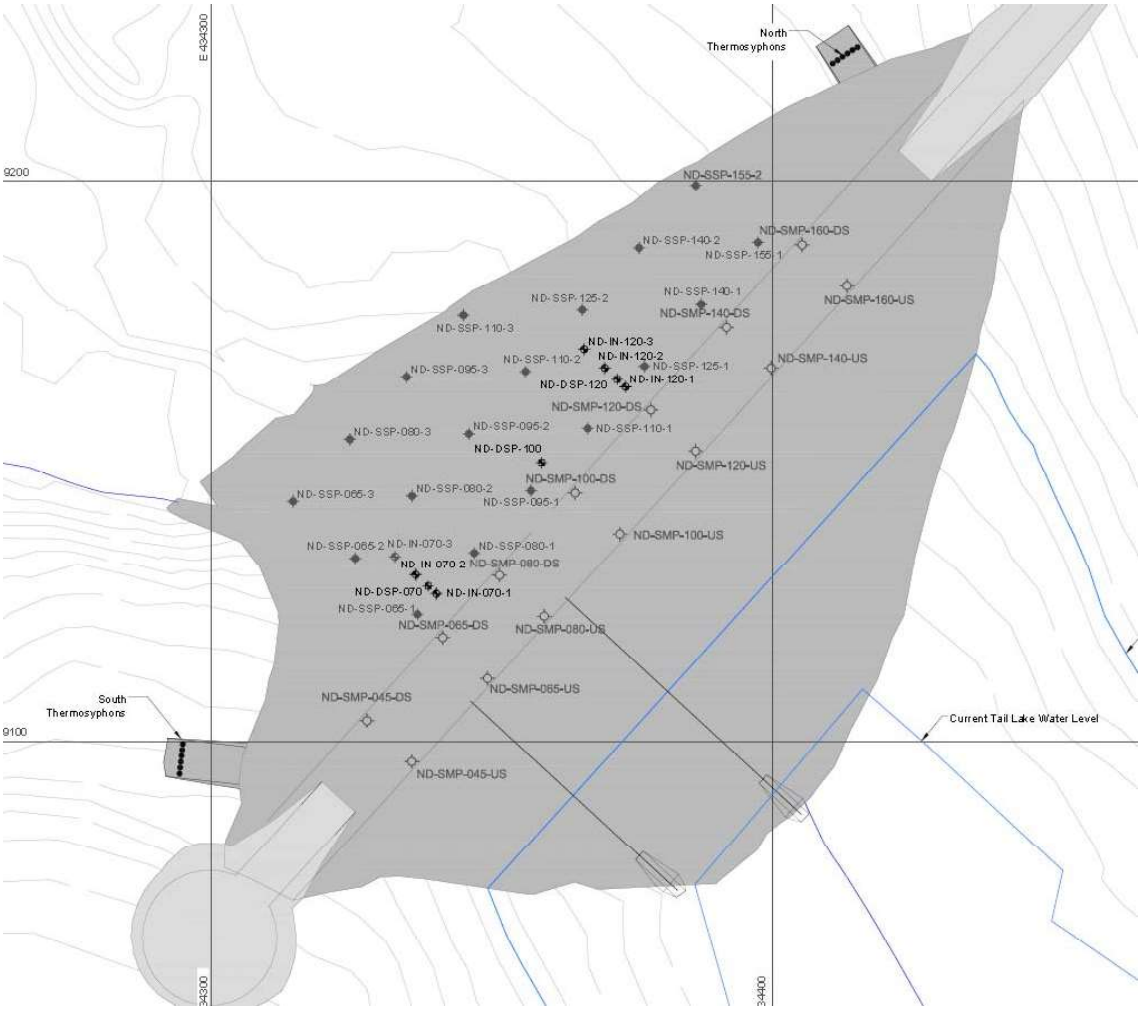
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Downstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	No
Crest of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Thermosyphons North Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Thermosyphons South Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Instrumentation (on crest and downstream side)		
Any visible concerns? (bent, rusted, cracked, etc.)	Yes	No
Thermistors and Dataloggers		
Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	No
Suspended Sediment in the TIA (When not frozen)		
Any suspended sediment visible in the reclaim pond?	Yes	No
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	No

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made



Photos:

Please collect the following photos: Photo from north end looking south along the dam Photo from south end looking north along the dam	☑ ☑
Other photos, please describe.	

Jamie Power

North Dam Weekly Walkover Survey Report

Date:	May 3, 2020
Inspected By:	Brett Kelly & Josh Baldock
Conditions:	(ie. snow on ground, clear) Snow Covered. Overcast. -4 Deg. C

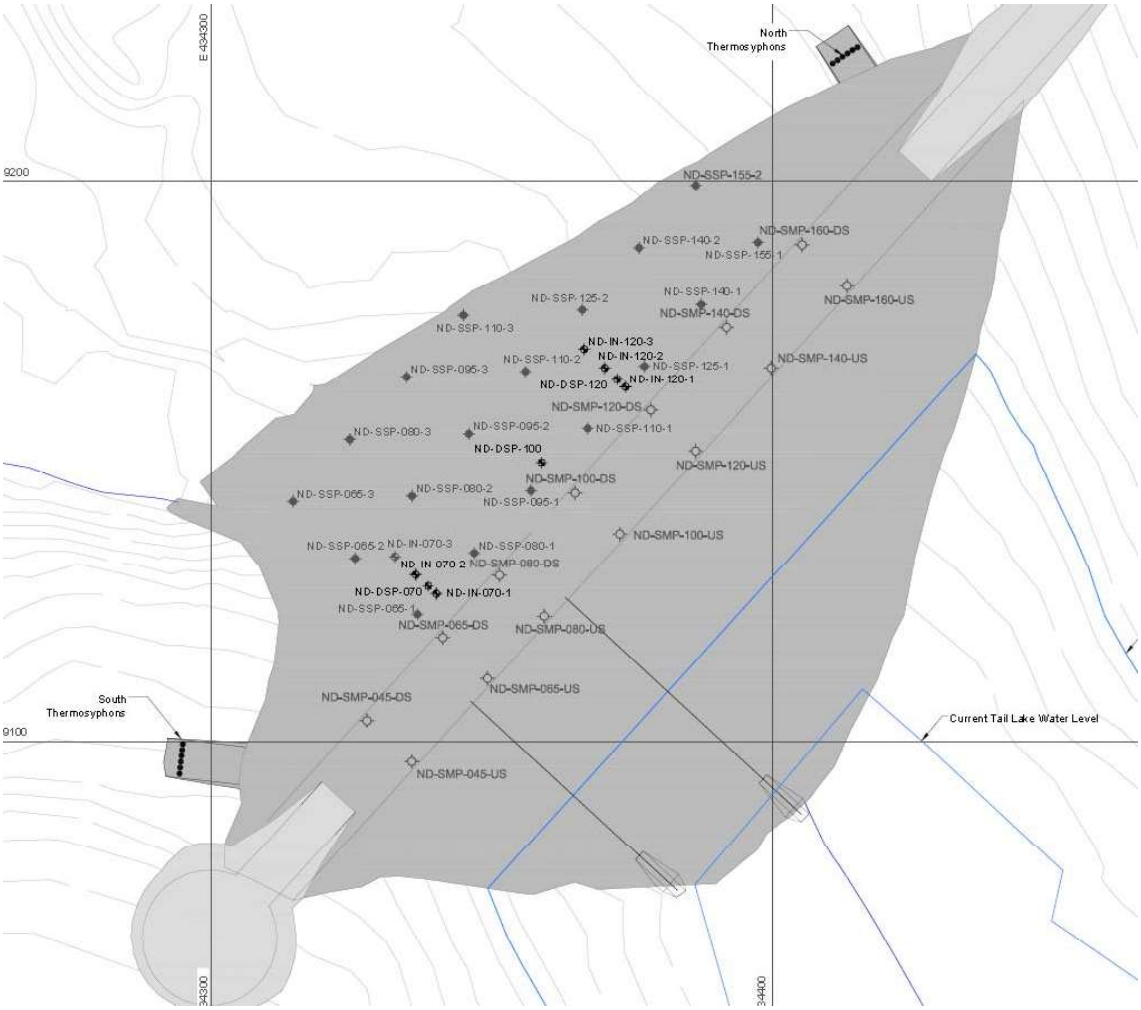
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Downstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	No
Crest of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Thermosyphons North Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Thermosyphons South Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Instrumentation (on crest and downstream side)		
Any visible concerns? (bent, rusted, cracked, etc.)	Yes	No
Thermistors and Dataloggers		
Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	No
Suspended Sediment in the TIA (When not frozen)		
Any suspended sediment visible in the reclaim pond?	Yes	No
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	No

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made



Photos:

Please collect the following photos:	
Photo from north end looking south along the dam	☐
Photo from south end looking north along the dam	☐
Other photos, please describe.	

B Kelly

North Dam Weekly Walkover Survey Report

Date:	May 10, 2020
Inspected By:	Brett Kelly & Greg Kam
Conditions:	(ie. snow on ground, clear) Snow Covered. Sunny. -6 Deg. C

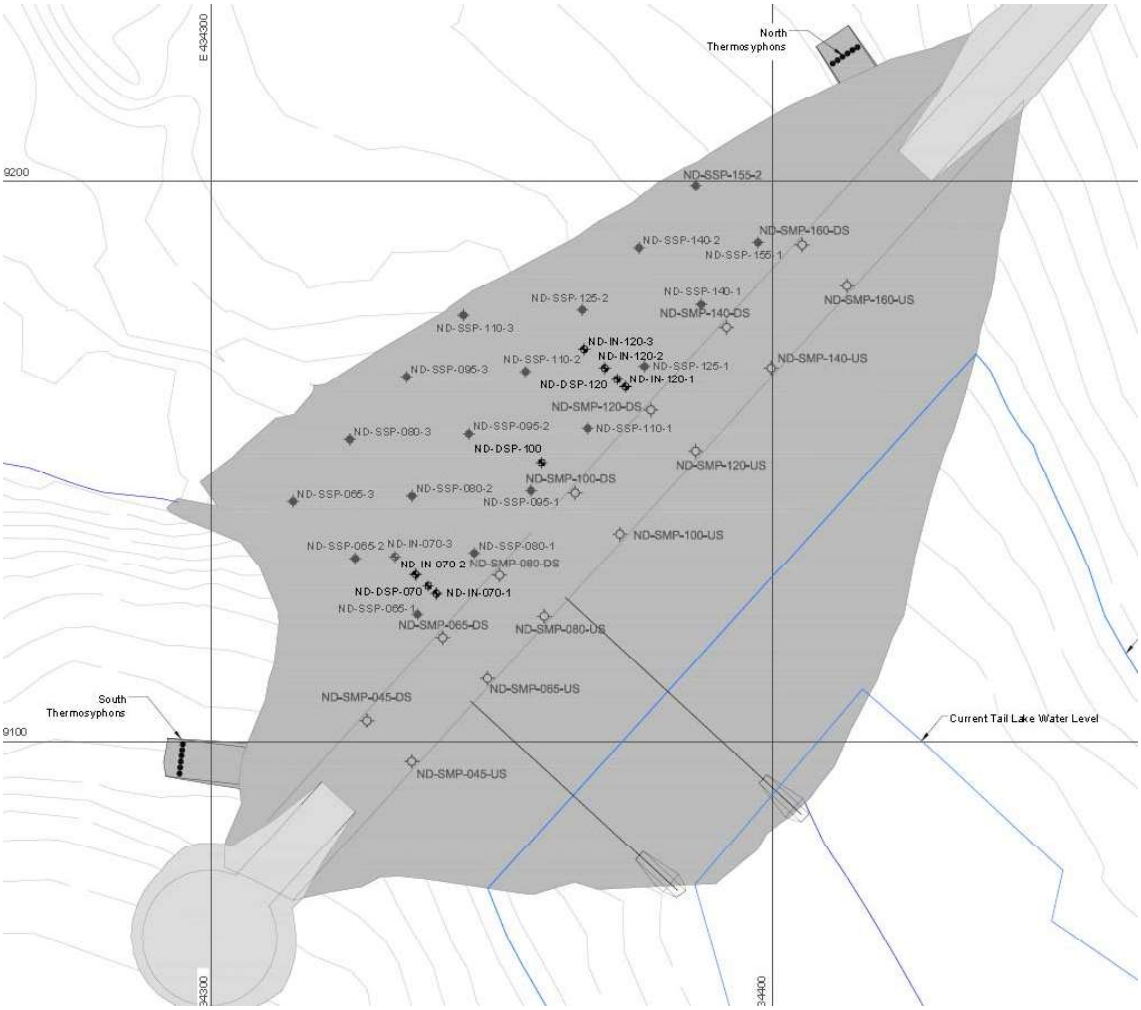
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Downstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	No
Crest of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Thermosyphons North Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Thermosyphons South Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Instrumentation (on crest and downstream side)		
Any visible concerns? (bent, rusted, cracked, etc.)	Yes	No
Thermistors and Dataloggers		
Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	No
Suspended Sediment in the TIA (When not frozen)		
Any suspended sediment visible in the reclaim pond?	Yes	No
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	No

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made



Photos:

Please collect the following photos:

- Photo from north end looking south along the dam ☐
- Photo from south end looking north along the dam ☐

Other photos, please describe.

B Kelly

North Dam Weekly Walkover Survey Report

Date:	May 18, 2020
Inspected By:	Brett Kelly
Conditions:	(ie. snow on ground, clear) Overcast, -7 Deg. C

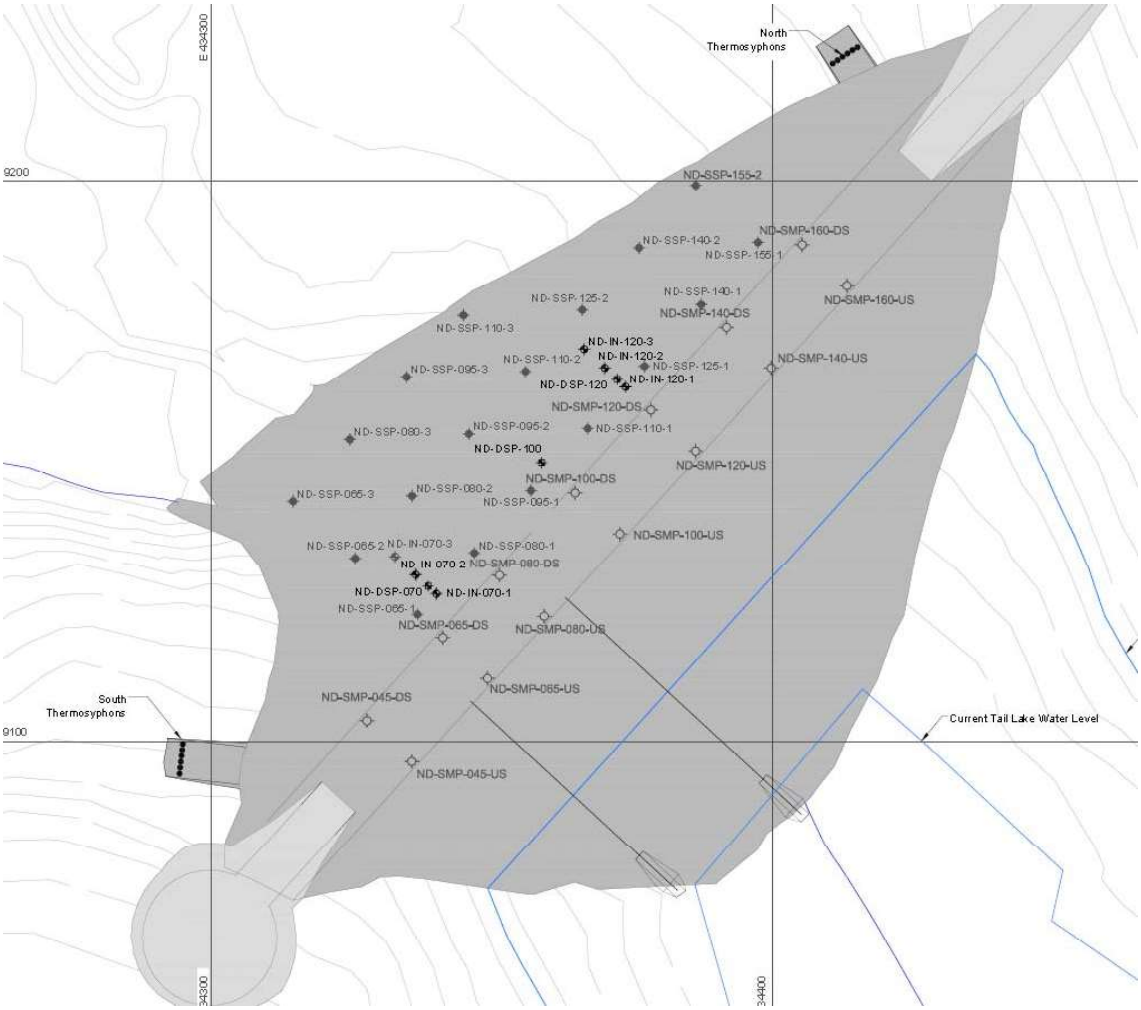
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Downstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	No
Crest of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Thermosyphons North Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Thermosyphons South Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Instrumentation (on crest and downstream side)		
Any visible concerns? (bent, rusted, cracked, etc.)	Yes	No
Thermistors and Dataloggers		
Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	No
Suspended Sediment in the TIA (When not frozen)		
Any suspended sediment visible in the reclaim pond?	Yes	No
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	No

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made



Photos:

Please collect the following photos:

Photo from north end looking south along the dam	☐
Photo from south end looking north along the dam	☐

Other photos, please describe.

B Kelly

North Dam Weekly Walkover Survey Report

Date:	May 23, 2020
Inspected By:	Brett Kelly
Conditions: (ie. snow on ground, clear)	Overcast, -14 Deg.C

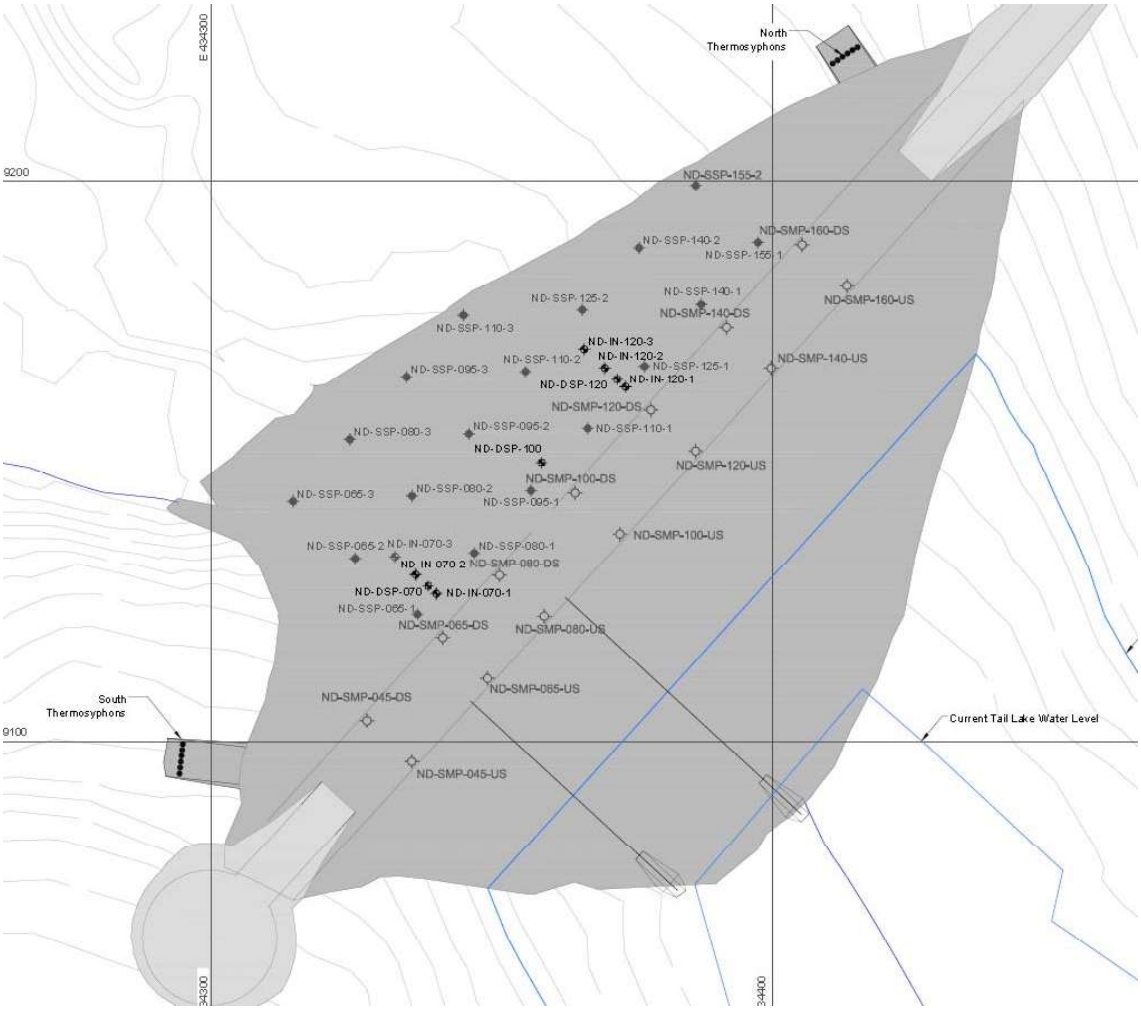
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Downstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	No
Crest of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Thermosyphons North Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Thermosyphons South Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Instrumentation (on crest and downstream side)		
Any visible concerns? (bent, rusted, cracked, etc.)	Yes	No
Thermistors and Dataloggers		
Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	No
Suspended Sediment in the TIA (When not frozen)		
Any suspended sediment visible in the reclaim pond?	Yes	No
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	No

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made



Photos:

Please collect the following photos:

Photo from north end looking south along the dam	☐
Photo from south end looking north along the dam	☐

Other photos, please describe.

B Kelly

North Dam Weekly Walkover Survey Report

Date:	July 2 2020
Inspected By:	Brett Kelly & Josh Baldock
Conditions:	(ie. snow on ground, clear) Clear, 15 Deg.C

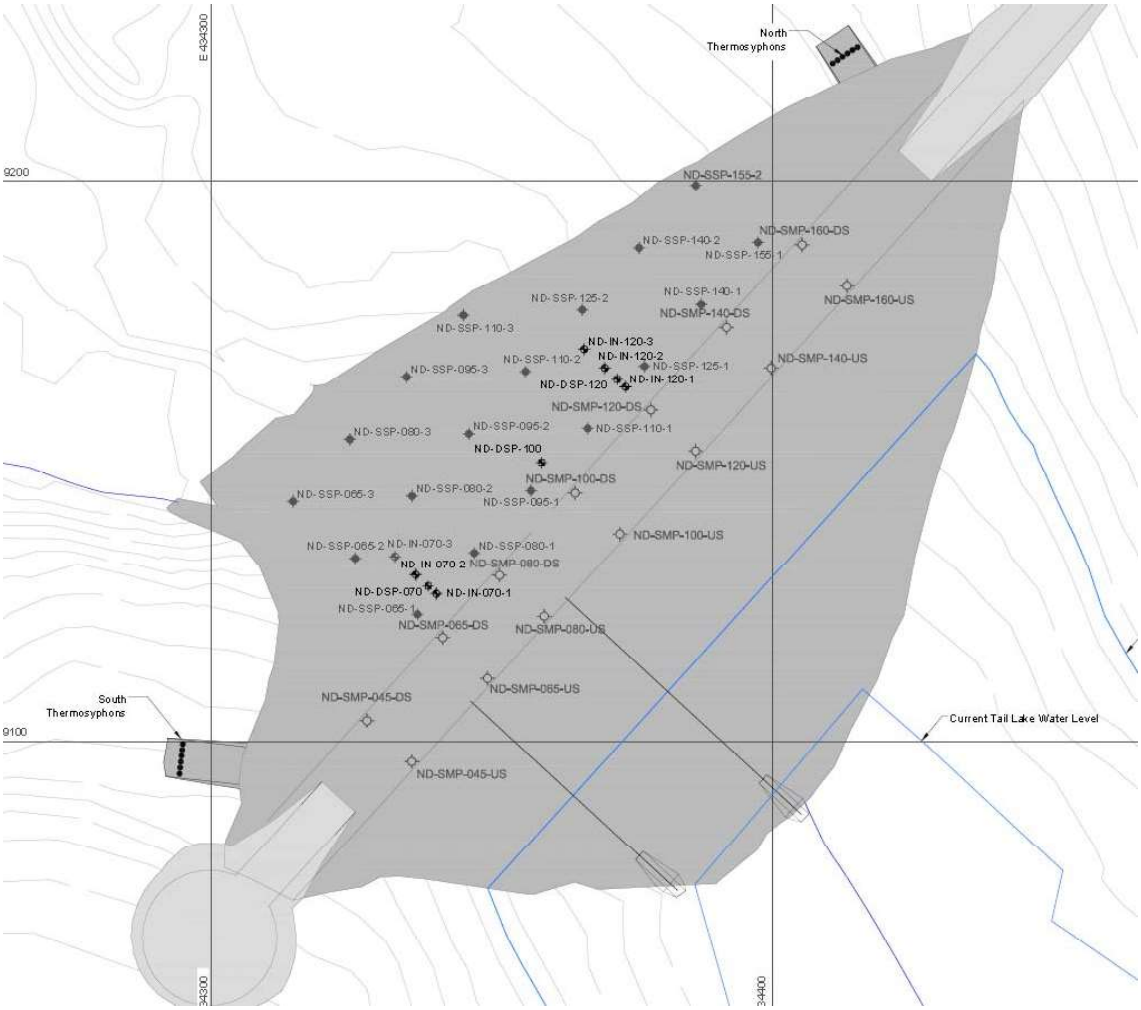
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Downstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	No
Crest of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Thermosyphons North Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Thermosyphons South Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Instrumentation (on crest and downstream side)		
Any visible concerns? (bent, rusted, cracked, etc.)	Yes	No
Thermistors and Dataloggers		
Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	No
Suspended Sediment in the TIA (When not frozen)		
Any suspended sediment visible in the reclaim pond?	Yes	No
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	No

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made



Photos:

Please collect the following photos:	
Photo from north end looking south along the dam	☐
Photo from south end looking north along the dam	☐

Other photos, please describe.

Brett Kelly

North Dam Weekly Walkover Survey Report

Date:	July 14 2020
Inspected By:	Brett Kelly & Kyle Conway
Conditions:	(ie. snow on ground, clear) Clear, 6 Deg.C

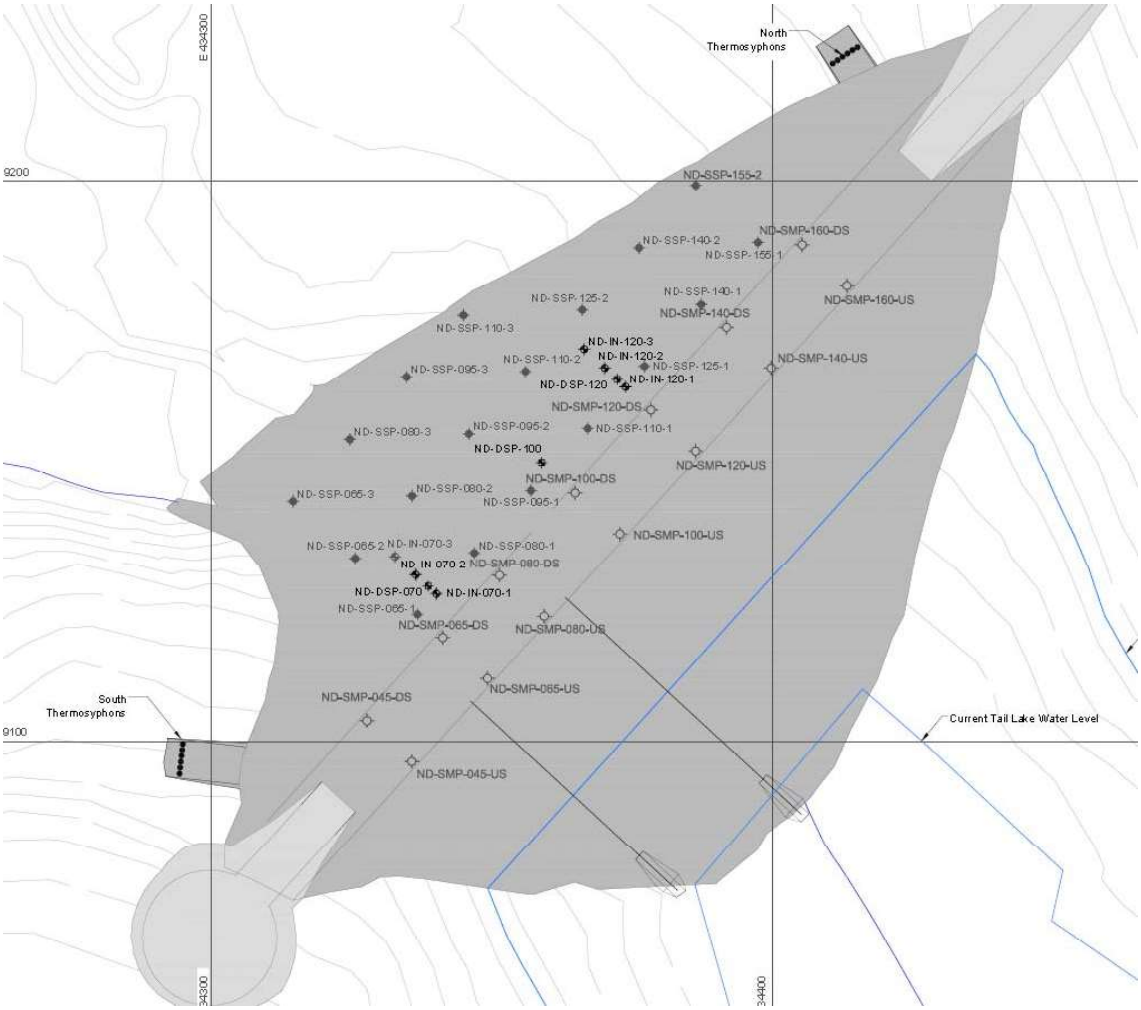
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Downstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	No
Crest of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Thermosyphons North Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Thermosyphons South Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Instrumentation (on crest and downstream side)		
Any visible concerns? (bent, rusted, cracked, etc.)	Yes	No
Thermistors and Dataloggers		
Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	No
Suspended Sediment in the TIA (When not frozen)		
Any suspended sediment visible in the reclaim pond?	Yes	No
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	No

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made



Photos:

Please collect the following photos:	
Photo from north end looking south along the dam	☐
Photo from south end looking north along the dam	☐
Other photos, please describe.	

Brett Kelly

North Dam Weekly Walkover Survey Report

Date:	July 19, 2020
Inspected By:	Brett Kelly
Conditions:	(ie. snow on ground, clear) Clear, 8 Deg.C

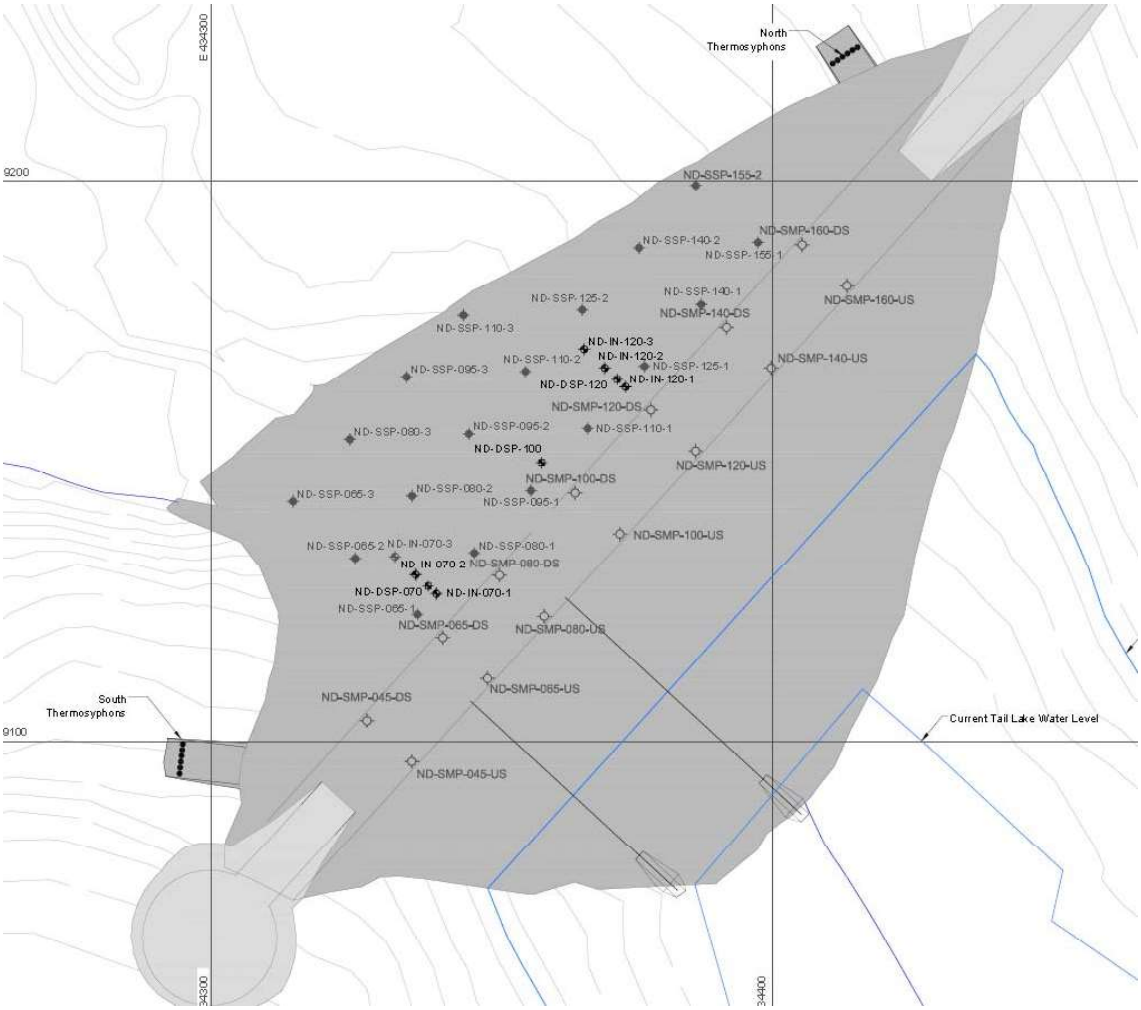
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Downstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	No
Crest of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Thermosyphons North Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Thermosyphons South Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Instrumentation (on crest and downstream side)		
Any visible concerns? (bent, rusted, cracked, etc.)	Yes	No
Thermistors and Dataloggers		
Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	No
Suspended Sediment in the TIA (When not frozen)		
Any suspended sediment visible in the reclaim pond?	Yes	No
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	No

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made



Photos:

Please collect the following photos:	
Photo from north end looking south along the dam	☐
Photo from south end looking north along the dam	☐
Other photos, please describe.	

North Dam Weekly Walkover Survey Report

Date:	26 - JULY - 2020
Inspected By:	BM
Conditions:	(ie. snow on ground, clear) CLEAR . 15°C . WIND NE 25 km/h

Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

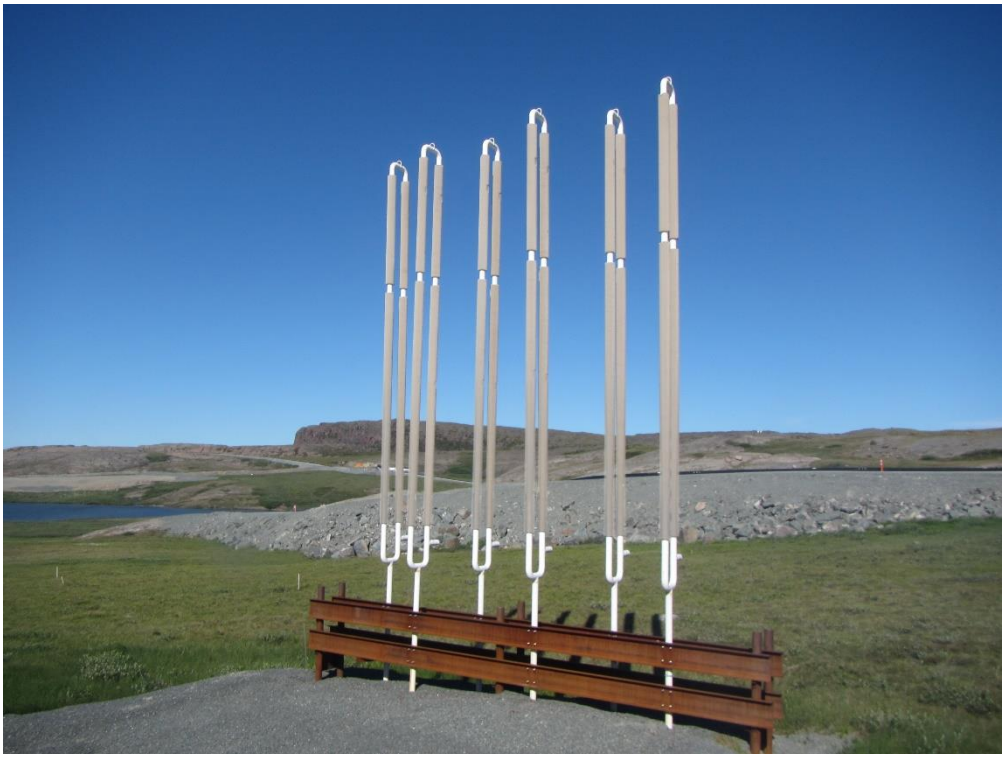
	Upstream Side of Dam		
(1)	Any visible concerns? (cracks, depressions, erosion, etc.)	(Yes)	No
	Downstream Side of Dam		
	Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	(No)
	Crest of Dam		
	Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	(No)
	Thermosyphons North Side EAST		
(2)	Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	(Yes)	No
	Thermosyphons South Side WEST		
(3)	Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	(Yes)	No
	Instrumentation (on crest and downstream side)		
	Any visible concerns? (bent, rusted, cracked, etc.)	Yes	(No)
	Thermistors and Dataloggers		
	Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	(No)
	Suspended Sediment in the TIA (When not frozen)		
	Any suspended sediment visible in the reclaim pond? GREENISH HUE	Yes	(No)
	Water at the Toe of the Downstream Side of the Dam		
(4)	Is water visible on the downstream side of the dam?	(Yes)	No

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

(1) CRACKS NEAR TOE OF BOAT ACCESS RAMP
2 PREVIOUSLY MARKED DEPRESSIONS NOT ON UPSTREAM SIDE CLOSER TOWARDS NE SIDE OF DAM

(2) + (3) SURFACE RUST MOSTLY CONFINED TO JOINTED AREAS

(4) PREVIOUSLY NOTED SEEP... NOT FLOWING AT TIME OF INSPECTION



North Dam Weekly Walkover Survey Report

Date:	Aug 23, 2020
Inspected By:	Brett Kelly
Conditions:	(ie. snow on ground, clear) Clear, 1 Deg.C

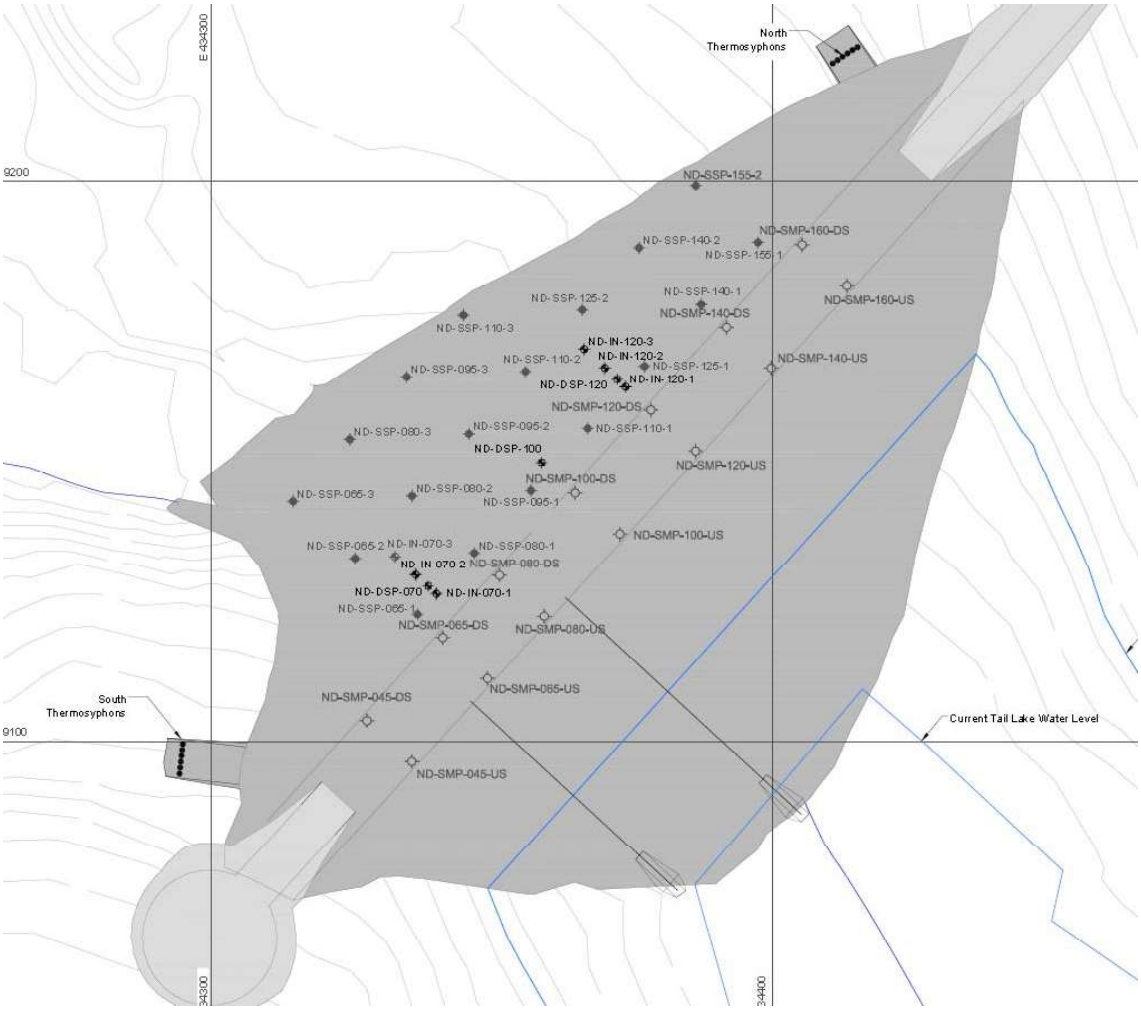
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Downstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	No
Crest of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Thermosyphons North Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Thermosyphons South Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Instrumentation (on crest and downstream side)		
Any visible concerns? (bent, rusted, cracked, etc.)	Yes	No
Thermistors and Dataloggers		
Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	No
Suspended Sediment in the TIA (When not frozen)		
Any suspended sediment visible in the reclaim pond?	Yes	No
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	No

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made



Photos:

Please collect the following photos:	
Photo from north end looking south along the dam	☐
Photo from south end looking north along the dam	☐
Other photos, please describe.	

North Dam Weekly Walkover Survey Report

Date:	Aug 30, 2020
Inspected By:	Brett Kelly
Conditions:	(ie. snow on ground, clear) Clear, -2 Deg.C

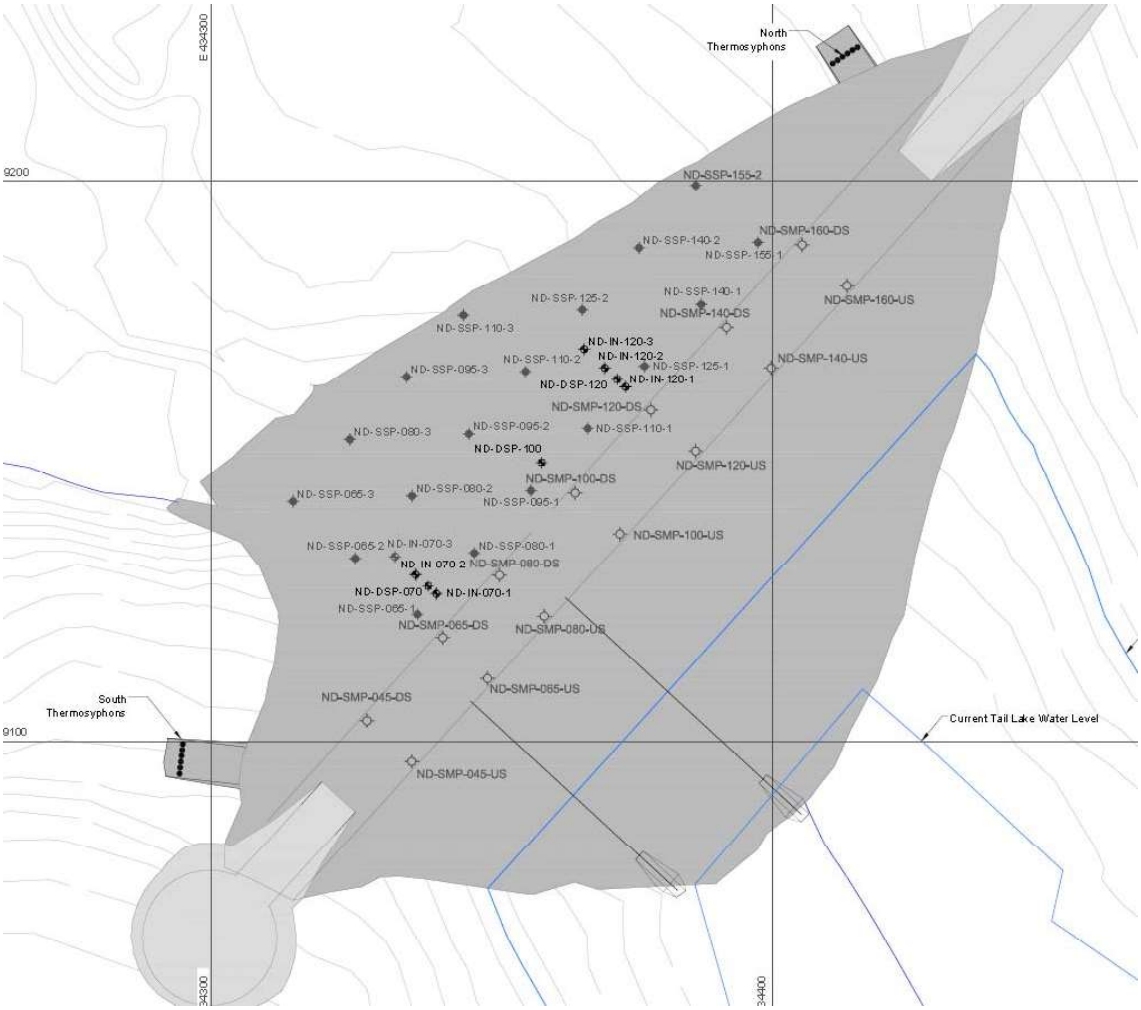
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Downstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	No
Crest of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Thermosyphons North Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Thermosyphons South Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Instrumentation (on crest and downstream side)		
Any visible concerns? (bent, rusted, cracked, etc.)	Yes	No
Thermistors and Dataloggers		
Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	No
Suspended Sediment in the TIA (When not frozen)		
Any suspended sediment visible in the reclaim pond?	Yes	No
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	No

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made



Photos:

Please collect the following photos:	
Photo from north end looking south along the dam	☐
Photo from south end looking north along the dam	☐
Other photos, please describe.	

North Dam Weekly Walkover Survey Report

Date:	Sep 6, 2020
Inspected By:	Brett Kelly
Conditions:	(ie. snow on ground, clear) Overcast, -4 Deg.C

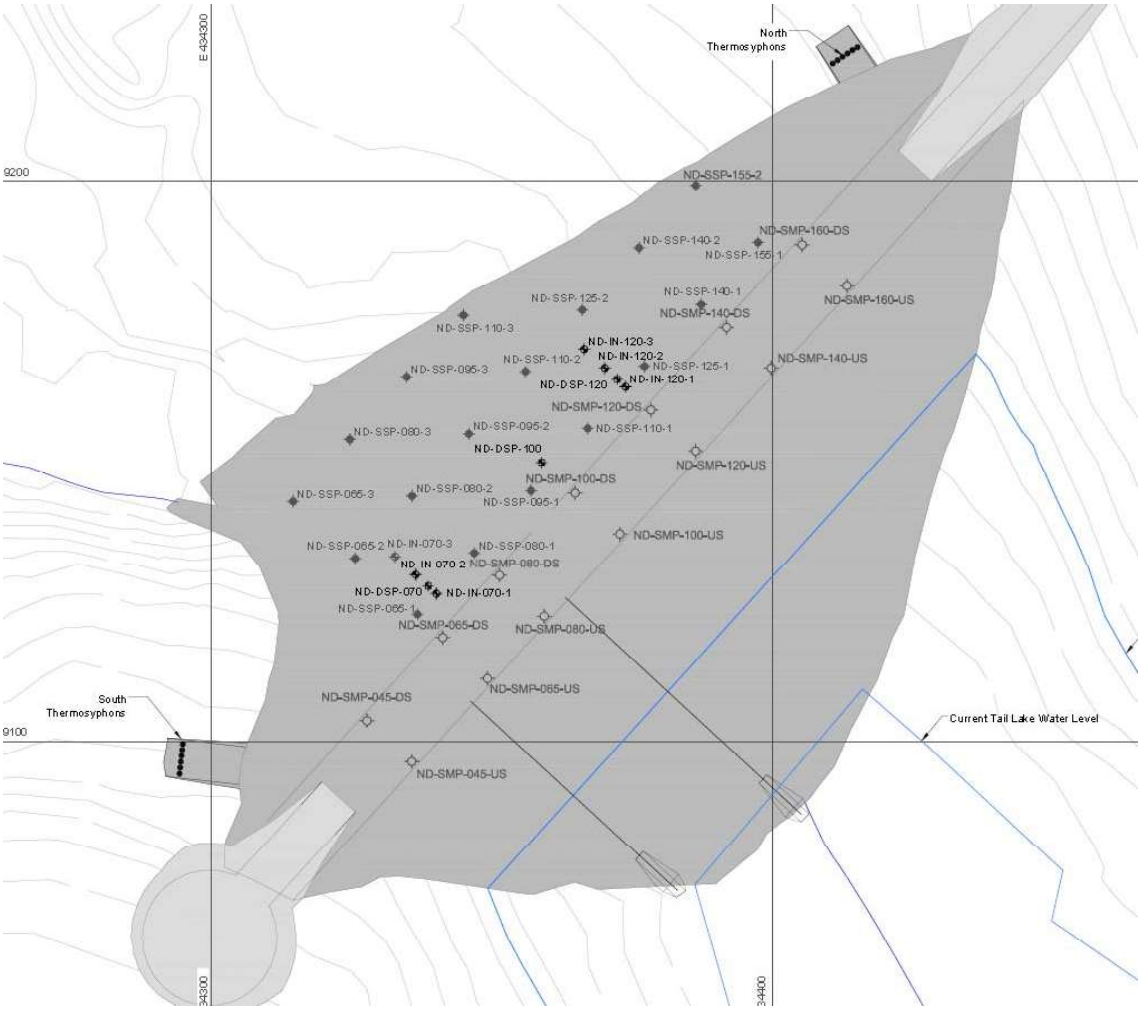
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Downstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	No
Crest of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Thermosyphons North Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Thermosyphons South Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Instrumentation (on crest and downstream side)		
Any visible concerns? (bent, rusted, cracked, etc.)	Yes	No
Thermistors and Dataloggers		
Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	No
Suspended Sediment in the TIA (When not frozen)		
Any suspended sediment visible in the reclaim pond?	Yes	No
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	No

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made



Photos:

Please collect the following photos:	
Photo from north end looking south along the dam	☐
Photo from south end looking north along the dam	☐
Other photos, please describe.	

North Dam Weekly Walkover Survey Report

Date:	Oct 19, 2020
Inspected By:	Brett Kelly
Conditions:	(ie. snow on ground, clear) Overcast, -20 Deg.C

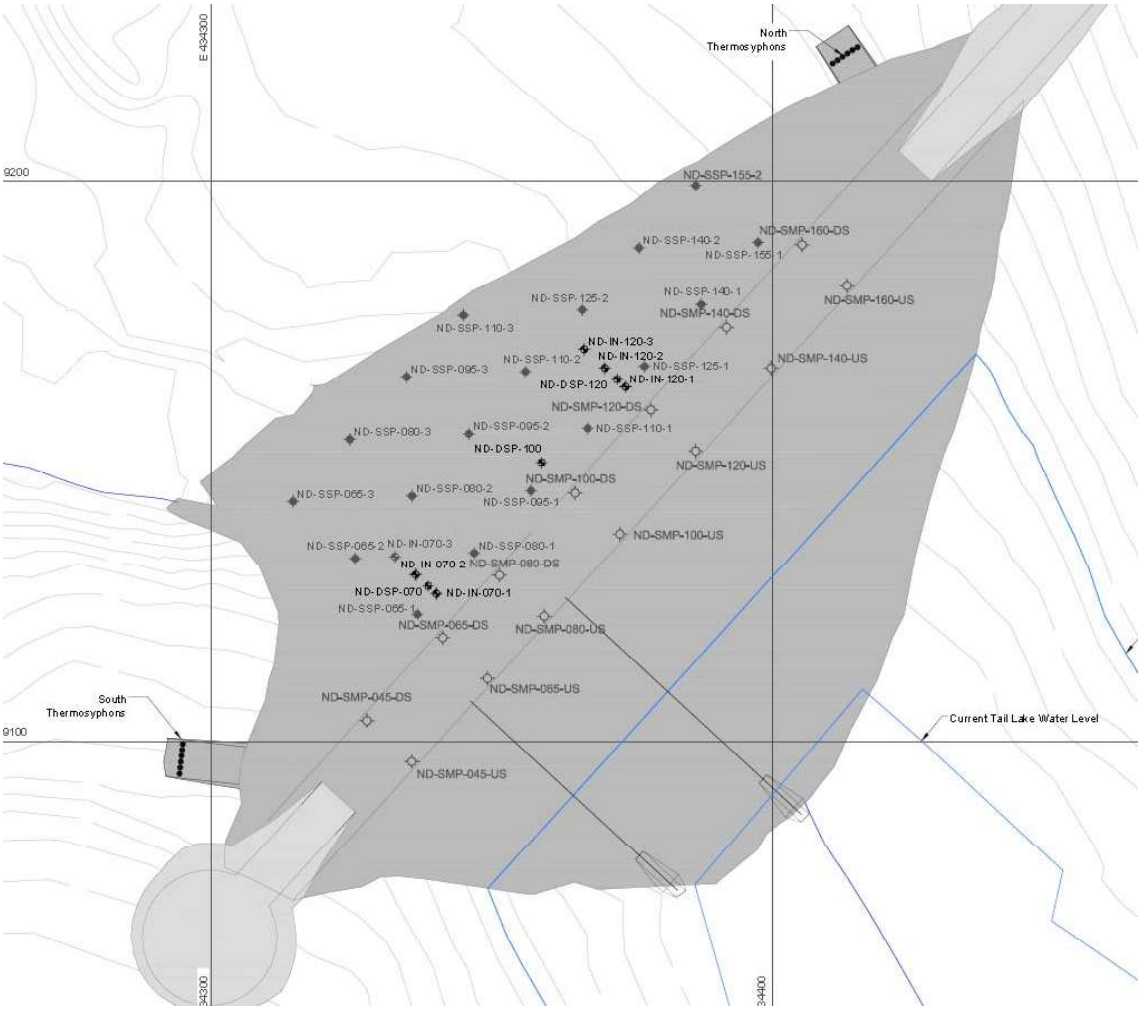
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Downstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	No
Crest of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Thermosyphons North Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Thermosyphons South Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Instrumentation (on crest and downstream side)		
Any visible concerns? (bent, rusted, cracked, etc.)	Yes	No
Thermistors and Dataloggers		
Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	No
Suspended Sediment in the TIA (When not frozen)		
Any suspended sediment visible in the reclaim pond?	Yes	No
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	No

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made



Photos:

Please collect the following photos:	
Photo from north end looking south along the dam	☐
Photo from south end looking north along the dam	☐
Other photos, please describe.	

North Dam Weekly Walkover Survey Report

Date:	Oct 25, 2020
Inspected By:	Brett Kelly
Conditions:	(ie. snow on ground, clear) Overcast, -16 Deg.C

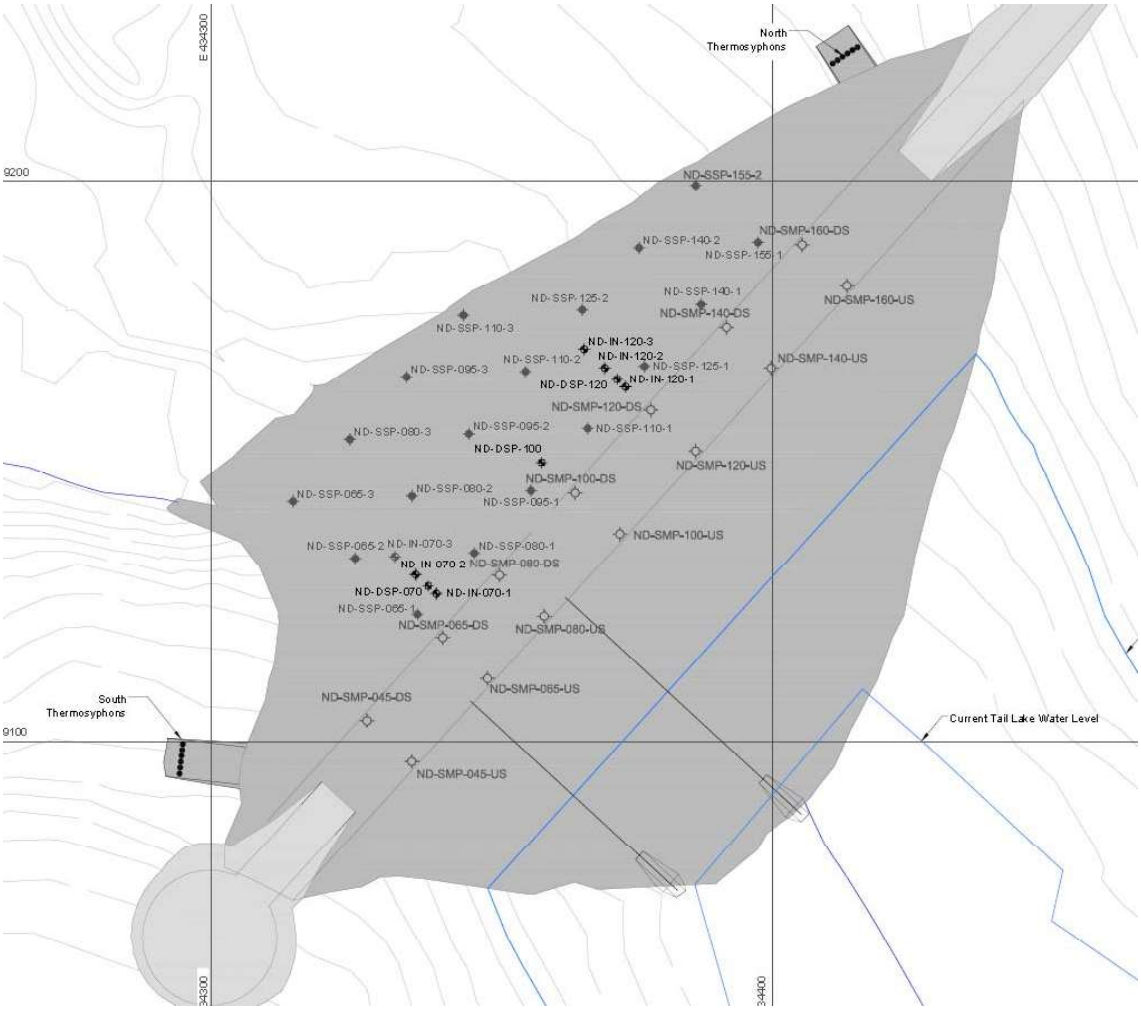
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Downstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	No
Crest of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Thermosyphons North Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Thermosyphons South Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Instrumentation (on crest and downstream side)		
Any visible concerns? (bent, rusted, cracked, etc.)	Yes	No
Thermistors and Dataloggers		
Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	No
Suspended Sediment in the TIA (When not frozen)		
Any suspended sediment visible in the reclaim pond?	Yes	No
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	No

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made



Photos:

Please collect the following photos:	
Photo from north end looking south along the dam	☐
Photo from south end looking north along the dam	☐
Other photos, please describe.	

North Dam Weekly Walkover Survey Report

Date:	Nov 1, 2020
Inspected By:	Brett Kelly
Conditions:	(ie. snow on ground, clear) Foggy, -26 Deg.C

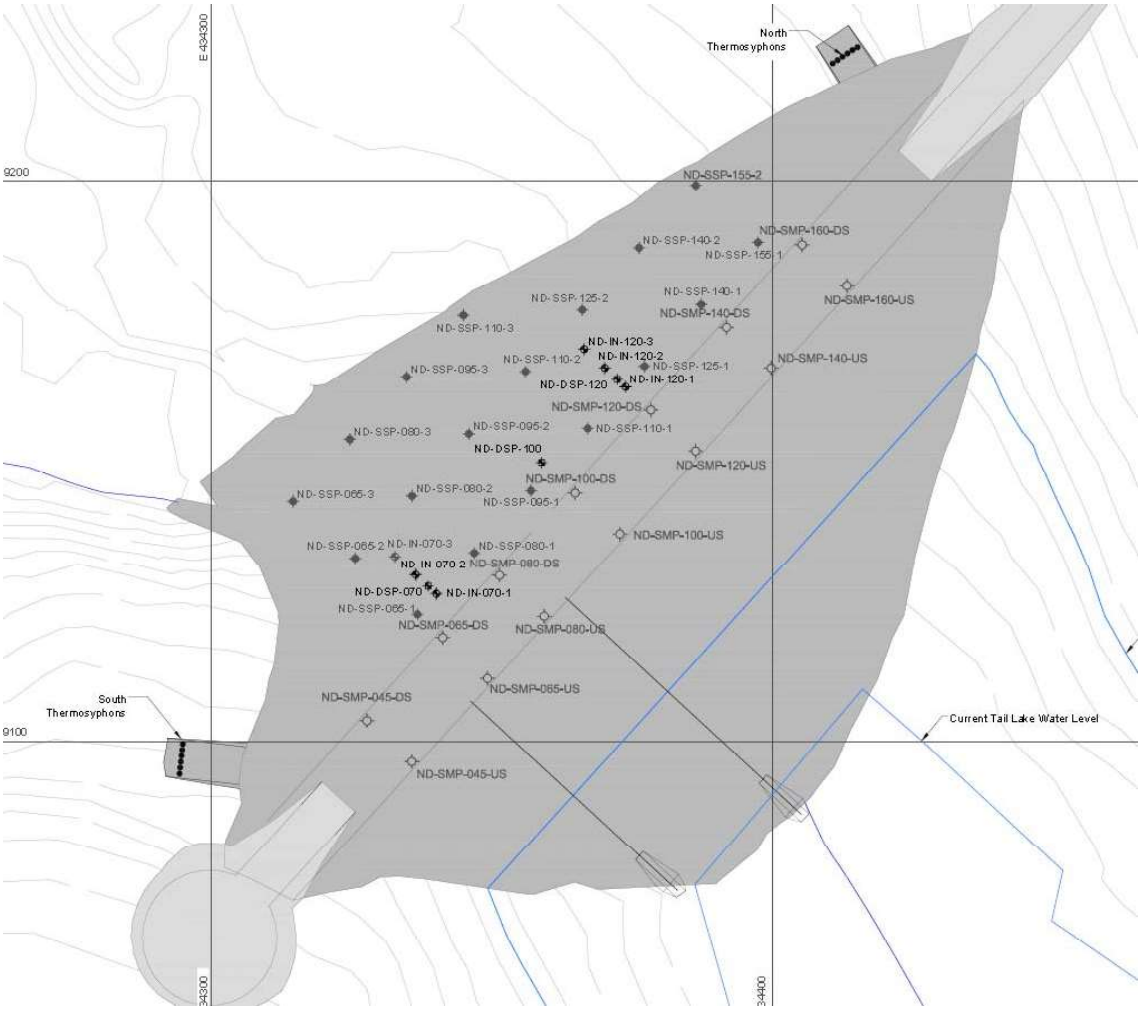
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Downstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	No
Crest of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Thermosyphons North Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Thermosyphons South Side		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Instrumentation (on crest and downstream side)		
Any visible concerns? (bent, rusted, cracked, etc.)	Yes	No
Thermistors and Dataloggers		
Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	No
Suspended Sediment in the TIA (When not frozen)		
Any suspended sediment visible in the reclaim pond?	Yes	No
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	No

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made



Photos:

Please collect the following photos:	
Photo from north end looking south along the dam	☐
Photo from south end looking north along the dam	☐
Other photos, please describe.	

North Dam Weekly Walkover Survey Report

Date:	Nov 7 / 2020
Inspected By:	Sarah Wannock
Conditions:	(ie. snow on ground, clear) Snow covered, no wind, clear sky, light flurries in past 24 hrs, ~-20°C

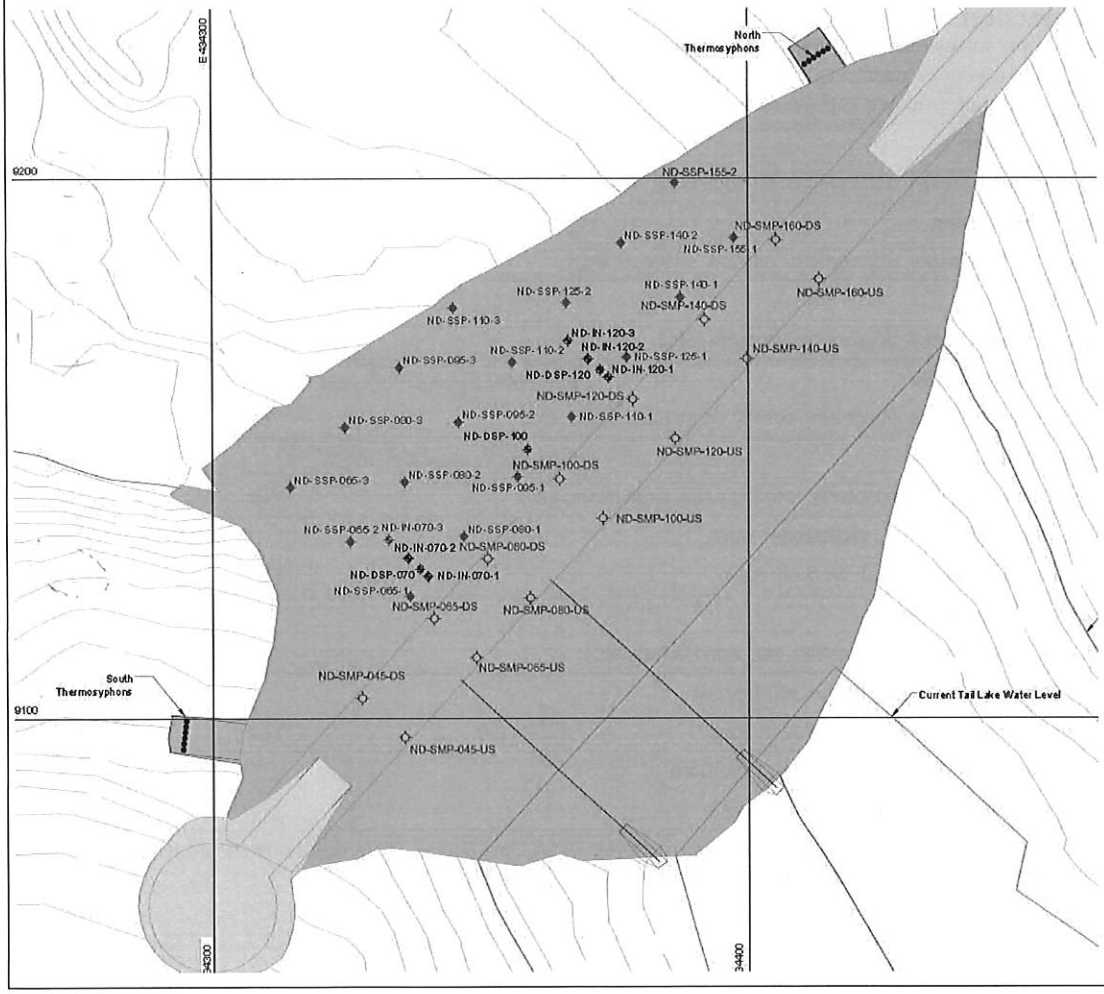
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.) Snow covered	Yes	(No)
Downstream Side of Dam		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	(No)
Crest of Dam		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	(No)
Thermosyphons North Side previously noted rust		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	No
Thermosyphons South Side previously noted rust		
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)	Yes	(No)
Instrumentation (on crest and downstream side)		
Any visible concerns? (bent, rusted, cracked, etc.)	Yes	(No)
Thermistors and Dataloggers		
Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	(No)
Suspended Sediment in the TIA (When not frozen)		
Any suspended sediment visible in the reclaim pond? Frozen	Yes	(No)
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	(No)

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made



Photos:

Please collect the following photos: Photo from north end looking south along the dam Photo from south end looking north along the dam	☑ ☑
Other photos, please describe.	

North Dam Weekly Walkover Survey Report

Date:	Nov 15/2020
Inspected By:	Sarah Wamock
Conditions:	(ie. snow on ground, clear) snow on ground, high winds, blowing snow

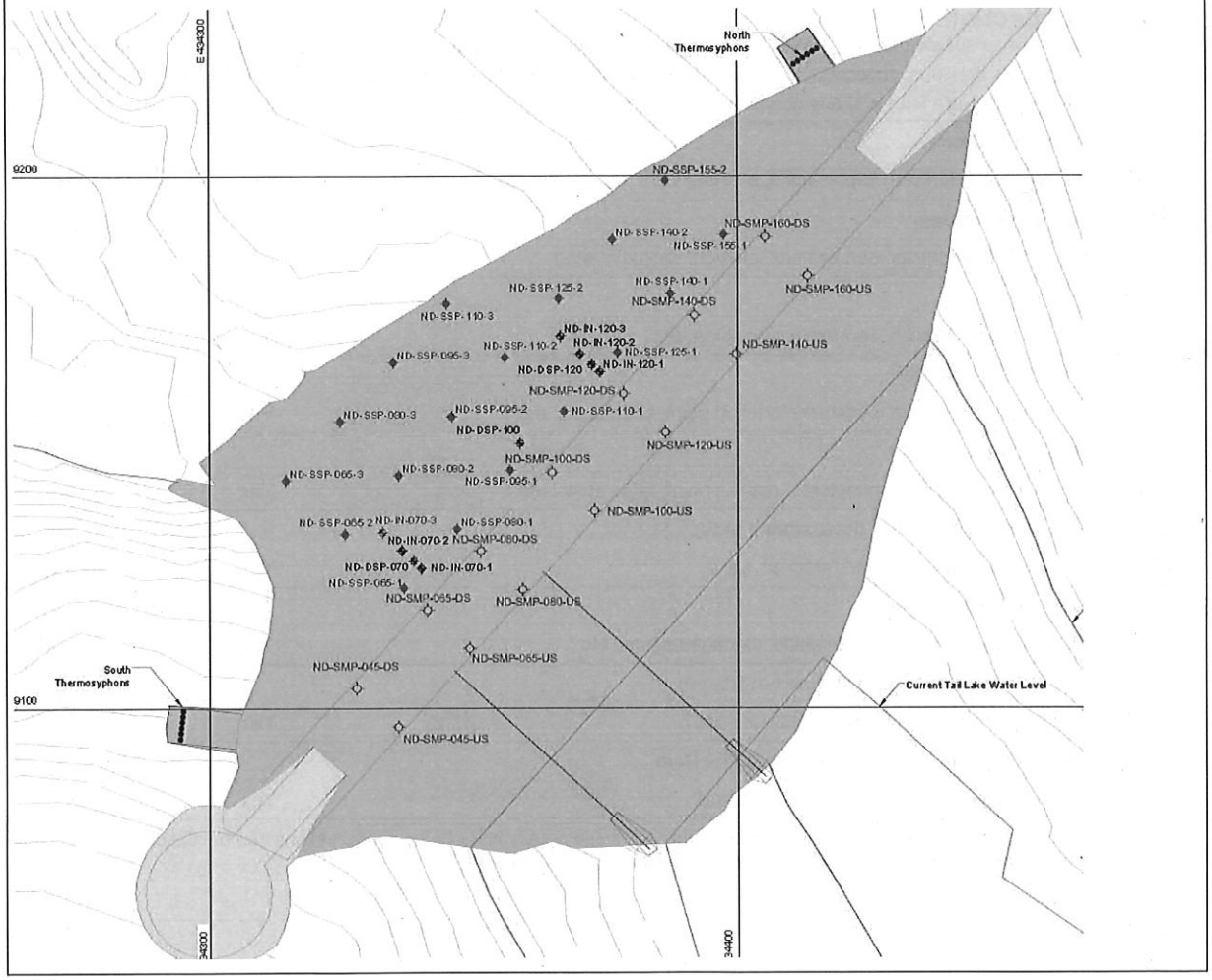
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam Any visible concerns? (cracks, depressions, erosion, etc.) Snow covered	Yes	(No)
Downstream Side of Dam Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	(No)
Crest of Dam Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	(No)
Thermosyphons North Side Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.) rust noted previously	Yes	(No)
Thermosyphons South Side Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.) rust noted previously	Yes	(No)
Instrumentation (on crest and downstream side) Any visible concerns? (bent, rusted, cracked, etc.)	Yes	(No)
Thermistors and Dataloggers Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	(No)
Suspended Sediment in the TIA (When not frozen) Any suspended sediment visible in the reclaim pond? NA - Frozen	Yes	No
Water at the Toe of the Downstream Side of the Dam Is water visible on the downstream side of the dam? NA - Frozen.	Yes	No

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made



Photos:

Please collect the following photos: Photo from north end looking south along the dam Photo from south end looking north along the dam	☑ ☑
Other photos, please describe.	

North Dam Weekly Walkover Survey Report

Date:	Nov 21 / 2020
Inspected By:	Sarah Warnock
Conditions:	(ie. snow on ground, clear) Snow on ground

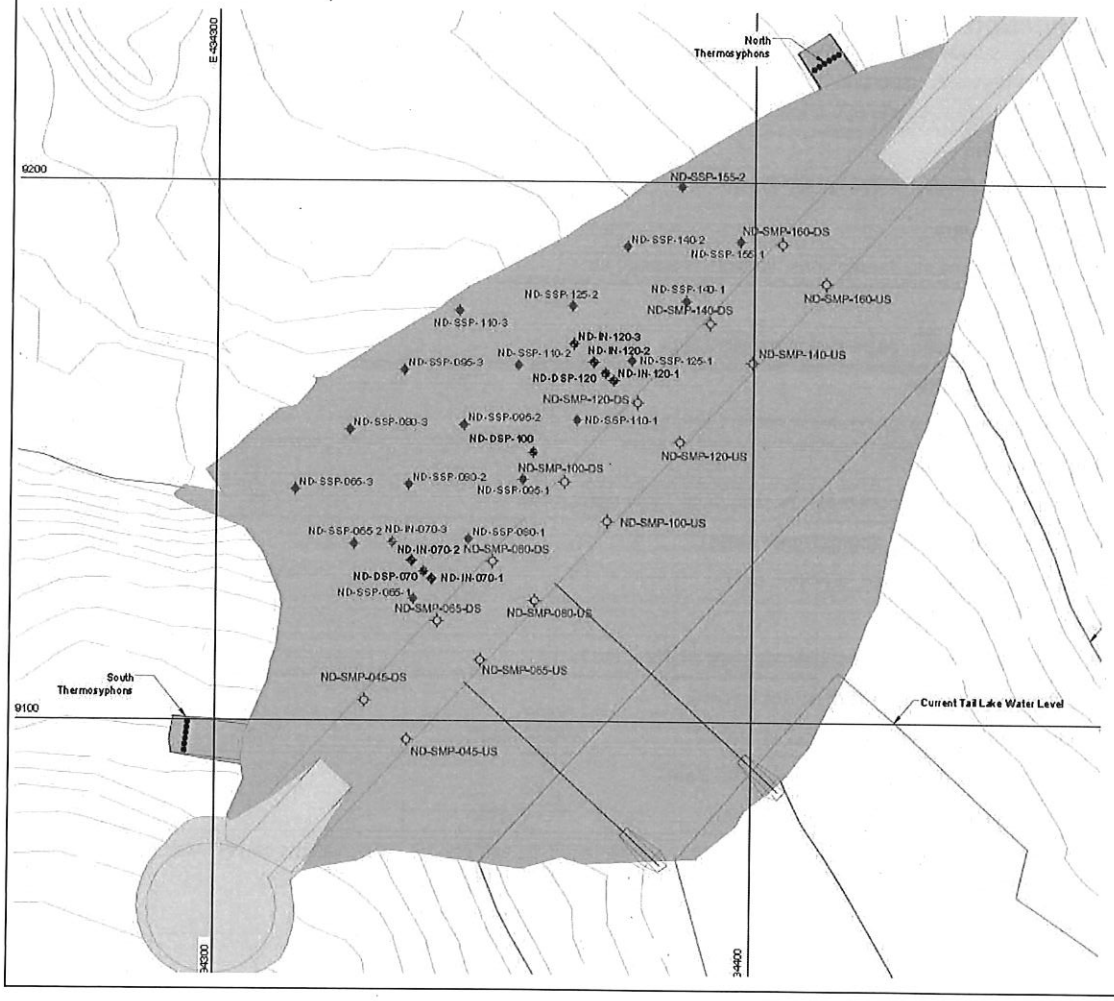
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam			
Any visible concerns? (cracks, depressions, erosion, etc.)	Snow covered	Yes	(No)
Downstream Side of Dam			
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)		Yes	(No)
Crest of Dam			
Any visible concerns? (cracks, depressions, erosion, etc.)		Yes	(No)
Thermosyphons North Side			
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)		Yes	(No)
Thermosyphons South Side			
Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.)		Yes	(No)
Instrumentation (on crest and downstream side)			
Any visible concerns? (bent, rusted, cracked, etc.)		Yes	(No)
Thermistors and Dataloggers			
Any visible concerns? (frayed or cut cables, damaged boxes, etc.)		Yes	No
Suspended Sediment in the TIA (When not frozen)			
Any suspended sediment visible in the reclaim pond?	Frozen	Yes	(No)
Water at the Toe of the Downstream Side of the Dam			
Is water visible on the downstream side of the dam?	Frozen	Yes	(No)

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made



Photos:

Please collect the following photos:	
Photo from north end looking south along the dam	☑ 1
Photo from south end looking north along the dam	☑ 2
Other photos, please describe.	

North Dam Weekly Walkover Survey Report

Date:	(SW) ~~Aug~~ Dec 19/2020
Inspected By:	Sarah Warnock
Conditions:	(ie. snow on ground, clear) Snow on ground

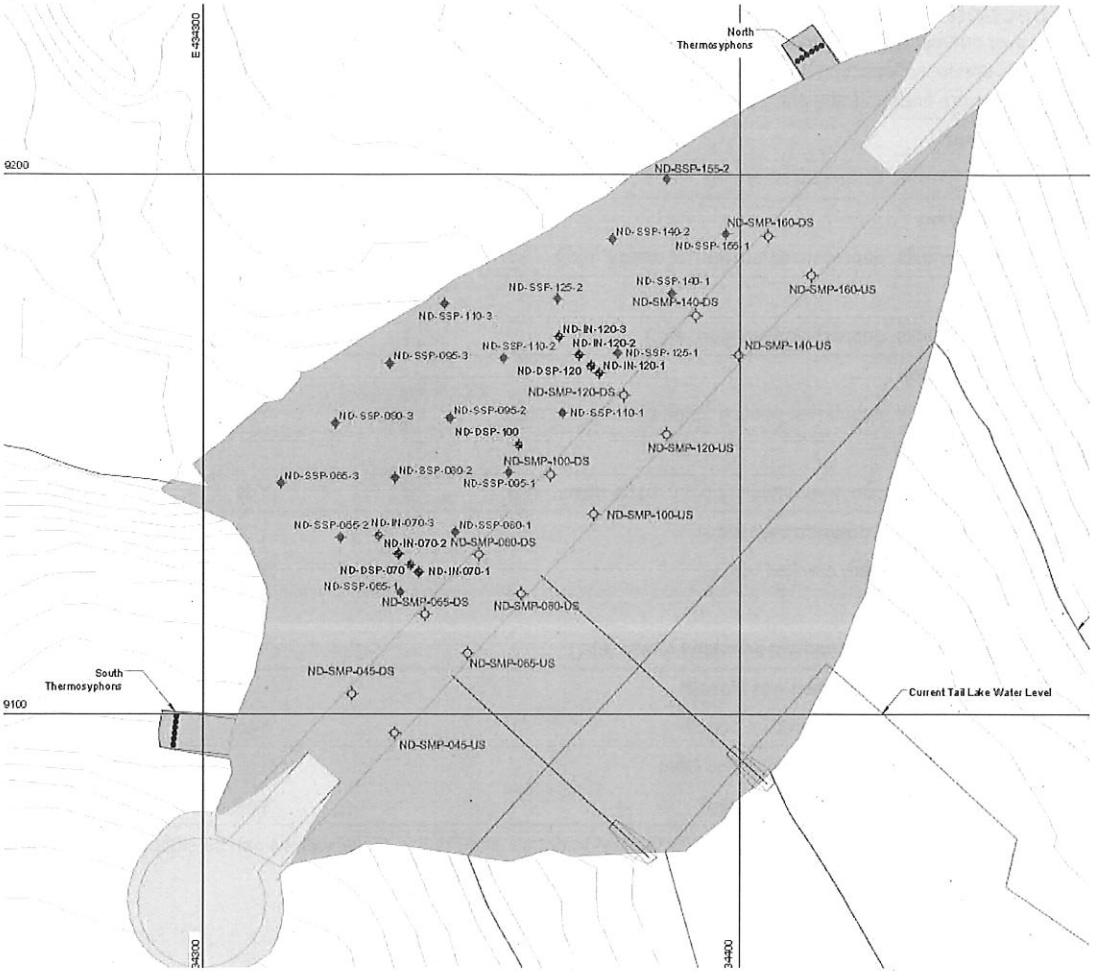
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam Any visible concerns? (cracks, depressions, erosion, etc.) Snow covered	Yes	(No)
Downstream Side of Dam Any visible concerns? (cracks, depressions, erosion, seepage, etc.) mostly snow covered	Yes	(No)
Crest of Dam Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	(No)
Thermosyphons North Side Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.) rust previously noted	Yes	(No)
Thermosyphons South Side Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.) rust previously noted	Yes	(No)
Instrumentation (on crest and downstream side) Any visible concerns? (bent, rusted, cracked, etc.)	Yes	(No)
Thermistors and Dataloggers Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	(No)
Suspended Sediment in the TIA (When not frozen) Any suspended sediment visible in the reclaim pond? Frozen	Yes	(No)
Water at the Toe of the Downstream Side of the Dam Is water visible on the downstream side of the dam? Frozen	Yes	(No)

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made



Photos:

Please collect the following photos: Photo from north end looking south along the dam Photo from south end looking north along the dam	✓ ✓
Other photos, please describe. Snow cover on u/s and d/s slopes.	

North Dam Weekly Walkover Survey Report

Date:	Dec 26/2020
Inspected By:	Sarah Warnock
Conditions:	(ie. snow on ground, clear) Snow on ground

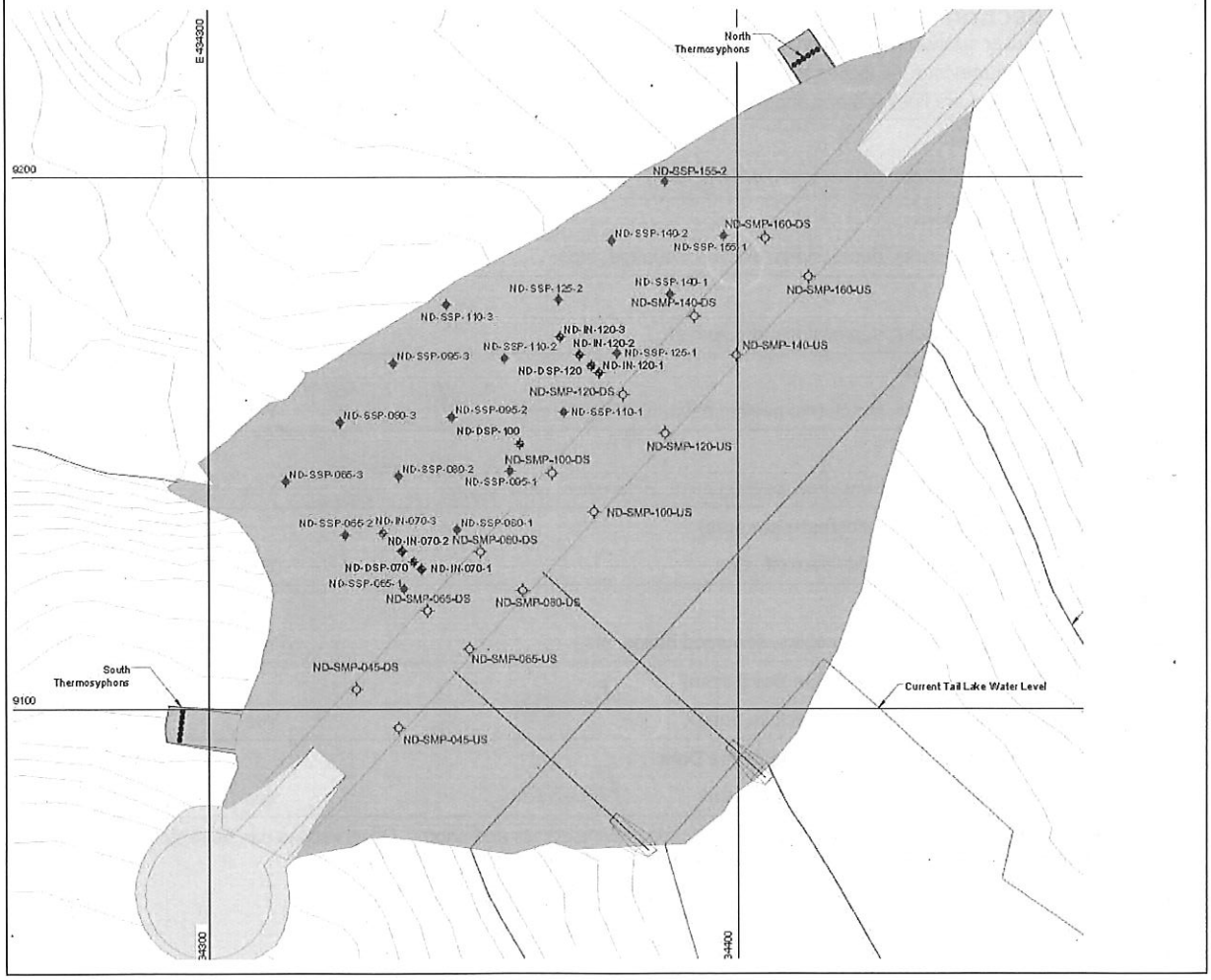
Visual Inspection:

This weekly walkover survey report is a means to track the condition on the North Dam, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	(No)
Downstream Side of Dam Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	(No)
Crest of Dam Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	(No)
Thermosyphons North Side Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.) no new issues rust noted	Yes	(No)
Thermosyphons South Side Any visible concerns? (cracks, punctures, peeling paint, birds nests, etc.) no new issues rust on risers.	Yes	(No)
Instrumentation (on crest and downstream side) Any visible concerns? (bent, rusted, cracked, etc.)	Yes	(No)
Thermistors and Dataloggers Any visible concerns? (frayed or cut cables, damaged boxes, etc.)	Yes	(No)
Suspended Sediment in the TIA (When not frozen) Any suspended sediment visible in the reclaim pond? frozen	Yes	(No)
Water at the Toe of the Downstream Side of the Dam Is water visible on the downstream side of the dam? frozen	Yes	(No)

If you answered yes to any of the questions above please provide details and photos. Observations can be sketched on the figure provided on the next page. If seepage has been noted please estimate the flow.

Please provide any other observations you have made



Photos:

Please collect the following photos: Photo from north end looking south along the dam Photo from south end looking north along the dam ☑
Other photos, please describe.

South Dam
Walkover Report

Frequency: Weekly or as specified by EOR

Date:	July 2 2020
Inspected By:	Brett Kelly & Josh Baldock
Conditions:	(ie. snow on ground, clear) Clear, 15 Deg.C

Visual Inspection:

This weekly walkover survey report is a means to track the condition on the **South Dam**, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	[No]
Downstream Side of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	[No]
Crest of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	[No]
Tailings Beach on the Upstream Side		
Is the beach within the operating limits? (Beach length of 100 meters, no water ponding or pooling near the dam etc.) * Use shoreline markers indicating 100 meters from the crest for visual reference*	[Yes]	No
Active Tailings Discharge Spigot		
Indicate the active discharge spigot location (Spigot number or (S) on the figure provided)		
Settlement Instrumentation (on crest and downstream side)		
Any visible concerns? (significantly rusted or otherwise damaged, etc.)	Yes	[No]
Thermistors and Dataloggers		
Any visible concerns? (cables frayed, disconnected or damaged, boxes cracked, etc.)	Yes	[No]
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	[No]
Is the water visibly flowing?	Yes	[No]
Walk over inspection of the downstream toe complete? (May to November)		
Inspector should walk the length of the downstream toe inspecting for seepage or slumping once most of the snow has melted (May to November)	[Yes]	No

If you answered yes to any of the questions above, or made other observations, please provide details and photos. Observations can be sketched on the figure provided below.

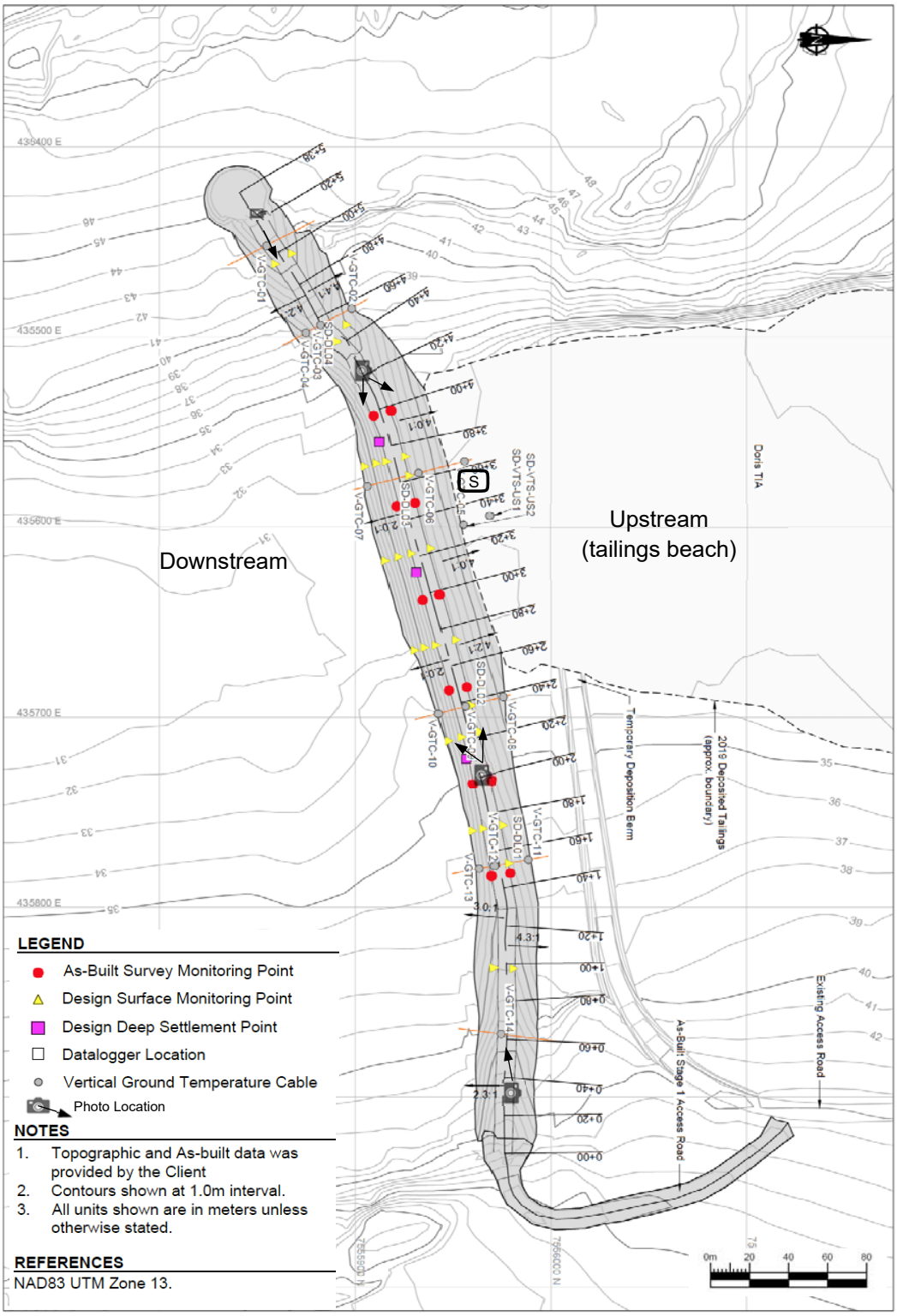
NOTES:

If seepage has been noted estimate the flow (high/medium/low) and report to TMAC Environmental Superintendent:

Photos:

Please collect the following photos:

- Photo from the crest looking W along the dam crest (Station 0+30) ☐
- Photo from the crest looking SW over the downstream toe along the dam (Station 2+00) ☐
- Photo from the crest looking W over the tailings beach (Station 2+00) ☐
- Photo from the crest looking NE over the tailings beach (Station 4+20) ☐
- Photo from the crest looking E over the downstream toe along the dam (Station 4+20) ☐
- Photo from west end looking E along the dam crest (Station 5+20) ☐



South Dam
Walkover Report

Frequency: Weekly or as specified by EOR

Date:	July 14 2020
Inspected By:	Brett Kelly & Kyle Conway
Conditions:	(ie. snow on ground, clear) Clear, 6 Deg.C

Visual Inspection:

This weekly walkover survey report is a means to track the condition on the **South Dam**, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	[No]
Downstream Side of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	[No]
Crest of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	[No]
Tailings Beach on the Upstream Side		
Is the beach within the operating limits? (Beach length of 100 meters, no water ponding or pooling near the dam etc.) * Use shoreline markers indicating 100 meters from the crest for visual reference*	[Yes]	No
Active Tailings Discharge Spigot		
Indicate the active discharge spigot location (Spigot number or (S) on the figure provided)		
Settlement Instrumentation (on crest and downstream side)		
Any visible concerns? (significantly rusted or otherwise damaged, etc.)	Yes	[No]
Thermistors and Dataloggers		
Any visible concerns? (cables frayed, disconnected or damaged, boxes cracked, etc.)	[Yes]	No
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	[No]
Is the water visibly flowing?	Yes	[No]
Walk over inspection of the downstream toe complete? (May to November)		
Inspector should walk the length of the downstream toe inspecting for seepage or slumping once most of the snow has melted (May to November)	[Yes]	No

If you answered yes to any of the questions above, or made other observations, please provide details and photos. Observations can be sketched on the figure provided below.

NOTES:

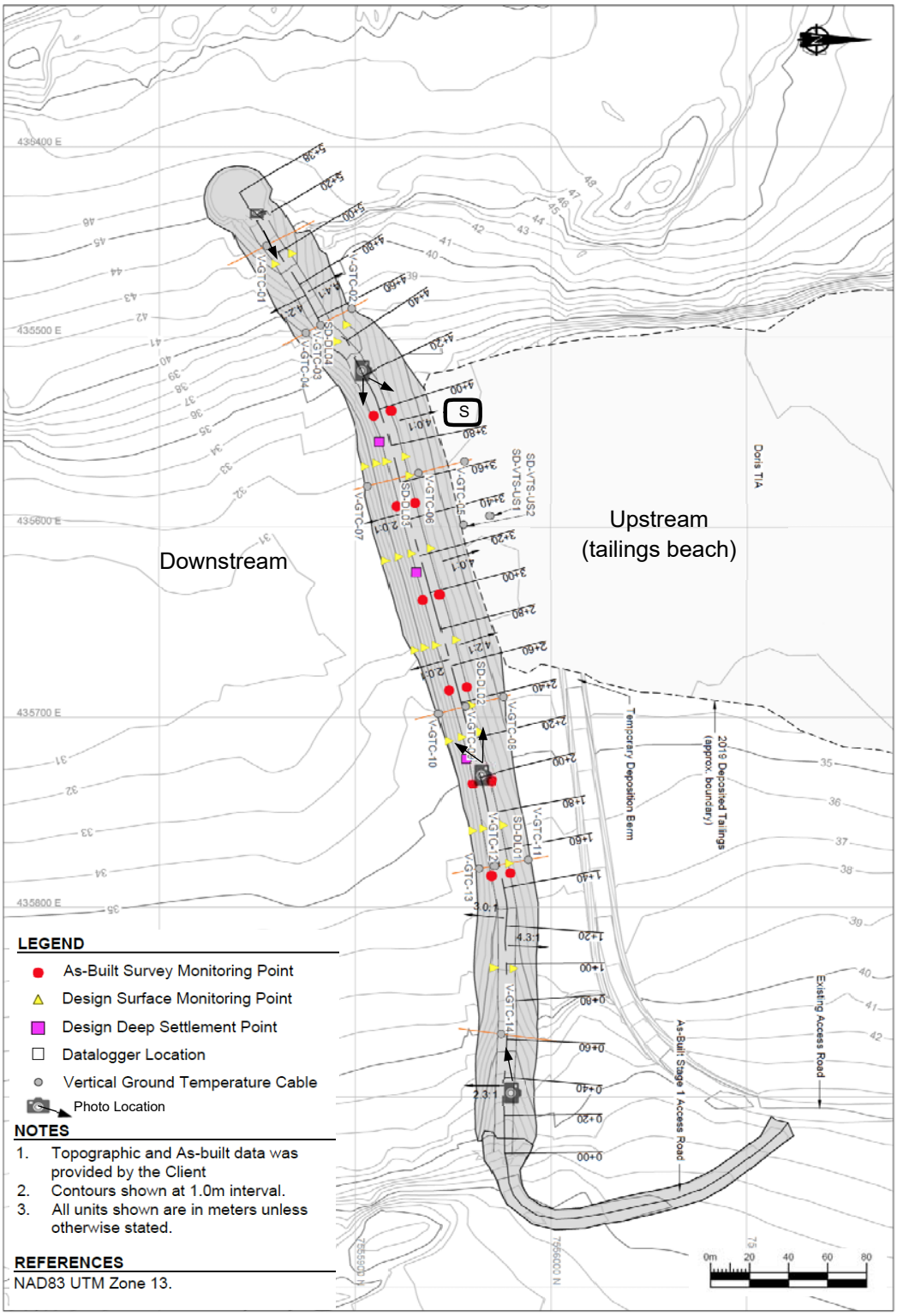
Datalogger and box damaged. It appears that the datalogger detached from its mount where it was epoxied in place. TMAC Environmental Superintendent present at time to inspect damage.

If seepage has been noted estimate the flow (high/medium/low) and report to TMAC Environmental Superintendent:

Photos:

Please collect the following photos:

- Photo from the crest looking W along the dam crest (Station 0+30) ☐
- Photo from the crest looking SW over the downstream toe along the dam (Station 2+00) ☐
- Photo from the crest looking W over the tailings beach (Station 2+00) ☐
- Photo from the crest looking NE over the tailings beach (Station 4+20) ☐
- Photo from the crest looking E over the downstream toe along the dam (Station 4+20) ☐
- Photo from west end looking E along the dam crest (Station 5+20) ☐



South Dam
Walkover Report

Frequency: Weekly or as specified by EOR

Date:	July 19, 2020
Inspected By:	Brett Kelly
Conditions:	(ie. snow on ground, clear) Clear, 8 Deg.C

Visual Inspection:

This weekly walkover survey report is a means to track the condition on the **South Dam**, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	[No]
Downstream Side of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	[No]
Crest of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	[No]
Tailings Beach on the Upstream Side		
Is the beach within the operating limits? (Beach length of 100 meters, no water ponding or pooling near the dam etc.) * Use shoreline markers indicating 100 meters from the crest for visual reference*	[Yes]	No
Active Tailings Discharge Spigot		
Indicate the active discharge spigot location (Spigot number or (S) on the figure provided)		
Settlement Instrumentation (on crest and downstream side)		
Any visible concerns? (significantly rusted or otherwise damaged, etc.)	Yes	[No]
Thermistors and Dataloggers		
Any visible concerns? (cables frayed, disconnected or damaged, boxes cracked, etc.)	[Yes]	No
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	[No]
Is the water visibly flowing?	Yes	[No]
Walk over inspection of the downstream toe complete? (May to November)		
Inspector should walk the length of the downstream toe inspecting for seepage or slumping once most of the snow has melted (May to November)	[Yes]	No

If you answered yes to any of the questions above, or made other observations, please provide details and photos. Observations can be sketched on the figure provided below.

NOTES:

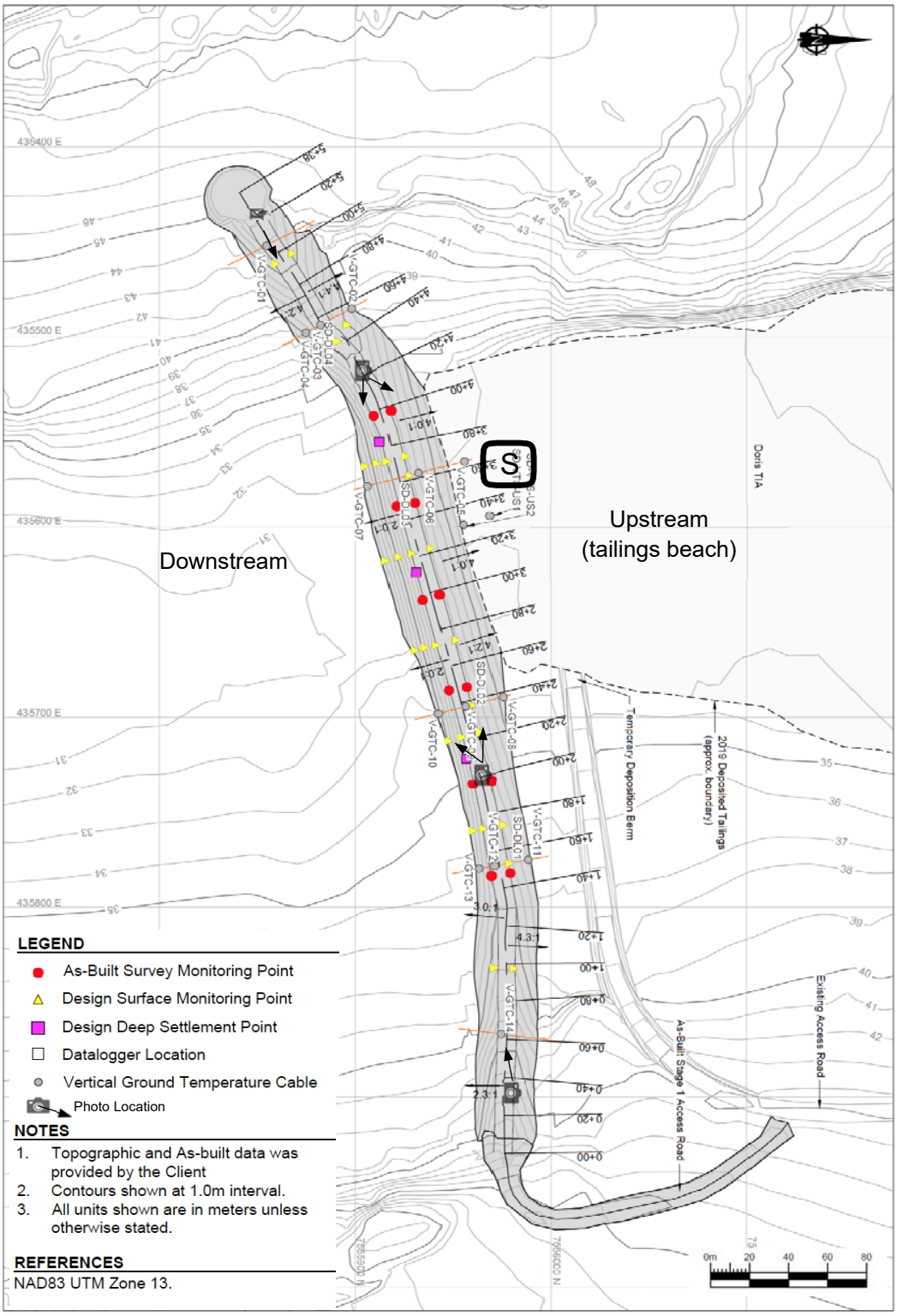
Datalogger that was found damaged during the inspection on July 14, 2020 is still detached from its mount. Environmental Superintendent aware.

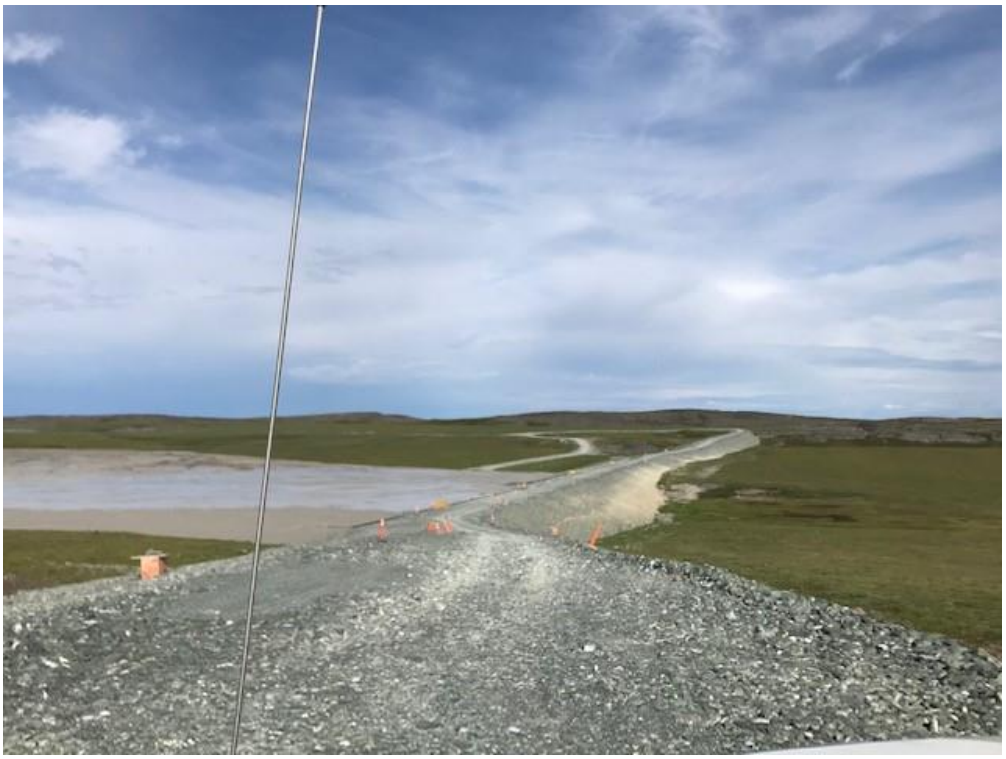
If seepage has been noted estimate the flow (high/medium/low) and report to TMAC Environmental Superintendent:

Photos:

Please collect the following photos:

- Photo from the crest looking W along the dam crest (Station 0+30) ☐
- Photo from the crest looking SW over the downstream toe along the dam (Station 2+00) ☐
- Photo from the crest looking W over the tailings beach (Station 2+00) ☐
- Photo from the crest looking NE over the tailings beach (Station 4+20) ☐
- Photo from the crest looking E over the downstream toe along the dam (Station 4+20) ☐
- Photo from west end looking E along the dam crest (Station 5+20) ☐





South Dam
Walkover Report

Frequency: Weekly or as specified by EOR

Date:	26 - JULY - 2020
Inspected By:	BM
Conditions:	(ie. snow on ground, clear) CLEAR . 15°C . WIND SSE 20 Km/h

Visual Inspection:

This weekly walkover survey report is a means to track the condition on the **South Dam**, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

(1)	**Upstream Side of Dam (Overall)** Any visible concerns? (cracks, depressions, erosion, etc.)	(Yes)	No
	Downstream Side of Dam (Overall) Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	(No)
	Crest of Dam (Overall) Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	(No)
(2)	**Tailings Beach on the Upstream Side** Is the beach within the operating limits? (Beach length of 100 meters, no water ponding or pooling near the dam etc.) * Use shoreline markers indicating 100 meters from the crest for visual reference*	(Yes)	No
(3)	**Active Tailings Discharge Spigot** Indicate the active discharge spigot location (Spigot number or (S) on the figure provided)	SPIGOT # 5	
	Settlement Instrumentation (on crest and downstream side) Any visible concerns? (significantly rusted or otherwise damaged, etc.)	Yes	(No)
(4)	**Thermistors and Dataloggers** Any visible concerns? (cables frayed, disconnected or damaged, boxes cracked, etc.)	Yes	(No)
(5)	**Water at the Toe of the Downstream Side of the Dam** Is water visible on the downstream side of the dam?	(Yes)	No
	Is the water visibly flowing?	Yes	(No)
	Walk over inspection of the downstream toe complete? (May to November) Inspector should walk the length of the downstream toe inspecting for seepage or slumping once most of the snow has melted (May to November)	Yes	(No)

If you answered yes to any of the questions above, or made other observations, please provide details and photos. Observations can be sketched on the figure provided below.

NOTES:

(1) DISTURBED GROUND EAST OF SPIGOT # 1 ... May be from when thermistor cables were previously repaired.

(2) WATER ENCROACHING WITHIN 100m ALONG EASTERN EDGE OF TIA

(3) RESIDUAL DISCHARGE FROM SPIGOT # 2. SMALL POOL OF WATER IMMEDIATELY ~~UNDERNEATH~~ UNDERNEATH DISCHARGE POINT

If seepage has been noted estimate the flow (high/medium/low) and report to TMAC Environmental Superintendent:

(4) SOLAR PANEL REPAIRED EARLIER IN WEEK BY BM

(5) ~~X~~ SMALL POOL OF WATER (SAMPLED ON JULY 23rd, 2020

T2

South Dam
Walkover Report

Frequency: Weekly or as specified by EOR

Date:	Aug 23, 2020
Inspected By:	Brett Kelly
Conditions:	(ie. snow on ground, clear) Clear, 1 Deg.C

Visual Inspection:

This weekly walkover survey report is a means to track the condition on the **South Dam**, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	[No]
Downstream Side of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	[No]
Crest of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	[No]
Tailings Beach on the Upstream Side		
Is the beach within the operating limits? (Beach length of 100 meters, no water ponding or pooling near the dam etc.) * Use shoreline markers indicating 100 meters from the crest for visual reference*	[Yes]	No
Active Tailings Discharge Spigot		
Indicate the active discharge spigot location (Spigot number or (S) on the figure provided)		
Settlement Instrumentation (on crest and downstream side)		
Any visible concerns? (significantly rusted or otherwise damaged, etc.)	Yes	[No]
Thermistors and Dataloggers		
Any visible concerns? (cables frayed, disconnected or damaged, boxes cracked, etc.)	Yes	[No]
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	[No]
Is the water visibly flowing?	Yes	[No]
Walk over inspection of the downstream toe complete? (May to November)		
Inspector should walk the length of the downstream toe inspecting for seepage or slumping once most of the snow has melted (May to November)	[Yes]	No

If you answered yes to any of the questions above, or made other observations, please provide details and photos. Observations can be sketched on the figure provided below.

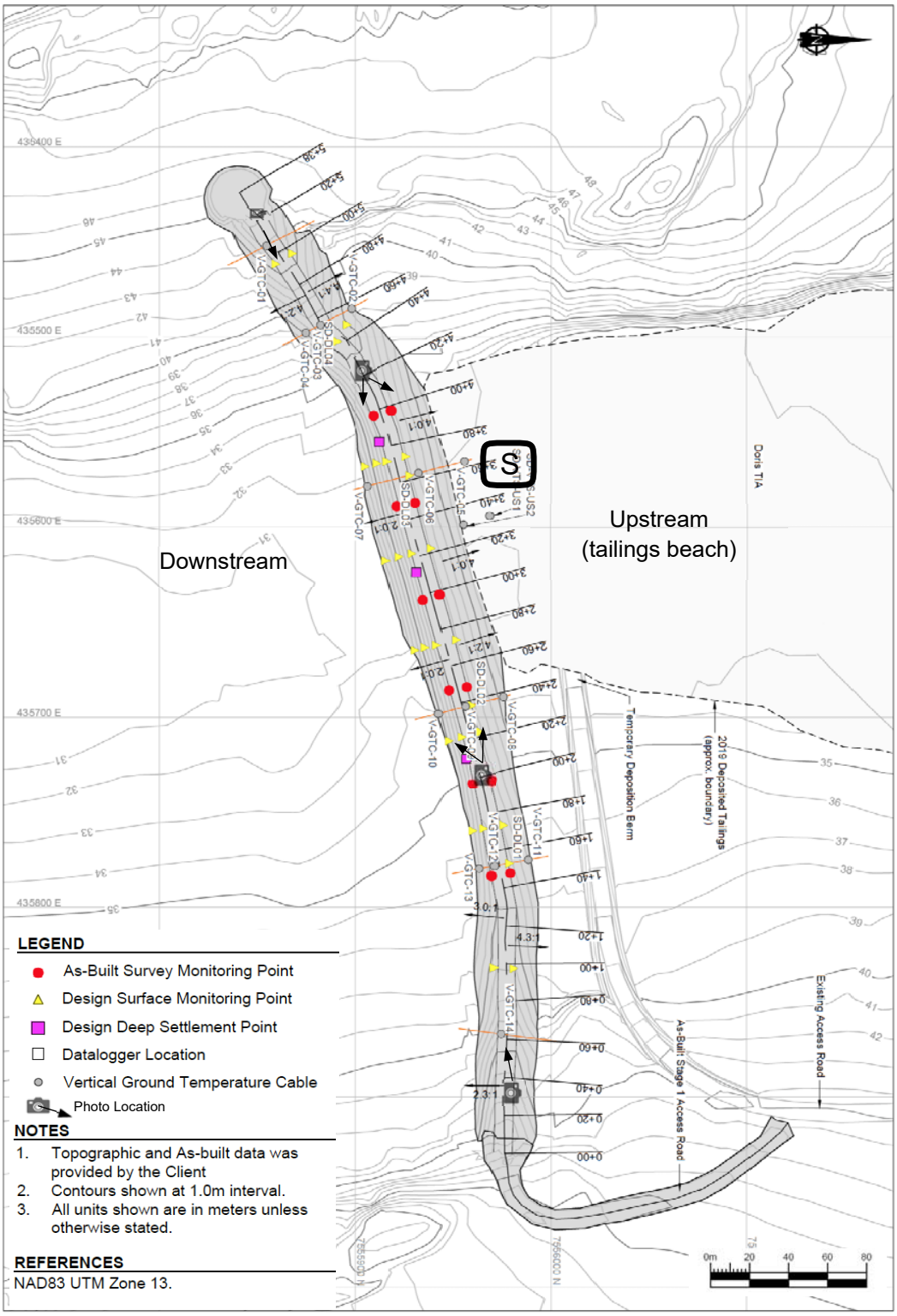
NOTES:

If seepage has been noted estimate the flow (high/medium/low) and report to TMAC Environmental Superintendent:

Photos:

Please collect the following photos:

- Photo from the crest looking W along the dam crest (Station 0+30) ☐
- Photo from the crest looking SW over the downstream toe along the dam (Station 2+00) ☐
- Photo from the crest looking W over the tailings beach (Station 2+00) ☐
- Photo from the crest looking NE over the tailings beach (Station 4+20) ☐
- Photo from the crest looking E over the downstream toe along the dam (Station 4+20) ☐
- Photo from west end looking E along the dam crest (Station 5+20) ☐



South Dam
Walkover Report

Frequency: Weekly or as specified by EOR

Date:	Aug 30, 2020
Inspected By:	Brett Kelly
Conditions:	(ie. snow on ground, clear) Clear, -2 Deg.C

Visual Inspection:

This weekly walkover survey report is a means to track the condition on the **South Dam**, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	[No]
Downstream Side of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	[No]
Crest of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	[No]
Tailings Beach on the Upstream Side		
Is the beach within the operating limits? (Beach length of 100 meters, no water ponding or pooling near the dam etc.) * Use shoreline markers indicating 100 meters from the crest for visual reference*	Yes	[No]
Active Tailings Discharge Spigot		
Indicate the active discharge spigot location (Spigot number or (S) on the figure provided)		
Settlement Instrumentation (on crest and downstream side)		
Any visible concerns? (significantly rusted or otherwise damaged, etc.)	Yes	[No]
Thermistors and Dataloggers		
Any visible concerns? (cables frayed, disconnected or damaged, boxes cracked, etc.)	Yes	[No]
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	[No]
Is the water visibly flowing?	Yes	[No]
Walk over inspection of the downstream toe complete? (May to November)		
Inspector should walk the length of the downstream toe inspecting for seepage or slumping once most of the snow has melted (May to November)	[Yes]	No

If you answered yes to any of the questions above, or made other observations, please provide details and photos. Observations can be sketched on the figure provided below.

NOTES:

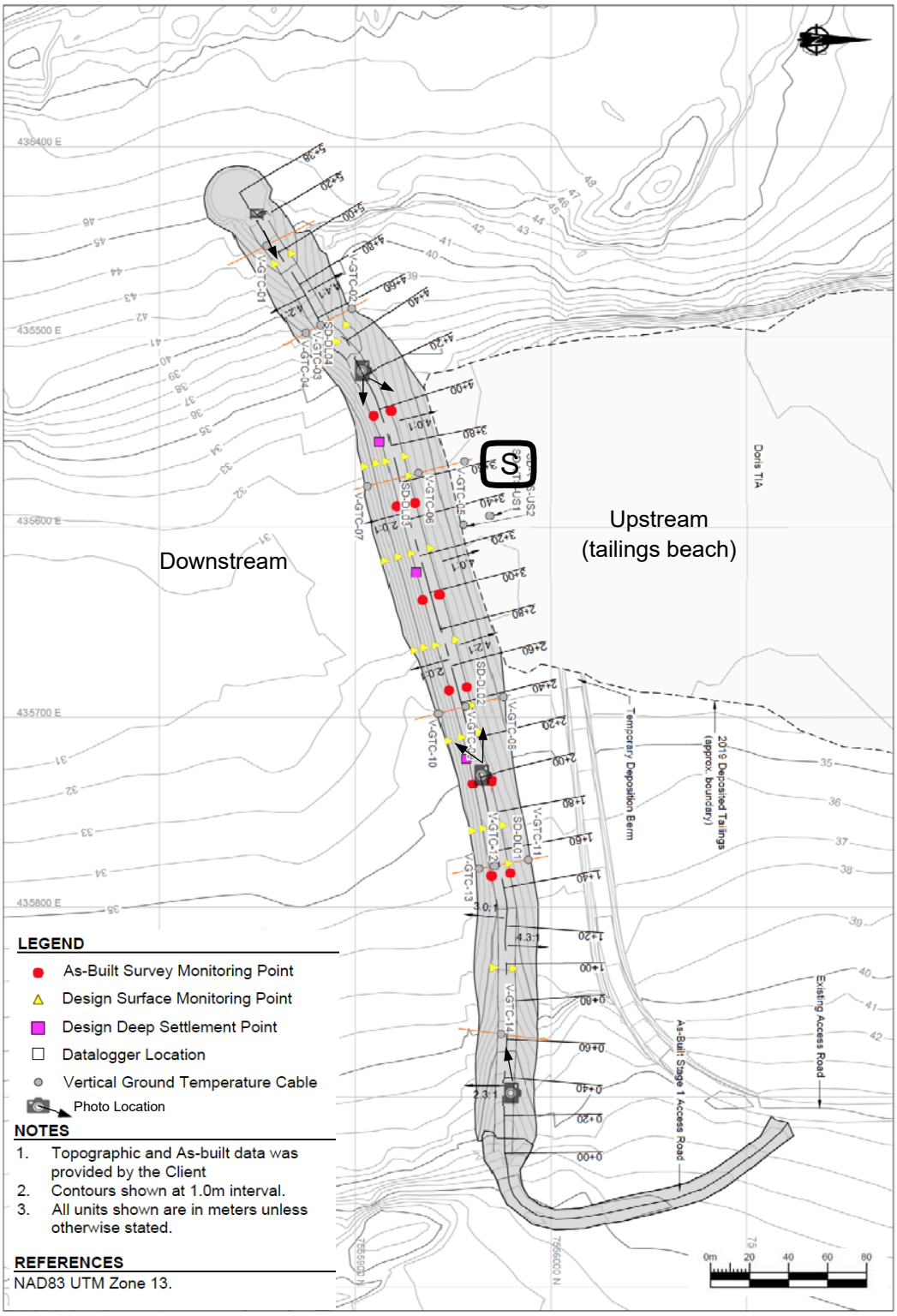
Spigot discarge location to be changed after inspection due to pooling at the face of the dam.

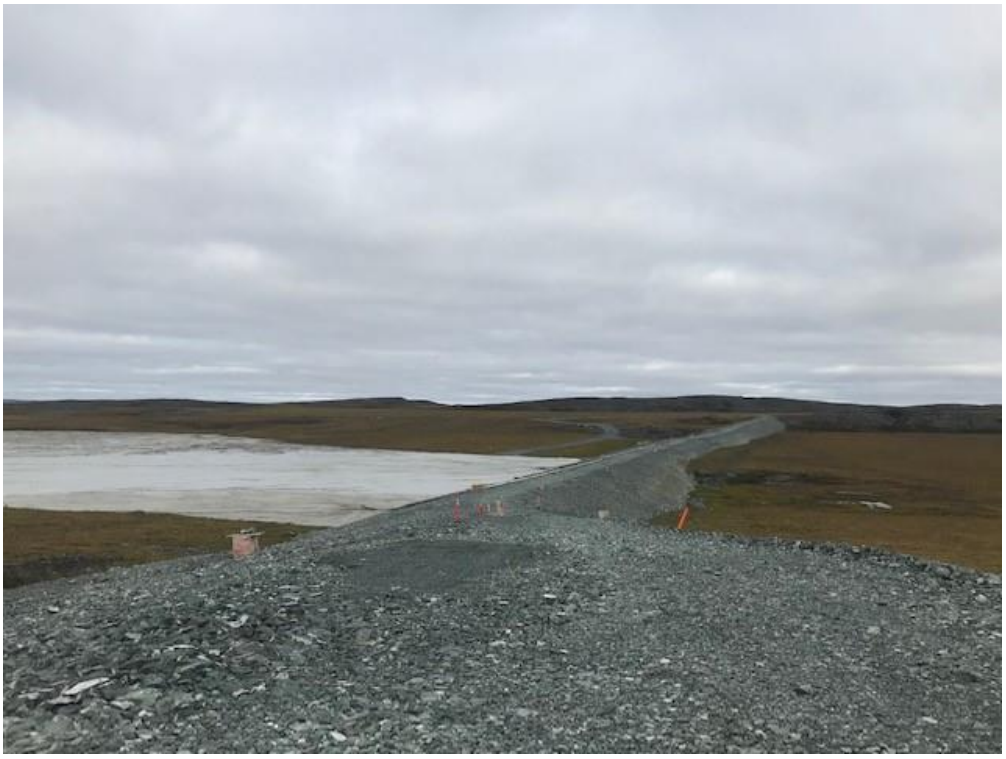
If seepage has been noted estimate the flow (high/medium/low) and report to TMAC Environmental Superintendent:

Photos:

Please collect the following photos:

- Photo from the crest looking W along the dam crest (Station 0+30) ☐
- Photo from the crest looking SW over the downstream toe along the dam (Station 2+00) ☐
- Photo from the crest looking W over the tailings beach (Station 2+00) ☐
- Photo from the crest looking NE over the tailings beach (Station 4+20) ☐
- Photo from the crest looking E over the downstream toe along the dam (Station 4+20) ☐
- Photo from west end looking E along the dam crest (Station 5+20) ☐





South Dam
Walkover Report

Frequency: Weekly or as specified by EOR

Date:	Sep 6, 2020
Inspected By:	Brett Kelly
Conditions:	(ie. snow on ground, clear) Overcast, -5 Deg.C

Visual Inspection:

This weekly walkover survey report is a means to track the condition on the **South Dam**, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	[No]
Downstream Side of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	[No]
Crest of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	[No]
Tailings Beach on the Upstream Side		
Is the beach within the operating limits? (Beach length of 100 meters, no water ponding or pooling near the dam etc.) * Use shoreline markers indicating 100 meters from the crest for visual reference*	Yes	[No]
Active Tailings Discharge Spigot		
Indicate the active discharge spigot location (Spigot number or (S) on the figure provided)		
Settlement Instrumentation (on crest and downstream side)		
Any visible concerns? (significantly rusted or otherwise damaged, etc.)	Yes	[No]
Thermistors and Dataloggers		
Any visible concerns? (cables frayed, disconnected or damaged, boxes cracked, etc.)	Yes	[No]
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	[No]
Is the water visibly flowing?	Yes	[No]
Walk over inspection of the downstream toe complete? (May to November)		
Inspector should walk the length of the downstream toe inspecting for seepage or slumping once most of the snow has melted (May to November)	[Yes]	No

If you answered yes to any of the questions above, or made other observations, please provide details and photos. Observations can be sketched on the figure provided below.

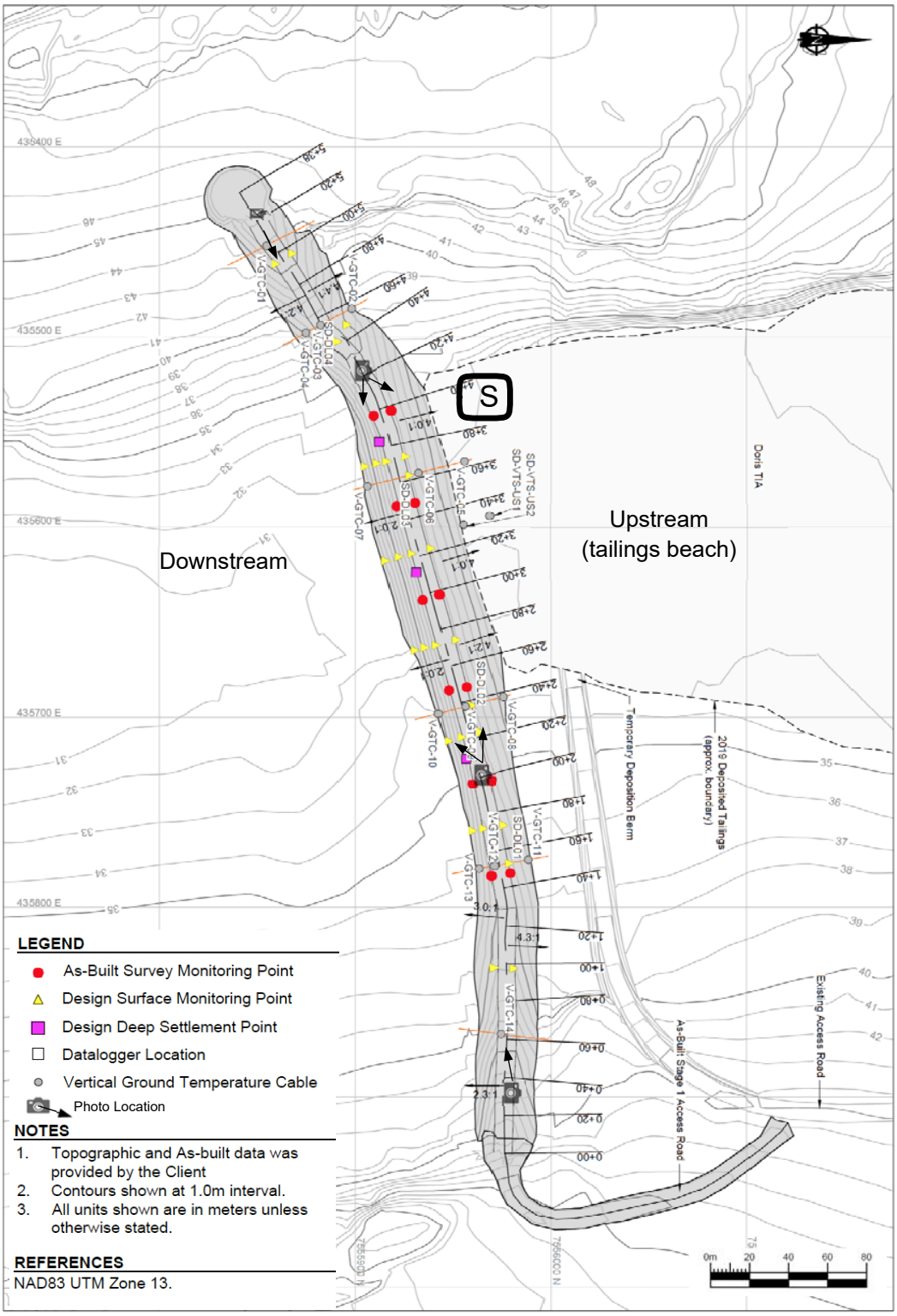
NOTES:

If seepage has been noted estimate the flow (high/medium/low) and report to TMAC Environmental Superintendent:

Photos:

Please collect the following photos:

- Photo from the crest looking W along the dam crest (Station 0+30) ☐
- Photo from the crest looking SW over the downstream toe along the dam (Station 2+00) ☐
- Photo from the crest looking W over the tailings beach (Station 2+00) ☐
- Photo from the crest looking NE over the tailings beach (Station 4+20) ☐
- Photo from the crest looking E over the downstream toe along the dam (Station 4+20) ☐
- Photo from west end looking E along the dam crest (Station 5+20) ☐



South Dam
Walkover Report

Frequency: Weekly or as specified by EOR

Date:	Oct 20, 2020
Inspected By:	Brett Kelly
Conditions:	(ie. snow on ground, clear) Overcast, -20 Deg.C

Visual Inspection:

This weekly walkover survey report is a means to track the condition on the **South Dam**, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	[No]
Downstream Side of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	[No]
Crest of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	[No]
Tailings Beach on the Upstream Side		
Is the beach within the operating limits? (Beach length of 100 meters, no water ponding or pooling near the dam etc.) * Use shoreline markers indicating 100 meters from the crest for visual reference*	[Yes]	No
Active Tailings Discharge Spigot		
Indicate the active discharge spigot location (Spigot number or (S) on the figure provided)	Varleys Corner	
Settlement Instrumentation (on crest and downstream side)		
Any visible concerns? (significantly rusted or otherwise damaged, etc.)	Yes	[No]
Thermistors and Dataloggers		
Any visible concerns? (cables frayed, disconnected or damaged, boxes cracked, etc.)	Yes	[No]
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	[No]
Is the water visibly flowing?	Yes	[No]
Walk over inspection of the downstream toe complete? (May to November)		
Inspector should walk the length of the downstream toe inspecting for seepage or slumping once most of the snow has melted (May to November)	Yes	[No]

If you answered yes to any of the questions above, or made other observations, please provide details and photos. Observations can be sketched on the figure provided below.

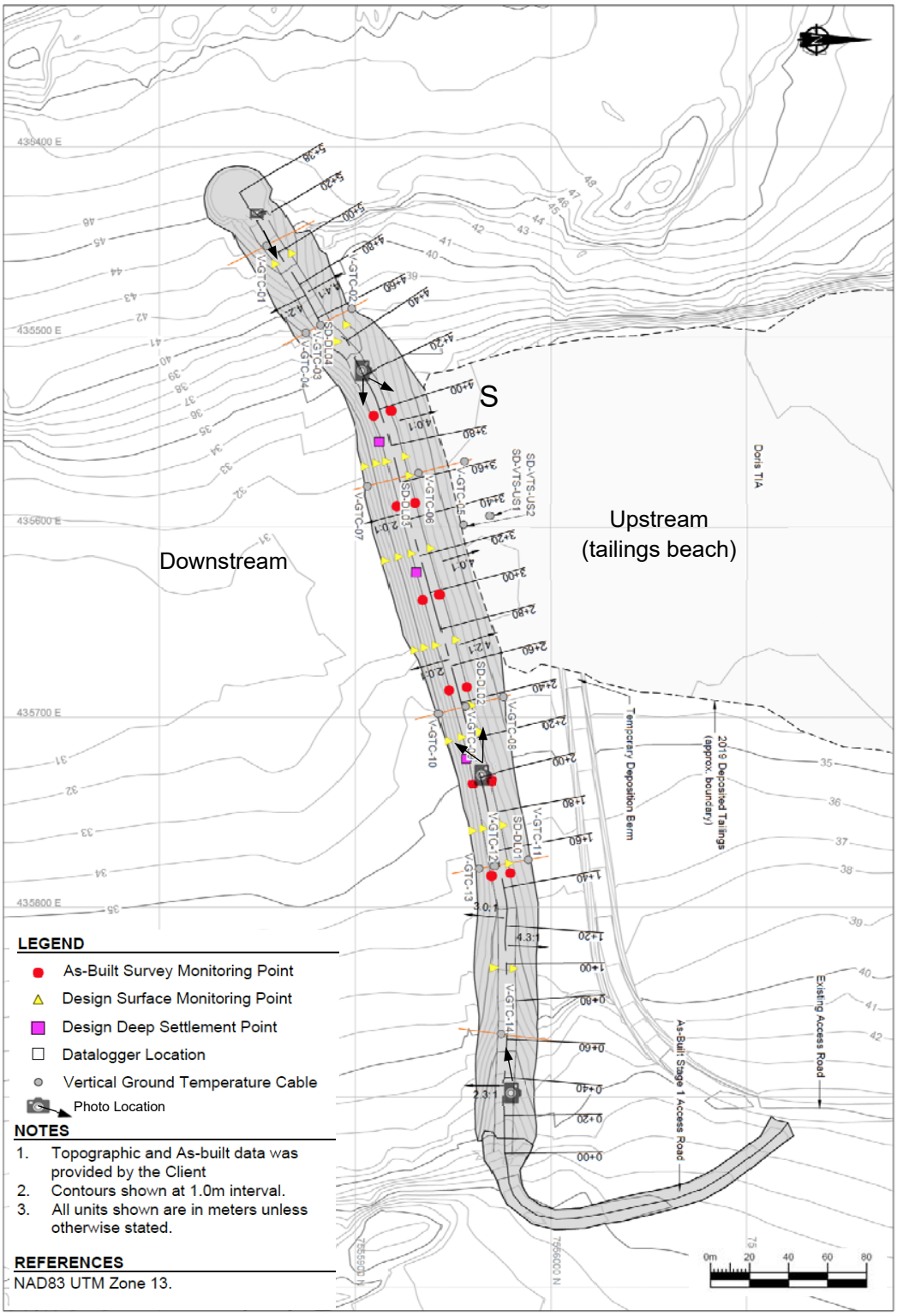
NOTES:

If seepage has been noted estimate the flow (high/medium/low) and report to TMAC Environmental Superintendent:

Photos:

Please collect the following photos:

- Photo from the crest looking W along the dam crest (Station 0+30) ☐
- Photo from the crest looking SW over the downstream toe along the dam (Station 2+00) ☐
- Photo from the crest looking W over the tailings beach (Station 2+00) ☐
- Photo from the crest looking NE over the tailings beach (Station 4+20) ☐
- Photo from the crest looking E over the downstream toe along the dam (Station 4+20) ☐
- Photo from west end looking E along the dam crest (Station 5+20) ☐



South Dam
Walkover Report

Frequency: Weekly or as specified by EOR

Date:	Nov 1, 2020
Inspected By:	Brett Kelly
Conditions:	(ie. snow on ground, clear) Foggy, -26 Deg.C

Visual Inspection:

This weekly walkover survey report is a means to track the condition on the **South Dam**, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	[No]
Downstream Side of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	[No]
Crest of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	[No]
Tailings Beach on the Upstream Side		
Is the beach within the operating limits? (Beach length of 100 meters, no water ponding or pooling near the dam etc.) * Use shoreline markers indicating 100 meters from the crest for visual reference*	[Yes]	No
Active Tailings Discharge Spigot		
Indicate the active discharge spigot location (Spigot number or (S) on the figure provided)	Varleys Corner (Spigot 1)	
Settlement Instrumentation (on crest and downstream side)		
Any visible concerns? (significantly rusted or otherwise damaged, etc.)	Yes	[No]
Thermistors and Dataloggers		
Any visible concerns? (cables frayed, disconnected or damaged, boxes cracked, etc.)	Yes	[No]
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam?	Yes	[No]
Is the water visibly flowing?	Yes	[No]
Walk over inspection of the downstream toe complete? (May to November)		
Inspector should walk the length of the downstream toe inspecting for seepage or slumping once most of the snow has melted (May to November)	Yes	[No]

If you answered yes to any of the questions above, or made other observations, please provide details and photos. Observations can be sketched on the figure provided below.

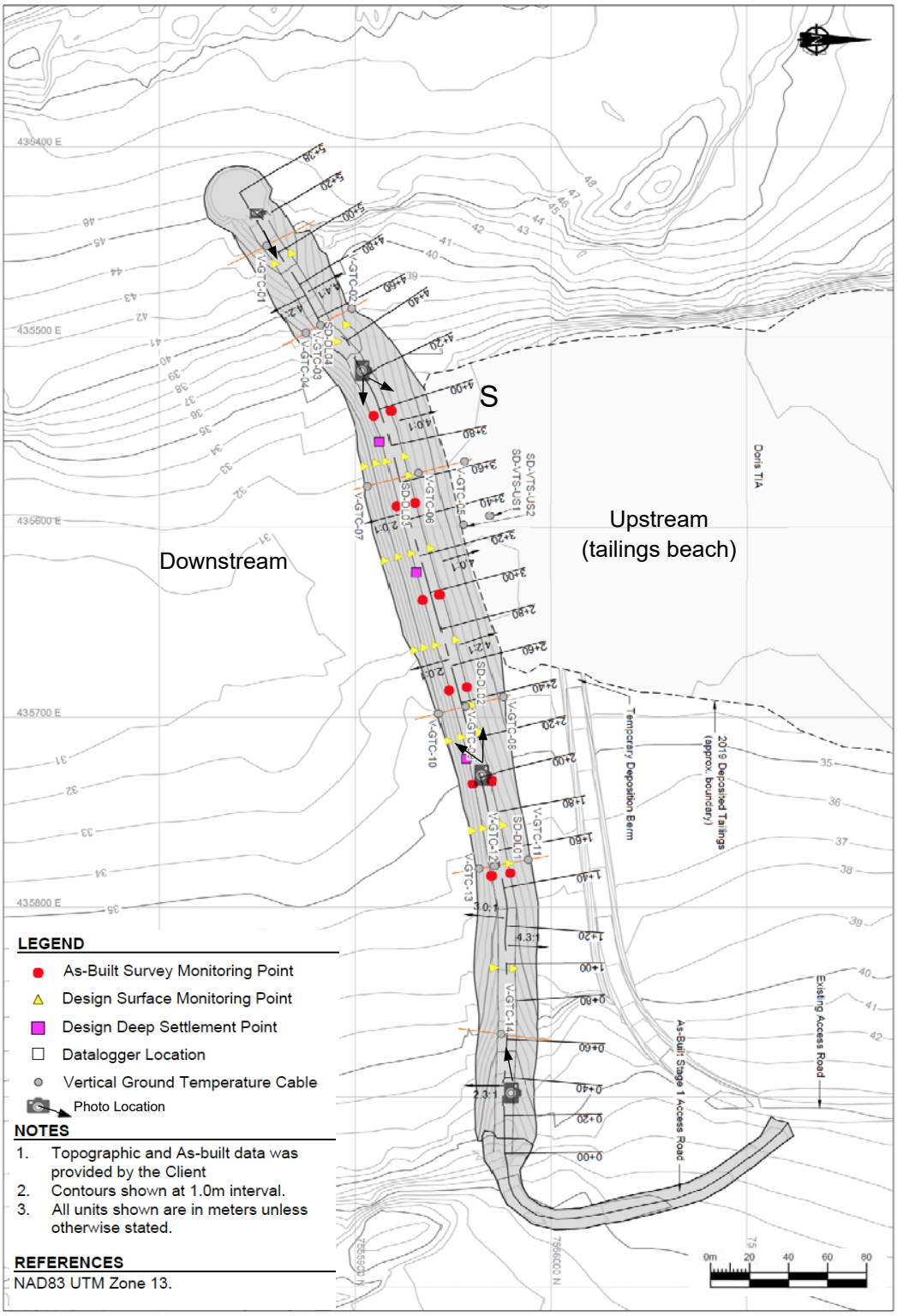
NOTES:

If seepage has been noted estimate the flow (high/medium/low) and report to TMAC Environmental Superintendent:

Photos:

Please collect the following photos:

- Photo from the crest looking W along the dam crest (Station 0+30) ☐
- Photo from the crest looking SW over the downstream toe along the dam (Station 2+00) ☐
- Photo from the crest looking W over the tailings beach (Station 2+00) ☐
- Photo from the crest looking NE over the tailings beach (Station 4+20) ☐
- Photo from the crest looking E over the downstream toe along the dam (Station 4+20) ☐
- Photo from west end looking E along the dam crest (Station 5+20) ☐



South Dam
Walkover Report

Frequency: Weekly or as specified by EOR

Date:	Nov 7/2020
Inspected By:	Sarah Warnock
Conditions: (ie. snow on ground, clear)	Snow covered ground, no wind, clear sky, light flurries in past 24 hrs. ~ -20°C

Visual Inspection:

This weekly walkover survey report is a means to track the condition on the **South Dam**, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam (Overall) Any visible concerns? (cracks, depressions, erosion, etc.) ~~Snow Covered~~ Snow covered	Yes	(No)
Downstream Side of Dam (Overall) Any visible concerns? (cracks, depressions, erosion, seepage, etc.) Snow covered.	Yes	(No)
Crest of Dam (Overall) Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	(No)
Tailings Beach on the Upstream Side this is a confusing way to phrase this Is the beach within the operating limits? (Beach length of 100 meters, no water ponding or pooling near the dam etc.) * Use shoreline markers indicating 100 meters from the crest for visual reference*	(Yes)	No
Active Tailings Discharge Spigot Indicate the active discharge spigot location (Spigot number or (S) on the figure provided) #		changing to 4 scheduled today.
Settlement Instrumentation (on crest and downstream side) Any visible concerns? (significantly rusted or otherwise damaged, etc.)	Yes	(No)
Thermistors and Dataloggers Snow on solar panels cleared Any visible concerns? (cables frayed, disconnected or damaged, boxes cracked, etc.)	Yes	(No)
Water at the Toe of the Downstream Side of the Dam Is water visible on the downstream side of the dam? Frozen, snow covered Is the water visibly flowing?	Yes Yes	(No) (No)
Walk over inspection of the downstream toe complete? (May to November) Inspector should walk the length of the downstream toe inspecting for seepage or slumping once most of the snow has melted (May to November)	Yes	(No) Deep snow cover at toe

If you answered yes to any of the questions above, or made other observations, please provide details and photos. Observations can be sketched on the figure provided below.

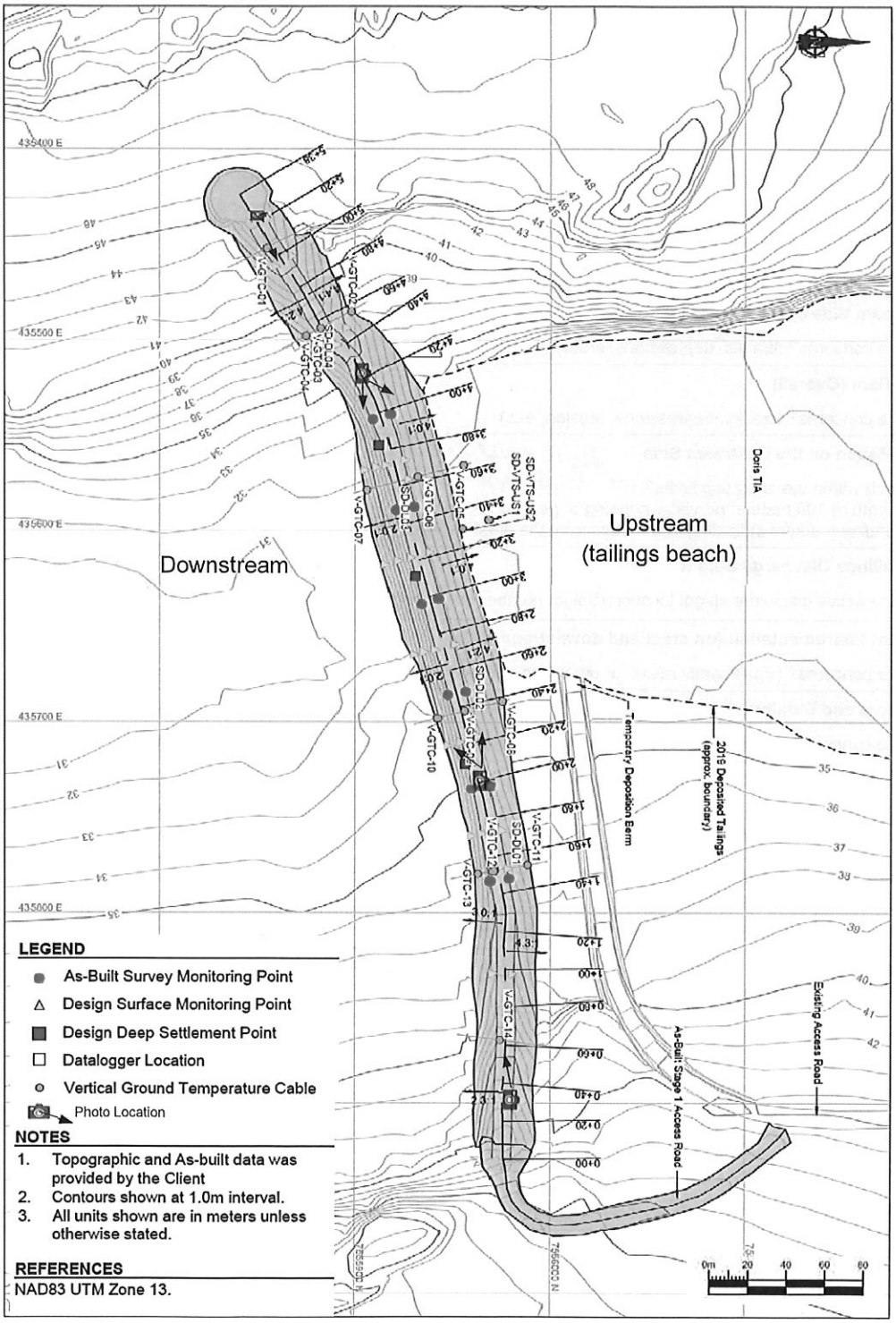
NOTES:

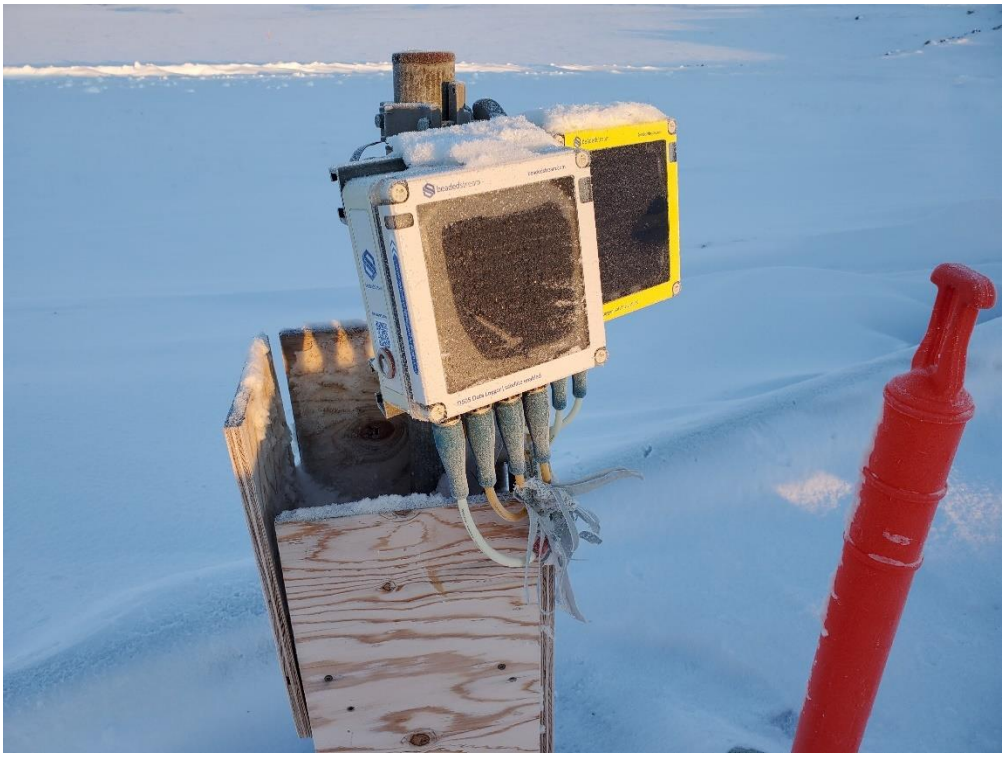
If seepage has been noted estimate the flow (high/medium/low) and report to TMAC Environmental Superintendent:

Photos:

Please collect the following photos:

- Photo from the crest looking W along the dam crest (Station 0+30)
- Photo from the crest looking SW over the downstream toe along the dam (Station 2+00)
- Photo from the crest looking W over the tailings beach (Station 2+00)
- Photo from the crest looking NE over the tailings beach (Station 4+20)
- Photo from the crest looking E over the downstream toe along the dam (Station 4+20)
- Photo from west end looking E along the dam crest (Station 5+20)





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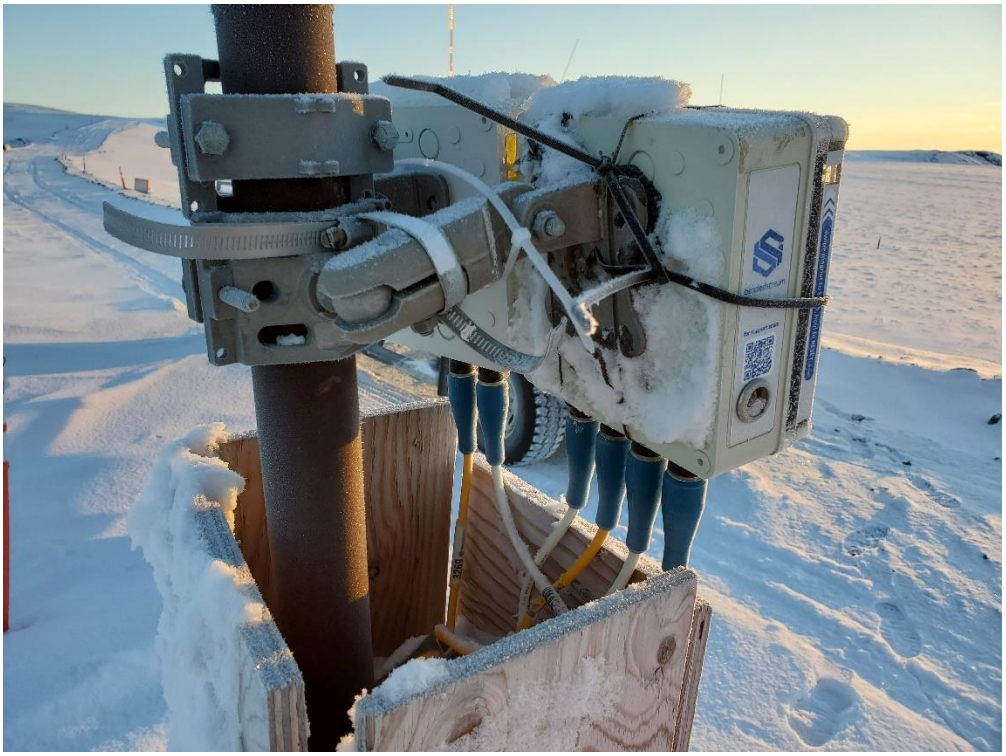

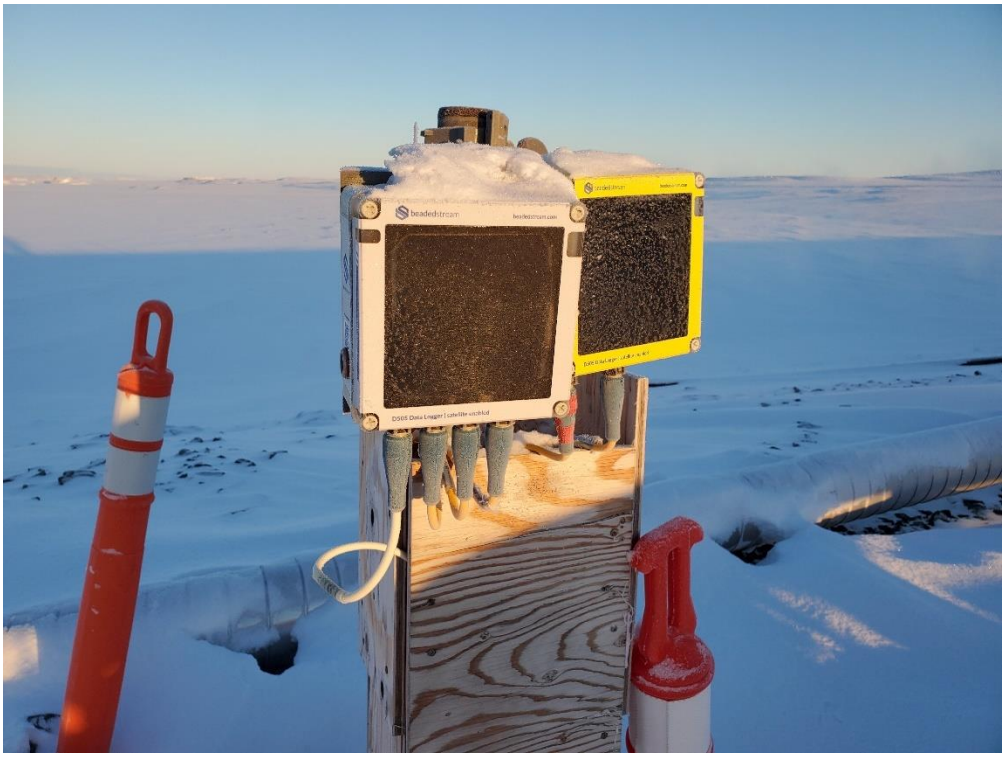

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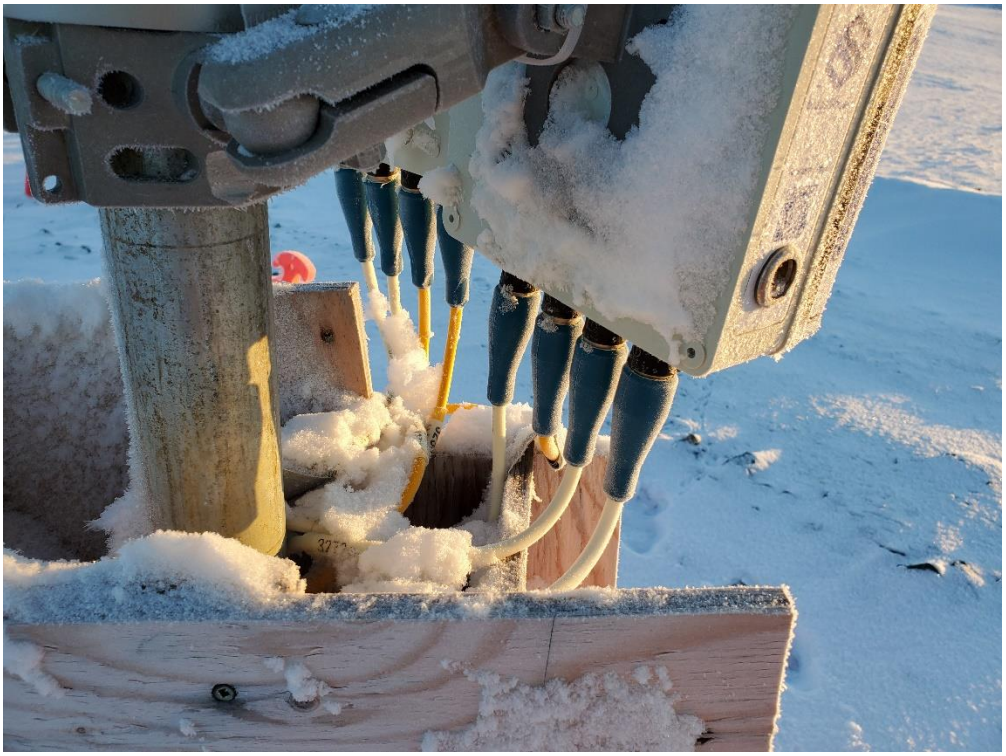
beadedstream.com
DS05 Data Logger | satellite enabled



South Dam
Walkover Report

Frequency: Weekly or as specified by EOR

Date:	Nov 15/2020
Inspected By:	Sarah Warnock
Conditions:	(ie. snow on ground, clear) Snow covered ground, high winds, blowing snow

Visual Inspection:

This weekly walkover survey report is a means to track the condition on the **South Dam**, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam (Overall) Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	No
Downstream Side of Dam (Overall) Any visible concerns? (cracks, depressions, erosion, seepage, etc.) Snow covered	Yes	(No)
Crest of Dam (Overall) Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	(No)
Tailings Beach on the Upstream Side Is the beach within the operating limits? (Beach length of 100 meters, no water ponding or pooling near the dam etc.) * Use shoreline markers indicating 100 meters from the crest for visual reference*	(Yes)	No
Active Tailings Discharge Spigot Indicate the active discharge spigot location (Spigot number or (S) on the figure provided)	H - Starting Nov 15.	
Settlement Instrumentation (on crest and downstream side) Any visible concerns? (significantly rusted or otherwise damaged, etc.) Some snow covered	Yes	(No)
Thermistors and Dataloggers Any visible concerns? (cables frayed, disconnected or damaged, boxes cracked, etc.)	Yes	(No)
Water at the Toe of the Downstream Side of the Dam Is water visible on the downstream side of the dam? frozen ground. Is the water visibly flowing? Snow cover	Yes Yes	(No) (No)
Walk over inspection of the downstream toe complete? (May to November) Inspector should walk the length of the downstream toe inspecting for seepage or slumping once most of the snow has melted (May to November)	(Yes)	No

If you answered yes to any of the questions above, or made other observations, please provide details and photos. Observations can be sketched on the figure provided below.

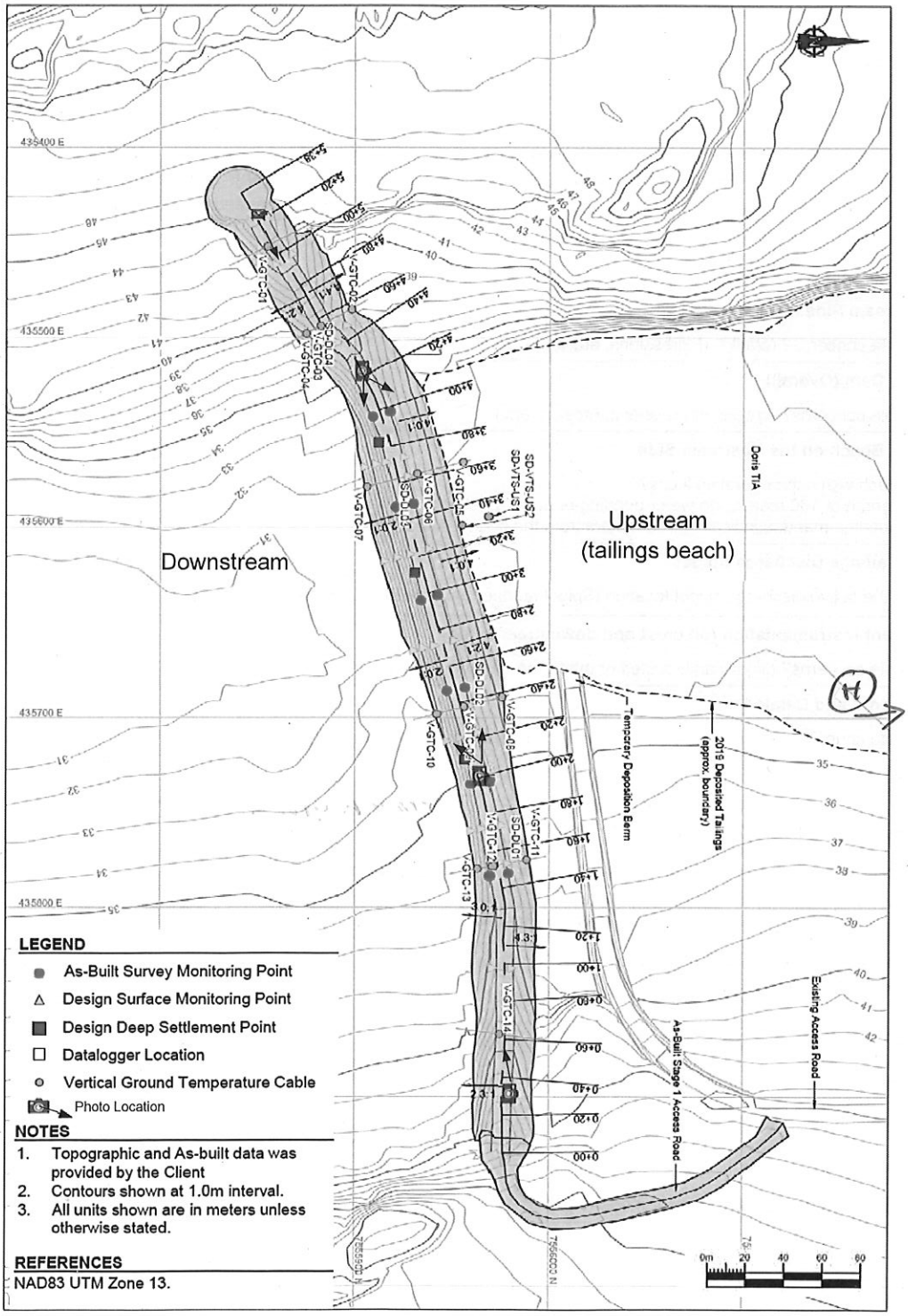
NOTES: Very low visibility during inspection.

If seepage has been noted estimate the flow (high/medium/low) and report to TMAC Environmental Superintendent:

Photos:

Please collect the following photos:

- Photo from the crest looking W along the dam crest (Station 0+30)
- Photo from the crest looking SW over the downstream toe along the dam (Station 2+00)
- Photo from the crest looking W over the tailings beach (Station 2+00)
- Photo from the crest looking NE over the tailings beach (Station 4+20)
- Photo from the crest looking E over the downstream toe along the dam (Station 4+20)
- Photo from west end looking E along the dam crest (Station 5+20)



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South Dam
Walkover Report

Frequency: Weekly or as specified by EOR

Date:	Nov 21/2020
Inspected By:	Sarah Wannock
Conditions:	(ie. snow on ground, clear) snow on ground

Visual Inspection:

This weekly walkover survey report is a means to track the condition on the **South Dam**, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	(No)
Downstream Side of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.) snow covered	Yes	(No)
Crest of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	(No)
Tailings Beach on the Upstream Side		
Is the beach within the operating limits? (Beach length of 100 meters, no water ponding or pooling near the dam etc.) * Use shoreline markers indicating 100 meters from the crest for visual reference*	(Yes)	No
Active Tailings Discharge Spigot		
Indicate the active discharge spigot location (Spigot number or (S) on the figure provided)	Spigot H	
Settlement Instrumentation (on crest and downstream side)		
Any visible concerns? (significantly rusted or otherwise damaged, etc.)	Yes	(No)
Thermistors and Dataloggers		
Any visible concerns? (cables frayed, disconnected or damaged, boxes cracked, etc.)	Yes	(No)
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam? Frozen, snow covered	Yes	(No)
Is the water visibly flowing?	Yes	(No)
Walk over inspection of the downstream toe complete? (May to November)		
Inspector should walk the length of the downstream toe inspecting for seepage or slumping once most of the snow has melted (May to November) Snow covered	Yes	No NA

If you answered yes to any of the questions above, or made other observations, please provide details and photos. Observations can be sketched on the figure provided below.

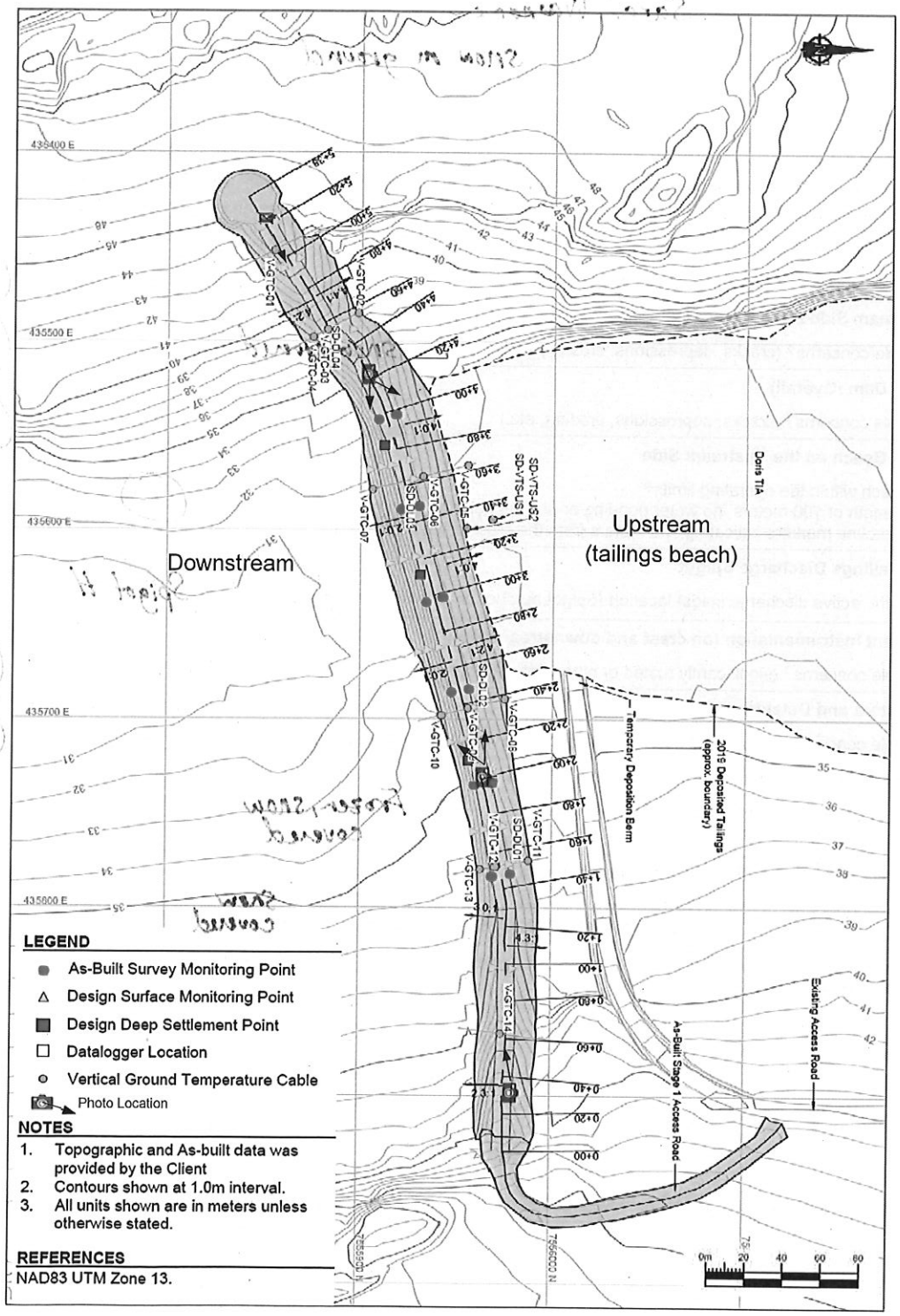
NOTES:

If seepage has been noted estimate the flow (high/medium/low) and report to TMAC Environmental Superintendent:

Photos:

Please collect the following photos:

- Photo from the crest looking W along the dam crest (Station 0+30) ✓
- Photo from the crest looking SW over the downstream toe along the dam (Station 2+00) ✓
- Photo from the crest looking W over the tailings beach (Station 2+00) ✓
- Photo from the crest looking NE over the tailings beach (Station 4+20) ✓
- Photo from the crest looking E over the downstream toe along the dam (Station 4+20) ✓
- Photo from west end looking E along the dam crest (Station 5+20) ✓



South Dam
Walkover Report

Frequency: Weekly or as specified by EOR

Date:	Dec 19/2020
Inspected By:	Sarah Wannock
Conditions:	(ie. snow on ground, clear) Snow covered

Visual Inspection:

This weekly walkover survey report is a means to track the condition on the **South Dam**, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	(No)
Downstream Side of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.) Snow covered	Yes	(No)
Crest of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	(No)
Tailings Beach on the Upstream Side		
Is the beach within the operating limits? (Beach length of 100 meters, no water ponding or pooling near the dam etc.) * Use shoreline markers indicating 100 meters from the crest for visual reference*	(Yes)	No
Active Tailings Discharge Spigot		
Indicate the active discharge spigot location (Spigot number or (s) on the figure provided)	Spigot H	
Settlement Instrumentation (on crest and downstream side)		
Any visible concerns? (significantly rusted or otherwise damaged, etc.) Snow covered on slope	Yes	(No)
Thermistors and Dataloggers		
Any visible concerns? (cables frayed, disconnected or damaged, boxes cracked, etc.)	Yes	(No)
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam? Frozen - toe snow covered	Yes	(No)
Is the water visibly flowing? Frozen	Yes	(No)
Walk over inspection of the downstream toe complete? (May to November)		
Inspector should walk the length of the downstream toe inspecting for seepage or slumping once most of the snow has melted (May to November) NA	Yes	No

If you answered yes to any of the questions above, or made other observations, please provide details and photos. Observations can be sketched on the figure provided below.

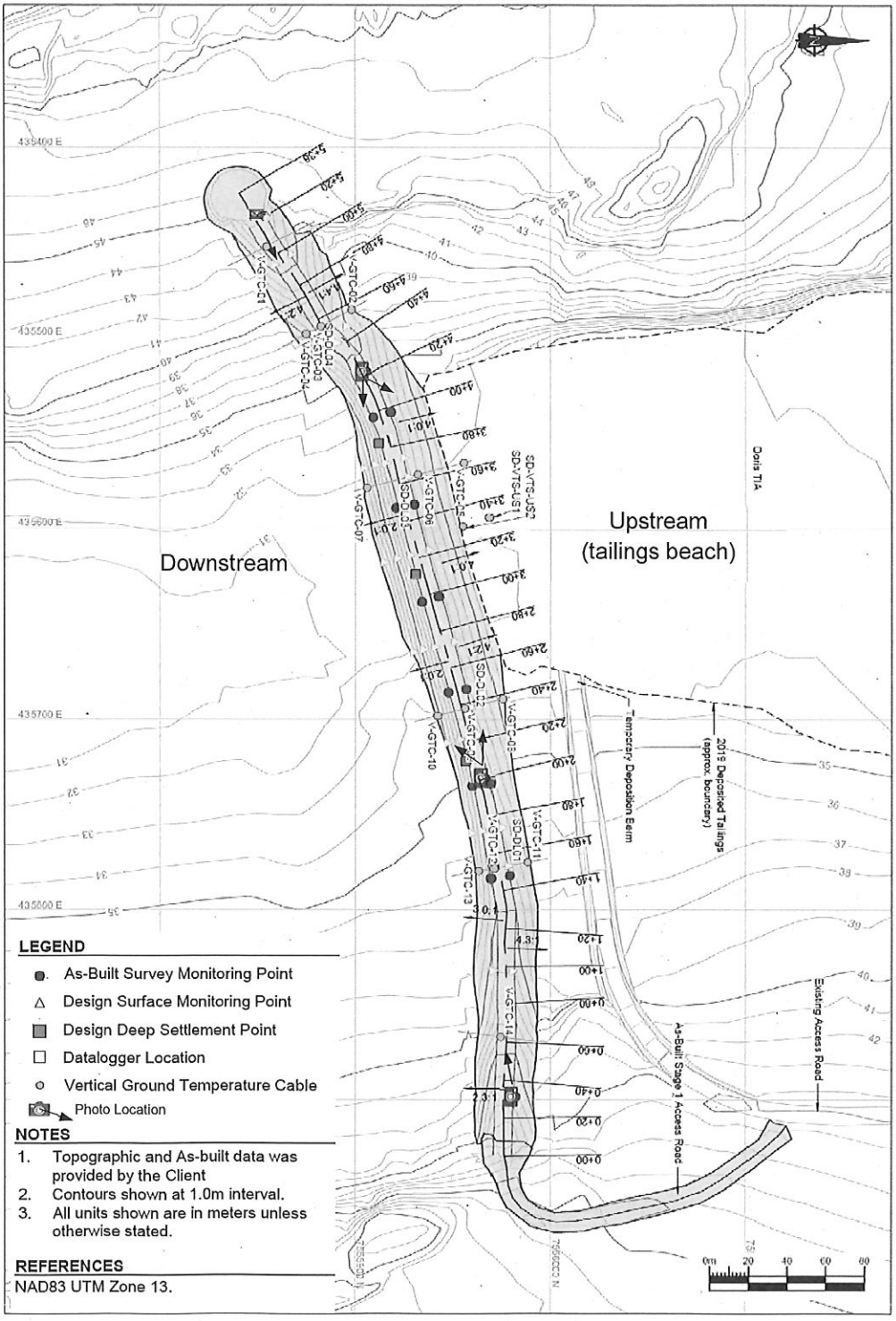
NOTES:

If seepage has been noted estimate the flow (high/medium/low) and report to TMAC Environmental Superintendent:

Photos:

Please collect the following photos:

- ☑ Photo from the crest looking W along the dam crest (Station 0+30)
- ☑ Photo from the crest looking SW over the downstream toe along the dam (Station 2+00)
- ☐ Photo from the crest looking W over the tailings beach (Station 2+00) Drone malfunctioned. Too cold temps
- ☑ Photo from the crest looking NE over the tailings beach (Station 4+20)
- ☑ Photo from the crest looking E over the downstream toe along the dam (Station 4+20)
- ☑ Photo from west end looking E along the dam crest (Station 5+20)



South Dam
Walkover Report

Frequency: Weekly or as specified by EOR

Date:	Dec 26/2020
Inspected By:	Sarah Wannvek
Conditions:	(ie. snow on ground, clear) Snow on ground.

Visual Inspection:

This weekly walkover survey report is a means to track the condition on the **South Dam**, please provide details on changes that have developed since the previous inspection and/or any observations of particular concern. All photos are appreciated. Please send the completed form (scans are fine) and any photos to hopebaymonitoring@srk.com and pluedke@srk.com

Upstream Side of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	(No)
Downstream Side of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, seepage, etc.)	Yes	(No)
Crest of Dam (Overall)		
Any visible concerns? (cracks, depressions, erosion, etc.)	Yes	(No)
Tailings Beach on the Upstream Side		
Is the beach within the operating limits? (Beach length of 100 meters, no water ponding or pooling near the dam etc.) * Use shoreline markers indicating 100 meters from the crest for visual reference*	(Yes)	No
Active Tailings Discharge Spigot		
Indicate the active discharge spigot location (Spigot number or (s) on the figure provided)	H - water	
Settlement Instrumentation (on crest and downstream side)		
Any visible concerns? (significantly rusted or otherwise damaged, etc.)	Yes	(No)
Thermistors and Dataloggers		
Any visible concerns? (cables frayed, disconnected or damaged, boxes cracked, etc.)	Yes	(No)
Water at the Toe of the Downstream Side of the Dam		
Is water visible on the downstream side of the dam? Frozen	Yes	(No)
Is the water visibly flowing?	Yes	(No)
Walk over inspection of the downstream toe complete? (May to November)		
Inspector should walk the length of the downstream toe inspecting for seepage or slumping once most of the snow has melted (May to November) NA	Yes	No

If you answered yes to any of the questions above, or made other observations, please provide details and photos. Observations can be sketched on the figure provided below.

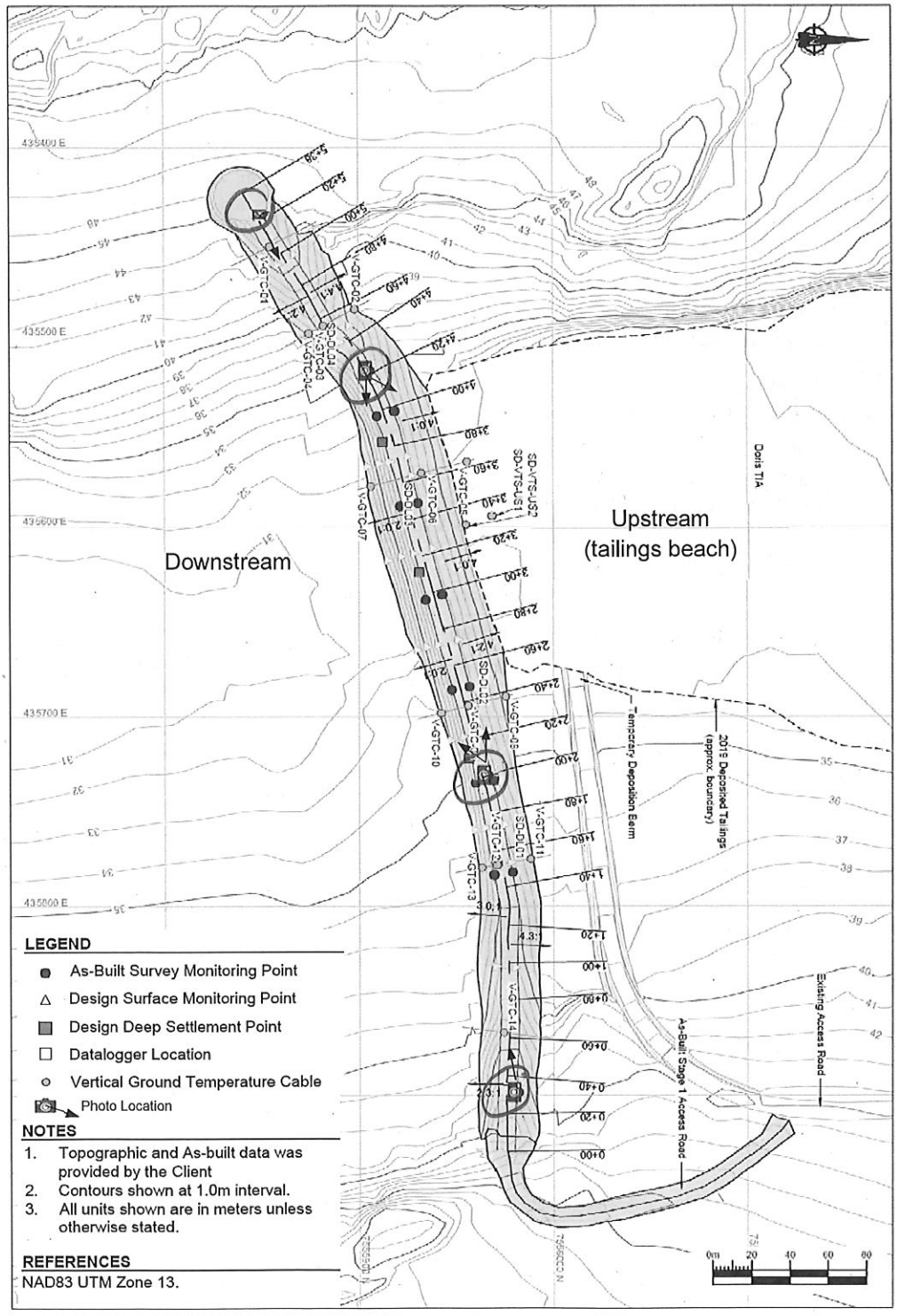
NOTES:

If seepage has been noted estimate the flow (high/medium/low) and report to TMAC Environmental Superintendent:

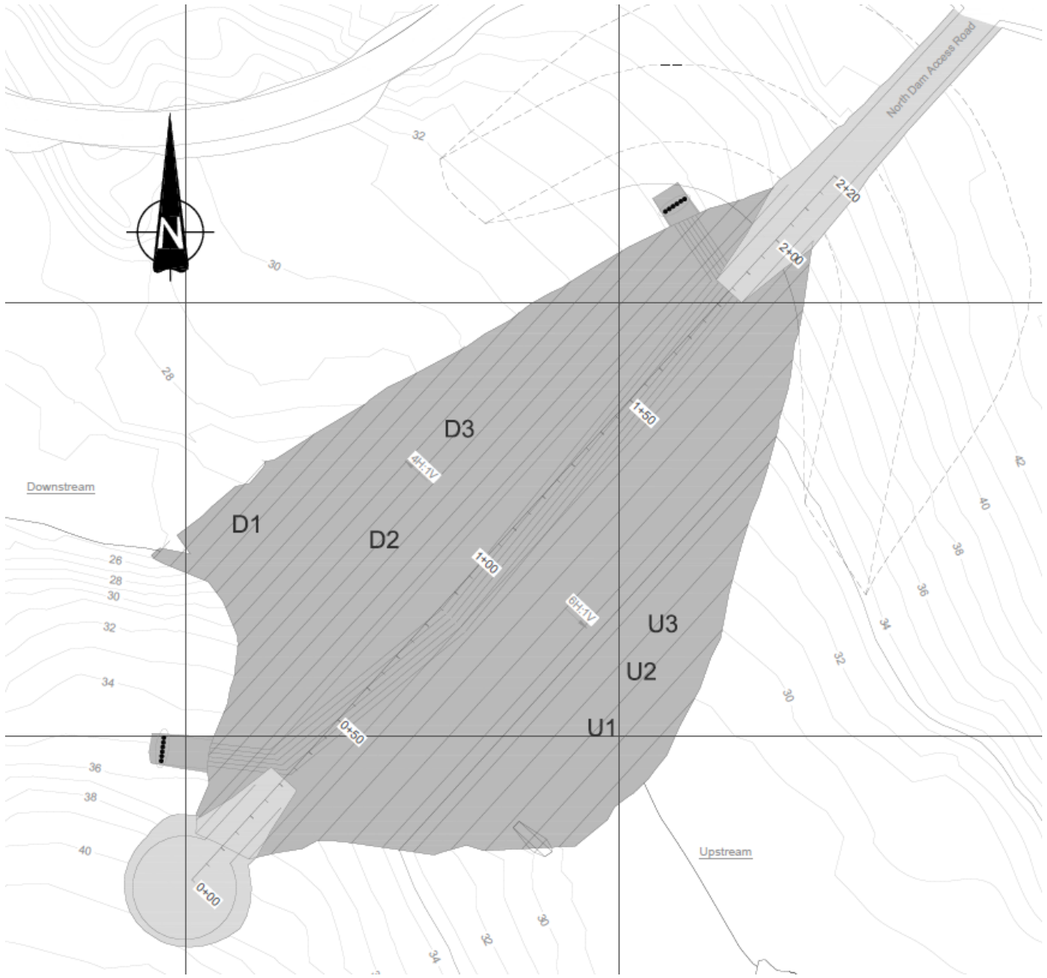
Photos:

Please collect the following photos:

- Photo from the crest looking W along the dam crest (Station 0+30)
- Photo from the crest looking SW over the downstream toe along the dam (Station 2+00)
- Photo from the crest looking W over the tailings beach (Station 2+00)
- Photo from the crest looking NE over the tailings beach (Station 4+20)
- Photo from the crest looking E over the downstream toe along the dam (Station 4+20)
- Photo from west end looking E along the dam crest (Station 5+20)



Appendix G Depression Monitoring



DEPRESSION TRACKING

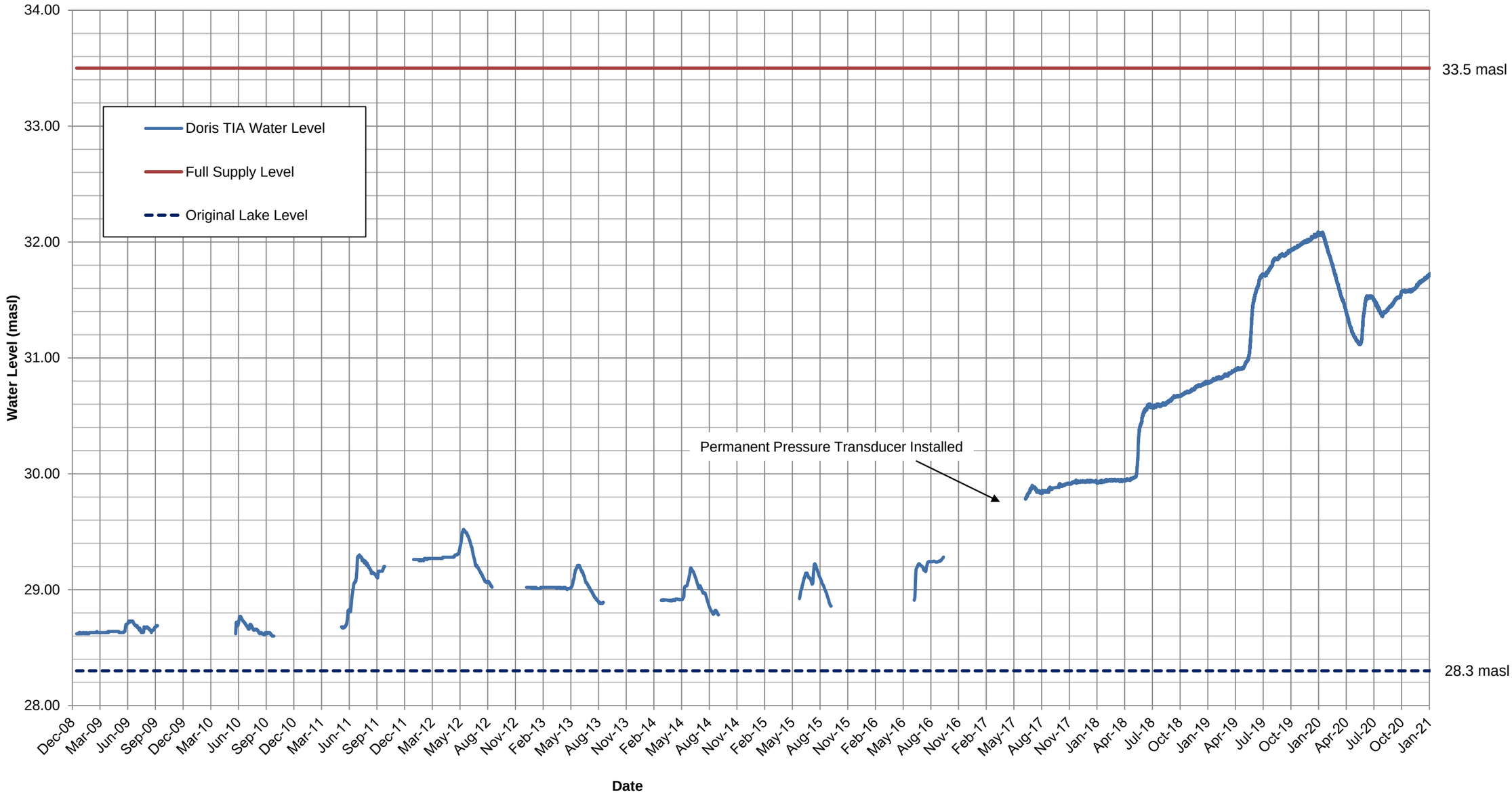
ID	Location	Comments	Northing	Easting
U1	Upstream	First noted June 2014	7559104	434393
		Boundaries spray painted and ID given July 2014		
		No substantial changes from previous inspection		
U2	Upstream	First noted June 2014	7559117	434402
		Boundaries spray painted and ID given July 2014		
		No substantial changes from previous inspection		
U3	Upstream	First noted June 2014	7559128	434407
		Boundaries spray painted and ID given July 2014		
		July 4, 2015 - Expanding toward U2		
		No substantial changes from previous inspection		
D1	Downstream	Identified during 2014 annual geotechnical inspection, spray painted and given ID.	7559151	434311
		September 1, 2014 - expanded towards the south		
		September 20, 2014 - TMAC ESR noted the depression looks to have expanded, paint mark updated.		
		July 4, 2015 - Slight expansion toward the crest was noted in the daily report		
		No substantial changes from previous inspection		
D2	Downstream	First noted in 2013 Annual Geotechnical Inspection	7559147	434344
		September 14, 2014 - TMAC ESR noted that the depression may have expanded slightly		
		No substantial changes from previous inspection		
D3	Downstream	First noted in 2013 Annual Geotechnical Inspection	7559173	434360
		August 10, 2014 - larger area marked		
		No substantial changes from previous inspection		

Notes:

1. Depression locations are based on hand held GPS measurements, accuracy is at best +/- 4 m.
2. Other small depressions were removed from the tracking system in 2016. Only significant depression were carried forward from the 2016 Annual Inspection.

srk consulting	AGNICO EAGLE	2020 AGI – North Dam
		Historic Depression Summary
Job No: 1CT022.057 Filename: App_G_ND_AGI_DepressionTracking.pptx	**DORIS TIA**	Date: Feb. 2021 / Approved: PDL / Figure: **G.1**

Appendix H TIA Water Levels

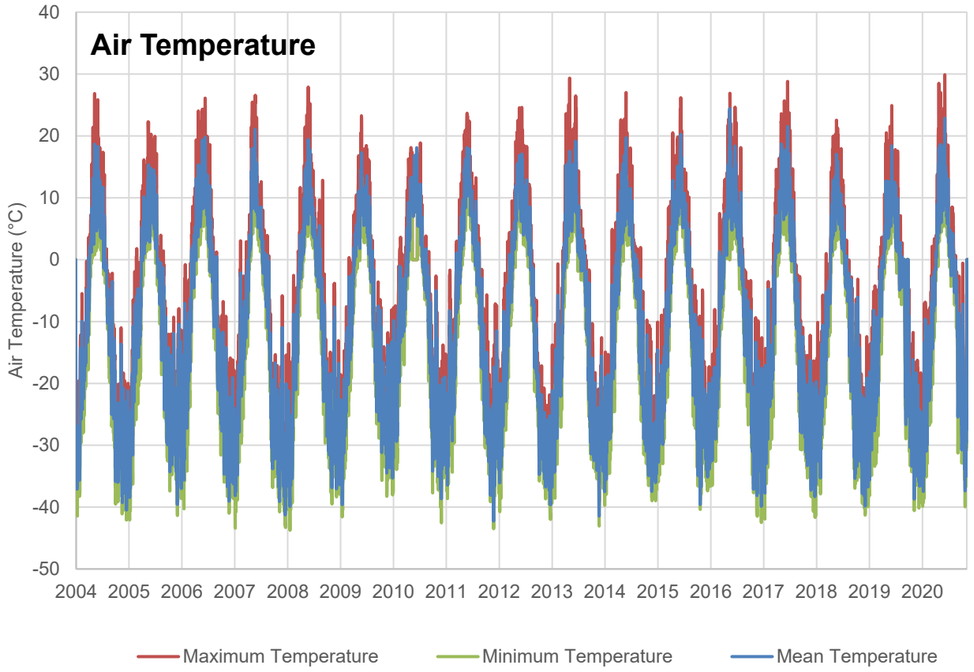


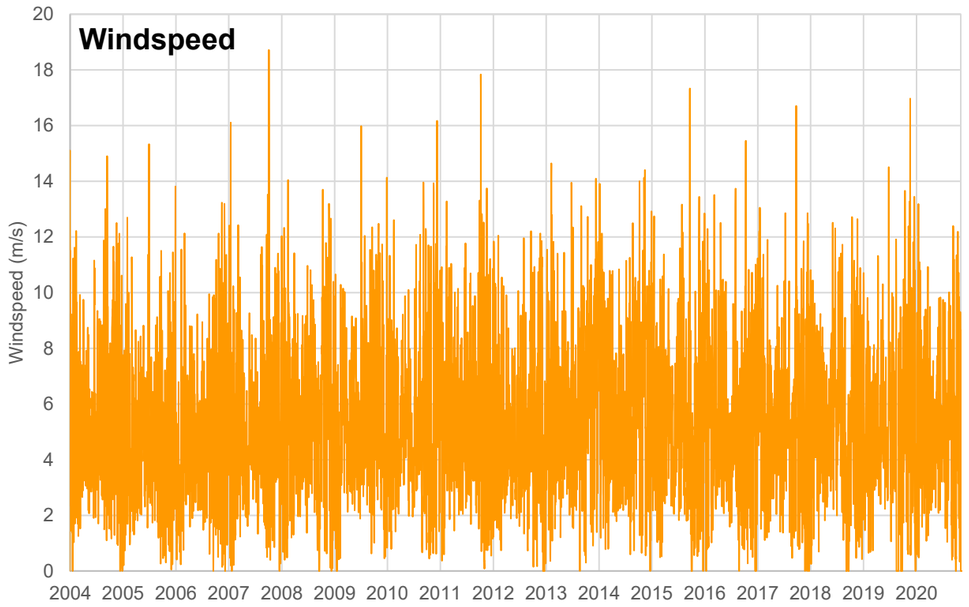
Notes:

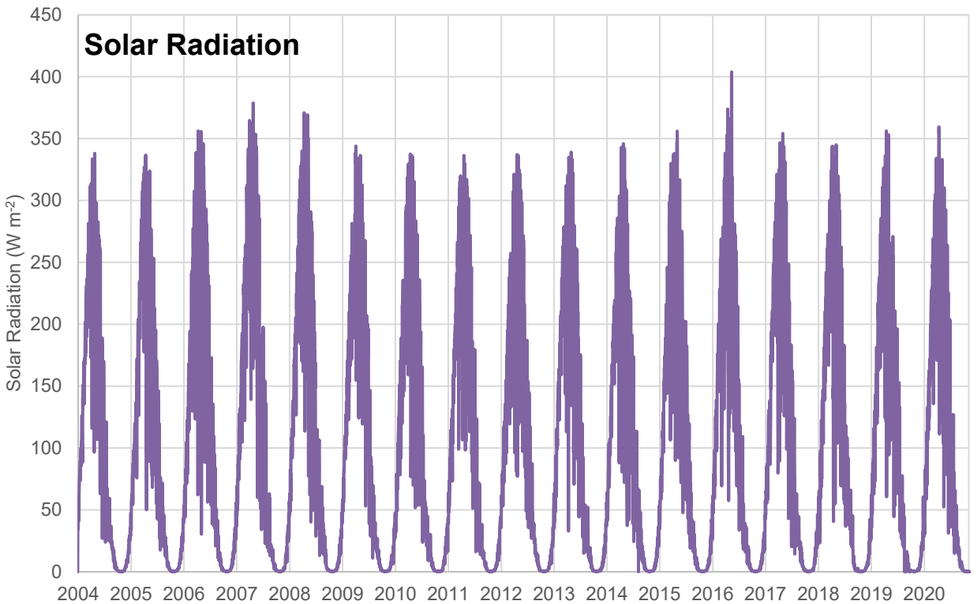
- Water level collected by permanent pressure transducer installed Summer 2017

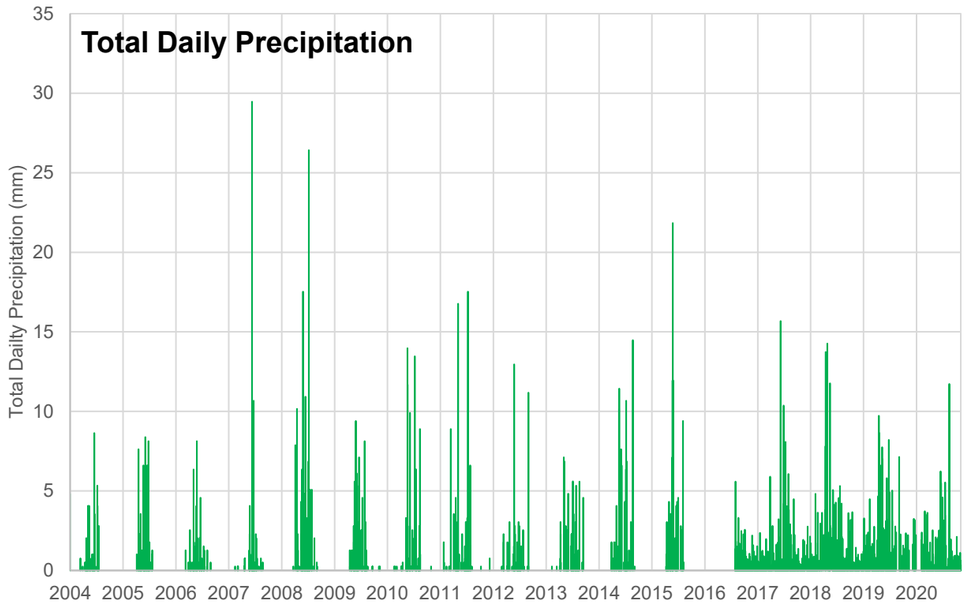
srk consulting	AGNICO EAGLE	2020 AGI
Job No: 1CT022.057 Filename: App_H_WaterLevel.pptx	DORIS TIA	TIA Reclaim Pond Water Level
		Date: Feb. 2021 / Approved: PDL / Figure: H.1

Appendix I Climate Data



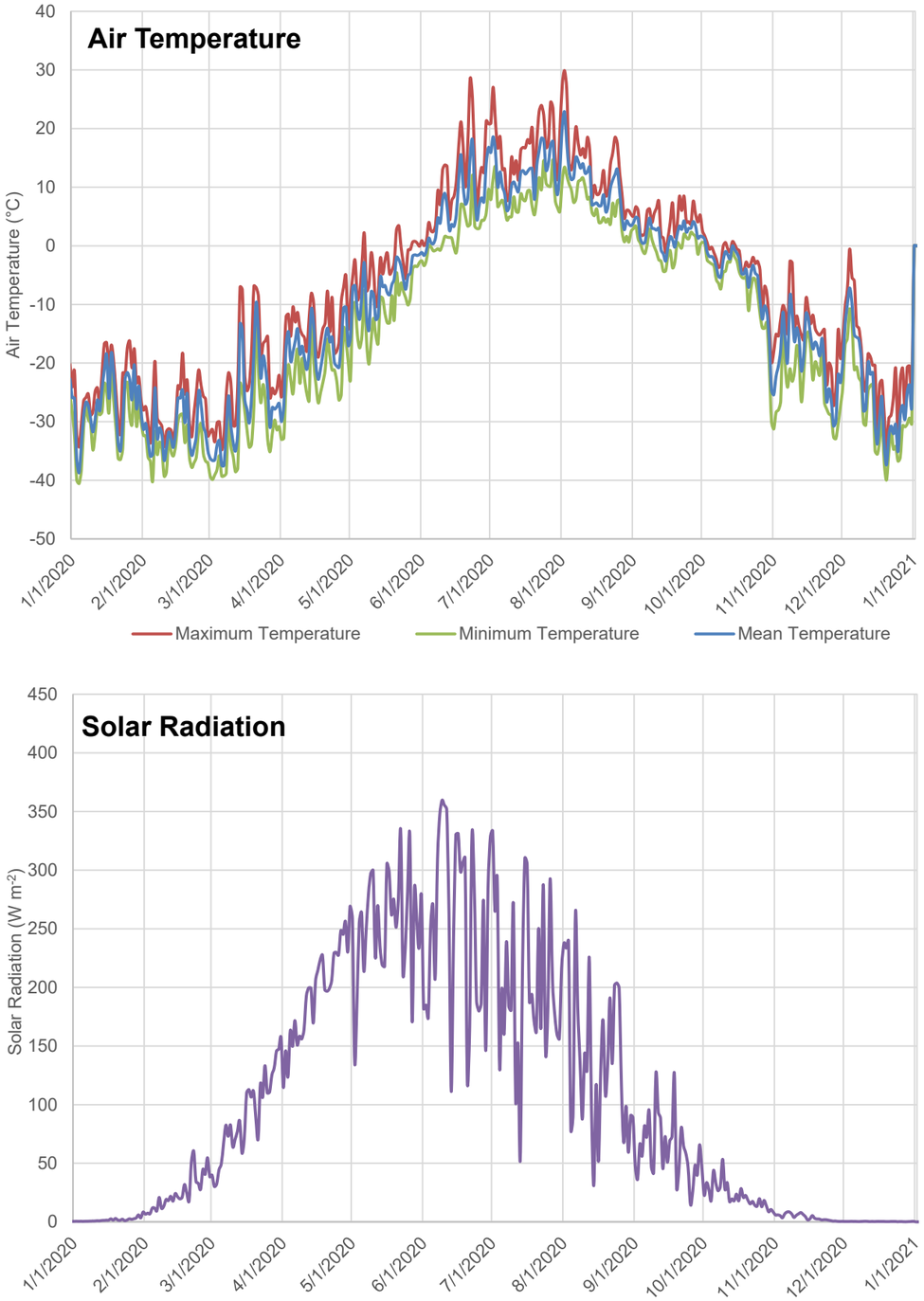


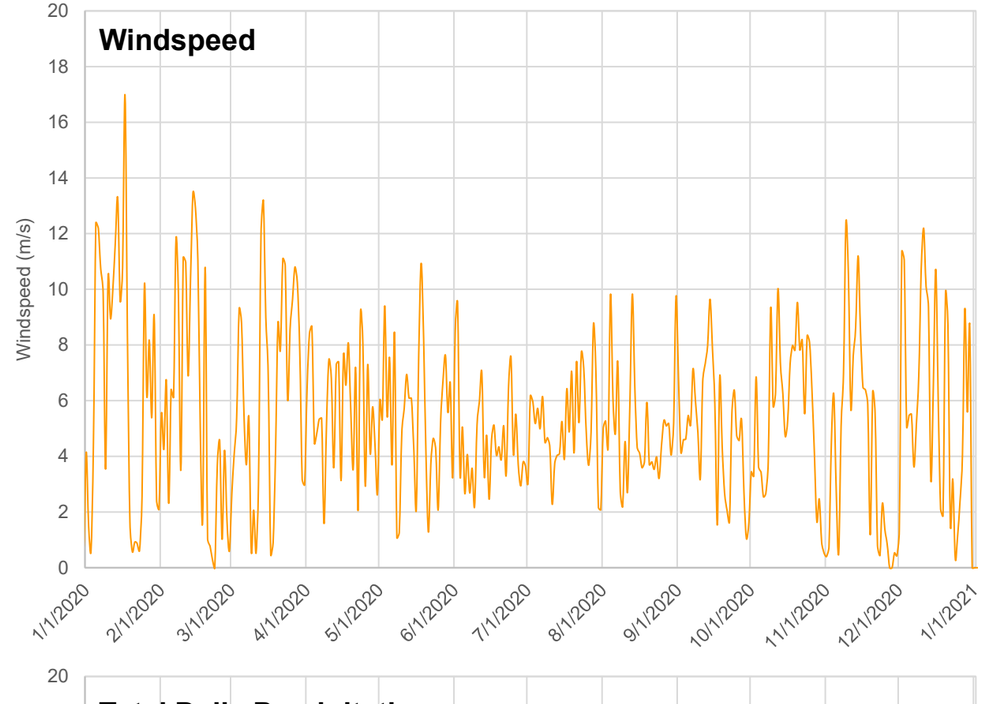


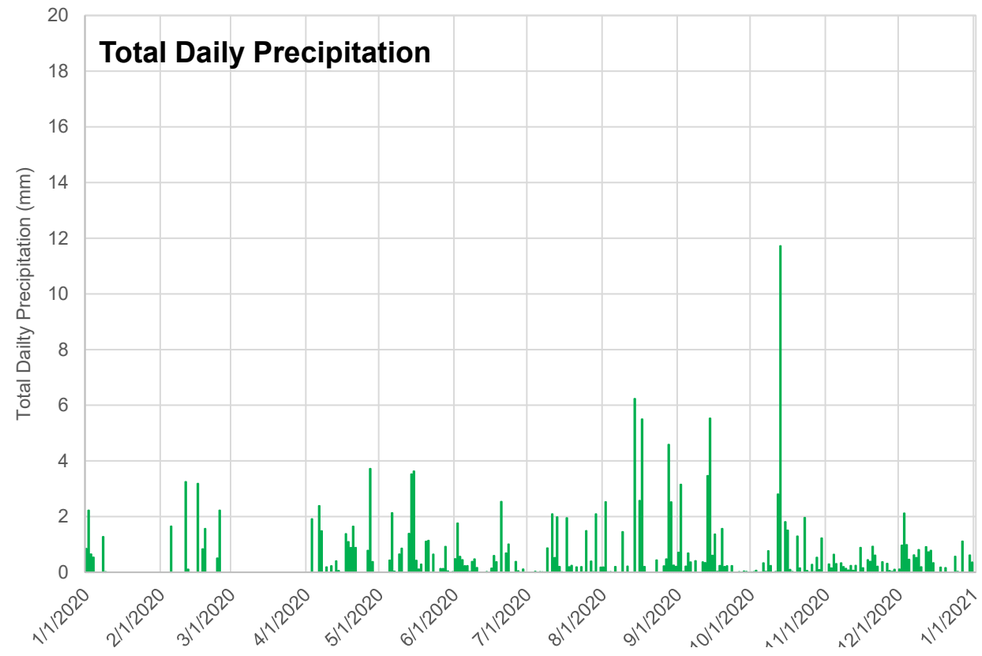


Notes:
1. Doris meteorological data from Stantec, select parameters shown
2. Total daily precipitation from mid-2016 to present includes snow water equivalent measurement during snowfall periods

srk consulting	AGNICO EAGLE	2020 Annual Geotechnical Inspection
		Doris Meteorological Station Historical Climate Record
Job No: 1CT022.057 Filename: ClimateData_2020_AGI	Doris TIA	Date: March 2021 · Approved: CWS · Figure: **I.1**

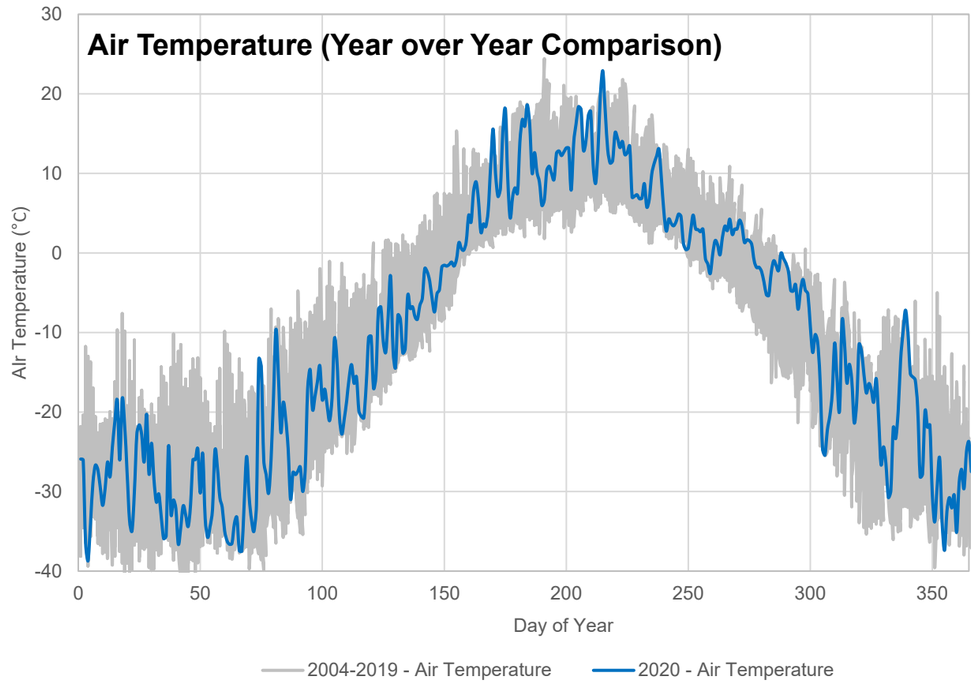






Notes:
1. Doris meteorological data from Stantec, select parameters shown
2. Total daily precipitation from mid-2016 to present includes snow water equivalent measurement during snowfall periods

srk consulting	AGNICO EAGLE	2020 Annual Geotechnical Inspection
		Doris Meteorological Station – 2020 Record
Job No: 1CT022.057 Filename: ClimateData_2020_AGI	Doris TIA	Date: March 2021 · Approved: CWS · Figure: **I.2**



Year	Mean Annual Air Temperature (°C)
2004	-10.5
2005	-11.8
2006	-8.5
2007	-11.9
2008	-12.1
2009	-11.2
2010	-8.2
2011	-10.4
2012	-10.0
2013	-11.1
2014	-11.2
2015	-10.8
2016	-9.7
2017	-10.1
2018	-11.8
2019	-10.9
2020	-10.5
Average (2004-2020)	**-10.6**

Notes:
1. Doris meteorological data from Stantec, select parameter shown

srk consulting

Job No: 1CT022.057
Filename: ClimateData_2020_AGI

AGNICO EAGLE

Doris TIA

2020 Annual Geotechnical Inspection

Air Temperature Year Over Year Comparison

Date: March 2021 | Approved: CWS | Figure: **I.3**

Appendix J 2020 Geochem Checks of Water at Dam Toes

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FINAL

Technical Memo

March 30, 2021

To	Sarah Warnock and Ashley Mathai, Hope Bay Project
From	Brooklyn Derry, Andrea Bowie
Cc	Oliver Curran, Hope Bay Project
Subject	2020 Geochemical Source Investigation of Water at the Toe of North and South Dams, Hope Bay Project
Client	Agnico Eagle Mines Ltd.
Project	1CT022.056

1 Background

The scope of the geochemical source investigation is to determine if TIA Reclaim Pond water is present in water observed at the downstream toe of the North and/or South dams and establish baseline water chemistry downstream of the South Dam.

The North Dam forms the northern boundary of the Doris TIA, within a narrow natural valley blocking the original Tail Lake outlet to Doris Lake. The structure impounds the Reclaim Pond and was designed as a water retaining structure. The dam has a central frozen core with a secondary upstream Geosynthetic Clay Liner (GCL). The dam is constructed from local quarry rock and consists of processed fines for the core, 150 mm nominal sized transition material, and a run of quarry (ROQ) outer shell. To ensure maintenance of frozen foundation conditions, the key trench of the dam is equipped with 12 horizontal thermosyphon evaporators. Flowing water has been observed each year along the downstream toe of the dam near the former outlet of Tail Lake since after the first winter of dam construction in 2011.

The South Dam is located at the southern end of the Doris TIA, on the watercourse to Ogama Lake. The South Dam is designed as a frozen foundation dam consisting of a compacted rock fill dam (sourced from a local quarry) with a GCL keyed into the permafrost overburden foundation for seepage control. The dam is designed to retain beached tailings as opposed to water. The dam is to be constructed in two phases, incorporating a single downstream raise. To date, the first phase of construction has been completed. Two ponds have been observed each year at the toe of the dam and were also observed prior to construction of the south dam.

Key dates for North and South Dam construction and tailings impoundment area (TIA) operations are as follows:

- February 2011 – Initiation of North Dam construction (over two winter seasons).
- April 2012 – Completion of North Dam construction.
- February 2017 – Effective start of tailings slurry discharge to TIA at a temporary berm within the TIA.
- January 2018 – Initiation of South Dam construction.
- February 2018 – Mine water discharged to the Doris TIA.
- June 2018 – Completion of South Dam construction, deposition from the South Dam began in the same timeframe.
- February 2020 – Doris TIA discharge to Roberts Bay commenced.
- August 2020 – Doris TIA discharge to Roberts Bay offline (Expected to return to service May 2021).

In 2017, based on a recommendation from the Engineer or Record (EOR), TMAC Resources Inc. initiated a monitoring program for flowing water at the toe of the North Dam (SRK 2018a). After completion of the South Dam, a similar monitoring program was initiated (SRK 2019a, 2019b) and both programs were updated in 2020 (SRK 2020d, 2020e) The water quality monitoring program at the toe of the dams includes the following:

- Inspections for flowing water at the toe of North and South dams between approximately June and October, and water quality sampling and analysis of flowing water at the toe where observed.
- Sample collection of TIA Reclaim Pond water at surveillance network program (SNP) station TL-1 and process water from the tailings slurry pumped to the TIA, at station TL-5.
- Sample collection of ponded water downstream of the South Dam.

As a supplementary monitoring program at the recommendation of the EOR, three samples of tailings pore water at the tailings slurry discharge points at the South Dam were sampled in August 2019 to quantify pond water chemistry and freezing point depression of the TIA tailings as the chemical composition of porewater within the tailings beach will directly impact heat transfer and freeze-back of the tailings over time (SRK 2020a). Delayed freezeback of the tailings beach could limit heat loss from the South Dam foundation immediately below the upstream toe.

The geochemical source investigation is a comparison of the flowing water at the toe of the dams water quality data with stations TL-1 and TL-5 that are monitored as part of and in compliance with Water Licence 2AM-DOH1335 Amendment No. 2 (Nunavut Water Board 2018). Water at the toe of the North and South Dams and water quality monitoring programs and associated data analysis presented herein are not a compliance requirement and is at the request of the EOR. This memo documents a geochemical source investigation of the aforementioned stations with the following objectives:

- Document the results of the 2020 monitoring programs for water at the toe of the North and South Dam;

- Assess the major ion chemistry of water quality monitoring stations, including all samples from the TIA pond;
- Assess the geochemical sources of the water observed at the toe of the North and South Dams as an indicator of containment and thermal performance of the dams; and
- Establish baseline chemistry downstream of the South dam at the ponded water stations.

2 Methods

2.1 Monitoring of Flowing Water at the Toe of the North Dam

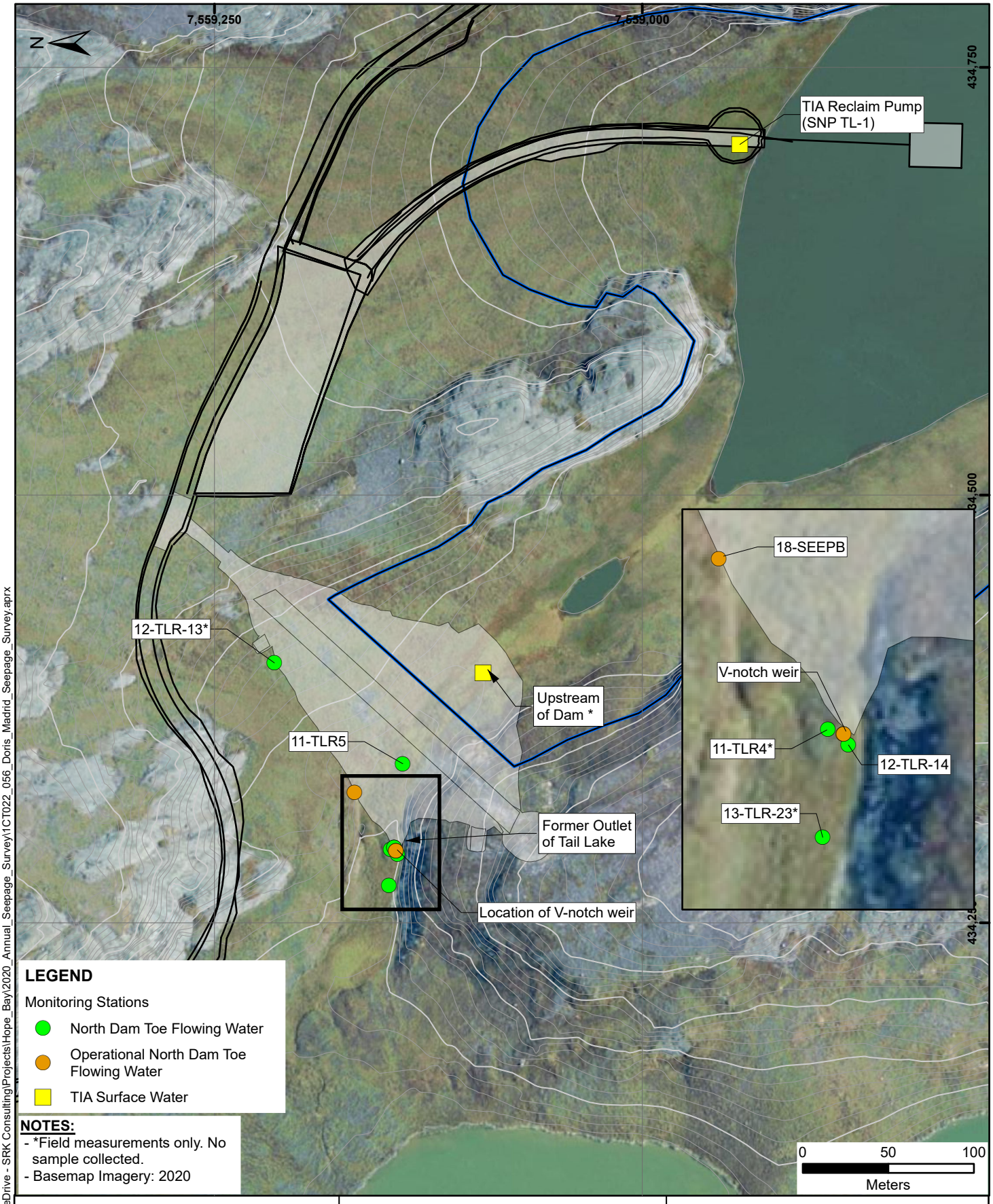
SRK Consulting (Canada) Inc. (2020d) outlines the North Dam toe flowing water inspection and water quality monitoring program. In summary, TMAC conducted weekly inspections of the dam toe. If water was observed flowing at the dam toe, TMAC collected the following samples at a maximum frequency of once per week (Figure 1):

- North Dam toe flowing water: field parameters and water quality samples for laboratory analysis are collected at all observed locations of flowing water.
- TL-1 (reclaim pump): field parameters and water quality samples for laboratory analysis.
- TIA Reclaim Pond water at upstream face of North Dam: field parameters only.

TMAC shipped samples to ALS Environmental in Vancouver, BC for the analysis of pH, electrical conductivity (EC), total alkalinity, sulphate, chloride, nutrients (ammonia, nitrate and nitrite), total cyanide, free cyanide, cyanate, and dissolved trace elements. At the time of sample collection, TMAC measured the following field parameters: pH, EC, oxidation-reduction potential (ORP), temperature, salinity and flow rate.

In 2020, TMAC collected 11 samples of flowing water at the toe of the North Dam and reclaim water from TL-1 over a 14-week period between June 22 and September 23, 2020. No flowing water was observed prior to June 22 and after September 23 due to sub zero temperatures. At TL-1, monitoring occurs year-round.

The sampling methods for supernatant solution (TL-5) are detailed in SRK (2020a) and briefly summarized herein. TMAC collected monthly samples (12 samples collected in 2020) of the process plant tailings supernatant (TL-5) from the flotation tailings thickener tank. The filtrate from the detox filter press (where detoxified tailings are dewatered) is pumped to the flotation tailings thickener tank prior to discharge to the TIA.



LEGEND

Monitoring Stations

- North Dam Toe Flowing Water
- Operational North Dam Toe Flowing Water
- TIA Surface Water

NOTES:

- *Field measurements only. No sample collected.
- Basemap Imagery: 2020

srk consulting

AGNICO EAGLE

Job No: 1CT022.027

Filename: 1CT022_056_Doris_Madrid_Seepage_Survey

Hope Bay Gold Project

North Dam Geochemical Source Investigation

North Dam Toe Flowing Water Sample Monitoring Locations

Date:	Approved:	Figure:
Mar 2021		01

Path: C:\Users\sconard\OneDrive - SRK Consulting\Projects\Hope_Bay\2020_Annual_Seepage_Survey\1CT022_056_Doris_Madrid_Seepage_Survey.aprx

2.2 Monitoring of Water at the Toe of the South Dam

SRK (2020e) outlines the South Dam toe water inspection and water quality monitoring program. Similar to the North Dam program, TMAC conducted weekly inspections of the dam toe. If water was observed flowing at the dam toe, TMAC was to collect the following samples at a maximum frequency of once per week (Figure 2):

- South Dam toe flowing water: field parameters and water quality samples for laboratory analysis at all observed locations of flowing water.
- Ponded water from two ponds at the dam toe: field parameters and water quality samples for laboratory analysis.
- TL-5 (tailings supernatant discharge from the mill): field parameters and water quality samples for laboratory analysis.
- TIA Reclaim Pond water at upstream face of South Dam: field parameters only when flowing water is observed. Data were not collected in 2020.

Samples were collected and analyzed as per the North Dam samples documented in Section 2.1. Note that in 2020 only ponded water (which existed in the low lying are prior to construction) was sampled from the South Dam and one location downstream where water flows from this ponded area to the downstream environment (South) was collected.

The recommended lab analyses and field parameters are the same as listed in Section 2.1. In 2020, one sample was collected at the toe of the South Dam on June 22 prior to the updated South Dam SOP where flowing and standing water were sampled and identified separately (SRK 2020e). The June sample is referred to as SDSP or flowing water in this memo, but based on location and review of field notes (absence of flow) is a sample from Pond 2. The two ponds were sampled following the SOP procedure six times throughout the year: Pond 1 on July 23 then five times from July 30 to September 23 and Pond 2 on July 7 for field parameters only and then five times from July 30 to September 23. The monitoring program for TL-5 is outlined in Section 2.1.

TMAC shipped samples to ALS Environmental in Vancouver, BC for the parameters outlined in Section 2.1.

435000
435250
435500
435750
436000
436250
7556250
7556000
7555750

SRK19-SD-SPIGOT3
SRK19-SD-SPIGOT2
SRK19-SD-SPIGOT1
SDPOND1
SDPOND2
SDSP_6/22/2020

0 50 100 150 200
Meters

LEGEND

- 2019 Tailings WQ Sample
- 2020 Pond Samples
- 2020 Water Sample
- Camp Layout Infrasctructure

NOTES

1. Coordinates of 2020 Water Sample are approximate.

REFERENCES

NAD 1983 Zone UTM 13N.
Drone imagery sourced from ESRI Basemap.

srk consulting

SRK JOB NO.: 1CT022.056
FILE NAME: 1CT022_056_Doris_Madrid_Seepage_Survey

AGNICO EAGLE

Hope Bay Gold Project

South Dam Geochemical Source Investigation

South Dam Water Sample Monitoring Locations

DATE:	APPROVED:	FIGURE:
Mar 2021		02

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2.3 Water Quality Database Compilation

SRK compiled data provided by TMAC for the geochemical source investigation, with stations presented in Figure 1 and Figure 2, and described in Table 1. An overview of additional water quality sampling data included in this assessment is described as follows:

- North Dam toe flowing water:
  - 2011 to 2014: opportunistic investigation along the downstream toe of the dam for flowing water (SRK 2012 to 2014).
  - 2017 to 2020: water monitoring program conducted as part of the North Dam monitoring program (SRK 2020c). In 2020, all flowing water samples were collected from the location of the v-notch weir.
- South Dam toe water:
  - 2020: water monitoring program conducted as part of the South Dam monitoring program (SRK 2020e)
- TL-1: samples collected as part of the SNP monitoring of TIA Reclaim Pond water, collected at the reclaim pump.
- TL-5: tailings supernatant samples collected within the mill prior to discharge to the TIA and as part of the SNP monitoring program.

SRK's QA/QC of TL-5 data received was documented in SRK (2020b, 2021) and concluded that all data were accepted. A summary of data QA/QC of the 2020 TL-1 and North and South dam water quality monitoring data is presented in Section 2.4.

Table 1: Data Sources

Station ID	Station Description	Years	Reference
North Dam flowing water	Downstream toe	2011 to 2014; 2017 to 2019	SRK (2012, 2013, 2014, 2018b, 2019b, 2020c)
TIA Reclaim Pond water	Upstream face of North Dam	2017 to 2019	SRK (2018b, 2019b, 2020c)
TL-1	Reclaim Pump	2011 to 2019	SNP monitoring program
TL-5	Tailings supernatant discharge to TIA	2017 to 2019	SNP monitoring program

2.4 Quality Control for 2020 Analytical Data

SRK reviewed all 2020 water quality data and conducted a geochemical quality control (QC) program to validate the data. This is routine practice by SRK to ensure confidence in the analysis, through identifying any possible limitations of the data. The outcomes of the QC program are summarized in Attachment 1. SRK flagged the following QC issues:

- TL-1:

  - Three samples had a greater than 1 unit difference in lab pH and field pH. Lab results were confirmed by reanalysis.
  - Nine samples had a greater than 30% RPD between field and lab EC. Lab EC was rechecked and field EC was verified.
- North Dam flowing water:
  - One sample had a higher dissolved than total Ba concentration with a greater than 20% RPD. Results were confirmed by reanalysis.
- South Dam Pond 1:
  - One sample had a greater than 30% RPD between field and lab EC. Lab EC was rechecked and field EC was verified. The field EC measurement was rejected.

All data were deemed acceptable except for field EC in one SD Pond 1 sample (July 23, 2020). SRK accepted all other data as received.

3 Results

3.1 North and South Dam Water Quality Monitoring

North Dam flowing water data and South Dam ponded water data from 2020 are summarized in Table 2 with full results presented in Attachment 2. Summary statistics for TL-1 and TL-5 are shown in Table 3.

The scope of the water chemistry assessment is to determine if TIA Reclaim Pond water is present in flowing water at the downstream toe of the North and/or South dams and establish baseline water chemistry downstream of the South Dam in the two ponds. This section discusses a subset of the water quality data, specifically EC, ammonia, nitrate, nitrite, chloride, sulphate, and other major ions, which were identified as geochemical tracers of TIA Reclaim Pond. Both sodium and potassium follow the major ion trend and were not discussed separately in this memo. For other parameters, there were no appreciable differences in concentration between flowing or ponded water at the toe samples and TL-1.

Table 2: Summary of 2020 North and South Dam Water Monitoring Data

Location	Date	Field pH	Field EC[2] uS/cm	Total Alkalinity mg/L as $CaCO_3$	SO_4 mg/L	Cl mg/L	Total Ammonia mg/L as N	NO_3 mg/L as N	NO_2 mg/L as N	Ca mg/L	Mg mg/L	K mg/L	Na mg/L	As mg/L	Co mg/L	Cu mg/L	Mn mg/L	Mo mg/L	Ni mg/L	Zn mg/L
North Dam Flowing Water (V-notch weir)	22-Jun-20	7.6	250	84	12	14	0.05	0.063	0.0013	25	5.1	2.0	10	0.00097	0.00031	0.0069	0.091	0.001	0.001	0.005
	30-Jun-20	7.9	410	110	37	40	0.041	0.34	0.0017	43	9.1	2.0	27	0.00058	0.0003	0.0065	0.013	0.001	0.001	0.005
	07-Jul-20	7.6	470	110	58	40	0.016	0.56	0.0014	39	10	2.1	33	0.0005	0.0003	0.0057	0.0067	0.001	0.001	0.005
	16-Jul-20	7.8	470	110	57	43	0.015	0.63	0.001	41	11	2.3	35	0.00049	0.00012	0.0071	0.0041	0.00062	0.00074	0.001
	30-Jul-20	7.9	570	130	80	42	0.022	0.76	0.0016	42	13	2.7	44	0.00046	0.00012	0.0056	0.0075	0.00075	0.00074	0.0019
	06-Aug-20	7.9	520	130	69	38	0.014	0.86	0.0027	45	12	2.6	43	0.00046	0.00013	0.0067	0.0062	0.001	0.00058	0.001
	19-Aug-20	7.8	530	140	65	32	0.011	0.66	0.0011	43	13	2.4	38	0.0005	0.0003	0.0061	0.0075	0.0011	0.001	0.005
	26-Aug-20	7.9	530	140	58	34	0.015	1	0.001	47	14	2.5	43	0.0005	0.0003	0.011	0.0063	0.0011	0.0013	0.005
	02-Sep-20	7.8	480	130	57	27	0.015	0.6	0.0018	45	12	1.8	33	0.00054	0.00013	0.0067	0.0063	0.00088	0.0011	0.001
	07-Sep-20	7.8	450	120	42	28	0.011	0.41	0.0016	48	12	1.8	26	0.00049	0.00011	0.0079	0.0047	0.00058	0.0014	0.001
	23-Sep-20	7.6	380	120	32	24	0.0095	0.19	0.001	44	8.7	1.3	19	0.00044	0.0001	0.0064	0.0031	0.00039	0.00093	0.001
SDSP_6/2/2020[1]	22-Jun-20	7.7	390	54	12	60	0.02	0.005	0.001	22	6.9	2.3	28	0.00071	0.0003	0.0073	0.0038	0.001	0.0012	0.005
SD Pond 1	23-Jul-20	7.1	*690*	170	4.2	110	0.016	0.025	0.005	38	18	0.59	77	0.0017	0.0027	0.00099	0.32	0.00022	0.004	0.0017
	30-Jul-20	7.1	660	180	5.4	94	0.038	0.005	0.001	33	18	2.7	67	0.0017	0.0021	0.0016	0.37	0.00035	0.0034	0.0017
	06-Aug-20	7	660	190	7.6	91	0.043	0.005	0.001	43	19	2.6	68	0.0013	0.0017	0.0011	0.27	0.0003	0.003	0.0022
	14-Aug-20	7.2	--	150	61	38	0.014	1.1	0.0013	38	12	2.8	47	0.00055	0.00015	0.0078	0.0072	0.0011	0.00077	0.001
	02-Sep-20	7.3	580	140	25	75	0.028	0.005	0.001	31	19	3.2	63	0.00075	0.00082	0.0025	0.097	0.00066	0.004	0.0047
	23-Sep-20	7.2	720	130	9	130	0.04	0.025	0.005	71	17	0.94	40	0.00067	0.0013	0.0026	0.22	0.000098	0.0033	0.0018
SD Pond 2	07-Jul-20	7.4	690	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	30-Jul-20	7.1	660	150	0.92	120	0.031	0.005	0.0015	35	19	2.9	66	0.0016	0.0037	0.001	0.67	0.00029	0.0046	0.0021
	06-Aug-20	7	680	190	2.3	100	0.064	0.005	0.001	43	20	2.2	69	0.0017	0.0021	0.001	0.38	0.00023	0.0042	0.001
	14-Aug-20	7.1	--	190	3.9	100	0.028	0.005	0.001	38	21	2.7	67	0.0013	0.0016	0.0011	0.31	0.0003	0.0042	0.0017
	02-Sep-20	7.4	540	140	28	74	0.027	0.005	0.001	28	18	3.6	61	0.00069	0.00055	0.0025	0.085	0.00057	0.0038	0.0067
	23-Sep-20	7.2	520	110	44	67	0.017	0.0062	0.001	26	17	4.1	55	0.00057	0.00068	0.0021	0.12	0.00046	0.0031	0.0015

Sources: \\srk.ad\dfs\na\van\Projects\01_SITES\Hope.Bay\1CT022.056_2020 Geochem Compliance\2020 Annual Reports\Doris TIA Seepage Memo\DamSeepage_HistoricalWQ_Compilation_2020.xlsx

Notes: Trace element for all samples is dissolved.

[1] Sample was classified as flowing water by TMAC but was collected from SD Pond 2.

[2] Field EC is reported for all samples except SD Pond 1 on July 23, 2020. Field EC was rejected, measurement was not included in analysis.

Table 3: Statistical Summary of Monitoring Data for TL-1, TL-5

Location	Year[1]	Statistic	Field pH	Field EC uS/cm	Total Alkalinity mg/L as $CaCO_3$	SO_4 mg/L	Cl mg/L	Total Ammonia mg/L as N	NO_3 mg/L as N	NO_2 mg/L as N	Ca mg/L	Mg mg/L	K mg/L	Na mg/L	As mg/L	Co mg/L	Cu mg/L	Mn mg/L	Mo mg/L	Ni mg/L	Zn mg/L
TL-1 (TIA Reclaim Pump)	2011-2016	Min	7.5	150	32	1	3.5	0.005	0.005	0.001	5.8	1.3	1.3	12	0.00017	0.0001	0.00072	0.0033	0.00053	0.0005	0.0013
		Median	7.5	150	35	2.4	39	0.05	0.05	0.05	12	5.7	1.6	14	0.0004	0.002	0.0013	0.005	0.005	0.002	0.002
		Max	7.5	150	45	5.7	63	0.26	1.2	0.05	21	9.7	2.6	24	0.0004	0.002	0.0014	0.018	0.005	0.002	0.012
		n	1	1	10	49	84	84	84	84	47	47	13	13	6	6	6	6	6	6	3
	2017	Min	7.5	340	75	81	60	0.21	0.085	0.0017	28	8.3	4.4	61	0.0004	0.0007	0.0067	0.054	0.00064	0.0016	0.0016
		Median	7.9	540	75	81	70	1.1	0.67	0.023	28	8.3	4.4	61	0.0004	0.0007	0.0067	0.054	0.00064	0.0016	0.0016
		Max	8.6	790	75	81	92	1.9	1.6	0.12	28	8.3	4.4	61	0.0004	0.0007	0.0067	0.054	0.00064	0.0016	0.0016
		n	14	13	1	1	17	30	19	19	1	1	1	1	1	1	1	1	1	1	1
	2018	Min	7.3	1100	82	260	110	0.92	0.61	0.02	56	21	15	220	0.00054	0.0014	0.0076	0.16	0.0013	0.0039	0.001
		Median	7.9	1900	93	300	380	2.7	1.1	0.2	67	30	18	300	0.00058	0.0015	0.013	0.31	0.0016	0.0042	0.002
		Max	10	2700	110	380	660	9.8	2	0.3	100	50	27	510	0.00087	0.0027	0.029	0.4	0.0026	0.0081	0.005
		n	34	30	10	10	18	49	18	18	13	13	13	14	13	13	13	13	13	13	14
	2019	Min	7.2	39	110	65	38	3.5	2.3	0.12	12	6.4	3.1	6	0.00076	0.0028	0.024	0.36	0.0028	0.007	0.002
		Median	7.8	4700	120	490	1100	4.9	2.7	0.19	140	74	35	750	0.11	0.3	0.19	0.45	0.29	0.12	0.5
		Max	8.7	8000	170	660	1500	7.5	3.9	0.99	160	110	52	1100	0.97	0.45	0.56	0.62	0.37	0.96	0.5
		n	50	50	18	19	21	46	19	19	46	46	46	46	46	46	46	46	46	46	46
	2020	Min	7.6	250	84	12	14	0.0095	0.063	0.001	25	5.1	1.3	10	0.00044	0.0001	0.0056	0.0031	0.00039	0.00058	0.001
		Median	7.8	470	120	57	34	0.015	0.6	0.0014	43	12	2.1	33	0.0005	0.00013	0.0067	0.0063	0.001	0.001	0.0019
		Max	7.9	570	140	80	43	0.05	1	0.0027	48	14	2.7	44	0.00097	0.00031	0.011	0.091	0.0011	0.0014	0.005
		N	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
TL-5 (Tailings Supernatant)	2017-2019 (Dissolved Metals)[2]	Min	6.1	7100	66	6	1200	11	0.1	0.02	110	76	62	1500	0.0014	0.007	0.0069	0.1	0.014	0.0069	0.005
		Median	8.2	8300	290	1900	1500	23	13	0.45	130	89	79	1800	0.0021	0.01	0.2	0.18	0.042	0.077	0.005
		Max	8.4	10000	350	2900	1800	61	40	1.2	160	110	100	2000	0.0063	0.025	150	1.3	0.11	3.5	0.26
		n	11	11	9	33	9	51	33	33	9	9	9	9	9	9	9	9	9	9	9
	2017-2018 (Total Metals)[3]	Min	--	--	--	--	--	--	--	--	51	22	39	510	0.001	0.0055	0.011	0.073	0.0033	0.017	0.0071
		Median	--	--	--	--	--	--	--	--	91	37	80	940	0.0042	0.013	0.11	0.16	0.0064	0.066	0.041
		Max	--	--	--	--	--	--	--	--	180	64	130	1500	0.04	0.037	0.71	0.91	0.011	0.12	0.43
		n	--	--	--	--	--	--	--	--	39	39	39	39	39	39	39	39	39	39	39
	2020 (Dissolved Metals)	Min	7.9	11000	270	1400	1800	28	5.8	0.39	120	110	74	1700	0.0016	0.0062	0.013	0.086	0.029	0.0088	0.01
		Median	8.3	13000	310	1800	2500	38	17	0.87	170	150	110	2300	0.0041	0.0095	0.16	0.15	0.055	0.079	0.01
		Max	8.4	20000	380	10000	3700	56	24	1.3	250	210	160	8000	0.014	0.047	2.2	0.62	0.1	0.57	0.05
		n	11	11	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12

Sources: \\srk.ad\dfs\na\van\Projects\01_SITES\Hope.Bay\1CT022.056_2020 Geochem Compliance\2020 Annual Reports\Doris TIA Seepage Memo\DamSeepage_HistoricalWQ_Compilation_2020.xlsx

Notes: All trace elements are dissolved except TL-5 monitoring data, as noted.

[1] Tailings deposition in the TIA commenced in 2017.

[2] Dissolved metals analysis at TL-5 commenced in 2019.

[3] Total metals data is presented for 2017 and 2018 because dissolved metals data is not available.

[4] Statistics for 2017-2018 have been updated for TL-5 from SRK (2019c) because SRK received additional sample results for 2017. Results were not reviewed under SRK's QA/QC program and are reported as received.

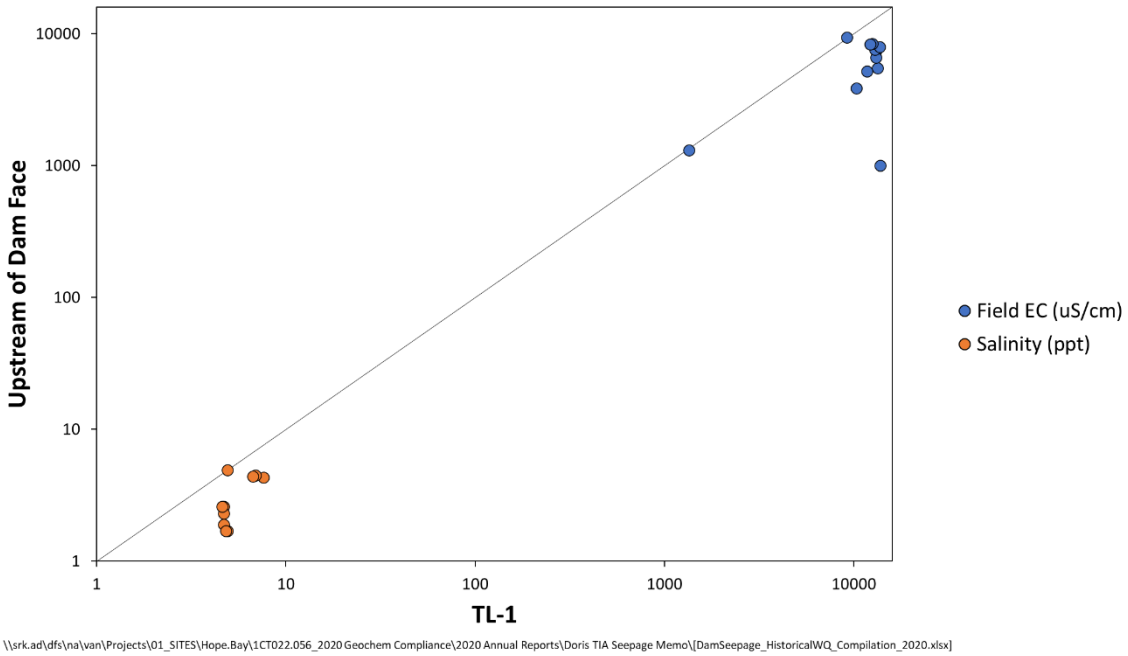
3.1.1 Comparison of TIA Surface Water Measurements

For each sampling even to flowing water at the toe of the North Dam sampling event, field measurements of EC and salinity were collected at TIA stations TL-1 and surface water immediately upstream of the North Dam to assess homogeneity of TIA pond water (Figure 3).

Salinity and EC values tended to be higher at TL-1 compared to the TIA water upstream of the dam face except for samples collected on June 30 (EC only) and September 23 (EC and salinity). The latter samples had field values at near parity on these dates while the majority of samples suggest heterogeneity within the TIA pond. The higher values at TL-1 are likely a result of periodic changes in site-wide water management of underground mine water.

The Doris mine intercepts naturally saline talik that interacts with drilling brines resulting in mine water flows characterized by elevated concentrations of magnesium, sodium, sulphate, chloride, and calcium[1]. In 2020, Doris mine water flows exceeding treatment plant capacity were typically pumped to the process plant pumpbox and then discharged to the TIA with the tailings slurry. During the open water season, this saline mine water was pumped to the TIA at a discharge location near the reclaim pump intake (TL-1). The higher field EC at TL-1 for samples in Figure 3 are likely a result of mine water input to the TIA. This trend was also observed in 2019 and suggests a degree of heterogeneity in salinity between TL-1 and the TIA pond upstream of the North Dam.

Figure 3: Comparison of Field EC and Salinity at TIA Surface Stations, 2020 Data



[1] From Doris Connector (TL-12a) and Doris North Ramp (level 4926 and TL-12)

3.1.2 Field pH and EC

Field pH data is presented in Figure 4 and is summarized as follows:

- Flowing water at the toe of the North Dam: Samples ranged from 7.6 and 7.9 in 2020 and has been stable since 2011.
- Flowing water at the toe of the South Dam: The single sample collected in 2020 had a pH of 7.7.
- South Dam Ponds: Pond 1 samples ranged from 7.0 to 7.3, pond 2 ranged from 7.0 to 7.4.

Field EC data is presented in Figure 5 and is summarized as follows:

- TL-5: Field EC values were higher than 2019 and ranged from 11,000 to 14,000 µS/cm except for three measurements ranging between 19,000 and >20,000 (over range) µS/cm in May, July, and August 2020.
- TL-1: Field EC increased compared to previous years. Measurements increased from ~6,000 to ~15,000 µS/cm between January 2020 and April 2020 and generally varied within this range for the remainder of the year. Two outlier measurements were recorded on June 30, 2020 (1,344 µS/cm) and December 20, 2020 (>20,000 µS/cm).
- Flowing water at the toe of the North Dam: Field EC ranged from 260 to 540 µS/cm and was within the range of historical data (<600 µS/cm since 2011).
- Flowing water at the toe of the South Dam: The single sample collected in 2020 had a field EC measurement of 391 µS/cm.
- South Dam ponds: Pond 1 samples ranged from 580 to 720 µS/cm. Pond 2 samples ranged from 520 to 690 µS/cm

Figure 4: Field pH Monitoring Data

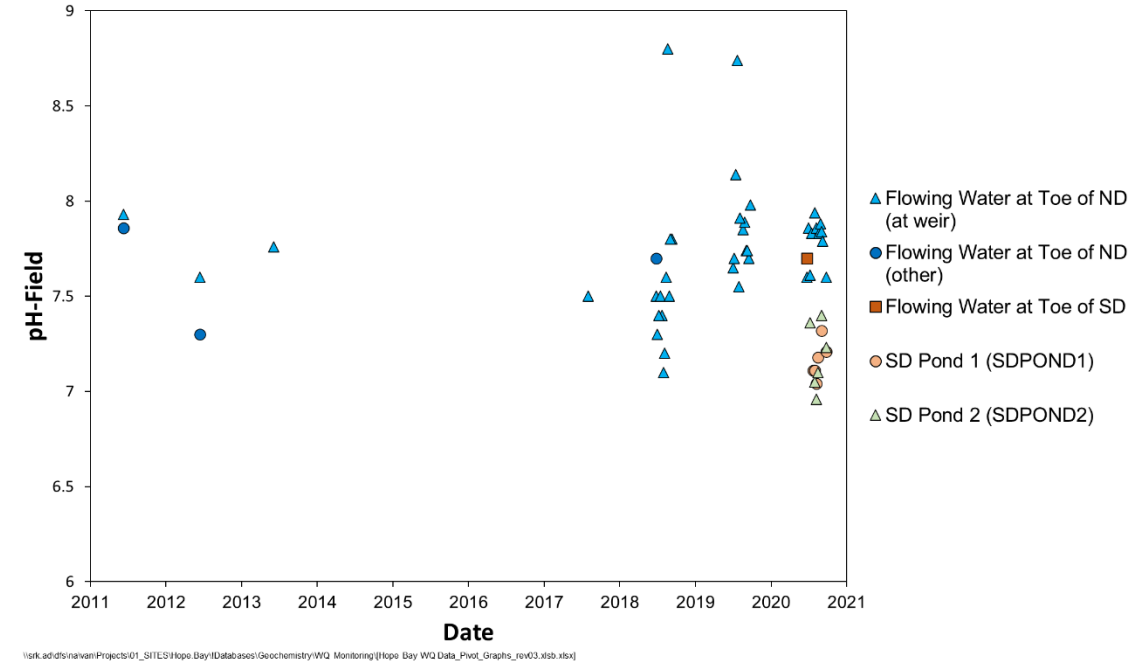
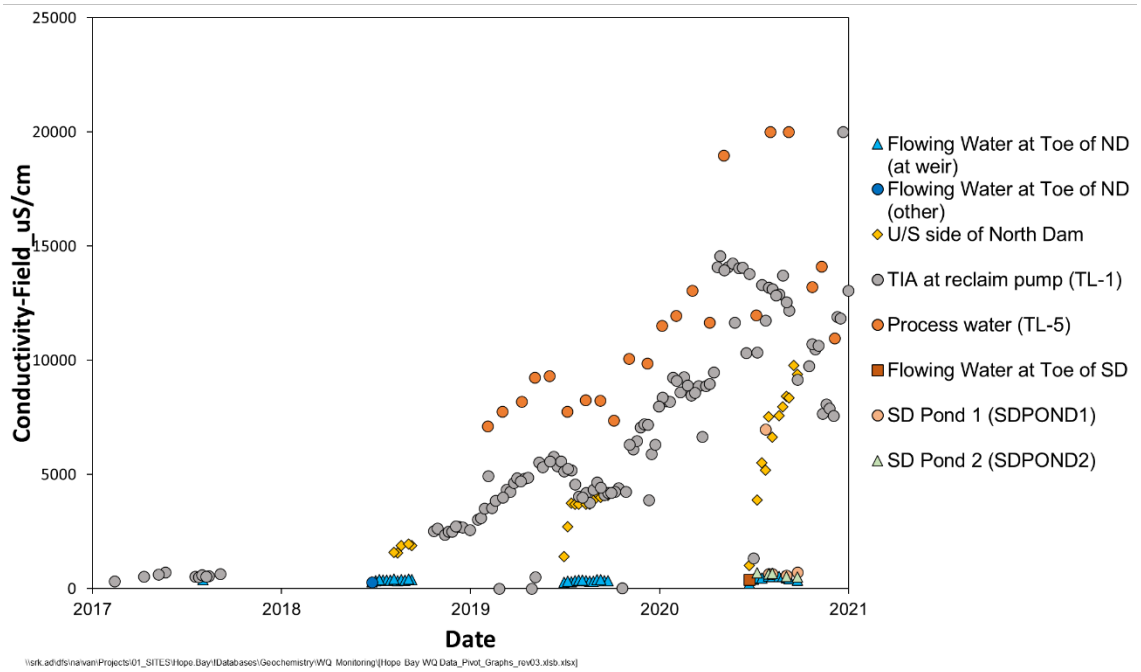


Figure 5: Field EC Monitoring Data



3.1.3 Ammonia, Nitrate, and Nitrite

Sources of ammonia, nitrate, and nitrite introduced to the TIA by tailings include i) blasting residues from milled ore and waste rock contact water, ii) process water containing the cyanide destruction supernatant, and iii) biological degradation in the TIA of cyanate and thiocyanate, which are produced as a by-product of the cyanide destruction circuit in the process plant. Ammonia from the process plant represents approximately 80% of the source load to the TIA.

Ammonia data are summarized as follows (Figure 6):

- TL-5: Ammonia concentrations generally showed an increasing trend since 2017, ranging from 28 to 56 mg/L in 2020. Concentrations remained higher than TL-1 by at least threefold.
- TL-1: Ammonia concentrations in 2020 were consistently ~9 mg/L from January to August, decreased to ~5 mg/L during September, and then increased to ~6 mg/L at the end of December. In 2020 and prior years, ammonia concentration showed an increasing trend with biologically-mediated seasonal fluctuations, where maximum concentrations are exhibited around late summer and minimum concentrations around September.
- Flowing water at the toe of the North Dam: Ammonia concentrations ranged from 0.0095 to 0.050 mg/L in 2020 and were roughly equivalent to concentrations observed in 2019 except for three samples that had higher concentrations in 2020 (0.0223, 0.0411, and 0.0501 mg/L). Consistent with SRK (2021), ammonia concentrations at TL-1 were greater than 200 times higher than samples of flowing water at the toe of the North Dam.
- Flowing water at the toe of the South Dam: The single sample collected was 0.020 mg/L and was >250 times lower than the process water.
- South Dam ponds: Pond 1 samples ranged from 0.014 to 0.040 mg/L. Pond 2 samples ranged from 0.017 to 0.064 mg/L. The pond samples were similar in ammonia concentration to the south dam pond samples and >300 times lower than the reclaim water.

Nitrate data are summarized as follows (Figure 7):

- TL-5: Nitrate concentrations were consistent with prior years and ranged from 5.8 to 24 mg/L in 2020. Minimum concentrations are comparable to TL-1, with peak concentrations >3 times higher than TL-1.
- TL-1: Nitrate concentrations showed an increasing trend since 2017 and ranged from 3.4 to 6.4 mg/L in 2020.
- Flowing water at the toe of the North Dam: Concentrations have remained stable since 2017 and ranged from 0.063 to 1.0 mg/L in 2020. Concentrations are >3 times lower than TL-1 concentrations.
- Flowing water at the toe of the South Dam: The single sample collected in 2020 was 0.005 mg/L.
- South Dam ponds: Pond 1 samples ranged from 0.005 to 1.1 mg/L and Pond 2 samples ranged from 0.005 to 0.0062 mg/L.

Nitrite data are summarized as follows (Figure 8):

- TL-5: Nitrite concentrations at TL-5 have been slightly increasing since 2017 and ranged from 0.40 to 1.3 mg/L in 2020. Concentrations at TL-5 were consistently higher than TL-1.
- TL-1: Nitrite concentrations at TL-1 were roughly equivalent to 2019 and ranged from 0.073 to 0.34 mg/L. Previous seasonal trends of nitrite concentrations indicated a decrease during the spring melt, followed by an increase in summer (June to August), and stable concentrations during fall and winter. In 2020, the decrease in nitrite concentrations was in summer (late June) rather than spring and was likely related to the full ice cover on the TIA as observed in satellite imagery dated June 16, 2020. Nitrite concentrations remained variable through the remainder of 2020.
- Flowing water at the toe of the North Dam: Nitrite concentration in 2020 ranged from below the detection limit (0.001 mg/L as N) to 0.0027 mg/L as N and was within the range of historical concentrations observed since 2017. Concentrations of nitrite at TL-1 were greater than 70 times higher than the samples of flowing water at the toe of the South Dam.
- Flowing water at the toe of the South Dam: The single sample collected in 2020 was 0.001 mg/L and was >70 times lower than reclaim water concentrations.
- South Dam ponds: Pond 1 samples range from 0.001 to 0.005 mg/L, while Pond 2 samples range from 0.001 to 0.0015 mg/L. All samples were over ten times lower than reclaim water concentrations.

Figure 6: Ammonia Monitoring Data

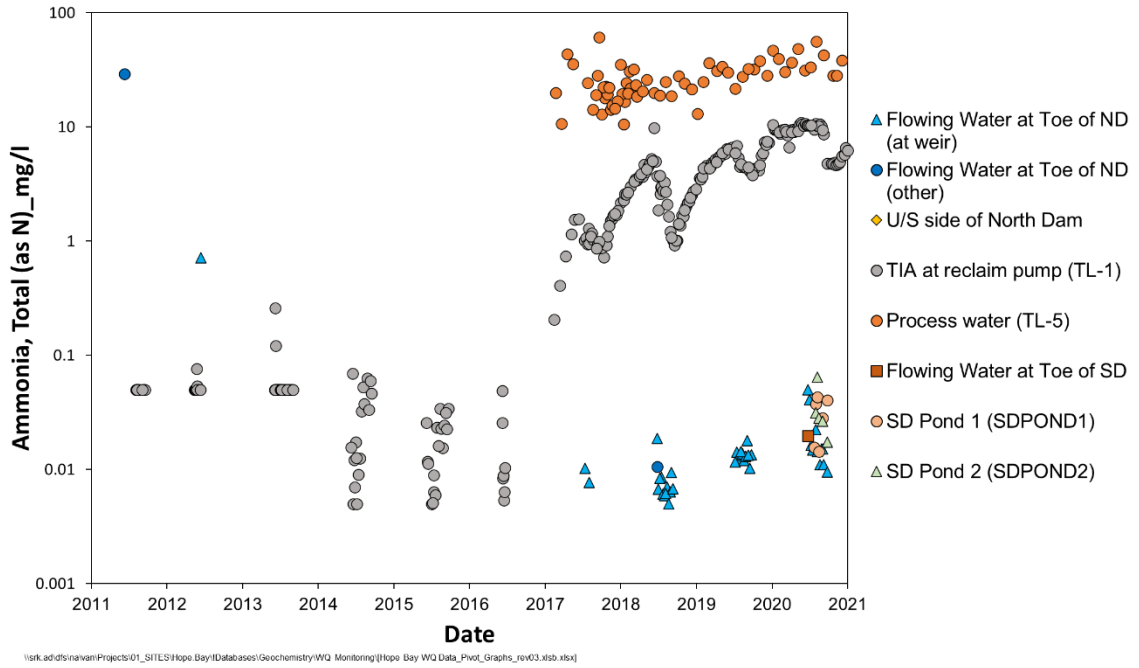


Figure 7: Nitrate Monitoring Data

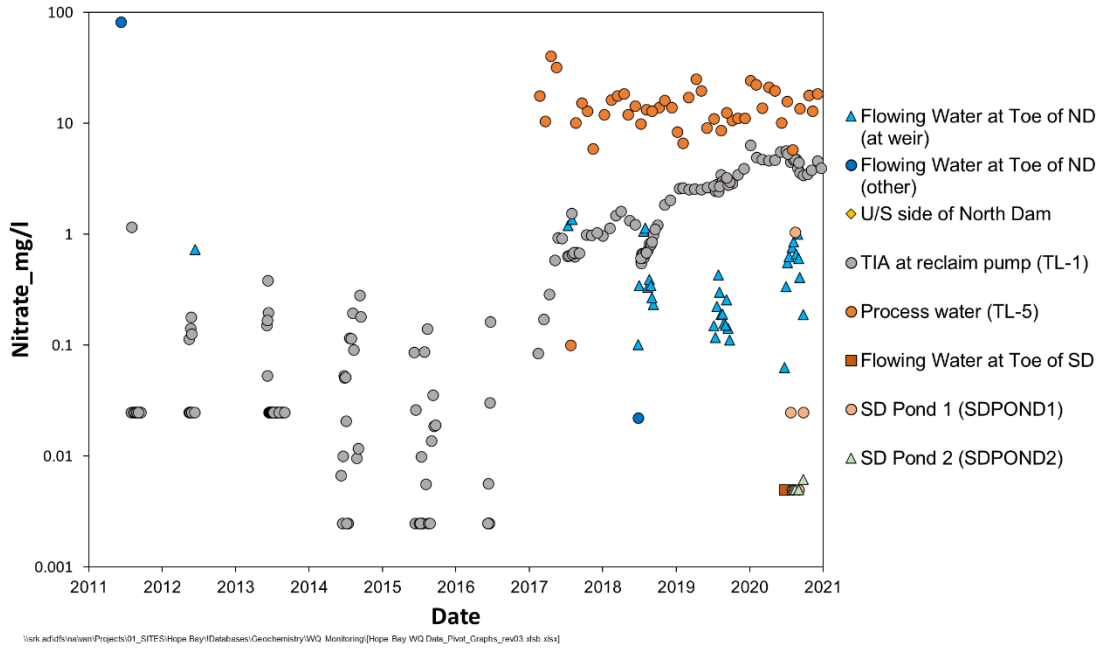
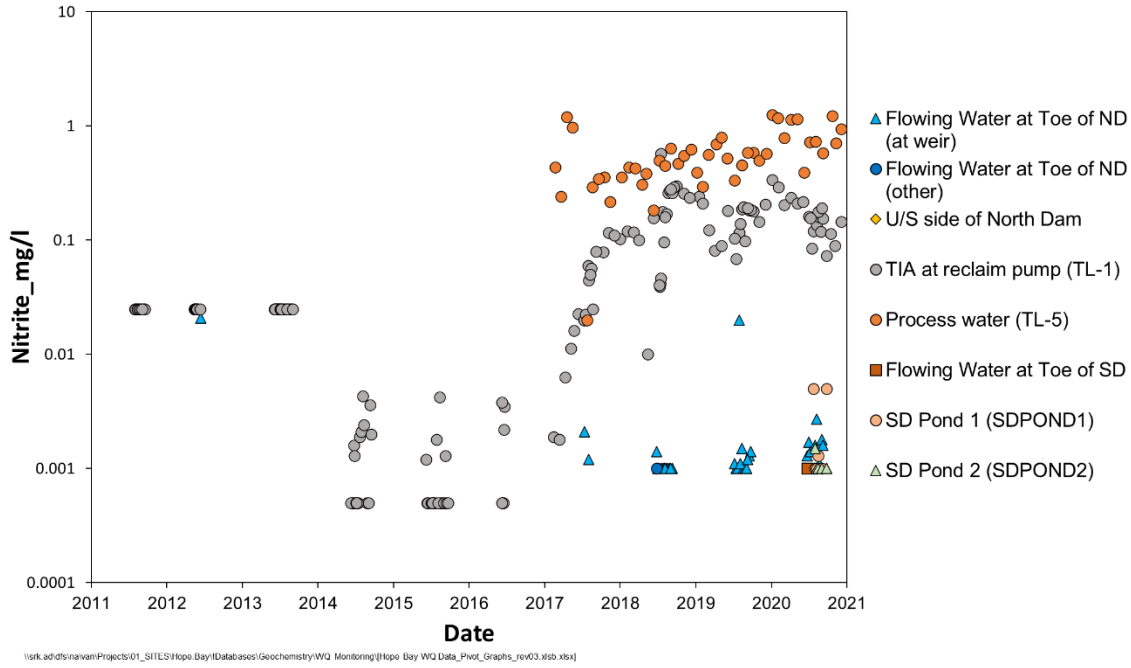


Figure 8: Nitrite Monitoring Data



3.1.4 Chloride and Sulfate

Calcium chloride drilling brines are used in the underground mine. As a result, the ore contains calcium chloride salts, which are processed in the process plant and subsequently discharged into the TIA. In addition, saline mine water containing calcium chloride is pumped to the TIA. Drilling brines are not used during quarry development; therefore, construction rock does not contain calcium chloride drilling brines. Chloride data are summarized as follows (Figure 9):

- TL-5: Chloride concentrations in 2020 were higher than 2019 and ranged from 1,800 to 3,700 mg/L
- TL-1: Chloride concentrations in 2020 were higher than 2019 and ranged from 1,500 to 2,700 mg/L. Overall chloride concentrations have been increasing since 2018 and exhibit a seasonal trend related to cryoconcentration, e.g. seasonal decrease during the open water season and increase during winter. One sample collected on December 20, 2020 had an anomalously high chloride concentration (7,920 mg/L).
- Flowing water at the toe of the North Dam: Chloride concentrations were similar to 2019, ranging from 14 to 43 mg/L. Concentrations at TL-1 were >50 times higher than in samples of flowing water at the toe of the North Dam.
- Flowing water at the toe of the South Dam: The single sample collected in 2020 was 60 mg/L. Concentrations at TL-1 were greater than 25 times higher than the sample of flowing water at the toe of the South Dam.
- South Dam ponds: Pond 1 ranged from 38 to 130 mg/L, while Pond 2 ranged from 67 to 120 mg/L. Concentrations at TL-1 were greater than 10 times higher than the pond samples.

The source of sulphate to the TIA is the processing of ore containing sulfide minerals and milling reagents. Sulfate data are summarized as follows (Figure 10):

- TL-5: Sulfate concentrations typically ranged from 1,400 to 2,400 mg/L and were consistent with previous years. One sample collected on August 2, 2020 had an anomalously high sulfate concentration (10,300 mg/L).
- TL-1: Sulfate concentrations ranged from 550 to 860 mg/L and have been increasing since 2017. Similar to chloride, sulfate concentrations appear to decrease seasonally during the open water season.
- Flowing water at the toe of the North Dam: Sulfate concentrations were more variable and elevated compared to previous years, ranging from 12 to 80 mg/L. Concentrations at TL-1 were greater than 10 times higher than in samples of flowing water at the toe of the North Dam.
- Flowing water at the toe of the South Dam: The single sample collected in 2020 was 12 mg/L. Concentrations at TL-1 were greater than 100 times higher than the sample of flowing water at the toe of the South Dam.
- South Dam ponds: Pond 1 samples ranged from 4.2 to 61 mg/L, while Pond 2 samples ranged from 0.92 to 44 mg/L. Concentrations at TL-1 were greater than 20 times higher than the pond samples.

Figure 9: Chloride Monitoring Data

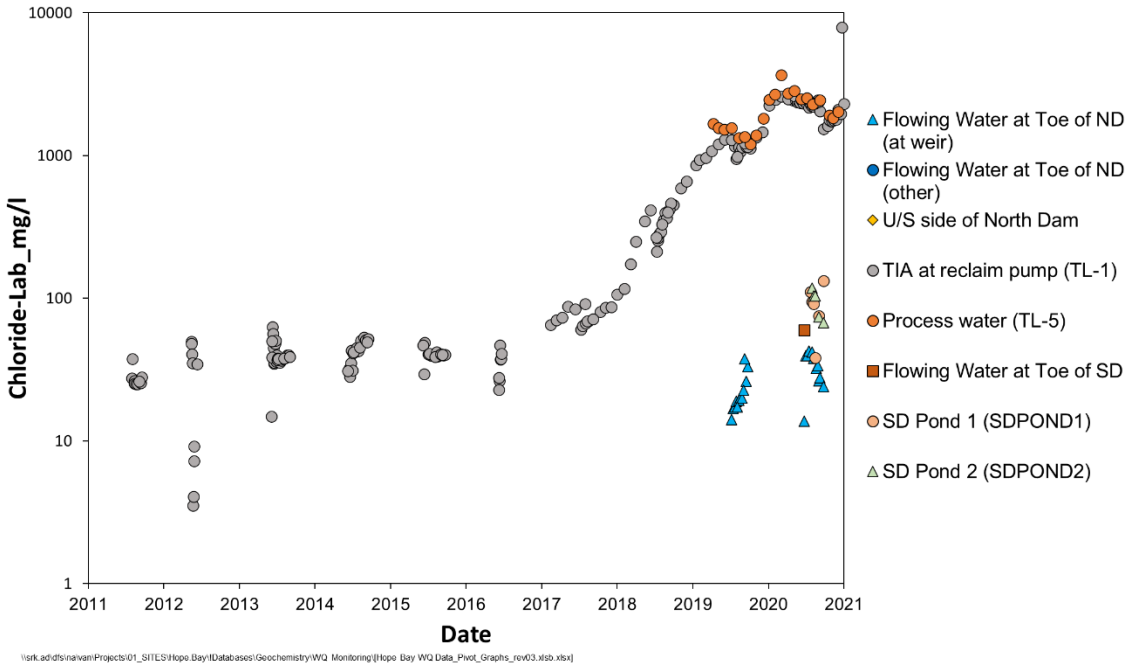
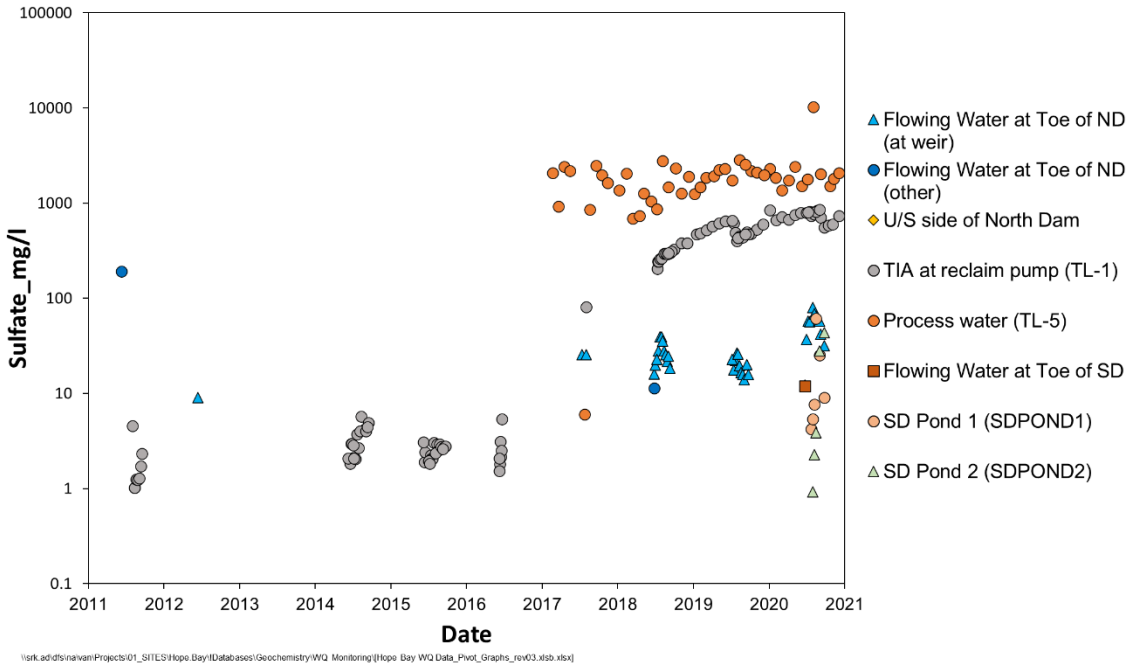


Figure 10: Sulfate Monitoring Data



3.2 Major Ion Chemistry

Table 4 summarizes the major ion chemistry of the South Dam Pond 1 and Pond 2 samples, the one sample of flowing water at the toe of the South Dam, and TL-1 and samples of flowing water at the toe of the North Dam prior to tailings deposition (2011-16) and since tailings deposition (2017-20). Figure 11 presents a Piper diagram for all samples with complete major ion chemistry.

Figure 11 indicates that almost all samples can be categorized into the six following geochemical groups: i) TL-1 samples collected prior to tailings deposition (2011-16); ii) TL-1 in 2017 (note one sample plotted in Figure 11); iii) TL-1 in 2018 to 2020; iv) samples of flowing water at the toe of the North dam from all years (2011-20); v) TIA pond water at the south dam (2019); and vi) sample of water at the toe of the South Dam. Of note is that the major ion chemistry of the samples of flowing water at the toe of the North Dam is geochemically distinct from TL-1, both prior to and after tailings deposition. Each group is discussed as follows:

- TL-1
  - 2011-16: Prior to tailings deposition, the major cations were characterized by sodium and calcium (medians of 14 and 7.5 mg/L, respectively) and the major anions by bicarbonate and chloride (medians of 35 mg/L as $CaCO_3$ and 26 mg/L, respectively).
  - 2017: Tailings deposition commenced in January 2017. The data from the one sample collected in August indicated that the major cation chemistry continued to be dominated by sodium and calcium but at higher concentrations (61 and 28 mg/L, respectively) and major anion chemistry shifted from bicarbonate-chloride to sulphate-bicarbonate (81 mg/L as $CaCO_3$ and 75 mg/L, respectively).
  - 2018-20: The major cation chemistry continued to be dominated by sodium and calcium but at increasingly higher concentrations each year (medians increasing from 290 to 1,400 mg/L and 62 to 220 mg/L, respectively) and that the major anion chemistry shifted from sulphate-bicarbonate to chloride-sulphate (medians increasing from 370 to 2,300 mg/L and 300 to 760 mg/L, respectively).
- TIA Pond Water at South Dam:
  - 2019: Samples from Spigot-1 and Spigot 2 (located at the tailings beach) were geochemically distinct from Spigot-3. At the time of sampling, tailings slurry had not yet been discharged from Spigot-3. The major cation chemistry for all three samples was dominated by sodium (range from 360 to 1,100 mg/L) while concentrations of calcium, magnesium and potassium were near equivalent (range from 44 to 97 mg/L, 43 to 78 mg/L, and 33 to 63 mg/L, respectively). For samples Spigot-1 and Spigot-2, the major anion chemistry was dominated by chloride and sulphate (range from 850 to 1,300 mg/L and 1,300 to 1,500 mg/L, respectively) whereas the dominant anions at Spigot-2 bicarbonate and chloride (580 mg/L and 410 mg/L, respectively). Notably, sulphate concentrations at Spigot-3 were low (3.5 mg/L). Lower anion concentrations may be linked to a flushing of this area with spring runoff.
- Flowing water at the toe of the North Dam: All samples are presented as one series in Figure 11 except the sample collected in 2011 (sample ID 11-TLR5). Major ion concentrations are higher for

11-TLR-15 compared to all other samples of flowing water at the toe of the North Dam, including sample 12-TLR-14. The higher ion concentrations may be attributable to the hypersaline pocket of groundwater that was intersected during the construction season prior to sample collection. The major ion chemistry of 12-TLR-14 and the 2017-20 samples is summarized as follows:

- 12-TLR-14 was collected at the same location as the v-notch weir with the major cation chemistry characterized by calcium and sodium (38 and 27 mg/L, respectively) and major anion chemistry characterized by alkalinity and chloride (150 mg/L as $CaCO_3$ and 30 mg/L, respectively).
- 2017-20: Compared to 12-TLR-14, the major ion chemistry was equivalent for cations (2020 median calcium and sodium concentrations of 43 and 33 mg/L, respectively) but variable compared to selected anions. Consistent with 12 TLR-14, major anion chemistry was dominated by alkalinity with equivalent concentrations (2020 median of 120 mg/L as $CaCO_3$); however, based on median concentrations, chloride and sulphate were both significant anions (2020 medians of 34 and 57 mg/L, respectively). Chloride and sulphate concentrations for the 2017-20 samples are variable and the range of concentrations (14 to 43 mg/L and 12 to 80 mg/L, respectively) are equivalent to 12-TLR-14.

- Water at the toe of the South Dam: The major ion composition of water at the toe of the South Dam are equivalent to baseline TL-1 samples (2011 to 2016) collected prior to tailings discharge. The major ion chemistry is summarized as follows:
  - Cations were dominated by calcium and sodium. The sample of flowing water at the toe of the South Dam median concentrations for calcium and sodium were 22 and 28 mg/L while ponds 1 and 2 had higher median concentrations for calcium (38 and 35 mg/L) and sodium (65 to 68 mg/L).
  - Anion chemistry was dominated by total alkalinity and chloride. The sample of flowing water at the toe of the South Dam median concentrations for total alkalinity and chloride were 54 and 60 mg/L while ponds 1 and 2 had higher median concentrations of total alkalinity (160 and 93 mg/L) and chloride (150 and 100 mg/L). The South dam samples exhibited variability in relative amounts of chloride and sulphate.
  - The flowing water at the toe of the South Dam sample is interpreted to represent ponded water based on major ion chemistry and other data discussed in this memo.

Table 4: Summary of Major Ion Chemistry for TL-1, flowing water at the toe of the North Dam, flowing water at the toe of the South Dam, and, South Dam Pond Samples

Station	Date Range	Statistic[1]	Cations[2]				Anions[2]		
			Ca	Mg	K	Na	Total Alkalinity[3]	Cl	SO_4
Flowing Water at the Toe of the North Dam	2011-13	11-TLR5	73	62	34	460	230	690	190
		12-TLR-14	38	9.9	3.8	27	150	30	9
	2017-19	Median	39	9.0	2.0	21	130	20	22
		Count	28	28	28	28	28	28	28
	2020	Median	43	12	2.1	33	120	34	57

Station	Date Range	Statistic[1]	Cations[2]				Anions[2]		
			Ca	Mg	K	Na	Total Alkalinity[3]	Cl	SO_4
		Count	11	11	11	11	11	11	11
TL-1	2011-16	Median	7.5	5	1.6	14	35	26	1.5
		Count	10	10	10	10	10	10	10
	2017	August	28	8.3	4.4	61	75	67	81
	2018	Median	62	28	17	290	100	370	300
		Count	8	8	8	8	8	8	8
	2019	Median	130	72	31	690	120	1100	480
		Count	21	21	21	21	21	21	21
	2020	Median	216	144	55.6	1410	175	2290	764
		Count	21	21	21	21	21	21	21
TIA Pond at South Dam	2019	SRK19-SD-SPIGOT1	97	78	63	1300	290	1300	1500
		SRK19-SD-SPIGOT2	60	73	58	1100	290	850	1300
		SRK19-SD-SPIGOT3	44	45	33	360	580	410	3.5
SD Pond 1	2020	Median	38	18	2.6	65	160	93	8.3
		Count	6	6	6	6	6	6	6
SD Pond 2	2020	Median	35	19	2.9	66	150	100	3.9
		Count	5	5	5	5	5	5	5
South Dam SDSP Sample	2020	SDSP_6/22/2020	22	6.9	2.3	28	54	60	12

Sources: \\srk.ad\dfs\na\van\Projects\01_SITES\Hope.Bay\1CT022.037_2019 Geochem Compliance\Task 145 - TIA Dam Seepage\Database Export\!TMAC_DMS_LinkedSpreadsheet_WQ_pivot_rtc.xlsx]

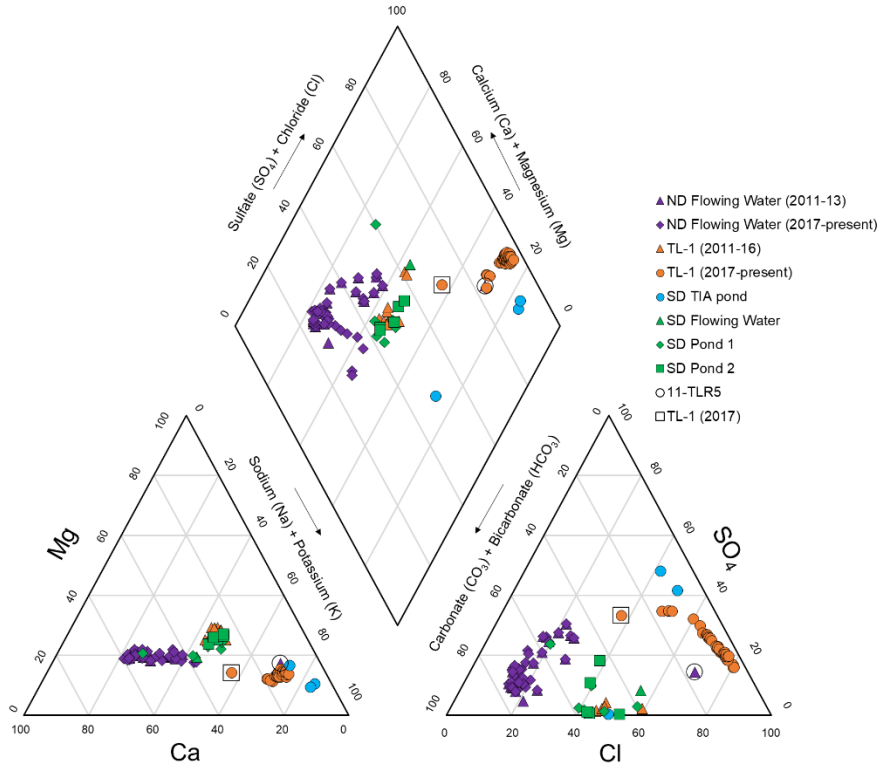
Notes:

[1] Sample IDs presented for North Dam ponding (2011-2013), TIA pond water, and South Dam ponding samples

[2] All units mg/L. Units for Alkalinity are mg/L as $CaCO_3$.

[3] Alkalinity in Figure 11 plotted as bicarbonate.

Figure 11: Piper Plot of TL-1, flowing water at the toe of the North Dam, flowing water at the toe of the South Dam, and, South Dam Pond Samples



Sources: \\srk.ad\dfs\na\van\Projects\01_SITES\Hope.Bay\!Databases\Geochemistry\WQ Monitoring\[Hope Bay WQ Data_Pivot_Graphs_rev03.xlsb.xlsx]

Notes: Alkalinity plotted as bicarbonate.

4 Conclusion and Recommendations

In 2017, TMAC initiated a monitoring program of flowing water at the toe of the North Dam by request from the EOR, including sample collection for water quality analysis. A similar monitoring program was implemented after construction of the South Dam.

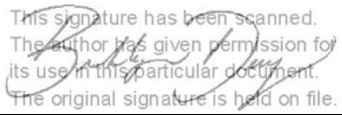
SRK reviewed the water quality database for flowing water at the toe of the North and South Dam pond samples[2] and SNP stations TL-1 (TIA Reclaim Pond water collected at the reclaim pump), TL-5 (tailings slurry process water discharged to the TIA) to investigate the potential sources of the flowing water at the toe of the North and South Dam. In 2020, the absence of flowing water was noted for each weekly inspection of the South Dam downstream toe.

A review of the geochemical data related to the flowing water at the toe of the North and South Dam ponded water assessment is summarized as follows:

- EC, ammonia, nitrate, nitrite, chloride and sulphate were identified as geochemical tracers of TIA Reclaim Pond water, with concentrations in TIA Reclaim Pond water uniformly higher than samples of flowing water at the toe of the North Dam and South Dam ponded water samples.
- Major ion concentrations and chemistry as assessed using a Piper diagram indicated that:
  - Major anion chemistry of TIA baseline samples (prior to tailings deposition) was dominated by alkalinity and chloride, and since deposition of tailings TIA Reclaim Pond water has evolved to be dominated by chloride and sulphate.
  - Samples of flowing water at the toe of the North Dam are geochemically distinct from TIA Reclaim Pond water, prior to and after tailings deposition in the TIA.
  - South Dam ponded water samples are geochemically similar to TIA baseline samples (prior to tailings deposition) and distinct from TIA Reclaim Pond water after tailings deposition in the TIA.
- For other parameters, there were no appreciable differences in concentration between the samples of flowing water at the toe of the North Dam and TIA Reclaim Pond water.
- No data suggest the presence of TIA Reclaim Pond water in the flowing water at the toe of the North Dam or in the South Dam ponds.

[2] Based on the data and field observations, the South Dam flowing water sample from 2020 is summarized herein as a ponded water sample but was discussed as a flowing water sample in the text.

Regards,
SRK Consulting (Canada) Inc.



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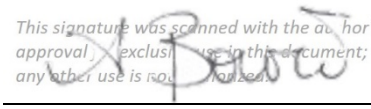

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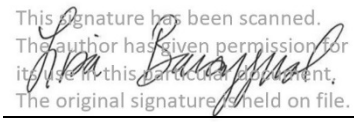
Reviewed by:



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Attachments:

Attachment 1 2020 QA/QC Summary
Attachment 2 Water Quality Data, 2020 North and South Dam Samples

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The opinions expressed in this document have been based on the information available to SRK at the time of preparation. SRK has exercised all due care in reviewing information supplied by others for use on this project. While SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information, except to the extent that SRK was hired to verify the data.

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Attachment 1 2020 QA/QC Summary

Table 5: Summary of QA/QC Assessment of 2020 Data for TL-1 Samples

QC Test	SRK QC Criteria	Results
Physical Test[1]		
Field Blank (n=1) for pH, TSS, and Turbidity	Minimum criteria is <2X DL, will accept <5X DL	All passed.
Method Blank (n=47) for TSS, (n=47) for TDS, (n=19) for EC, (n=20) for Turbidity, and (n=4) for Total Alkalinity	<2X DL	All passed.
Field Duplicate (n=0)	For samples >10X DL should be within +/-30% RPD	--
Leachate Duplicate (n=25) for TSS, (n=14) for pH, (n=15) for Turbidity, (n=7) for EC, (n=4) for Total Alkalinity, and (n=3) for TDS	For samples >10X DL should be within +/-20% RPD	All passed.
Field pH vs. Lab pH (n=46)	Difference should not be greater than 1 pH unit	3 samples failed: 2020-11-11 (YL2000203-001) 2020-11-18 (YL2000217-001) 2020-11-24 (YL2000244-001) Lab recheck confirmed. Data accepted.
Field EC vs Lab EC (n=20)	For samples > 10X the detection limit (DL), % RPD should be within +/-30%	9 samples failed: 2020-05-05 (L2444630-1) 2020-06-02 (L2456734-1) 2020-07-06 (L2476565-2) 2020-08-06 (L2485657-1) 2020-08-13 (L2489482-1) 2020-08-19 (L2492292-2) 2020-09-02 (L2498918-1) 2020-10-15 (YL2000126-001) 2020-11-03 (YL2000185-001) Lab EC were rechecked and confirmed, Field EC were verified. Data accepted.
Laboratory Control Sample (n=19) for EC, Turbidity, (n=12) for TDS, (n=47) for TSS, and (n=4) for Total Alkalinity; Certified Reference Material (n=45) for pH	Within specified tolerance ranges.	All passed.
Anions and Nutrients[2]		
Field Blank (n=1) for Total Ammonia, Un-ionized Ammonia, and Cl	Minimum criteria is <2X DL, will accept <5X DL	All passed.
Method Blank (n=15) for Total Alkalinity, (n=47) for Total Ammonia, (n=36) for Cl, (n=19) for Nitrate (as N), Nitrite (as N), (n=22) for SO4, (n=11) for TKN, (n=20) for Total N, and (n=12) for Ortho-P, Total P	<2X DL	All passed.
Field Duplicate (n=0)	For samples >10X DL should be within +/-30% RPD	--
Leachate Duplicate (n=3) for TKN, Total Alkalinity and Total P, (n=6) for Total N, (n=6) for Nitrate (as N), Nitrite (as N), (n=7) for SO4, (n=16) for Cl, and (n=4) for Ortho-P	For samples >10X DL should be within +/-20% RPD	All passed.
Ion Balance (n=27)	EC>100 uS/cm, % difference should be within +/-10%	All passed.

QC Test	SRK QC Criteria	Results
Laboratory Control Sample (n=14) for Total Alkalinity, (n=44) for Total Ammonia, (n=34) for Cl, (n=19) for Nitrate (as N), Nitrite (as N), (n=18) for Sulfate (SO4), (n=9) for TKN, Ortho-P, (n=14) for Total N, and (n=11) for Total P	Within specified tolerance ranges.	All passed.
Cyanides[3]		
Field Blank (n=1) for Cyanate, Cyanide-WAD, Total Cyanide and SCN	Minimum criteria is <2X DL, will accept <5X DL	All passed.
Method Blank (n=45) for Cyanide-WAD, Total Cyanide, (n=44) for Cyanate, SCN, and (n=18) for Cyanide-Free	<2X DL	All passed.
Field Duplicate (n=0)	For samples >10X DL should be within +/-30% RPD	--
Leachate Duplicate (n=19) for SCN, (n=13) for Total Cyanide, (n=16) for Cyanate, (n=4) for Cyanide-Free, and (n=11) for Cyanide-WAD	For samples >10X DL should be within +/-20% RPD	All passed.
Laboratory Control Sample (n=45) for Cyanide-WAD, Total Cyanide, SCN, (n=43) for Cyanate, and (n=18) for Cyanide, Free	Within specified tolerance ranges.	All passed.
Trace Metals by ICP-MS and Hg-CVAAS		
Field Blank (n=1) for Total and Dissolved	Minimum criteria is <2X DL, will accept <5X DL	All passed.
Method Blank (n=45) for Total and (n=44) for Dissolved, (n=43) for Total-Hg, and (n=39) for Dissolved-Hg	<2X DL	1 sample failed: 2020-08-13 (L2489482-1) - Al failed with ALS lab qualifier. Data accepted.
Field Duplicate (n=1) for Dissolved and (n=1) for Total	For samples >10X DL should be within +/-30% RPD	--
Leachate Duplicate (n=14) for Total and (n=17) for Dissolved, (n=15) for Total-Hg, and (n=18) for Dissolved-Hg	For samples >10X DL should be within +/-20% RPD	--
Total vs Dissolved Metals (n=45)	Total Metals>Dissolved metals. Total Metals should be greater than Dissolved Metals, if not the % difference should be within +/-20%. ALS would use 10X DL, Maxxam would use 5X DL	All passed.
Laboratory Control Sample (n=44) for Total and (n=45) for Dissolved, (n=43) for Total-Hg, and (n=39) for Dissolved-Hg	Within specified tolerance ranges.	All passed.
Volatile Organic Compounds[4] (Matrix: Water)		
Field Blank (n=0)	Minimum criteria is <2X DL, will accept <5X DL	--
Method Blank (n=2) for Benzene, Ethylbenzene, Methyl-tert-butyl ether [MTBE], Styrene, Toluene, and Xylene (m+p, o)	<2X DL	All passed.

QC Test	SRK QC Criteria	Results
Field Duplicate (n=0)	For samples >10X DL should be within +/-30% RPD	--
Leachate Duplicate (n=2) for Benzene, Ethylbenzene, Methyl-tert-butyl ether [MTBE], Styrene, Toluene, and Xylene (m+p, o)	For samples >10X DL should be within +/-20% RPD	All passed.
Laboratory Control Sample (n=2) for Benzene, Ethylbenzene, Methyl-tert-butyl ether [MTBE], Styrene, Toluene, and Xylene(m+p, o)	Within specified tolerance ranges.	All passed.

Sources: \\srk.ad\dfs\na\van\Projects\01_SITES\Hope.Bay\1CT022.056_2020 Geochem Compliance\330 - Data QAQC and Mgmt\[Hope Bay_North and South Dam_Seepage_SummaryQAQC_2020_rtc_rev01.xlsx]

Notes:

[1] Conductivity (EC), pH, Total Suspended Solids (TSS)

[2] Total Alkalinity, Phenolphthalein Alkalinity, Total Ammonia, Unionized Ammonia, Cl, NO3, NO2, SO4

[3] Cyanide-WAD, Total CN, Cyanate, Thiocyanate (SCN), Cyanide-Free

[4] Benzene, Ethylbenzene, Methyl-Tert-Butyl-Ether(MTBE), Styrene, Toluene, Xylene (m+p, o).

Table 6: Summary of QA/QC Assessment of 2020 Data for North Dam Samples

QC Test	SRK QC Criteria	Results
Physical Test[1]		
Field Blank (n=0)	Minimum criteria is <2X DL, will accept <5X DL	--
Method Blank (n=10) for EC, (n=11) for TSS, (n=4) for Turbidity, and (n=1) for Total Alkalinity	<2X DL	All passed.
Field Duplicate (n=0)	For samples >10X DL should be within +/-30% RPD	--
Leachate Duplicate (n=6) for TSS, (n=2) for EC and pH, and (n=1) for Total Alkalinity	For samples >10X DL should be within +/-20% RPD	All passed.
Field pH vs. Lab pH (n=10)	Difference should not be greater than 1 pH unit	All passed.
Field EC vs Lab EC (n=10)	For samples > 10X the detection limit (DL), % RPD should be within +/-30%	All passed.
Laboratory Control Samples (n=10) for EC, (n=11) for TSS, and (n=4) for Turbidity; Certified Reference Material (n=9) for pH	Within specified tolerance ranges.	All passed.
Anions and Nutrients[2]		
Field Blank (n=0)	Minimum criteria is <2X DL, will accept <5X DL	--
Method Blank (n=9) for Total Alkalinity, and Total Ammonia, (n=10) for Cl, SO4, Nitrate (as N), Nitrite (as N), and (n=8) for Total N	<2X DL	All passed.
Field Duplicate (n=0)	For samples >10X DL should be within +/-30% RPD	--
Leachate Duplicate (n=4) for Total N, (n=2) for Total Ammonia, and SO4, and (n=1) for Total Alkalinity, Cl, Nitrate (as N), Nitrite (as N)	For samples >10X DL should be within +/-20% RPD	All passed.
Ion Balance (n=9)	EC>100 uS/cm, % difference should be within +/-10%	All passed.
Laboratory Control Sample (n=9) for Total Alkalinity, and Total Ammonia, (n=10) for Cl, Nitrate (as N), Nitrite (as N), SO4, and (n=8) for Total N.	Within specified tolerance ranges.	All passed.
Cyanides[3]		
Field Blank (n=0)	Minimum criteria is <2X DL, will accept <5X DL	--

QC Test	SRK QC Criteria	Results
Method Blank (n=9) for Total Cyanide, Cyanate, Cyanide-Free, and SCN	<2X DL	All passed.
Field Duplicate (n=0)	For samples >10X DL should be within +/-30% RPD	--
Leachate Duplicate (n=3) for SCN, (n=1) for Total Cyanide, (n=1) for Cyanate, and Cyanide-Free	For samples >10X DL should be within +/-20% RPD	All passed.
Laboratory Control Sample (n=8) for Total Cyanide, Cyanide-Fee, and SCN, and (n=9) for Cyanate	Within specified tolerance ranges.	All passed.
Trace Metals by ICP-MS and Hg-CVAAS		
Field Blank (n=0)	Minimum criteria is <2X DL, will accept <5X DL	--
Method Blank (n=8) for Total and Dissolved, (n=8) for Total-Hg, and (n=7) for Dissolved-Hg	<2X DL	All passed.
Field Duplicate (n=0)	For samples >10X DL should be within +/-30% RPD	--
Leachate Duplicate (n=1) for Total, (n=3) for Dissolved, and (n=3) for Total-Hg	For samples >10X DL should be within +/-20% RPD	All passed.
Total vs Dissolved Metals (n=8)	Total Metals>Dissolved metals. Total Metals should be greater than Dissolved Metals, if not the % difference should be within +/-20%. ALS would use 10X DL, Maxxam would use 5X DL	1 sample failed: 2020-08-26 (L2495677-1) for Ba. Confirmed by recheck. Data accepted.
Laboratory Control Sample (n=8) for Total and Dissolved, (n=8) for Total-Hg, and (n=7) for Dissolved-Hg	Within specified tolerance ranges.	All passed.

Sources: \\srk.ad\dfs\na\van\Projects\01_SITES\Hope.Bay\1CT022.056_2020 Geochem Compliance\330 - Data QAQC and Mgmt\[Hope Bay_North and South Dam_Seepage_SummaryQAQC_2020_rtc_rev01.xlsx]

Notes:

[1] Conductivity (EC), pH, Total Suspended Solids (TSS)

[2] Total Alkalinity, Phenolphthalein Alkalinity, Total Ammonia, Unionized Ammonia, Cl, NO3, NO2, SO4

[3] Cyanide-WAD, Total CN, Cyanate, Thiocyanate (SCN), Cyanide-Free

Table 7: Summary of QA/QC Assessment of 2020 Data for South Dam Pond 1 Samples

QC Test	SRK QC Criteria	Results
Physical Test[1]		
Field Blank (n=0)	Minimum criteria is <2X DL, will accept <5X DL	--
Method Blank (n=6) for TSS, (n=5) for EC, and (n=1) for Turbidity, Total Alkalinity	<2X DL	All passed.
Field Duplicate (n=0)	For samples >10X DL should be within +/-30% RPD	--
Leachate Duplicate (n=4) for EC, (n=2) for pH, (n=3) for TSS, and (n=1) for Total Alkalinity, Turbidity	For samples >10X DL should be within +/-20% RPD	All passed.
Field pH vs. Lab pH (n=5)	Difference should not be greater than 1 pH unit	All passed.
Field EC vs Lab EC (n=5)	For samples > 10X the detection limit (DL), % RPD should be within +/-30%	1 sample failed: 2020-07-23 (L2479634-1). Lab EC was confirmed by recheck, Field EC was verified and rejected. All others passed.
Laboratory Control Samples (n=5) for EC, (n=6) for TSS, and (n=1) for Turbidity; Certified Reference Material (n=5) for pH	Within specified tolerance ranges.	All passed.
Anions and Nutrients[2]		
Field Blank (n=0)	Minimum criteria is <2X DL, will accept <5X DL	--
Method Blank (n=4) for Total Ammonia, Total Alkalinity, and (n=5) for Nitrate (as N), Nitrite (as N), SO4, Cl	<2X DL	All passed.
Field Duplicate (n=0)	For samples >10X DL should be within +/-30% RPD	--
Leachate Duplicate (n=1) for Total Alkalinity, Cl, Nitrate (as N), Nitrite (as N), Total N, and (n=2) for SO4	For samples >10X DL should be within +/-20% RPD	All passed.
Ion Balance (n=4)	EC>100 uS/cm, % difference should be within +/-10%	All passed.
Laboratory Control Sample (n=4) for Total Ammonia, Total Alkalinity, and (n=5) for Nitrate (as N), Nitrite (as N), SO4, Cl	Within specified tolerance ranges.	All passed.
Cyanides[3]		
Field Blank (n=0)	Minimum criteria is <2X DL, will accept <5X DL	--

QC Test	SRK QC Criteria	Results
Method Blank (n=4) for Total Cyanide, Cyanate, Cyanide-Free, and SCN, and (n=3) for Cyanide-WAD	<2X DL	All passed.
Field Duplicate (n=0)	For samples >10X DL should be within +/- 30% RPD	--
Leachate Duplicate (n=1) for Total Cyanide, and SCN	For samples >10X DL should be within +/- 20% RPD	All passed.
Laboratory Control Sample (n=4) for Total Cyanide, Cyanate, Cyanide-Free, and SCN, and (n=3) for Cyanide-WAD	Within specified tolerance ranges.	All passed.
Trace Metals by ICP-MS and Hg-CVAAS		
Field Blank (n=0)	Minimum criteria is <2X DL, will accept <5X DL	--
Method Blank (n=4) for Total and Dissolved, (n=4) for Total Hg, and (n=3) for Dissolved-Hg	<2X DL	All passed.
Field Duplicate (n=0)	For samples >10X DL should be within +/- 30% RPD	--
Leachate Duplicate (n=1) for Total and Dissolved, and (n=3) for Total-Hg	For samples >10X DL should be within +/- 20% RPD	All passed.
Total vs Dissolved Metals (n=4)	Total Metals>Dissolved metals. Total Metals should be greater than Dissolved Metals, if not the % difference should be within +/-20%. ALS would use 10X DL, Maxxam would use 5X DL	All passed.
Laboratory Control Sample (n=4) for Total and Dissolved, (n=4) for Total Hg, and (n=3) for Dissolved Hg	Within specified tolerance ranges.	All passed.

Sources: \\srk.ad\dfs\na\van\Projects\01_SITES\Hope.Bay\1CT022.056_2020 Geochem Compliance\330 - Data QAQC and Mgmt\[Hope Bay_North and South Dam_Seepage_SummaryQAQC_2020_rtc_rev01.xlsx]

Notes:

[1] Conductivity (EC), pH, Total Suspended Solids (TSS)

[2] Total Alkalinity, Phenolphthalein Alkalinity, Total Ammonia, Unionized Ammonia, Cl, NO3, NO2, SO4

[3] Cyanide-WAD, Total CN, Cyanate, Thiocyanate (SCN), Cyanide-Free

Table 8: Summary of QA/QC Assessment of 2020 Data for South Dam Pond 2 Samples

QC Test	SRK QC Criteria	Results
Physical Test[1]		
Field Blank (n=0)	Minimum criteria is <2X DL, will accept <5X DL	--
Method Blank (n=5) for EC, (n=6) for TSS, (n=1) for Turbidity, (n=1) for Total Alkalinity	<2X DL	All passed.
Field Duplicate (n=0)	For samples >10X DL should be within +/-30% RPD	--
Leachate Duplicate (n=3) for TSS, (n=3) for pH and EC, (n=1) for Total Alkalinity	For samples >10X DL should be within +/-20% RPD	Passed
Field pH vs. Lab pH (n=5)	Difference should not be greater than 1 pH unit	All passed.
Field EC vs Lab EC (n=5)	For samples > 10X the detection limit (DL), % RPD should be within +/-30%	All passed.
Laboratory Control Samples (n=5) for EC, (n=6) for TSS, and (n=1) for Turbidity; Certified Reference Material (n=5) for pH	Within specified tolerance ranges.	All passed.
Anions and Nutrients[2]		
Field Blank (n=0)	Minimum criteria is <2X DL, will accept <5X DL	--
Method Blank (n=4) for Total Alkalinity, Total Ammonia, Total N, (n=5) for Cl, SO4, Nitrate (as N), and Nitrite (as N)	<2X DL	All passed.
Field Duplicate (n=0)	For samples >10X DL should be within +/-30% RPD	--
Leachate Duplicate (n=1) for Total N, SO4, and (n=2) for Total Ammonia	For samples >10X DL should be within +/-20% RPD	Passed
Ion Balance (n=11)	EC>100 uS/cm, % difference should be within +/-10%	All passed.
Laboratory Control Sample (n=11) for Total Alkalinity, and Total Ammonia, (n=12) for Cl, Nitrate (as N), Nitrite (as N), and SO4, and (n=10) for Total N	Within specified tolerance ranges.	All passed.
Cyanides[3]		
Field Blank (n=0)	Minimum criteria is <2X DL, will accept <5X DL	--

QC Test	SRK QC Criteria	Results
Method Blank (n=4) for Total Cyanide, Cyanate, Cyanide-Free, SCN, and (n=2) for Cyanide-WAD	<2X DL	All passed.
Field Duplicate (n=0)	For samples >10X DL should be within +/- 30% RPD	--
Leachate Duplicate (n=1) for SCN	For samples >10X DL should be within +/- 20% RPD	Passed
Laboratory Control Sample (n=4) for Total Cyanide, Cyanate, Cyanide-Free, SCN, and (n=2) for Cyanide-WAD	Within specified tolerance ranges.	All passed.
	Trace Metals by ICP-MS and Hg-CVAAS	
Field Blank (n=0)	Minimum criteria is <2X DL, will accept <5X DL	--
Method Blank (n=4) for Total and Dissolved	<2X DL	All passed.
Field Duplicate (n=0)	For samples >10X DL should be within +/- 30% RPD	--
Lab Duplicate (n=1) for Total and Dissolved, (n=3) for Total-Hg	For samples >10X DL should be within +/- 20% RPD	--
Total vs Dissolved Metals (n=4)	Total Metals>Dissolved metals. Total Metals should be greater than Dissolved Metals, if not the % difference should be within +/-20%. ALS would use 10X DL, Maxxam would use 5X DL	All passed.
Laboratory Control Sample (n=4) for Total and Dissolved	Within specified tolerance ranges.	All passed.

Sources: \\srk.ad\dfs\na\van\Projects\01_SITES\Hope.Bay\1CT022.056_2020 Geochem Compliance\330 - Data QAQC and Mgmt\[Hope Bay_North and South Dam_Seepage_SummaryQAQC_2020_rtc_rev01.xlsx]

Notes:

[1] Conductivity (EC), pH, Total Suspended Solids (TSS)

[2] Total Alkalinity, Phenolphthalein Alkalinity, Total Ammonia, Unionized Ammonia, Cl, NO3, NO2, SO4

[3] Cyanide-WAD, Total CN, Cyanate, Thiocyanate (SCN), Cyanide-Free

Table 9: Summary of QA/QC Assessment of 2020 Data for South Dam Samples

QC Test	SRK QC Criteria	Results
Physical Test[1]		
Field Blank (n=0)	Minimum criteria is <2X DL, will accept <5X DL	--
Method Blank (n=1) for EC and TSS	<2X DL	All passed.
Field Duplicate (n=0)	For samples >10X DL should be within +/-30% RPD	--
Leachate Duplicate (n=1) for TSS	For samples >10X DL should be within +/-20% RPD	All passed.
Field pH vs. Lab pH (n=1)	Difference should not be greater than 1 pH unit	All passed.
Field EC vs Lab EC (n=1)	For samples > 10X the detection limit (DL), % RPD should be within +/-30%	All passed.
Laboratory Control Samples (n=1) for pH, EC, and TSS	Within specified tolerance ranges.	All passed.
Anions and Nutrients[2]		
Field Blank (n=0)	Minimum criteria is <2X DL, will accept <5X DL	--
Method Blank (n=1) for Total Alkalinity, Total Ammonia, Cl, Nitrate (as N), Nitrite (as N), Total N, and SO4	<2X DL	All passed.
Field Duplicate (n=0)	For samples >10X DL should be within +/-30% RPD	--
Leachate Duplicate (n=1) for Total N	For samples >10X DL should be within +/-20% RPD	All passed.
Ion Balance (n=1)	EC>100 uS/cm, % difference should be within +/-10%	All passed.
Laboratory Control Sample (n=1) for Total Alkalinity, Total Ammonia, Cl, Nitrate (as N), Nitrite (as N), Total N, and SO4	Within specified tolerance ranges.	All passed.
Cyanides[3]		
Field Blank (n=0)	Minimum criteria is <2X DL, will accept <5X DL	--
Method Blank (n=1) for Total Cyanide, Cyanate, Cyanide-Free, and SCN	<2X DL	All passed.
Field Duplicate (n=0)	For samples >10X DL should be within +/-30% RPD	--
Leachate Duplicate (n=1) for SCN	For samples >10X DL should be within +/-20% RPD	All passed.

QC Test	SRK QC Criteria	Results
Laboratory Control Sample (n=1) for Total Cyanide, Cyanate, Cyanide-Free, and SCN	Within specified tolerance ranges.	All passed.
Trace Metals by ICP-MS and Hg-CVAAS		
Field Blank (n=0)	Minimum criteria is <2X DL, will accept <5X DL	--
Method Blank (n=1) for Total and Dissolved, (n=1) for Total-Hg	<2X DL	All passed.
Field Duplicate (n=0)	For samples >10X DL should be within +/- 30% RPD	--
Leachate Duplicate (n=0)	For samples >10X DL should be within +/- 20% RPD	--
Total vs Dissolved Metals (n=1)	Total Metals>Dissolved metals. Total Metals should be greater than Dissolved Metals, if not the % difference should be within +/-20%. ALS would use 10X DL, Maxxam would use 5X DL	All passed.
Laboratory Control Sample (n=1) for Total and Dissolved, and (n=1) for Total-Hg	Within specified tolerance ranges.	All passed.

Sources: \\srk.ad\dfs\na\van\Projects\01_SITES\Hope.Bay\1CT022.056_2020 Geochem Compliance\330 - Data QAQC and Mgmt\[Hope Bay_North and South Dam_Seepage_SummaryQAQC_2020_rtc_rev01.xlsx]

Notes:

[1] Conductivity (EC), pH, Total Suspended Solids (TSS)

[2] Total Alkalinity, Phenolphthalein Alkalinity, Total Ammonia, Unionized Ammonia, Cl, NO3, NO2, SO4

[3] Cyanide-WAD, Total CN, Cyanate, Thiocyanate (SCN), Cyanide-Free

Attachment 2 Water Quality Data, 2020 North and South Dam Samples

Station	Lab Sample ID	Sample Date	Field Measurements															
			pH	EC	ORP	Temperature	Salinity	Chloride	pH	EC	Turbidity	Hardness (as CaCO3)	TSS	TDS	Total Alkalinity (as CaCO3)	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)
			s.u.	µS/cm	mV	C	ppt	mg/L	s.u.	µS/cm	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ND Upstream	--	6/22/2020	7.5	1006	218	12		412.09										
	--	6/30/2020	8.02	1305	98	4.6	0.6											
	--	7/7/2020	7.59	3880	101	9.3	1.7											
	--	7/16/2020	8.35	5510	180	12.8	1.9											
	--	7/23/2020	9.01	5190	161	17.2	1.7											
	--	7/30/2020	8.78	7540	147	12.3	2.6											
	--	8/6/2020	9.03	6640	150	14.5	2.3											
	--	8/19/2020	8.69	7570	82	11.5	2.6											
	--	8/26/2020	8.49	7960	95	11	4.3											
	--	9/2/2020	8.27	8420	167	7.7	4.5											
	--	9/7/2020	8.27	8360	117	5.6	4.4											
	--	9/16/2020	7.64	9780	154	4.1	5.1											
	--	9/23/2020	8.04	9380	155	3.9	4.9											
NDSP	L2464612-1	6/22/2020	7.6	245	176	10.2	0.1	35.1	7.8	220		84.2	50.2		83.6			
	L2469116-1	6/30/2020	7.86	414	52	5.6	0.2		7.86	419		144	*3*		111			
	L2472304-1	7/7/2020	7.61	467	38	6.5	0.2		7.75	451		138	3.2		109			
	L2476565-1	7/16/2020	7.83	466	145	6.8	0.2		7.81	471		147	*3*		109			
	L2482664-3	7/30/2020	7.94	565	146	5.7	0.2		7.97	539		158	4.7		131			
	L2486024-3	8/6/2020	7.86	524	142	9.1	0.2		7.95	499		162	7.9		134			
	L2492292-1	8/19/2020	7.83	530	43	3.2	0.2		7.9	501		162	*3*		144			
	L2495677-1	8/26/2020	7.88	525	56	3.6	0.2		8.07	512		174	12		139			
	L2498942-1	9/2/2020	7.84	478	142	1.9	0.2		8.28	437		159	*3*		129			
	L2500033-1	9/7/2020	7.79	452	90	1	0.2		8.05	411		171	*3*		124			
	YL2000046-001	9/23/2020	7.6	377	121	3.6	0.2		7.65	381		146	*3*		122			
SDPOND1	L2479634-1	7/23/2020	7.11	6980	164	19.9	0.3		7.12	687		170	10.1		166			
	L2482664-1	7/30/2020	7.11	656	171	10.5	0.3		7.78	646		155	15.7		182			
	L2486024-1	8/6/2020	7.04	655	149	12.4	0.3		7.68	640		184	34.5		189			
	L2490466-1	8/14/2020	7.18						7.91	535		145	3.6		151			
	L2498942-2	9/2/2020	7.32	576	140	7.3	0.3		8.07	541		155	*3*		135			
	YL2000046-003	9/23/2020	7.21	719	53	10.3	0.3		7.2	714		247	5.6		130			
SDPOND2	--	7/7/2020	7.36	690	108	16.4	0.3											
	L2482664-4	7/30/2020	7.05	659	121	10.1	0.3		7.68	651		166	12.5		146			
	L2486024-2	8/6/2020	6.96	679	97	12.1	0.3		7.66	673		188	18.7		187			
	L2490466-2	8/14/2020	7.1						7.92	719		180	*3*		193			
	L2498942-3	9/2/2020	7.4	540	137	7.4	0.2		8.02	535		146	*3*		136			
	YL2000046-004	9/23/2020	7.23	519	66	8.4	0.2		7.1	525		135	13.4		109			
SDSP	L2464612-2	6/22/2020	7.7	391	203	15.2	0.2		7.7	314		82.8	*3*		54.4			

Station	Lab Sample ID	Sample Date	Physical Parameters, Anions, and Nutients														
			Alkalinity, Phenolphthalein (as CaCO3)	Ammonia, Total (as N)	Ammonia, Un-ionized (as N)	Nitrate	Nitrite	Sulphate	Chloride	Total Nitrogen	TKN	Cyanate	Cyanide, Free	Cyanide, Total	Cyanide, WAD	Thiocyanate	Ortho-Phosphate
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ND Upstream	--	6/22/2020															
	--	6/30/2020															
	--	7/7/2020															
	--	7/16/2020															
	--	7/23/2020															
	--	7/30/2020															
	--	8/6/2020															
	--	8/19/2020															
	--	8/26/2020															
	--	9/2/2020															
	--	9/7/2020															
	--	9/16/2020															
	--	9/23/2020															
NDSP	L2464612-1	6/22/2020		0.0501	0.000341	0.0631	0.0013	12.3	13.8	0.563		0.24	*0.005*	*0.005*		0.55	
	L2469116-1	6/30/2020		0.0411	0.000386	0.34	0.0017	37	39.5	0.699		*0.2*	*0.005*	*0.005*		*0.5*	
	L2472304-1	7/7/2020		0.0164	0.000093	0.556	0.0014	57.5	39.6	0.781		*0.2*	*0.005*	*0.005*		*0.5*	
	L2476565-1	7/16/2020		0.0149	0.000055	0.631	*0.001*	56.6	42.7	0.887		*0.2*	*0.005*	*0.005*		*0.5*	
	L2482664-3	7/30/2020		0.0223	0.000253	0.763	0.0016	80.1	42.1	1.02		*0.2*	*0.005*	*0.005*	*0.005*	0.53	
	L2486024-3	8/6/2020		0.0143	0.000177	0.857	0.0027	68.8	38	1.1		*0.2*	*0.005*	*0.005*	*0.005*	0.54	
	L2492292-1	8/19/2020		0.011		0.664	0.0011	64.6	32.3	1.08		*0.2*	*0.005*	*0.005*		0.59	
	L2495677-1	8/26/2020		0.0152		1	*0.001*	58.3	33.8	1.47		*0.2*	*0.005*	*0.005*		*0.5*	
	L2498942-1	9/2/2020		0.0152		0.604	0.0018	57.2	26.5	0.964		0.2	*0.005*	*0.005*		*0.5*	
	L2500033-1	9/7/2020		0.011		0.407	0.0016	41.7	27.8	0.875		*0.2*	*0.005*	*0.005*		0.69	
	YL2000046-001	9/23/2020		0.0095	*0.001*	0.19	*0.001*	31.7	24.1	0.61		*0.2*	*0.005*	*0.005*		0.56	
SDPOND1	L2479634-1	7/23/2020		0.0157	0.000079	*0.025*	*0.005*	4.2	111	2.09		0.4	*0.005*	0.0056	*0.005*	*2.5*	
	L2482664-1	7/30/2020		0.0376	0.000093	*0.005*	*0.001*	5.39	94.4	1.97		0.23	*0.005*	*0.005*	*0.005*	0.94	
	L2486024-1	8/6/2020		0.043	0.000105	*0.005*	*0.001*	7.62	91.1	2.02		0.42	*0.005*	0.0081	*0.005*	1.04	
	L2490466-1	8/14/2020		0.0143	0.000038	1.05	0.0013	61.2	38.2	1.34		*0.2*	*0.005*	*0.005*	*0.005*	0.58	
	L2498942-2	9/2/2020		0.0284		*0.005*	*0.001*	25.3	75.1	1.31		0.34	*0.005*	*0.005*		1.18	
	YL2000046-003	9/23/2020		0.0404	*0.001*	*0.025*	*0.005*	9	133	1.63		*0.2*	*0.005*	*0.005*		0.77	
SDPOND2	--	7/7/2020															
	L2482664-4	7/30/2020		0.0314	0.000066	*0.005*	0.0015	0.92	118	1.91		0.31	*0.005*	*0.005*	*0.005*	0.81	
	L2486024-2	8/6/2020		0.0641	0.000128	*0.005*	*0.001*	2.28	104	2.85		*0.2*	*0.005*	0.0066	*0.005*	0.99	
	L2490466-2	8/14/2020		0.0283	0.000058	*0.005*	*0.001*	3.88	104	1.68		0.22	*0.005*	0.0058	*0.005*	1.04	
	L2498942-3	9/2/2020		0.0266		*0.005*	*0.001*	27.9	74.2	1.23		0.33	*0.005*	*0.005*		0.89	
	YL2000046-004	9/23/2020		0.0174	*0.001*	0.0062	*0.001*	43.6	67.3	1.05		*0.2*	*0.005*	*0.005*		0.86	
SDSP	L2464612-2	6/22/2020		0.0198	0.000318	*0.005*	*0.001*	11.9	59.7	0.567		*0.2*	*0.005*	*0.005*		0.73	

Station	Lab Sample ID	Sample Date	Phosphorus, Dissolved	Phosphorus, Total (ICP)	BOD	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cs	Cr	Co	Cu	Fe
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ND Upstream	--	6/22/2020																	
	--	6/30/2020																	
	--	7/7/2020																	
	--	7/16/2020																	
	--	7/23/2020																	
	--	7/30/2020																	
	--	8/6/2020																	
	--	8/19/2020																	
	--	8/26/2020																	
	--	9/2/2020																	
	--	9/7/2020																	
	--	9/16/2020																	
	--	9/23/2020																	
NDSP	L2464612-1	6/22/2020	*0.3*	*0.3*		0.0145	*0.0005*	0.00097	*0.02*	*0.0001*	*0.2*	*0.1*	*0.000005*	25.3		*0.001*	0.00031	0.0069	0.058
	L2469116-1	6/30/2020	*0.3*	*0.3*		0.0181	*0.0005*	0.00058	*0.02*	*0.0001*	*0.2*	*0.1*	*0.000005*	42.7		*0.001*	*0.0003*	0.0065	0.186
	L2472304-1	7/7/2020	*0.3*	*0.05*		0.0222	*0.0005*	*0.0005*	*0.02*	*0.0001*	*0.2*	*0.1*	0.0000085	38.7		*0.001*	*0.0003*	0.0057	0.109
	L2476565-1	7/16/2020	*0.05*	*0.05*		0.0338	*0.0001*	0.00049	0.00804	*0.0001*	*0.00005*	0.068	0.0000057	41.1	*0.00001*	0.00017	0.00012	0.00707	0.099
	L2482664-3	7/30/2020	*0.05*	*0.05*		0.0416	0.00013	0.00046	0.00974	*0.0001*	*0.00005*	0.087	*0.000005*	42.4	*0.00001*	0.00016	0.00012	0.00557	0.068
	L2486024-3	8/6/2020	*0.05*	0.056		0.0651	*0.0001*	0.00046	0.00833	*0.0001*	*0.00005*	0.111	*0.000005*	45.4	*0.00001*	0.00019	0.00013	0.0067	0.084
	L2492292-1	8/19/2020	*0.3*	*0.3*		0.0225	*0.0005*	*0.0005*	*0.02*	*0.0001*	*0.2*	0.1	*0.000005*	42.9		*0.001*	*0.0003*	0.0061	0.136
	L2495677-1	8/26/2020	*0.3*	*0.05*		0.0823	*0.0005*	*0.0005*	*0.02*	*0.0001*	*0.2*	*0.1*	*0.000005*	46.7		*0.001*	*0.0003*	0.0106	0.206
	L2498942-1	9/2/2020	*0.05*	*0.05*		0.0234	*0.0001*	0.00054	0.0074	*0.0001*	*0.00005*	0.065	*0.000005*	44.5	*0.00001*	0.00024	0.00013	0.00671	0.085
	L2500033-1	9/7/2020	*0.05*	*0.05*		0.0401	*0.0001*	0.00049	0.0069	*0.0001*	*0.00005*	0.049	*0.000005*	48.1	*0.00001*	0.00034	0.00011	0.00793	0.12
	YL2000046-001	9/23/2020	*0.05*	*0.05*		0.011	*0.0001*	0.00044	0.00539	*0.0001*	*0.00005*	0.028	*0.000005*	44	*0.00001*	0.00021	*0.0001*	0.0064	0.083
SDPOND1	L2479634-1	7/23/2020	0.06	0.131		0.0554	*0.0001*	0.00168	0.0188	*0.0001*	*0.00005*	0.04	*0.000005*	38.1	*0.00001*	0.00127	0.00273	0.00099	3.4
	L2482664-1	7/30/2020	0.059	0.145		0.0566	0.00011	0.00166	0.0161	*0.0001*	*0.00005*	0.024	*0.000005*	32.7	*0.00001*	0.00138	0.0021	0.00155	1.67
	L2486024-1	8/6/2020	*0.05*	0.107		0.0541	*0.0001*	0.00134	0.0157	*0.0001*	*0.00005*	0.028	*0.000005*	42.8	*0.00001*	0.00145	0.00168	0.0011	1.31
	L2490466-1	8/14/2020	*0.05*	*0.05*		0.0613	*0.0001*	0.00055	0.0087	*0.0001*	*0.00005*	0.114	*0.000005*	38.1	*0.00001*	0.00022	0.00015	0.00779	0.142
	L2498942-2	9/2/2020	*0.05*	0.054		0.113	*0.0001*	0.00075	0.0131	*0.0001*	*0.00005*	0.022	*0.000005*	31	*0.00001*	0.00131	0.00082	0.00245	0.568
	YL2000046-003	9/23/2020	*0.05*	*0.05*		0.0247	*0.0001*	0.00067	0.0201	*0.0001*	*0.00005*	0.011	0.0000055	71.1	*0.00001*	0.00083	0.00128	0.00262	0.629
SDPOND2	--	7/7/2020																	
	L2482664-4	7/30/2020	*0.05*	0.063		0.0507	*0.0001*	0.0016	0.0217	*0.0001*	*0.00005*	0.011	*0.000005*	34.7	*0.00001*	0.0011	0.00365	0.00101	3.88
	L2486024-2	8/6/2020	*0.05*	0.228		0.059	*0.0001*	0.00165	0.0126	*0.0001*	*0.00005*	0.017	*0.000005*	42.9	*0.00001*	0.00129	0.00206	0.001	2.55
	L2490466-2	8/14/2020	*0.05*	0.064		0.0569	*0.0001*	0.00129	0.0116	*0.0001*	*0.00005*	0.02	*0.000005*	37.9	*0.00001*	0.00124	0.0016	0.00111	1.33
	L2498942-3	9/2/2020	*0.05*	0.073		0.117	*0.0001*	0.00069	0.0131	*0.0001*	*0.00005*	0.019	*0.000005*	28.4	*0.00001*	0.00134	0.00055	0.00253	0.322
	YL2000046-004	9/23/2020	*0.05*	*0.05*		0.111	*0.0001*	0.00057	0.012	*0.0001*	*0.00005*	0.012	*0.000005*	26	*0.00001*	0.00111	0.00068	0.00212	0.341
SDSP	L2464612-2	6/22/2020	*0.3*	*0.3*		0.0491	*0.0005*	0.00071	*0.02*	*0.0001*	*0.2*	*0.1*	*0.000005*	21.8		*0.001*	*0.0003*	0.0073	0.104

Station	Lab Sample ID	Sample Date	Dissolved Metals																	
			Pb	Li	Mg	Mn	Hg	Mo	Ni	K	Rb	Se	Si	Ag	Na	Sr	S	Te	Tl	Th
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ND Upstream	--	6/22/2020																		
	--	6/30/2020																		
	--	7/7/2020																		
	--	7/16/2020																		
	--	7/23/2020																		
	--	7/30/2020																		
	--	8/6/2020																		
	--	8/19/2020																		
	--	8/26/2020																		
	--	9/2/2020																		
	--	9/7/2020																		
	--	9/16/2020																		
	--	9/23/2020																		
NDSP	L2464612-1	6/22/2020	*0.0005*	0.0018	5.1	0.0905	*0.000005*	*0.001*	*0.001*	*2*		0.0001	2.22	*0.00002*	10.4	0.0336			*0.0002*	
	L2469116-1	6/30/2020	*0.0005*	0.0024	9.1	0.0129	*0.000005*	*0.001*	*0.001*	*2*		0.000144	2.57	*0.00002*	27.1	0.0548			*0.0002*	
	L2472304-1	7/7/2020	*0.0005*	0.0022	10	0.00667	*0.000005*	*0.001*	*0.001*	2.1		0.000333	2.7	*0.00002*	33.3	0.0584			*0.0002*	
	L2476565-1	7/16/2020	*0.00005*	0.0024	10.8	0.00409	*0.000005*	0.000618	0.00074	2.33	0.001	0.000245	2.93	*0.00001*	34.9	0.0755	19.6	*0.0002*	*0.00001*	0.00013
	L2482664-3	7/30/2020	*0.00005*	0.0045	12.6	0.00747	*0.000005*	0.000754	0.00074	2.66	0.00116	0.000547	2.69	*0.00001*	44.2	0.0691	25.8	*0.0002*	*0.00001*	*0.0001*
	L2486024-3	8/6/2020	*0.00005*	0.003	11.9	0.00617	*0.000005*	0.00102	0.00058	2.56	0.00116	0.000437	2.87	*0.00001*	42.7	0.0722	23.9	*0.0002*	*0.00001*	0.00014
	L2492292-1	8/19/2020	*0.0005*	0.0032	13.2	0.00754	*0.000005*	0.0011	*0.001*	2.4		0.000429	3.36	*0.00002*	38.3	0.068			*0.0002*	
	L2495677-1	8/26/2020	*0.0005*	0.0029	13.9	0.0063	*0.000005*	0.0011	0.0013	2.5		0.000428	3.75	*0.00002*	42.9	0.0872			*0.0002*	
	L2498942-1	9/2/2020	*0.00005*	0.0029	11.6	0.00626	*0.000005*	0.000876	0.00112	1.84	0.00084	0.000364	3.73	*0.00001*	32.5	0.0684	19	*0.0002*	*0.00001*	*0.0001*
	L2500033-1	9/7/2020	*0.00005*	0.0029	12.2	0.00471	*0.000005*	0.000575	0.00135	1.77	0.00068	0.000296	3.96	*0.00001*	25.7	0.0653	14.2	*0.0002*	*0.00001*	*0.0001*
	YL2000046-001	9/23/2020	*0.00005*	0.0028	8.72	0.00308	*0.000005*	0.000393	0.00093	1.27	0.00055	0.00018	3.8	*0.00001*	19.3	0.0596	10.4	*0.0002*	*0.00001*	*0.0001*
SDPOND1	L2479634-1	7/23/2020	0.000055	0.0073	18.1	0.317	*0.000005*	0.000224	0.00401	0.591	0.00097	0.00011	4.1	*0.00001*	76.7	0.144	2.37	*0.0002*	*0.00001*	0.00032
	L2482664-1	7/30/2020	0.000115	0.0077	17.9	0.365	*0.000005*	0.000348	0.00337	2.68	0.00209	0.000117	7.22	*0.00001*	66.5	0.118	2.53	*0.0002*	*0.00001*	0.0003
	L2486024-1	8/6/2020	0.000061	0.0069	18.6	0.273	*0.000005*	0.000303	0.00303	2.6	0.00208	0.000079	8.03	*0.00001*	68.3	0.131	3.47	*0.0002*	*0.00001*	0.00034
	L2490466-1	8/14/2020	*0.00005*	0.0027	12.1	0.00722	*0.000005*	0.00105	0.00077	2.81	0.00134	0.000524	2.97	*0.00001*	47	0.0653	21.5	*0.0002*	*0.00001*	0.00017
	L2498942-2	9/2/2020	0.000075	0.0063	18.9	0.0972	*0.000005*	0.000664	0.00399	3.21	0.00146	0.000076	7.23	*0.00001*	63.1	0.0942	9	*0.0002*	*0.00001*	0.00038
	YL2000046-003	9/23/2020	*0.00005*	0.0076	16.8	0.219	*0.000005*	0.000098	0.00329	0.942	0.00086	0.000076	6.6	*0.00001*	40	0.0835	4.02	*0.0002*	*0.00001*	0.00013
SDPOND2	--	7/7/2020																		
	L2482664-4	7/30/2020	*0.00005*	0.0097	19.2	0.668	*0.000005*	0.000288	0.00458	2.85	0.00174	0.000139	4.74	*0.00001*	66.1	0.129	1	*0.0002*	*0.00001*	0.00029
	L2486024-2	8/6/2020	*0.00005*	0.0087	19.7	0.381	*0.000005*	0.000226	0.00415	2.17	0.00176	0.000151	6.41	*0.00001*	69.3	0.132	1.6	*0.0002*	*0.00001*	0.00033
	L2490466-2	8/14/2020	*0.00005*	0.0099	20.8	0.314	0.0000055	0.000296	0.00416	2.66	0.00188	0.000094	6.48	*0.00001*	67.3	0.123	2.22	*0.0002*	*0.00001*	0.00032
	L2498942-3	9/2/2020	0.000062	0.006	18.2	0.0851	*0.000005*	0.000569	0.00376	3.6	0.0013	0.000094	7.7	*0.00001*	60.8	0.0787	9.93	*0.0002*	*0.00001*	0.00034
	YL2000046-004	9/23/2020	0.000054	0.0058	17.1	0.115	*0.000005*	0.00046	0.00312	4.09	0.00128	0.000106	7.82	*0.00001*	55	0.0728	15.4	*0.0002*	*0.00001*	0.00032
SDSP	L2464612-2	6/22/2020	*0.0005*	0.0035	6.91	0.00375	*0.000005*	*0.001*	0.0012	2.3		0.000066	1.02	*0.00002*	28.1	0.0318			*0.0002*	

Station	Lab Sample ID	Sample Date	Sn	Ti	W	U	V	Zn	Zr	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cs	Cr
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ND Upstream	--	6/22/2020																		
	--	6/30/2020																		
	--	7/7/2020																		
	--	7/16/2020																		
	--	7/23/2020																		
	--	7/30/2020																		
	--	8/6/2020																		
	--	8/19/2020																		
	--	8/26/2020																		
	--	9/2/2020																		
	--	9/7/2020																		
	--	9/16/2020																		
	--	9/23/2020																		
NDSP	L2464612-1	6/22/2020	*0.0005*	*0.01*		*0.0002*	*0.0005*	*0.005*		1.48	*0.0005*	0.00171	*0.02*	*0.0001*	*0.2*	*0.1*	0.0000078	27.2		0.0078
	L2469116-1	6/30/2020	*0.0005*	*0.01*		0.00023	*0.0005*	*0.005*		0.283	*0.0005*	0.00084	*0.02*	*0.0001*	*0.2*	*0.1*	0.0000073	40.8		*0.001*
	L2472304-1	7/7/2020	*0.0005*	*0.01*		0.00021	*0.0005*	*0.005*		0.264	*0.0001*	0.00066	0.00933	*0.0001*	*0.00005*	0.067	0.0000278	46.6	0.000014	0.00083
	L2476565-1	7/16/2020	*0.0001*	0.00031	*0.0001*	0.00024	*0.0005*	*0.001*	*0.0002*	0.288	*0.0001*	0.00055	0.0106	*0.0001*	*0.00005*	0.065	*0.000005*	43.7	0.000013	0.0008
	L2482664-3	7/30/2020	*0.0001*	0.00038	*0.0001*	0.00022	*0.0005*	0.0019	*0.0002*	0.437	*0.0001*	0.00054	0.0137	*0.0001*	*0.00005*	0.111	*0.000005*	47.2	0.000018	0.00078
	L2486024-3	8/6/2020	*0.0001*	0.00046	*0.0001*	0.000268	*0.0005*	*0.001*	0.00026	0.593	*0.0001*	0.00072	0.0141	*0.0001*	*0.00005*	0.121	*0.000005*	46.5	0.000024	0.00117
	L2492292-1	8/19/2020	*0.0005*	*0.01*		0.00024	*0.0005*	*0.005*		0.246	*0.0005*	*0.0005*	*0.02*	*0.0001*	*0.2*	0.11	0.0000051	45.4		*0.001*
	L2495677-1	8/26/2020	*0.0005*	*0.01*		0.00035	*0.0005*	*0.005*		0.494	*0.0001*	0.00067	0.0132	*0.0001*	*0.00005*	0.109	*0.000005*	46.5	0.000024	0.00093
	L2498942-1	9/2/2020	*0.0001*	0.00052	*0.0001*	0.000225	*0.0005*	*0.001*	*0.0002*	0.0936	*0.0001*	0.00054	0.00804	*0.0001*	*0.00005*	0.075	*0.000005*	45.2	*0.00001*	0.00038
	L2500033-1	9/7/2020	*0.0001*	0.00086	*0.0001*	0.000241	*0.0005*	*0.001*	0.00024	0.199	*0.0001*	0.00056	0.00887	*0.0001*	*0.00005*	0.053	*0.000005*	43.7	*0.00001*	0.0006
	YL2000046-001	9/23/2020	*0.0001*	*0.0003*	*0.0001*	0.000166	*0.0005*	*0.001*	*0.0002*	0.0724	*0.0001*	0.00056	0.00727	*0.0001*	*0.00005*	0.033	*0.000005*	47.7	*0.00001*	0.00037
SDPOND1	L2479634-1	7/23/2020	*0.0001*	0.00253	0.00041	0.000081	0.00073	0.0017	0.00091	0.0782	*0.0001*	0.00178	0.0206	*0.0001*	*0.00005*	0.038	*0.000005*	37.7	*0.00001*	0.00147
	L2482664-1	7/30/2020	*0.0001*	0.0027	0.00035	0.000095	0.0008	0.0017	0.00092	0.243	*0.0001*	0.00191	0.0204	*0.0001*	*0.00005*	0.029	*0.000005*	39.1	0.00001	0.00188
	L2486024-1	8/6/2020	*0.0001*	0.00282	0.00037	0.000095	0.00102	0.0022	0.0011	0.138	*0.0001*	0.00168	0.0194	*0.0001*	*0.00005*	0.018	*0.000005*	40.1	*0.00001*	0.00154
	L2490466-1	8/14/2020	*0.0001*	0.00049	*0.0001*	0.000295	*0.0005*	*0.001*	0.0003	1.07	*0.0001*	0.00077	0.0194	*0.0001*	*0.00005*	0.121	*0.000005*	40.8	0.000042	0.0017
	L2498942-2	9/2/2020	*0.0001*	0.00299	0.00014	0.000124	0.0007	0.0047	0.00116	0.18	*0.0001*	0.00084	0.014	*0.0001*	*0.00005*	0.023	0.0000064	28.5	*0.00001*	0.00156
	YL2000046-003	9/23/2020	*0.0001*	0.00085	*0.0001*	0.000044	*0.0005*	0.0018	0.00045	0.0394	*0.0001*	0.00081	0.0247	*0.0001*	*0.00005*	0.014	0.0000054	75.6	*0.00001*	0.0008
SDPOND2	--	7/7/2020																		
	L2482664-4	7/30/2020	*0.0001*	0.00204	0.00011	0.000097	0.00088	0.0021	0.00078	0.0747	*0.0001*	0.00164	0.0233	*0.0001*	*0.00005*	0.014	*0.000005*	37.2	*0.00001*	0.0012
	L2486024-2	8/6/2020	*0.0001*	0.00278	0.00017	0.000114	0.00114	*0.001*	0.00103	0.228	*0.0001*	0.00197	0.0307	*0.0001*	*0.00005*	0.015	0.0000052	41.5	*0.00001*	0.00167
	L2490466-2	8/14/2020	*0.0001*	0.00275	0.00014	0.000136	0.00088	0.0017	0.00096	0.118	*0.0001*	0.00139	0.0144	*0.0001*	*0.00005*	0.022	*0.000005*	40.7	*0.00001*	0.0014
	L2498942-3	9/2/2020	*0.0001*	0.0028	*0.0001*	0.000107	0.00077	0.0067	0.00105	0.177	*0.0001*	0.00083	0.0141	*0.0001*	*0.00005*	0.024	0.0000088	27.7	*0.00001*	0.0015
	YL2000046-004	9/23/2020	*0.0001*	0.00236	*0.0001*	0.000085	0.00063	0.0015	0.00098	0.224	*0.0001*	0.0007	0.0149	*0.0001*	*0.00005*	0.015	0.0000065	25.5	*0.00001*	0.00141
SDSP	L2464612-2	6/22/2020	*0.0005*	*0.01*		*0.0002*	*0.0005*	*0.005*		0.1	*0.0005*	0.00076	*0.02*	*0.0001*	*0.2*	*0.1*	*0.000005*	22.8		*0.001*

Station	Lab Sample ID	Sample Date	Total Metals																
			Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	K	Rb	Se	Si	Ag	Na	Sr	S
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ND Upstream	--	6/22/2020																		
	--	6/30/2020																		
	--	7/7/2020																		
	--	7/16/2020																		
	--	7/23/2020																		
	--	7/30/2020																		
	--	8/6/2020																		
	--	8/19/2020																		
	--	8/26/2020																		
	--	9/2/2020																		
	--	9/7/2020																		
	--	9/16/2020																		
	--	9/23/2020																		
NDSP	L2464612-1	6/22/2020	0.00195	0.0135	2.56	0.00053	0.0029	6.34	0.131	*0.000005*	*0.001*	0.0052	*2*		0.000127	4.29	*0.00002*	10.2	0.0336	
	L2469116-1	6/30/2020	0.0004	0.009	0.488	*0.0005*	0.0031	8.95	0.0161	*0.000005*	*0.001*	0.0014	2.1		0.000144	3.06	0.000022	25.6	0.0557	
	L2472304-1	7/7/2020	0.0003	0.0077	0.412	0.000137	0.0032	11.5	0.0103	*0.000005*	0.000587	0.00101	2.33	0.00131	0.000324	3.18	*0.00001*	37.2	0.0737	20.1
	L2476565-1	7/16/2020	0.00025	0.00774	0.325	0.000121	0.0023	11.3	0.00733	*0.000005*	0.000609	0.00106	2.35	0.00137	0.00029	3.23	*0.00001*	35.3	0.0748	19.5
	L2482664-3	7/30/2020	0.00031	0.00678	0.36	0.000295	0.0031	13.9	0.0114	*0.000005*	0.000782	0.00109	2.49	0.00163	0.000521	3.63	*0.00001*	45.9	0.0752	26.6
	L2486024-3	8/6/2020	0.00047	0.00871	0.718	0.00024	0.0034	13.2	0.0152	*0.00001*	0.000923	0.00113	2.87	0.00184	0.000551	3.88	*0.00001*	48.4	0.0738	26.1
	L2492292-1	8/19/2020	*0.0003*	0.0073	0.317	*0.0005*	0.0034	13.8	0.0106	*0.000005*	0.0011	0.0013	2.4		0.000433	3.9	*0.00002*	38.8	0.0677	
	L2495677-1	8/26/2020	0.00037	0.0113	0.547	0.00018	0.0034	12.9	0.0101	*0.000005*	0.00119	0.00184	2.57	0.00196	0.000455	4.58	*0.00001*	38.2	0.085	20.8
	L2498942-1	9/2/2020	0.00018	0.00744	0.186	*0.00005*	0.0031	11.7	0.00706	*0.000005*	0.000948	0.00124	1.97	0.0009	0.000371	3.9	*0.00001*	31.4	0.0703	19.5
	L2500033-1	9/7/2020	0.00023	0.00949	0.292	0.000083	0.0029	11.3	0.0067	*0.000005*	0.000615	0.00151	1.82	0.00097	0.000272	4.23	0.000011	27.6	0.0691	15.4
	YL2000046-001	9/23/2020	0.00016	0.00806	0.159	*0.00005*	0.0033	10.6	0.00404	*0.000005*	0.000439	0.00136	1.47	0.00067	0.000187	4.28	*0.00001*	20	0.0643	12.1
SDPOND1	L2479634-1	7/23/2020	0.00314	0.00142	4.88	0.000087	0.0076	17	0.36	0.0000126	0.000253	0.00436	0.595	0.001	0.000119	4.44	*0.00001*	76.2	0.147	2.3
	L2482664-1	7/30/2020	0.00244	0.00237	2.86	0.000226	0.007	21.3	0.413	*0.000005*	0.000407	0.00389	2.56	0.00265	0.000136	7.79	*0.00001*	71.3	0.132	2.41
	L2486024-1	8/6/2020	0.00238	0.0015	4.75	0.000084	0.0088	21.2	0.361	*0.00001*	0.000174	0.00459	2.52	0.00188	0.000132	7.1	*0.00001*	71.1	0.135	2.02
	L2490466-1	8/14/2020	0.00058	0.011	0.976	0.000346	0.0037	13	0.0176	*0.000005*	0.0011	0.00194	3.15	0.00286	0.000468	5.83	*0.00001*	48.4	0.0693	23
	L2498942-2	9/2/2020	0.00093	0.00287	0.738	0.000131	0.0062	17.6	0.0985	*0.000005*	0.000613	0.00437	3.3	0.00157	0.000101	7.31	*0.00001*	59.5	0.0842	8.75
	YL2000046-003	9/23/2020	0.00144	0.0035	0.795	*0.00005*	0.009	19.3	0.234	0.0000065	0.000138	0.00365	1.06	0.0012	0.000111	7.1	*0.00001*	40	0.0913	5.08
SDPOND2	--	7/7/2020																		
	L2482664-4	7/30/2020	0.00387	0.00142	4.66	0.000054	0.0102	21.3	0.666	*0.000005*	0.000311	0.00456	3.03	0.00195	0.000093	4.93	0.000018	68.2	0.134	1.01
	L2486024-2	8/6/2020	0.00267	0.002	6.82	0.000124	0.0093	21.7	0.381	0.0000078	0.000194	0.00539	2.61	0.00193	0.000133	7.18	*0.00001*	71.7	0.137	1.52
	L2490466-2	8/14/2020	0.00178	0.00163	2	0.000073	0.0089	21.8	0.344	0.0000055	0.000332	0.00457	2.48	0.00201	0.000116	7.14	*0.00001*	67.9	0.123	2.26
	L2498942-3	9/2/2020	0.0007	0.00274	0.938	0.000096	0.0058	17.7	0.1	*0.000005*	0.000627	0.00399	3.46	0.00126	0.000116	7.36	*0.00001*	59.5	0.0837	9.79
	YL2000046-004	9/23/2020	0.00076	0.00251	0.531	0.000092	0.0065	18	0.107	*0.000005*	0.000501	0.00345	4.2	0.00142	0.000125	8.13	*0.00001*	52.4	0.0756	16.1
SDSP	L2464612-2	6/22/2020	*0.0003*	0.0065	0.185	*0.0005*	0.0033	6.96	0.00444	*0.000005*	*0.001*	0.0013	2.3		0.000059	1.12	*0.00002*	27.4	0.0286	

Station	Lab Sample ID	Sample Date	Te	Tl	Th	Sn	Ti	W	U	V	Zn	Zr
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ND Upstream	--	6/22/2020										
	--	6/30/2020										
	--	7/7/2020										
	--	7/16/2020										
	--	7/23/2020										
	--	7/30/2020										
	--	8/6/2020										
	--	8/19/2020										
	--	8/26/2020										
	--	9/2/2020										
	--	9/7/2020										
	--	9/16/2020										
	--	9/23/2020										
NDSP	L2464612-1	6/22/2020		*0.00001*		*0.0005*	0.046		-0.0002	0.00519	*0.005*	
	L2469116-1	6/30/2020		*0.00001*		*0.0005*	0.012		0.00026	0.00088	*0.005*	
	L2472304-1	7/7/2020	*0.0002*	*0.00001*	0.00014	0.00017	0.00993	*0.0001*	0.000223	0.00118	*0.003*	0.00023
	L2476565-1	7/16/2020	*0.0002*	*0.00001*	0.00014	0.0001	0.00882	*0.0001*	0.00021	0.00059	*0.003*	0.00034
	L2482664-3	7/30/2020	*0.0002*	*0.00001*	0.00016	*0.0001*	0.0136	*0.0001*	0.000245	0.0008	*0.003*	0.00028
	L2486024-3	8/6/2020	*0.0002*	*0.00001*	0.00022	*0.0001*	0.0188	*0.0001*	0.000274	0.00169	*0.003*	0.00037
	L2492292-1	8/19/2020		*0.00001*		*0.0005*	*0.01*		0.00029	0.00056	*0.005*	
	L2495677-1	8/26/2020	*0.0002*	*0.00001*	0.00027	*0.0001*	0.0176	*0.0001*	0.000385	0.0012	*0.003*	0.00062
	L2498942-1	9/2/2020	*0.0002*	*0.00001*	*0.0001*	*0.0001*	*0.0033*	*0.0001*	0.000229	*0.0005*	*0.003*	0.00039
	L2500033-1	9/7/2020	*0.0002*	*0.00001*	0.00012	*0.0001*	0.00706	*0.0001*	0.000255	0.00064	*0.003*	0.00031
	YL2000046-001	9/23/2020	*0.0002*	*0.00001*	*0.0001*	*0.0001*	0.00206	*0.0001*	0.000187	*0.0005*	*0.003*	*0.0002*
SDPOND1	L2479634-1	7/23/2020	*0.0002*	*0.00001*	0.00031	*0.0001*	0.00351	0.00051	0.000092	0.00108	*0.003*	0.00082
	L2482664-1	7/30/2020	*0.0002*	*0.00001*	0.00034	*0.0001*	0.0105	0.00039	0.0001	0.00141	*0.003*	0.00086
	L2486024-1	8/6/2020	*0.0002*	*0.00001*	0.00034	*0.0001*	0.00525	0.00024	0.000133	0.00182	*0.003*	0.00086
	L2490466-1	8/14/2020	*0.0002*	*0.00001*	0.00037	*0.0001*	0.0337	*0.0001*	0.000315	0.00196	*0.003*	0.0009
	L2498942-2	9/2/2020	*0.0002*	*0.00001*	0.00036	*0.0001*	0.00568	0.00026	0.000118	0.00088	0.011	0.00094
	YL2000046-003	9/23/2020	*0.0002*	*0.00001*	0.00013	*0.0001*	0.00138	*0.0001*	0.000052	*0.0005*	*0.003*	0.00044
SDPOND2	--	7/7/2020										
	L2482664-4	7/30/2020	*0.0002*	*0.00001*	0.00029	*0.0001*	0.00268	0.00013	0.000096	0.00107	*0.003*	0.00075
	L2486024-2	8/6/2020	*0.0002*	*0.00001*	0.00036	*0.0001*	0.00863	0.00023	0.000141	0.00227	0.0049	0.00092
	L2490466-2	8/14/2020	*0.0002*	*0.00001*	0.00031	*0.0001*	0.00476	0.00017	0.000148	0.00129	*0.003*	0.00078
	L2498942-3	9/2/2020	*0.0002*	*0.00001*	0.0003	*0.0001*	0.00452	0.00025	0.000105	0.00102	*0.003*	0.00085
	YL2000046-004	9/23/2020	*0.0002*	*0.00001*	0.00028	*0.0001*	0.0062	*0.0001*	0.000088	0.00094	*0.003*	0.00087
SDSP	L2464612-2	6/22/2020		*0.00001*		*0.0005*	*0.01*		*0.0002*	*0.0005*	*0.005*	

Station	Lab Sample ID	Sample Date	Field Measurements															
			pH	EC	ORP	Temperature	Salinity	Chloride	pH	EC	Turbidity	Hardness (as CaCO3)	TSS	TDS	Total Alkalinity (as CaCO3)	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)
			s.u.	µS/cm	mV	C	ppt	mg/L	s.u.	µS/cm	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
TL-1	L2402830-1	1/6/2020	7.95	8370	180	3.4	4.6		8.12	8130		1140	7	4990	165			
	L2405211-1	1/13/2020	7.56	8220	138	4.8	4.6		7.69			1060	10.9					
	L2407821-1	1/20/2020	7.48	8200	87	4.5	5		7.97			1170	10.6					
	L2410564-1	1/27/2020	7.7	9260	139	3.2	5		7.75				17.3					
	L2413197-1	2/3/2020	7.57	9110	58	3.9	4.9		7.56	8360		1310	6.5	5570	155			
	L2415845-1	2/10/2020	7.59	8610	123	5.6	4.8		8.07				8.5					
	L2417844-1	2/17/2020	7.52	9270	15	6.1	5		8.18				8.3					
	L2420865-1	2/24/2020	7.66	8900	248	2.6	5.1		7.78			1180	6.7					
	L2423271-1	3/2/2020	7.59	8480	91	3.6	5		7.83	8690		1210	7.4	5490	159			
	L2426296-1	3/9/2020	7.21	8580	54	6.5	5.1		8.01				7.3					
	L2428726-1	3/16/2020	7.42	8890	47	5.2	5.3		7.79				7.7					
	L2430974-1	3/23/2020	7.53	6670	186	1.3	3.7		7.82			792	4.8					
	L2432833-1	3/30/2020	7.57	8880	70	1.6	4.9		7.59			1260	7.1					
	L2435046-1	4/6/2020	7.46	8980	145	3.6	4.9		8.13	8570		1240	5.8	5730	164			
	L2437430-1	4/14/2020	7.41	9470	132	2.9	4.9		8.06			1230	27.2					
	L2439887-1	4/21/2020	7.46	14100	182	4.4	5		8.06			1160	3.5					
	L2441174-1	4/27/2020	7.53	14570	59	2.8	5		8			1170	4.6					
	L2444630-1	5/5/2020	7.52	13960	67	3.4	4.9		8.03	8450		1170	10.2	5410	164			
	L2447192-1	5/12/2020	7.45	14100	44	4.7	5		8.06			1230	9.7					
	L2450828-1	5/21/2020	7.57	14260	157	4.3	4.9		7.84			1170	*3*					
	L2451759-1	5/25/2020	7.47	11670	191	5	5		7.82			1220	6.7					
	L2456734-1	6/2/2020	7.45	14050	51	5.2	5		7.94	8400		1170	11.1	5180	175			
	L2459092-1	6/9/2020	7.55	14060	222	3	5		7.95			1200	13					
	L2462389-1	6/16/2020	7.31	10320	208	4.9			7.9			1130	14.7					
	L2464829-1	6/22/2020	7.48	13800	218	6.8	4.9		7.76		15.4		6.6					
	L2469116-2	6/30/2020	7.7	1344	141	1.8	4.9		7.86	8450		1140	11.3		176			
	L2471611-1	7/7/2020	7.39	10350	76	3.5	4.9		7.64	8510			8	5770	194			
	L2476565-2	7/16/2020	7.53	13320	198	3.4	4.7		7.66	8100		1140	9		182			
	L2477555-2	7/20/2020											8					
	L2479634-2	7/23/2020	7.49	11750	197	12.8	4.8		7.54	8570		1140	11.3		183			
	L2482664-2	7/30/2020	7.4	13190	178	4.9	4.7		7.71	8340	14.1	424	10.3		177			
	L2485657-1	8/6/2020	7.39	13130	191	5.8	4.7		7.82	8300	12.4	1140	6.7	5300	186			
	L2489482-1	8/13/2020	7.31	12850	189	6	4.8		7.86	8360	11.8	1140	8.6		188			
	L2492292-2	8/19/2020	7.64	12890	41	6.6	4.6		7.79	8140	12.5	1130	11.6		188			
	L2495677-2	8/26/2020	7.67	13730	93	7.3	7.6		7.97	8890	17.9	1260	14.8		184			
	L2498918-1	9/2/2020	7.59	12560	172	7.7	6.9		7.9	7970	13.1	1130	16.8	5170	177			
	L2500033-2	9/7/2020	7.52	12190	140	8.7	6.7		7.91	7640	13.4	1120	16		159			
	YL2000046-002	9/23/2020	7.76	9170	158	6.3	4.9		7.97	5600	12.2	748	21.6		109			
	YL2000126-001	10/15/2020	7.99	9750	162	2.3	3.4		8.08	6390	9.26	763	11.5	3550	113			
	YL2000154-001	10/21/2020	8.05	10720	115	2.6	3.6		8.08		8.26	984	7.9					
	YL2000170-001	10/28/2020	7.8	10490	126	3.9	3.6		8.18		8.01	815	12.6					
	YL2000185-001	11/3/2020	8.1	10640	134	3.4	3.7		8.07	6460	8.83	885	12	3900	116			
	YL2000203-001	11/11/2020	6.94	7680	129	2.9	3.5		8.11		7.83	811	10.6					
	YL2000217-001	11/18/2020	6.77	8090	205	4.3	3.7		7.88		7.48	826	13.5					
	YL2000244-002	11/24/2020	6.69	7900	240	3.1	3.6		8.1		6.56	910	13					
	--	12/2/2020	7.61	7570	67	-0.2	3.4											
	YL2000258-001	12/4/2020	7.61						7.97	6800	15	894	39.6	3980	125			
	YL2000280-001	12/9/2020	7.92	11910	142	1.4	3.9		7.85		13	932	19.6					
	YL2000296-001	12/15/2020	7.82	11840	55	1.8	4.1		7.85		12.1	977	14.4					
	YL2000304-001	12/20/2020	7.6	20000	226	5.6	10		7.87		20.4	992	16	14400				
	YL2100018-001	12/30/2020	7.23	13050	87	4.3	4.6		7.67		8.9	1190	8.6					
TL-5	L2402982-1	1/5/2020	8.35	11530	106	6.9	6.6		8.23	11400		1010	104		349			
	L2413105-1	2/2/2020	8.34	11960	129	6.4	6.7		8.18	11200		1240	15.5		307			
	L2425667-1	3/4/2020	8.29	13050	51	7.1	7.8		8.16	13100		1500	39		266	266	*1*	*1*
	L2435040-1	4/6/2020	8.4	11660	127	11.4	6.6		8.19	11100		1010	34.6		275			
	L2444686-1	5/4/2020	8.32	18970	90	13.4	6.5		8.51	12100		1050	8.2		375	343	31.8	*1*
	L2458861-1	6/7/2020							8.24	10200		1170	69		328	328	*1*	*1*
	L2472321-1	7/5/2020	8.1	11980	24	16	5.9		8	10700		1230	72.8		304			
	YL2000006-001	8/2/2020	8.36	20000	189	18	10		8.2	21600		1000	42.6		308			
	L2500031-1	9/6/2020	7.92	20000	176	9.6	10		8.21	11100		997	22.3		313			
	YL2000153-001	10/21/2020	8.22	13220	74	14.6	4.8		8.21	8410		778	17.5		280	280	*1*	*1*
	YL2000198-001	11/9/2020	8.29	14120	89	13.2	5.2		8.23	8890		764	7.8		283	283	*1*	*1*
	YL2000261-001	12/4/2020	8.11	10980	126	9.4	5.1		8.38	9530		896	29.4		316	299	17	*1*

Station	Lab Sample ID	Sample Date	Physical Parameters, Anions, and Nutients													
			Alkalinity, Phenolphthalein (as CaCO3)	Ammonia, Total (as N)	Ammonia, Un-ionized (as N)	Nitrate	Nitrite	Sulphate	Chloride	Total Nitrogen	TKN	Cyanate	Cyanide, Free	Cyanide, Total	Cyanide, WAD	Thiocyanate	Ortho-Phosphate
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
TL-1	L2402830-1	1/6/2020		10.5	0.101	6.35	0.34	848	2250	18.9	12.5	11	*0.005*	0.444	0.0051	2.77	0.001
	L2405211-1	1/13/2020		9.55	0.0423							6.2		0.396	0.0051	2.06	
	L2407821-1	1/20/2020		9.4	0.0338							4.1		0.317	0.0063	*2.5*	
	L2410564-1	1/27/2020		9.34	0.05							3.48		0.251	*0.005*	1.45	
	L2413197-1	2/3/2020		9.02	0.038	4.96	0.293	665	2470	15.1	10.9	0.27	*0.005*	0.202	*0.005*	*2.5*	*0.001*
	L2415845-1	2/10/2020		8.74	0.0442							6.06		0.157	*0.005*	0.73	
	L2417844-1	2/17/2020		9.45	0.0424							4.2		0.114	*0.005*	0.68	
	L2420865-1	2/24/2020		9.09	0.0423							6.18		0.174	*0.005*	*0.5*	
	L2423271-1	3/2/2020		9.52	0.041	4.73	0.204	721	2590	14.8	10.4	6.06	*0.005*	0.179	*0.005*	*2.5*	*0.001*
	L2426296-1	3/9/2020		9.17	0.0208							3.24		0.157	*0.005*	*0.5*	
	L2428726-1	3/16/2020		8.44	0.028							4.56		0.154	*0.005*	*2.5*	
	L2430974-1	3/23/2020		6.64	0.0206							2.34		0.131	*0.005*	*0.5*	
	L2432833-1	3/30/2020		9.46	0.033							8.73		0.144	*0.005*	*2.5*	
	L2435046-1	4/6/2020		9.04	0.0289	4.63	0.236	675	2490	15.4	11.4	4.38	*0.005*	0.159	*0.005*	*1*	*0.001*
	L2437430-1	4/14/2020		9.57	0.0257				2730			*1*		0.164	*0.005*	*0.5*	
	L2439887-1	4/21/2020		9.12	0.0311				2500			1.8		0.152	*0.005*	0.67	
	L2441174-1	4/27/2020		9.52	0.0334				2440			*1*		0.142	*0.005*	0.66	
	L2444630-1	5/5/2020		9.25	0.0333	4.7	0.21	753	2620	14.7	11.4	0.6	*0.005*	0.178	*0.005*	*0.5*	*0.001*
	L2447192-1	5/12/2020		10.6	0.0361				2420			6.9		0.444	0.18	1.43	
	L2450828-1	5/21/2020		10.9	0.0472				2360			*1*		0.505	0.248	1.66	
	L2451759-1	5/25/2020		10.6	0.0389				2400			5.3		0.505	0.225	1.62	
	L2456734-1	6/2/2020		10.3	0.0367	5.58	0.216	795	2350	17.7	11.8	12	0.21	0.506	0.232	1.81	0.0015
	L2459092-1	6/9/2020		10.7	0.04				2420			7.1		0.434	0.178	1.59	
	L2462389-1	6/16/2020		10.4	0.0262				2330			8		0.369	0.17	3.1	
	L2464829-1	6/22/2020		10.4	0.045				2420			4.14		0.4	0.157	1.61	
	L2469116-2	6/30/2020		10.4	0.0494	5.68	0.162	796	2350	17		6.87	0.107	0.356	0.115	1.71	
	L2471611-1	7/7/2020		10.4	0.0279	5.31	0.156	803	2500	16.3	15.3	3.2	0.0706	0.319	0.0754	1.28	0.0019
	L2476565-2	7/16/2020		10.4	0.0387	5.4	0.085	816	2180	16.5		6	0.0266	0.231	0.0325	1.42	
	L2477555-2	7/20/2020															
	L2479634-2	7/23/2020		9.57	0.0677	4.49	0.12	736	2290	17.1		3	0.0234	0.202	0.0248	1.26	
	L2482664-2	7/30/2020		10.7	0.0332	5.01	0.157	801	2210	18.1		0.3	0.0108	0.177	0.0145	1.04	
	L2485657-1	8/6/2020		10.3	0.0335	4.67	0.136	764	2220	17.1	12	2.6	0.0064	0.189	0.0067	0.82	0.0013
	L2489482-1	8/13/2020		10.2	0.028	4.72	0.177	815	2320	16.1		1.4	0.005	0.156	0.0075	*2.5*	
	L2492292-2	8/19/2020		10.6	0.065	4.75	0.16	831	2280	16.1		2.4	0.0074	0.141	0.0072	*2.5*	
	L2495677-2	8/26/2020		10.2	0.071	3.96	0.119	793	2450	15.3		4.2	0.0097	0.171	0.0101	0.62	
	L2498918-1	9/2/2020		9.46	0.0566	4.43	0.191	855	2390	15.1	11.8	*1*	0.0108	0.0817	0.0101	*0.5*	0.0023
	L2500033-2	9/7/2020		8.65	0.0477	3.61	0.155	710	2050	13.4		*1*	0.0076	0.123	0.0076	*0.5*	
	YL2000046-002	9/23/2020		4.79	*0.001*	3.42	0.0728	554	1540	9.87		1.08	0.0055	0.0275	*0.005*	*0.5*	
	YL2000126-001	10/15/2020		4.82	*0.001*	3.5	0.114	588	1620	10.4	6.77	2.7	*0.005*	0.022	*0.005*	0.55	*0.001*
	YL2000154-001	10/21/2020		4.75	0.0011				1770			3.12		0.0279	*0.005*	0.52	
	YL2000170-001	10/28/2020		4.9	*0.001*				1740			2.46		0.0225	*0.005*	0.73	
	YL2000185-001	11/3/2020		4.66	0.0013	3.79	0.0895	599	1740	10.8	5.85	2.46	*0.005*	0.0234	*0.005*	*0.5*	0.0011
	YL2000203-001	11/11/2020		4.71	*0.001*				1770			3.3		0.0255	*0.005*	*0.5*	
	YL2000217-001	11/18/2020		4.81	*0.001*				1800			4		0.0225	*0.005*	0.55	
	YL2000244-002	11/24/2020		4.94	*0.001*				1790			3.3		0.0235	*0.005*	*0.5*	
	--	12/2/2020															
	YL2000258-001	12/4/2020		5.56	*0.001*	4.6	0.145	731	2110	10.9	6.98	3.54	*0.01*	0.0619	*0.01*	0.64	0.001
	YL2000280-001	12/9/2020		5.68	*0.001*				1960			4.32		0.0995	*0.01*	0.83	
	YL2000296-001	12/15/2020		5.74	*0.001*				1960			5.04		0.0844	*0.005*	1.05	
	YL2000304-001	12/20/2020		6.56	0.0275	3.98			7920			4.8		0.0722	*0.005*	1.21	
	YL2100018-001	12/30/2020		6.24	0.0124				2300			3.66		0.0792	*0.01*	0.57	
TL-5	L2402982-1	1/5/2020		47.2	1.49	24.4	1.25	2290	2470			88.2	0.139	5.52	0.162	20.3	
	L2413105-1	2/2/2020		39.8	1.18	22.5	1.18	1850	2680			76.2	0.122	2.79	0.159	21.4	
	L2425667-1	3/4/2020	*2*	30.4	0.849	13.8	0.79	1360	3680			64.5	0.178	3.08	0.429	12.9	
	L2435040-1	4/6/2020		37	1.83	21.3	1.14	1750	2730			79.2	0.043	2.8	0.152	14.9	
	L2444686-1	5/4/2020	15.9	48.3	2.32	19.7	1.15	2420	2860			130	1.36	6.49	2.13	52	
	L2458861-1	6/7/2020	*2*	31.5		10.2	0.393	1520	2480			59	0.075	1.56	0.176	8.82	
	L2472321-1	7/5/2020		33.5	1.2	15.8	0.721	1780	2530			55.2	1.04	4.09	2.1	32.5	
	YL2000006-001	8/2/2020		56.3	4.09	5.82	0.735	10300	2280			157	*0.01*	0.512	0.047	15.6	
	L2500031-1	9/6/2020		42.6	0.628	13.7	0.582	2030	2450			95.7	*0.1*	2.49	0.13	231	
	YL2000153-001	10/21/2020	*1*	28.3	0.0024	18	1.23	1520	1920			61.2	*0.2*	3.23	*0.2*	31.8	
	YL2000198-001	11/9/2020	*1*	28.2	0.0025	12.9	0.707	1810	1830			46.6	*0.2*	2.46	*0.2*	14.5	
	YL2000261-001	12/4/2020	8.5	38.4	0.0017	18.6	0.942	2080	2030			67	0.0589	3.02	0.176	14.7	

Station	Lab Sample ID	Sample Date	Phosphorus, Dissolved	Phosphorus, Total (ICP)	BOD	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cs	Cr	Co	Cu	Fe
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
TL-1	L2402830-1	1/6/2020	0.3	0.3		0.0099	0.00088	0.00148	0.029	0.0005	0.2	0.69	0.000025	218		0.001	0.00482	0.0318	0.24
	L2405211-1	1/13/2020	0.25			0.0096	0.00079	0.00124	0.028	0.0001	0.00025	0.705	0.000025	199		0.0005	0.00422	0.0276	0.305
	L2407821-1	1/20/2020	0.3			0.0063	0.00076	0.00129	0.03	0.0005	0.2	0.67	0.000029	231		0.001	0.00378	0.0153	0.432
	L2410564-1	1/27/2020	0.25	0.25		0.0073	0.00067	0.0012	0.0298	0.0005	0.00025	0.736	0.000027	228	0.00005	0.0005	0.00382	0.0198	0.18
	L2413197-1	2/3/2020	0.3	0.3		0.0053	0.00062	0.00121	0.031	0.0001	0.2	0.63	0.000034	243		0.001	0.00376	0.0252	0.282
	L2415845-1	2/10/2020	0.25	0.25		0.0094	0.00058	0.00125	0.0295	0.0005	0.00025	0.695	0.000025	236	0.00005	0.0005	0.00368	0.0283	0.228
	L2417844-1	2/17/2020	0.25	0.25		0.0051	0.00058	0.00126	0.0315	0.0005	0.00025	0.725	0.000035	239	0.00005	0.0005	0.0038	0.0269	0.136
	L2420865-1	2/24/2020	0.25			0.0085	0.00066	0.00177	0.0291	0.0001	0.00025	0.726	0.000025	214		0.0005	0.00327	0.0232	0.112
	L2423271-1	3/2/2020	0.3	0.3		0.0057	0.00053	0.00132	0.031	0.0005	0.2	0.72	0.000025	225		0.001	0.00349	0.0246	0.084
	L2426296-1	3/9/2020	0.25	0.25		0.005	0.0006	0.00131	0.0288	0.0005	0.00025	0.655	0.000025	213	0.00005	0.0005	0.00352	0.0233	0.211
	L2428726-1	3/16/2020	0.25	0.25		0.005	0.00057	0.00109	0.0301	0.0005	0.00025	0.671	0.000025	220	0.00005	0.0005	0.0036	0.0271	0.143
	L2430974-1	3/23/2020	0.25			0.0056	0.00052	0.00123	0.0279	0.0001	0.00025	0.466	0.000025	157		0.0005	0.00408	0.0376	0.099
	L2432833-1	3/30/2020	0.25			0.007	0.00056	0.00102	0.0307	0.0001	0.00025	0.708	0.00003	223		0.0005	0.00363	0.0266	0.156
	L2435046-1	4/6/2020	0.3	0.3		0.005	0.00057	0.0012	0.032	0.0001	0.2	0.63	0.000025	229		0.001	0.00374	0.0236	0.202
	L2437430-1	4/14/2020	0.25			0.0067	0.00062	0.00132	0.0369	0.0001	0.00025	0.734	0.000025	240		0.0005	0.00377	0.0211	0.276
	L2439887-1	4/21/2020	0.25			0.005	0.00055	0.0012	0.03	0.0001	0.00025	0.744	0.000025	234		0.0005	0.00344	0.0197	0.077
	L2441174-1	4/27/2020	0.25			0.005	0.0005	0.00112	0.0288	0.0001	0.00025	0.645	0.000025	217		0.0005	0.00336	0.024	0.393
	L2444630-1	5/5/2020	0.3	0.3		0.005	0.00062	0.00111	0.029	0.0001	0.2	0.65	0.000025	216		0.001	0.00356	0.0218	0.281
	L2447192-1	5/12/2020	0.25			0.0053	0.00071	0.00138	0.0295	0.0001	0.00025	0.651	0.000025	238		0.0005	0.00488	0.146	0.199
	L2450828-1	5/21/2020	0.25	0.25		0.005	0.00068	0.00163	0.0336	0.0001	0.00025	0.617	0.000025	220		0.0005	0.00575	0.169	0.139
	L2451759-1	5/25/2020	0.25			0.0055	0.00073	0.00157	0.036	0.0001	0.00025	0.617	0.000025	234		0.0005	0.0054	0.214	0.164
	L2456734-1	6/2/2020	0.3	0.3		0.005	0.0007	0.00166	0.035	0.0001	0.2	0.66	0.000025	215		0.001	0.00576	0.222	0.224
	L2459092-1	6/9/2020	0.25			0.005	0.00074	0.00182	0.0327	0.0001	0.00025	0.666	0.000025	234		0.0005	0.0055	0.176	0.146
	L2462389-1	6/16/2020	0.25			0.0062	0.00072	0.00186	0.0336	0.0001	0.00025	0.679	0.000025	206		0.0005	0.00555	0.17	0.126
	L2464829-1	6/22/2020	0.25	0.25		0.0058	0.00072	0.00171	0.0336	0.0005	0.00025	0.664	0.000025	210	0.00005	0.0005	0.00553	0.153	0.12
	L2469116-2	6/30/2020	0.3	0.3		0.005	0.0008	0.00215	0.031	0.0005	0.2	0.67	0.000025	221		0.001	0.00565	0.152	0.224
	L2471611-1	7/7/2020	0.25	0.0654		0.005	0.00063	0.00175	0.0361	0.0001	0.00025	0.795	0.000025	258		0.0005	0.0056	0.119	0.282
	L2476565-2	7/16/2020	0.25	0.25		0.005	0.00067	0.00164	0.0319	0.0005	0.00025	0.658	0.000061	226	0.00005	0.0005	0.00579	0.0758	0.134
	L2477555-2	7/20/2020																	
	L2479634-2	7/23/2020	0.25	0.25		0.005	0.0007	0.00154	0.0351	0.0005	0.00025	0.699	0.000025	215	0.00005	0.0005	0.00511	0.0505	0.136
	L2482664-2	7/30/2020	0.1	0.25		0.0026	0.00029	0.00069	0.0136	0.0002	0.0001	0.221	0.00001	81.5	0.00002	0.0002	0.00215	0.0165	0.045
	L2485657-1	8/6/2020	0.25	0.25		0.005	0.00079	0.00176	0.032	0.0001	0.00025	0.683	0.000025	230		0.0005	0.00554	0.034	0.114
	L2489482-1	8/13/2020	0.3	0.3		0.005	0.00076	0.00157	0.034	0.0005	0.2	0.63	0.000025	230	0.0001	0.001	0.00547	0.031	0.122
	L2492292-2	8/19/2020	0.3	0.3	5	0.005	0.00073	0.00185	0.035	0.0005	0.2	0.64	0.000025	215		0.001	0.00533	0.0261	0.161
	L2495677-2	8/26/2020	0.3	0.25		0.006	0.00065	0.00149	0.035	0.0005	0.2	0.7	0.000025	239		0.001	0.00492	0.0363	0.174
	L2498918-1	9/2/2020	0.25	0.25		0.005	0.0007	0.00161	0.0363	0.0001	0.00025	0.634	0.000025	214	0.00005	0.0005	0.00528	0.0374	0.127
	L2500033-2	9/7/2020	0.25	0.25		0.005	0.00068	0.00174	0.0303	0.0005	0.00025	0.618	0.000025	210	0.00005	0.0005	0.00484	0.0338	0.088
	YL2000046-002	9/23/2020	0.25	0.25		0.005	0.00071	0.0015	0.0222	0.0005	0.00025	0.444	0.000025	144	0.00005	0.0005	0.00371	0.028	0.066
	YL2000126-001	10/15/2020	0.25	0.25		0.0081	0.00066	0.00154	0.0229	0.0005	0.00025	0.417	0.000025	142	0.00005	0.0005	0.00341	0.0452	0.072
	YL2000154-001	10/21/2020	0.25			0.005	0.0005	0.00162	0.0242	0.0005	0.00025	0.506	0.000025	180	0.00005	0.0005	0.00363	0.0426	0.135
	YL2000170-001	10/28/2020	0.25	0.25		0.0051	0.00055	0.00143	0.0254	0.0005	0.00025	0.523	0.000025	148	0.00005	0.0005	0.00397	0.0456	0.114
	YL2000185-001	11/3/2020	0.25	0.0614		0.005	0.00054	0.00301	0.0267	0.0005	0.00025	0.544	0.000025	161	0.00005	0.0005	0.00404	0.0434	0.106
	YL2000203-001	11/11/2020	0.25			0.005	0.00053	0.00169	0.0261	0.0005	0.00025	0.529	0.000025	147	0.00005	0.0005	0.0039	0.0429	0.093
	YL2000217-001	11/18/2020	0.25	0.25		0.0051	0.00054	0.00163	0.026	0.0005	0.00025	0.47	0.000025	155	0.00005	0.0005	0.00373	0.041	0.087
	YL2000244-002	11/24/2020	0.05	0.05		0.001	0.00057	0.00165	0.0286	0.0001	0.00005	0.509	0.0000138	166	0.00001	0.0001	0.00432	0.0477	0.078
	--	12/2/2020																	
	YL2000258-001	12/4/2020	0.25	0.0875		0.0078	0.00064	0.00191	0.0266	0.0005	0.00025	0.498	0.000025	164	0.00005	0.0005	0.00432	0.0384	0.098
	YL2000280-001	12/9/2020	0.25	0.25		0.0109	0.00065	0.0022	0.0261	0.0005	0.00025	0.547	0.000025	167	0.00005	0.0005	0.00437	0.037	0.116
	YL2000296-001	12/15/2020	0.25	0.25		0.0083	0.00072	0.00188	0.0255	0.0005	0.00025	0.585	0.000025	172	0.00005	0.0005	0.00436	0.0142	0.125
	YL2000304-001	12/20/2020	0.25	0.25		0.0116	0.00068	0.00226	0.0274	0.0005	0.00025	0.611	0.000025	183	0.00005	0.0005	0.00456	0.0252	0.126
	YL2100018-001	12/30/2020	0.328			0.0075	0.00068	0.00221	0.032	0.0005	0.00025	0.684	0.000025	205	0.00005	0.0005	0.00468	0.0361	0.317
TL-5	L2402982-1	1/5/2020	0.5	0.5		0.032	0.0023	0.0018	0.034	0.001	0.2	1.03	0.000061	180		0.001	0.0075	0.185	1.87
	L2413105-1	2/2/2020	0.5	0.5		0.038	0.0033	0.0016	0.045	0.0002	0.0005	0.91	0.00005	206		0.001	0.0062	0.055	1.03
	L2425667-1	3/4/2020	0.5	0.5		0.045	0.0046	0.0039	0.0461	0.001	0.0005	1.15	0.00005	252	0.00036	0.001	0.0139	0.355	1.15
	L2435040-1	4/6/2020	0.5	0.5		0.037	0.0046	0.0075	0.0455	0.0002	0.0005	0.97	0.00005	155		0.001	0.0103	0.177	1.04
	L2444686-1	5/4/2020	0.77	0.53		0.059	0.0052	0.0122	0.0461	0.0002	0.0005	0.94	0.00005	146		0.001	0.0402	1.68	1.59
	L2458861-1	6/7/2020	0.5	0.5		0.042	0.0034	0.0055	0.0342	0.001	0.0005	0.85	0.00005	200	0.00014	0.001	0.0085	0.101	0.38
	L2472321-1	7/5/2020	0.62	0.62		0.066	0.0036	0.0103	0.044	0.001	0.0005	1.06	0.00005	176	0.00026	0.001	0.0404	0.872	0.33
	YL2000006-001	8/2/2020	2.5	1		0.0868	0.00511	0.0137	0.067	0.001	0.0025	0.793	0.00025	205	0.0005		0.0471	2.17	0.5
	L2500031-1	9/6/2020	0.7	0.89		0.049	0.0026	0.0032	0.0433	0.0002	0.0005	0.98	0.00005	171	0.0001	0.001	0.0093	0.0131	0.91
	YL2000153-001	10/21/2020	0.5	0.5		0.126	0.00564	0.00269	0.0275	0.001	0.0005	0.877	0.00005	123	0.00053	0.001	0.00923	0.138	1.14
	YL2000198-001	11/9/2020	0.5	0.387		0.109	0.00343	0.00321	0.0362	0.001	0.0005	0.849	0.00005	130	0.000233	0.001	0.00615	0.0338	0.77
	YL2000261-001	12/4/2020	0.522	0.523		0.0787	0.00564	0.00433	0.0336	0.001	0.0005	0.793	0.00005	147	0.000125	0.001	0.00972	0.128	1.06

Station	Lab Sample ID	Sample Date	Dissolved Metals																
			Pb	Li	Mg	Mn	Hg	Mo	Ni	K	Rb	Se	Si	Ag	Na	Sr	S	Te	Tl	Th
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
TL-1	L2402830-1	1/6/2020	0.0005	0.0375	144	0.519	0.0000139	0.0167	0.0133	62		0.0006	2.55	0.00005	1430	2.03			0.0002	
	L2405211-1	1/13/2020	0.00025	0.0357	138	0.528	0.000005	0.0134	0.0115	53.3		0.00068	2.69	0.00005	1380	2.01	281		0.00005	
	L2407821-1	1/20/2020	0.0005	0.0332	145	0.604	0.000005	0.0117	0.0101	55.4		0.0005	2.68	0.00005	1360	2.17			0.0002	
	L2410564-1	1/27/2020	0.00025	0.0361	157	0.61	0.0000138	0.0114	0.0086	58.1	0.0197	0.0004	2.78	0.00005	1460	2.14	281	0.001	0.00005	0.0005
	L2413197-1	2/3/2020	0.0005	0.0342	170	0.637	0.0000067	0.0088	0.0093	54.3		0.00033	2.82	0.00005	1540	2.32	243		0.0002	
	L2415845-1	2/10/2020	0.00025	0.0346	171	0.64	0.000005	0.00905	0.009	57.6	0.0196	0.00038	2.86	0.00005	1490	2.39	254	0.001	0.00005	0.0005
	L2417844-1	2/17/2020	0.00025	0.0367	156	0.651	0.0000203	0.00897	0.0093	57.6	0.0189	0.00039	2.99	0.00005	1430	2.29	255	0.001	0.00005	0.0005
	L2420865-1	2/24/2020	0.00025	0.0358	157	0.614	0.000005	0.00856	0.0101	53.9		0.0004	2.81	0.00005	1470	2.11	255		0.00005	
	L2423271-1	3/2/2020	0.0005	0.0352	157	0.647	0.000005	0.0093	0.009	56.6		0.00049	2.93	0.00005	1450	2.2			0.0002	
	L2426296-1	3/9/2020	0.00025	0.0333	156	0.62	0.0000105	0.00838	0.0085	52.8	0.0188	0.0009	2.91	0.00005	1390	2.09	241	0.001	0.00005	0.0005
	L2428726-1	3/16/2020	0.00025	0.0409	150	0.61	0.000005	0.00893	0.009	51.8	0.0189	0.00025	2.8	0.00005	1400	2.18	245	0.001	0.00005	0.0005
	L2430974-1	3/23/2020	0.00025	0.0305	97.1	0.6	0.000005	0.00844	0.0098	46.1		0.00042	2.76	0.00005	977	1.44	243		0.00005	
	L2432833-1	3/30/2020	0.00025	0.0369	171	0.618	0.000005	0.00907	0.0096	59.1		0.00039	3.08	0.00005	1470	2.42	281		0.00005	
	L2435046-1	4/6/2020	0.0005	0.0327	162	0.644	0.000005	0.0099	0.009	54.2		0.00042	2.88	0.00005	1470	2.23	273		0.0002	
	L2437430-1	4/14/2020	0.00025	0.039	152	0.675	0.000005	0.00964	0.0091	56		0.00036	3.21	0.00005	1380	2.36	274		0.00005	
	L2439887-1	4/21/2020	0.00025	0.0354	141	0.523	0.000005	0.0101	0.0081	53.2		0.00054	2.76	0.00005	1520	2.35	271		0.00005	
	L2441174-1	4/27/2020	0.00025	0.0351	153	0.65	0.000005	0.00894	0.0091	54.9		0.00028	3.03	0.00005	1470	2.3	251		0.00005	
	L2444630-1	5/5/2020	0.0005	0.0347	153	0.613	0.000005	0.0098	0.0075	50.9		0.00046	2.89	0.00005	1430	2.39	244		0.0002	
	L2447192-1	5/12/2020	0.00025	0.0359	154	0.616	0.000005	0.0111	0.0205	61.7		0.0005	2.96	0.00005	1470	2.38	287		0.00005	
	L2450828-1	5/21/2020	0.00025	0.0358	150	0.637	0.000005	0.011	0.0258	59.1		0.00043	3.23	0.00005	1520	2.05	295		0.00005	
	L2451759-1	5/25/2020	0.00025	0.0419	153	0.674	0.000005	0.0114	0.0251	61.7		0.00051	3.33	0.000071	1540	2.19	312		0.00005	
	L2456734-1	6/2/2020	0.0005	0.0403	153	0.635	0.000005	0.0106	0.0268	59.9		0.00053	3.18	0.000082	1450	2.05	318		0.0002	
	L2459092-1	6/9/2020	0.00025	0.0369	151	0.661	0.000005	0.0109	0.0243	58.6		0.00047	3	0.00006	1460	2.16	304		0.00005	
	L2462389-1	6/16/2020	0.00025	0.0336	150	0.653	0.000005	0.0104	0.0258	57.6		0.0006	3	0.00005	1420	1.95	295		0.00005	
	L2464829-1	6/22/2020	0.00025	0.0351	150	0.643	0.000005	0.0103	0.0225	59.2	0.0181	0.00056	2.94	0.000065	1410	2.03	277	0.001	0.00005	0.0005
	L2469116-2	6/30/2020	0.0005	0.0356	143	0.608	0.000005	0.0109	0.0255	53.3		0.00039	2.87	0.000115	1390	1.95			0.0002	
	L2471611-1	7/7/2020	0.00025	0.0424	172	0.687	0.000005	0.0108	0.0244	64.3		0.00055	3.6	0.00005	1610	2.19	335		0.00005	
	L2476565-2	7/16/2020	0.00025	0.0393	139	0.646	0.000005	0.0115	0.0244	58.8	0.0177	0.00133	3.28	0.00005	1410	1.85	321	0.001	0.00005	0.0005
	L2477555-2	7/20/2020																		
	L2479634-2	7/23/2020	0.00025	0.036	147	0.681	0.000005	0.0106	0.0199	57.2	0.0178	0.00049	3.3	0.00005	1390	1.96	286	0.001	0.00005	0.0005
	L2482664-2	7/30/2020	0.0001	0.014	53.7	0.264	0.000005	0.00432	0.0086	21.8	0.00692	0.00015	1.18	0.00002	525	0.748	114	0.0004	0.00002	0.0002
	L2485657-1	8/6/2020	0.00025	0.038	138	0.676	0.000005	0.0125	0.0205	58		0.00061	3.25	0.00005	1360	2.11	303		0.00005	
	L2489482-1	8/13/2020	0.0005	0.0365	139	0.697	0.000005	0.0118	0.0205	59	0.0164	0.00051	3.37	0.0001	1500	1.99	299	0.002	0.0002	0.001
	L2492292-2	8/19/2020	0.0005	0.0361	144	0.708	0.000005	0.0117	0.0203	59.6		0.00076	3.38	0.00005	1340	1.93			0.0002	
	L2495677-2	8/26/2020	0.0005	0.0364	162	0.745	0.000005	0.0108	0.019	62.8		0.00062	3.39	0.00005	1590	2.28			0.0002	
	L2498918-1	9/2/2020	0.00025	0.0365	144	0.875	0.000005	0.012	0.021	55.6	0.0175	0.00038	3.31	0.00005	1470	2	306	0.001	0.00005	0.0005
	L2500033-2	9/7/2020	0.00025	0.0344	145	0.78	0.000005	0.0111	0.0198	53.9	0.0156	0.00052	3.01	0.00005	1250	1.98	265	0.001	0.00005	0.0005
	YL2000046-002	9/23/2020	0.00025	0.0286	94.6	0.35	0.0000143	0.00876	0.0114	39.5	0.0113	0.00025	1.98	0.0001	969	1.36	208	0.001	0.00005	0.0005
	YL2000126-001	10/15/2020	0.00025	0.0224	99	0.36	0.000005	0.00976	0.0109	38.2	0.0116	0.000623	2	0.00005	930	1.4	219	0.001	0.00005	0.0005
	YL2000154-001	10/21/2020	0.00025	0.0262	130	0.405	0.000005	0.00883	0.0115	49.1	0.0134	0.000392	2.19	0.00005	1270	1.78	222	0.001	0.00005	0.0005
	YL2000170-001	10/28/2020	0.00025	0.0247	108	0.415	0.000005	0.00925	0.0124	42.9	0.0145	0.000415	2.44	0.00005	1100	1.5	242	0.001	0.00005	0.0005
	YL2000185-001	11/3/2020	0.00025	0.0266	118	0.45	0.000005	0.00971	0.0148	47	0.014	0.000338	2.48	0.00005	1100	1.52	234	0.001	0.00005	0.0005
	YL2000203-001	11/11/2020	0.00025	0.0261	108	0.439	0.000005	0.00949	0.0129	44.1	0.014	0.000396	2.37	0.00005	1070	1.42	224	0.001	0.00005	0.0005
	YL2000217-001	11/18/2020	0.00025	0.0274	106	0.441	0.000005	0.00938	0.0119	42.3	0.0136	0.000448	2.4	0.00005	1040	1.39	234	0.001	0.00005	0.0005
	YL2000244-002	11/24/2020	0.00033	0.0265	120	0.485	0.000005	0.00967	0.0137	44.9	0.015	0.000341	2.35	0.000156	1160	1.52	220	0.0002	0.00001	0.0001
	--	12/2/2020																		
	YL2000258-001	12/4/2020	0.00025	0.0273	117	0.46	0.000005	0.0104	0.0136	46.2	0.0154	0.000355	2.41	0.00005	1180	1.6	240	0.001	0.00005	0.0005
	YL2000280-001	12/9/2020	0.00025	0.0272	125	0.459	0.000005	0.0102	0.0139	48	0.0155	0.000371	2.44	0.00005	1220	1.65	262	0.001	0.00005	0.0005
	YL2000296-001	12/15/2020	0.00025	0.0295	133	0.455	0.000005	0.0109	0.0143	51.2	0.0152	0.000421	2.54	0.00005	1320	1.68	277	0.001	0.00005	0.0005
	YL2000304-001	12/20/2020	0.00025	0.0296	130	0.453	0.000005	0.0102	0.0147	50.6	0.0157	0.000315	2.58	0.0001	1220	1.65	267	0.001	0.00005	0.0005
	YL2100018-001	12/30/2020	0.00025	0.0313	164	0.546	0.000005	0.0103	0.0148	59.8	0.0181	0.000426	2.77	0.00005	1460	2	268	0.001	0.00005	0.0005
TL-5	L2402982-1	1/5/2020	0.0005	0.044	136	0.185	0.000005	0.103	0.0105	103		0.00133	1.54	0.0001	2280	1.62			0.0002	
	L2413105-1	2/2/2020	0.0005	0.048	177	0.201	0.000025	0.0622	0.0088	116		0.00214	1.48	0.0001	2420	2.02	715		0.0001	
	L2425667-1	3/4/2020	0.0005	0.062	213	0.183	0.00001	0.0445	0.151	129	0.048	0.00137	1.25	0.0001	2390	2.44	527	0.002	0.0001	0.001
	L2435040-1	4/6/2020	0.0005	0.061	152	0.136	0.00005	0.0482	0.0814	113		0.0022	1.53	0.00082	2220	1.74	708		0.0001	
	L2444686-1	5/4/2020	0.0005	0.06	166	0.103	0.0000059	0.0896	0.503	138		0.00497	1.55	0.0001	2470	1.83	850		0.0001	
	L2458861-1	6/7/2020	0.0005	0.045	163	0.208	0.00001	0.0683	0.1	104	0.0412	0.00128	1.56	0.0001	2000	1.7	620	0.002	0.0001	0.001
	L2472321-1	7/5/2020	0.0005	0.046	191	0.135	0.000025	0.0657	0.569	160	0.0436	0.00316	1.87	0.0001	2380	1.55	796	0.002	0.0001	0.001
	YL2000006-001	8/2/2020	0.0025	0.057	136	0.622	0.0000636	0.0291	0.164	74.3	0.022	0.00686	3.3	0.0005	8040	2.1	4400	0.01	0.0005	0.005
	L2500031-1	9/6/2020	0.0005	0.043	138	0.165	0.000025	0.0699	0.0344	112	0.0346	0.00646	1.74	0.0001	2060	1.51	760	0.002	0.0001	0.001
	YL2000153-001	10/21/2020	0.0005	0.0211	114	0.0857	0.000005	0.0436	0.0426	114	0.0391	0.00356	1.04	0.000234	1660	1.07	610	0.002	0.0001	0.001
	YL2000198-001	11/9/2020	0.0005	0.0289	106	0.1	0.000005	0.0315	0.0542	89	0.0388	0.00174	1.1	0.0001	1720	1.18	690	0.002	0.0001	0.001
	YL2000261-001	12/4/2020	0.0005	0.0356	129	0.128	0.000005	0.04	0.077	96.4	0.0342	0.00251	1.22	0.0001	2060	1.3	775	0.002	0.0001	0.001

Station	Lab Sample ID	Sample Date	Sn	Ti	W	U	V	Zn	Zr	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cs	Cr
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
TL-1	L2402830-1	1/6/2020	*0.0005*	*0.01*		0.0003	*0.0025*	0.0082		0.119	0.00096	0.00174	0.027	*0.0005*	*0.2*	0.74	*0.000025*	195		*0.001*
	L2405211-1	1/13/2020	*0.0005*	*0.0015*		0.000286	*0.0025*	0.0094	*0.001*	0.094	0.00077	0.00144	0.028	*0.0005*		0.76	*0.00005*	223		*0.001*
	L2407821-1	1/20/2020	*0.0005*	*0.01*		0.00022	*0.0025*	0.0086		0.106	0.00071	0.00157	0.033	*0.0005*		0.73	0.000027	218		*0.001*
	L2410564-1	1/27/2020	*0.0005*	*0.0015*	0.00124	0.00024	*0.0025*	0.0103	*0.001*	0.361	0.00069	0.00159	0.0308	*0.0005*	*0.00025*	0.742	0.000026	233	*0.00005*	0.00054
	L2413197-1	2/3/2020	*0.0005*	*0.01*		0.00022	*0.0025*	0.0092	*0.001*	0.102	0.00059	0.00131	0.033	*0.0005*	*0.2*	0.67	0.000027	242		*0.001*
	L2415845-1	2/10/2020	*0.0005*	*0.0015*	0.00113	0.00026	*0.0025*	0.0097	*0.001*	0.133	0.0006	0.00145	0.0297	*0.0005*	*0.00025*	0.722	*0.000025*	224	*0.00005*	0.00055
	L2417844-1	2/17/2020	*0.0005*	*0.0015*	0.00114	0.000258	*0.0025*	0.0111	*0.001*	0.168	0.00063	0.0014	0.0329	*0.0005*	*0.00025*	0.727	0.000161	230	*0.00005*	*0.0005*
	L2420865-1	2/24/2020	*0.0005*	*0.0015*		0.00023	*0.0025*	0.0107	*0.001*	0.099	0.00064	0.00135	0.033	*0.0005*		0.67	*0.000025*	218		*0.001*
	L2423271-1	3/2/2020	*0.0005*	*0.01*		0.00022	*0.0025*	0.0085		0.121	0.00059	0.00174	0.032	*0.0005*	*0.2*	0.67	0.000037	216		0.0013
	L2426296-1	3/9/2020	*0.0005*	*0.0015*	0.00108	0.000227	*0.0025*	0.0135	*0.001*	0.128	0.00059	0.00145	0.0335	*0.0005*	*0.00025*	0.655	*0.000025*	205	*0.00005*	*0.0005*
	L2428726-1	3/16/2020	*0.0005*	*0.0015*	0.00117	0.000229	*0.0025*	0.0123	*0.001*	0.106	0.00058	0.00133	0.0293	*0.0005*	*0.00025*	0.779	0.00003	254	*0.00005*	*0.0005*
	L2430974-1	3/23/2020	*0.0005*	*0.0015*		0.000244	*0.0025*	*0.005*	*0.001*	0.06	*0.0005*	0.00132	0.028	*0.0005*		0.48	*0.000025*	166		*0.001*
	L2432833-1	3/30/2020	*0.0005*	*0.0015*		0.000238	*0.0025*	0.0156	*0.001*	0.093	0.00063	0.00153	0.03	*0.0005*		0.71	*0.000025*	217		*0.001*
	L2435046-1	4/6/2020	*0.0005*	*0.01*		0.00023	*0.0025*	0.0117	*0.001*	0.075	0.00061	0.00133	0.032	*0.0005*	*0.2*	0.72	*0.000025*	229		*0.001*
	L2437430-1	4/14/2020	*0.0005*	*0.0015*		0.000271	*0.0025*	0.0209	*0.001*	0.088	*0.001*	0.0015	0.032	*0.001*		0.67	*0.00005*	234		*0.001*
	L2439887-1	4/21/2020	*0.0005*	*0.0015*		0.000281	*0.0025*	*0.005*	*0.001*	0.11	0.00061	0.00136	0.032	*0.0005*		0.7	0.000065	224		*0.001*
	L2441174-1	4/27/2020	*0.0005*	*0.0015*		0.000231	*0.0025*	0.0093	*0.001*	0.141	0.00067	0.0018	0.031	*0.0005*		0.67	*0.000035*	209		*0.001*
	L2444630-1	5/5/2020	*0.0005*	*0.01*		0.00022	*0.0025*	0.0101	*0.001*	0.066	0.00063	0.00217	0.034	*0.0005*	*0.2*	0.65	*0.000025*	220		*0.001*
	L2447192-1	5/12/2020	*0.0005*	*0.0015*		0.000247	*0.0025*	0.0076	*0.001*	0.103	0.00071	0.0016	0.032	*0.0005*		0.65	*0.000025*	219		*0.001*
	L2450828-1	5/21/2020	*0.0005*	*0.0015*		0.000278	*0.0025*	0.0072	*0.001*	0.073	0.00074	0.00177	0.036	*0.0005*	*0.00025*	0.656	*0.000025*	220	*0.00005*	*0.0005*
	L2451759-1	5/25/2020	*0.0005*	*0.0015*		0.000375	*0.0025*	0.0066	*0.001*	0.06	0.00074	0.00173	0.035	*0.0005*		0.61	*0.000025*	215		*0.001*
	L2456734-1	6/2/2020	*0.0005*	*0.01*		0.00029	*0.0025*	0.0068	*0.001*	0.139	0.00074	0.00242	0.035	*0.0005*	*0.2*	0.65	*0.000025*	212		0.001
	L2459092-1	6/9/2020	*0.0005*	*0.0015*		0.000284	*0.0025*	0.0079	*0.001*	0.157	0.00075	0.00273	0.034	*0.0005*		0.69	*0.000025*	221		0.0011
	L2462389-1	6/16/2020	0.00076	*0.0015*		0.000258	*0.0025*	0.0064	*0.001*	0.172	0.00077	0.00259	0.034	*0.0005*		0.64	0.000025	214		0.0011
	L2464829-1	6/22/2020	*0.0005*	*0.0015*	0.00115	0.000275	*0.0025*	0.0065	*0.001*	0.192	0.00074	0.0023	0.0334	*0.0005*	*0.00025*	0.673	*0.000025*	219	*0.00005*	0.00147
	L2469116-2	6/30/2020	*0.0005*	*0.01*		0.0003	*0.0025*	0.0111		0.098	0.00087	0.00248	0.033	*0.0005*	*0.2*	0.65	0.000036	222		*0.001*
	L2471611-1	7/7/2020	*0.0005*	*0.0015*		0.000287	*0.0025*	0.008	*0.001*	0.123	0.00068	0.00264	0.0351	*0.0005*	*0.00025*	0.76	0.000026	257	*0.00005*	0.00072
	L2476565-2	7/16/2020	*0.0005*	*0.0015*	0.00095	0.000305	*0.0025*	0.0053	*0.001*	0.141	0.00075	0.00273	0.03	*0.0005*	*0.00025*	0.65	0.000027	219	*0.00005*	0.00096
	L2477555-2	7/20/2020																		
	L2479634-2	7/23/2020	*0.0005*	*0.0015*	0.00106	0.000294	*0.0025*	0.0057	*0.001*	0.106	0.00082	0.00283	0.0402	*0.0005*	*0.00025*	0.72	*0.000025*	230	*0.00005*	0.00054
	L2482664-2	7/30/2020	*0.0002*	*0.0006*	0.00038	0.000114	*0.001*	*0.002*	*0.0004*	0.112	0.0008	0.00263	0.0362	*0.0005*	*0.00025*	0.669	*0.000025*	221	*0.00005*	*0.0005*
	L2485657-1	8/6/2020	*0.0005*	*0.0015*		0.000304	*0.0025*	*0.005*	*0.001*	0.086	0.00073	0.00269	0.0364	*0.0005*	*0.00025*	0.737	*0.000025*	244	*0.00005*	*0.0005*
	L2489482-1	8/13/2020	*0.0005*	*0.01*	*0.001*	0.00033	*0.0025*	0.0052	*0.002*	0.067	0.0009	0.00251	0.034	*0.0005*	*0.2*	0.64	*0.000025*	231		*0.001*
	L2492292-2	8/19/2020	*0.0005*	*0.01*		0.0003	*0.0025*	0.0055		0.093	0.0008	0.00242	0.035	*0.0005*	*0.2*	0.68	*0.000035*	214		*0.001*
	L2495677-2	8/26/2020	*0.0005*	*0.01*		0.00026	*0.0025*	0.0086		0.14	0.00072	0.00296	0.037	*0.0005*	*0.00025*	0.712	*0.000025*	246	*0.00005*	*0.0005*
	L2498918-1	9/2/2020	*0.0005*	*0.0015*	*0.00113*	0.000279	*0.0025*	0.0109	*0.001*	0.068	0.00072	0.00249	0.0364	*0.0005*	*0.00025*	0.636	*0.000025*	238	*0.00005*	*0.0005*
	L2500033-2	9/7/2020	*0.0005*	*0.0015*	0.00099	0.000247	*0.0025*	*0.005*	*0.001*	0.086	0.00066	0.0026	0.0361	*0.0005*	*0.00025*	0.639	*0.000025*	201	*0.00005*	*0.0005*
	YL2000046-002	9/23/2020	*0.0005*	*0.0015*	0.0007	0.000193	*0.0025*	0.0054	*0.001*	0.219	0.00064	0.00224	0.0256	*0.0005*	*0.00025*	0.508	*0.000025*	147	*0.00005*	0.00084
	YL2000126-001	10/15/2020	*0.0005*	*0.0015*	*0.00087*	0.000207	*0.0025*	*0.005*	*0.001*	0.0438	0.00059	0.00186	0.0216	*0.0005*	*0.00025*	0.426	*0.000025*	135	*0.00005*	*0.0005*
	YL2000154-001	10/21/2020	*0.0005*	*0.0015*	0.00103	0.000182	*0.0025*	*0.005*	*0.001*	0.0778	0.00051	0.00282	0.0271	*0.0005*	*0.00025*	0.558	*0.000025*	170	*0.00005*	0.00055
	YL2000170-001	10/28/2020	*0.0005*	*0.0015*	*0.00092*	0.000268	*0.0025*	0.0086	*0.001*	0.0744	0.00058	0.002	0.0269	*0.0005*	*0.00025*	0.489	*0.000025*	160	0.000127	*0.0005*
	YL2000185-001	11/3/2020	*0.0005*	*0.0015*	0.0009	0.000241	*0.0025*	*0.005*	*0.001*	0.109	0.00054	0.00484	0.0255	*0.0005*	*0.00025*	0.589	*0.000025*	172	*0.00005*	*0.0005*
	YL2000203-001	11/11/2020	*0.0005*	*0.0015*	0.00107	0.000197	*0.0025*	*0.005*	*0.001*	0.0773	0.00052	0.00223	0.0274	*0.0005*	*0.00025*	0.619	*0.000025*	162	*0.00005*	0.00052
	YL2000217-001	11/18/2020	*0.0005*	*0.0015*	0.00096	0.000226	*0.0025*	*0.005*	*0.001*	0.0626	0.00054	0.0026	0.0286	*0.0005*	*0.00025*	0.564	*0.000025*	168	*0.00005*	*0.0005*
	YL2000244-002	11/24/2020	*0.0001*	*0.0003*	0.00087	0.000224	*0.0005*	*0.001*	*0.0002*	0.0571	0.00052	0.00256	0.0274	*0.0001*	*0.00005*	0.634	0.0000105	176	*0.00001*	*0.0001*
	--	12/2/2020																		
	YL2000258-001	12/4/2020	*0.0005*	*0.0015*	0.001	0.000221	*0.0025*	0.0051	*0.001*	0.203	0.00061	0.00246	0.0277	*0.0005*	*0.00025*	0.557	*0.000025*	166	*0.00005*	0.00064
	YL2000280-001	12/9/2020	*0.0005*	*0.0015*	0.00116	0.0002	*0.0025*	0.0059	*0.001*	0.192	0.00064	0.00263	0.0282	*0.0005*	*0.00025*	0.646	*0.000025*	185	*0.00005*	*0.0005*
	YL2000296-001	12/15/2020	*0.0005*	*0.0015*	0.00128	0.000227	*0.0025*	0.0056	*0.001*	0.12	0.00069	0.00248	0.0301	*0.0005*	*0.00025*	0.603	*0.000025*	177	0.000052	*0.0005*
	YL2000304-001	12/20/2020	*0.0005*	*0.0015*	0.00143	0.000222	*0.0025*	*0.005*	*0.001*	0.268	0.00072	0.0032	0.0467	*0.0005*	*0.00025*	2.46	*0.000025*	510	0.000282	0.00104
	YL2100018-001	12/30/2020	*0.0005*	*0.0015*	0.00137	0.000247	*0.0025*	0.0055	*0.001*	0.0962	0.00064	0.00268	0.0346	*0.0005*	*0.00025*	0.679	*0.000025*	186	*0.00005*	*0.0005*
TL-5	L2402982-1	1/5/2020	*0.001*	*0.01*		*0.0002*	*0.005*	*0.01*		0.329	0.003	0.0131	0.0368	*0.001*	*0.0005*	0.96	*0.00008*	176	*0.0001*	0.0026
	L2413105-1	2/2/2020	*0.001*	*0.003*		0.00027	*0.005*	*0.01*	*0.002*	0.283	0.0034	0.008	0.0441	*0.001*	*0.0005*	1.04	*0.00005*	203	0.00018	0.001
	L2425667-1	3/4/2020	*0.001*	*0.003*	0.0064	0.00073	*0.005*	*0.01*	*0.002*	0.239	0.0048	0.0262	0.0493	*0.001*	*0.0005*	1.09	*0.00006*	245	0.00034	0.0018
	L2435040-1	4/6/2020	*0.001*	*0.003*		0.00084	*0.005*	*0.01*	*0.002*	0.428	0.0047	0.0377	0.0471	*0.001*	*0.0005*	0.95	*0.00005*	147	0.00019	0.0031
	L2444686-1	5/4/2020	*0.001*	*0.003*		0.00111	*0.005*	*0.01*	*0.002*	0.139	0.0053	0.0301	0.0504	*0.001*	*0.0005*	0.94	*0.00005*	149	0.00059	*0.001*
	L2458861-1	6/7/2020	*0.001*	*0.003*	0.0043	0.00044	*0.005*	*0.01*	*0.002*	0.225	0.004	0.0393	0.0377	*0.001*	*0.0005*	0.86	*0.00005*	210	0.00014	0.0033
	L2472321-1	7/5/2020	*0.001*	*0.003*	0.005	0.00081	*0.005*	*0.01*	*0.002*	1.02	0.0041	0.202	0.043	*0.001*	*0.0005*	0.95	0.000055	191	0.00034	0.0132
	YL2000006-001	8/2/2020	*0.005*	*0.015*	0.00819	*0.0005*	*0.025*	*0.05*	*0.015*	0.119	0.0061	0.0158	0.0595	*0.002*	*0.001*	0.808	*0.0001*	202	*0.0002*	0.00805
	L2500031-1	9/6/2020	*0.001*	*0.003*	*0.0031*	0.00029	*0.005*	*0.01*	*0.002*	0.337	0.0033	0.0098	0.0428	*0.001*	*0.0005*	1.04	*0.00005*	173	0.00018	0.0021
	YL2000153-001	10/21/2020	*0.001*	*0.003*	0.00567	0.00016	*0.005*	*0.01*	*0.002*	0.471	0.00587	0.00608	0.0272	*0.001*	*0.0005*	0.787	*0.00005*	120	0.000506	*0.001*
	YL2000198-001	11/9/2020	*0.001*	*0.003*	0.00582	0.000368	*0.005*	*0.01*	*0.002*	0.188	0.00423	0.00443	0.0373	*0.0005*	*0.00025*	0.897	*0.00003*	141	0.000298	0.00068
	YL2000261-001	12/4/2020	*0.001*	*0.003*	0.0103	0.000372	*0.005*	*0.01*	*0.002*	0.605	0.0058	0.0496	0.0339	*0.001*	*0.0005*	0.889	0.000153	149	0.000165	0.00353

Station	Lab Sample ID	Sample Date	Total Metals																
			Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	K	Rb	Se	Si	Ag	Na	Sr	S
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
TL-1	L2402830-1	1/6/2020	0.00474	0.0624	0.602	*0.0005*	0.0396	145	0.507	0.000019	0.0155	0.0137	58.7		0.00047	2.81	*0.00005*	1460	1.82	
	L2405211-1	1/13/2020	0.00449	0.0676	0.719	*0.0005*	0.0371	150	0.545	0.0000128	0.0146	0.0124	57.3		0.00049		*0.00005*	1460		
	L2407821-1	1/20/2020	0.00414	0.066	0.985	*0.0005*	0.0387	155	0.628	0.00001	0.0114	0.0115	54.2		0.00047		*0.00005*	1490		
	L2410564-1	1/27/2020	0.00411	0.0694	1.48	0.00039	0.0367	160	0.649	0.0000173	0.0113	0.0099	58.9	0.0213	0.00045	3.29	*0.00005*	1510	2.2	278
	L2413197-1	2/3/2020	0.00386	0.0637	0.789	*0.0005*	0.0374	155	0.659	0.0000112	0.0102	0.0099	54.6		0.00036	3.09	*0.00005*	1480	2.36	
	L2415845-1	2/10/2020	0.00363	0.0764	0.953	0.00025	0.0354	157	0.652	0.000014	0.00873	0.0099	53.4	0.02	0.0003	3.3	*0.00005*	1450	2.34	245
	L2417844-1	2/17/2020	0.00388	0.0751	0.792	*0.00025*	0.0346	159	0.668	0.0000273	0.00948	0.0101	57.8	0.0207	0.00032	3.28	*0.00005*	1440	2.44	253
	L2420865-1	2/24/2020	0.00377	0.0692	0.733	*0.0005*	0.0356	155	0.624	0.0000254	0.0097	0.0102	53.1		0.00037		*0.00005*	1390		
	L2423271-1	3/2/2020	0.00372	0.0689	1.52	*0.0005*	0.0323	150	0.651	0.0000065	0.0092	0.0102	50.3		0.00054	2.85	*0.00005*	1410	2.21	
	L2426296-1	3/9/2020	0.0036	0.0616	1.21	*0.00025*	0.0315	162	0.687	0.0000087	0.00823	0.0095	55.3	0.02	0.00039	3.19	*0.00005*	1450	1.99	257
	L2428726-1	3/16/2020	0.00363	0.0628	0.823	*0.00025*	0.0358	160	0.63	*0.000005*	0.0096	0.0096	55.1	0.0206	0.00041	3.13	*0.00005*	1480	2.51	262
	L2430974-1	3/23/2020	0.00414	0.0607	0.338	*0.0005*	0.0322	98.1	0.603	*0.000005*	0.0079	0.0102	46.2		0.00051		*0.00005*	1000		
	L2432833-1	3/30/2020	0.00365	0.0601	0.807	*0.0005*	0.0365	166	0.631	*0.000005*	0.0084	0.0085	52.9		0.00043		*0.00005*	1400		
	L2435046-1	4/6/2020	0.00372	0.0569	1.18	*0.0005*	0.0363	148	0.666	*0.000005*	0.0101	0.0098	53.1		0.0004	3.26	*0.00005*	1390	2.19	
	L2437430-1	4/14/2020	0.0037	0.053	1.63	*0.0005*	0.036	160	0.661	*0.000005*	0.0098	0.0098	54		*0.0005*		*0.0001*	1420		
	L2439887-1	4/21/2020	0.00377	0.0552	0.98	*0.0005*	0.0339	146	0.63	*0.000005*	0.0099	0.01	52.6		0.00042		*0.00005*	1490		
	L2441174-1	4/27/2020	0.00361	0.0625	1.73	*0.0005*	0.0367	157	0.677	*0.000005*	0.0099	0.0105	55		0.00035		*0.00005*	1470		
	L2444630-1	5/5/2020	0.00376	0.0543	1.41	*0.0005*	0.0379	149	0.663	*0.000005*	0.0094	0.0092	54.7		0.00028	3.18	*0.00005*	1380	2.25	
	L2447192-1	5/12/2020	0.00519	0.231	1.29	*0.0005*	0.0396	147	0.682	*0.000005*	0.0108	0.0217	58		0.00047		0.00025	1480		
	L2450828-1	5/21/2020	0.00605	0.326	1.17	*0.00025*	0.0414	162	0.712	*0.000005*	0.0121	0.0286	60.7	0.0198	0.00062	3.5	0.000289	1560	2.23	315
	L2451759-1	5/25/2020	0.00594	0.286	1.08	*0.0005*	0.0337	137	0.648	*0.000005*	0.0112	0.0257	54.9		0.00046		0.000312	1370		
	L2456734-1	6/2/2020	0.00587	0.295	1.58	*0.0005*	0.0396	147	0.644	*0.000005*	0.0117	0.0282	58.5		0.00056	3.66	0.00025	1430	2.16	
	L2459092-1	6/9/2020	0.00548	0.272	1.5	*0.0005*	0.0369	148	0.665	*0.000005*	0.0107	0.0254	59.4		0.00068		0.000259	1420		
	L2462389-1	6/16/2020	0.00571	0.264	1.27	*0.0005*	0.0348	151	0.672	*0.000005*	0.0108	0.0261	59.1		0.00059		0.000276	1360		
	L2464829-1	6/22/2020	0.00564	0.246	1.08	*0.00025*	0.0376	158	0.688	*0.000005*	0.0118	0.025	58.5	0.0195	0.00048	3.72	0.00021	1520	2.15	295
	L2469116-2	6/30/2020	0.00613	0.256	0.819	*0.0005*	0.0389	136	0.687	*0.000005*	0.0122	0.0288	57.4		0.00046	3.08	0.000279	1310	1.93	
	L2471611-1	7/7/2020	0.00535	0.21	1.76	*0.00025*	0.0405	169	0.68	*0.000005*	0.0111	0.0248	62.3	0.0177	0.00042	3.57	0.000201	1610	2.37	287
	L2476565-2	7/16/2020	0.00578	0.163	1.1	*0.00025*	0.0384	135	0.622	*0.000005*	0.0119	0.0256	56.6	0.0181	0.00056	3.56	0.000123	1320	1.86	318
	L2477555-2	7/20/2020																		
	L2479634-2	7/23/2020	0.00563	0.143	1.77	*0.00025*	0.0408	156	0.741	*0.000005*	0.0119	0.0239	62.5	0.0189	0.00069	4.01	0.000092	1530	2.21	297
	L2482664-2	7/30/2020	0.00545	0.1	0.963	*0.00025*	0.0377	140	0.682	*0.000005*	0.0127	0.0224	61.1	0.0185	0.0006	3.55	0.000059	1440	2.05	332
	L2485657-1	8/6/2020	0.00594	0.116	1.05	*0.00025*	0.0389	152	0.779	*0.00001*	0.0123	0.0233	63.2	0.0181	0.00045	3.62	0.00006	1500	2.07	330
	L2489482-1	8/13/2020	0.00546	0.0906	0.923	*0.0005*	0.0389	138	0.717	*0.000005*	0.0121	0.0218	57.6		0.00068	3.55	0.000054	1500	1.94	
	L2492292-2	8/19/2020	0.00563	0.095	0.94	*0.0005*	0.0347	140	0.758	*0.000005*	0.0125	0.0232	54.8		0.00075	3.62	0.000064	1350	1.96	
	L2495677-2	8/26/2020	0.0053	0.0994	1.36	*0.00025*	0.0386	155	0.801	*0.00001*	0.0123	0.0216	58.1	0.019	0.00051	3.79	0.000077	1460	2.27	310
	L2498918-1	9/2/2020	0.00565	0.0828	0.725	*0.00025*	0.0365	156	0.896	*0.000005*	0.0127	0.0226	60.8	0.0174	0.00055	3.27	*0.00005*	1470	2.33	282
	L2500033-2	9/7/2020	0.0054	0.081	0.927	*0.00025*	0.0309	145	0.848	*0.000005*	0.0107	0.0212	54	0.0169	0.00053	3.24	0.000056	1350	1.99	282
	YL2000046-002	9/23/2020	0.00422	0.0507	0.753	*0.00025*	0.0268	104	0.388	*0.000025*	0.00979	0.0136	42.6	0.0141	0.000483	2.66	*0.00005*	968	1.43	221
	YL2000126-001	10/15/2020	0.00353	0.0748	0.522	*0.00025*	0.0224	92.7	0.383	*0.000005*	0.00905	0.0115	36.1	0.012	0.000468	2.13	*0.00005*	854	1.31	213
	YL2000154-001	10/21/2020	0.0041	0.0876	0.828	*0.00025*	0.0282	113	0.454	*0.00005*	0.00906	0.0128	43.4	0.014	*0.00025*	2.46	*0.00005*	1120	1.58	220
	YL2000170-001	10/28/2020	0.00387	0.0779	0.559	*0.00025*	0.022	108	0.438	*0.000005*	0.00961	0.0126	44.5	0.0138	0.000721	2.23	*0.00005*	1140	1.49	225
	YL2000185-001	11/3/2020	0.00453	0.0799	0.654	*0.00025*	0.0314	123	0.472	*0.000005*	0.0099	0.0158	47.5	0.0153	0.000439	2.69	*0.00005*	1240	1.57	246
	YL2000203-001	11/11/2020	0.00402	0.0747	0.535	*0.00025*	0.0274	113	0.47	*0.000005*	0.00957	0.0133	45.5	0.0139	0.000292	2.6	*0.00005*	1100	1.46	237
	YL2000217-001	11/18/2020	0.00412	0.0791	0.523	*0.00025*	0.0268	120	0.481	*0.000005*	0.00979	0.0139	45.7	0.0146	0.000323	2.58	*0.00005*	1160	1.53	229
	YL2000244-002	11/24/2020	0.00428	0.0777	0.488	0.000397	0.0292	116	0.488	*0.000005*	0.00984	0.0141	45.5	0.0146	0.000434	2.63	0.000167	1130	1.53	250
	--	12/2/2020																		
	YL2000258-001	12/4/2020	0.00437	0.0723	0.759	*0.00025*	0.0288	123	0.492	*0.000025*	0.0103	0.0155	47.1	0.0147	0.000341	3.1	*0.00005*	1200	1.56	256
	YL2000280-001	12/9/2020	0.00459	0.0744	0.582	*0.00025*	0.0304	132	0.484	*0.000005*	0.011	0.0155	50.6	0.0161	0.000449	2.93	*0.00005*	1310	1.69	263
	YL2000296-001	12/15/2020	0.00458	0.0709	0.587	*0.00025*	0.0302	127	0.507	*0.000005*	0.0112	0.0165	54.1	0.0167	0.000495	2.87	*0.00005*	1290	1.72	273
	YL2000304-001	12/20/2020	0.0064	0.0662	1.14	*0.00025*	0.0841	524	0.948	*0.000005*	0.0106	0.0163	137	0.0562	0.000416	4.44	0.000213	4040	6.49	323
	YL2100018-001	12/30/2020	0.00473	0.0652	0.617	*0.00025*	0.0324	152	0.561	*0.000005*	0.0103	0.016	59.8	0.0175	0.0004	3.07	*0.00005*	1460	1.99	291
TL-5	L2402982-1	1/5/2020	0.0129	0.334	6.06	0.00079	0.045	150	0.237	*0.000025*	0.105	0.0163	115	0.0201	0.00151	2.2	0.00056	2470	1.56	946
	L2413105-1	2/2/2020	0.0088	0.135	2.96	0.00074	0.049	151	0.228	*0.000025*	0.063	0.0111	115	0.0383	0.00194	1.9	0.00027	2420	1.91	744
	L2425667-1	3/4/2020	0.0173	0.365	3.65	0.00058	0.054	241	0.237	0.0000063	0.0468	0.172	131	0.048	0.00218	1.5	0.00029	2450	2.6	534
	L2435040-1	4/6/2020	0.0151	0.221	4	0.00108	0.061	153	0.172	*0.000005*	0.0541	0.101	120	0.0289	0.00206	2.2	0.00106	2130	1.73	672
	L2444686-1	5/4/2020	0.0435	1.8	2.42	*0.0005*	0.064	164	0.119	0.0000071	0.0914	0.531	143	0.0505	0.00468	1.6	0.00067	2410	1.75	911
	L2458861-1	6/7/2020	0.0124	0.106	2.88	*0.0005*	0.054	177	0.243	*0.000025*	0.0721	0.108	112	0.0429	0.00278	1.9	0.00015	2080	1.95	668
	L2472321-1	7/5/2020	0.0634	1.61	11.9	0.00198	0.05	183	0.275	*0.000025*	0.0701	0.639	148	0.0389	0.00586	2.9	0.00062	2350	1.73	687
	YL2000006-001	8/2/2020	0.0372	2.35	2.38	0.00339	0.0513	121	0.525	0.000041	0.0307	0.144	62	0.0192	0.00323	2.94	0.00678	6090	1.87	3910
	L2500031-1	9/6/2020	0.012	0.0858	3.56	*0.0005*	0.044	161	0.208	*0.0001*	0.0719	0.0421	120	0.0388	0.00431	2.2	0.00024	2260	1.6	832
	YL2000153-001	10/21/2020	0.0111	0.139	2.58	*0.0005*	0.0206	122	0.105	*0.0001*	0.0445	0.0448	119	0.0372	0.00325	2.7	0.000767	1700	1.07	625
	YL2000198-001	11/9/2020	0.00711	0.0945	1.49	*0.00025*	0.0295	117	0.111	*0.00005*	0.0319	0.0564	94	0.0397	0.00282	1.31	0.000176	1810	1.2	736
	YL2000261-001	12/4/2020	0.0205	0.262	9.91	0.001	0.0373	128	0.166	*0.000025*	0.0392	0.092	93.9	0.0347	0.0049	2.17	0.00101	2040	1.24	834

Station	Lab Sample ID	Sample Date	Te	Tl	Th	Sn	Ti	W	U	V	Zn	Zr
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
TL-1	L2402830-1	1/6/2020		*0.00005*		*0.0005*	*0.01*		0.00025	*0.0025*	*0.015*	
	L2405211-1	1/13/2020		*0.00005*		*0.0005*	*0.01*		0.00024	*0.0025*	*0.015*	
	L2407821-1	1/20/2020		*0.00005*		*0.0005*	*0.01*		0.00023	*0.0025*	*0.015*	
	L2410564-1	1/27/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	0.0049	0.00125	0.000248	*0.0025*	*0.015*	*0.001*
	L2413197-1	2/3/2020		*0.00005*		*0.0005*	*0.01*		0.00026	*0.0025*	*0.015*	
	L2415845-1	2/10/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	0.0024	0.00116	0.000254	*0.0025*	*0.015*	*0.001*
	L2417844-1	2/17/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	0.0043	0.00125	0.000234	*0.0025*	*0.015*	*0.001*
	L2420865-1	2/24/2020		*0.00005*		*0.0005*	*0.01*		0.00028	*0.0025*	*0.015*	
	L2423271-1	3/2/2020		*0.00005*		*0.0005*	*0.01*		0.00025	*0.0025*	*0.015*	
	L2426296-1	3/9/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	0.0025	0.00118	0.000236	*0.0025*	0.016	*0.001*
	L2428726-1	3/16/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	0.0021	0.00123	0.000219	*0.0025*	*0.015*	*0.001*
	L2430974-1	3/23/2020		*0.00005*		*0.0005*	*0.01*		0.00025	*0.0025*	*0.015*	
	L2432833-1	3/30/2020		*0.00005*		*0.0005*	*0.01*		0.00024	*0.0025*	0.016	
	L2435046-1	4/6/2020		*0.00005*		*0.0005*	*0.01*		0.00023	*0.0025*	*0.015*	
	L2437430-1	4/14/2020		*0.0001*		*0.001*	*0.01*		0.00023	*0.005*	*0.03*	
	L2439887-1	4/21/2020		*0.00005*		*0.0005*	*0.01*		0.00025	*0.0025*	*0.015*	
	L2441174-1	4/27/2020		*0.00005*		*0.0005*	*0.01*		0.00024	*0.0025*	*0.015*	
	L2444630-1	5/5/2020		*0.00005*		*0.0005*	*0.01*		0.00024	*0.0025*	*0.015*	
	L2447192-1	5/12/2020		*0.00005*		*0.0005*	*0.01*		0.00027	*0.0025*	*0.015*	
	L2450828-1	5/21/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	*0.0015*	0.00123	0.000294	*0.0025*	*0.015*	*0.001*
	L2451759-1	5/25/2020		*0.00005*		*0.0005*	*0.01*		0.00026	*0.0025*	*0.015*	
	L2456734-1	6/2/2020		*0.00005*		*0.0005*	*0.01*		0.00032	*0.0025*	*0.015*	
	L2459092-1	6/9/2020		*0.00005*		*0.0005*	*0.01*		0.00027	*0.0025*	*0.015*	
	L2462389-1	6/16/2020		*0.00005*		*0.0005*	*0.01*		0.00029	*0.0025*	*0.015*	
	L2464829-1	6/22/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	0.0023	0.00124	0.000287	*0.0025*	*0.015*	*0.001*
	L2469116-2	6/30/2020		*0.00005*		*0.0005*	*0.01*		0.00031	*0.0025*	*0.015*	
	L2471611-1	7/7/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	*0.0015*	0.00121	0.000276	*0.0025*	*0.015*	*0.001*
	L2476565-2	7/16/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	*0.0015*	0.00109	0.000301	*0.0025*	*0.015*	*0.001*
	L2477555-2	7/20/2020										
	L2479634-2	7/23/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	0.0032	0.0013	0.000317	*0.0025*	*0.015*	*0.001*
	L2482664-2	7/30/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	*0.0015*	0.00109	0.000286	*0.0025*	*0.015*	*0.001*
	L2485657-1	8/6/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	*0.0015*	0.00116	0.000307	*0.0025*	*0.015*	*0.001*
	L2489482-1	8/13/2020		*0.00005*		*0.0005*	*0.01*		0.00031	*0.0025*	*0.015*	
	L2492292-2	8/19/2020		*0.00005*		*0.0005*	*0.01*		0.00032	*0.0025*	*0.015*	
	L2495677-2	8/26/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	0.0025	0.00131	0.000293	*0.0025*	*0.015*	*0.001*
	L2498918-1	9/2/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	*0.0015*	0.00107	0.000295	*0.0025*	*0.015*	*0.001*
	L2500033-2	9/7/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	0.0021	0.00116	0.000271	*0.0025*	*0.015*	*0.001*
	YL2000046-002	9/23/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	*0.0072*	0.00079	0.000232	*0.0025*	*0.015*	*0.001*
	YL2000126-001	10/15/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	*0.0015*	0.00087	0.000182	*0.0025*	*0.015*	*0.001*
	YL2000154-001	10/21/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	0.00168	0.00101	0.000195	*0.0025*	*0.015*	*0.001*
	YL2000170-001	10/28/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	*0.0015*	0.00092	0.000235	*0.0025*	*0.015*	*0.001*
	YL2000185-001	11/3/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	*0.0024*	0.00097	0.000282	*0.0025*	*0.015*	*0.001*
	YL2000203-001	11/11/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	*0.0015*	0.00094	0.000203	*0.0025*	*0.015*	*0.001*
	YL2000217-001	11/18/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	0.00196	0.00098	0.000217	*0.0025*	*0.015*	*0.001*
	YL2000244-002	11/24/2020	*0.0002*	*0.00001*	*0.0001*	*0.0001*	*0.0003*	0.00088	0.000227	*0.0005*	*0.003*	*0.0002*
	--	12/2/2020										
	YL2000258-001	12/4/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	0.00295	0.00092	0.000229	*0.0025*	*0.015*	*0.001*
	YL2000280-001	12/9/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	*0.0015*	0.0013	0.000225	*0.0025*	*0.015*	*0.001*
	YL2000296-001	12/15/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	*0.0015*	0.00136	0.000218	*0.0025*	*0.015*	*0.001*
	YL2000304-001	12/20/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	0.00181	0.00598	0.000402	*0.0025*	*0.015*	*0.001*
	YL2100018-001	12/30/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	*0.0015*	0.00137	0.000212	*0.0025*	*0.015*	*0.001*
TL-5	L2402982-1	1/5/2020	*0.002*	*0.0001*	*0.001*	*0.001*	0.004	0.0037	0.00017	*0.005*	*0.03*	*0.002*
	L2413105-1	2/2/2020	*0.002*	*0.0001*	*0.001*	*0.001*	*0.003*	0.0033	0.00033	*0.005*	*0.03*	*0.002*
	L2425667-1	3/4/2020	*0.002*	*0.0001*	*0.001*	*0.001*	*0.003*	0.0065	0.00067	*0.005*	*0.03*	*0.002*
	L2435040-1	4/6/2020	*0.002*	*0.0001*	*0.001*	*0.001*	0.0138	0.0044	0.00078	*0.005*	*0.03*	*0.002*
	L2444686-1	5/4/2020	*0.002*	*0.0001*	*0.001*	*0.001*	*0.003*	0.0071	0.00103	*0.005*	*0.03*	*0.002*
	L2458861-1	6/7/2020	*0.002*	*0.0001*	*0.001*	*0.001*	*0.003*	0.0044	0.00041	*0.005*	*0.03*	*0.002*
	L2472321-1	7/5/2020	*0.002*	*0.0001*	*0.001*	*0.001*	0.0122	0.0051	0.00087	0.0057	*0.03*	*0.002*
	YL2000006-001	8/2/2020	*0.004*	*0.0002*	*0.002*	*0.002*	*0.006*	0.00762	*0.0002*	*0.01*	*0.06*	*0.004*
	L2500031-1	9/6/2020	*0.002*	*0.0001*	*0.001*	*0.001*	*0.003*	0.003	0.00025	*0.005*	*0.03*	*0.002*
	YL2000153-001	10/21/2020	*0.002*	*0.0001*	*0.001*	*0.001*	*0.0171*	0.00625	0.000176	*0.005*	*0.03*	*0.002*
	YL2000198-001	11/9/2020	*0.001*	*0.00005*	*0.0005*	*0.0005*	*0.0015*	0.00539	0.000399	*0.0025*	*0.015*	*0.001*
	YL2000261-001	12/4/2020	*0.002*	*0.0001*	*0.001*	*0.001*	0.00574	0.00976	0.000353	*0.005*	0.0561	*0.002*

Appendix K South Dam Ground Temperature Cable Review

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Technical Memo

April 20, 2021

To	Project File
From	Christopher Stevens, PhD
Reviewed:	John Kurylo, PEng
Subject	Hope Bay South Dam: Thermal Performance Review 2020
Client	Agnico Eagle Mines Limited
Project	1CT022.057

1 Introduction

The tailings management system (TMS) for the Hope Bay Project includes sub-aerial tailings deposition into the Doris tailings impoundment area (TIA). The South Dam is one of three dams that will be constructed to form the ultimate TIA. The TIA currently consists of the water retaining, frozen core North Dam commissioned in 2012 and the frozen foundation South Dam, Phase 1, to retain tailings solids (Figure 1).

Phase 1 construction of the South Dam was undertaken over the winter of 2018 (SRK 2019a; 2019b). The structure was designed and constructed as a frozen foundation dam with an upstream geosynthetic clay liner (GCL) keyed into the permafrost foundation to achieve containment (Figure 1). The TIA is operated to allow for a continuous tailings beach to form along the upstream face of the South Dam. This beach was developed to further limit water seepage and heat transfer contributing to warming and thaw of the foundation. It is imperative that both the key trench and underlying permafrost foundation be maintained in a frozen state to achieve the required stability and containment over the 25-year design life.

This memo reviews measured ground temperature and thermal performance of the South Dam from completion of the Phase 1 construction to December 31, 2020.

2 Design and Construction

2.1 Dam Components

The main components of the South Dam include the excavated key trench, GCL, and dam shell (Figure 1). The key trench was excavated using ripping excavation and drill and blast techniques to tie

into permafrost. The GCL was design with a chevron ('V') shape along the upstream slope of the key trench and above ground portion of the dam fill. The GCL is placed above and below bedding and transition filter material, and surrounding by the of run-of-quarry (ROQ) forming the dam shell.

Phase 1 of the South Dam, approved under the existing Water License, has a crest elevation of 38.0 m. Phase 2 of the dam will include a downstream raise of the dam with tie-in of the existing GCL. Phase 2 design includes a downstream dam raise to the ultimate crest elevation of 46 m. The entire key trench was designed for Phase 1, i.e. Phase 1 included the key trench required for the Phase 1 s as well as the future Phase 2 elevations, as it would be difficult to tie into the liner below ground during Phase 2 without imposing permafrost disturbance. A minimum fill was designed to allow for thermal protection of the foundation during Phase 1 tailings deposition.

Additional details on design of the South Dam is provided by SRK (2019a). Phase 1 As-built reporting including as-built drawings and quality assurance (QA) records and quality control (QC) documentation are provided by SRK (2019b).

2.2 Foundation

The South Dam is located on the south end of the former Tail Lake on the watershed boundary that separates the TIA from Ogama Lake. The dam alignment extends across a local valley, with slightly higher surface elevation on either side of the valley (Figure 1). Geotechnical programs were completed under four separate investigations to inform design of the dam. The investigations included recovery of frozen soil core and cuttings, the logging and sampling of the soil and rock, laboratory testing of soil index properties, percolation testing of the foundation, and installation of ground temperature cables in select boreholes.

The cross-valley dam alignment is characterized by a thin veneer of hummocky organic soil underlain by saline marine silty clay and clayey silt which transitions to sand and gravel till over bedrock. Overburden thickness generally decreases toward the east and west abutments and increase in thickness toward two central gullies that are separated by a bedrock outcrop (Figure 1). The average permafrost temperature within the dam footprint prior to construction was -8°C.

Frozen soil cores were used to visually estimated excess ground ice. The excess ground ice was up to approximately 90%, with some discrete bodies of nearly pure massive ground near 100%. Additional observations of ground ice were based on cuttings, gravimetric moisture content results, and visual inspection of the excavated key-trench during construction. Ice-wedges have been inferred from airphoto interpretations and were visually confirmed during key trench excavation.

Soil porewater samples recovered using brine drilling in the summer of 2003 and winter of 2006 were found to average 36 ppt (n=12) which is equivalent to a freezing point depression of approximately -2°C. The soil porewater freezing point depression used in the design was based on these measurements. More recent sonic drilling completed in the winter of 2018 indicated an average porewater salinity of 3.1 ppt (n=55) from recovered samples, resulting in an estimated freezing point depression of -0.2°C (maximum value of 8.5 ppt, estimated freezing point depression of -0.5°C). Air-hammer drillholes completed with a rock quarry drill rig prior to dam construction also indicated an

average porewater salinity of 4.5 ppt (n=55) resulting in an estimated freezing point depression of -0.2°C (maximum value of 11.7 ppt, freezing point depression of -0.6°C). The higher salinity values from 2003 and 2006 are likely caused by brine contamination of the sample during drilling.

2.3 Construction

Construction of the Phase 1 dam was undertaken between January 2018 and mid-July 2018. Mean daily air temperatures over the construction period ranged from a minimum of -42°C on February 17, 2018 to a maximum of +13°C on July 11, 2018. Civil earthwork included key trench excavation, sub-grade preparation, GCL installation in the lower portion of the key trench, below ground backfill of the key trench, placement of above ground downstream and upstream dam fill. Ground temperature cables were installed at selection monitoring locations (Figures 1 and 2).

Key trench excavation was followed by surface preparation, and below ground backfill of the key trench between April and June. Downstream dam fill was placed between early May and early June, followed by GCL installation and above ground placement of dam fill between early June and mid-July. A previously constructed temporary deposition berm, constructed upstream of the South Dam footprint, was raised in May 2018 to limit TIA water from impacting the active construction area (Figure 1).

3 Thermal Design and Modeling

The thermal design of the South Dam has allowed for sufficient rockfill cover to limit warming and thaw of the permafrost foundation. The effectiveness of the thermal cover decreases as the width and height of the structure decreases toward the eastern and western abutments, and seasonal heat loss and gain are more pronounced within the embankment and key trench. The thermal regime of the dam is controlled largely by atmosphere-to-surface heat exchange, thermal and physical conditions along the upstream face of the dam, and heat transfer through the fill material.

The design does not consider the affects of heat advected by surface water infiltration (snowmelt or precipitation) or water seepage from the facility. The latter is mitigated by the fine-grained, low permeability tailings beach developed immediately upstream and the GCL installed within the upstream face and keyed into the permafrost foundation.

Thermal modeling was carried to support thermal design of the dam using a commercially available finite element program SVHeat from SoilVision (SRK 2019c). The thermal design for the dam was carried out using two-dimensional cross sections representative of the dam geometry with consideration for thermal conduction. Two critical sections were modeled: the typical maximum and the minimum fill sections of the dam.

The modeling was completed to determine if the design is suitable to maintain the liner within a frozen key-in trench and to estimate extent of thaw beneath the foundation. The foundation was considered to be frozen during design if the ground temperature remained colder than -2°C which accounted for the average site-wide porewater freezing point depression within natural overburden soil.

Thermal modeling completed as apart of engineering design concluded:

- For the maximum dam section, the maximum temperature at the monitoring point with a bedrock foundation and thin overburden foundation was -4.0°C and -4.8°C, respectively (Figure 3).
- For the minimum dam section, the maximum modeled temperature at the key trench monitoring point with a thin overburden and thick overburden foundation was -3.0°C and -3.3°C, respectively (Figure 4).
- Seasonal variations in foundation temperature generally decreases as the size of the dam and fill thickness increased, due to an increased distance for conductive heat transfer of energy.
- Tailings were expected to freezeback over time due to sub-aerial exposure and atmospheric heat transfer. This consequently provides additional containing mass (adding resisting thermal mass in front of the dam structure) and promotes lateral heat transfer with the dam.

4 Tailings Deposition

The South Dam was designed as a tailings solid retaining structure and thermal performance is contingent on maintaining an exposed tailings beach along the upstream face. To achieve these conditions, tailings deposition has been monitored to ensure ponding of supernatant water does not occur along the face of the dam (minimum offset of water extending at least 100 m away from the upstream South Dam crest).

The TIA is currently designed for storage of around 18.0 Mt based on the TMAC 2020 updated pre-feasibility study of tailings with 20% allowance for ice entrainment (see the 2021 SRK tailings deposition planning memo for additional details). The total Phase 1 tailings storage capacity is estimated to be around 2.3 Mm^3. Phase 2 tailings deposition will include a downstream raise of the South Dam and eventual construction of a new West Dam to provide additional capacity. Six spigot points were originally planned for Phase 1; three spigots located from the South Dam and two spigots from the east side of the TIA. Additional infill spigots have been added along the east side to develop a more continuous tailings beach and to allow for operational flexibility.

Phase 1 tailings deposition at the TIA began in January 2017 at two spigot locations on the east side of the TIA. In August 2017 the deposition was switched a temporary deposition berm to develop a tailings beach and minimize the risk of the TIA pond encroaching on the South Dam footprint prior to construction. Over the winter of 2018, the tailings deposition was moved to east side of the TIA until late June of 2019. Deposition commenced from the upstream face of the South Dam from June of 2019 to October 2019. Tailings deposition again switched to the east side of the TIA in October of 2019 to allow for winter heat loss from the South Dam tailings beach and to limit ice entrapment in this area.

In the spring of 2020, the deposition was shifted back to the South Dam to allow addition aggradation of the tailings beach in this area. Due to reduced mill throughput, the active tailings discharge spigot was occasionally switched to an eastern spigot located further north to allow water discharge from the discharge line. In the late fall of 2020 and the early part of the winter of 2021, tailings discharge has remained active on the eastern flank of the TIA well north (upstream) of the South Dam.

5 Ground Temperature Monitoring System

The South Dam is routinely inspected by Hope Bay staff during operation and includes an annual inspection completed by the Engineer of Record. In addition, monitoring points have been installed as part of the design to evaluate deformation and thermal regime of the dam and foundation. This monitoring has been developed to allow for evaluation of dam performance over the life of the structure and implementation of mitigation measures, if required. Ground temperature cables (GTCs) were install in the foundation of the dam and within the fill to monitor temperature of the permafrost foundation and along the upstream slope of the key trench (Figure 2). Ground temperature measurements for all instrumented sites are provided by SRK (2020).

5.1 Instrument Layout

Digital GTCs and data loggers manufactured by BeadedStream were installed at six representative monitoring sections along the dam alignment during construction. The instrumented sections include Stations 0+065, 0+155, 0+240, 0+365, 0+460, 0+510 (Figure 1). Temperature is recorded every four hours using the datalogger and transmitted every twelve hours via Iridium satellite to allow for near real-time monitoring of the South Dam thermal conditions.

The general arrangement of the GTCs include vertical cables (VTS) installed beneath the upstream, downstream, and key trench (Figure 2). Horizontal cables (HTS) have also been installed along the upstream slope of the key trench and the above ground portion of the GCL. One GTC (SD-HST-B1-KT) was installed on top of the lower/upper GCL overlap near the upstream crest of the key trench.

Two additional ground temperature cables (SD-VTS-US1 and SD-VTS-US2) were installed to monitor conditions within an area susceptible to melting of massive ground ice. These locations are near the lowest elevation of the dam alignment where ice wedges form a polygonal network and surface water was expected to pond prior to tailings beach development. The two cables also provide long-term temperatures beneath the tailing beach.

Active tailings deposition from the South Dam has extended across monitoring Sections 3+65 and 2+40. The additional monitoring section were outside of the thermal influence of the tailings beach at the end of 2021.

5.2 Instrument Function

A total of twenty-seven GTCs were installed during Phase 1 construction (SRK 2019b). A total of twenty GTCs were functioning at the start of March 2021 (Table 1). Of the seven inactive GTCs, three were damaged throughout or immediately following Phase 1 construction. Attempts were made to repair these cables. Currently, five vertical and two horizontal GTCs are inactive (Table 1). Two additional cables (SD-VTS-US1 and SD-VTS-US2) have partial damage with one or two functioning sensors. The cause(s) of some of the inactive cables has not been determined and warrants further onsite investigation. It is speculated that there has been some downhole tensional pulling on these cables, and as the South Dam ground temperature cables are wired in series, has resulted in the loss of some of the lower elevation temperature measurements / beads.

Table 1: Ground Temperature Cable Status

Station ID	GTC ID	# of Sensors (Functional / As-built)	Status
0+65	SD-VTS-065-KT	11 / 11	Active
0+65	SD-HTS-065-US	5 / 5	Active
1+55	SD-VTS-155-KT	11 / 11	Active
1+55	SD-HTS-155-US	5 / 5	Active
1+55	SD-VTS-155-US	0 / 11	Inactive
1+55	SD-VTS-155-DS	11 / 11	Active
1+55	SD-HTS-155-KT	0 / 11	Inactive
2+40	SD-HTS-240-KT	0 / 11	Active
2+40	SD-VTS-240-KT	11 / 11	Active
2+40	SD-HTS-240-US	7 / 7	Active
2+40	SD-VTS-240-US	0 / 11	Inactive
2+40	SD-VTS-240-DS	0 / 11	Inactive
3+65	SD-VTS-365-KT	0 / 11	Inactive
3+65	SD-HTS-365-KT	11 / 11	Active
3+65	SD-HTS-365-US	11 / 11	Active
3+65	SD-VTS-365-US	11 / 11	Active
3+65	SD-VTS-365-DS	0/ 11	Inactive
3+65	SD-VTS-US1	2 / 13	Active (Partial)
3+65	SD-VTS-US2	1 / 15	Active (Partial)
4+60	SD-VTS-460-KT	11 / 11	Active
4+60	SD-HTS-460-KT	11 / 11	Active
4+60	SD-VTS-460-US	11 / 11	Active
4+60	SD-VTS-460-DS	11 / 11	Active
4+60	SD-HTS-460-US	0 / 5	Inactive
5+10	SD-VTS-510-KT	11 / 11	Active
5+10	SD-HTS-510-US	5 / 5	Active
NA	SD-HTS-B1-KT	20 / 20	Active

Notes:

[1] Number of functional GTC cables on 3/1/2021

[2] Partial indicates a limited number of sensors are functioning on the GTC

6 Thermal Response

6.1 Construction Period

Ground temperature was measured throughout the construction period to monitoring thermal conditions during material placement and to identify possible instrument damage during construction.

The data record over this period was limited to the time of cable installation and availability of field staff to make the daily measurements.

Over the construction period, the dam fill material temperature generally followed the air temperature. Fill placed below grade in the key trench over the winter was able to maintain the relatively colder initial material temperature, compared to above ground fill placed at the start of the spring freshet. The general difference in material temperature was expected and emphasis was placed on completion of the below ground fill prior to air temperature rising above 0°C.

In early June of 2018, an unexpected warming of ground temperature was observed from the horizontal GTC installed along the upstream slope of the key trench and from the top sensors on vertical GTC installed below the base of the key trench (Figure 5). The warming events consisted of rapid increase temperature of approximately 12°C in less than 24 hrs along the upstream key trench slope (Figure 5).

The observed warming was not consistent with the increase in air temperature and displayed traits of non-conductive heat transfer through the dam fill. The increase in ground temperature propagated from deeper on the key trench slope to shallower depth sensors which indicates a deeper heat source. The lack of attenuation of the warming event with time and depth also suggests non-conductive heat transfer which results in more immediate changes in sensible heat when compared to thermal conduction. Heat from the warming event was conducted beneath the key trench foundation but was determined to have minor thermal influence on the long-term ground thermal regime.

The rapid increase in ground temperature (warming event) was inferred to be caused by the advection of heat from seepage of surface water along the upstream slope of the key trench fill (ROQ material). The thermal response was immediately verified in the field and upstream interceptor measures / grading was put in place installed to limit surface water contact with the fill.

6.2 Base of Tailings

Ground temperature near the base of tailings beach is monitored immediately upstream of the toe at SD-VTS-US-2 (Figure 6). Ground temperature measured 0.5 m below the base of tailings beach has shown seasonal variation since late 2019. The minimum and maximum ground temperature varied from -0.3°C to -7.2°C in 2019 (Figure 6). Ground temperature at the same depth varied from -2.1°C to -10°C in 2020. Over the same period, ground temperature measured at a similar depth beneath the upstream toe at SD-VTS-US-1 has slightly cooled from a maximum temperature of -0.1°C to -2.5°C.

The measurements suggest that heat sourced from the tailings is seasonally lost during winter periods of non-deposition, and extensive thaw of the upstream foundation has not occurred beneath the tailings at the monitoring location. The tailings beach has frozen back, as inferred from the thermal behavior measured at SD-VTS-US-2. The cooling trend observed over the two years is expected to continue (Figure 6).

6.3 Upstream and Downstream Toe

Figures 7 through 12 show the minimum, maximum, and average foundation ground temperature for 2019 and 2020. At most sites, ground temperature within the depth of seasonal variation have remained similar or slightly colder when compared to the previous year. Table 2 shows the average ground temperature and seasonal active thaw depth beneath the upstream and downstream toe for 2020. The average ground temperature is provided for the uppermost sensor located 0.5 m below grade for locations with active GTCs.

The upstream and downstream toe average ground temperature was measured to be -4.6°C to -5.6°C for sites with active GTC. The variability in average ground temperature at these sites is mainly a function of the fill thickness and related geometric effects of the various dam section and thermal influence of the tailings beach for some locations. The most notable change in ground temperature was measured SD-VTS-365-US, where previously warmer temperatures (-0.7°C in 2019) have subsequently cooled to an average temperature of -5.2°C in 2020 (Figure 10). The relatively warm ground temperatures previously measured at SD-VTS-365-US were due to active tailings deposition. More recently exposure of the tailings beach in the winter has resulted in ground cooling of the foundation at this location.

The reported thaw depth for the upstream and downstream toe is based on the 0°C and the -2°C isotherm (Table 2). The latter considers the average design freezing point depression for saline overburden soil. Active layer thaw beneath the upstream toe ranged from 0 to 1.1 m based on the 0°C isotherm and 0.6 to 2.2 m with consideration of the -2°C freezing point depression. Active layer thaw based on the 0°C isotherm reported in 2019 are similar to those for 2020, with exception Section 0+460 which increased by 0.2 m at the downstream toe. The observed thaw is seasonal with freezeback occurring each winter. The loss of GTC function limits measurement of these conditions at some monitoring sections, as indicated with a hyphen in Table 2.

As previously noted, the porewater salinity collected immediately prior to dam construction indicate salinity values were significantly less than those collected with brine drilling. The brine drill samples are considered to be contaminated by drill fluid and not representative of the in-situ conditions.

Table 2: Average Ground Temperature and Thaw Depth for Upstream and Downstream Toe

Station	GTC ID	Location	Thaw Depth, 0°C Isotherm (m)	Thaw Depth, -2°C Isotherm[1] (m)	Average Ground Temperature[2], 2020 (°C)
0+155	SD-VTS-155-US	Upstream Toe	-	-	-
	SD-VTS-155-DS	Downstream Toe	0.0	0.6	-4.6
0+240	SD-VTS-240-US	Upstream Toe	-	-	-
	SD-VTS-240-DS	Downstream Toe	-	-	-
0+365	SD-VTS-365-US	Upstream Toe	0.0	2.2	-5.2
	SD-VTS-365-DS	Downstream Toe	-	-	-
0+460	SD-VTS-460-US	Upstream Toe	1.0	1.8	-5.6
	SD-VTS-460-DS	Downstream Toe	1.1	1.9	-5.0

Notes:

[3] Thaw depth based on the -2°C isothermal represents the design freezing point depression for soil porewater

[4] Average ground temperature based on uppermost sensors

[5] Hyphen indicates incomplete measurements due to GTC failure.

6.4 Key Trench

The maximum ground temperature measured at the base of the key trench for 2018, 2019, 2002 is shown in Table 3. The maximum annual key trench temperature for the thickest fill sections ranged from -6.0°C to -7.3°C at Station 0+240 and 0+365, and -5.4°C at Station 0+155. These maximum temperatures are comparable with those measured in 2019 (Table 3). Measured key trench temperatures are also below the modeled estimates for these three monitoring sections (Figure 3).

At the thinnest fill sections (Stations 0+065, 0+460, and 0+510), the maximum temperature ranged from -4.7°C to -4.9°C in 2020. There has been a cooling of the key trench at monitoring Sections 0+460, and 0+510 since 2018, while condition at Section 0+065 have remained similar over this same time period (Table 3). Thaw, as defined by the design freezing point depression of -2°C, has not observed in the ground temperature measured beneath the key trench.

The relatively warmer key trench temperature measured at Stations 0+065, 0+460, and 0+510 result from reduced fill over the key trench compared to thicker fill sections (Stations 2+40 and 3+65). The foundation at the thinner fill section also consist of bedrock or are characterized by thin overburden soil which results in greater seasonal heat gain to the foundation. Whereas, the relatively colder key trench temperatures are measured at sections with greater fill thickness founded on ice-rich soil with a higher heat capacity and latent heat requirement.

Seasonal variations in ground temperature due to heat gain and loss from the ground were also measured beneath the key trench (Figures 7 through 12). The greatest variation in temperature were at sections with the minimum fill thickness and decrease as fill thickness increase, as expected. The seasonal change in foundation temperature are in general agreement with the previous thermal modeling results (Figure 4).

Table 3: Maximum Key Trench Ground Temperature

Station	GTC ID	Ground Temperature (°C)[1]		
		2018	2019	2020
0+065	SD-VTS-065-KT	-4.7	-4.7	-4.7
0+155	SD-VTS-155-KT	-	-5.4	-5.4
0+240	SD-VTS-240-KT	-6.6	-7.3	-7.3
0+365	SD-VTS-365-KT	-6.9[2]	-6.0[3]	-6.0[3]
0+460	SD-VTS-460-KT	-3.9	-4.1	-4.8
0+510	SD-VTS-510-KT	-3.2	-3.6	-4.9

Notes:

[1] Maximum temperature at base of key trench

[2] Ground temperature for 0+365 based mid-April to mid-July data

[3] Measurement from Sensor 7 of SD-HTS-365-KT supplemented due to missing data for from SD-VTS-365-KT

Horizonal GTCs installed along the upstream slope of the key trench at SD-HTS-365-KT and SD-HTS-460-KT are shown in Figure 13. Seasonal variations in temperature are recorded along the upstream slope key trench temperature, indicating seasonal heat gain and loss. In general, the temperatures are observed to decrease with increased sensors depth in the key trench and increase distance from toe (Figure 13).

The warmest ground temperatures are recorded by the uppermost sensors installed at the crest of the key trench which represents the shallowest depth for HTS-KT (horizontal GTC – key trench) sensors (Figure 2). At SD-HTS-365-KT, the maximum temperature for the upper most sensor decreased from -1.3°C in 2019 and -1.9 in 2020 (Figure 13). The maximum temperature at SD-HTS-240-KT was -2.4°C in 2019 and -2.9°C in 2020. The equivalent GTC installed at SD-HTS-460-KT also shown ground cooling, with the maximum temperatures decreasing from -1.3°C in 2019 to -1.7°C in 2020 (Figure 13).

7 Findings

The South Dam was designed and constructed as a frozen foundation dam to retain tailings solids. The safe operation of the dam requires careful consideration of thermal performance of the structure. Review of the South Dam ground temperature data has led to the following findings.

- The dam is generally performing as thermally designed. Figure 14 shows a summary of the maximum and average temperature for key locations of the dam.
- Design freezing point depression of -2°C based on porewater samples recovered from brine drilling may not be representative of in-situ conditions due to contamination of the core by drilling fluids. The finding is supported by more recent soil samples collected over representative depths with sonic and air-hammer drilling prior to construction of the dam. The average porewater freezing

point depression for 110 samples collected with sonic and air-hammer drilling was -0.2°C (minimum value of -0.6°C).

- Maximum annual key trench ground temperature decreased in the year following construction, as expected. In 2019 and 2020, the maximum key trench temperatures remained relatively similar with exception of SD-VTS-460-KT and SD-VTS-510-KT which continue to show ground cooling since 2018. The maximum annual key trench temperature for the monitoring sections is within the expected range of predicted temperatures for the dam (Figures 3 and 4). The finding indicates that the dam fill is currently adequate to maintain permafrost ground temperatures and a frozen key trench tie-in with the GCL liner beneath the dam.
- Ground thermal regime beneath the key trench shows minimal seasonal heat gain or loss beneath the dam sections with thicker fill, such as Section 2+40. A similar thermal regime is expected beneath the key trench at Section 3+65 but cannot be confirmed due to instrument failure at this location. Greater seasonal variation in key trench temperature have been measured beneath dam sections with minimum fill cover (Sections 0+65. 1+55, 4+60, 5+10). The measured seasonal variation in key trench temperature are generally comparable to the modeled values for 2020. Thaw was not observed along the upstream slope of the key trench based on the measured temperature and assuming a freezing point depression near 0°C.
- Active layer thaw beneath the upstream and downstream toe based on the 0°C isotherm and -2°C isotherm range from 0 to 1.1 m and 0.6 to 2.2 m, respectively. Thaw beneath the dam toe can be expected over the life of the structure and should be monitored to ensure conditions remain within the design limits. GTC failure has limited the ability to monitoring active layer thaw and permafrost foundation temperature at some locations beneath the upstream and downstream toe of the dam.
- Ground temperatures measured immediately below the tailings beach at SD-VTS-US2 suggest freezeback of the tailings has occurred. The underlying overburden has showing a trend of ground cooling over time.
- Thermal evidence of water seepage at the base of the GCL tie-in and within the permafrost foundation was not observed in 2020 and is not expected to be an issue.
- A total of five vertical and two horizontal GTCs are currently inactive due to suspected failure of the instruments (Table 1). The surface cable lead and connection with the data loggers should be checked for damage and repair, where possible.

8 Recommendations

- GTCs provide thermal monitoring of the dam to ensure conditions remain within the intended design for safe operation and tailings containment. Additional attempts to identify the cause of the recent instrumentation failure and resolve through repair at sites SD-VTS-240-US, SD-VTS-240-DS, SD-VTS-365-DS, should be carried out in 2021.
- If repair is determined to not be possible, GTC replacement is recommended at select locations where failure has occurred. Figure 15 shows the recommended location for installation of four replacement GTCs to maintain a high integrity of the monitoring system. Each cable would be

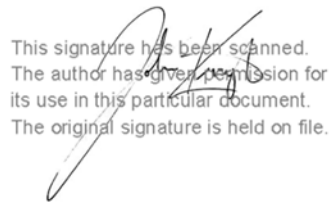
vertically installed to monitor foundation conditions. Winter drilling is likely required to safely access some locations that extend beneath the tailings beach.

- As part of additional thermal evaluation of the dam, such as in 2021, it is recommended that the existing thermal models be updated to reflect construction as-built conditions, tailings deposition, and the new understanding of the soil freezing point depression. The latter is expected to alter the unfrozen water content curve and thermal properties of the soil and therefore heat transfer in the foundation over time.
- In support of ongoing surveillance of the dam, ground temperature data loggers and cables should be routinely inspected following the established dam operation, maintenance, and surveillance (OMS) manual and dam instrumentation standard operating procedures (SOPs).

Regards,
SRK Consulting (Canada) Inc.

Christopher Stevens, PhD
Senior Geocryologist (Permafrost)

Reviewed by



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Attachments:

Attachment 1 Figures

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References

SRK Consulting (Canada) Inc., 2019a. Phase 1 South Dam Design Report, Hope Bay, Nunavut, Canada. Submitted to TMAC Resources Inc.

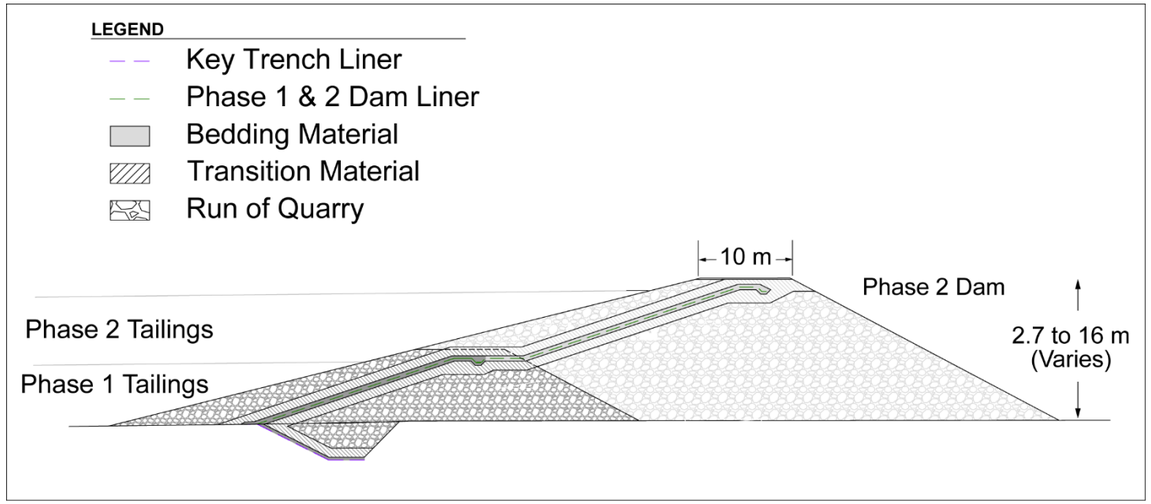
SRK Consulting (Canada) Inc., 2019b. Hope Bay Project, Phase 1 South Dam As-Built Report. Submitted to TMAC Resources Inc.

SRK Consulting (Canada) Inc., 2019c. South Dam – Detail Design Thermal Modeling. Submitted to TMAC Resources Inc.

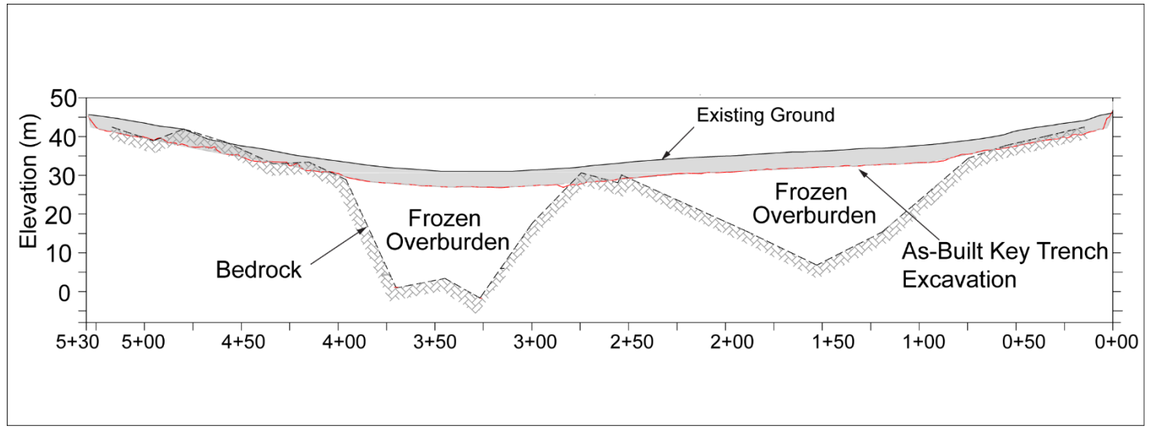
SRK Consulting (Canada) Inc., 2020. 2019 Annual Geotechnical Inspection Tailings Impoundment Area Hope Bay Project, Hope Bay, Nunavut. Submitted to TMAC Resources Inc.

Attachment 1 Figures

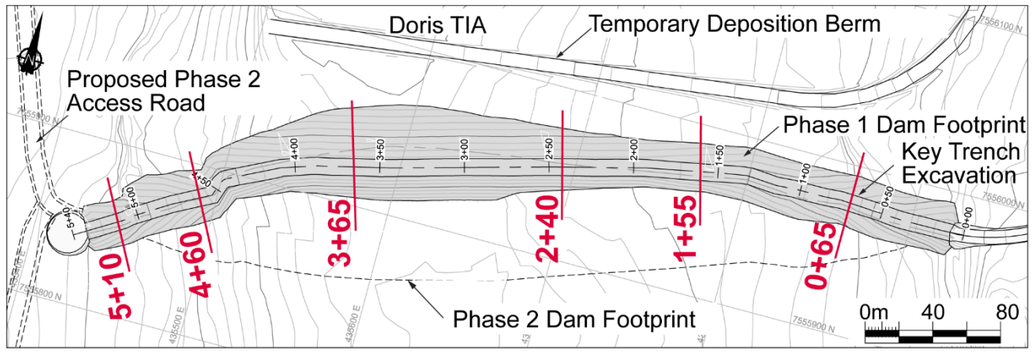
South Dam Phase 1 and Phase 2 (Simplified Cross Section)



As-built Phase 1 – Key Trench



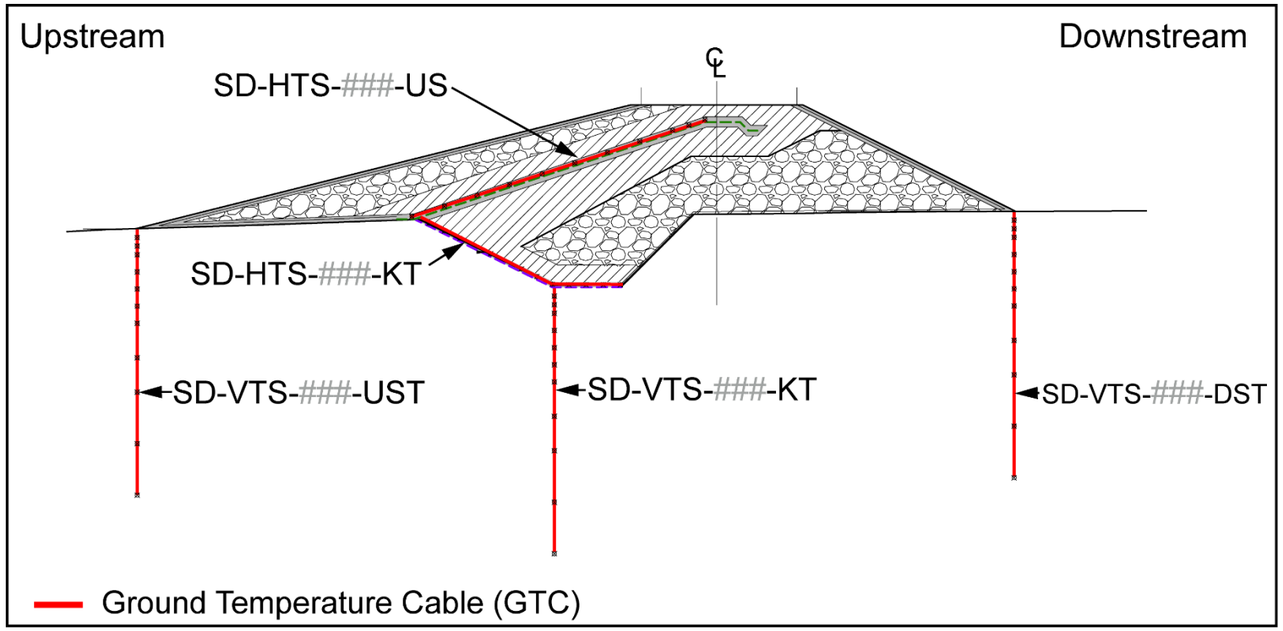
As-built Phase 1 – Plan View



Notes:
1. Red lines and section numbers represent ground temperature cables (GTC) monitoring sections

srk consulting	AGNICO EAGLE	2020 Annual Geotechnical Inspection Tailings Impoundment Area
Job No: 1CT022.057 Filename: South Dam Thermal Review2019	HOPE BAY PROJECT	**South Dam** **Cross Section and Plan View**
		Date: March 2021 / Approved: CWS / Figure: **1**

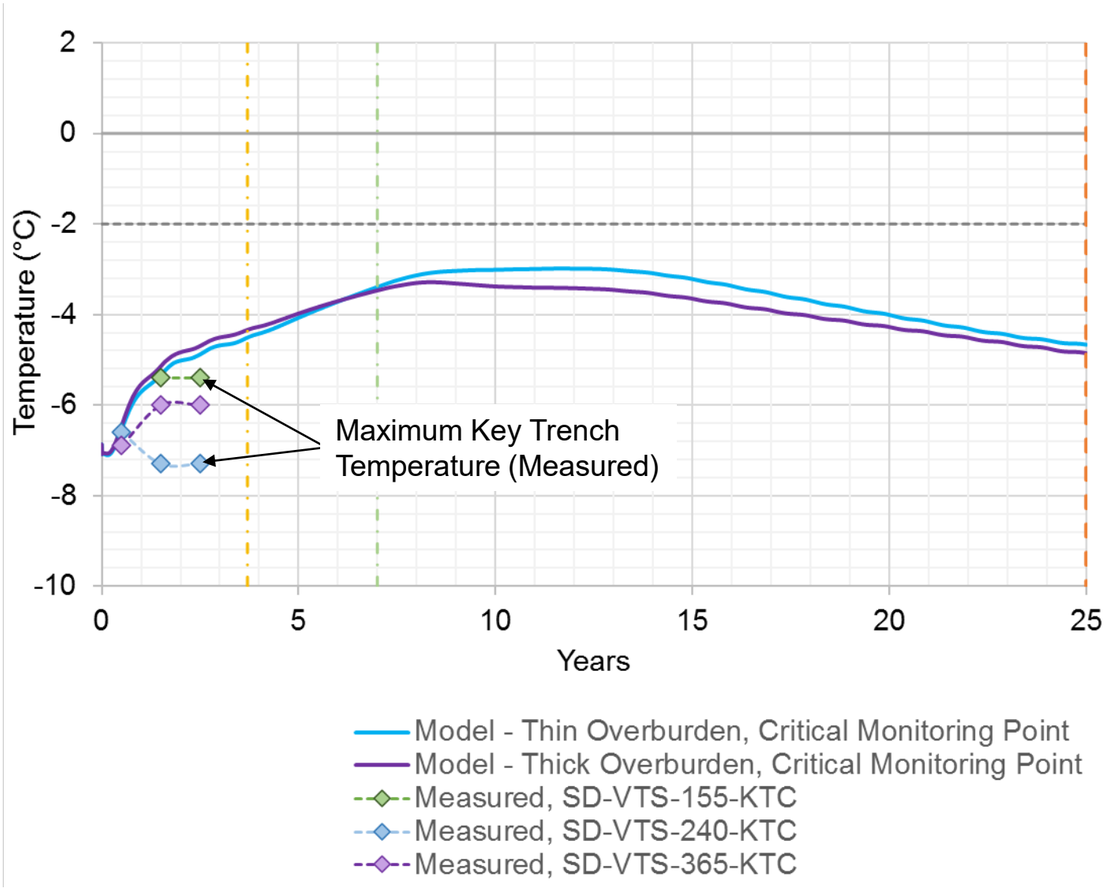
Ground Temperature Cable (GTC) Configuration

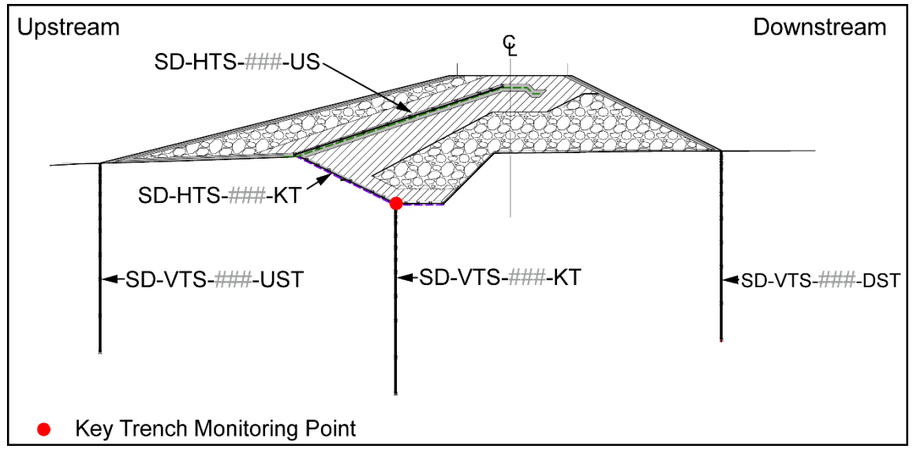


Notes:
1. As-built drawings for each GTC monitoring section provided by SRK (2019c)

srk consulting	AGNICO EAGLE	2020 Annual Geotechnical Inspection Tailings Impoundment Area
		Typical Configuration of Ground Temperature Cables
Job No: 1CT022.057 Filename: South Dam Thermal Review2019	HOPE BAY PROJECT	Date: March 2021 | Approved: CWS | Figure: **2**

Maximum Section of Dam – Key Trench Monitoring Point

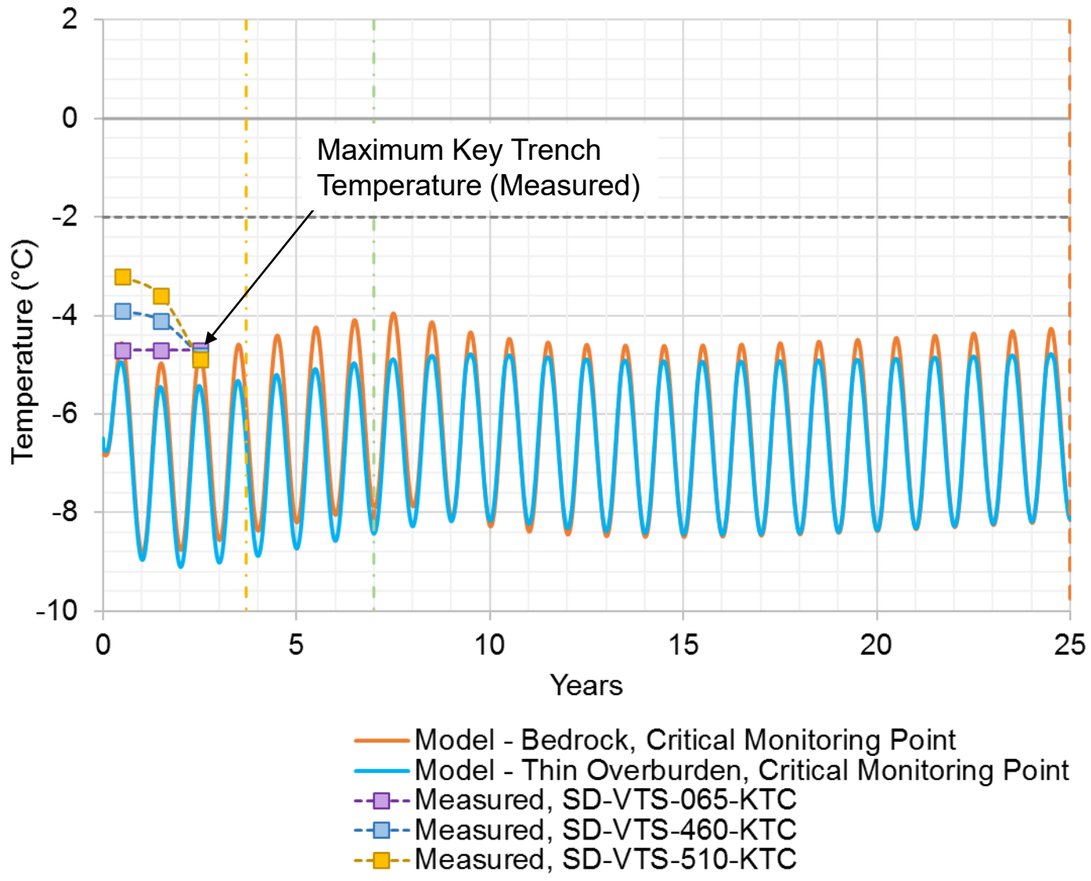


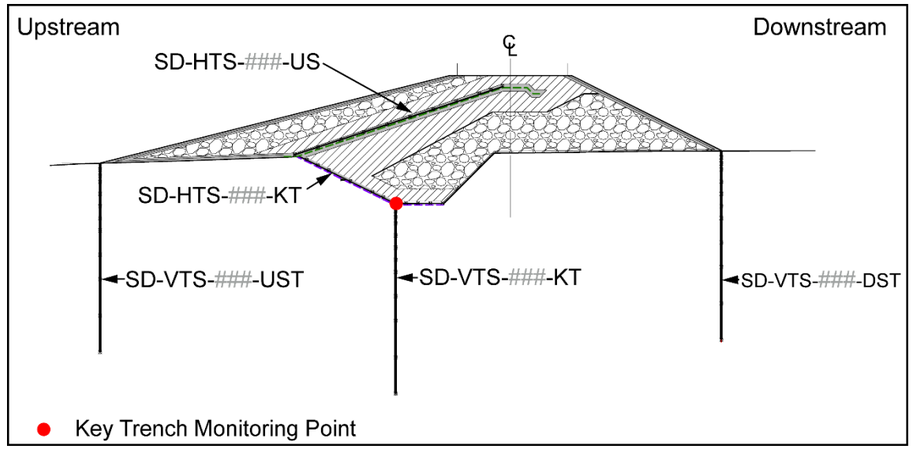


Notes:
1. Maximum modeled ground temperature for critical key trench monitoring point from SRK (2019c)
2. Maximum temperature measured at the base of key trench shown for SD-VTS-155-KT, -240-KT, -365-KT

srk consulting	AGNICO EAGLE	2020 Annual Geotechnical Inspection Tailings Impoundment Area
		Maximum Section of Dam – Key Trench Monitoring Point
Job No: 1CT022.057 Filename: South Dam Thermal Review2019	HOPE BAY PROJECT	Date: March 2021 | Approved: CWS | Figure: 3

Minimum Section of Dam – Key Trench Monitoring Point

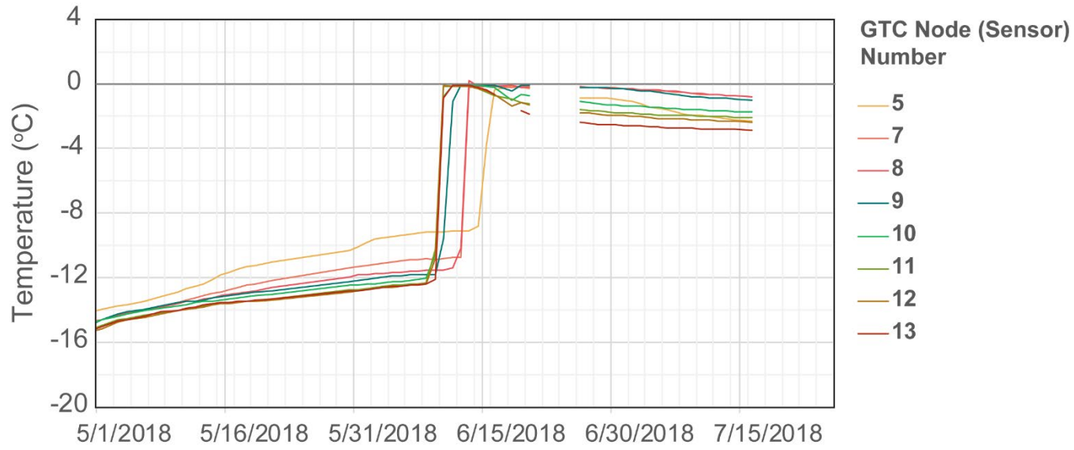


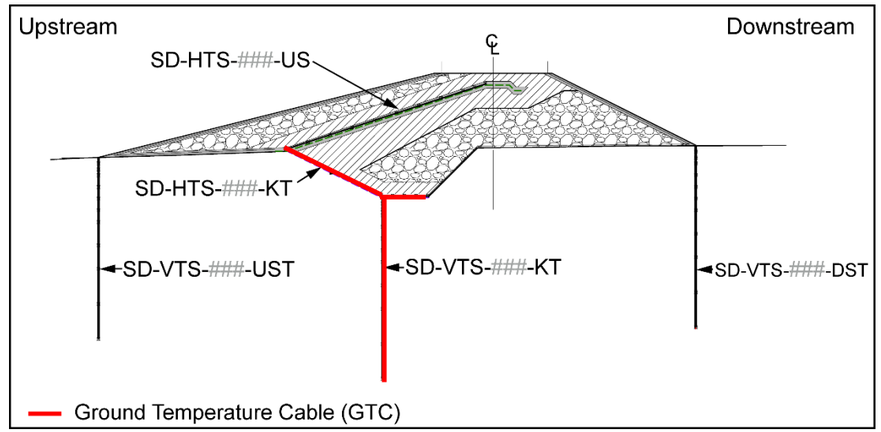


Notes:
1. Maximum modeled ground temperature for critical key trench monitoring point from SRK (2019c)
2. Maximum temperature measured at the base of key trench shown for SD-VTS-155-KT, -240-KT, -365-KT

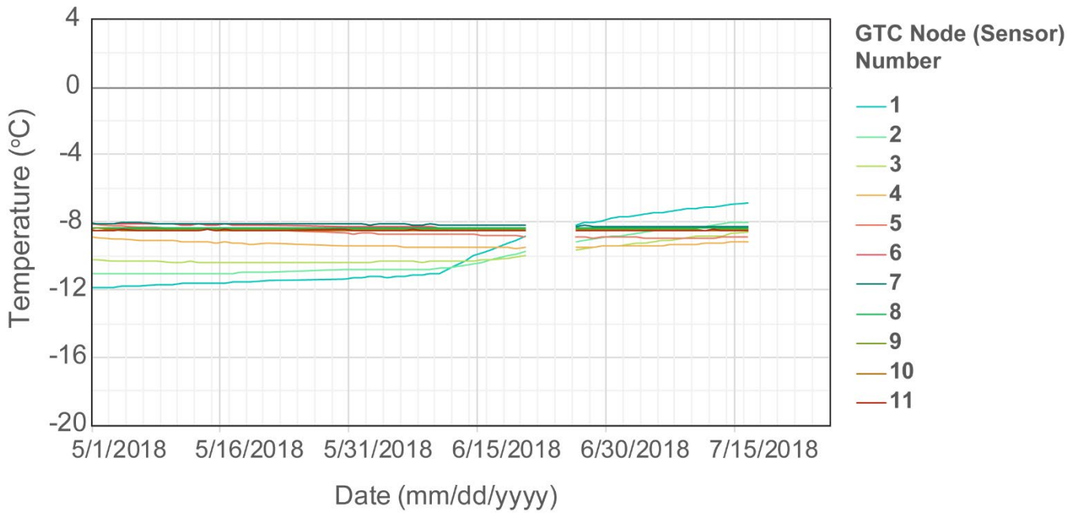
srk consulting	AGNICO EAGLE	2020 Annual Geotechnical Inspection Tailings Impoundment Area
		Minimum Section of Dam – Key Trench Monitoring Point
Job No: 1CT022.057 Filename: South Dam Thermal Review2019	HOPE BAY PROJECT	Date: March 2021 | Approved: CWS | Figure: **4**

Construction Period – Ground Temperature at SD-HTS-365-KT



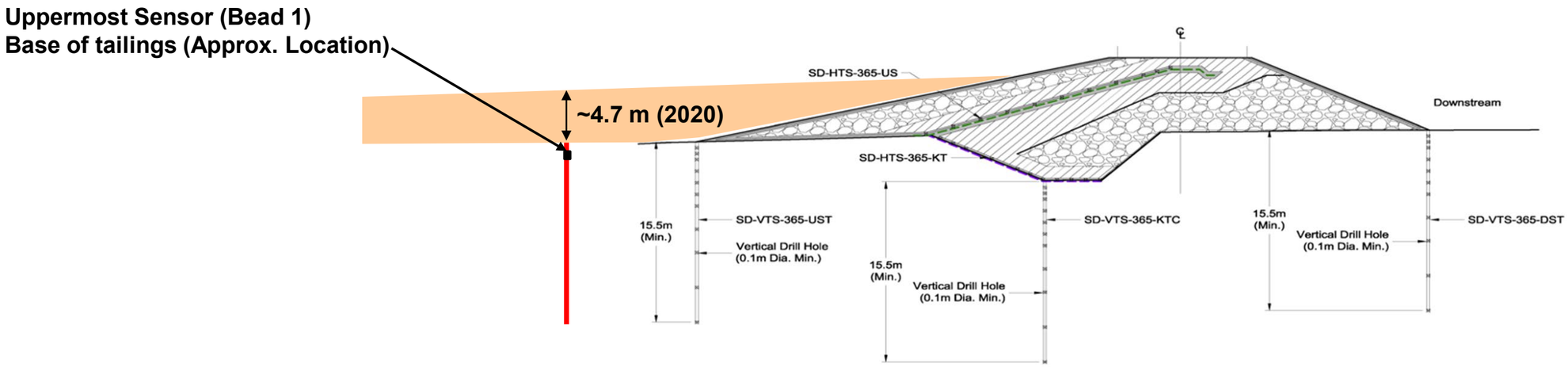


Construction Period – Ground Temperature at SD-VTS-365-KT

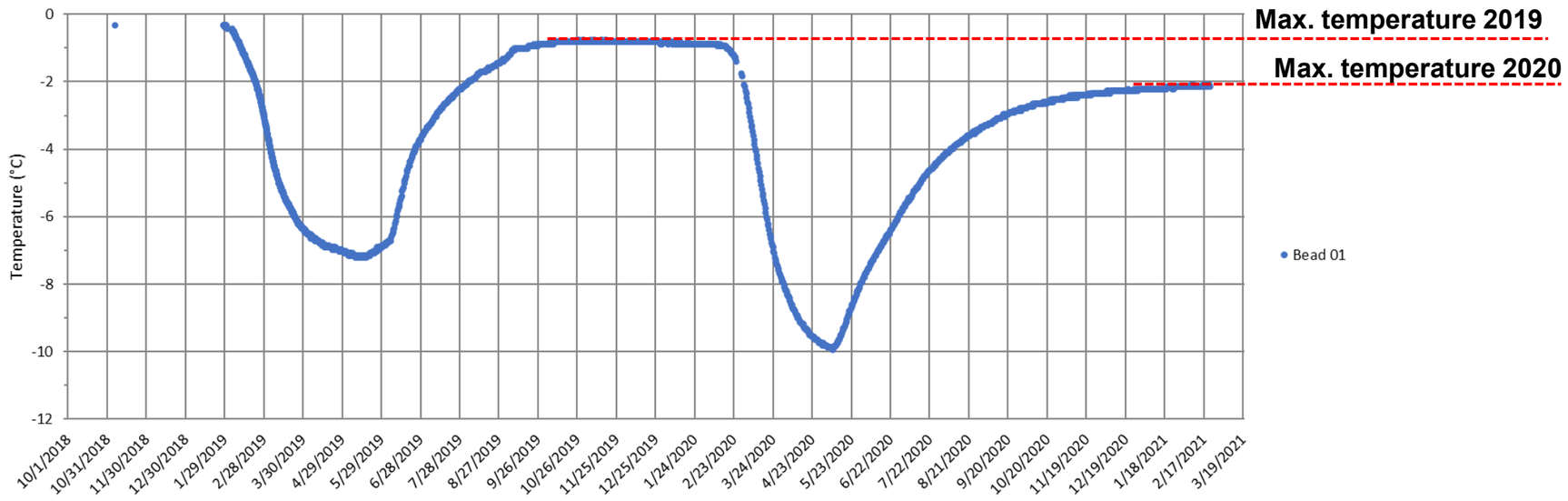


Notes:
1. Ground temperature measured over construction period at SD-HTS-365-KT and SD-VTS-365-KT
2. Rapid warming of ground temperature observed other monitoring sections over a similar period of time

srk consulting	AGNICO EAGLE	2020 Annual Geotechnical Inspection Tailings Impoundment Area
Job No: 1CT022.057 Filename: South Dam Thermal Review2019	HOPE BAY PROJECT	**Construction Period – Rapid Ground Temperature Warming**
		Date: March 2021 / Approved: CWS / Figure: **5**



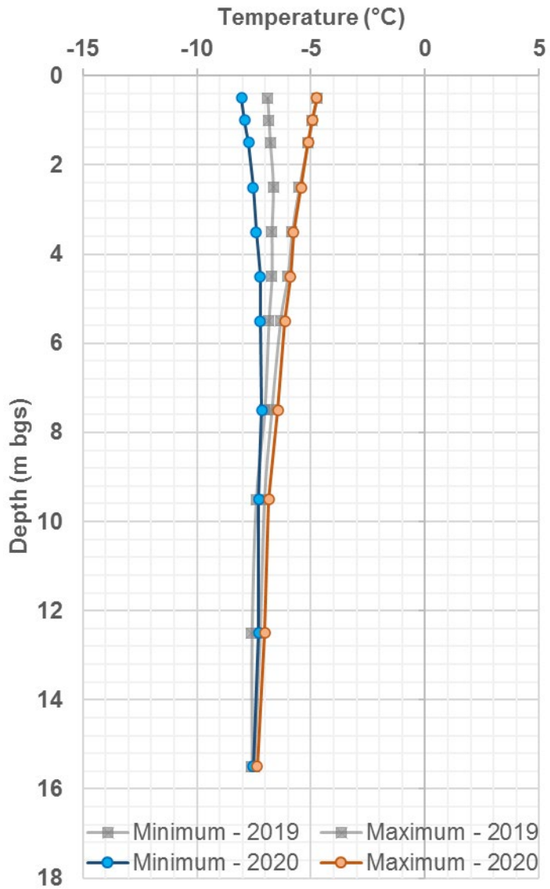
SD-VTS-US2



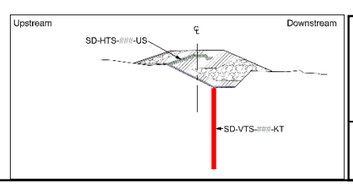
Notes:
1. Uppermost sensor (Bead 1) located immediately below the base of tailings beach
2. Tailings beach approximately 3.8 m and 4.7 m thick in 2019 and 2020, respectively

srk consulting	AGNICO EAGLE	2020 Annual Geotechnical Inspection Tailings Impoundment Area
Job No: 1CT022.057 Filename: South Dam Thermal Review2019	HOPE BAY PROJECT	**Base of Tailings Temperature – SD-VTS-US2 at Section 0+365**
		Date: March 2021 / Approved: CWS / Figure: **6**

SD-VTS-065-KT



Notes:
1. Ground temperature cables not installed beneath upstream and downstream toe at Section 0+65



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HOPE BAY PROJECT

2020 Annual Geotechnical Inspection
Tailings Impoundment Area

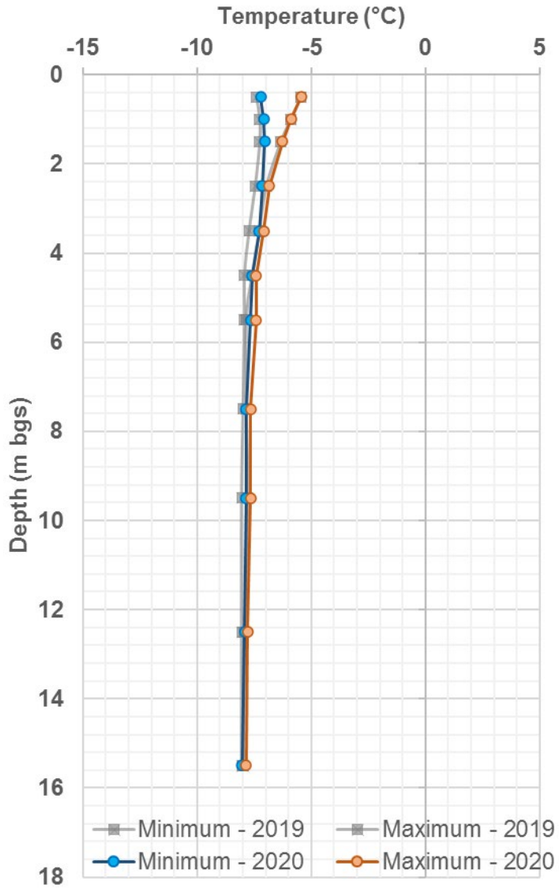
Foundation Ground Temperature – Section 0+65

Date:	Approved:	Figure:
March 2021	CWS	7

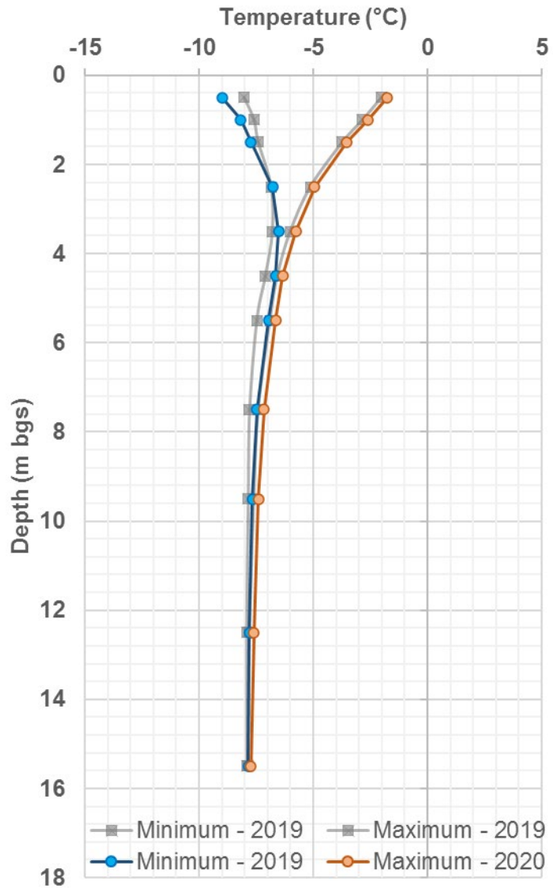
SD-VTS-155-US

Ground Temperature Data Not Received for 2020

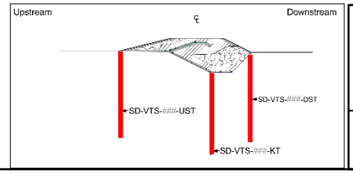
SD-VTS-155-KT



SD-VTS-155-DS



Notes:
1. Ground temperature sensors failure below uppermost node at SD-VTS-155-US



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HOPE BAY PROJECT

2020 Annual Geotechnical Inspection
Tailings Impoundment Area

Foundation Ground Temperature – Section 1+55

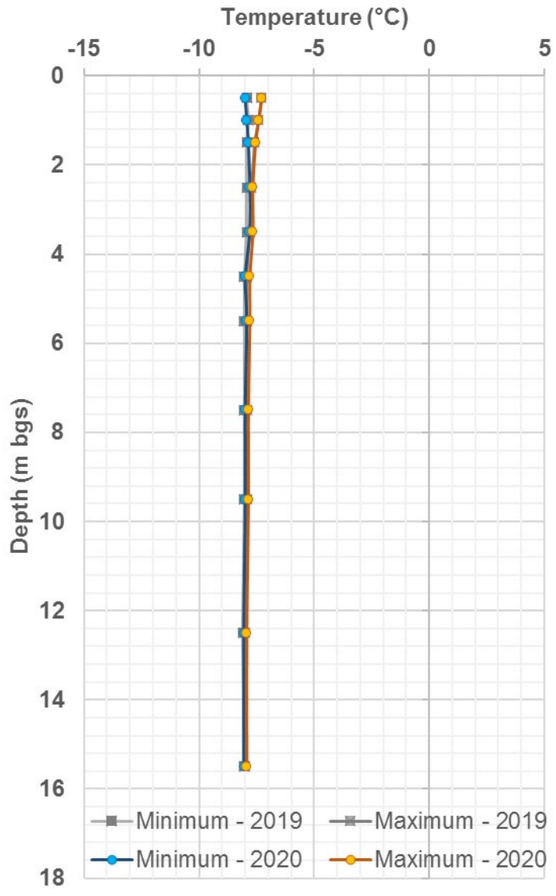
Date: March 2021 | Approved: CWS | Figure: **8**

SD-VTS-240-US

SD-VTS-240-KT

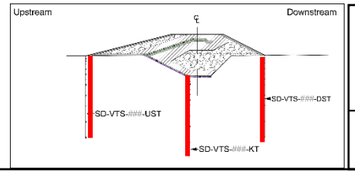
SD-VTS-240-DS

Ground Temperature Data Not Received for 2020



Ground Temperature Data Not Received for 2020

Notes:
1. Ground temperature data not received at SD-VTS-240-US and SD-VTS-240-DS in 2020



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AGNICO EAGLE

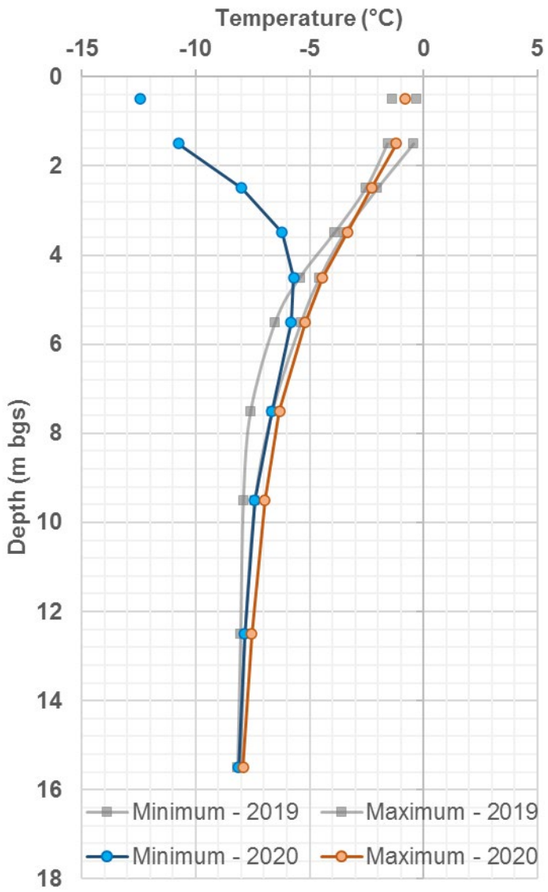
HOPE BAY PROJECT

2020 Annual Geotechnical Inspection
Tailings Impoundment Area

Foundation Ground Temperature – Section 2+40

Date:	Approved:	Figure:
March 2021	CWS	9

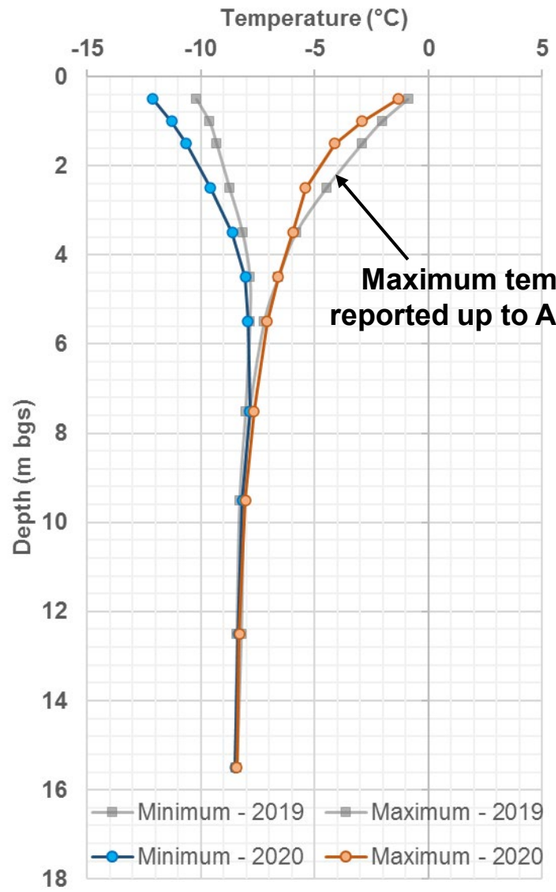
SD-VTS-365-US



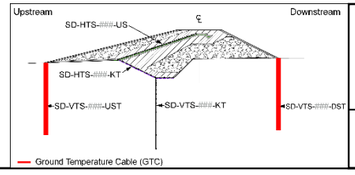
SD-VTS-365-KT

Ground Temperature Data Not Received for 2020

SD-VTS-365-DS



Notes:
1. Ground temperature data not received from GTC SD-VTS-365
2. Ground temperature for SD-VTS-365-DS up to August 3, 2020. GTC inactive beyond stated date.



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Job No: 1CT022.057
Filename: South Dam Thermal Review2019

AGNICO EAGLE

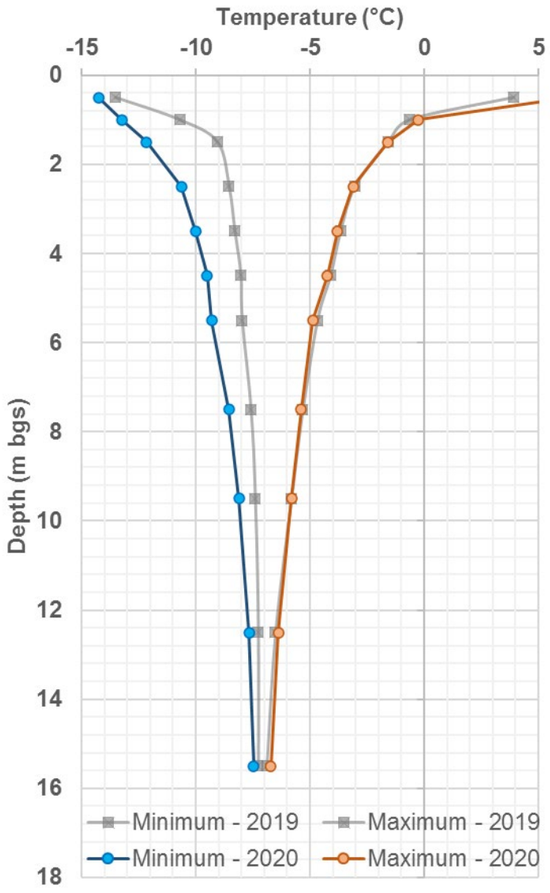
HOPE BAY PROJECT

2020 Annual Geotechnical Inspection
Tailings Impoundment Area

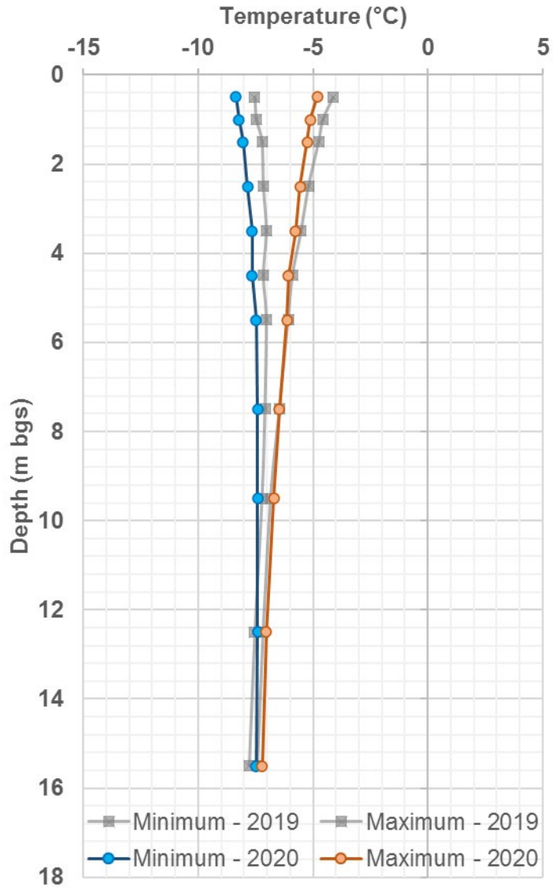
Foundation Ground Temperature – Section 3+65

Date:	Approved:	Figure:
March 2021	CWS	**10**

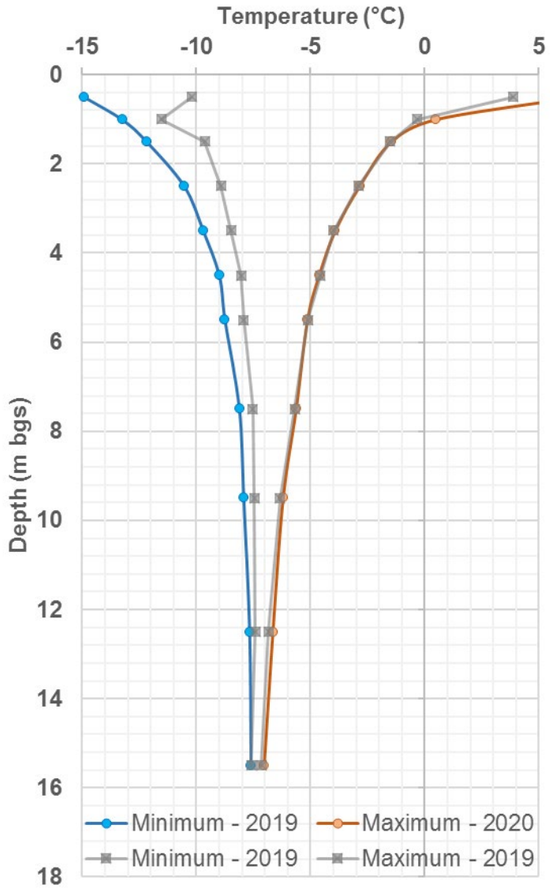
SD-VTS-460-US

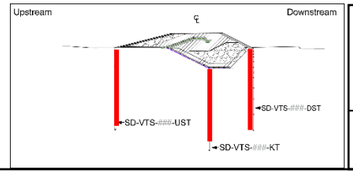


SD-VTS-460-KT



SD-VTS-460-DS





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Job No: 1CT022.057

Filename: South Dam Thermal Review2019

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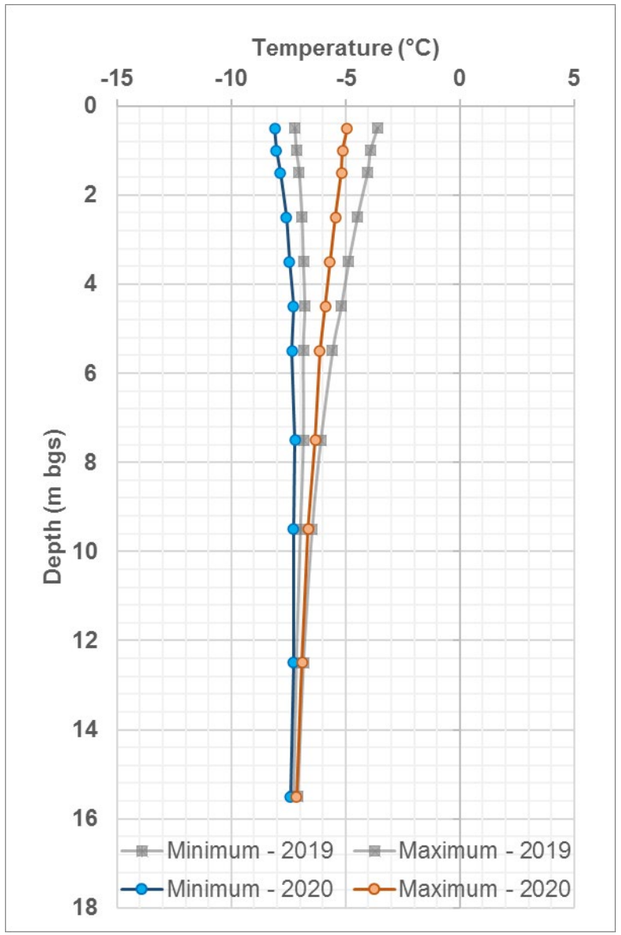
2020 Annual Geotechnical Inspection
Tailings Impoundment Area

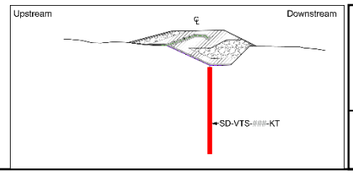
Foundation Ground Temperature – Section 4+60

Date:	Approved:	Figure:
March 2021	CWS	**11**

SD-VTS-510-KT



Notes:
1. Ground temperature cables not installed beneath upstream and downstream toe at Section 5+10



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Job No: 1CT022.057
Filename: South Dam Thermal Review2019

AGNICO EAGLE

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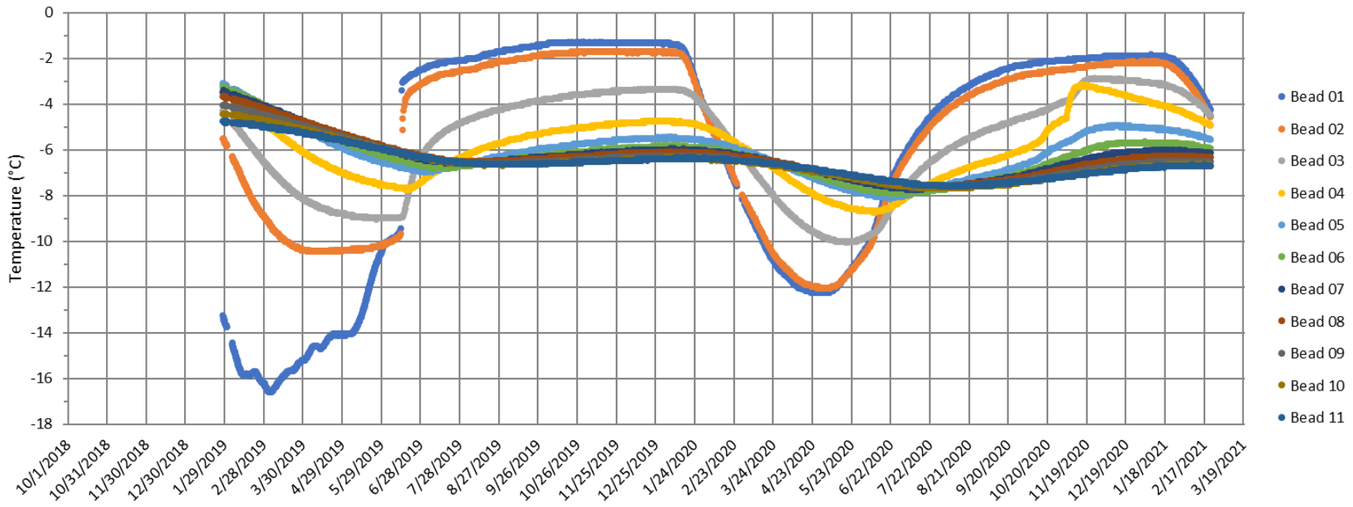
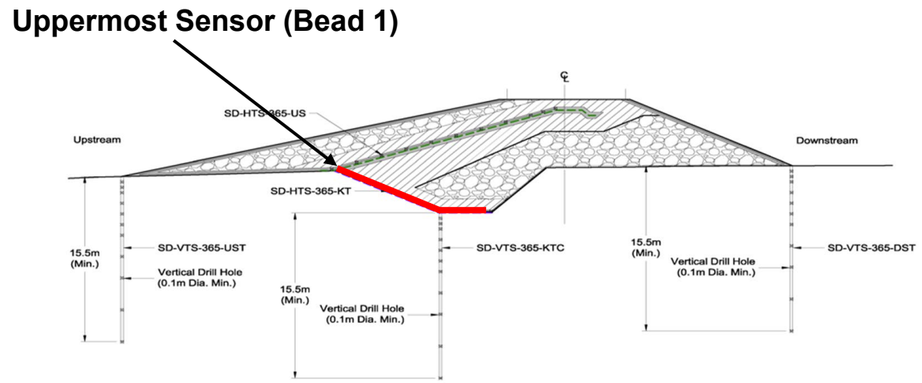
2020 Annual Geotechnical Inspection
Tailings Impoundment Area

Foundation Ground Temperature – Section 5+10

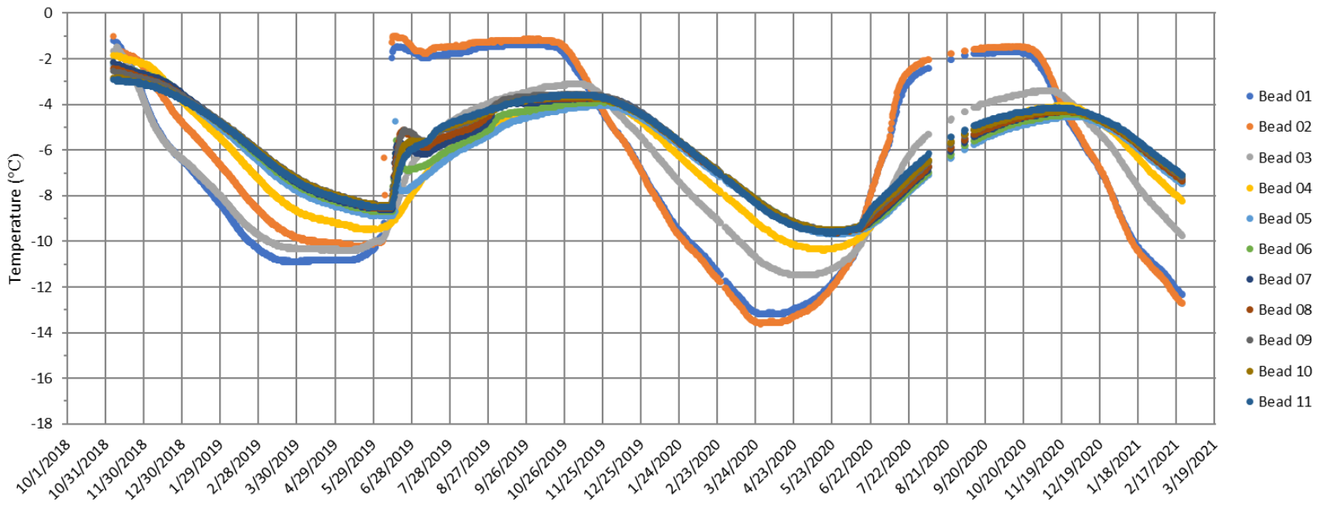
Date:	Approved:	Figure:
March 2021	CWS	**12**

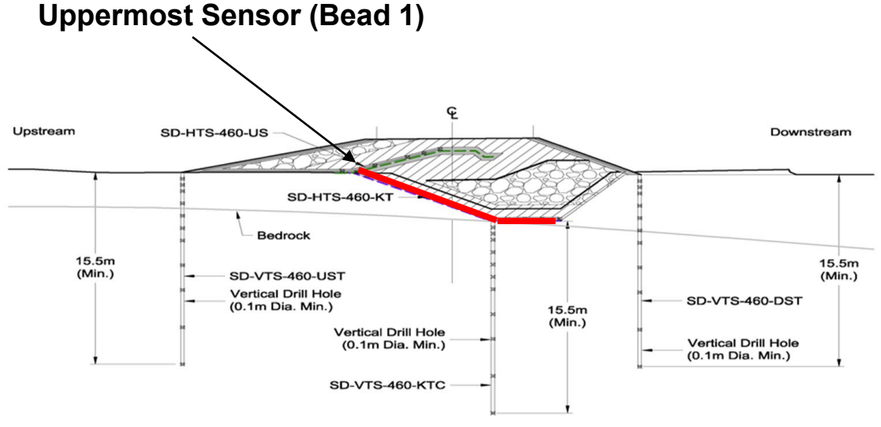
SD-HTS-365-KT





SD-HTS-460-KT

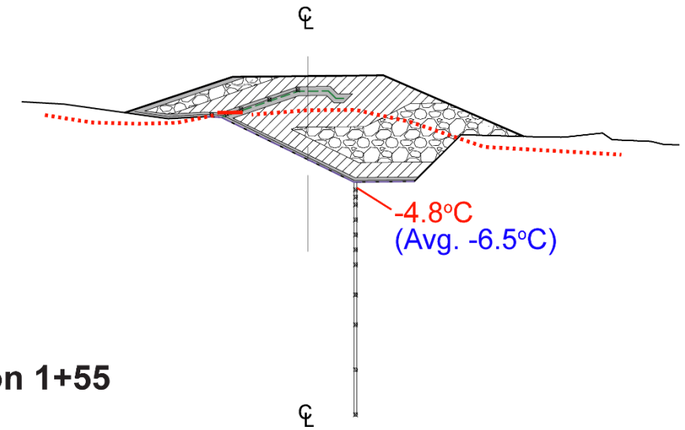




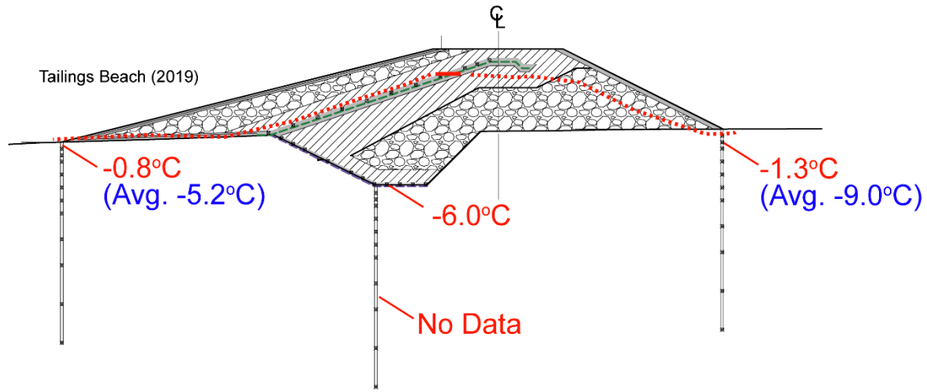
Notes:
1. Uppermost sensor (Bead 1) located at the shallowest key trench depth furthest upstream from the dam centerline

srk consulting	AGNICO EAGLE	2020 Annual Geotechnical Inspection Tailings Impoundment Area
Job No: 1CT022.057 Filename: South Dam Thermal Review2019	HOPE BAY PROJECT	**Key Trench Upstream Slope – Sections 3+65 & 4+60** Date: March 2021 · Approved: CWS · Figure: **13**

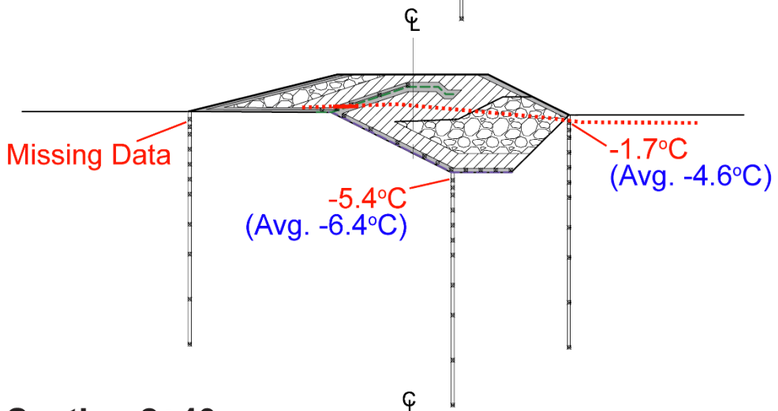
Section 0+65



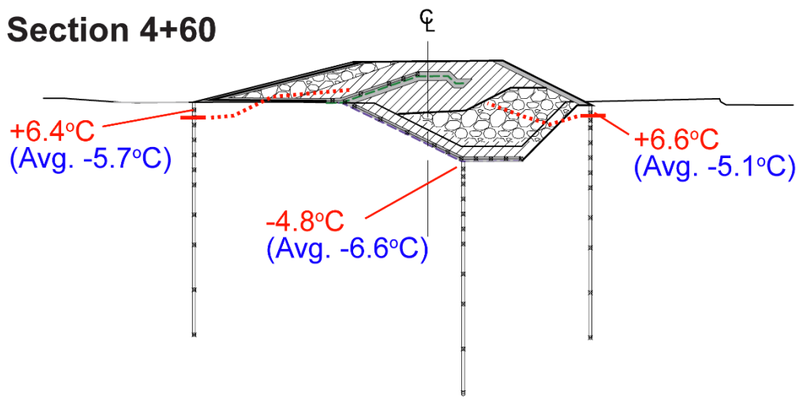
Section 3+65



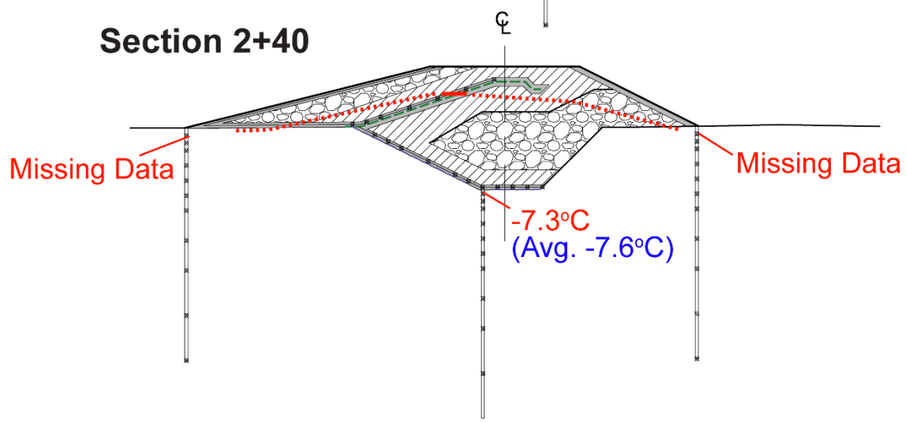
Section 1+55



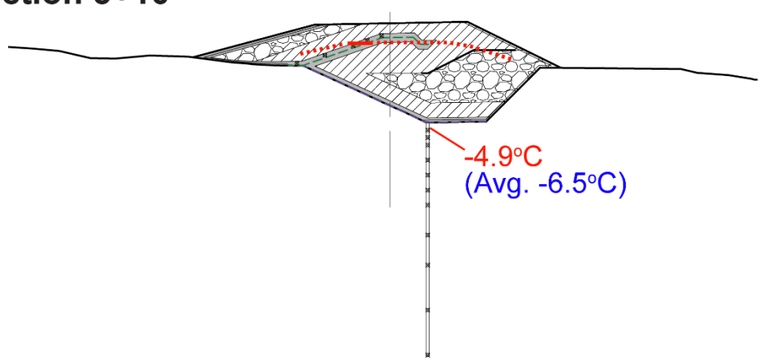
Section 4+60



Section 2+40

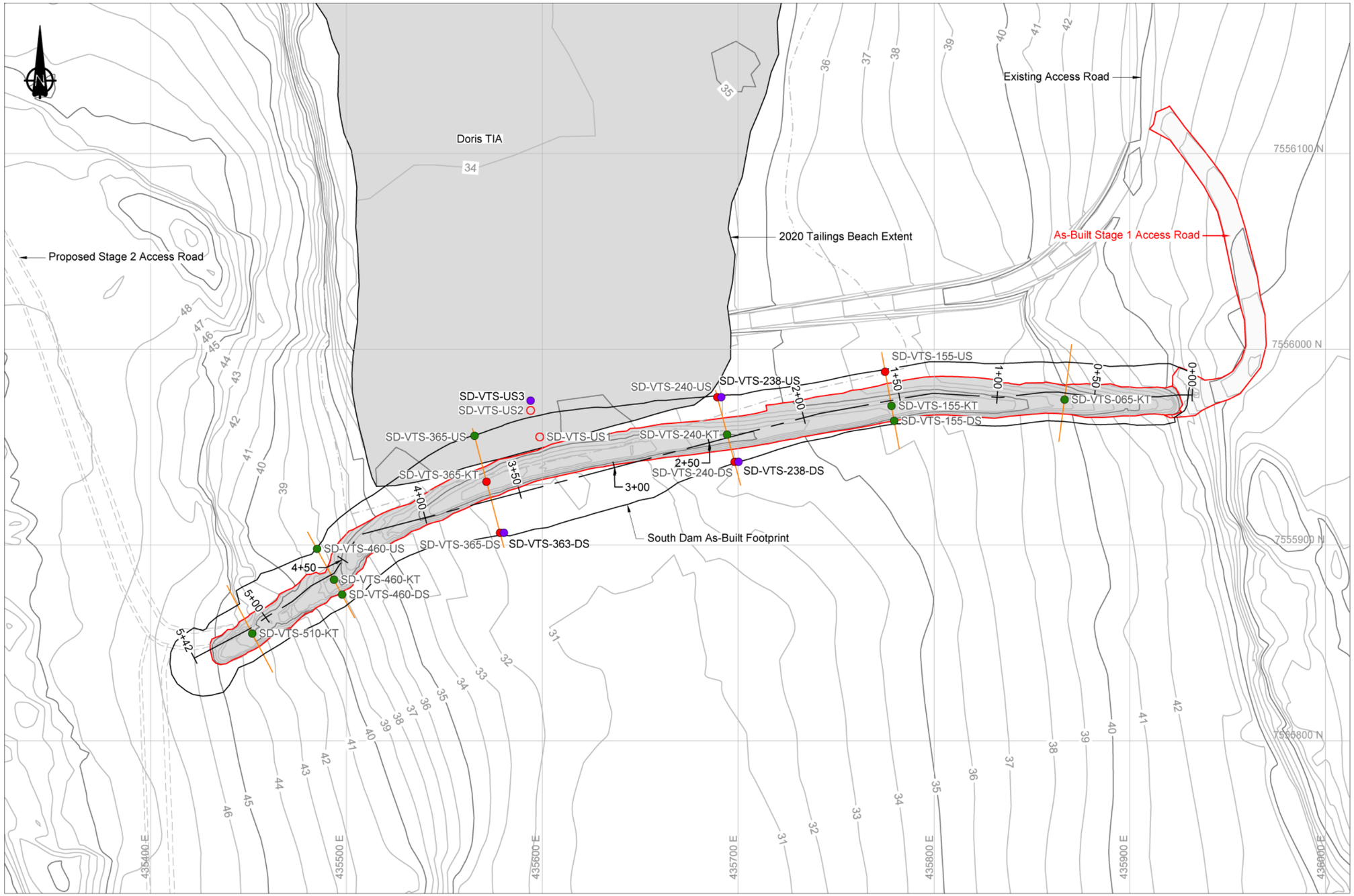


Section 5+10



Notes:
1. Temperature shown in blue represent average (Avg.) values for 2020
2. Temperature shown in red represent maximum values for 2020
3. Solid red line represent approximate position of thaw based on 0°C isotherm
4. Red dashed line represent interpreted position of thaw for the 0°C isotherm
5. Maximum temperature for Section 3+65 reported up to Aug. 3, 2020

srk consulting	AGNICO EAGLE	2020 Annual Geotechnical Inspection Tailings Impoundment Area
		Monitoring Sections – 2020 Summary
Job No: 1CT022.057 Filename: South Dam Thermal Review2019	HOPE BAY PROJECT	Date: March 2021 · Approved: CWS · Figure: **14**



LEGEND

- Active GTC
- Inactive GTC
- Partial Function GTC
- Recommended Replacement GTC
- Monitoring Section
- Proposed Road / Dam Infrastructure
- As-Built Key Trench Excavation
- Phase 1 Tailings Footprint
- Dam Footprint
- Tailings Extent (2020)

NOTES

1. Contours shown at 1.0m interval. Topographic contour data from the terrain model was provided by the Client (TMAC).
2. All units shown are in meters unless otherwise stated.
3. Status of vertically installed ground temperature cables (GTCs) as of March 2021.

REFERENCES

NAD83 UTM Zone 13.

REPLACEMENT GTC (Recommended)

I.D.	Northing	Easting
SD-VTS-US3	7555974	435594
SD-VTS-238-US	7555976	435691
SD-VTS-238-DS	7555942	435700
SD-VTS-363-DS	7555906	435580

0m 20 40 60 80

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AGNICO EAGLE

HOPE BAY PROJECT

2020 Annual Geotechnical Inspection
Tailings Impoundment Area

Recommended Location for Replacement GTCs

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Appendix L Tailings Deposition Update

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Issued for Discussion

Technical Memo

April 20, 2021

To	Ashley Mathai and Sarah Warnock, Hope Bay Project
From	Jasur Umarov, John Kurylo, SRK
Cc	Oliver Curran, Hope Bay Project
Subject	Hope Bay TIA Tailings Deposition Plan – 2021 Update
Client	Agnico Eagle Mines Ltd.
Project	1CT022.057

1 Introduction

The Hope Bay Project is a gold mining (and milling) project that is located 705 km northeast of Yellowknife and 153 km southwest of Cambridge Bay, in Nunavut Territory, east of Bathurst Inlet. The project encompasses three areas of mineralization with additional exploration targets. The three mineral resources are Doris, Madrid, and Boston.

The Project consists of two phases. Phase 1 includes mining and infrastructure at Doris, while Phase 2 includes mining and infrastructure at Madrid and Boston located approximately 10 and 60 km due south from Doris, respectively. As of December 2018, the Doris Type A Water License was amended to include Madrid (2AM-DOH1335), and Boston was granted its own Type A Water License (2AM-BOS1835). The tailings are deposited sub-aerially into the Doris Tailings Impoundment Area (TIA) approximately 5 km from the Doris Mill area.

Tailings containment is currently provided by two structures: a water retaining frozen core dam (North Dam) and a frozen foundation tailings containment dam (South Dam). The North Dam construction was completed in 2012 (SRK 2012) and the South Dam starter dam (Phase 1) was completed in July 2018 (SRK 2019). Deposition plans were previously prepared in 2017 and 2020 to identify options for increased tailings storage capacity within the Doris TIA (SRK 2017) and assist with the TMAC PFS update (SRK 2020).

As part of the Annual Geotechnical Inspection (AGI) an annual review of the deposition plans has been conducted. As part of the Phase 2 operations, the South Dam will be raised, and a new dam will need to be constructed at the south-western edge of the TIA (West Dam). The West Dam will be constructed and operated similarly to the South Dam (i.e. tailings containment dam with a frozen foundation).

This memo presents the results of the annual deposition modeling review in support of the Annual Geotechnical Inspection (AGI). This assessment considers the currently projected Life of Mine (LoM) tailings volumes, including the actual tailings placed by the end of 2020. The purpose of this memo is first to look at expected tailings deposition plans for 2021 and then to look at longer projections into the mine life to help with ongoing waste management, milling, reclaim, and dam construction and raise planning. It is expected that actual site conditions will vary from the simplified or idealized depositions conditions presented in this memo. Based on the changing site condition, a detailed updated look at the tailings deposition planning is still suggested to be done on an annual basis, to best assist with operation and long term planning considerations.

2 Operation Philosophy

2.1 Deposition Strategy

The overall deposition strategy is to maintain a tailings surface with positive drainage towards the reclaim pond at closure and to limit ice entrainment during operations. To maintain a surface with positive drainage towards the north, tailings will be deposited from several points from the South Dam and West Dam (Phase 2) (during the summer months) and spigot points will be moved progressively to the north (during the winter months).

Single point deposition has been specified for the winter months to minimize the risk of ice entrainment; as this way a the heat from the tailings deposition will be concentrated in a single area. This single point winter deposition, also allows for some freezeback of the tailings off the upstream portion of the South Dam to occur. During the summer periods, three spigot points are specified (typically off the upstream slope of the dam to best develop a upstream tailings beach). However, these spigot points can be operated one at a time splitting deposition between each point evenly.

The existing beach at the South Dam was deposited between 2017 and the last (2020) open water season. Significant beach development was achieved in 2020 to establishing a longer beach freeboard above the reclaim pond. Tailings deposition will continue to progressively move water away from the dam and maintain a surface with positive drainage to the north. After construction of the West Dam, summer deposition will move to the West Dam to form a beach and again direct water away from the dam. Maintaining a distance between the reclaim pond and the South and West Dam will facilitate freeze-back of the foundation and mitigate potential for seepage within the dams. At this time a minimum 100m offset of the supernatant pond from the South Dam crest has been specified and is being maintained on site. Deposition during winter months will progress along the east side of the TIA.

The North Dam will continue to act as a water retaining dam for the lifespan of the TIA. The site wide water balance will need to be reviewed as tailings deposition continues and the size of the reclaim pond is reduced. Note that the TIA water and load balance is looked at monthly during operations and a comprehensive look it done for the water and load balance at least once a year (this is compiled and presented is a different / subsequent SRK memorandum).

Seasonal changes of the spigot locations must be scheduled to avoid ice blockages or 'ice dams' and minimize ice entrainment within the tailings mass. The deposition planning presented in this memo does not present complete fine details of such seasonal operations and instead focus on the larger overall summer and winter deposition periods. The Engineer of Record will continue to be in close contact with site and will work with them to update and move spigot locations as needed during 2021, using the deposition planning presented in this memo to help with those discussions and decisions.

2.2 Reclaim

The reclaim pond pumphouse is located at the north end of the TIA adjacent the North Dam. It consists of a pump system located on the reclaim jetty pad, that is connected to a submerged intake line. Water pumped from the reclaim pumphouse is directed to the mill for reuse in the mill circuit or to the water treatment plant prior to discharge to Roberts Bay (when the Roberts Bay discharge / marine outfall is operational).

The full supply level (FSL) of 33.5 masl should not be exceeded under normal operating circumstances. This FSL is set by the existing elevations of the North Dam, and associated internal components and requirements to storm volume storge and freeboard. The reclaim intake line has been anchored in a locally deep area (>2m deep) at the north end of the TIA to facilitate pumping during winter periods where relatively deep ice can develop. The position of the intake line may need to be re-evaluated as tailings deposition begins to encroach in the area. However, preliminary deposition modeling suggests this is many years away, and the position of the intake is not expected to be required to be moved in 2021.

3 Objectives, Operational Criteria and Assumptions

The tailings deposition plan has been completed to:

- Develop an accurate tailings surface to facilitate the development of a representative stage-capacity curve for the TIA through its life (this is also then used in the water and load balance checks and planning);
- Determine optimum tailings discharge locations and durations that coincide with the deposition philosophy;
- Optimise tailings deposition locations to facilitate the use of reclaim water and limit ice entrainment;
- Identify the approximate timing requirements for construction of West Dam and South Dam raise, to assist with planning; and
- Determine the sensitivity of deposition rates and beach angles on overall storage.

Tailings deposition planning was performed using Muk3D (MineBridge 2021), a conceptual design and detailed planning software. The deposition modeling assumptions are summarised in Table 1, and are based on the actual survey data, laboratory testing, and experience with tailings that have similar characteristics. The existing tailings beach surface was surveyed from December 15, 2020 to December 28, 2020, which coincides with a total tailings deposition estimate of 1,637,000 tonnes of tailings deposited by the end of 2020.The surveyed surface and its estimated sub-aqueous portion,

modeled at 1.5% slope (assumption), were incorporated into the base surface for the analysis to account for existing tailings placement. Some sensitivity checks on slope angles, and impacts on tailings storage, were also completed during the course of this work.

Table 1: Summary of Tailings Deposition Modeling Assumptions

Component	Value
Total Tailings Storage Requirement [1]	18.0 Mt (13.5 Mm^3)
Tailings Currently Deposited [2]	1.6 Mt
Remaining Tailings Storage Requirement	16.4 Mt (12.6 Mm^3)
Deposited Tailings Dry Density	1.3 t/m^3 (based on laboratory tests)
Tailings Beach Slope (Sub-aerial Portion)	0.5%
Tailings Beach Slope (Sub-aqueous Portion) [3]	1.0 to 1.5%
North Dam Full Supply Level (Normal Operations)	33.5 m
Discharge Method	Single/ Multi Point Discharge

Notes:

[1] Based on TMAC's 2020 Pre-Feasibility Study (TMAC 2020)

[2] Based on information provided by TMAC in the beginning of 2021

[3] Both short-term and life of mine tailings modeled at 1.0% and 1.5% sub-aerial slope to capture the likely range of possible outcomes

Tailings throughput has been modeled in accordance with the expected upper range of tailings production expected going forward. These rates are in line with the rates expected in TMAC's 2020 PFS Study (TMAC 2020). Additionally, a reduced scenario was modeled with a tailings throughput of 1,600 t/day (maximum production rate recorded in 2020) through 2023 and then 3,200 t/day for 2024 onward. This is conservative (in terms of larger rates) compared to the average production rate since March 2020 of 1100 t/day and expected tailing production rate through 2023 of 1,500 t/day.

Table 2: Summary of Tailings Production rates

Year (inclusive)	High Tailings Production Rate [1] (t/day)	Reduced Tailings Production Rate (t/day)
2021 to 2023	2,000	1,600
2024 to end of mine life	4,000	3,200

Notes:

[1] Based on TMAC's 2020 Pre-Feasibility Study (TMAC 2020), expected to be conservative based on current production rates

The 2020 surveyed tailings beach slope was measured at roughly a 0.5% sub-aerial slope, with steeper slopes in more recently deposited areas, and slightly shallower slopes in some areas where there has been more water deposition / pumping into the TIA. It is expected that in long term, those steeper tailings slope portions will flatten out to approximately 0.5% overall (as tailings elevations raise and different spigot locations are used etc.). Sub-aqueous slopes estimated from the 2018 and 2019 bathymetry ranged from 0.5% to 2%. To support the subaqueous slopes assumed in the model, the 2019 tailings beach survey, topography and bathymetry were combined as a base tailings surface. The

2020 tailings survey was then used to calculate the volume of sub-aerial tailings and a sub-aqueous tailings surface was projected out from the limit of the upland beach and calibrated to the 2020 actual deposition tonnage, including 20% ice entrainment. A 1.5% sub-aqueous slope was carried forward as the base case as it calibrated most closely to the actual 2020 tailings tonnage given the range of uncertainties in survey accuracy, ice entrainment and tailings density.

4 Deposition Modeling Results

Deposition modeling was undertaken for three scenarios. The scenarios are summarized in Table 3.

Table 3: Summary of Modeled Scenarios

Scenario Number	Sub - scenario	Scenario	Model Years	Sub-aerial Slope (%)	Sub-aqueous Slope (%)	Pond Level (masl)	Tailings Production Rate
1	A	Base Case	Short Term (2021)	0.5%	1.5%	32.5	High
	B	Base Case	Life of Mine (2022 to end of mine life)	0.5%	1.5%	33.5	High
2	A	Sensitivity	Short Term (2021)	0.5%	1.5%	32.5	Reduced
	B	Sensitivity	Life of Mine (2022 to end of mine life)	0.5%	1.5%	33.5	Reduced
3	A	Sensitivity	Short Term (2021)	0.5%	1.0%	32.5	High
	B	Sensitivity	Life of Mine (2022 to end of mine life)	0.5%	1.0%	33.5	High

As tailings deposition slopes are dependent on solids content, discharge of other water streams such as underground inflows deposited with the tailings streams were expected to impact the slope angles. The variability of the beach slope was considered in the sensitivity analysis and provided a range of the overall tailings storage volumes and reclaim pond size.

The plan view of the modelling results for the six sub-scenarios are presented in Figures 1 to 3. Discharge points are consistent in each scenario and have been labelled in accordance with the naming convection used by Agnico Eagle's Hope Bay personnel (Spigots A to H). A further breakdown of deposition models is shown in Attachment 1 notes.

The short-term (2021) deposition plan scenarios (Scenarios 1A, 2A, and 3A) were completed based on the current discharge point (Spigot H) until spring 2021. Tailings are then discharged from the South Dam to continue raising the beach (Spigots A, B and C). As winter 2022 approaches, the deposition point is proposed to move further north to Spigot I, to ensure the newly formed beach does not cut-off the flow from the South Dam during subsequent deposition and avoid spigot movement during the winter months.

For subsequent years, deposition is split into two phases: seven months of ‘summer’ deposition during warmer seasons, or while ice thickness on the reclaim pond is limited (June to December), and; five months of ‘winter’ deposition during coldest months, while the ice is thickest. The tailings deposition location and elevations, as well as deposition tonnages for the LOM scenarios (Scenarios 1, 2 and 3) are presented in Table 4.

The base case scenario (Scenario 1) represent the higher tailings deposition rate, and therefore highest rate of rise and more frequent changes in required discharge locations (a conservative assumption for planning in terms of less time between moves or raises). Based on these model outputs (Table 4) and assuming tailings will not be discharged from the South Dam in 2022, the South Dam raise will be required in 2022. Tailings will reach the West Dam key trench base elevation and will begin to encroach on the West Dam foundation area in the 2024-2025; hence the West Dam construction is will likely be required to begin in Winter 2023 (if the higher end of milling rates are realized on site) or in Winter 2024 (if the lower end of milling rates are actually realized on site).

In the base case LOM scenario (Scenario 1B), the final volume of the pond at full service level is approximately 150,000 m^3.

The current conditions scenario (Scenario 2A/B) represents a continuation of the maximum 2020 tailings deposition rates after March 2020, as a target rate carried forward (assuming constant production through 2021). Based on the model outputs (Table 4), the South Dam Phase 2 raise would still be required in 2022. Note that the South Dam Phase 2 raise has already been designed and permitted and the Phase 2 key trench was already proactively completed as part of the initial South Dam construction.

Scenario 3 presents a case where the reclaim pond is reduced due to the flatter slope of the sub-aqueous beach, but again, still requires the South Dam raise in 2022.

Table 4: Summary of Deposition Model Scenarios

Year	Scenario 1						Scenario 2					Scenario 3				
	Modeling Stage	Discharge Location	Discharge Elevation (masl)	Incremental Tonnage (tonnes)	Cumulative Tonnage to Date[1] (tonnes)	Pond Volume (m^3)	Discharge Location	Discharge Elevation (masl)	Incremental Tonnage (tonnes)	Cumulative Tonnage to Date[1] (tonnes)	Pond Volume (m^3)	Discharge Location	Discharge Elevation (masl)	Incremental Tonnage (tonnes)	Cumulative Tonnage to Date[1] (tonnes)	Pond Volume (m^3)
2021	1	H	33.1	360,000	2,000,000	5,041,000	H	33.0	288,000	1,928,000	5,092,000	H	32.6	360,000	2,000,000	5,034,000
2021	2	A+B+C	36.3	240,000	2,240,000	5,032,000	A+B+C	36.1	192,000	2,120,000	5,087,000	A+B+C	36.3	240,000	2,240,000	5,024,000
2021	3	I	32.6	120,000	2,360,000	4,940,000	H	33.2	96,000	2,216,000	5,019,000	H	32.8	120,000	2,360,000	4,933,000
2022	4	I	43.5	730,000	3,090,000	5,438,000	I	34.2	584,000	2,800,000	5,619,000	I	34.0	730,000	3,090,000	5,417,000
2023	5	A+B+C	37.6	430,000	3,520,000	5,384,000	A+B+C	37.3	344,000	3,144,000	5,573,000	A+B+C	37.6	430,000	3,520,000	5,352,000
2023	6	J	34.0	300,000	3,820,000	5,155,000	I	34.6	240,000	3,384,000	5,405,000	I	34.3	300,000	3,820,000	5,132,000
2024	7	A+B+C	39.4	860,000	4,680,000	5,123,000	A+B+C	38.8	688,000	4,072,000	5,361,000	A+B+C	39.4	860,000	4,680,000	5,092,000
2024	8	K	33.7	600,000	5,280,000	4,662,000	J	34.3	480,000	4,552,000	5,000,000	J	34.0	600,000	5,280,000	4,634,000
2025	9	A+B+C	40.7	860,000	6,140,000	4,606,000	A+B+C	40.0	688,000	5,240,000	4,977,000	A+B+C	40.7	860,000	6,140,000	4,592,000
2025	10	K	34.4	600,000	6,740,000	4,161,000	K	33.8	480,000	5,720,000	4,608,000	K	33.6	600,000	6,740,000	4,131,000
2026	11	A+B+C	41.8	860,000	7,600,000	4,153,000	A+B+C	41.0	688,000	6,408,000	4,580,000	A+B+C	41.7	860,000	7,600,000	4,058,000
2026	12	L	34.1	600,000	8,200,000	3,696,000	K	34.3	480,000	6,888,000	4,222,000	K	34.3	600,000	8,200,000	3,604,000
2027	13	A+B+C	42.8	860,000	9,060,000	3,656,000	A+B+C	41.9	688,000	7,576,000	4,216,000	A+B+C	42.5	860,000	9,060,000	3,495,000
2027	14	L	34.7	600,000	9,660,000	3,213,000	L	34.0	480,000	8,056,000	3,850,000	L	34.1	600,000	9,660,000	3,039,000
2028	15	A+B+C	43.5	860,000	10,520,000	3,130,000	A+B+C	42.6	688,000	8,744,000	3,806,000	A+B+C	43.2	860,000	10,520,000	2,903,000
2028	16	L	35.2	600,000	11,120,000	2,698,000	L	34.4	480,000	9,224,000	3,447,000	L	34.9	600,000	11,120,000	2,464,000
2029	17	A+B+C	44.2	860,000	11,980,000	2,587,000	A+B+C	43.2	688,000	9,912,000	3,373,000	A+B+C	43.9	860,000	11,980,000	2,353,000
2029	18	M	34.6	600,000	12,580,000	2,148,000	L	34.9	480,000	10,392,000	3,021,000	M	34.5	600,000	12,580,000	1,907,000
2030	19	N+O+P	42.0	860,000	13,440,000	1,871,000	A+B+C	43.8	688,000	11,080,000	2,928,000	A+B+C	44.5	860,000	13,440,000	1,790,000
2030	20	Q	35.2	600,000	14,040,000	1,468,000	L	35.3	480,000	11,560,000	2,585,000	M	35.3	600,000	14,040,000	1,404,000
2031	21	R	43.6	860,000	14,900,000	1,336,000	A+B+C	44.3	688,000	12,248,000	2,488,000	N+O+P	42.5	860,000	14,900,000	1,259,000
2031	22	Q	36.1	600,000	15,500,000	991,000	M	34.6	480,000	12,728,000	2,138,000	M	36.1	600,000	15,500,000	921,000
2032	23	N+O+P	43.2	860,000	16,360,000	881,000	N+O+P	42.0	688,000	13,416,000	1,907,000	R	44.2	860,000	16,360,000	875,000
2032	24	Q	36.8	600,000	16,960,000	590,000	M	35.3	480,000	13,896,000	1,597,000	Q	36.5	600,000	16,960,000	565,000
2033	25	N+O+P	43.9	860,000	17,820,000	553,000	N+O+P	42.5	688,000	14,584,000	1,449,000	N+O+P	43.7	860,000	17,820,000	510,000
2033	26	Q	37.6	600,000	18,420,000	329,000	M	36.0	480,000	15,064,000	1,184,000	Q	37.4	600,000	18,420,000	295,000
2034	27	N+O+P	44.5	860,000	19,280,000	326,000	R	44.0	688,000	15,752,000	1,149,000	N+O+P	44.4	860,000	19,280,000	289,000
2034	28	Q	38.4	600,000	19,880,000	156,000	Q	36.2	480,000	16,232,000	877,000	Q	38.3	600,000	19,880,000	133,000
2035							R	44.5	688,000	16,920,000	809,000					
2035							Q	36.9	480,000	17,400,000	572,000					
2036							N+O+P	43.8	688,000	18,088,000	544,000					
2036							Q	37.5	480,000	18,568,000	360,000					
2037							N+O+P	44.4	688,000	19,256,000	355,000					
2037							Q	38.2	480,000	19,736,000	209,000					

Notes: The deposition model scenarios for 2021 assume a pond elevation of 32.5 masl. Following years assume a pond elevation of 33.5 masl.

1. Cumulative tonnage values include the total deposited dry tonnage of tailings of 1,640,000 Mt to date (end of December 2020)

5 Discussion

Three deposition scenarios have been modeled for the current LoM tailings depositions (Table 3) and are summarized as:

1. Sub-aerial slopes of 0.5% and sub-aqueous slopes of 1.5% with high production rates
2. Sub-aerial slopes of 0.5% and sub-aqueous slopes of 1.5% with reduced production rates
3. Sub-aerial slopes of 0.5% and sub-aqueous slopes of 1.5% with high production rates

The deposition modeling indicates that the existing TIA can accommodate the remaining LOM tailings without modification. The Phase 2 raise of the South Dam is required by 2022 and West Dam construction is expected to be needs to be completed by the spring of 2024, under the more conservative scenarios (Scenario 1 and 3) with higher production rates (i.e. less time before the raise is needed).

The reduced production, Scenario 2, has the closest deposition rate to anticipated average deposition rate of 1,500 t/day from 2021 through 2023 (based on current guidance from Hope Bay staff). Under Scenario 2, the South Dam would still need to be raised in 2022; however, the need for the West Dam construction pushed out to a completion date of spring 2025.

These modelled scenarios are conservative (in terms of tailings volumes and rates) and do not include the various options available for operational flexibility, and conditions that might be variable on site. Some potential modifications to the deposition strategy, which will be based on site observations of actual conditions, are listed below:

- If tailings start encroaching on the west flank during deposition from Spigot H in 2021 and it is too early in the season to deposit form the South Dam, deposition should be moved north of Spigot H to Spigot I.
- Under further reduced production rates of approximately 1,000 t/day, below the average rate since March 2020, it is plausible that deposition could occur from the South Dam for two summer seasons, with the contingency to relocate the deposition to Spigot H or I earlier than normal in Summer 2022. This may would postpone the South Dam raise by one year and may help to push the requirement to have the South Dam Phase 2 raise in place by Summer 2023 (instead of in 2022).
- In early stages of the deposition (2021), the winter discharge points are relatively close to the pond and the winter period are assumed to be longer to limit ice entrainment. However, in later years, the discharge period from the South/ West Dam faces is extended. This increases potential for ice entrainment. Monitoring ice entrainment and in-situ density in the next few years will be important to understand and calibrate the assumptions in the model and identify associated risks.

The overall tailings capacity of the TIA in not particularly sensitive to the tailings sub-aqueous slope angles (Table 4). The slope angles primarily impact the reclaim pond storage volume and the timing on when spigot locations should be switched. With reduced deposition rates, as modeled in Scenario 2, the TIA will have a larger reclaim capacity at the end of mine life.

The reclaim pond becomes significantly smaller by the end of mine life under Scenarios 1 and 3 (respectively, 156,000 and 133,000 m^3). This is because the deposition scenarios assume large deposition quantities associated with Spigots M and Q towards the end of mine life. This may lead to water management challenges toward the end of mine life, however with the continually updated and reviewed water balances being maintained, this can be confirmed and modifications made to operation plans as needed, to endure that process demands can be met from the reduced pond volume. It is also likely that significant quantities of water will need to be treated and discharged annually (via Roberts Bay / the marine discharge line) to maintain the reclaim pond below the North Dam full supply level of 33.5 masl. The SRK annual water and load balance reporting should be consulted for further discussion on treatment and discharge of TIA water.

The deposition plan should be reviewed as part of the next AGI to ensure the assumptions remail valid and there is capacity for the projected life of mine tailings. Interim checks may be conducted at any time by Agnico or the TIA Engineer of Record, when significant changes to the operation are expected. A bathymetry as well as a subaerial beach survey should be also completed on a yearly basis, to confirm the tailings slopes and to help update the estimates of the TIA capacity.

Regards,
SRK Consulting (Canada) Inc.

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Jasur Umarov, EIT
Staff Consultant

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John Kurylo, MSc, PEng
Senior Consultant

Attachments:

Attachment 1 Figures
Attachment 2 TIA Deposition Plan – 2021 Update Notes

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The opinions expressed in this document have been based on the information available to SRK at the time of preparation. SRK has exercised all due care in reviewing information supplied by others for use on this project. While SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information, except to the extent that SRK was hired to verify the data.

References

MineBridge Software Inc. 2021, Muk 3D Formation / Tailings software. Licensed to SRK Consulting (Canada) Inc. March 2021.

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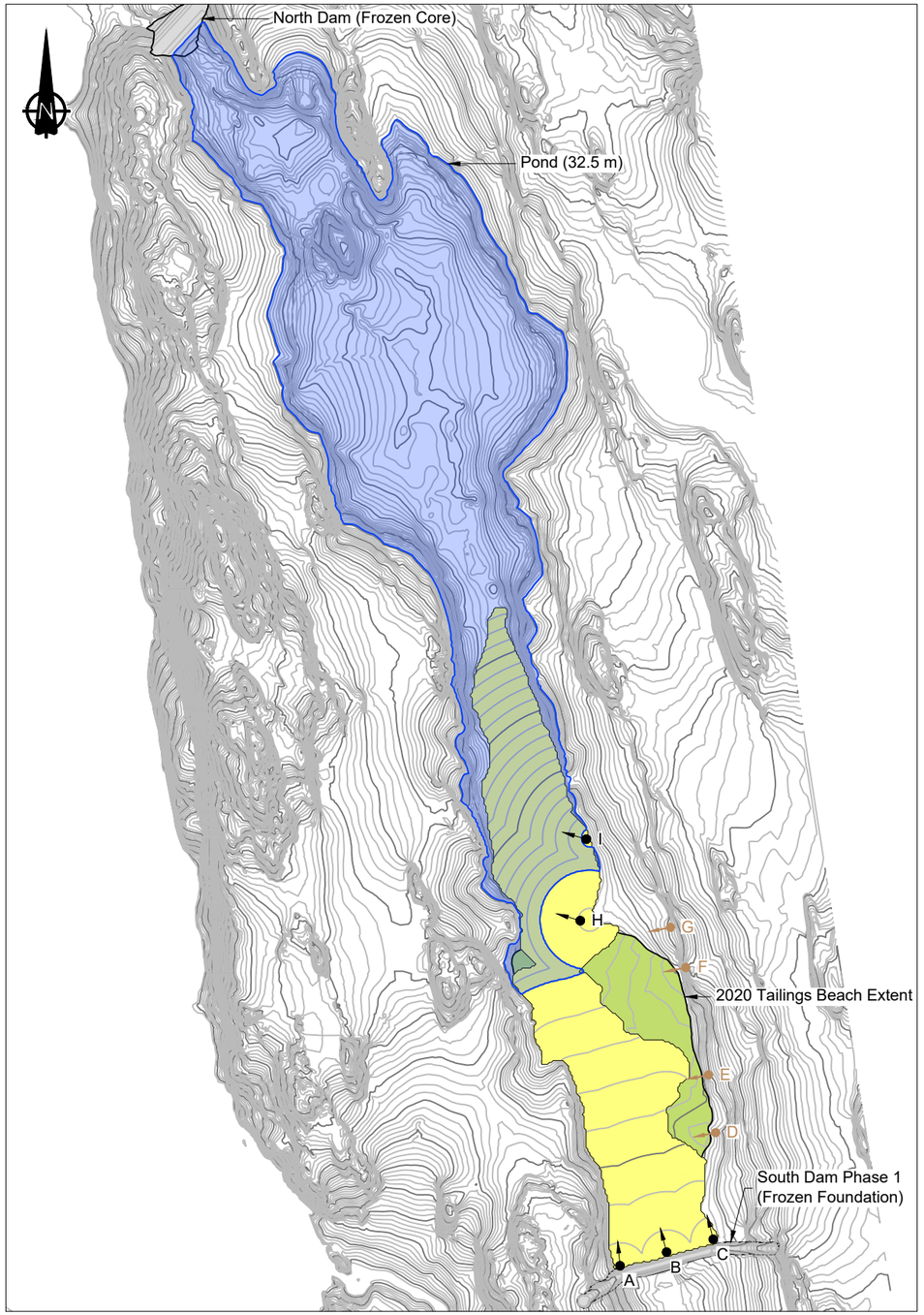
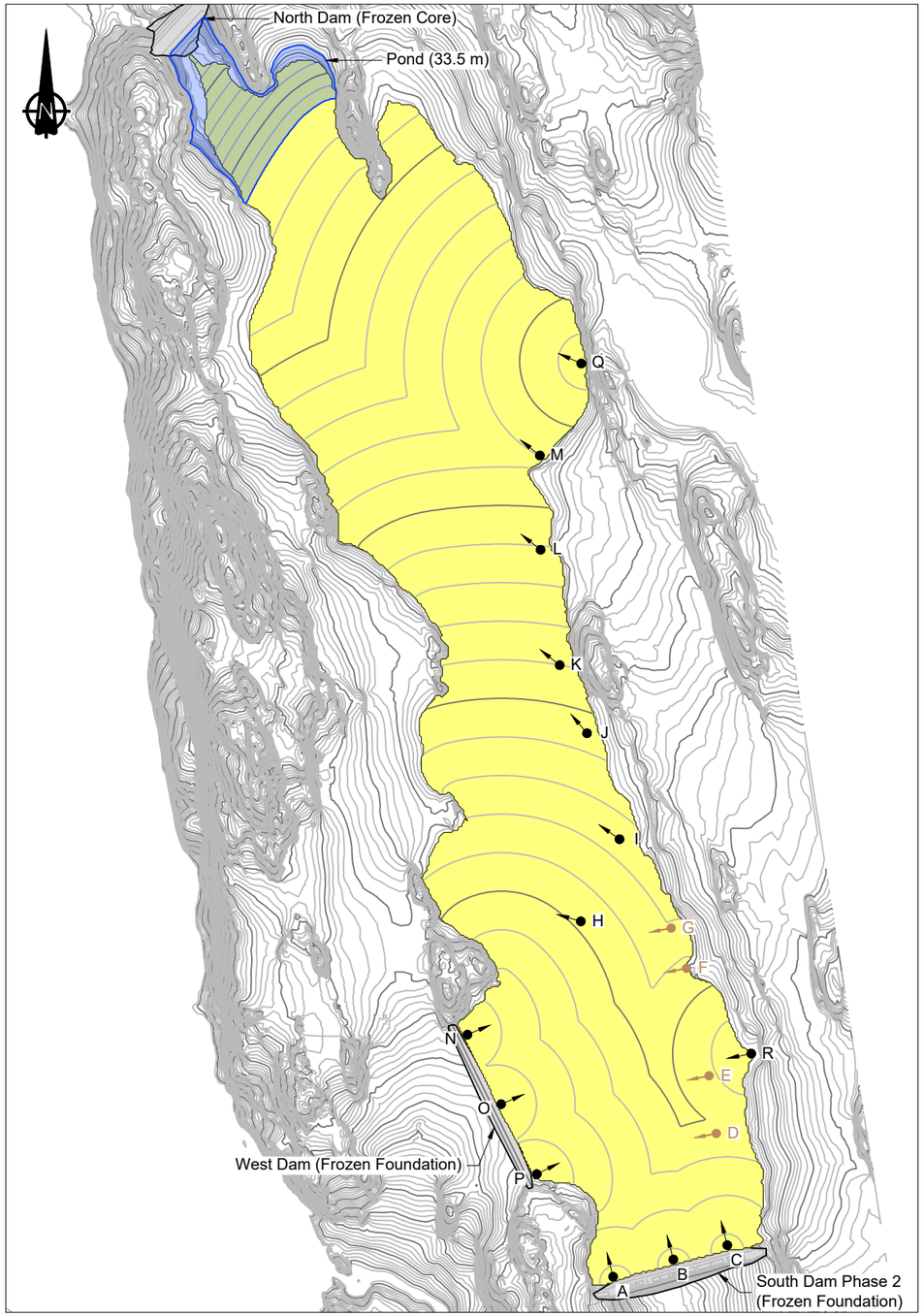
Attachment 1 Figures



Scenario 1 - Projected Tailings Deposition 2021



Scenario 1 - Projected Tailings Deposition LOM

LEGEND

- Old Spigot Location
- Modeled Spigot Location
- Pond
- Dam Footprint
- Deposited Tailings
- Tailings Extent (2020)

NOTES

1. Scenario 1 production rates are assumed to be 2,000 t/day from 2021 to 2023, and 4,000 t/day from 2024 and onward. Sub-aerial and sub-aqueous slopes are assumed at 0.5% and 1.5%, respectively.
2. Deposition model scenario is based on the bathymetry survey completed in 2019 and tailings beach survey completed in December 2020 by TMAC. Sub-aqueous portion of 2020 tailings is assumed to be 1.5%.
3. A deposited tailings dry density of 1.3 t/m³ was used.
4. Topographic data and surveys were provided by the client.
5. Contours are shown every 0.5 m.

REFERENCE

1. NAD83 UTM Zone 13.
2. 2020 tailings survey dated December 2020.
3. Bathymetry survey dated August 2019.

0m 100 200 300 400 500 600

srk consulting

SRK JOB NO.: 1CT022.057

FILE NAME: 1CT022.057 - 2021 Tailings Deposition.dwg

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DORIS TIA

TIA Tailings Deposition Plan - 2021 Update

Projected Tailings Deposition
Scenario 1

DATE:	APPROVED:	FIGURE:
March 2021	JBK	01

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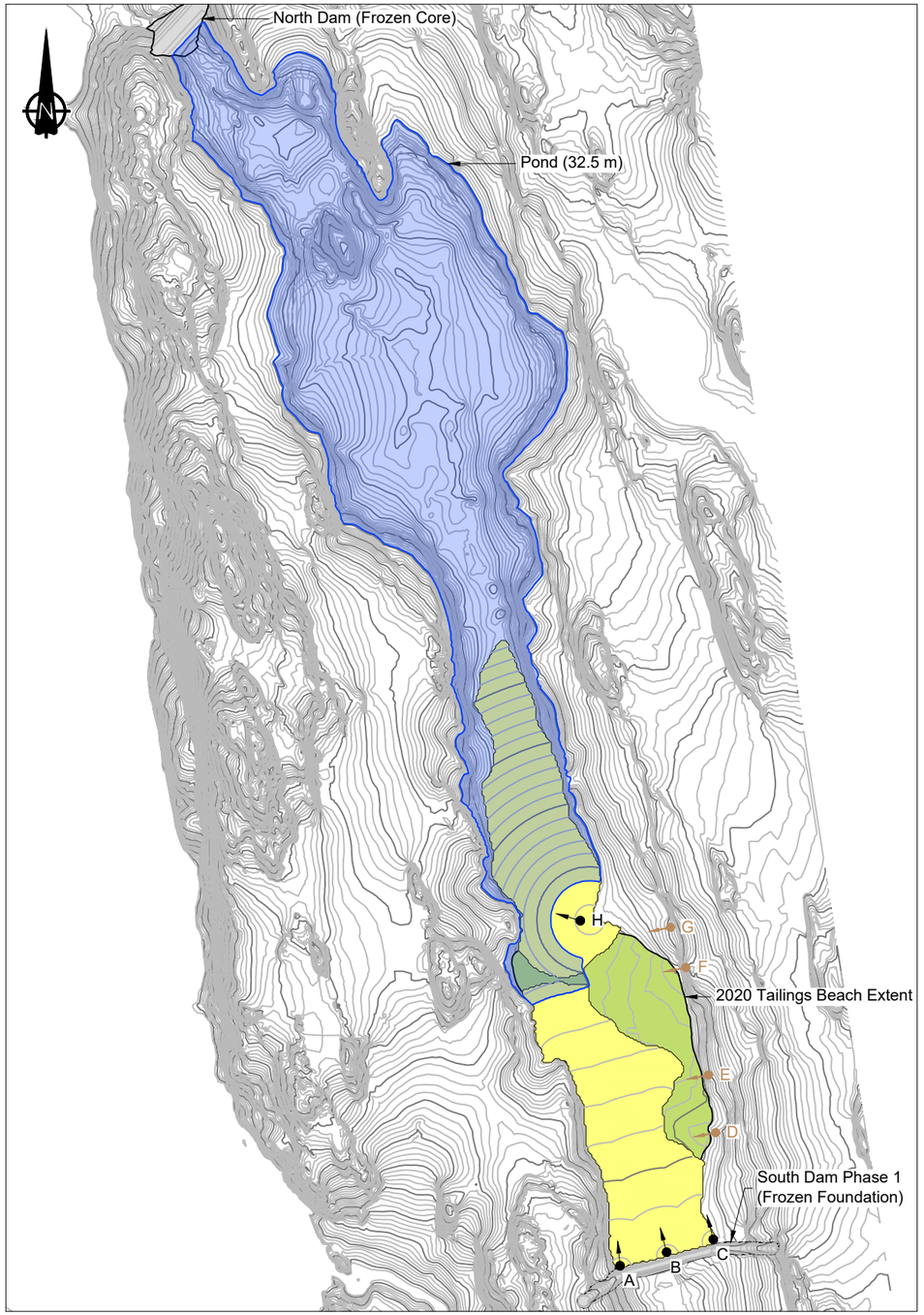
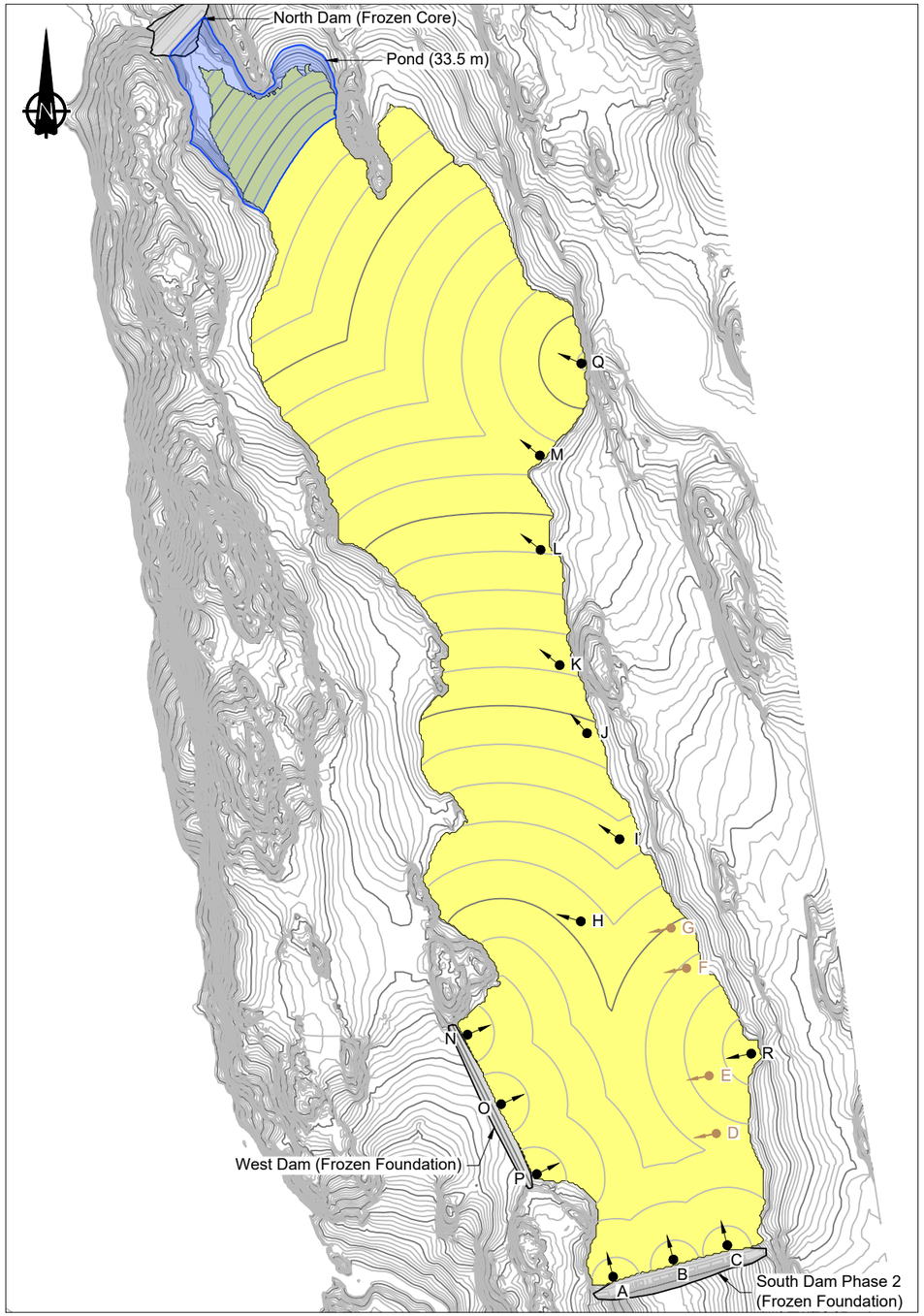


Scenario 2 - Projected Tailings Deposition 2021



Scenario 2 - Projected Tailings Deposition LOM

LEGEND

- Old Spigot Location
- Modeled Spigot Location
- Pond
- Dam Footprint
- Deposited Tailings
- Tailings Extent (2020)

NOTES

1. Scenario 2 production rates are based on the maximum recorded production rate in 2020 (1,600 t/day): 1,600 t/day from 2021 to 2023, and 3,200 t/day from 2024 and onward. Sub-aerial and sub-aqueous slopes are assumed at 0.5% and 1.5%, respectively.
2. Deposition model scenario is based on the bathymetry survey completed in 2019 and tailings beach survey completed in December 2020 by TMAC. Sub-aqueous portion of 2020 tailings is assumed to be 1.5%.
3. A deposited tailings dry density of 1.3 t/m3 was used.
4. Topographic data and surveys were provided by the client.
5. Contours are shown every 0.5 m.

REFERENCE

1. NAD83 UTM Zone 13.
2. 2020 tailings survey dated December 2020.
3. Bathymetry survey dated August 2019.

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TIA Tailings Deposition Plan - 2021 Update

Projected Tailings Deposition
Scenario 2

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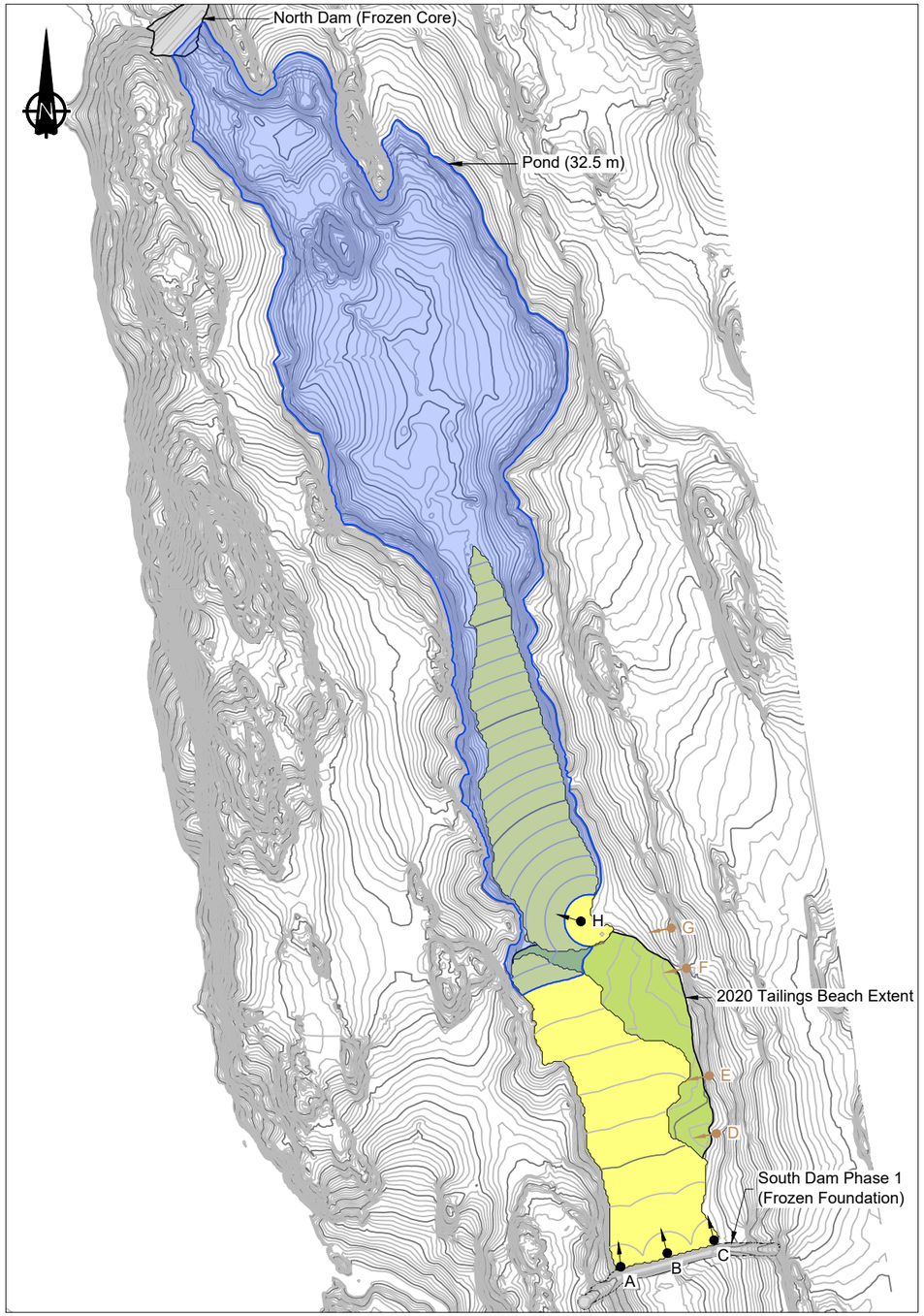
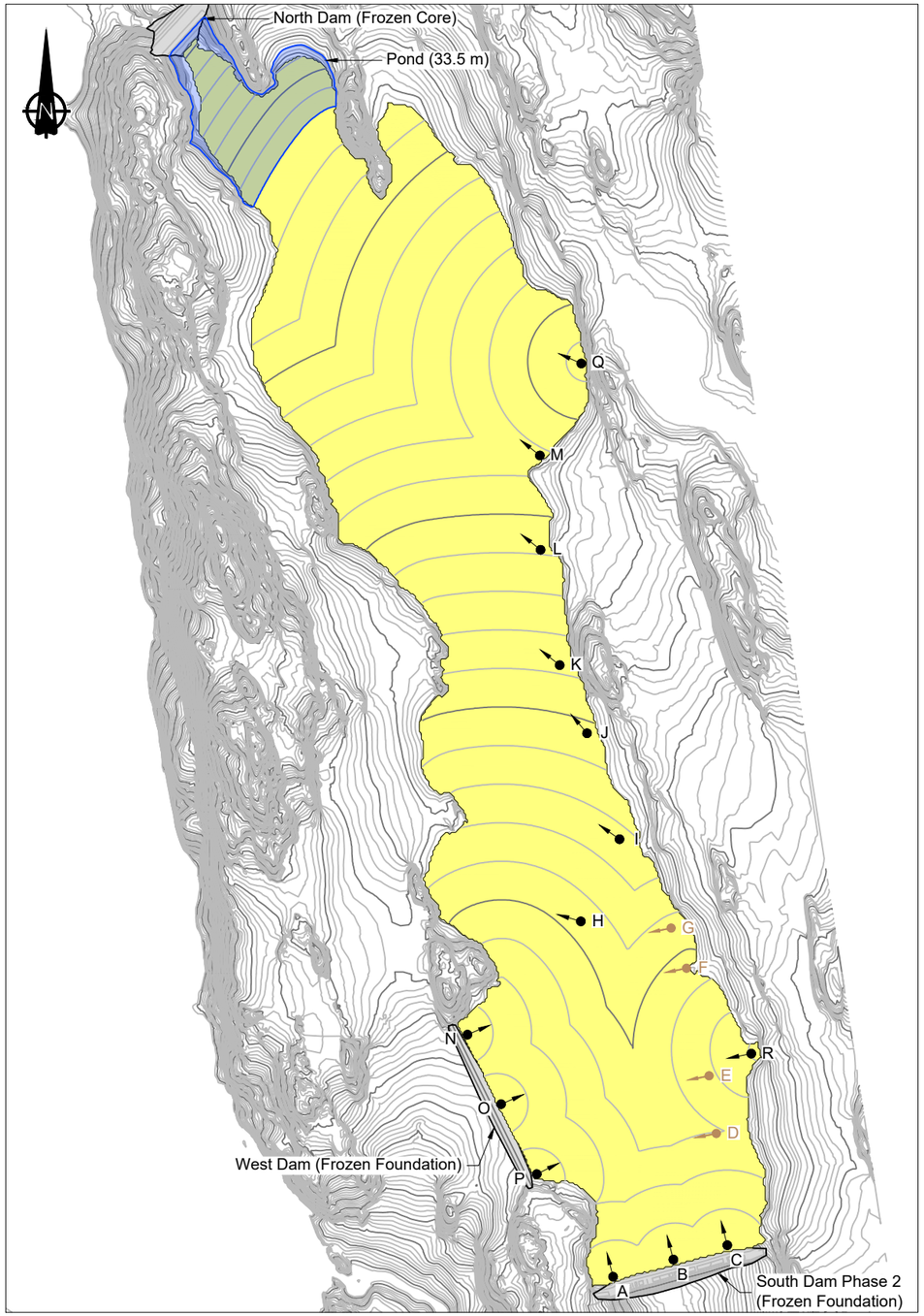


Scenario 3 - Projected Tailings Deposition 2021



Scenario 3 - Projected Tailings Deposition LOM

LEGEND

- Old Spigot Location
- Modeled Spigot Location
- Pond
- Dam Footprint
- Deposited Tailings
- Tailings Extent (2020)

NOTES

1. Scenario 3 production rates are assumed to be 2,000 t/day from 2021 to 2023, and 4,000 t/day from 2024 and onward. Sub-aerial and sub-aqueous slopes are assumed at 0.5% and 1.0%, respectively.
2. Deposition model scenario is based on the bathymetry survey completed in 2019 and tailings beach survey completed in December 2020 by TMAC. Sub-aqueous portion of 2020 tailings is assumed to be 1.5%.
3. A deposited tailings dry density of 1.3 t/m3 was used.
4. Topographic data and surveys were provided by the client.
5. Contours are shown every 0.5 m.

REFERENCE

1. NAD83 UTM Zone 13.
2. 2020 tailings survey dated December 2020.
3. Bathymetry survey dated August 2019.

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FILE NAME: 1CT022.057 - 2021 Tailings Deposition.dwg

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DORIS TIA

TIA Tailings Deposition Plan - 2021 Update

Projected Tailings Deposition
Scenario 3

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March 2021	JBK	03

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Attachment 2 TIA Deposition Plan – 2021 Update Notes

TIA Deposition Plan – 2021 Update

Preliminary Notes

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Base Surface

The base surface is based on the combination of:

- Pre-mining topo
- 2018 Tailings beach surveys
- 2019 Bathymetry
- South Dam as-built
- North Dam as-built

2020 Deposition Surface is based on Dec 2020 tailings beach survey. Sub-aqueous tailings are modeled with the following slopes:

- 0.5%
- 1.0%
- 1.5%

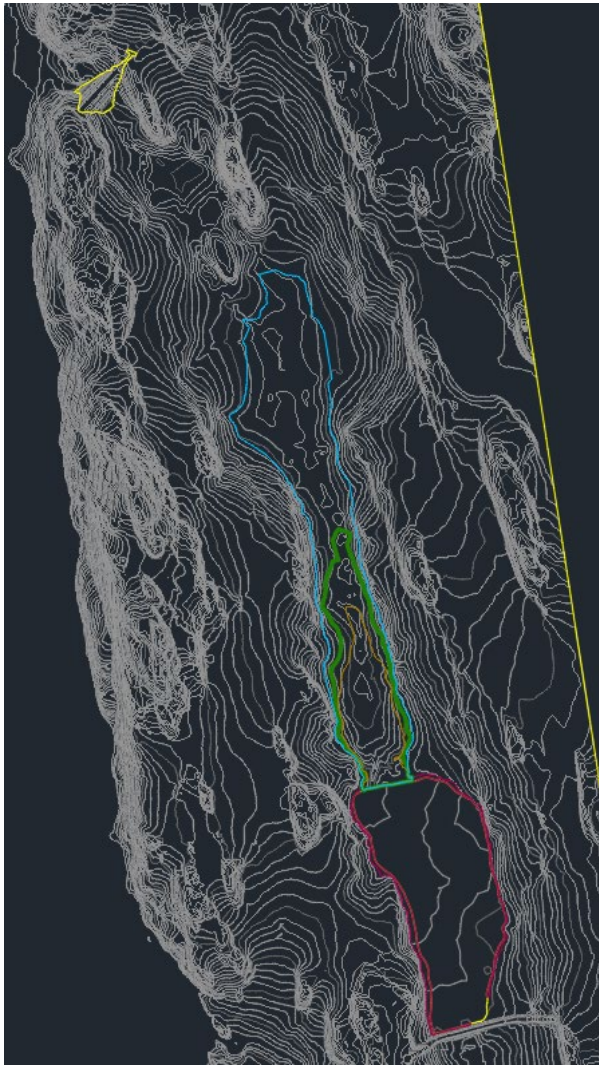
Assumed Sub-Aqueous Deposition Slope [%]	Approx. Tailings Volume Stored in TIA* [m^3]	Approx. Tailings Tonnage Stored in TIA* (assuming 1.3 t/m^3 density) [t]	Tailings Tonnage Stored in TIA* (assuming 1.2 t/m^3 density) [t]
0.5%	1,350,000	1,760,000	1,620,000
1.0%	670,000	870,000	800,000
1.5%	510,000	660,000	610,000

Actual Deposition:

Period	Tailings Solids Production Rate (t/day)	Monthly Tailings Solids Production (tonnes)
Jan-20	923	28,606
Feb-20	951	27,569
Mar-20	1,280	39,680
Apr-20	1,286	38,580
May-20	1,072	33,232
Jun-20	1,566	46,980
Jul-20	952	29,512
Aug-20	736	22,816
Sep-20	383	11,490
Oct-20	1,037	32,145
Nov-20	878	26,332
Dec-20	1,018	31,551
	Total:	**368,493**

** Volumes/tonnages are calculated based on 2019 bathymetry and 2019 tailings beach survey (including modeled sub-aqueous section). These values correspond to estimated tailings deposited since end of December 2019*

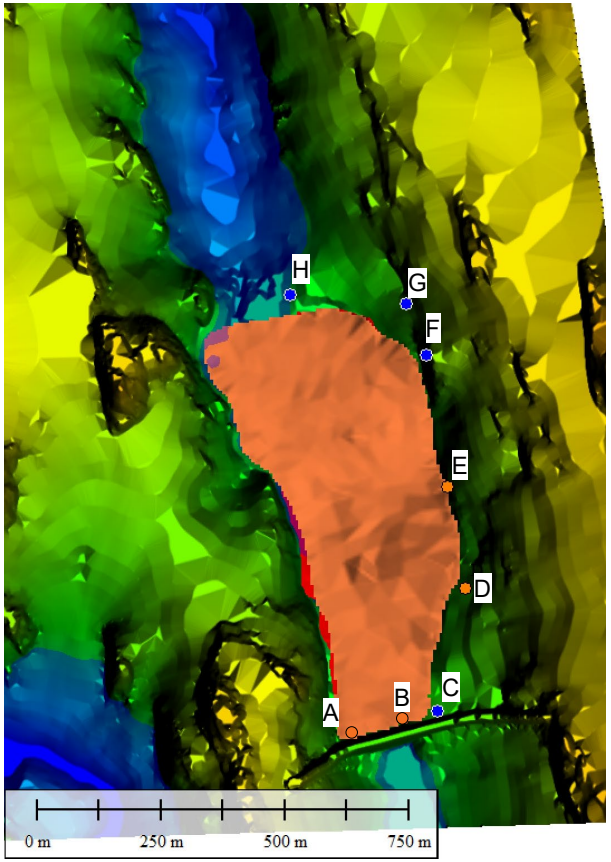
Based on review of 2018 and 2019 bathymetry surveys (slopes around the presumed tailings beaches) and accounting for ice entrainment and previous survey accuracies, sub-aqueous tailings slope is assumed to be 1.5%. This was used as it is volumetrically conservative in terms of total available storage space.



2020 Deposition Points

Based on South Dam Walk Over Reports (started noting deposition points in July 2020):

- Jan 2020 – Jun 2020: Unknown (no surveys)
- July 2020 – Early September 2020: Spigots A&B
- Early September - Mid October: Unknown (no surveys)
- Mid October 2020 – Mid November 2020: Spigot F (Varleys Corner)
- Nov 15 – Feb 2021: Spigot H
  - End of December - Water discharge
  - January – unspecified, assuming tailings?



- Spigot Locations Surveyed in Oct 2020
- Approximate Spigot Locations (based on aerial imagery)

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Deposition Plan Assumptions and Scenarios

- **Pond Level:**
  - 32.5 for 2021
  - 33.5 for long term
- **Beach Slopes:**
  - Sub-aerial: 0.5%
  - Sub-aqueous: 1.5%
    - Sensitivity model with 1.0% slope
- **Deposition Rate:**
  - Base Case (based on 2020 TMAC PFS)
    - 2021 – 2023: 2,000 t/day
    - 2024 onward: 4,000 t/day
  - Sensitivity
    - 2021 – 2023: 1,600 t/day (max production rate in 2020)
    - 2024 onward: 3,200 t/day (doubled)
- **Tailings Density:**
    - Lab test data suggests 1.3 t/m^3
- **Deposition Points:**
  - Single point deposition for winter months
  - Three spigot points during summer (Jul – Oct)
    - Once west dam is built, summer deposition will move more to the west dam to form a beach

Scenario Number	Sub-scenario	Scenario Case	Model years	Subaerial Slope (%)	Sub-aqueous Slope (%)	Pond Level (masl)	Tailings Production Rate
1	A	Base Case	Short Term (2021)	0.5%	1.5%	32.5	Base Case
	B	Base Case	Life of Mine (2022 to end of mine life)	0.5%	1.5%	33.5	Base Case
2	A	Sensitivity	Short Term (2021)	0.5%	1.5%	32.5	Sensitivity
	B	Sensitivity	Life of Mine (2022 to end of mine life)	0.5%	1.5%	33.5	Sensitivity
3	A	Sensitivity	Short Term (2021)	0.5%	1.0%	32.5	Base Case
	B	Sensitivity	Life of Mine (2022 to end of mine life)	0.5%	1.0%	33.5	Base Case

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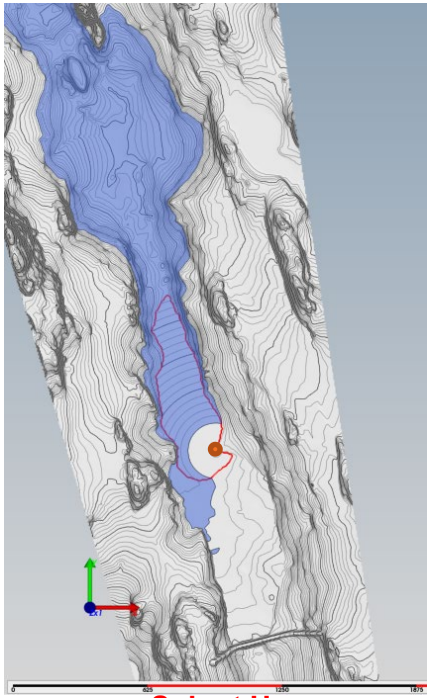
Scenario 1A
2021 Deposition Plan

0.5% Sub-Aerial
1.5% Sub-Aqueous
Pond Elevation at 32.5 masl
2,000 t/day deposition rate

Jan 2021 – Jun 2021

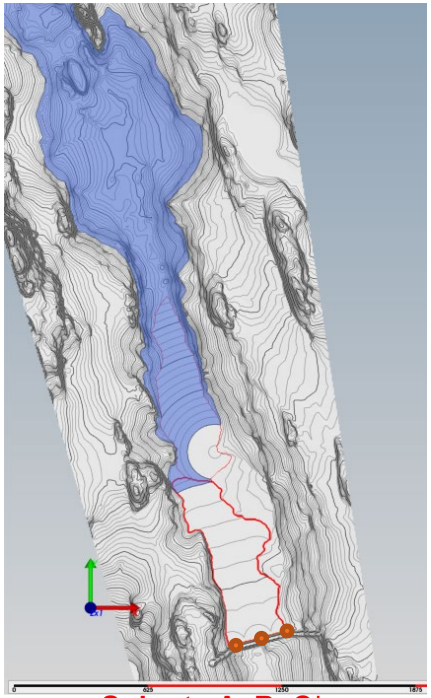
(360,000 tonnes)



Spigot H
Deposition elevation: 33.1 m

Jul 2021 – Oct 2021

(240,000 tonnes)

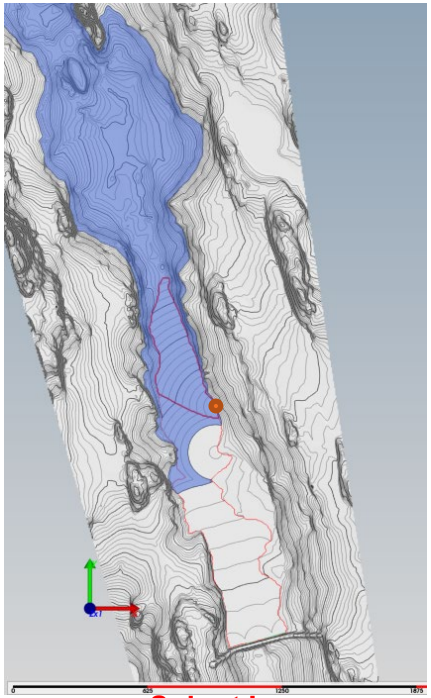


Spigots A, B, C*
Deposition elevation: 36.3 m

* Spigot C moved more to east to avoid ponding on the east side of the dam

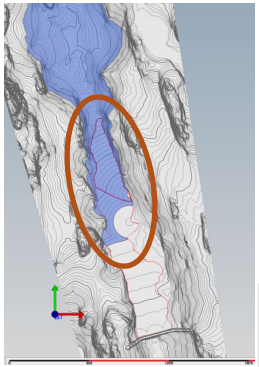
Nov 2021 – Dec 2021

(120,000 tonnes)



Spigot I
Deposition elevation: 32.6 m

Scenario 1B LOM Deposition



0.5% Sub-Aerial
1.5% Sub-Aqueous
Pond Elevation at 33.5 masl
2,000/4,000 t/day deposition rate

- In 2022, only deposit from Spigot I
- 2023 and onwards:
  - 7 months deposited from Spigots A+B+C (Summers)
  - 5 months deposited from Spigot J and move north (K, L, M …) to prevent flow cut off (Winters)

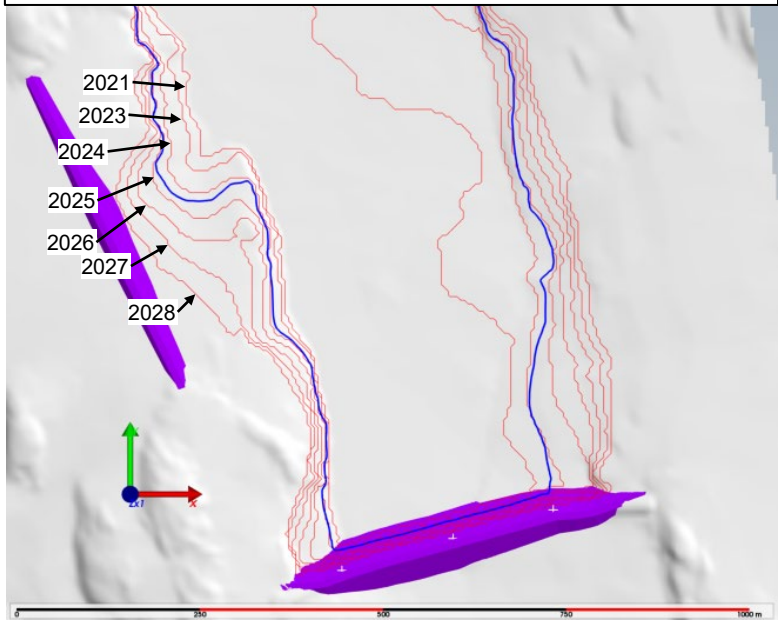
Year	Total Tailings Deposited after December 2020 (m3)	Estimated* Total Tailings Deposited after December 2020 (tonnes)	South Dam Deposition Elevation (m)
End of 2020	0	0	35.2 (current)
End of 2021	554,000	720,000	36.3
End of 2022	1,115,000	1,450,000	36.3 (no deposition off dam)
End of 2023	1,677,000	2,180,000	37.6
End of 2024	2,800,000	3,640,000	39.4
End of 2025	3,923,000	5,100,000	40.7
End of 2026	5,046,000	6,560,000	41.8
End of 2027	6,169,000	8,020,000	42.8
End of 2028	7,292,000	9,480,000	43.5

*Assuming 1.3 t/m^3 dry density for deposited tailings

South Dam Phase 1 tailings FSL = 36.5 m. South Dam should be raised in 2022

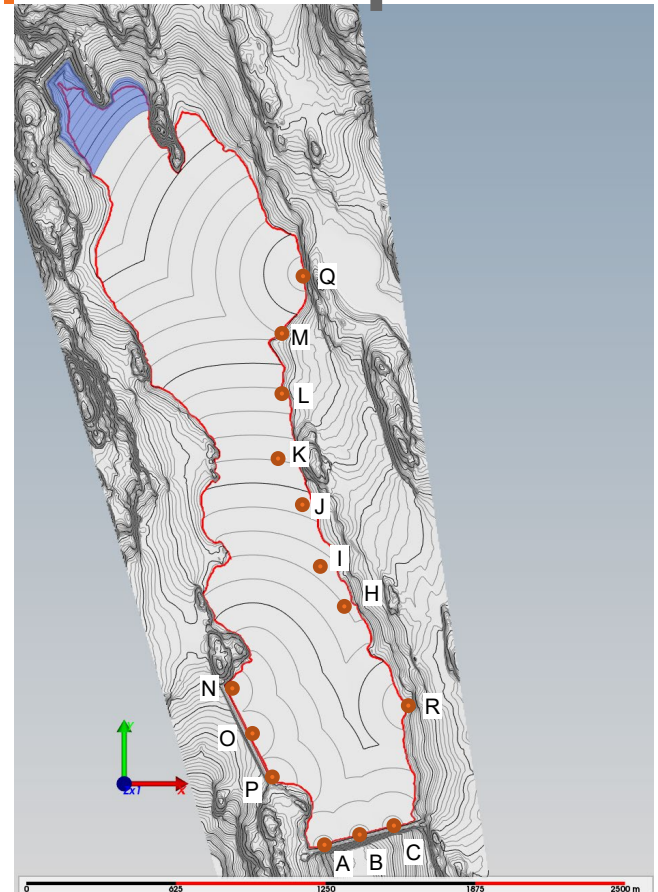
West Dam key trench base min elevation = 37 masl
Tailings reach 37 masl around West Dam in 2024-2025

At the end of 2025, the tailing beach will be ~ 55m away from the proposed West Dam footprint



Scenario 1B
LOM Deposition

0.5% Sub-Aerial
1.5% Sub-Aqueous
Pond Elevation at 33.5 masl
2,000/4,000 t/day deposition rate



- Deposition modeled until the end of 2034
- Total tailings deposited (start of 2021 – end of 2034) = 18.2 Mt
- Pond Volume at 33.5 masl = 156,000 m3

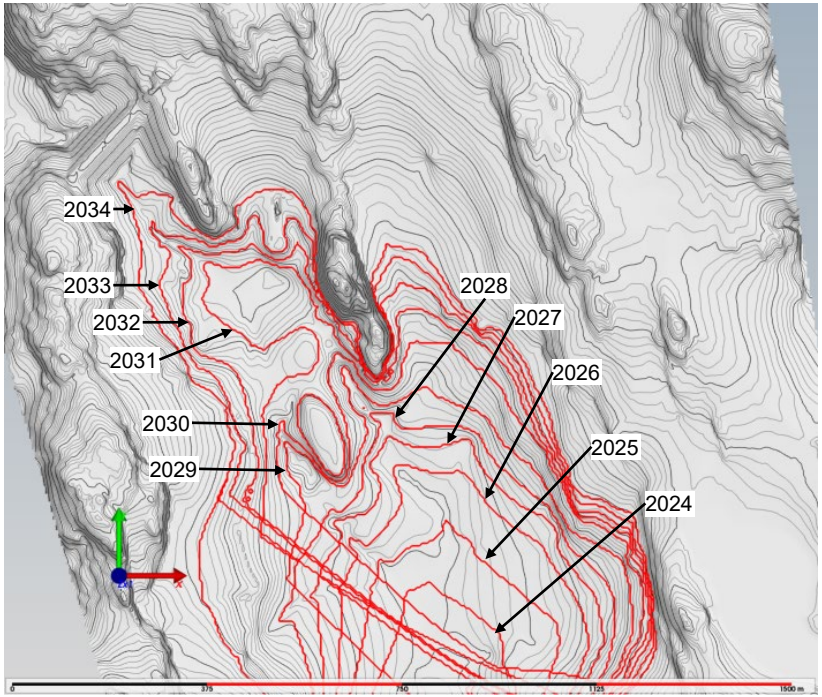
Year	Season	Spigot(s)
2022	Full	I
2023	Summer	A+B+C
2023	Winter	J
2024	Summer	A+B+C
2024	Winter	K
2025	Summer	A+B+C
2025	Winter	K
2026	Summer	A+B+C
2026	Winter	L
2027	Summer	A+B+C
2027	Winter	L
2028	Summer	A+B+C
2028	Winter	L
2029	Summer	A+B+C
2029	Winter	M
2030	Summer	N+O+P
2030	Winter	Q
2031	Summer	R
2031	Winter	Q
2032	Summer	N+O+P
2032	Winter	Q
2033	Summer	N+O+P
2033	Winter	Q
2034	Summer	N+O+P
2034	Winter	Q

Scenario 1B - LOM Deposition Tailings Footprint around ND

0.5% Sub-Aerial
1.5% Sub-Aqueous
Pond Elevation at 33.5 masl
2,000/4,000 t/day deposition rate

Year End	Pond Volume* (m^3)
2021	4,940,000
2022	5,438,000
2023	5,155,000
2024	4,662,000
2025	4,161,000
2026	3,696,000
2027	3,213,000
2028	2,698,000
2029	2,148,000
2030	1,468,000
2031	991,000
2032	590,000
2033	329,000
2034	156,000

* At 32.5 masl in 2021 and 33.5 masl (FSL) for 2022 and onward



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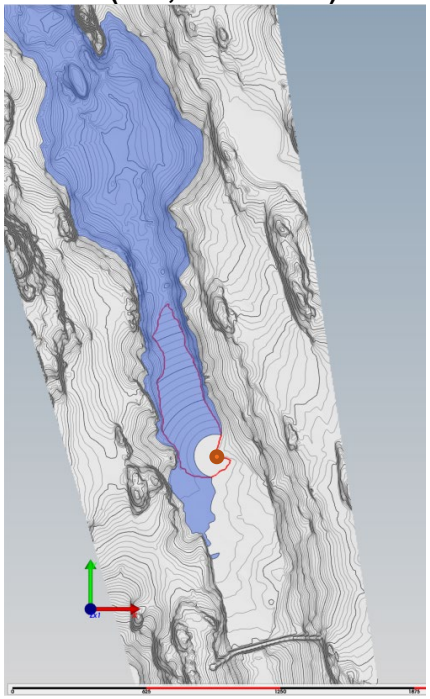
Scenario 2A
2021 Deposition Plan

0.5% Sub-Aerial
1.5% Sub-Aqueous
Pond Elevation at 32.5 masl
1,600 t/day deposition rate

Jan 2021 – Jun 2021

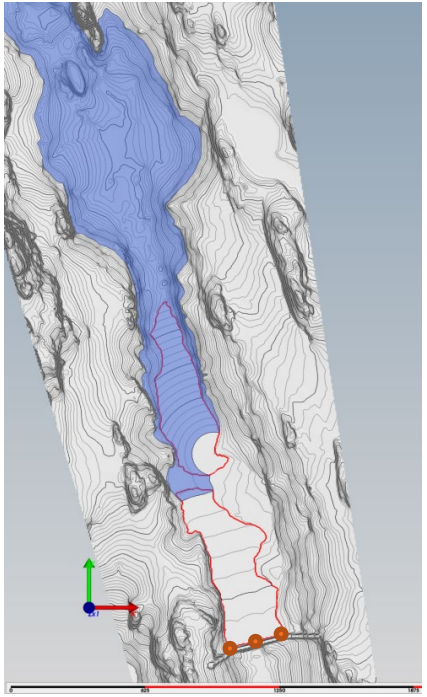
(288,000 tonnes)



Spigot H
Deposition elevation: 33.0 m

Jul 2021 – Oct 2021

(192,000 tonnes)

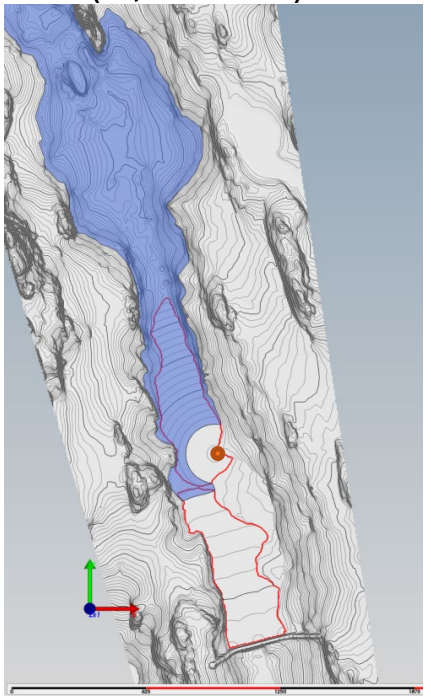


Spigots A, B, C*
Deposition elevation: 36.1 m

* Spigot C moved more to east to avoid ponding on the east side of the dam

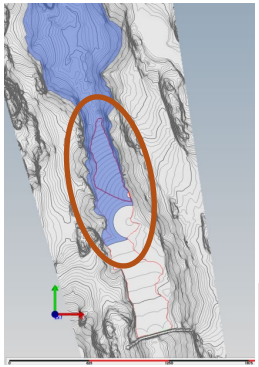
Nov 2021 – Dec 2021

(96,000 tonnes)



Spigot H
Deposition elevation: 32.2 m

Scenario 2B LOM Deposition



0.5% Sub-Aerial
1.5% Sub-Aqueous
Pond Elevation at 33.5 masl
1,600/3,200 t/day deposition rate

- In 2022, only deposit from Spigot I
- 2023 and onwards:
  - 7 months deposited from Spigots A+B+C (Summers)
  - 5 months deposited from Spigot I and move north (J, K, L …) to prevent flow cut off (Winters)

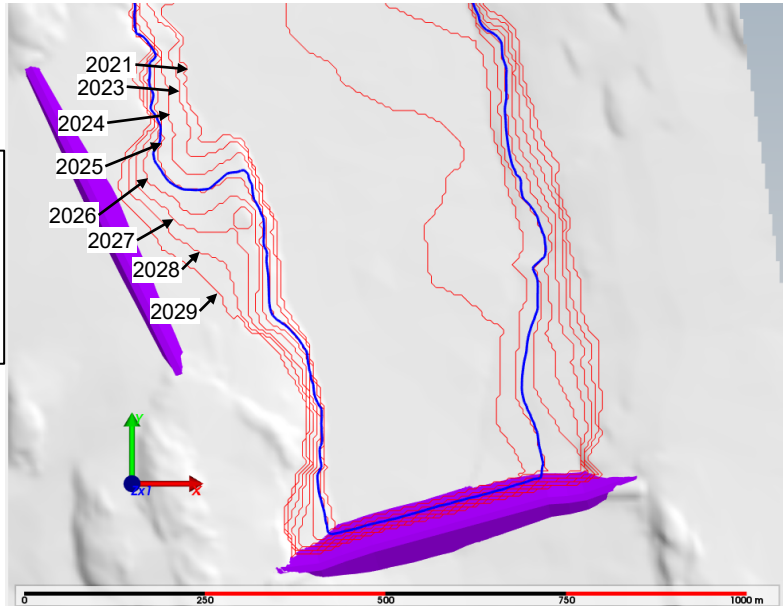
Year	Total Tailings Deposited after December 2020 (m3)	Estimated* Total Tailings Deposited after December 2020 (tonnes)	South Dam Deposition Elevation (m)
End of 2020	0	0	35.2 (current)
End of 2021	576,000	443,000	36.1
End of 2022	1,160,000	892,000	36.1 (no deposition off dam)
End of 2023	1,744,000	1,342,000	37.3
End of 2024	2,912,000	2,240,000	38.8
End of 2025	4,080,000	3,138,000	40.0
End of 2026	5,248,000	4,037,000	41.0
End of 2027	6,416,000	4,935,000	41.9
End of 2028	7,584,000	5,834,000	42.6

*Assuming 1.3 t/m^3 dry density for deposited tailings

South Dam Phase 1 tailings FSL = 36.5 m. South Dam should be raised in 2022

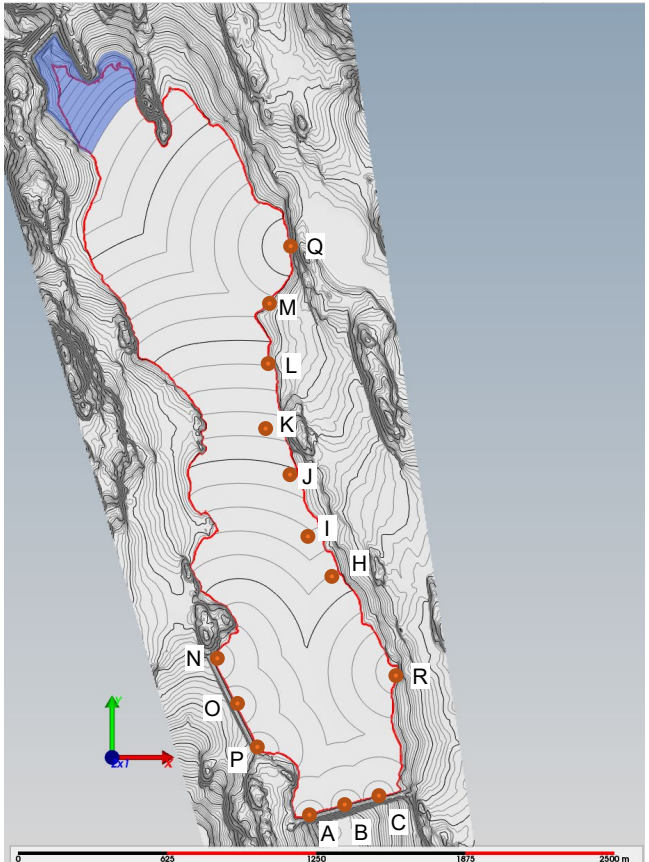
West Dam key trench base min elevation = 37 masl
Tailings reach 37 masl around West Dam in 2025

At the end of 2025, the tailing beach will be ~ 65m away from the proposed West Dam footprint



Scenario 2B
LOM Deposition

0.5% Sub-Aerial
1.5% Sub-Aqueous
Pond Elevation at 33.5 masl
1,600/3,200 t/day deposition rate



- Deposition modeled until the end of 2037
- Total tailings deposited (start of 2021 – end of 2037) = 18.1 Mt
- Pond Volume at 33.5 masl = 209,000 m3

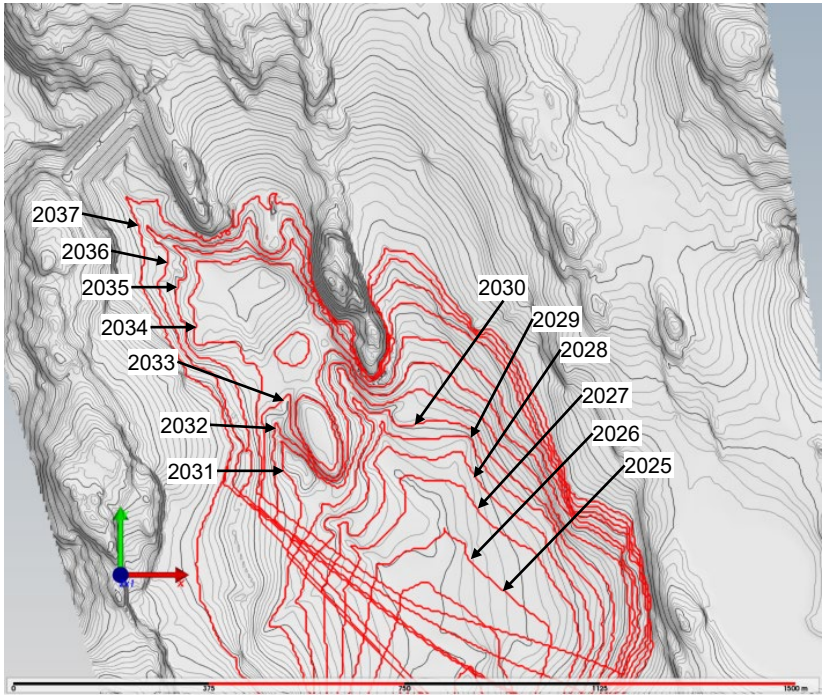
Year	Season	Spigot(s)
2022	Full	I
2023	Summer	A+B+C
2023	Winter	I
2024	Summer	A+B+C
2024	Winter	J
2025	Summer	A+B+C
2025	Winter	K
2026	Summer	A+B+C
2026	Winter	K
2027	Summer	A+B+C
2027	Winter	L
2028	Summer	A+B+C
2028	Winter	L
2029	Summer	A+B+C
2029	Winter	L
2030	Summer	A+B+C
2030	Winter	L
2031	Summer	A+B+C
2031	Winter	M
2032	Summer	N+O+P
2032	Winter	M
2033	Summer	N+O+P
2033	Winter	M
2034	Summer	R
2034	Winter	Q
2035	Summer	R
2035	Winter	Q
2036	Summer	N+O+P
2036	Winter	Q
2037	Summer	N+O+P
2037	Winter	Q

Scenario 2B - LOM Deposition Tailings Footprint around ND

0.5% Sub-Aerial
1.5% Sub-Aqueous
Pond Elevation at 33.5 masl
1,600/3,200 t/day deposition rate

Year End	Pond Volume* (m^3)
2021	5,019,000
2022	5,619,000
2023	5,405,000
2024	5,000,000
2025	4,608,000
2026	4,222,000
2027	3,850,000
2028	3,447,000
2029	3,021,000
2030	2,585,000
2031	2,138,000
2032	1,597,000
2033	1,184,000
2034	877,000
2035	572,000
2036	360,000
2037	209,000

* At 32.5 masl in 2021 and 33.5 masl (FSL) for 2022 and onward



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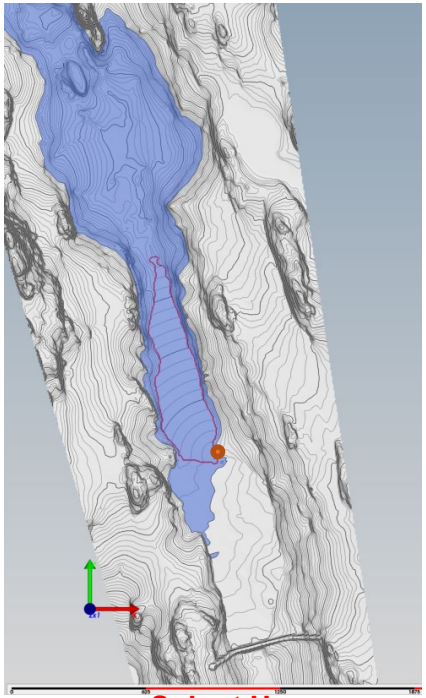
Scenario 3A
2021 Deposition Plan

0.5% Sub-Aerial
1.0% Sub-Aqueous
Pond Elevation at 32.5 masl
2,000 t/day deposition rate

Jan 2021 – Jun 2021

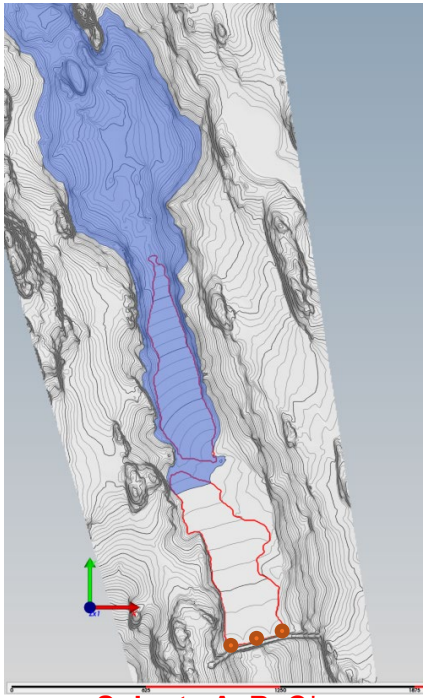
(360,000 tonnes)



Spigot H
Deposition elevation: 32.6 m

Jul 2021 – Oct 2021

(240,000 tonnes)

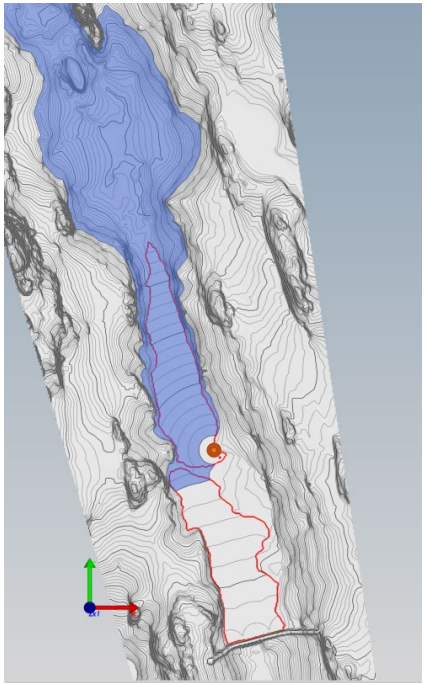


Spigots A, B, C*
Deposition elevation: 36.3 m

* Spigot C moved more to east to avoid ponding on the east side of the dam

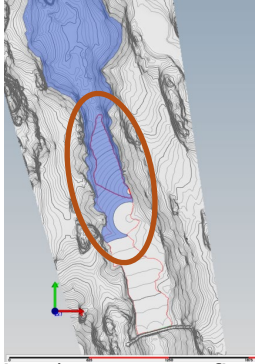
Nov 2021 – Dec 2021

(120,000 tonnes)



Spigot H
Deposition elevation: 32.8 m

Scenario 3B LOM Deposition



0.5% Sub-Aerial
1.0% Sub-Aqueous
Pond Elevation at 33.5 masl
2,000/4,000 t/day deposition rate

- In 2022, only deposit from Spigot I
- 2023 and onwards:
  - 7 months deposited from Spigots A+B+C (Summers)
  - 5 months deposited from Spigot I and move north (J, K, L …) to prevent flow cut off (Winters)

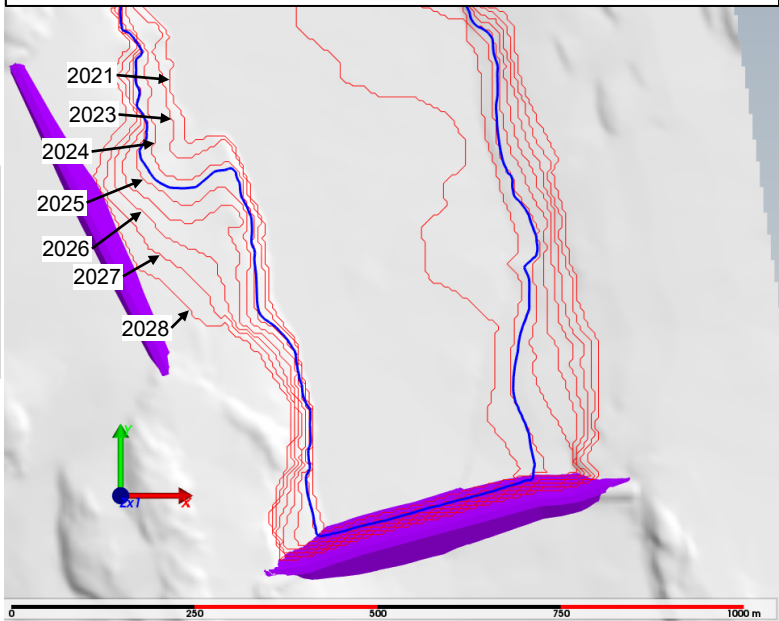
Year	Total Tailings Deposited after December 2020 (m3)	Estimated* Total Tailings Deposited after December 2020 (tonnes)	South Dam Deposition Elevation (m)
End of 2020	0	0	35.2 (current)
End of 2021	554,000	720,000	36.3
End of 2022	1,115,000	1,450,000	36.3 (no deposition off dam)
End of 2023	1,677,000	2,180,000	37.6
End of 2024	2,800,000	3,640,000	39.4
End of 2025	3,923,000	5,100,000	40.7
End of 2026	5,046,000	6,560,000	41.7
End of 2027	6,169,000	8,020,000	42.5
End of 2028	7,292,000	9,480,000	43.2

*Assuming 1.3 t/m^3 dry density for deposited tailings

South Dam Phase 1 tailings FSL = 36.5 m. South Dam should be raised in 2022

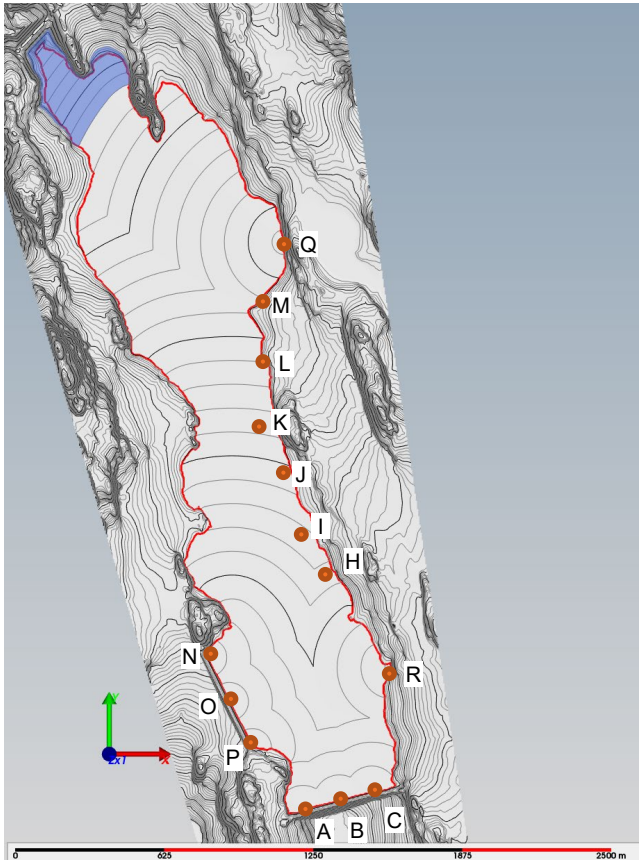
West Dam key trench base min elevation = 37 masl
Tailings reach 37 masl around West Dam in 2024-2025

At the end of 2025, the tailing beach will be ~ 55m away from the proposed West Dam footprint



Scenario 3B
LOM Deposition

0.5% Sub-Aerial
1.0% Sub-Aqueous
Pond Elevation at 33.5 masl
2,000/4,000 t/day deposition rate



- Deposition modeled until the end 2034
- Total tailings deposited (start of 2021 – end of 2034) = 18.2 Mt
- Pond Volume at 33.5 masl = 133,000 m3

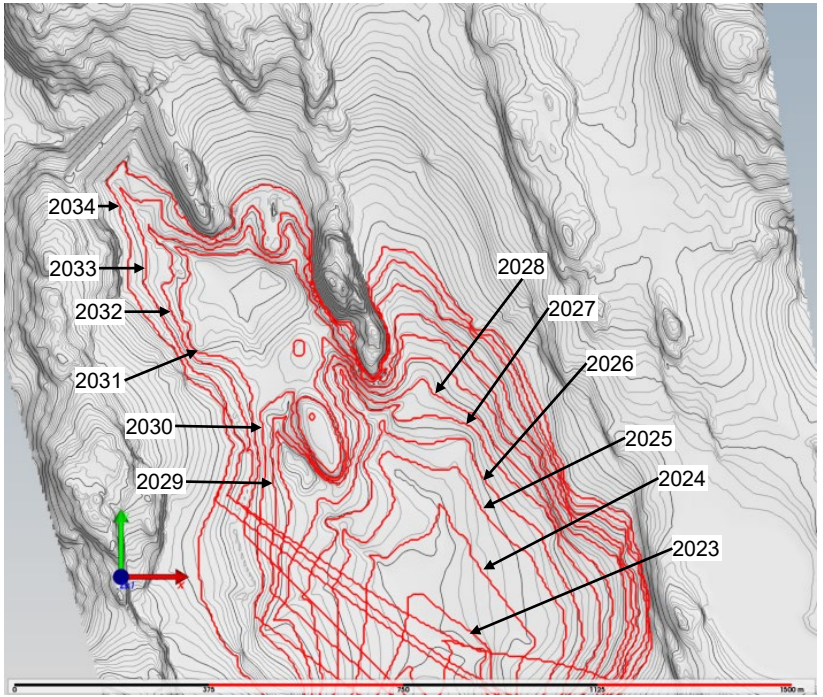
Year	Season	Spigot(s)
2022	Full	I
2023	Summer	A+B+C
2023	Winter	I
2024	Summer	A+B+C
2025	Winter	J
2025	Summer	A+B+C
2026	Winter	K
2026	Summer	A+B+C
2027	Winter	K
2027	Summer	A+B+C
2028	Winter	L
2028	Summer	A+B+C
2029	Winter	L
2029	Summer	A+B+C
2030	Winter	M
2030	Summer	A+B+C
2031	Winter	M
2031	Summer	N+O+P
2032	Winter	M
2032	Summer	R
2033	Winter	Q
2033	Summer	N+O+P
2034	Winter	Q
2034	Summer	N+O+P

Scenario 3B - LOM Deposition Tailings Footprint around ND

0.5% Sub-Aerial
1.0% Sub-Aqueous
Pond Elevation at 33.5 masl
2,000/4,000 t/day deposition rate

Year End	Pond Volume* (m^3)
2021	4,933,000
2022	5,417,000
2023	5,132,000
2024	4,634,000
2025	4,131,000
2026	3,604,000
2027	3,039,000
2028	2,464,000
2029	1,907,000
2030	1,404,000
2031	921,000
2032	565,000
2033	295,000
2034	133,000

* At 32.5 masl in 2021 and 33.5 masl (FSL) for 2022 and onward



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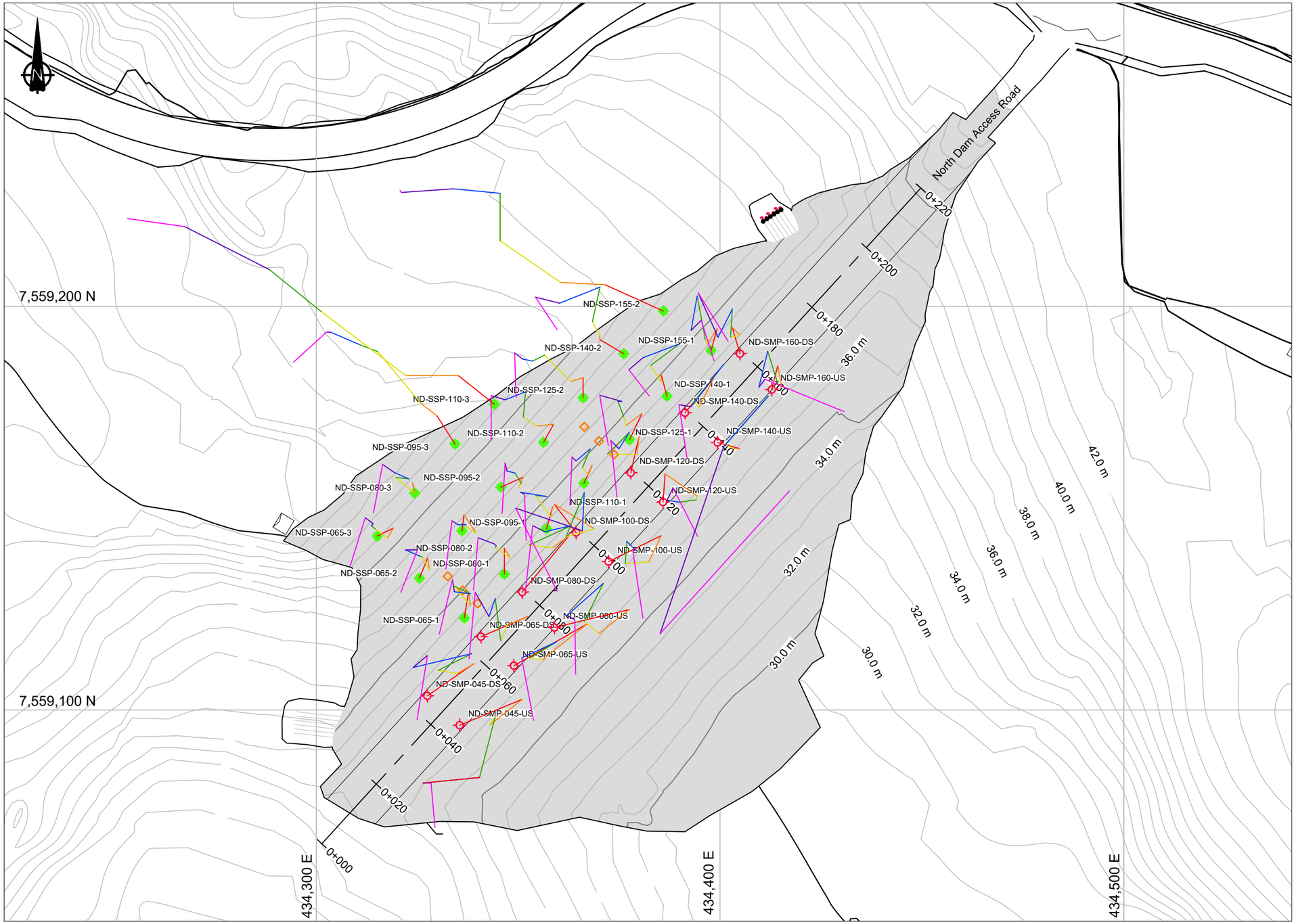
Appendix M North Dam Deformation Checks



LEGEND

- Surficial Survey Point As-Built
- Survey Monitoring Point (Crest) As-Built
- Inclinometer Location
- Surficial Displacement (Sep 2013 to Sep 2014)
- Surficial Displacement (Sep 2014 to Sep 2015)
- Surficial Displacement (Sep 2015 to Sep 2016)
- Surficial Displacement (Sep 2016 to Sep 2017)
- Surficial Displacement (Sep 2017 to Sep 2018)
- Surficial Displacement (Sep 2018 to Sep 2019)
- Surficial Displacement (Sep 2019 to Sep 2020)

REFERENCE

NAD83UTM Zone 13.

NOTES

1. Vectors originate from as-built survey points.
2. Plotted displacement vectors are exaggerated 500x.
3. Typical surveys completed by total station are expected to have a total error of less than 10mm. Errors in setup or lack of back-sight checks may increase this error. There is a potential for compounding of error between the surveys.

0mm 2 4 6 8
Displacement Vectors

0m 10 20 30 40
Plan View

srk consulting

SRK JOB NO.: 1CT022.057
FILE NAME: NorthDam_DsiplacementVectors_Yearly_wIncl.dwg

AGNICO EAGLE

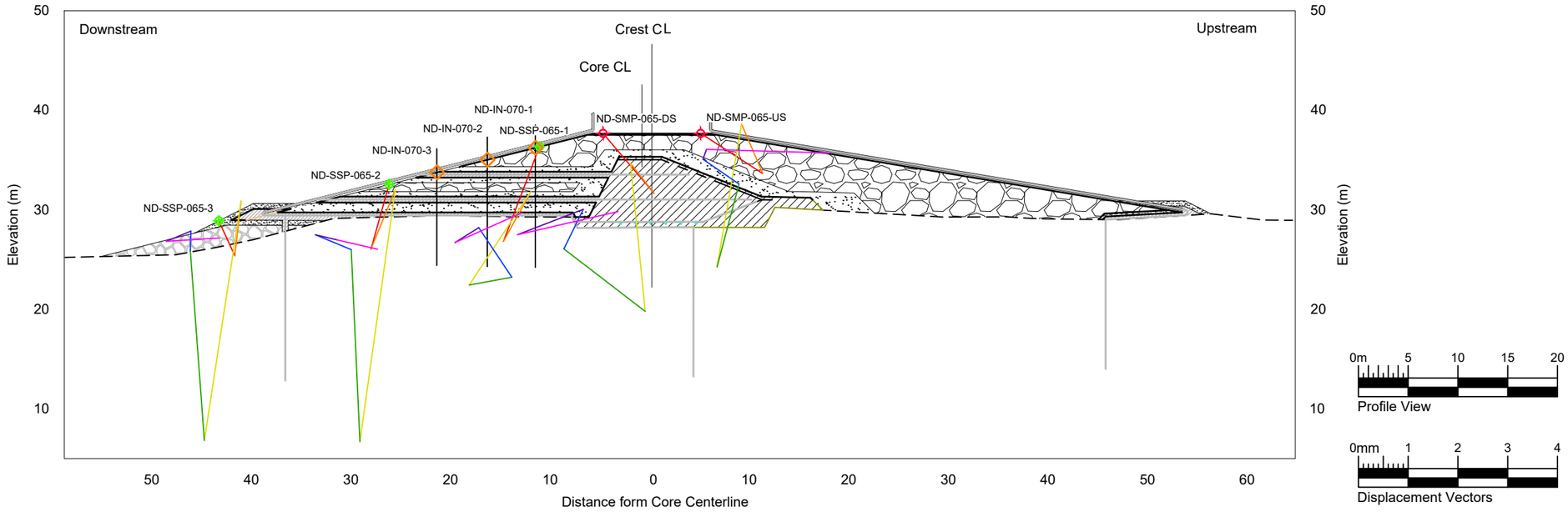
Hope Bay Project

2020 Annual Geotechnical Inspection

North Dam
Yearly Displacement Vector Plots
Plan View

DATE:	APPROVED:	FIGURE:
Mar 2021	PDL	M.1

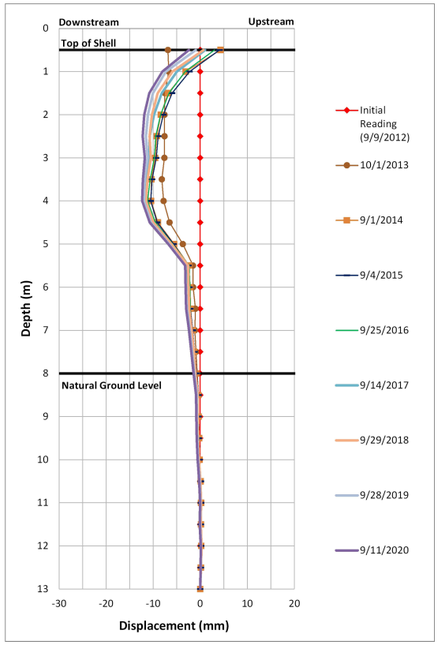
J:\01_SITES\Hope Bay\1CT022.057_2020 Geotechnical Investigations\NorthDam_DisplacementVectors\Working\NorthDam_DsiplacementVectors_Yearly_wIncl.dwg



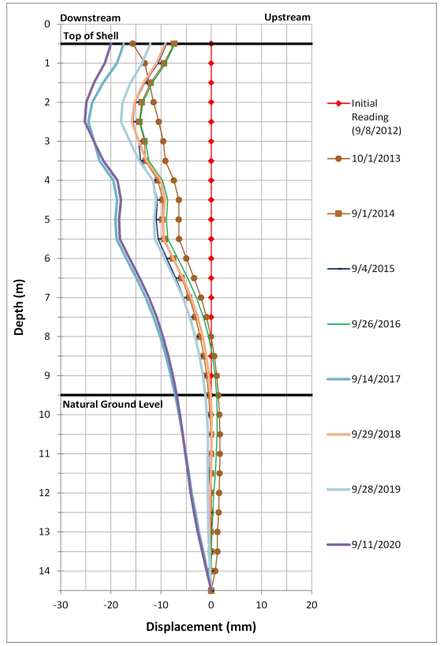
LEGEND

- Ground Temperature Cable
- Core Material
- Transition Material
- Run of Quarry (ROQ) Material
- Surficial Survey Point
- Survey Monitoring Point (Crest)
- Inclinometer Location
- Surficial Displacement (Sep 2013 to Sep 2014)
- Surficial Displacement (Sep 2014 to Sep 2015)
- Surficial Displacement (Sep 2015 to Sep 2016)
- Surficial Displacement (Sep 2016 to Sep 2017)
- Surficial Displacement (Sep 2017 to Sep 2018)
- Surficial Displacement (Sep 2018 to Sep 2019)
- Surficial Displacement (Sep 2019 to Sep 2020)

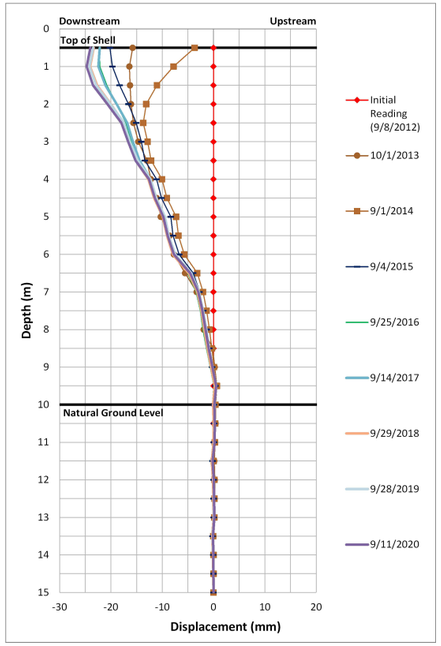
STA 0+060



ND-IN-070-3
Displacement Perpendicular to Centerline



ND-IN-070-2
Displacement Perpendicular to Centerline



ND-IN-070-1
Displacement Perpendicular to Centerline

NOTES

1. Vectors originate from as-built survey points.
2. Plotted displacement vectors are exaggerated 500x.
3. Typical surveys completed by total station are expected to have a total error of less than 10mm. Errors in setup or lack of back-sight checks may increase this error. There is a potential for compounding of error between the surveys.
4. Inclinometer manufacturer's accuracy is +/- 0.25 mm per location.

J:\01_SITES\Hope Bay\1CT022.057_2020 Geotechnical Investigations\NorthDam_DisplacementVectors\Working\NorthDam_DisplacementVectors_Yearly_wIncl.dwg

srk consulting

AGNICO EAGLE

SRK JOB NO.: 1CT022.057

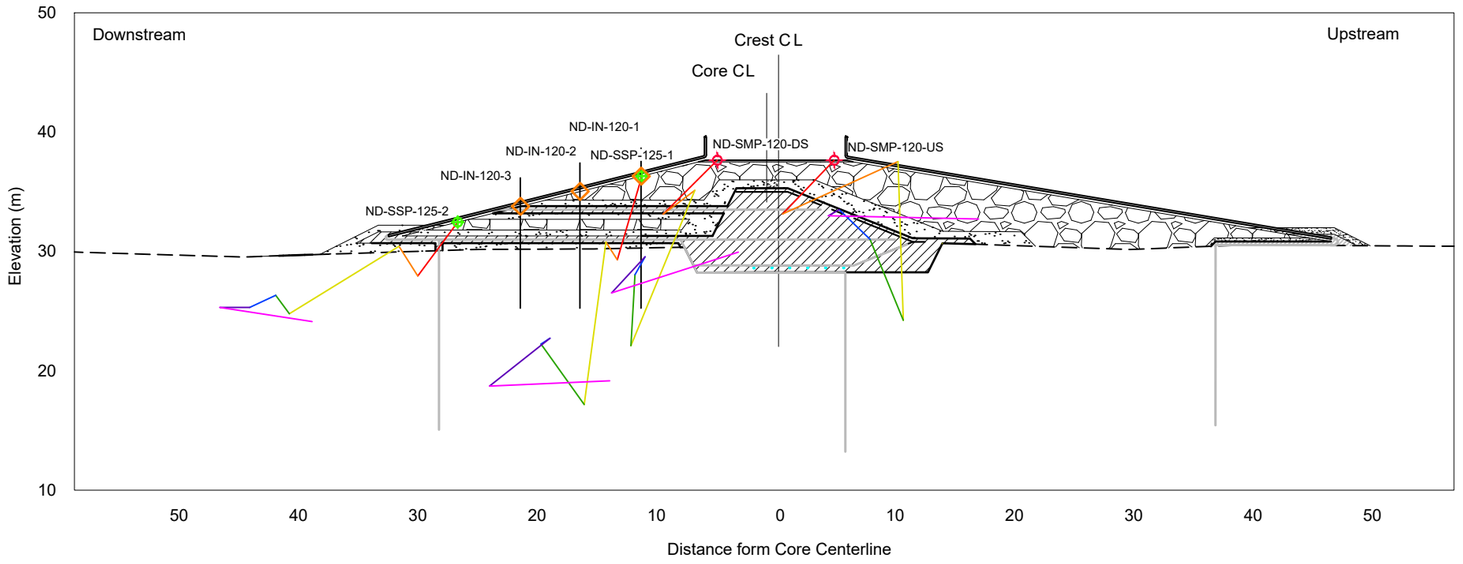
FILE NAME: NorthDam_DsiplacementVectors_Yearly_wIncl.dwg

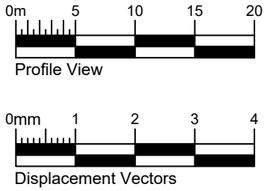
Hope Bay Project

2020 Annual Geotechnical Inspection

North Dam
Yearly Displacement Vector Plots
Profile - STA 0+060

DATE:	APPROVED:	FIGURE:
Mar 2021	PDL	M.2

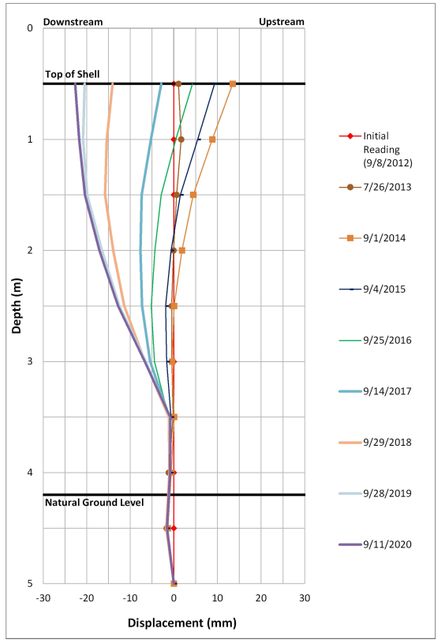




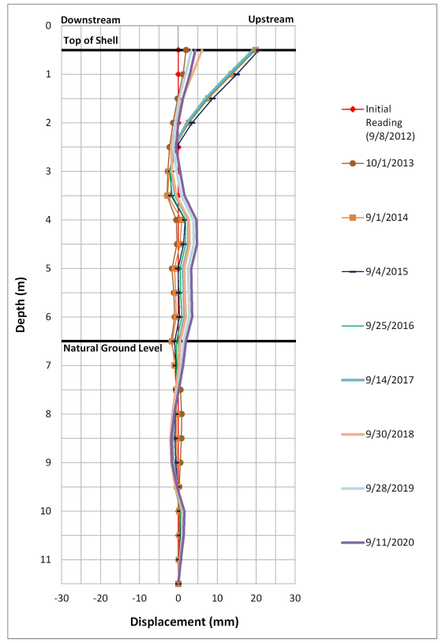
LEGEND

- Ground Temperature Cable
- Core Material
- Transition Material
- Run of Quarry (ROQ) Material
- Surficial Survey Point
- Survey Monitoring Point (Crest)
- Inclinometer Location
- Surficial Displacement (Sep 2013 to Sep 2014)
- Surficial Displacement (Sep 2014 to Sep 2015)
- Surficial Displacement (Sep 2015 to Sep 2016)
- Surficial Displacement (Sep 2016 to Sep 2017)
- Surficial Displacement (Sep 2017 to Sep 2018)
- Surficial Displacement (Sep 2018 to Sep 2019)
- Surficial Displacement (Sep 2019 to Sep 2020)

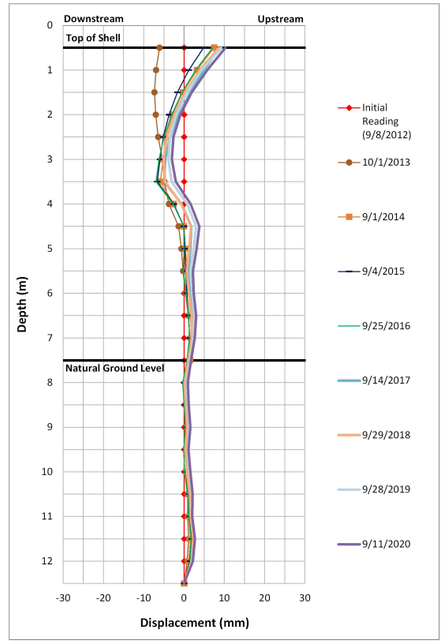
STA 0+130



ND-IN-120-3
Displacement Perpendicular to Centerline



ND-IN-120-2
Displacement Perpendicular to Centerline



ND-IN-120-1
Displacement Perpendicular to Centerline

NOTES

1. Vectors originate from as-built survey points.
2. Plotted displacement vectors are exaggerated 500x.
3. Typical surveys completed by total station are expected to have a total error of less than 10mm. Errors in setup or lack of back-sight checks may increase this error. There is a potential for compounding of error between the surveys.
4. Inclinometer manufacturer's accuracy is +/- 0.25 mm per location.

J:\01_SITES\Hope Bay\1CT022.057_2020 Geotechnical Investigations\NorthDam_DisplacementVectors\Working\NorthDam_DsiplacementVectors_Yearly_wIncl.dwg

srk consulting

SRK JOB NO.: 1CT022.057
FILE NAME: NorthDam_DsiplacementVectors_Yearly_wIncl.dwg

AGNICO EAGLE

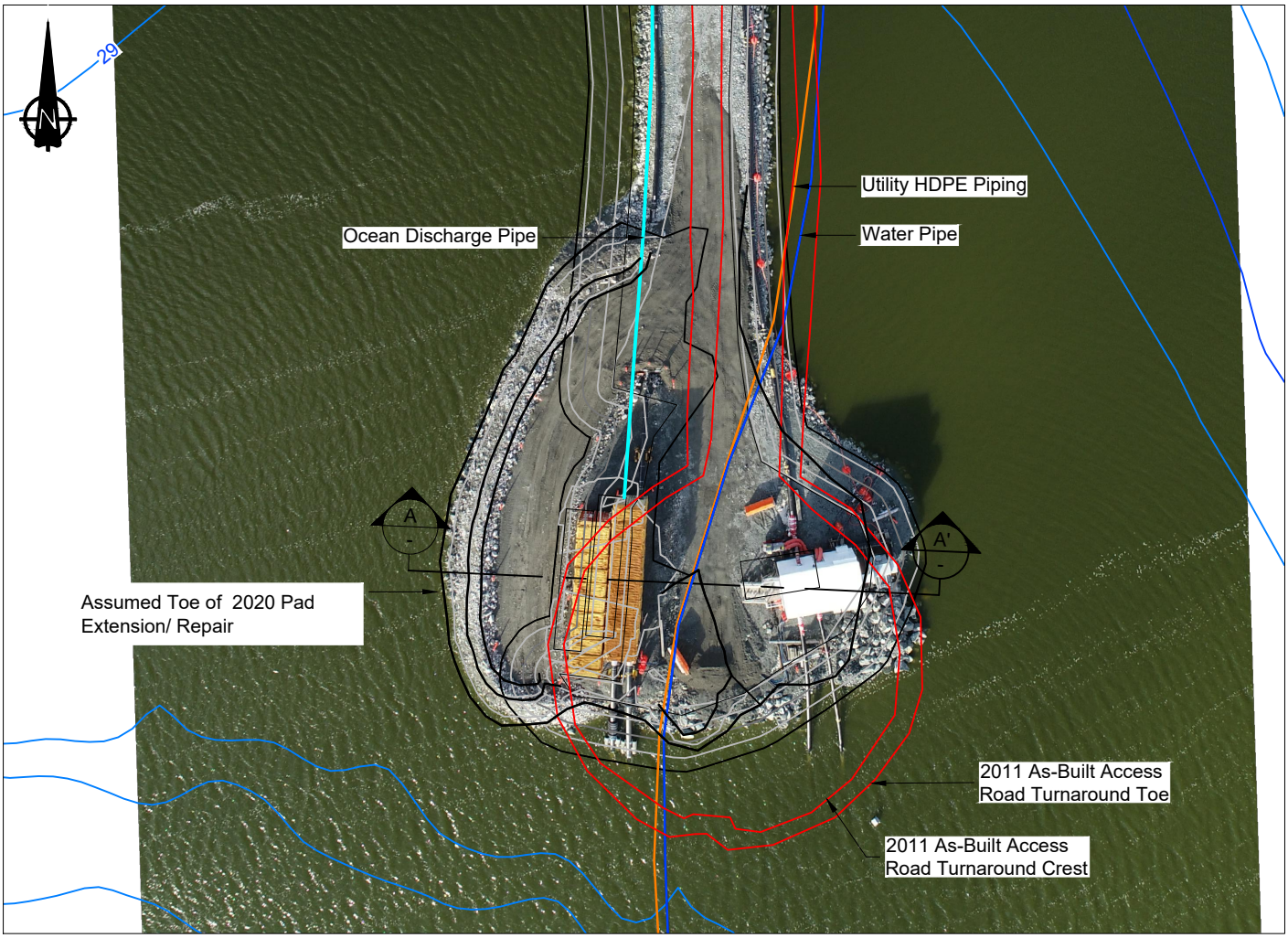
Hope Bay Project

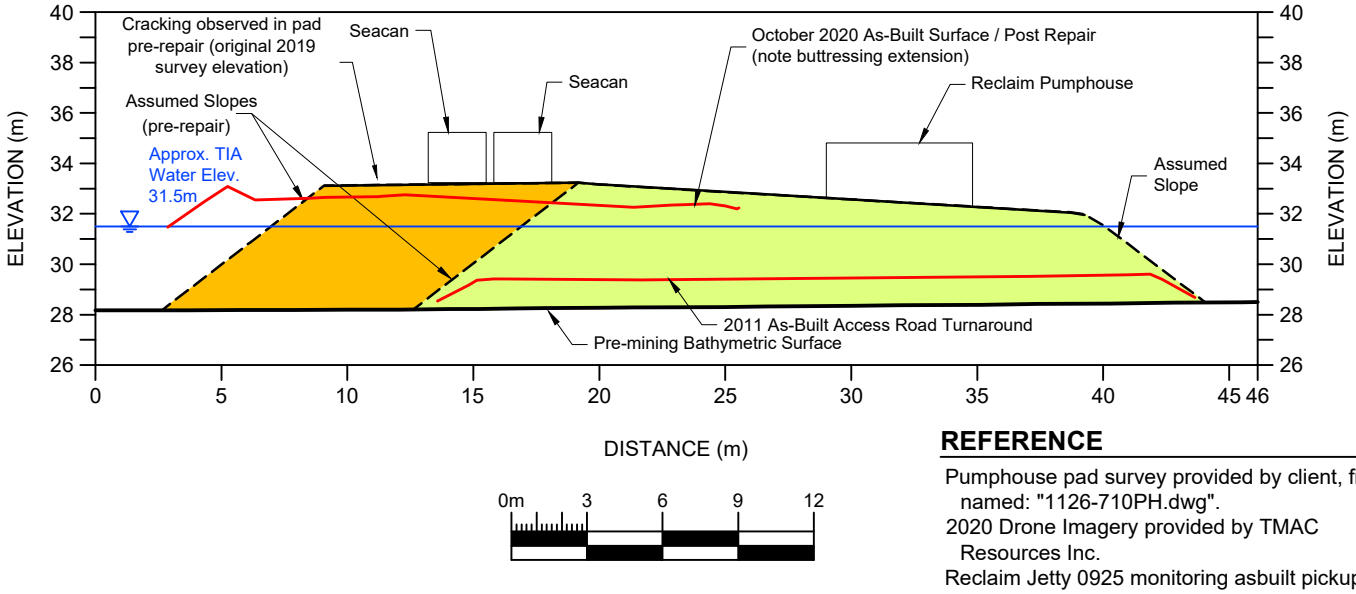
2020 Annual Geotechnical Inspection

North Dam
Yearly Displacement Vector Plots
Profiles - STA 0+130

DATE: Mar 2021 | APPROVED: PDL | FIGURE: M.3

Appendix N Reclaim Jetty Repair As-builts





REFERENCE

Pumphouse pad survey provided by client, file named: "1126-710PH.dwg".
2020 Drone Imagery provided by TMAC Resources Inc.
Reclaim Jetty 0925 monitoring asbuilt pickup.csv

srk consulting

TMAC RESOURCES

Hope Bay Project

Doris TIA

710 Pumphouse Pad
As-Built Layout and Section

SRK JOB NO.:	1CT022.064
FILE NAME:	October 2020.dwg

DATE:	APPROVED:	FIGURE:
October 2020	JBK	1

P:\Projects\01_SITES\Hope Bay\IACAD\As-Builts\TIA Reclaim Jetty\October 2020.dwg

srk consulting

Hope Bay Project

710 Pumphouse Pad - Reclaim Jetty

AGNICO EAGLE

Surficial Settlement Monitoring Points

The most recent survey date **11/21/2020**

Vertical displacement[1] (cm) from last four surveys:

	Post Remediation	Pre Remediation [2]
RJ-SSM-R1 [3]	Destroyed	-8.5
RJ-SSM-R2 [3]	Destroyed	-20.6
RJ-SSM-R3 [4]	Destroyed	-21
RJ-SSM-R3-New [4]	0.7	n/a
RJ-SSM-R4 [4]	Destroyed	-21.3
RJ-SSM-R4-New [4]	0.4	n/a
RJ-SSM-R5 [4]	Destroyed	-20.7
RJ-SSM-R5-New [4]	-0.3	n/a
RJ-SSM-R6	-4.3	-14.0
RJ-SSM-R7	-2.3	-2.1
RJ-SSM-R8	-2.8	-13.1
RJ-SSM-R9	-2.2	-10.7
RJ-SSM-R10	-3.3	-8.3

	Post Remediation	Pre Remediation [2]
RJ-SSM-S1	3.5	-13.9
RJ-SSM-S2	0.1	-11.7
RJ-SSM-S3 [5]	Destroyed	-10.8
RJ-SSM-S4	n/a	n/a
RJ-SSM-S5	2.5	-11.7
RJ-SSM-S6	n/a	n/a
RJ-SSM-S7	3.1	-6.2
RJ-SSM-S8	-2.2	-2.7

Horizontal displacement (cm) from last four surveys:

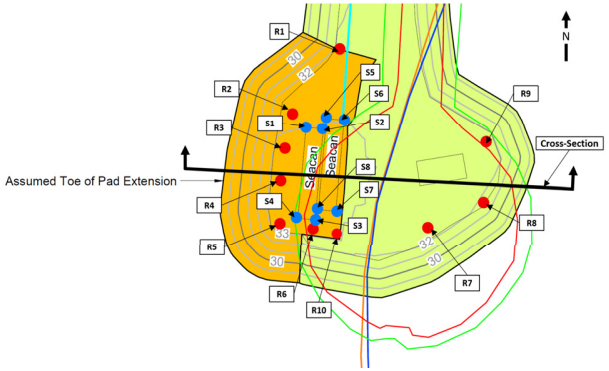
	Post Remediation	Pre Remediation [2]
RJ-SSM-R1 [3]	Destroyed	6.0
RJ-SSM-R2 [3]	Destroyed	10.4
RJ-SSM-R3 [4]	Destroyed	11.5
RJ-SSM-R3-New [4]	2.2	n/a
RJ-SSM-R4 [4]	Destroyed	9.4
RJ-SSM-R4-New [4]	2.8	n/a
RJ-SSM-R5 [4]	Destroyed	8.0
RJ-SSM-R5-New [4]	4.7	4.7
RJ-SSM-R6	5.9	9.0
RJ-SSM-R7	6.4	2.6
RJ-SSM-R8	4.6	14.1
RJ-SSM-R9	2.3	9.1
RJ-SSM-R10	1.8	9.8

	Post Remediation	Pre Remediation [2]
RJ-SSM-S1	2.5	11.2
RJ-SSM-S2	6.5	7.5
RJ-SSM-S3 [5]	Destroyed	9.8
RJ-SSM-S4	n/a	n/a
RJ-SSM-S5	1.4	10.5
RJ-SSM-S6	n/a	n/a
RJ-SSM-S7	5.0	10.6
RJ-SSM-S8	5.1	4.7

Total Displacement (cm) from last four surveys:

	Post Remediation	Pre Remediation [2]
RJ-SSM-R1 [3]	Destroyed	10.4
RJ-SSM-R2 [3]	Destroyed	23.1
RJ-SSM-R3 [4]	Destroyed	23.9
RJ-SSM-R3-New [4]	2.3	n/a
RJ-SSM-R4 [4]	Destroyed	23.3
RJ-SSM-R4-New [4]	2.8	n/a
RJ-SSM-R5 [4]	Destroyed	22.2
RJ-SSM-R5-New [4]	4.7	n/a
RJ-SSM-R6	7.3	16.6
RJ-SSM-R7	6.8	3.3
RJ-SSM-R8	5.4	19.2
RJ-SSM-R9	3.2	14.1
RJ-SSM-R10	3.8	12.8

	Post Remediation	Pre Remediation [2]
RJ-SSM-S1	4.3	17.8
RJ-SSM-S2	6.5	13.9
RJ-SSM-S3 [5]	Destroyed	14.6
RJ-SSM-S4	n/a	n/a
RJ-SSM-S5	2.9	15.7
RJ-SSM-S6	n/a	n/a
RJ-SSM-S7	5.9	12.3
RJ-SSM-S8	5.5	5.4

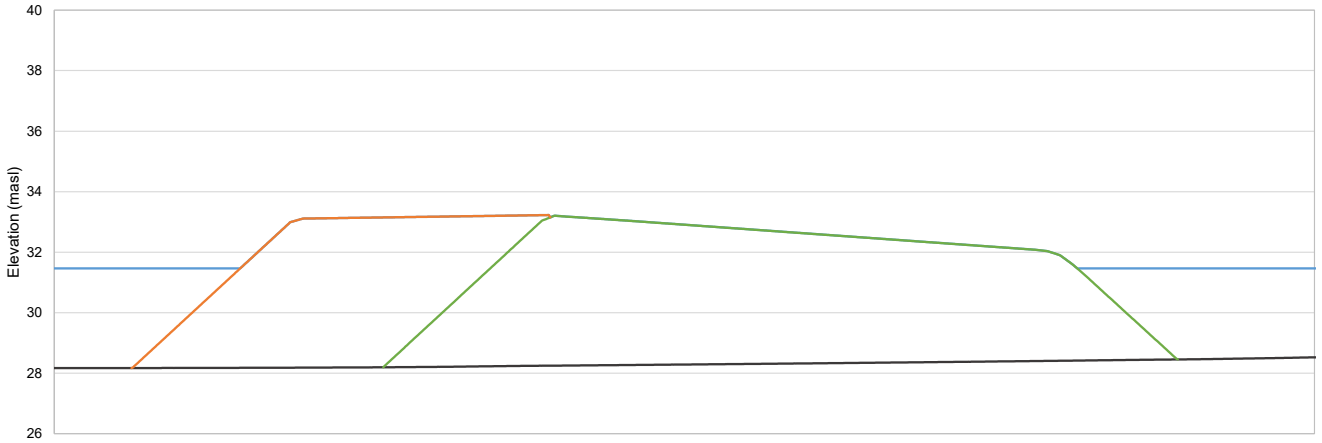


Note:

1. Negative vertical displacement indicates settlement
2. Remediation works were completed in September 2020
3. Points have not been surveyed since Aug 30. Either buried or destroyed during remediation works.
4. Points have not been surveyed since From Sep 10 to Nov 3. Reinstalled to facilitate remediation works.
5. No data has been received since the remediation works. Assumed destroyed.

- Within normal performance (<5 cm)
- Check is required (>5 cm)
- Concerning level of displacement (>10 cm)
- Immediate action is required (>15 cm)

TIA Water Level



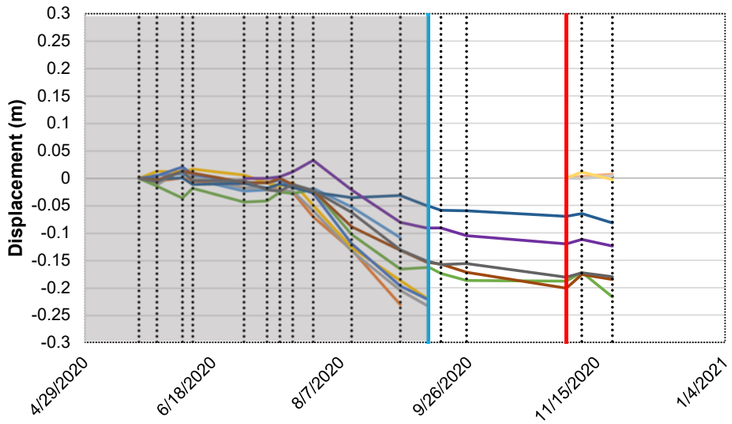
Water Level Survey Date **9/25/2020**

Surveyed Water Level **31.5** masl

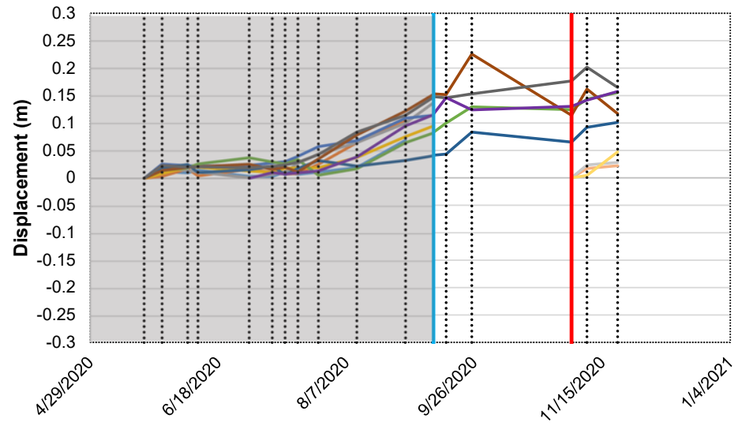
Attachments:

- 710 Pumphouse Pad surficial settlement monitoring plan and settlement monitoring results

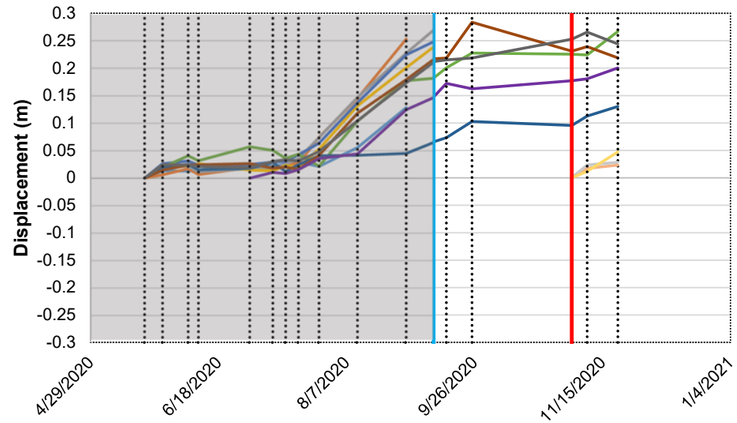
Vertical Displacement



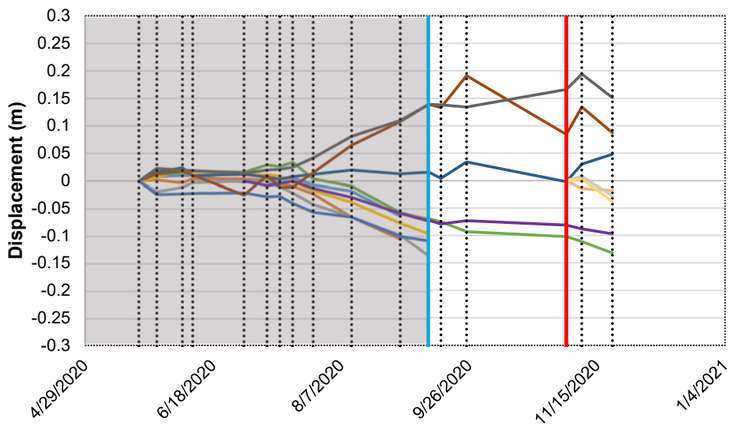
Horizontal Displacement



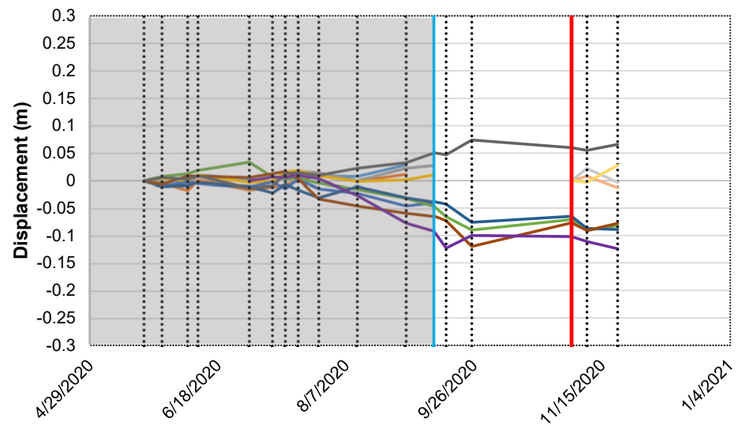
Total Displacement

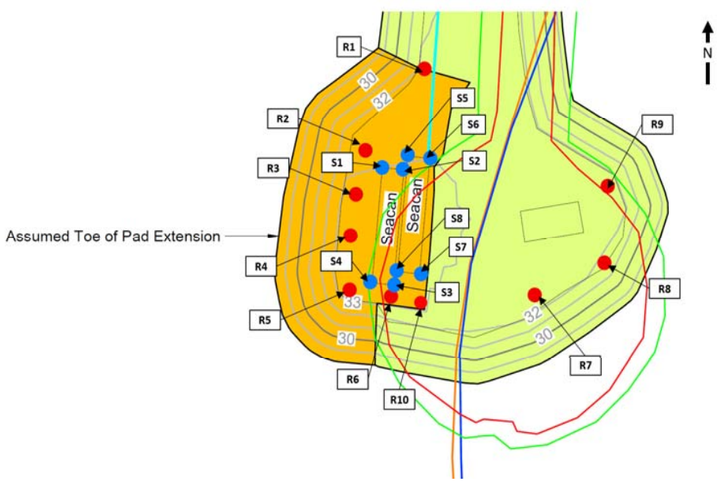


Change in Easting



Change in Northing





LEGEND:

- RJ-SSM-R1
- RJ-SSM-R2
- RJ-SSM-R3
- RJ-SSM-R3-New
- RJ-SSM-R4
- RJ-SSM-R4-New
- RJ-SSM-R5
- RJ-SSM-R5-New
- RJ-SSM-R6
- RJ-SSM-R7
- RJ-SSM-R8
- RJ-SSM-R9
- RJ-SSM-R10
- Survey Date
- Approximate Start of Jetty Repairs
- New Monument Installation

NOTES:

1. RJ-SSM-R1 and RJ-SSM-R2 have not been surveyed since Aug 30. Either buried or destroyed during remediation works.

2. RJ-SSM-R3, RJ-SSM-R4 and RJ-SSM-R5 have not been surveyed since Sep 10. Moved out to facilitate remediation works.

srk consulting

Job No: 1CT022.057

Filename: RF_SurveyMonitoringData_for2020AGI.xlsx

AGNICO EAGLE

Hope Bay Project

2020 AGI - 710 Pumphouse Pad

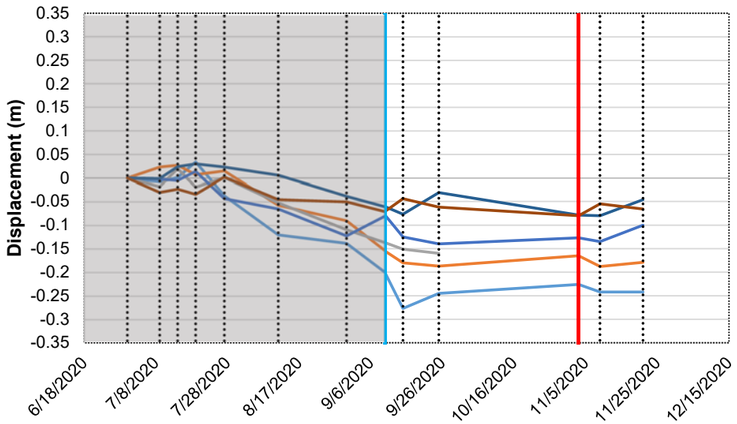
Surficial Settlement Monitoring Point (Rock Bolt) Displacement Timeseries

Date: March 2021

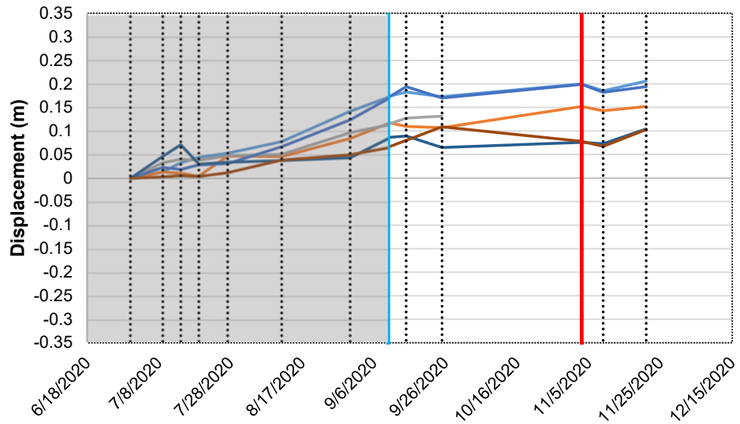
Approved: JBK

Figure: **X.X**

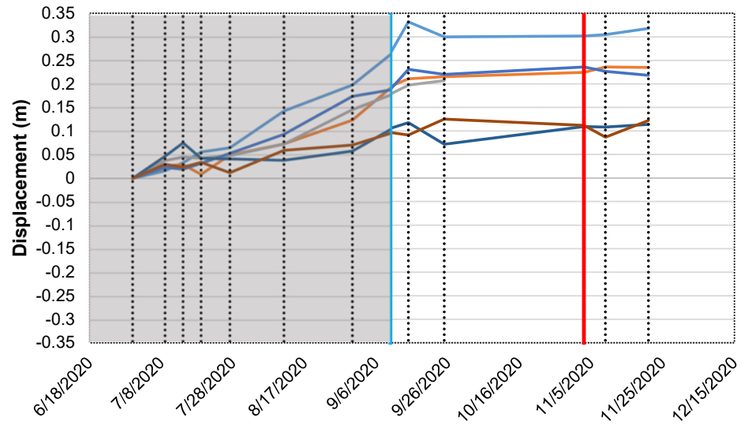
Vertical Displacement



Horizontal Displacement



Total Displacement



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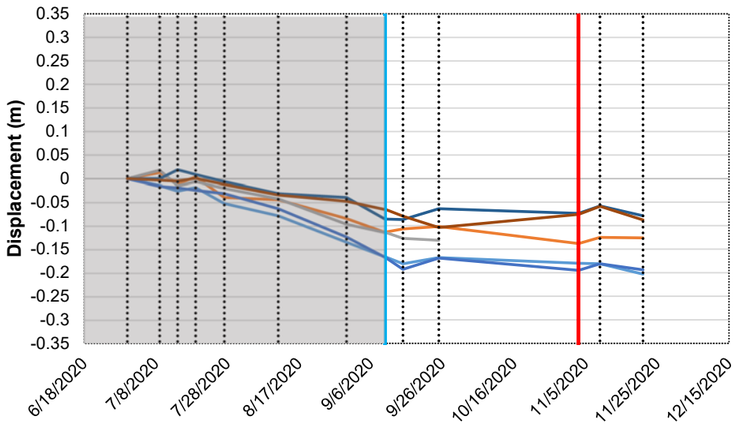
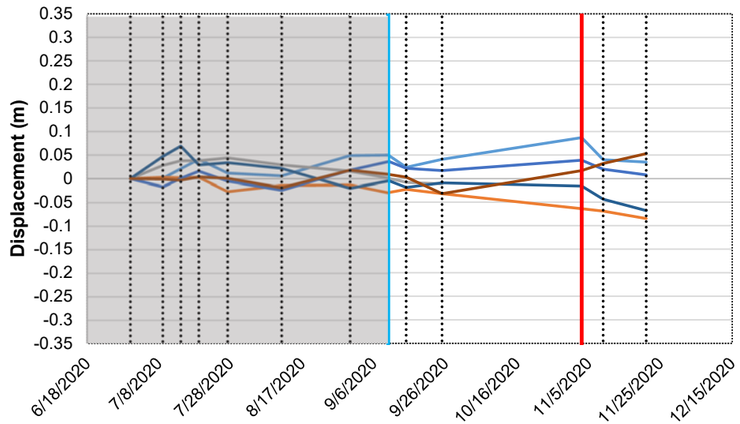
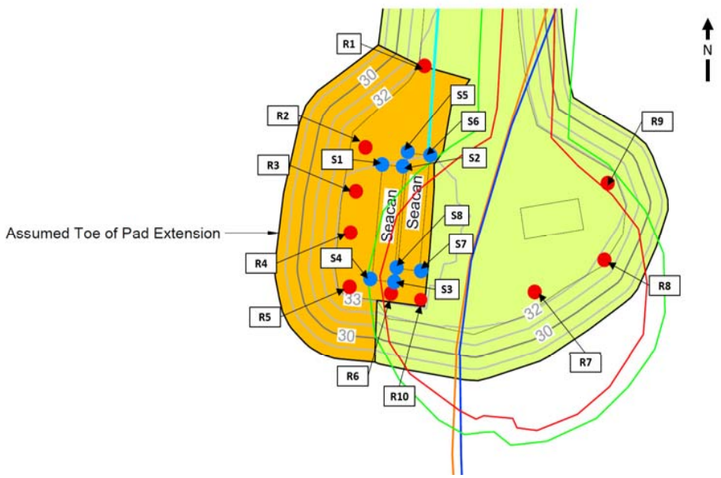


Change in Northing





LEGEND:

- RJ-SSM-S1
- RJ-SSM-S2
- RJ-SSM-S3
- RJ-SSM-S4
- RJ-SSM-S5
- RJ-SSM-S7
- RJ-SSM-S8
- Survey Date
- Approximate Start of Jetty Repairs
- New Monument Installation

NOTES:

1. June 30, 2020 survey is set as the baseline.
2. No new monuments were installed on seacan locations

srk consulting	AGNICO EAGLE	**2020 AGI - 710 Pumphouse Pad**
Job No: 1CT022.057 Filename: RJ_SurveyMonitoringData_for2020AGI.xlsx	**Hope Bay Project**	**Surficial Settlement Monitoring Point (Seacan) Displacement Timeseries**
		Date: March 2021 / Approved: JBK / Figure: **X.X**

Attachment 2

Recommendations and TMAC Responses – TIA (TMAC, 2021)

Table 1. 2020 Tailings Impoundment Area Annual Geotechnical Inspection Report Recommendations and TMAC Response

Table 1: TMAC Response to 2020 AGI Recommendations

Inspection Item	2019 Recommendations (for reference)	2020 Recommendations	TMAC Response
	General TIA Management Recommendations		
Third Party Dam Safety Review	▪ Conduct an independent third-party Dam Safety Review for both the North and South Dams in the summer of 2021.	▪ Conduct an independent third-party Dam Safety Review (DSR) for both the North and South Dams in the summer of 2021. *Planning for this is in progress. An independent third-party Dam Safety Review is scheduled to be conducted for both the North and South Dams in summer of 2021 pending COVID-19 restrictions.*	TMAC has engaged Tetra Tech to conduct an independent third-party Dam Safety Review for both the North and South Dams in summer of 2021.
Tailings Operating, Maintenance and Surveillance (OMS) Manual and Emergency Response Plan (ERP)	▪ An update to the OMS manual is in progress by SRK and will be submitted by Q4, 2020. This update is aimed to be a notable improvement to the current OMS. This noted, additional updates are expected in Q3 and Q4 2020. The focus of the OMS updates in Q3 and Q4 will be further refinement of the Trigger Action Response Plans (TARPs). The OMS for this facility will be a 'living' document that is expected to be reviewed annually. ▪ TMAC should ensure all staff are properly informed and trained on the contents of the OMS Manual. ▪ *At the time of writing this report, TMAC was in the process of developing a standalone 'Hope Bay Project Dam Emergency Plan', rather than updates to the ERP, to address dam emergencies. It will incorporate inundation mapping and dam break scenarios. The standalone dam emergency plan will be released upon completion of the OMS update to ensure alignment.* An Emergency Reponses Plan exists for the site; however, this document was lacking sufficient detail for a specific emergency at the TIA, if one were to occur. In 2019 SRK visited site and held a session with site personnel to go over preliminary dam break inundation maps completed by SRK and to provide inputs into what should be included in the site ERP updates to ensure the TIA is	▪ A draft version of the 'Hope Bay Project Dam Emergency Plan' was completed by Hope Bay staff in 2021. This Dam Emergency Plan should be finalized by site and integrated with the into the OMS and TARP framework ▪ Once integrated, the suite of OMS, TARPs, ERP and Dam Emergency Plan should reviewed with all site operations annually and updated as necessary. ▪ All of these components should be reviewed against AEM's corporate tailings management system and updated tailings standards through a gap analysis to identify required updates. ▪ *A revised OMS was issued in 2020* ▪ *TARPs were developed for the TIA in Q4 2020. Further refinement based on site input to the TARPs and integration with OMS manual should be completed in 2021*	▪ The Hope Bay Dam Emergency Plan will be finalized and integrated into the OMS and TARP framework. ▪ The Dam Emergency Plan will be reviewed and updated annually as necessary. Additional refinement of the TARPs and integration with the Agnico Eagle tailings management system will occur in 2021. ▪ A review of this plan will be conducted with site operations personnel annually.

Inspection Item	2019 Recommendations (for reference)	2020 Recommendations	TMAC Response
	properly covered in this document. An update to the ERP is recommended in 2020 to provide additional details for the TIA.		
TIA Roles and Responsibilities	▪ TMAC must agree on the roles and responsibilities for the TIA, train and inform personnel of their duties, and operate the facility accordingly. This will be an ongoing recommendation that is expected to be repeated annually. The roles and responsibilities for the TIA will be defined in the OMS update, to be released in 2020.	▪ The roles and responsibilities for the TIA are defined in the OMS update and must be updated with any changes in AEM's corporate structure.	▪ The roles and responsibilities for the TIA will be reviewed in 2021 and the OMS will be revised as necessary.
Compliance with Monitoring Requirements	▪ Conduct monitoring in accordance with the Monitoring SOP, paying attention to those areas where conformance is not consistently met. ▪ Update the Monitoring SOP to include South Dam monitoring requirements. SRK is currently preparing a separate SOP for the South Dam, and one already exists for the North Dam. A draft version of the South Dam SOP was submitted to TMAC in June 2020 and a final version is expected in July 2020.	▪ Conduct monitoring in accordance with the specified frequency in the Monitoring SOP and OMS. If changes in the monitoring frequency are required due to new operating schedules these must be proposed to and approved by the EOR. ▪ The North and South Dam Monitoring SOPs were updated in 2020. An additional update should be completed following any notable updates to the Tailings Management System.	▪ TMAC will continue to conduct monitoring in accordance with the Monitoring SOP and OMS.
North Dam Inspection and Review of Monitoring Data			
Ground Temperature Cables (GTCs)	▪ There are no specific recommendations for the installed GTCs. However, TMAC should aim to improve performance tracking of the dataloggers at the South Dam and check to see if cables are being damaged by wildlife after spring melt in order to confirm that current cable protection is adequate.	▪ No recommendations. ▪ Consider implementing satellite telemetry for the North Dam data loggers to allow daily transmission of the measurements rather than manual downloads. This would be a more proactive approach rather than a requirement at this time.	N/A
Thermosyphons	▪ The 2018 recommendations were completed in 2019 and Arctic Foundations Canada (AFC) visited the site for an inspection. Additional details are provided in this 2019 AGI (see Appendix A).	▪ No recommendations.	N/A
CR1000 Datalogger Battery Voltage	▪ The external CR1000 datalogger batteries should continue to be monitored and recharged annually or replaced as needed.	▪ The external CR1000 datalogger batteries should continue to be monitored and recharged annually or replaced as needed. ▪ *The batteries have been recharged in March 2021.*	N/A
Inclinometers	▪ The inclinometer and associated readout device should be recalibrated every 3 years as per recommended best practice. SRK was aware that TMAC sent this instrument for recalibration	▪ The inclinometer probe and read-out were sent for recalibration and maintenance, but due to Covid-19 it was not possible to complete in 2020. The probe has and readout should be re-	▪ The slope inclinometer probe and read-out box were sent to the manufacturer for recalibration in February 2021.

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	but due to COVID-19, the instrument calibration was unable to be performed and had to be returned from the out of country manufacturers. This recommendation should be revisited before the spring of 2021.	sent to the manufacturer for recalibration and maintenance in 2021. ■ *Note that TMAC has informed SRK that the inclinometer probe has now been sent off site (sent off site Q1 2021) for recalibration and maintenance.*	
Survey Monitoring Points	■ Backfill the erosion around survey monitoring point ND−DSP−100 at the North Dam. ■ Continue to carefully observe the North Dam downstream shell settlement points ND-SSP-080-3 and ND-SSP-110-3 to determine if thaw settlement of the toe is causing undue deformation.	■ Backfill the erosion around survey monitoring point ND−DSP−100 at the North Dam. ■ Continue to carefully observe the North Dam downstream shell settlement points ND-SSP-080-3 and ND-SSP-110-3 to monitor for increased thaw settlement of the toe and undue deformation. ■ Installation of additional surficial survey points (SSP) on the upstream face of the North Dam to track deformation of the upstream face. These additional SSPs are recommended to better track the deformation of the upstream shell as foundation at the toe thaws due to elevated Reclaim Pond water levels. Note that this upstream foundation thaw is expected as per the original designs and there are no concerns with current thaw rate, however improved tracking of the displacement going forward will provide an early warning should adverse thaw conditions occur, and help ensure the dam design life is not being impacted.	■ Backfill of the erosion around survey monitoring point ND-DSP-100 at the North Dam will be completed in 2021. ■ TMAC will continue to monitor settlement points on the downstream shell of the North Dam to monitor for thaw settlement. ■ TMAC will discuss locations for additional SSP points on the upstream face of the North Dam and install additional locations as required.
Creep Displacement	■ None.	■ No recommendations.	N/A
Walkover Surveys	■ The required weekly walkover surveys at the North Dam are not being completed in accordance with the SOP. This is an important surveillance activity as defined in the OMS Manual and needs to be complied with.	■ Complete weekly walkover surveys at the North Dam in accordance with the Monitoring SOPs. This is an important surveillance activity as defined in the OMS Manual and needs to be complied with. *Since 2018 there has been an improvement in the frequency of the walk over surveys but additional surveys were still required to be in accordance with the SOPs.*	■ TMAC continues to strive to complete all weekly walkover surveys. This will continue in 2021 and in future.
North Dam Seepage Monitoring	■ Continue water quality monitoring of North Dam seepage according to the methods outlined in SRK (2018b) (this was completed in 2019). ■ Conduct at least one additional frost probe survey along the same transects in early	■ No recommendations. ■ Frost probe surveys are not required as part of the 2021 monitoring. If conditions change and a frost probe survey is required, the EOR will inform Hope Bay staff.	N/A

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	summer and early fall, following the same procedure as in 2018 and 2019. Based on current favourable results, SRK will revisit the requirements for the frost probe surveys as part of the 2020 AGI and determine if further surveys are required beyond 2020.		
AGI Physical Inspection	▪ None	▪ No recommendations.	N/A
	South Dam Inspection and Review of Monitoring Data		
Ground Temperature Cables (GTCs) and D405 Dataloggers	▪ Complete a walk over survey of the South Dam after spring melt and look for any exposed or damaged ground temperature cables. This will allow for preventative maintenance to be done if exposed cables are observed, which will help to limit the potential for damage from wildlife. ▪ SRK to further assess, if repairs are not possible, replacement of Ground Temperature Cables SD-VTS-155-US, SD-VTS-240-US and SD-VTS-240-DS will be required. ▪ Manually download data from each datalogger once annually or as specified by the EOR.	▪ GTCs provide thermal monitoring of the dam to ensure conditions remain within the intended design for safe operation and tailings containment. GTC replacement is recommended in some areas of the South Dam where recent instrument failure has occurred. Four replacement GTCs are suggested to be installed at this time (two upstream and two downstream). TMAC should work with the EOR to install these replacement GTCs as soon as practical. Priority should be given to the two upstream GTC replacements. ▪ *Four replacement GTC strings are now on site (at the Doris North Camp). The exact timing of the installation of these cables has not yet been established due to current site limitations with available surface drill rigs.* ▪ Beadedstream telemetry subscription requires annual renewal. TMAC should work with the EOR to ensure that the telemetry system operations are maintained. ▪ Complete a walk over survey of the South Dam after spring melt and look for any exposed or damaged ground temperature cables. This will allow for preventative maintenance and placement of protective material to be done if exposed cables are observed, which will help to limit the potential for damage from wildlife. ▪ Manually download data from each datalogger once annually in accordance with the monitoring SOP.	▪ TMAC will work with the EOR to schedule installation of replacement GTCs at the South Dam. ▪ The Beadedstream telemetry subscription will be renewed annually. ▪ TMAC will continue to assess exposed ground temperature cables during weekly walk over surveys. ▪ Manual downloads from each datalogger will be conducted annually as outlined in the monitoring SOP.
Survey Monitoring Points	▪ None.	▪ A monthly survey of the downstream toe is required as part of the Monitoring SOP. This	▪ TMAC will conduct surveys at the South Dam as outlined in the monitoring SOP.

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		monitoring requirement should be conducted at least once during August each year to track the lateral extent of ponding downstream of the dam.	
Walkover Surveys	▪ Start weekly walkover surveys of the South Dam in 2020. This is an important surveillance activity. Additional details will be provided to TMAC in the South Dam SOP.	▪ Complete weekly walkover surveys at the South Dam in accordance with the Monitoring SOPs. This is an important surveillance activity as defined in the OMS Manual and needs to be complied with.	▪ TMAC continues to strive to complete all weekly walkover surveys. This will continue in 2021 and in future.
South Dam Seepage and Ponded Water Monitoring	▪ Not part of the 2019 AGI	▪ No recommendations.	N/A
Annual Physical Inspection of the South Dam	▪ None	▪ Methods to limit tailings dispersion downstream of the dam should be considered in 2021. As the sub-aerial tailings beach grows, this is expected to become a more critical item. ▪ The initial phases of some permafrost degradation and increased ponding water has been observed at the downstream toe of the South Dam. This downstream area is near the area where snow access roads were constructed as part of the Phase 1 South Dam construction (and is within the ultimate Phase 2 dam footprint). Remediation of this area should be considered prior to construction of the Phase 2 raise (Phase 2 raise not expected to be completed in 2021 at this time). This remediation would be expected to consist of the placement of 1.5m thickness of ROQ material directly over these areas (and against the current downstream dam fill / shell).	▪ TMAC will review options for limiting tailings dispersion downstream of the dam and develop an action plan for implementation. ▪ TMAC will review the recommended remedial action presented for potential permafrost degradation downstream of the South Dam with the EOR.
		TIA-Wide Monitoring	
Tailings Deposition System	▪ TMAC should install the dedicated mine water discharge pipeline to the TIA as soon as possible to allow tailings deposition to recommence from the South Dam. It is critical that tailings deposition from South Dam recommence in order to maintain a beach length of at least 100 m at all times, for all TIA water levels. *UPDATE: this was addressed at the start of 2020 and is now complete. The Roberts Bay Discharge system is now operational.*	▪ Saline mine water may only be discharged through the tailings pipeline from, or within, 300 m of the South Dam provided the freezing point depression is less than 0.5°C (less than 4,500 mg/L Cl maximum equivalent). While not current practice, this operational recommendation remains in place. ▪ The tailings discharge system must be operated in accordance with the designated tailings discharge plan. Primary spigot moves should be expected during, or shortly after, spring melt	▪ TMAC will continue the operational practice of only discharging saline mine water through the tailings pipeline within proximity to the South Dam if Cl levels remain below the recommended criteria. ▪ TMAC will continue to operate the tailings discharge system as outlined by the EOR. ▪ A bathymetric survey of the TIA is scheduled to be completed in the summer of 2021.

Inspection Item	2019 Recommendations (for reference)	2020 Recommendations	TMAC Response
	▪ Saline mine water may only be discharged together with tailings from, or within, 300 m of the South Dam provided the freezing point depression is less than 0.5ºC (around 4,500 mg/L Cl maximum equivalent). If the freezing point depression exceeds 0.5ºC, saline mine water may only be discharged with tailings at other designated tailings discharge points further than 300 m from the South Dam or directly into the Reclaim Pond. The freezing point depression calculation is provided in this AGI and will be incorporated by SRK into the updated OMS Manual (update currently in progress). ▪ The tailings discharge system must be operated in accordance with the designated tailings discharge plan. Primary spigot moves should be expected around, or shortly afterwards, spring melt and again prior to winter freeze up. ▪ Areas along the eastern shoreline of the TIA where tailings discharge has occurred at elevations above 36.5 m need to be carefully monitored to determine if permafrost damage is occurring due to tailings flow and vegetation dieback. Should any damage be noted, appropriate proactive mitigation may be required.	and again prior to winter freeze up. In the summer of 2021, it is expected that at least one additional spigot location will be required to be installed (north of the current spigot H location). ▪ No TIA bathymetric survey was conducted in 2020, as approved by the EOR. For 2020 deposition planning, conservative volume assumptions were used as part of the 2020 AGI tailings deposition plan (i.e. assuming larger deposited volumes or less available space). A bathymetry survey of the TIA reclaim pond should be completed in 2021 to allow for better determination of the tailings volume and available storage volume in the TIA. ▪ Plans should start to be made in 2021 for the Phase 2 raise of the South Dam; The raise is expected to be required once the tailings beach reaches against the existing dam reaches the full supply level for tailings (36.5 masl or approximately 2.64Mt of total tailings tonnage). The required timing is dependent on milling rates, but construction is expected in winter 2022 or 2023.	▪ TMAC will begin planning of the Phase 2 South Dam raise as required based on anticipated milling rates.
Emergency Dump Catch Basins	▪ Repair the Western Emergency Dump Catch Basin at the earliest opportunity to ensure liner movement does not occur and impact the as-built storage capacity of this Emergency Catch Basin.	▪ The Western Emergency Dump Catch Basin still requires repairs. These repairs should still be planned to be carried out.	▪ The repair of the Western Emergency Dump Catch Basin will be repaired as soon as practical. Until that time, this facility will not be used.
Pipelines (Reclaim, Tailings Deposition and TIA Discharge)	▪ TMAC must carefully inspect all pipelines placed directly on the tundra for signs of vegetation dieback and associated flow path channeling. Where this is occurring, the pipeline must be relocated to follow existing all-weather road shoulders, and appropriate remediation needs to be put in place where damage has occurred. Going forward, TMAC should consider abandoning the practice of placing pipelines directly onto the tundra.	▪ TMAC must carefully inspect all pipelines placed directly on the tundra for signs of vegetation dieback and associated flow path channeling. Where this is occurring, the pipeline must be relocated to follow existing all-weather road shoulders, and appropriate remediation needs to be put in place where damage has occurred. ▪ The permafrost thermal erosion feature that has developed along the northern shore of the TIA was backfilled by TMAC in 2019. This area	▪ TMAC will continue to inspect all pipelines placed directly on the tundra for signs of vegetation dieback. ▪ TMAC will continue to monitor the thermal erosion feature that was backfilled in 2019. ▪ Monitoring of the TIA Reclaim Jetty Pad will continue in 2021.

Inspection Item	2019 Recommendations (for reference)	2020 Recommendations	TMAC Response
	▪ The permafrost thermal erosion feature that has developed along the northern shore of the TIA was backfilled by TMAC in 2019. This area should continue to be monitored to ensure that additional thermal erosion does not result in this area.	should continue to be monitored to ensure that additional thermal erosion does not result in this area. ▪ Monitoring should continue at the repaired TIA Reclaim Jetty Pad (710 Pumphouse pad) following the recommended survey frequency of twice monthly from May to November.	
TIA Reclaim Pumphouse (710) Pad	▪ Notable settlement was noted at the TIA Reclaim Jetty Pad (also referred to as the 710 Pumphouse pad). Upon visual inspection and from review of the as-built data, it looks like new ROQ material was placed off the edge of the pad in thick, end dumped lifts in order to widen the pad for the new 710 pumphouse. There are notable stability concerns with this pad as large settlements and notable cracking indicate that a failure of this pad (albeit slow) appears to be occurring. However, it should be noted that the rate of movement could increase suddenly causing a sudden failure, and this risk should not be ignored. Monitoring of this area (at least weekly during winter and daily during months with no ice cover on the lake) should be completed. It is recommended that remediation measures be completed for the pad in order to stabilize the fill and prevent further deformation. This is expected to consist of placing additional fill along the outside of the access road and pad to reduce the overall slope and provide additional confining stress at the toe of the pad (which is currently underwater). Rates of loading must be controlled and slow enough in order to avoid inducing excess pore pressures in the foundation. This means that it may take weeks to build this small additional fill and that the dumping faces should be spread out as much as possible. Material should be end dumped back from the working face and spread with an excavator with the largest reach on site (to limit loading at the crest).	▪ Settlement monitoring at the Reclaim Jetty should continue in 2021 (twice monthly, May to November). ▪ Major Jetty repairs were completed in 2020. There is still one area off the most WSW end of the reclaim jetty fill (i.e. by the area where the pipelines extend from the seacans into the TIA) that are still over steepened and should be carefully monitored. ▪ Additional (relatively minor) fills are recommended on the west side of the pad where the full fill extents, of the proposed reclaim jetty repairs, were not fully met. ▪ Once all repairs are complete, ensure the recommended survey monitoring points are reestablished.	▪ Settlement monitoring of the TIA Reclaim Jetty Pad will continue in 2021. ▪ The area off the most WSW end of the reclaim jetty is inaccessible at this time due to the location of the pump house building and submerged pipelines. This area will continue to be monitored. ▪ TMAC will work with the EOR to determine what additional fill requirements are needed for the reclaim jetty repairs. ▪ Survey monitoring points were reestablished after works were completed in 2020. This will be done again when additional remedial works are completed.
Shoreline Erosion	▪ None.	▪ No recommendations; Shoreline Erosion is no longer a formal monitoring requirement, and as-	N/A

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		such will not be reported as a section in the 2021 AGI. Should shoreline erosion be observed throughout the year, or during the AGI it will be reported as part of the overall TIA condition assessment.	
TIA Water Balance and Level Targets	▪ It is of paramount importance that the Roberts Bay Discharge System Pipeline be completed during the summer of 2019. Further delay of this may result in reduced operations. ▪ *UPDATE: this was addressed at the start of 2020 and is **now complete**. The Roberts Bay Discharge system is now operational.*	▪ It is of paramount importance that the RBDS be re-commissioned by May 2021 to manage water levels in the Reclaim Pond. Further delay of this may result in reduced operations. ▪ *During maintenance of the Roberts bay Discharge Line in the fall of 2020, portions of the submersed line became buoyant requiring the submersed line to be shortened. The end of the Roberts Bay Discharge line is now at around 20m depth in Roberts Bay compared to the previous 40 meters depth. In Q1 2021, TMAC made a submission to the Nunavut Impact Review Board indicating why the revised discharge location does not pose a significant modification to the Hope Bay Mine or the previously assessed environmental effects. It is expected that this discharge line will be able to be used again before freshet 2021.* ▪ If delays in approvals to use the Roberts Bay Discharge system are expected past the end of May 2021 then the EOR should be informed so additional plans can be made with site staff. Water levels in the TIA will continue to be carefully monitored (specifically during the periods where there is no discharge from the TIA to Roberts Bay). ▪ Continue discharge 2021 to reduce the water levels in the pond to within the target elevation range. ▪ Continue to monitor the South Dam beach length to maintain at least 100 meters separation between the Dam and the Reclaim Pond or any large pond.	▪ TMAC received approval from the Nunavut Impact Review Board in April to allow discharge into Roberts Bay at the 20m depth. Dewatering of the TIA is anticipated to begin in April 2021. ▪ The South Dam beach will continue to be monitored to ensure the 100m separation between the South Dam and the Reclaim pond/pooling water is maintained.
TIA Water Quality	▪ No recommendations; however, the following comments are made below. ▪ The water treatment plant for the TIA is required to be maintained in good operational condition so that discharge of supernatant water can	▪ No recommendations. ▪ If water quality or water treatment capacity is expected to impact the ability to maintain the Reclaim Pond within the operational range, the EOR must be notified.	▪ TMAC continues to closely monitor water quality in the TIA and will communicate with the EOR if water quality or water treatment capacity is expected to impact the ability to maintain the Reclaim Pond within the operational range.

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	occur once the Roberts Bay Discharge System Pipeline is operational, and allow treated water to be discharged in order to maintain water levels in the TIA below the full supply level. ■ *UPDATE: as of the start of 2020 the Roberts Bay Discharge system and the connected water treatment plant is now operational.*		
Climate Data	■ None.	■ No recommendations.	N/A