2015 Geotechnical Annual Review, Minto Mine, YT

Prepared for

Minto Explorations Ltd.

Prepared by

SRK Consulting (Canada) Inc.
1CM002.039
August 2015

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Project No: 1CM002.039

File Name: 2015GeotechInsp_Report_1CM002-039_ek_phm_20150806_FNL

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1 Introduction

On June 25-26, 2015, SRK Consulting (Canada) Inc. completed a geotechnical inspection of the Minto Mine site (Figure 1). The purpose of the inspection was to document the physical condition of the site based on visual observations and to provide geotechnical assessment, noting potential signs of physical instability such as erosion, differential settlement, sloughing or bulging of material, seepage, and so on. The inspection is documented in the photographic compilation provided in Appendix A. This report summarizes the findings and recommendations.

This is the fourth year of geotechnical inspections of the site completed by SRK, with the first inspection completed in September 2012 (SRK 2012c). Previous inspections were completed by EBA Engineering Consultants Ltd.

This report is in partial fulfillment of the requirements of the existing Water Licence QZ96-006, Amendment 8. Clause 82 of the water licence requires that physical inspections be completed after the spring thaw in May/June of each year and again before the onset of winter in September of each year. This report fulfills the May/June inspection requirements.

Source: Capstone Mining (http://capstonemining.com/s/Minto.asp)

Figure 1: Site Location

2 Conditions

The geotechnical inspection was completed by Erik Ketilson, PEng, of SRK. Aaron Thomson, EIT, and Brendan Moloney of Minto accompanied Mr. Ketilson during the inspection. Kevin Cymbalisty of Minto, was SRK's primary contact for information about the activities during the past year.

Weather during the site inspection was mostly sunny on June 25, 2015, hazy due to forest fires (approximately 30 km from site) on June 26, 2015, with showers commencing at the end of the inspection, upon return to the site access barge. Temperatures were estimated at approximately 5°C in the morning, and above 20 °C. The site was generally dry during the inspection.

3 Scope

Table 3.1 provides a list of the facilities that were included as part of the inspection and a list of design reports and monitoring guidance documents that were reviewed as required to guide the inspection. In addition, previous years' reports were available for review before the site inspection.

As part of the inspection, instrumentation data was reviewed to check for indications of unusual performance or change in trends. Section 4 of this report presents a list of data reviewed, including the last data collection date.

Table 3.1: Facilities Inspected and Guidance Documents

Facility	Design Reports	Monitoring/Inspection Guidance Documents
Dry Stack Tailings Storage Facility (DSTSF)	EBA 2007. Geotechnical Design Report, Dry Stack Tailings Storage Facility, Minto Mine, Yukon. EBA File: 1200173. January 2007.	Minto 2014c. Revision 2014-1 Operation, Maintenance, and Surveillance Manual, Dry Stack Tailings Storage Facility, Minto Mine, YT.
Mill Valley Fill Extension (MVFE)	EBA 2011a. Waste Rock and Overburden Management Plan, Phase IV Development, Minto Mine YT. EBA File: W14101068.015. September 9, 2011. EBA 2011b. Upstream Water Management for the Mill Valley Fill Expansion and Dry Stack Tailings Storage Facility. EBA File: W14101168.013. September 14, 2011. SRK 2014a. Mill Valley Fill Extension Stage 2 Preliminary Design report – Final. SRK File 1CM002.012.027. June 2014.	Minto 2014a. Minto Mine Physical Monitoring Plan, June 2014.
Main Waste Rock Dump (MWD)	EBA 1998. Geotechnical Evaluation Proposed Main Waste Dump, Minto Project, Yukon Territory. EBA File: 0201-95-11509. April 1998.	Performance monitoring and annual inspection requirements detailed in the EBA 1998 design report.
Southwest Waste Dump (SWD)	EBA 2008d. Geotechnical Design Proposed Southwest Waste Dump, Minto Mine, Yukon. EBA File: W14101068.005. September 2008.	EBA 2008d contains minimum monitoring requirements for physical inspections, deformation surveys, and instrumentation monitoring. Instrumentation monitoring plan includes a schedule and threshold warning levels.

Facility	Design Reports	Monitoring/Inspection Guidance Documents
Reclamation Overburden Dump (ROD)	EBA 2008a. Geotechnical Design Proposed Reclamation Overburden Dump, Minto Mine, Yukon. EBA File: W14101068.004. February 2008. EBA 2010. Reclamation Overburden Dump Expansion Geotechnical Design Report. EBA File: W14101068.0040. June 29, 2010.	Performance monitoring and annual inspection requirements detailed in the EBA 2010 design report.
Ice-Rich Overburden Dump (IROD)	EBA, 2006a. Geotechnical Design Ice-Rich Overburden Dump, Minto Mine, Minto, YT. EBA file: 1200173. January 2006. EBA, 2007. Ice-Rich Overburden Dump Containment Berm Inspection Report, Minto Mine Site, Minto Yukon. EBA File: 1200173.001. June 19, 2007.	Long-term monitoring and annual inspection requirements are listed in the EBA 2006 design report.
Ore Stockpiles	None	None
Mill and Camp Site	EBA 1994. Geotechnical Evaluation Mill and Camp Site, Minto Project, Yukon. EBA File: 0201-11509. Dec. 1994.	None
Mill Water Pond (MWP)	Not available	EBA 1997. Construction Quality Assurance Manual for Waste Dumps, Tailings/Water Dam, Mill Water Pond, and Diversion Ditch, Minto Project, Yukon. EBA File 0201-95-11509. August, 1997.
Fuel Containment Facility	Not available	Not available
South Diversion Ditch (SDD)	EBA 2006b. Design Drawings, South Diversion Ditch & Collection Pond. IFC. July 2006. EBA 2012. Pipe Design for South Diversion Ditch Realignment, Minto Mine, YT. EBA File: W14101068.013. May 4, 2012. SRK 2013a. South Diversion Ditch Realignment and Overflow Spillway. SRK Project No.: 1CM002.006.200, February 1, 2013.	None
Minto Creek Detention Structure (MCDS)	EBA 2009. Conveyance Network Detention Structure and Water Collection Sump Design. EBA 2011d. Minto Project: Minto Creek Detention Structure Seepage Monitoring Program. EBA File: W14101068.001. October 25, 2011.	EBA 2011d contains monitoring requirements including frequency, triggers, and responses.
Water Storage Pond Dam (WSP)	EBA 1995. Geotechnical Design Tailings/Water Dam, Minto Project, Yukon. EBA File: 0201-95-11509. Dec. 1995. EBA 2008b. As-built Construction Report, Water Retention Dam, Minto Mine, Minto, YT. EBA File: 1200173.001. April 2008.	Tetra Tech EBA 2014. Operation, Maintenance and Surveillance Manual, Water Storage Pond Dam, Minto Mine, Minto, YT. EBA File: W14103414-01. August 2014.
Big Creek Bridge	Not available	Not available
South Wall Buttress/Main Pit In-Pit Dump	EBA 2011e. Area 1 South Wall Buttress Design Report, Minto Mine, Yukon. EBA File: W141010668.012, July 2011.	Minto 2014a. Minto Mine Physical Monitoring Plan, June 2014.

4 Monitoring and Instrumentation Data

Table 4.1 lists instrumentation data reviewed as part of the inspection, with the date of the most recent data. Changes to the list of instrumentation compared to the last inspection are listed below the table in the notes. Instrumentation plots are provided in Appendix B. Data that has not been updated since the last geotechnical inspection is not included in the appendix.

Table 4.1: Summary of Instrumentation Data

Facility	Instrumentation Type	List of Reviewed Instrumentation	Last Reading Date
Dry Stack Tailings Storage Facility and Mill Valley Fill Extension (DSTSF and MVFE)	Survey Hubs	DSSH06, DSSH10, DSSH12, DSSH14, DSSH15, DSSH17, DSSH18, DSSH19, DSSH20, DSSH21, DSSH22, DSSH23, DSSH24, DSSH25.	July 2015
	Inclinometers	DSI-14, DSI-21	June 2015
	Piezometers	DSP-5A, DSP-5B, DSP-6A, DSP-6B	June 2015
	Ground Temperature Cables	DST-10, DST-11, DST-13, DST-14, DST-15	June 2015
Main Waste Rock Dump (MWD)	Inclinometers	MDI-2	June 2015
South Waste Dump (SWD)	Survey Hubs[1]	SWD-01, SWD-01A, SWD-02, SWD-02A, SWD-04A, SWD-05A	July 2015
	Inclinometers	SDI-3	June 2015
	Piezometers	SDP-2, SDP-3, SDP-4	June 2015
	Ground Temperature Cables	SDT-1, SDT-2, SDT-3, SDT-4	June 2015
Main Pit South Wall	Survey Hubs [2]	M69, M73, M74, M75, M76, M79, M80, M81, M82, M83, M84	July 2015
Mill Water Pond (MWP)	Ground Temperature Cables	MWPT-1, MWPT-2	April, 2015
Water Storage Pond Dam	Survey Hubs	WSP-1, WSP-2, WSP-3, WSP-4, WSP-5	June 2015
	Piezometers	WDP-2, WDP-3, WDP-3A, WDP-4, WDP-5, WDP-6, WDP-7, WDP-8, WDP-9, WDP-10, WDP-11, WDP-12, WDP-13	June 2015
	Ground Temperature Cables	WDT-1, WDT-2, WDT-3, WDT-4, WDT-5, WDT-6, WDT-7, WDT-8	June 2015

Note(s):

(1) Last reading of SWD-03A August 2014. The survey hub was noted in the 2014 annual inspection to be highly disturbed: the instrument heaved 75 cm above ground and was leaning.

(2) Survey hub M69 was reactivated; three additional hubs (M82, M83, and M84) were established in 2015 on the Main Pit south wall buttress and in-pit waste dumps.

4.1 Dry Stack Tailings Storage Facility

Movements in the Dry Stack Tailings Storage Facility (DSTSF) were first identified in early 2009. A detailed assessment and history of the physical stability associated with these movements is provided in the letter report "Detailed Review of Foundation Performance at Select Mine Waste Facilities and Main Pit South Wall" (SRK 2012a). The Mill Valley Fill Extension Stage 1 was designed to mitigate the movement and construction of the facility, which began in January 2012 and was nearly completed by March 2013.

Ground temperature profiles from the functional instrumentation are provided in Figures 1 and 2 of Appendix B. Temperature profiles from previous instrumentation that have malfunctioned are included in previous inspection reports. The temperature readings in the instrumentation installed in 2013 are either still cooling as the sensors approach equilibrium with the surrounding soils, or show no significant trend. The profiles indicate that warm permafrost is present at all locations, except in the lower portions of DST-11 and DST-13. DST-11 is located near the crest of the DSTSF, while DST-13 is located approximately 300 m east of the DSTSF in an undisturbed location.

Piezometric data from the DSTSF are presented in Figure 3 of Appendix B. The piezometric data includes plots of the pore water pressure ratios (r_u) for each sensor. The r_u is the ratio of pore water pressure to the overburden pressure. A pore water pressure ratio of 0.5 would be similar to the effect of a groundwater table at surface.

The pressures at DSP-6 indicate non-saturated conditions. The pressures at DSP-5 indicate excess pore water pressure conditions with the pore water pressure ratio (r_u) at DSP-5A increasing to 0.2 and the r_u at DSP-5B decreasing from a peak of 0.5 to a ratio of 0.4.

A stability analysis was completed to assess if the pore water pressures were a concern to the overall stability. The results of the stability analysis are provided in Figure 1 of Appendix C. The analysis methodology are the same as those used for the DSTSF assessment reported in SRK (2014a) with the MVFE removed and a continuous shear zone assumed to be present below the base of the tailings. A sensitivity analysis was completed with the r_u values within the silt layer beneath the tailings varied between 0 and 1.0. The analysis resulted in a factor of safety of 2.0 at an r_u value of 0.5.

Profiles and time-displacement plots from inclinometers with additional data since the 2014 Fall Geotechnical Inspection (SRK 2014b) are presented in Figure 4 in Appendix B. The results are consistent to those observed during the 2014 data review with no new shear zones or accelerations in movement detected. Table 4.2 provides a summary of the inclinometer results and observations. The locations of the inclinometers are provided in Figure 2 in Appendix B.

Table 4.2: DSTSF Inclinometer Summary

Inclinometer	Comments
DSI-14	Two shear zones are present: • The upper shear zone is located within the top 4 m of native materials beneath the MVFE. The materials in this zone consist of organics and a loose gravel layer. Since the inclinometer installation, the movement rate has shown a decreasing trend with a current velocity of approximately 0.1 mm/day. • The lower shear zone is approximately 3 m above the bedrock contact and consists of ice-rich, medium to high plastic clay materials. Significant ice lenses were noted in the borehole logs within the zone. Movement rates have also decreased with a current velocity of approximately 0.2 mm/day.
DSI-21	• Shear zone located approximately 11 m above the bedrock contact and 1 m below the tailings. The borehole logs note layered ice and soil in this region with 1 to 2 mm ice lenses spaced 5 mm apart and 20% excess ice. • Movement rates of this zone have decreased with a current velocity of approximately 0.03 mm/day.

Survey hub movement data are presented in Figures 5 to 8 of Appendix B and are summarized in Table 4.3. Survey hubs along the waste rock crest and MVFE all show a deceleration trend. Survey hubs DSSH23, DSSH24, and DSSH25 show signs of seasonal settlement. Each of these hubs were installed in 2013 over the overburden cover on the DSTSF. These hubs all show a decelerating trend in the horizontal direction.

Table 4.3: DSTSF and MVFE Survey Hub Summary

Survey Hub	July 2014 Rate of Movement, dNEZ (mm/day)	Current Rate of Movement, dNEZ (mm/day)	Inspection Comment
DSSH06	1.6	1.0	
DSSH10	1.1	0.8	
DSSH12	1.7	1.1	
DSSH14	1.7	1.0	
DSSH15	1.4	0.8	
DSSH17	0.8	0.7	
DSSH18	0.8	0.5	
DSSH19	0.6	0.6	
DSSH20	no trend	no trend	- Instrument appears to have settled approximately 5 cm between July 2014 and January 2015.
DSSH21	0.9	0.6	
DSSH22	1.2	1.0	
DSSH23	1.2	0.5	- Instrument settled 20cm between May and October 2014. - dNE shows a deceleration trend.
DSSH24	1.1	1.4	- Movement related to settlement of instrument; - dNE shows a slight deceleration trend.
DSSH25	1.9	0.7	- Instrument settled 30 cm between March and October, 2014. - dNE shows a deceleration trend.

4.2 Main Waste Dump

Two inclinometers, MDI-1 and MDI-2, have been installed at the Main Waste Dump. Of the two, only MDI-2 is functional. The last reading of MDI-1 was obtained in November 2012.

Profiles and time displacement plots for both inclinometers are presented in Figure 9 of Appendix B. There is no movement trend detected in MDI-2.

Previous readings from both inclinometers indicate some past movement towards the Main Pit. The MDI-1 profile indicated past movement near the surface (within the rock fill and sand till fill) and was confirmed by site representatives to be the result of a Cat 777 haul truck driving over the instrument location in May 2010. Past movement of MDI-2 was also within rock fill and was determined to have been the result of the removal of the rock fill placed between the instrument location and the Main Pit (EBA 2011f).

4.3 Southwest Waste Dump

The minimum requirements for the monitoring frequency and instrumentation threshold warning levels are noted in the design report (EBA 2008d). The monitoring requirements were developed before the observation of deformation movements and the installation of additional instrumentation to monitor the movements.

A detailed assessment and history of the physical stability associated with the Southwest Waste Dump (SWD) movements are provided in the letter report “Detailed Review of Foundation Performance at Select Mine Waste Facilities and Main Pit South Wall” (SRK 2012b).

The temperature cables, inclinometers, and piezometers installed at the SWD are intended to monitor foundation conditions along the toe of the slope. Survey hubs were also installed in March 2011 to monitor surface movements along the southeast perimeter.

Survey hub movement data are presented in Figures 10 and 11 of Appendix B. A summary of the current rates of movement compared to 2013 is provided in Table 4.4. Some of these hubs, as noted in the Table 4.4, appear to be disturbed due to heaving caused by frost action as evidenced by exposed concrete. This frost action is also evidenced by the seasonal variability in the movement data. As a result, the movement rates are questionable; however, they are supported by the movement rates observed at SDI-3.

Movements in the northeast corner of the dump (SWD-1, SWD-1A, SWD-2, and SWD 2A) were previously reported to be related to the movements of the south wall of the Main Pit (EBA 2011c). The movement of these hubs have slowed, or are similar, compared to movement rates in the fall of 2013, which may be related to the completion of the South Wall Buttress. Movement rates of the survey hubs further to the south are similar to the 2014 rates, which as noted above, is suspected to partially due to disturbance of the hubs.

Table 4.4: Southwest Waste Dump Survey Hub Summary

Survey Hub	July 2014 Rate of Movement, dNEZ (mm/day)	Current Rate of Movement, dNEZ (mm/day)	Inspection Comment
SWD-01	0.3	0.3	
SWD-01A	0.4	no movement	Instrument has heaved approx. 30 cm above ground.
SWD-02	0.4	0.4	
SWD-02A	0.6	0.4	
SWD-03A	2.8	----	Instrument has heaved 75 cm above ground and is leaning. -last reading August 2014.
SWD-04A	0.6	0.6	Instrument has heaved approx. 55 cm above ground.
SWD-05A	0.3	0.3	Instrument has heaved approx. 90 cm and leaning.

Monitoring of inclinometer SDI-3 resumed in April 2014 (after the previous reading in 2012). The profile and time-displacement graphs for this inclinometer are presented in Figure 12 of Appendix B. The displacement profile indicates an upper and lower shear zone.

The upper shear zone movement increased in 2014 to up to 0.5 mm/day, the movement rate has decreased by approximately half in 2015. The movement is suspected to be related to thawing of the permafrost colluvium with potentially high excess pore water pressures, which is supported by the slight warming trend in temperature data at SDT-2 and SDT-3 and the high porewater pressure ratio data provided in Figure 14 of Appendix B. The movement rate is also suspected to be associated with waste rock resloping activities completed in the area in 2015. The movement rate of the upper shear zone is expected to decrease as the pore water pressure dissipates.

The lower shear zone is located 7 to 10 m above the bedrock contact in an ice-rich zone consisting of stratified ice (frequent 5 to 75 mm thick ice lenses). Movement of the lower shear zone has also decreased in 2015 from 0.25 to 0.12 mm/day. The conditions at this shear zone are similar to other movement zones observed at the DSTSF and south wall of the Main Pit believed to be caused by ice creep and/or plastic deformations. Both shear zones have the same direction of movement orientated parallel to the slope of the bedrock surface.

Ground temperatures and pore water pressure data for the SWD are presented in Figures 13 and 14 of Appendix B. The profiles indicate that warm permafrost is present at all locations of the instrumentation with a slight warming trend. The pore water pressure ratio for all piezometers show a decreasing trend.

4.4 Main Pit

The initial indication of movement in the Main Pit south wall was observed by Minto in April 2009. A waste rock buttress was subsequently designed and constructed. Substantial completion of the buttress was completed in 2013. A detailed assessment and history of the physical stability

associated with the Main Pit south wall is provided in the letter report "Detailed Review of Foundation Performance at Select Mine Waste Facilities and Main Pit South Wall" (SRK 2012b).

Survey hub movement data for the Main Pit south wall are presented in Figure 15 of Appendix B. The data indicates that the movement rates have significantly decreased, and are generally showing a decelerating trend.

Three additional hubs were established on the waste rock dumps within the Main Pit. M82 was established on May 23, 2015 on the South Wall Buttress with seven readings completed (last reading on July 4, 2015) at the time of review. The average velocity over this period is 0.6 mm/day; however, due to the limited data available, additional readings are recommended to confirm this trend. Survey hubs M83 and M84 were established in January 2015 on the in-pit dump located to the northwest of the south wall buttress. These hubs show a current movement rate of 0.2 mm/day.

4.5 Mill Water Pond

Instrumentation at the MWP (Mill Water Pond) consists of ground temperature cables with temperature data presented in Figure 16 of Appendix B. Monitoring of MWP ground temperature data resumed in March 2014 (after the previous reading in 2012). There appears to be no significant change in trends since the readings have resumed.

4.6 Water Storage Pond

Instrumentation within the dam at the WSP (Water Storage Pond) consists of eight ground temperature cables, 13 vibrating wire piezometers, and five survey hubs.

Survey hub movement data is presented in Figure 17 of Appendix B. No significant movement was observed.

Ground temperature and piezometric data are presented in Figures 18 to 21 of Appendix B. All temperature sensors are above zero and continue to show a warming trend.

5 Results and Recommendations

Findings of the inspection are documented in the photographic compilation of figures in Appendix A. Seventeen figures provide a record of observations across the site.

A summary of the recommendations is provided in Table 5.1. Recommendations with a high priority for action are highlighted.

Table 5.1: Summary of Recommendations

Area	Appendix A Figure #	Recommendation
General	-	The condition of all survey hubs on site should be reviewed. Hubs experiencing frost heave should be noted and replaced with hubs that are not susceptible to frost heave. Alternate installation methods could include grouting a hub mount to a large boulder, using a deeper post, and/or welding a base plate (1 m x 1 m) to the base of the post and placing in a deep pit excavation backfilled with compacted, non-frost susceptible materials.
Dry Stack Tailings Storage Facility & Mill Valley Fill Extension	-	Regrade the DSTSF overburden surface to promote runoff once the final cover design has been determined and cover the remaining areas of exposed tailings on the south edge of the facility.
	3	Cover the historical instrumentation to prevent preferential flow paths, and develop a plan for decommissioning instrumentation that is no longer used.
	3	Continue to monitor the 2013 crack and settlement area in the MVFE.
	3	Continue to monitor the 2014 crack and install two survey nails/pins (one on each side of the crack) to measure the relative displacement using a tape measure.
	4	The slopes at the outlet for the tailings diversion ditch should be monitored for signs of instability and erosion.
Southwest Waste Dump	-	Complete reading of the survey hub and slope inclinometers on at least a monthly and bi-monthly basis, respectively, and continue monitoring ground movement rates. Notify SRK of any other observations or increases in movement that indicate a significant change in dump performance or dump stability.
	-	The survey hubs at the toe of the dumps were not inspected, and the condition should be reviewed to determine if there is ongoing susceptibility to frost heave (similar to previous inspections).
	6	Monitor the large linear crack noted near the crest at the south-east corner of the dump.
Reclamation Overburden Dump	7	Continue to monitor the slope failure areas identified for further signs of movement or instability.
Mill Site	-	Continue to monitor the retaining wall near the mill's apron feeder tunnel and maintain a photographic record of its condition. (This was not inspected as part of this inspection).
	9	Western corner of slope appears undercut and regular monitoring of the slope should occur to identify signs of instability.
Camp Site	10	Regrade the area above the erosion channels on the camp pad to promote runoff away from these areas.
	10	In addition to the surface regrading, develop and implement measures to mitigate the erosion.
	10	Monitor the erosion gully and the seepage noted along the hillside east of the water treatment plant. Install erosion protection along the slope to limit further erosion of the pile.

Area	Appendix A Figure #	Recommendation
	10	Shallow the slopes of the diversion ditch or complete routine maintenance of the ditch to maintain appropriate drainage at the north end of the camp terrace.
Mill Water Pond	-	Due to the tears in the geomembrane, the pond is not considered functional. Repairs are required if the pond is to be brought back into service.
	11	Repair fencing around the pond such that it is continuous.
	11	If the MWP is to be brought back into service the following actions are recommended: • Patch tears in the liner system. • Fill the voids under the tears before patching. • Clean out sediments accumulated in the surface runoff ponds and culverts
South Diversion Ditch	13	Remove vegetation and perform routine maintenance along ditch alignment.
	13	Along the airport ditch, cover the exposed geotextile, and confirm the ditching profile through the access road drains correctly.
Minto Creek Detention Structure	14	Continue annual monitoring for further signs of instability or seepage on the downstream slope of the MCDS.
	14	Repair the crest and exposed geotextile, or move towards replacing the pond as planned.
Water Storage Pond Dam	15	Significant erosion on the left abutment. Plans for repair should be made in conjunction with the Engineer of Record.
	15	Continue regular monitoring of the dam, noting specifically the clarity of the seepage and flow exiting the stilling basin and the seepage rate through the weir.
Big Creek Bridge	16	Continue regular annual monitoring of sediment accumulation in the culverts. If sediments continue to accumulate, clean them out. Exposed geotextile around culverts should be repaired.
South Wall Buttress / In-Pit Dump	17	The tension crack area in the In-Pit Dump should continue to be monitored. A photographic record should be maintained to inspect for changes in condition. Following completion of the buttress, additional survey hubs should be installed along the crest to monitor movement.
	17	Tensions cracks were observed on Level 821. Recommend adding survey monuments, and painting cracks, and adding these to the

Note(s):

(1) High priority actions are highlighted in blue.

This report, "2015 Geotechnical Annual Review, Minto Mine, YT", was prepared by SRK Consulting (Canada) Inc.

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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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SRK 2013b. 2013 Geotechnical Annual Review, Minto Mine, YT. SRK Project Number: 1CM002.012.005.

SRK 2014a. Mill Valley Fill Extension Stage 2 Preliminary Design Report – Final. Prepared for Minto Explorations, Ltd. SRK Project Number: 1CM002.012.027. June.

SRK 2014b. 2014 Geotechnical Annual Review, Minto Mine, YT. Prepared for Minto Explorations, Ltd. SRK Project Number: 1CM002.012.028. November.

Tetra Tech EBA 2014. Operation, Maintenance and Surveillance Manual, Water Storage Pond Dam, Minto Mine, Minto, YT. EBA File: W14103414-01. August.

Appendix A: Photographic Report

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2014 Orthophoto.

Inspection Area Number

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Spring 2015 Geotechnical Inspection

Site Overview

Job No: 1CM002.039

Filename: AppA_Minto2015SpringInspection_20150731.pptx

Minto Mine

Date: July 2015 | Approved: EK | Figure: 1

1 Dry Stack Tailings Storage Facility

- Photo (a) shows a minor erosion gully on the waster rock shell of the DSTSF.
- Photo (b) shows a waste rock pad that was constructed, and has resulted in low areas for water collection on either side of the pad.
- Photo (c) shows the waste rock shell looking towards the west-north-west.
- Photo (d) shows the waste rock shell looking towards the east-north-east.
- Photo (e) shows exposed tailings on the south side of the DSTSF.

Recommendations

- Monitor for erosion along the downstream face of the DSTSF.
- The condition of all survey hubs on site should be reviewed. Hubs experiencing frost heave should be noted and replaced with hubs that are not susceptible to frost heave.

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Spring 2015 Geotechnical Inspection

Dry Stack Tailings Storage Facility

Job No: 1CM002.039
Filename: AppA_Minto2015SpringInspection_20150731.pptx

Minto Mine

Date: July 2015 | Approved: EK | Figure: **2**

1 Dry Stack Tailings Storage Facility

- Photo (a) is the tension crack observed in 2014. The crack is actively monitored. This area should continue to be inspected to monitor for crack progression.
- Photo (b) is the old Tailings Diversion Ditch – no long in use.
- Photos (c) and (d) show the typical condition of the instrumentation.
    - Uncovered
    - Large voids surrounding the casings;
    - Uncovered.
- The condition of the Mill Valley Fill Extension.
    - The area appeared unchanged from the notes in the 2014 inspection. Evidence of a longitudinal crack is still present, although it does not appear to be actively propagating.

Recommendations

- Continue to monitor the Mill Valley Fill Extension crack and settlement area.
- Continue to monitor the crack on the north-east corner of the DSTSF. Install two survey nails/pins (one on each side of the crack) to measure the relative displacement using a tape measure.
- Cover the historical instrumentation to prevent preferential flow paths, and develop a plan for decommissioning instrumentation that is no long used.

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Job No: 1CM002.039 Filename: AppA_Minto2015SpringInspection_20150731.pptx	Minto Mine	**Dry Stack Tailings Storage Facility**
		Date: July 2015 / Approved: EK / Figure: 3

1 Dry Stack Tailings Storage Facility - Tailings Diversion Ditch

- In general, the berm and ditch appeared functional, with conditions in the western portion similar to those observed in previous inspections. No signs of instability or ditch obstructions were noted along the ditch alignment.
- The ditch outlet was excavated through placed waste rock. The slopes were steep, and a high amount of finer material was noted along the excavated slopes. This may be susceptible to erosion during large flow events.
- The ditch was completely dry at the time of the inspection.

(a) View of the diversion ditch. Rip rap is well placed, and compacted, and the ditch is free of debris.
(b) View of the transition from unarmoured diversion ditch to armoured diversion ditch.
(c) View of the diversion ditch upstream portion of the channel. The area remains unchanged compared to 2013 inspection.
(d) View of the downstream face of the diversion ditch. Note steep slopes and large boulders.

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Minto Mine

Spring 2015 Geotechnical Inspection

Dry Stack Tailings Storage Facility – TDD

Date:	Approved:	Figure:
July 2015	EK	4

2 Main Waste Dump

- Reclamation activities at the dump were completed between 2011 and 2012 with re-contouring of portions of the dump slopes. The regraded area is noted in the plan below. The regraded slopes have been covered and revegetated with different vegetation prescriptions placed on different portions of the cover.
- No signs of instability were observed.

- Photo (a): Overview of the Main Waste Dump looking northeast.
- Photos (b) View of the erosion visible on the regraded waste rock dump. Minor rills and gullies are present at the base of the regraded slope where vegetation is not yet established. No signs of instability were observed.

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		Main Waste Dump	
Job No: 1CM002.039 Filename: AppA_Minto2015SpringInspection_20150731.pptx	Minto Mine	Date: July 2015	Approved: EK / Figure: **5**

3 Southwest Waste Dump

Significant efforts at regrading the southwest waste rock pile has occurred since the last inspection. At the time of the 2015 inspection, no dumping or regrading was actively.

The survey hubs at the toe of the dumps were not inspected.

Photo (a): View of the regraded SWD looking north.
Photos (b), (c), (d): Observed crack near crest of regraded slope.
No signs of slumping or toe bulging were noted.

Recommendations

- The observed tension crack should be monitored, and the source determined. (e.g. edge of historical waste rock bench?, poor operator? Active slumping, with toe regraded?)
- The condition of the survey hubs should be reviewed for susceptibility to frost heave.

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		Southwest Waste Dump
Job No: 1CM002.039 Filename: AppA_Minto2015SpringInspection_20150731.pptx	Minto Mine	Date: July 2015 / Approved: EK / Figure: **6**

4 Reclamation Overburden Dump

Previous year's inspections noted localized slumping, discontinuous tension cracks, and erosion gullies within the area. The failure has not compromised the overall dump slope angle and as a result, the failure is not expected to reduce the overall stability of the dump. Historical vantage points for photographs were inaccessible by truck due to modified access road alignments.

- Photo (a) shows a tension crack along the access ramp into the ROD. This area is currently inaccessible by truck, but should the area become opened, stabilization of the access road may be required. The observed tension crack should be monitored in the short term.
- Photo (b) shows a longitudinal crack within the ROD. This area is completely contained within other overburden stockpiles.
- Other areas of the ROD remain the same as noted in previous years' inspections:
    - Slumping, settlement and tension cracks are expected in the dump as it is constructed with frozen overburden with thawing expected.
    - Discontinuous tension cracks and differential settlement observed along the perimeter crest.
    - Ground undulation is typically 0.3 m and is prevalent throughout the facility.

Recommendations

- Monitor the ROM for further signs of movement or instability.

5 Ice Rich Overburden Dump

- The IROD is completely contained within the south waste rock pile.

- Photo (c) shows the waste material (supporting vegetation) that has now encapsulating the berm.
- No signs of instability were observed.
- No pooled water was observed around the perimeter of the IROD indicating that water is able to drain as per the original design intent.

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		Reclamation and Ice Rich Overburden Dumps	
Job No: 1CM002.039 Filename: AppA_Minto2015SpringInspection_20150731.pptx	Minto Mine	Date: July 2015	Approved: EK / Figure: 7

6 Ore Stockpiles

- The ore stockpiles were nearly depleted at the time of the inspection. All slopes appeared in good condition: no slumping, bulges, cracks, or other signs of instability were observed.

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		Ore Stockpiles		
Job No: 1CM002.039 Filename: AppA_Minto2015SpringInspection_20150731.pptx	Minto Mine	Date: July 2015	Approved: EK	Figure: **8**

7 Mill Site

Conditions of the mill area backslope had recently undergone maintenance to remove loose debris at the toe of the slope due to active erosion. The condition otherwise was consistent with the conditions reported in previous inspections.

Photos (a) and (b): Excavation at the toe of the slope – removal of loose debris. Not signs of instability noted.

Photo (c): slope appears to be slightly undercut, no signs of instability were noted.

Recommendations

- Visually inspect the north slope adjacent to the mill.
- Note: The retaining wall at the mill's apron feeder tunnel was not inspected. Continue to monitor and maintain a photographic record of its condition.

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		Mill Site
Job No: 1CM002.039 Filename: AppA_Minto2015SpringInspection_20150731.pptx	Minto Mine	Date: July 2015 / Approved: EK / Figure: **9**

8 Camp Site

Photo (a): Slope above the main camp site appears stable, however continues to have minor erosion, which can cover the utilidor.

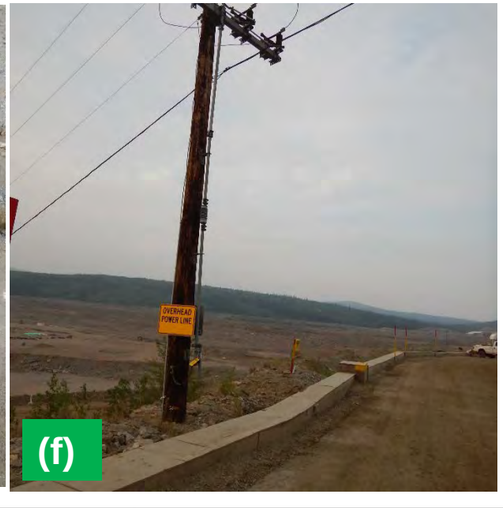
- Eroded sand/gravel is generally present at the base of the slope with occasional cobbles/boulders up to 300 mm.

Photo (b): Cracks observed in steep slopes along the diversion ditch.

Photo (c) to (f): seepage coming out of hill causing erosion directly above the camp power line. View of the seep at the northwest corner of the camp expansion. Erosion channels present south of the camp site near the carpenters shop. Conditions are similar to the Fall 2013 inspection.

Recommendations

- The area above the erosion channels on the camp pad should be regraded to promote runoff away from the channels.
- Develop and implement measure to mitigate the erosion by the carpenter's shop.
- The source of the seepage source located east of the water treatment plan should be determined, or a rip-rapped channel should be created to prevent further erosion.
- Shallow the slopes of the diversion ditch or complete routine maintenance of the ditch to maintain appropriate drainage at the north end of the camp terrace.
- It is recommended that these actions be completed in the following year. In place of the surface grading, a small ditch could be constructed near the slope crest to direct runoff to the drop channel or half-culvert.



srk consulting	capstone MINTO MINE OPERATED BY MINTO EXPLORATIONS LTD.	Spring 2015 Geotechnical Inspection
		Camp Site
Job No: 1CM002.039 Filename: AppA_Minto2015SpringInspection_20150731.pptx	Minto Mine	Date: July 2015 / Approved: EK / Figure: **10**

9 Mill Water Pond

The Mill Water Pond is no longer in service.

Conditions of the Mill Water Pond are unchanged compared to SRK's historical inspections.

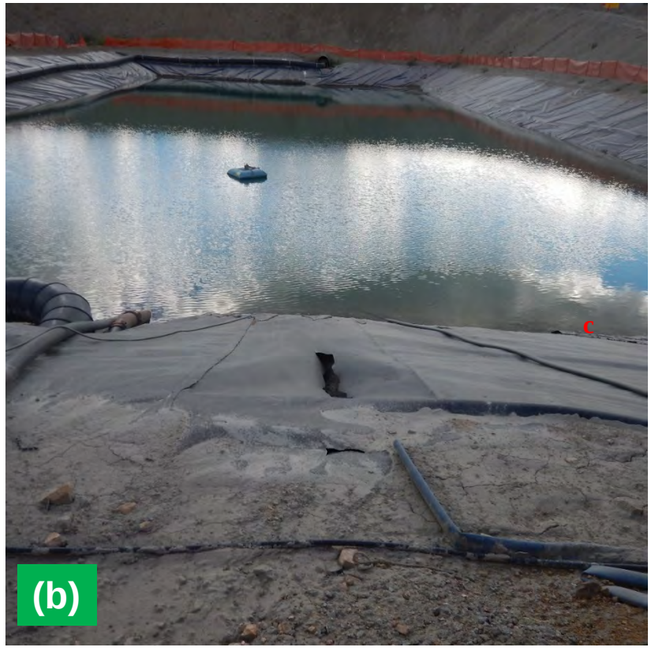
a) Panoramic view of the Mill Water Pond. Tears in the geomembrane system are the same as reported in previous inspections. No new tears or geomembrane defects were observed. Note the fencing around the pond is not continuous.
b) Two tears in the liner midway along the northeast edge of the pond. These tears were first observed in 2009. The largest tear is approximately 1.5 m in length and is parallel to the slope. The smaller tear is approximately 0.5 m in length and orientated perpendicular the slope. A void is present beneath the slope that in previous inspections has been noted to be increasing in size due to water penetration from surface.
c) View of a historical patch on the northeast side of the pond. The condition of the patch is unknown, but does not appear completely sealed (white arrow).

Recommendations

- The perimeter fencing should be repaired.

If the Mill Water Pond is to be brought back into service the following actions are recommended:

- The liner tears should be patched the next time a liner crew is onsite. For the liner tear noted in Photo (c), Figure 14, sand should be placed to fill the void beneath the tear.
- The sediments accumulated in the surface runoff ponds and culverts should be cleaned out.



srk consulting	capstone MINTO MINE OPERATED BY MINTO EXPLORATIONS LTD.	Spring 2015 Geotechnical Inspection	
Job No: 1CM002.039 Filename: AppA_Minto2015SpringInspection_20150731.pptx	Minto Mine	**Mill Water Pond**	
		Date: July 2015	Approved: EK / Figure: **11**

10 Fuel Containment Facility

Observations

- Photo (a) is a general overview of the fuel containment facility. Note the development of the erosion gully along the access ramp (white arrow).
- Photo (b) is a photo of the end of the geotextile cover over the geomembrane. Exposed geomembrane is visible around the perimeter of the fuel containment facility.
- Conditions of the facility appear to be the same as reported in the 2014 review.
- No tears or defects in the liner were observed.
- The liner bedding cover was saturated, but there was not pooled water present.
- Rutting is present in the southern half, and around the perimeter. No liner is exposed as a result of the trafficking.

Recommendations

- The bedding layer over the geomembrane (150 mm thick) was not meant for heavy equipment. Vehicle access should be limited to the occasional visit with low ground pressure equipment.
- Monitor for damage to the geomembrane around the perimeter of the fuel containment facility.
- No actions required.

srk consulting	capstone MINTO MINE OPERATED BY MINTO EXPLORATIONS LTD.	Spring 2015 Geotechnical Inspection
		Fuel Containment Facility
Job No: 1CM002.039 Filename: AppA_Minto2015SpringInspection_20150731.pptx	Minto Mine	Date: July 2015 / Approved: EK / Figure: **12**

11 South Diversion Ditch

- The inspection of the South Diversion Ditch also included a portion of the ditching adjacent to the airport access road.
- Since the Fall 2014 inspection, there appears to be vegetation within the ditch alignment.
- The inlet structure at the end of the ditch was unobstructed.
- No signs of instability were noted along the side-slopes.

a) View of the ditch at adjacent to the airport road. Vegetation within the alignment was limited, and not impacting the capacity of the ditch.
b) Exposed geotextile along the airport road ditch alignment.
c) Airport road ditch at road crossing is at a higher invert than the rest of the ditch. The capacity of the ditch may be impacted.
d) South diversion ditch looking northwest.

Recommendations
- Repair / cover exposed geotextile along the airport road alignment.
- Confirm the airport road ditch profile shown in photo (c) drains properly.
- Remove vegetation within the South Diversion Ditch.

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		South Diversion Ditch	
Job No: 1CM002.039 Filename: AppA_Minto2015SpringInspection_20150731.pptx	Minto Mine	Date: July 2015	Approved: EK / Figure: **13**

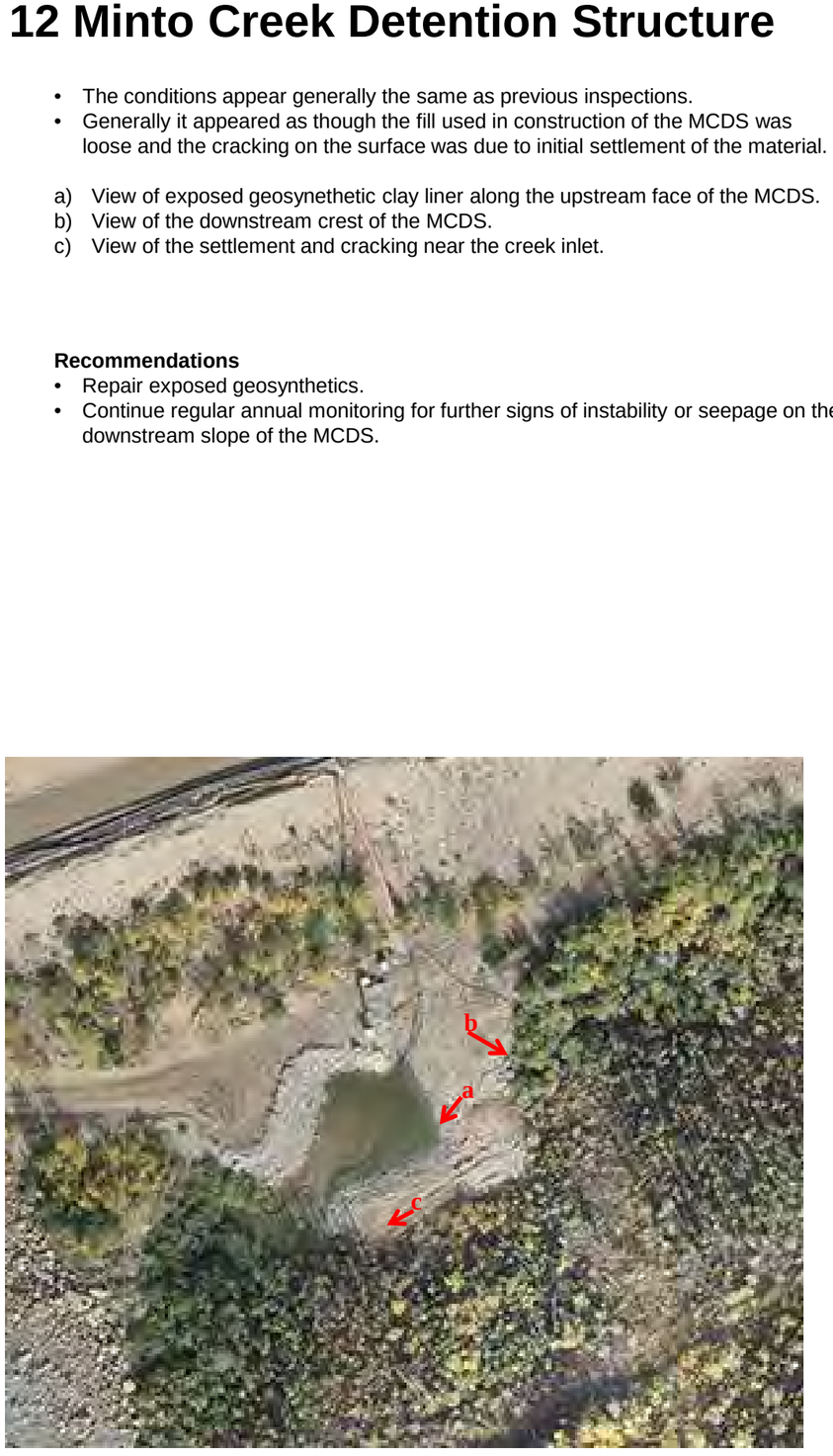
12 Minto Creek Detention Structure

- The conditions appear generally the same as previous inspections.
- Generally it appeared as though the fill used in construction of the MCDS was loose and the cracking on the surface was due to initial settlement of the material.

a) View of exposed geosynethetic clay liner along the upstream face of the MCDS.
b) View of the downstream crest of the MCDS.
c) View of the settlement and cracking near the creek inlet.

Recommendations

- Repair exposed geosynthetics.
- Continue regular annual monitoring for further signs of instability or seepage on the downstream slope of the MCDS.



srk consulting	capstone MINTO MINE OPERATED BY MINTO EXPLORATIONS LTD.	Spring 2015 Geotechnical Inspection	
		Minto Creek Detention Structure	
Job No: 1CM002.039 Filename: AppA_Minto2015SpringInspection_20150731.pptx	Minto Mine	Date: July 2015	Approved: EK / Figure: **14**

13 Water Storage Pond Dam

- A large area of erosion was evident on the left abutment of the dam.
- The water level was lower than the minimum operating level, exposing the dam to potential erosion.
- No signs of instability along the dam, or at the abutments other than the evident erosion on the upstream side of the dam at the left abutment.
- Seepage water downstream of the dam was clear and no accumulation of sediments was observed.
- The weir present downstream of the dam had an estimated flow rate of 1L/s. Condition of the seepage water appears unchanged compared to the 2013 inspection. Water flow could not be heard in the rockfill adjacent to the seep. The water was clear with no turbidity.

Photo (a): View of the upstream face looking towards the north. Note the water level is below the rip rap armouring on the face of the dam.

Photo (b), (c), and (d): Erosion on the left abutment.

Recommendations

- Engage the Engineer of Record in the repair of the dam at the left abutment.
- Continue regular monitoring of the dam, noting specifically the clarity of the seepage and flow exiting the stilling basin, and the seepage rate through the weir.

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Job No: 1CM002.039
Filename: AppA_Minto2015SpringInspection_20150731.pptx

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Minto Mine

Spring 2015 Geotechnical Inspection

Water Storage Pond Dam

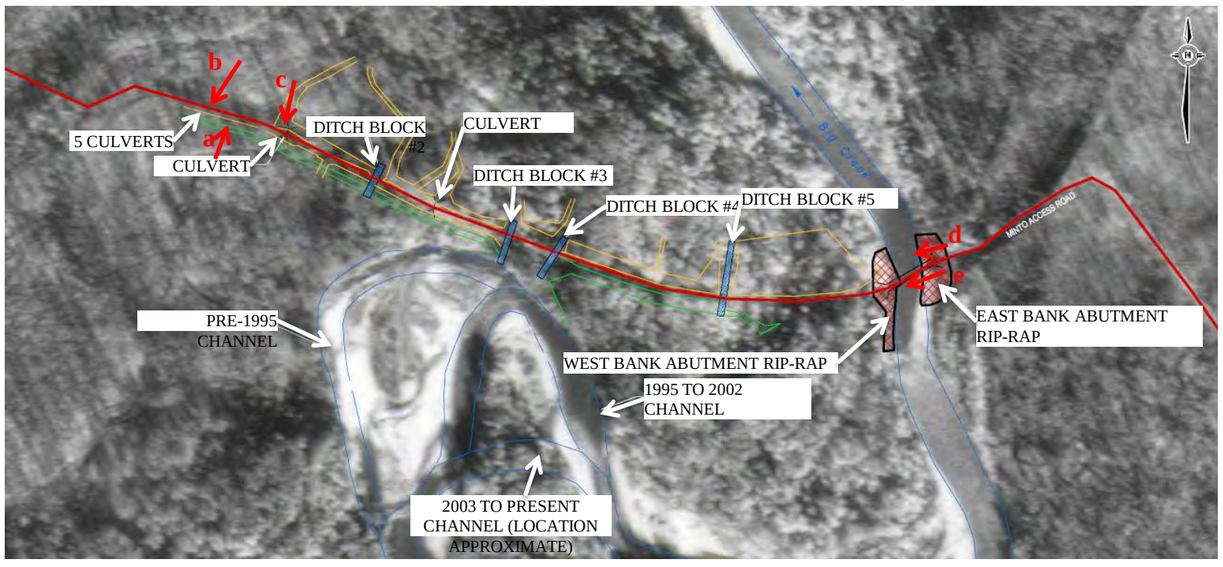
Date:	Approved:	Figure:
July 2015	EK	**15**

14 Big Creek Bridge

- Conditions of the culverts are unchanged since the previous Fall 2013 inspection. The first culvert west of the bridge is in satisfactory condition.
- Photo (a) and (b) shows 5 culverts, each with diameter of 1.1m. The culverts are in satisfactory condition, with no blockages at either end. Exposed geotextile on the south side should be repaired.
- Photo (d) shows the downstream end of the 2nd culvert west of the bridge. Sediment accumulation should continue to be monitored and cleaned out if sediments continue to accumulate.
- Ditch Blocks were not inspected.
- Photo (c) shows the downstream end of the 2nd culvert west of the bridge. Sediment accumulation should continue to be monitored and cleaned out if sediments continue to accumulate. The exposed geotextile should be repaired.
- Photos (d) and (e) show above and below the bridge, respectively. The bridge abutments and road approaches are in good condition, no signs of instability were observed.

Recommendations

- Continue regular annual monitoring of sediment accumulation in the culverts, and clean out if sediments continue to accumulate.
- Repair exposed geotextile around culverts.



Source: Figure 1, EBA letter "Big Creek Bridge– 2011 Annual Review, Minto Mine, YT", dated September 30, 2011.

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Job No: 1CM002.039 Filename: AppA_Minto2015SpringInspection_20150731.pptx	Minto Mine	**Big Creek Bridge**	
		Date: July 2015	Approved: EK	Figure: **16**

15 Main Pit, South Wall Buttress & In-Pit Dumps

Photo a: View of the In-Pit Dump taken from the north west corner of the pit.
Photo b: View of the tension cracks at level 821 above the In-Pit Dump located west of the South Wall Buttress. These cracks were first observed during the 2015 site inspection.
Photo c: View of the tension cracks on the In-Pit Dump located west of the South Wall Buttress. This area has been blocked off and is inaccessible to equipment. The movement is believed to be due to the large dump height, with the material end dumped directly into the pit water.

Recommendations

- The tension crack area should be continue to be visually monitored, and the survey hubs should continue to be monitored. A photographic record should be maintained to inspect for changes in condition.
- Survey hubs should be installed at level 821 to monitor movement and cracks should be painted.

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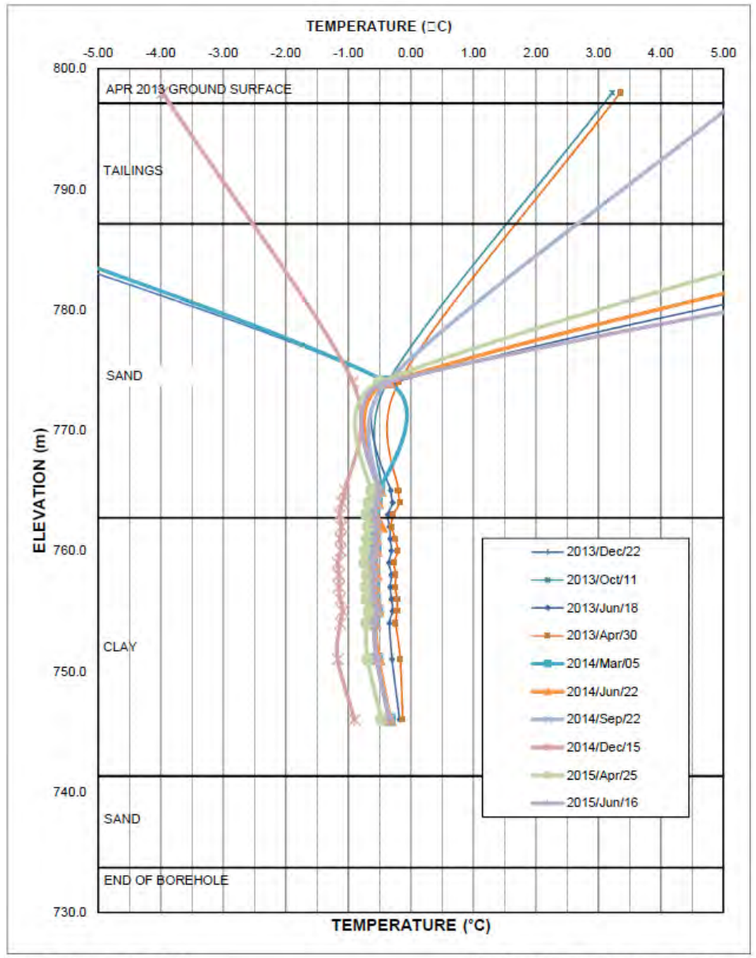
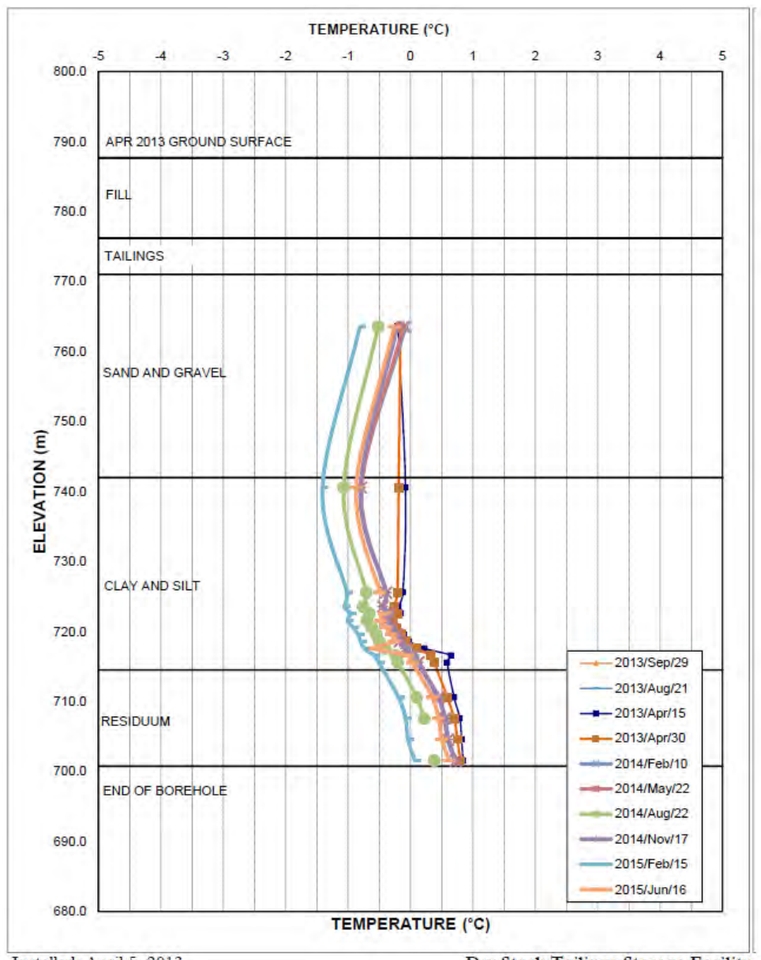
Job No: 1CM002.039 Filename: AppA_Minto2015SpringInspection_20150731.pptx	Minto Mine	**South Wall Buttress**	
		Date: July 2015	Approved: EK / Figure: **17**

Appendix B: Monitoring Instrumentation Data



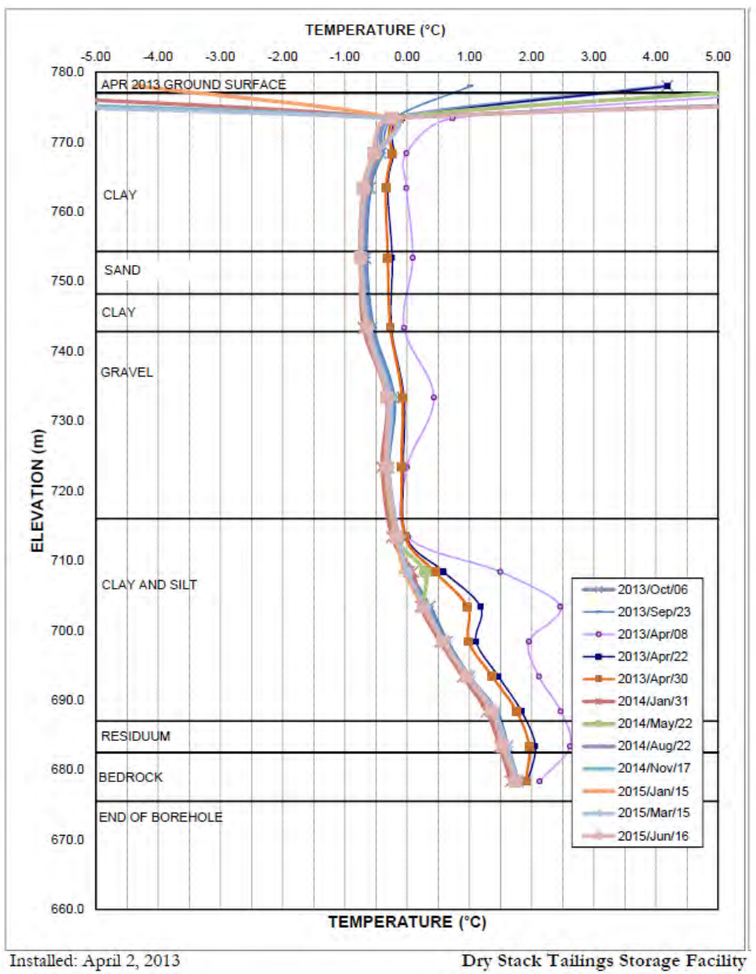
Installed: April 17, 2013

Dry Stack Tailings Storage Facility
Ground Temperature Profile - DST-10



Installed: April 5, 2013

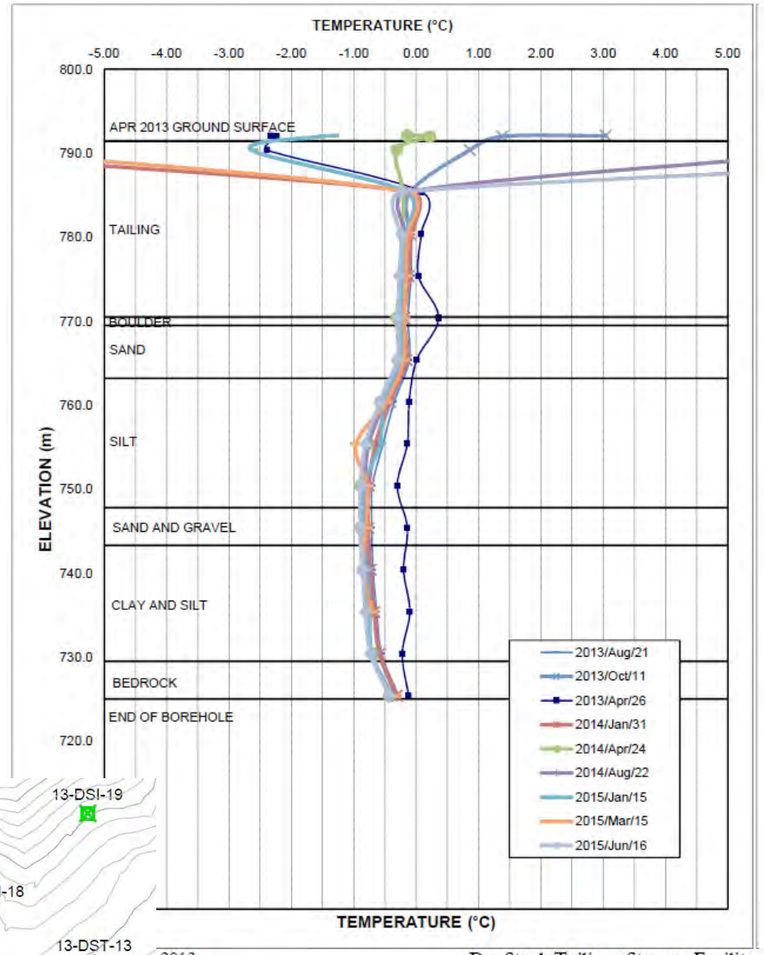
Dry Stack Tailings Storage Facility
Ground Temperature Profile - DST-11



Installed: April 2, 2013

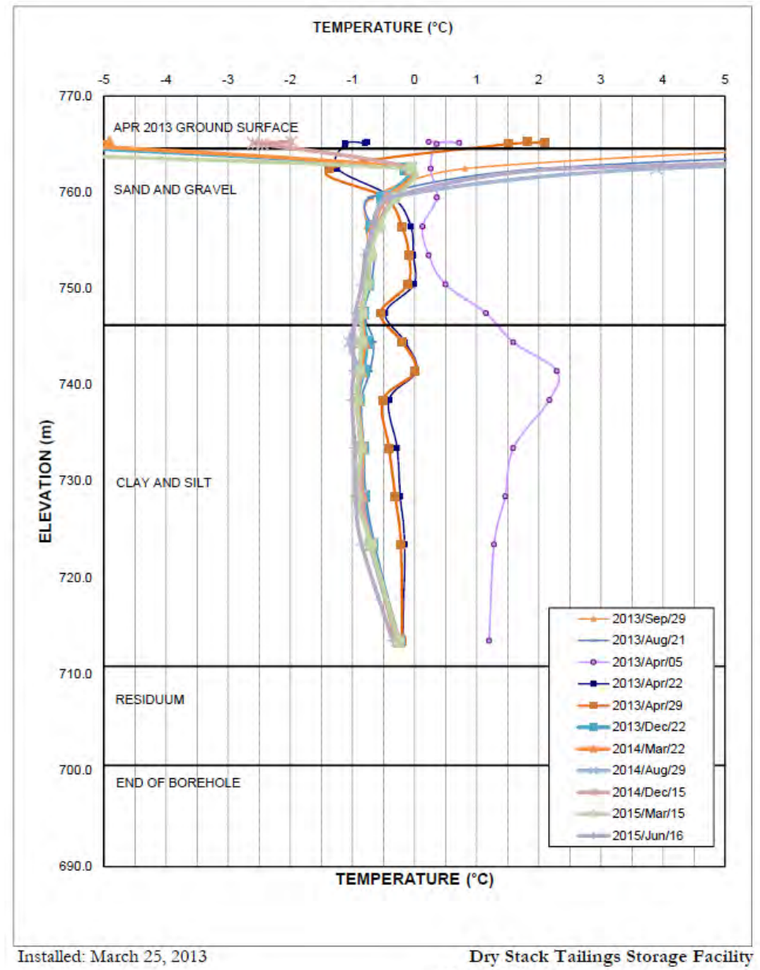
Dry Stack Tailings Storage Facility
Ground Temperature Profile - DST-13

srk consulting VANCOUVER	capstone MINTO MINE OPERATED BY MINTO EXPLORATIONS LTD.	2015 Freshet Geotechnical Review
Job No: 1CM002.012.039 Filename: Minto_2015FreshetInspection_1CM002.039..ppt	Minto Mine	**DSTSF Thermistors (1 of 2)**
		Date: July 2015 / Approved: PHM / Figure: 1



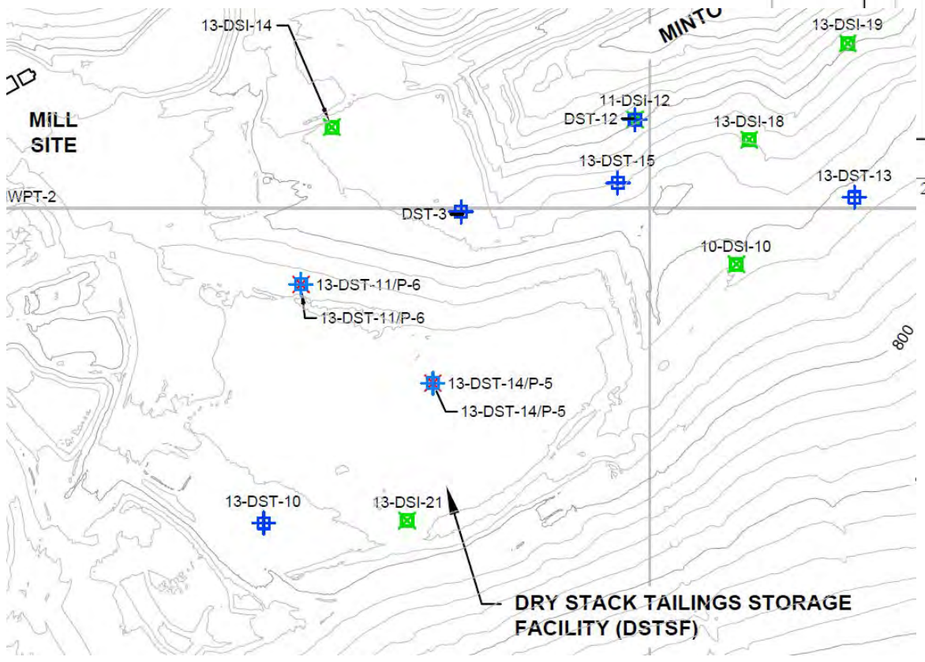
2013

Dry Stack Tailings Storage Facility
Ground Temperature Profile - DST-14

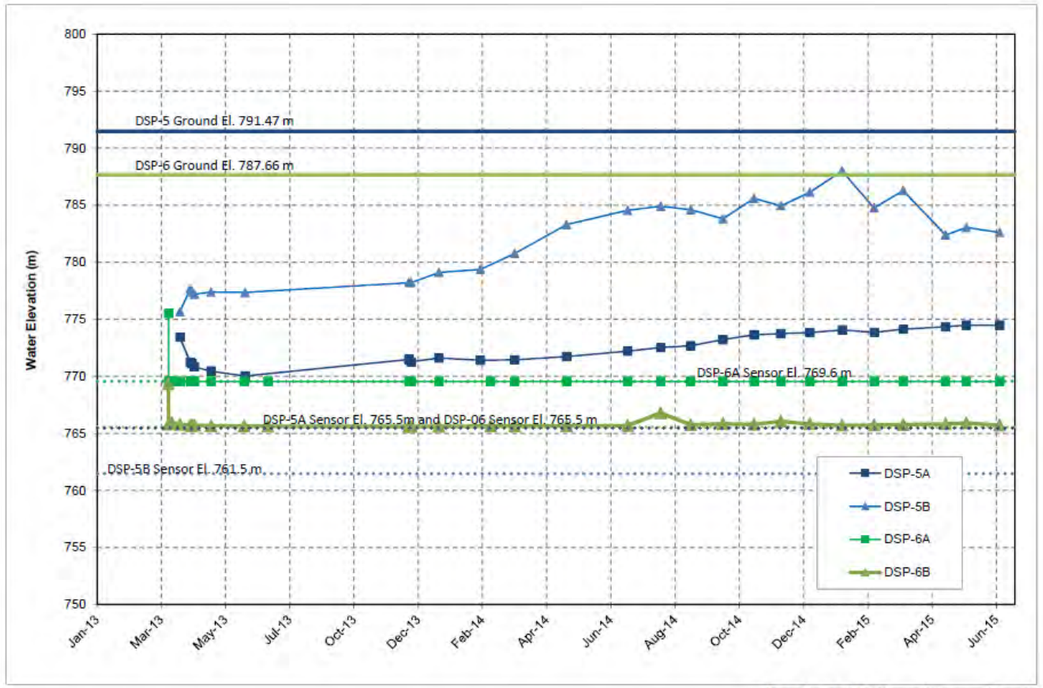


Installed: March 25, 2013

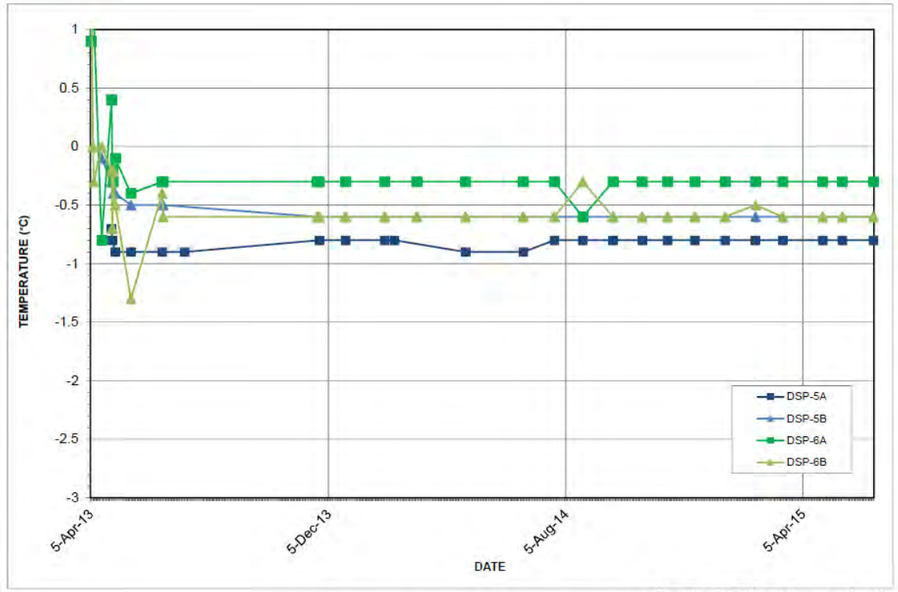
Dry Stack Tailings Storage Facility
Ground Temperature Profile - DST-15



srk consulting VANCOUVER	capstone MINTO MINE OPERATED BY MINTO EXPLORATIONS LTD.	2015 Freshet Geotechnical Review
Job No: 1CM002.012.039 Filename: Minto_2015FreshetInspection_1CM002.039..ppt	Minto Mine	**DSTSF Thermistors (2 of 2)** Date: July 2015 · Approved: PHM · Figure: **2**



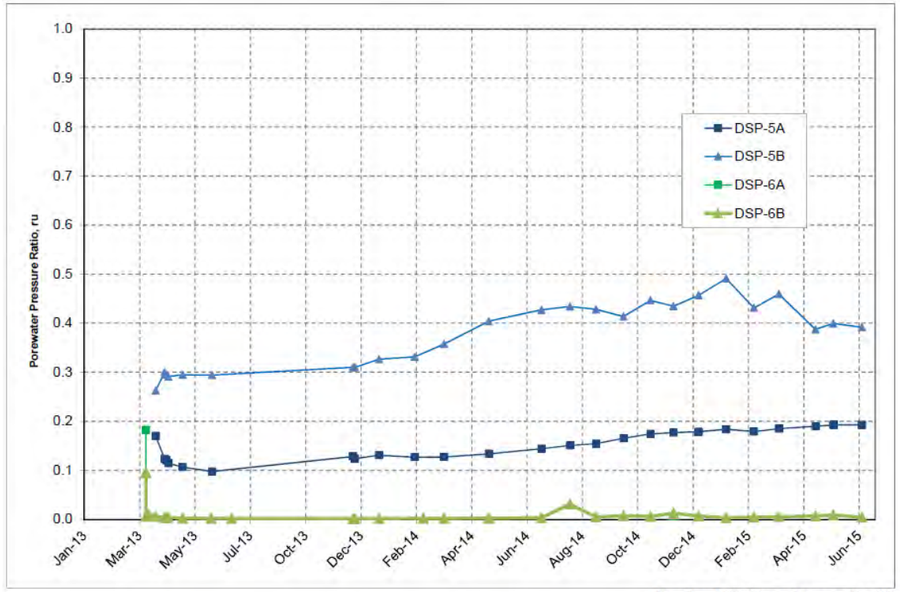
Dry Stack Tailings Storage Facility
Instrument Water Elevation - DSP-5A, DSP-5B, DSP-6A, DSP-6B



Dry Stack Tailings Storage Facility
Ground Temperature Profile of VW Piezometer - DSP-5A, DSP-5B, DSP-6A, DSP-6B

Notes:

- Water pressure elevations may not be accurate as barometric pressures were estimated and temperature sensors indicate frozen conditions.
- DSP-5 piezometer sensors are installed at the same location as the DST-14 ground temperature cable presented in Figure 2.
- DSP-6 piezometer sensors are installed at the same location as the DST-11 ground temperature cable presented in Figure 1.



Dry Stack Tailings Storage Facility
Ground Temperature Profile of VW Piezometer - DSP-5A, DSP-5B, DSP-6A, DSP-6B

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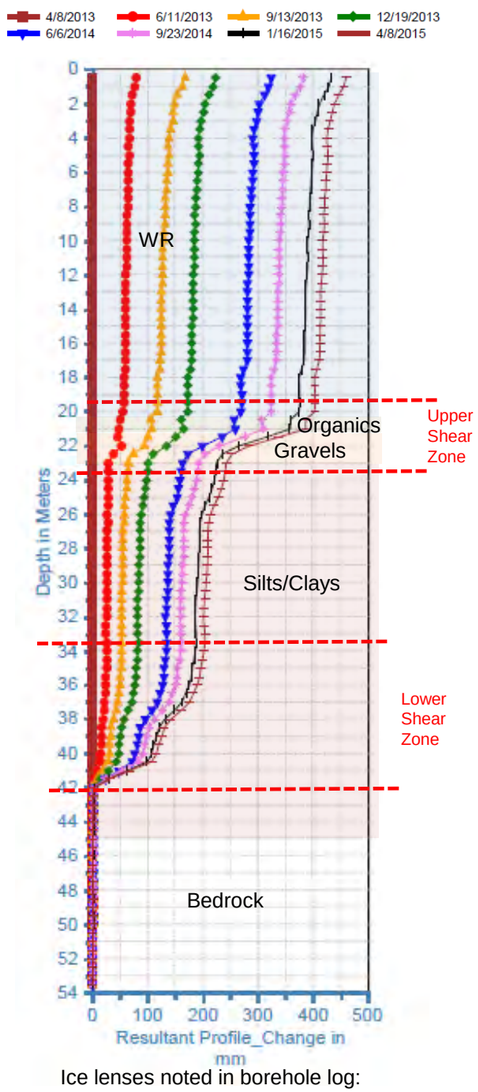
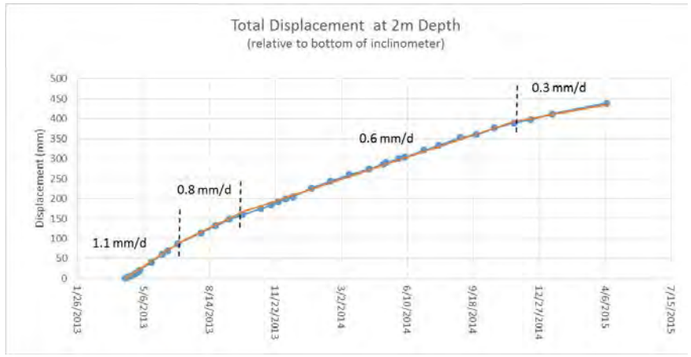
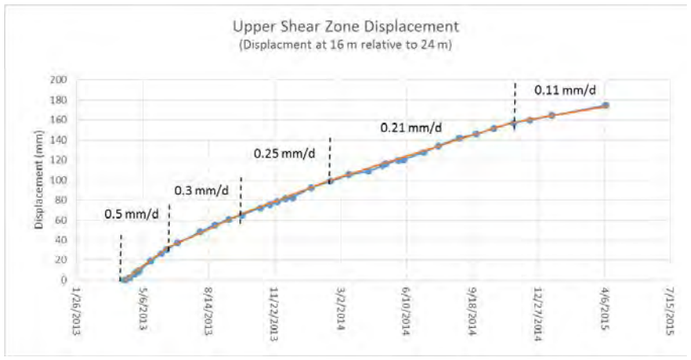
2015 Freshet Geotechnical Review

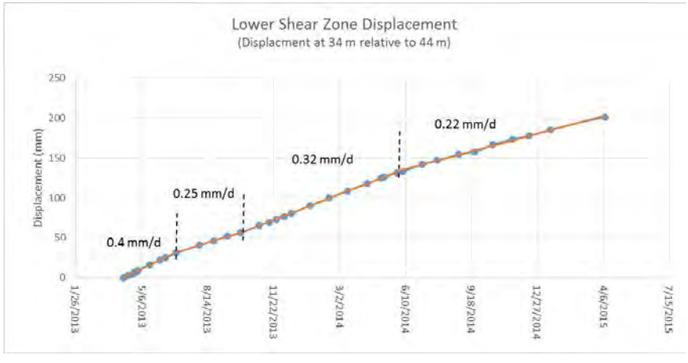
DSTSF Piezometers

Job No: 1CM002.012.039	Minto Mine	Date: July 2015	Approved: PHM	Figure: 3
Filename: Minto_2015FreshetInspection_1CM002.039..ppt			



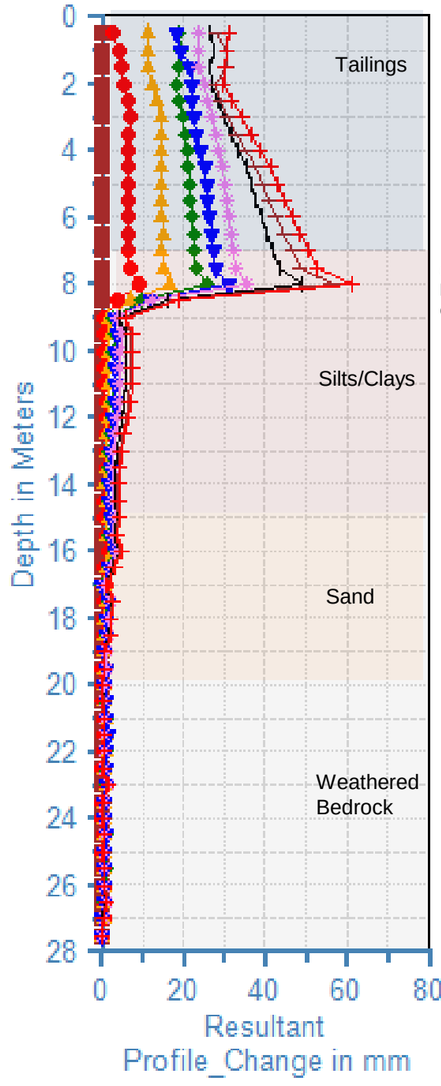


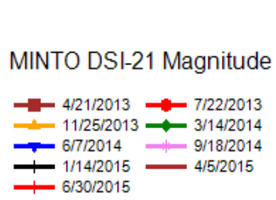




Ice lenses noted in borehole log:

- 10 mm thick at 31m;
- 75 mm thick at 34 m;
- 125 mm thick at 38 m;
- 50 mm thick at 39 m.

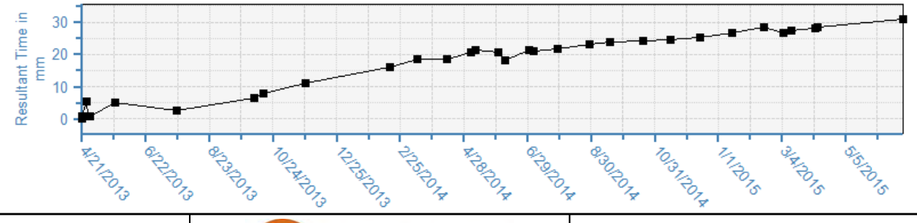




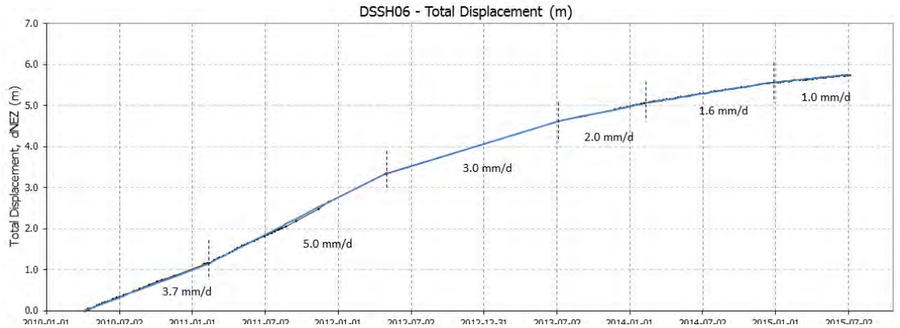
@ 7-8m: Layered ice+soil, 1-2 mm lenses with 5mm soil separation, 20% excess ice.

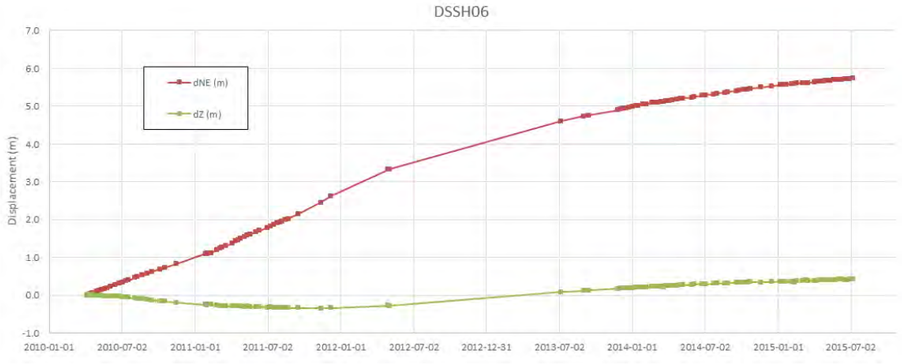
DSI-21

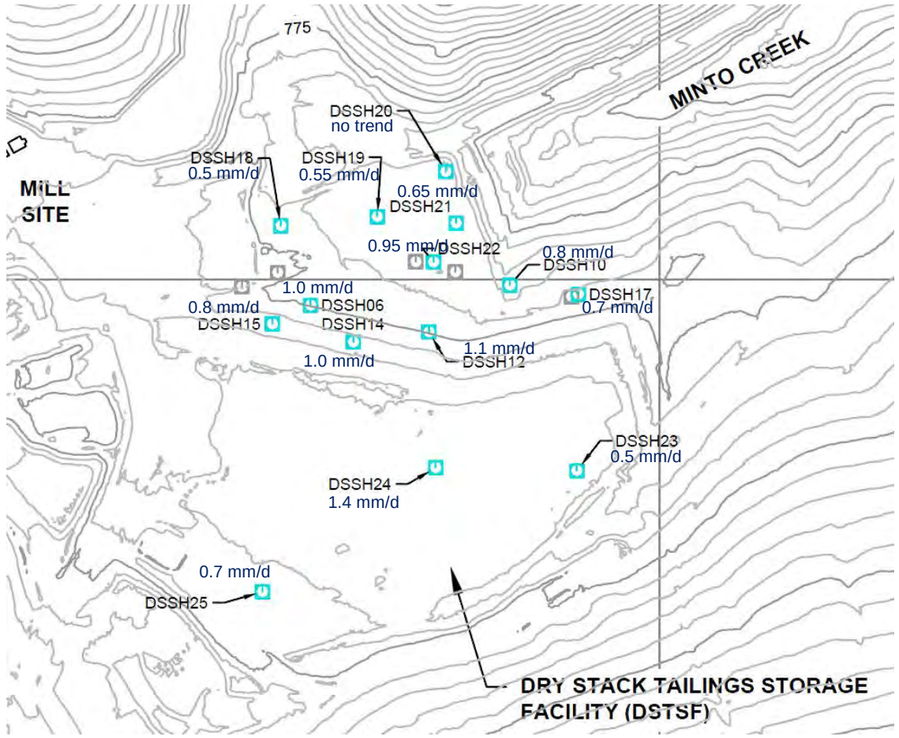
Magnitude Displacement between top and bottom of inclinometer (mm)

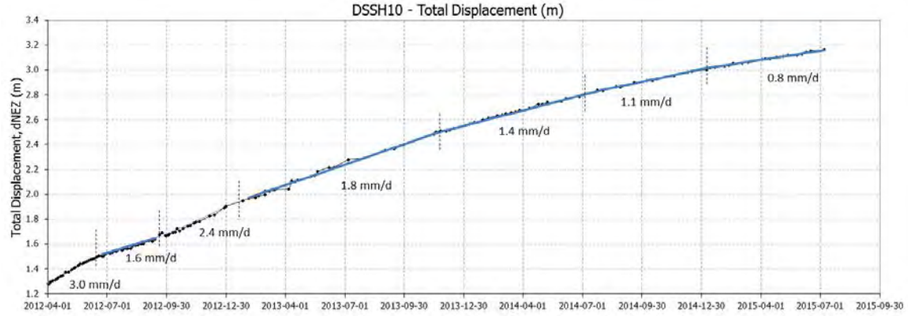


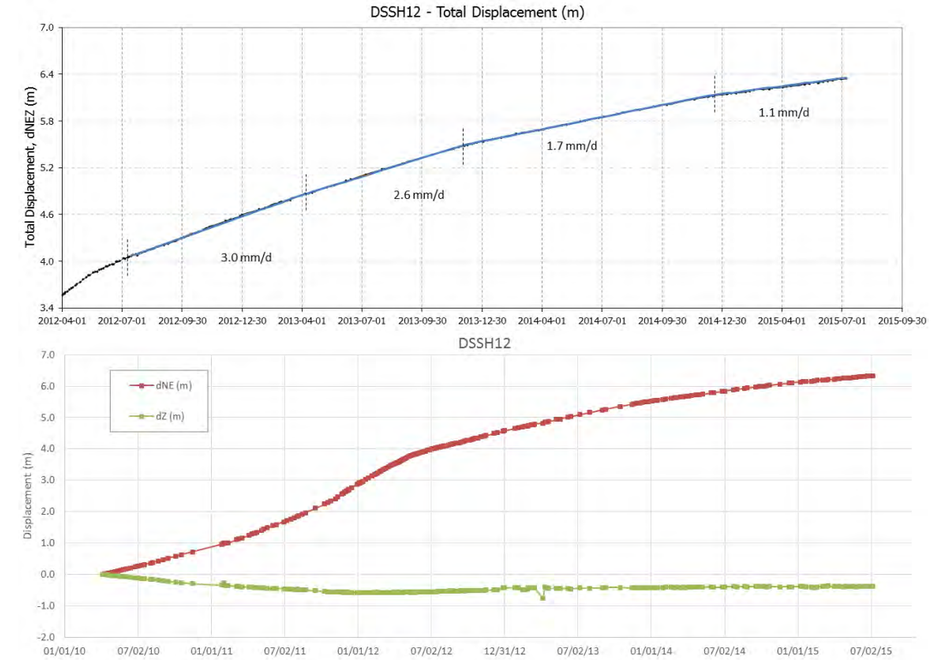
srk consulting VANCOUVER	capstone MINTO MINE OPERATED BY MINTO EXPLORATIONS LTD.	2015 Freshet Geotechnical Review	
Job No: 1CM002.012.039 Filename: Minto_2015FreshetInspection_1CM002.039..ppt	Minto Mine	**DSTSF Inclinometers**	
		Date: July 2015	Approved: PHM / Figure: **4**











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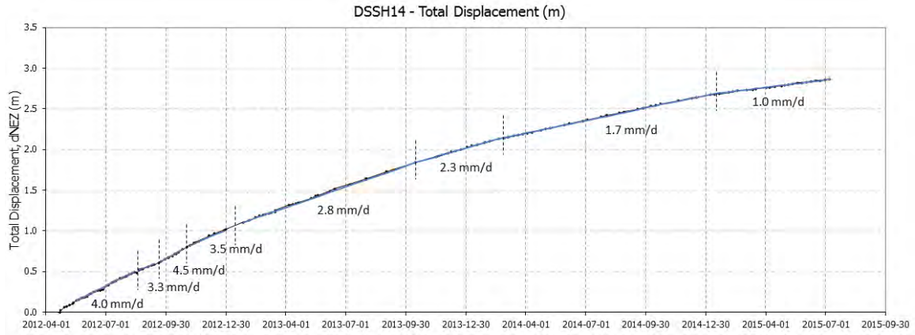
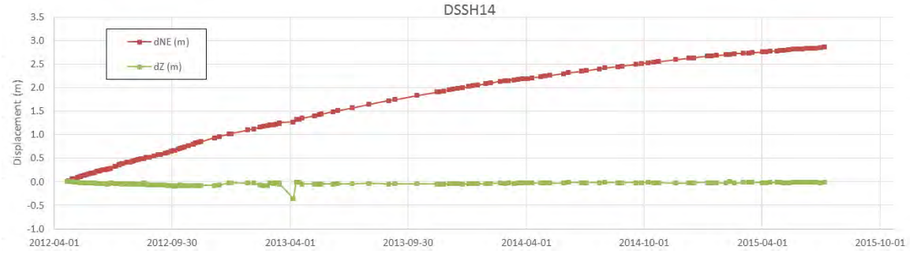
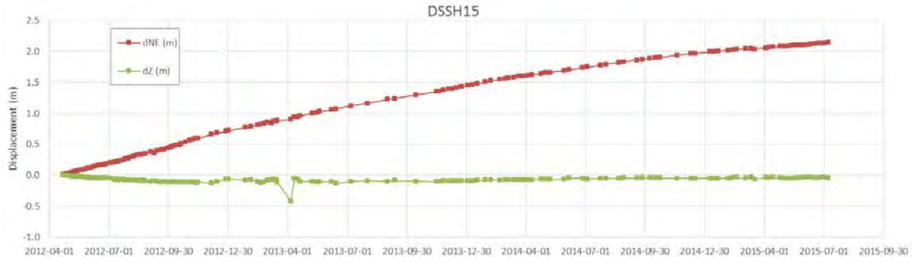
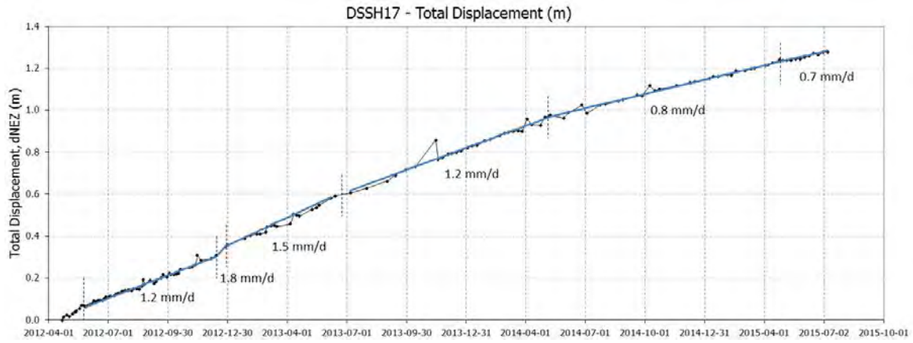
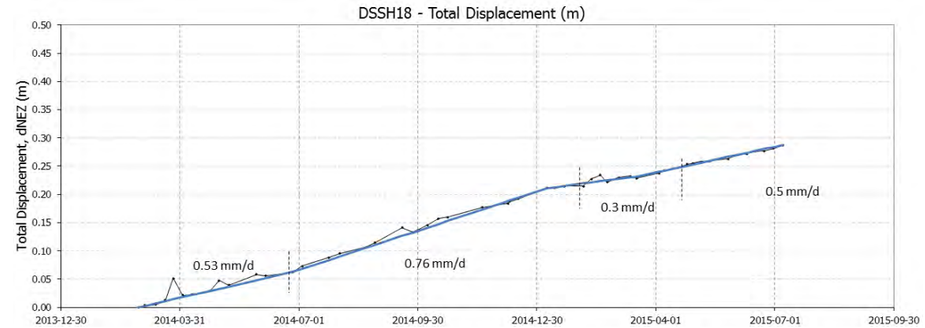
		DSTSF Survey Hubs (1 of 4)
Job No: 1CM002.012.039 Filename: Minto_2015FreshetInspection_1CM002.039..ppt	Minto Mine	Date: July 2015 / Approved: PHM / Figure: **5**

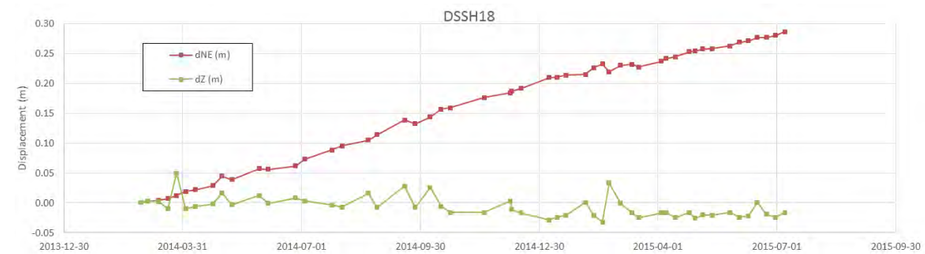












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2015 Freshet Geotechnical Review

DSTSF Survey Hubs (2 of 4)

Job No: 1CM002.012.039

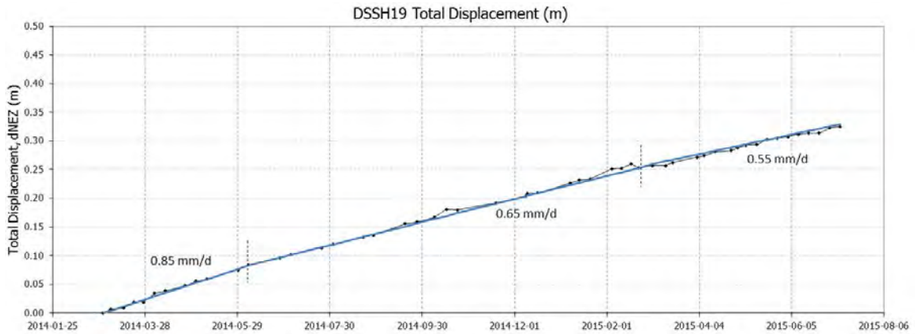
Filename: Minto_2015FreshetInspection_1CM002.039..ppt

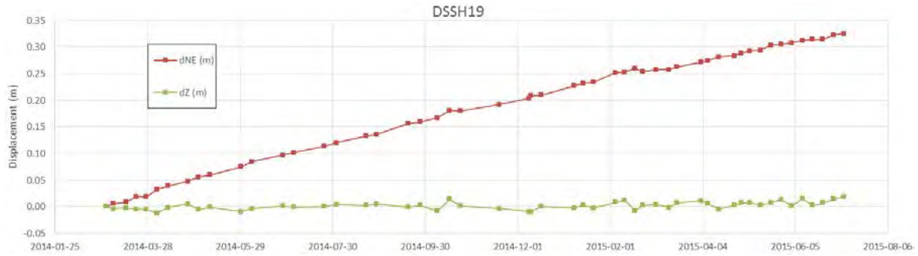
Minto Mine

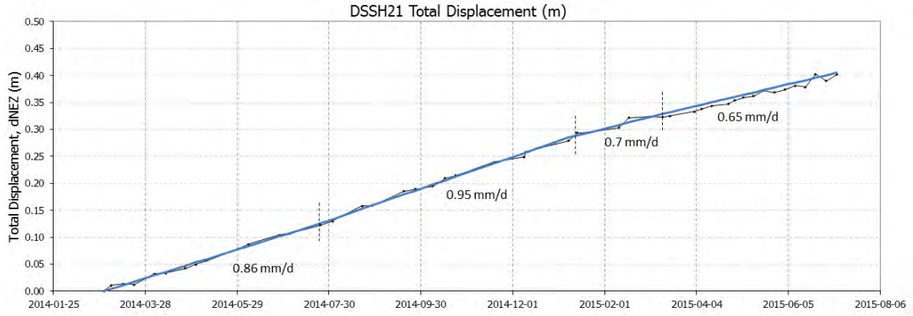
Date: July 2015

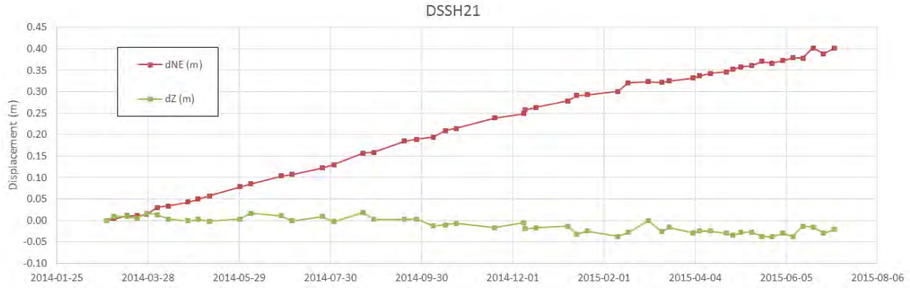
Approved: PHM

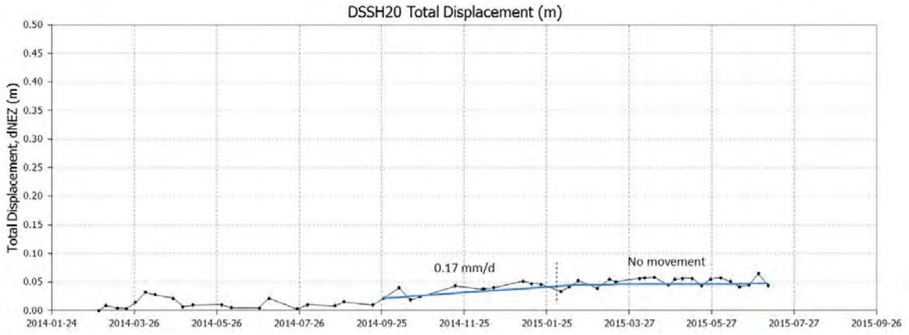
Figure: **6**

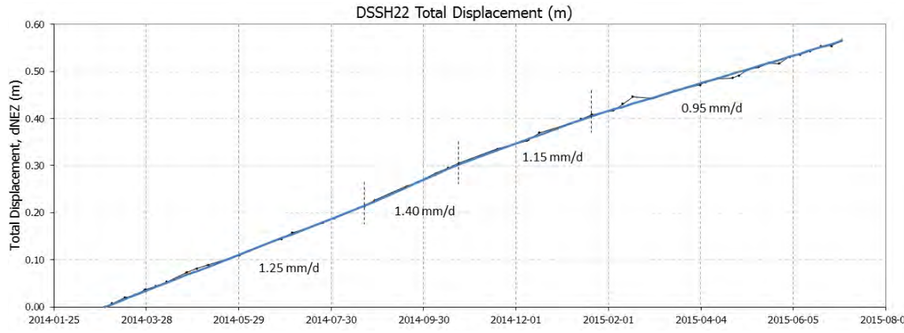


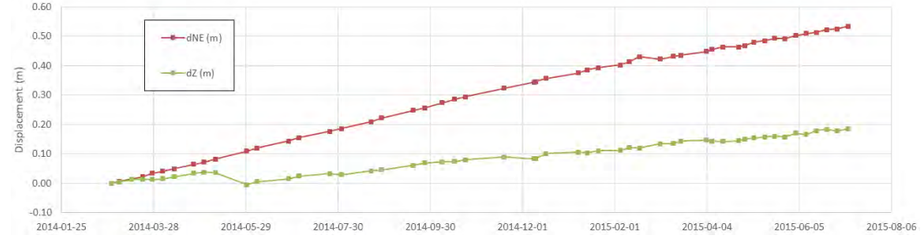












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2015 Freshet Geotechnical Review

DSTSF Survey Hubs (3 of 4)

Job No: 1CM002.012.039

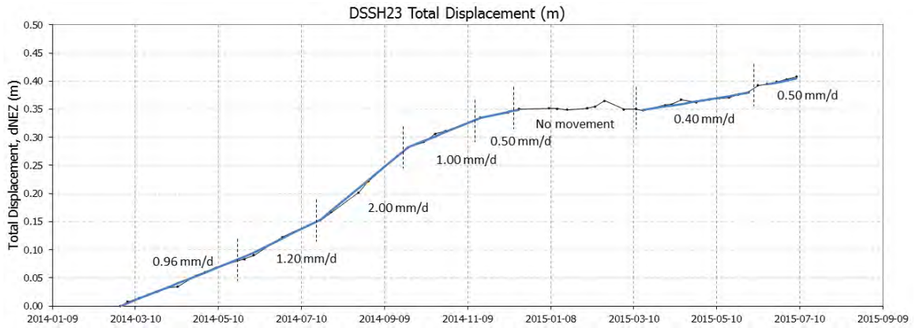
Filename: Minto_2015FreshetInspection_1CM002.039..ppt

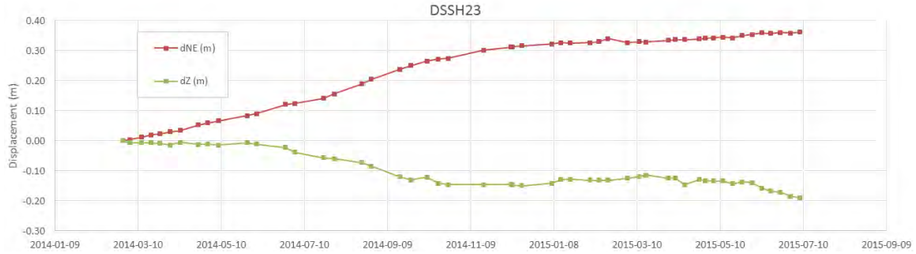
Minto Mine

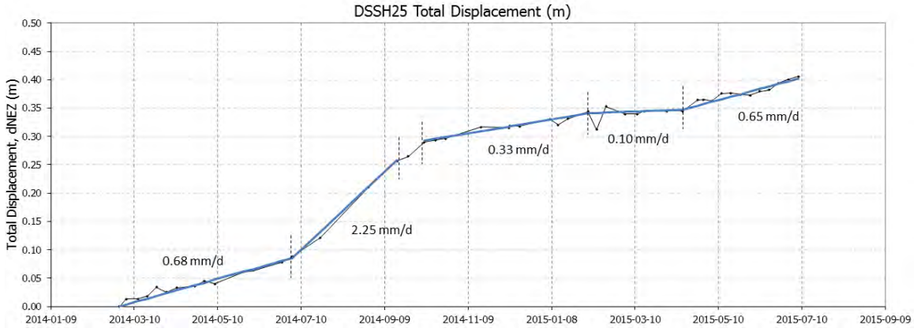
Date: July 2015

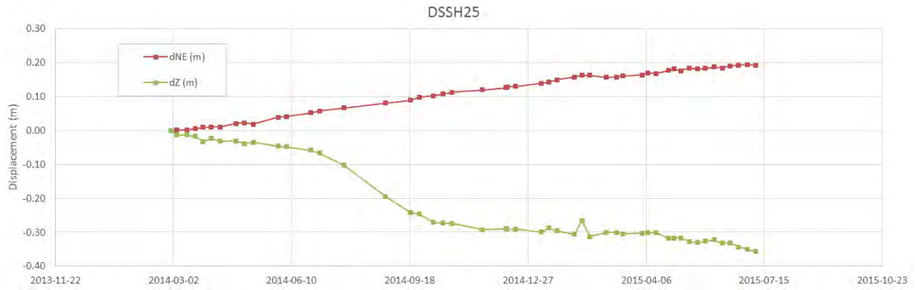
Approved: PHM

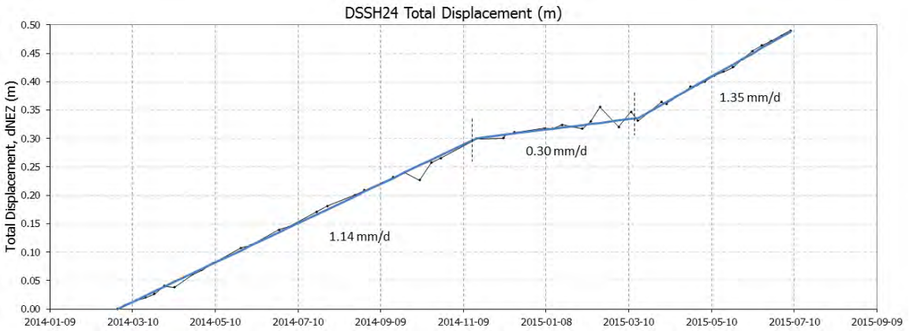
Figure: **7**

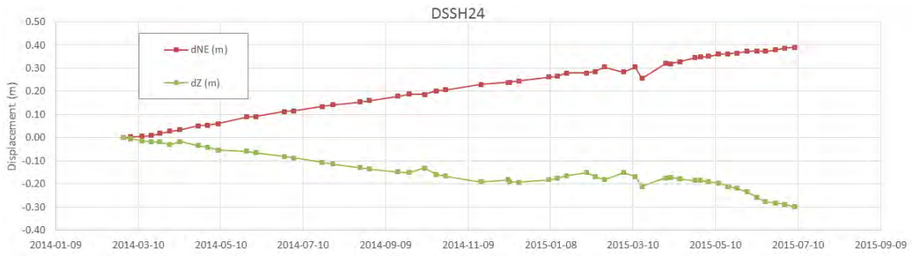












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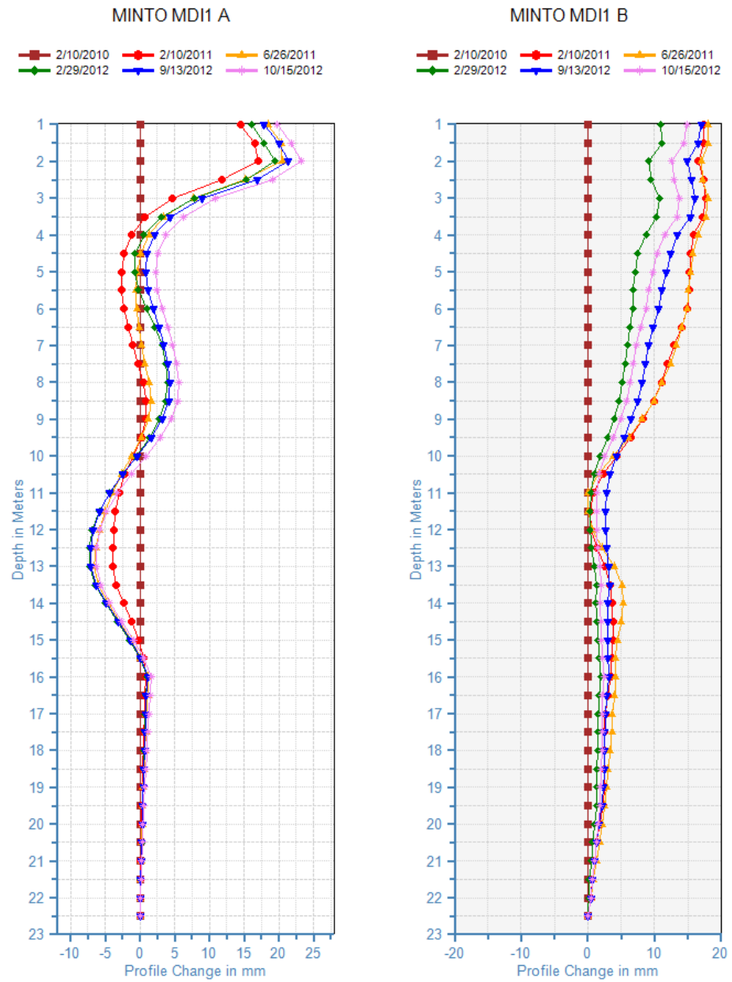
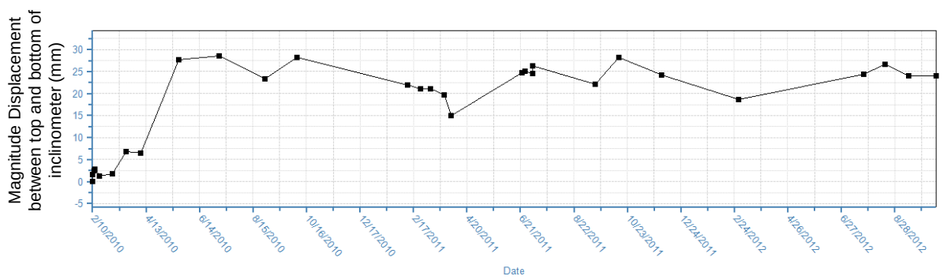
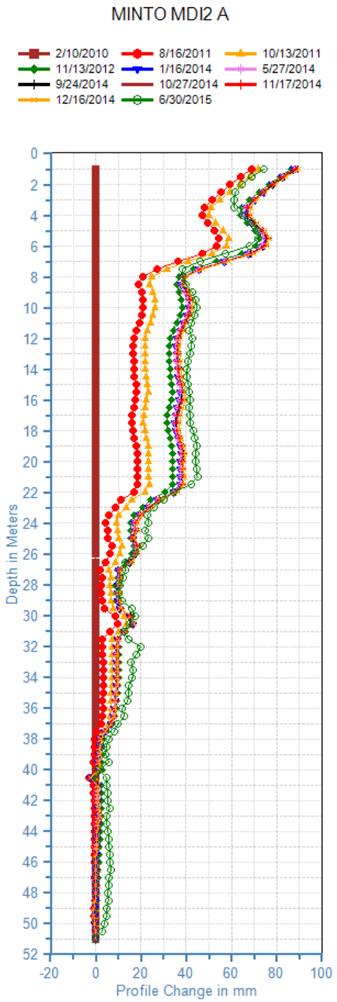
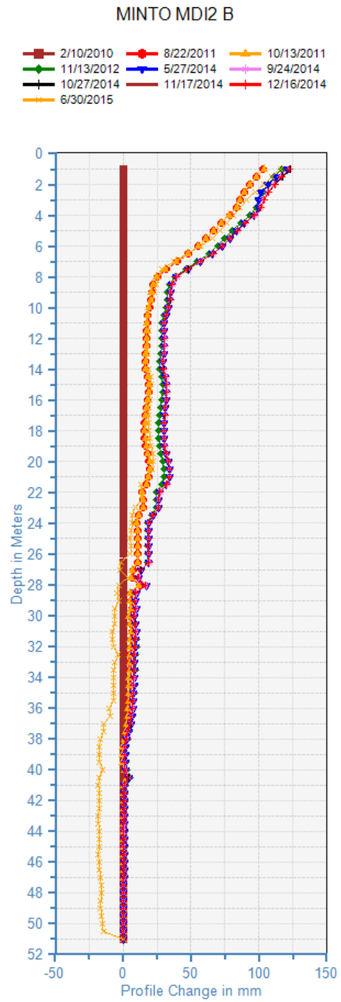
Job No: 1CM002.012.039 Filename: Minto_2015FreshetInspection_1CM002.039..ppt	Minto Mine	**DSTSF Survey Hubs (4 of 4)**
		Date: July 2015 / Approved: PHM / Figure: **8**

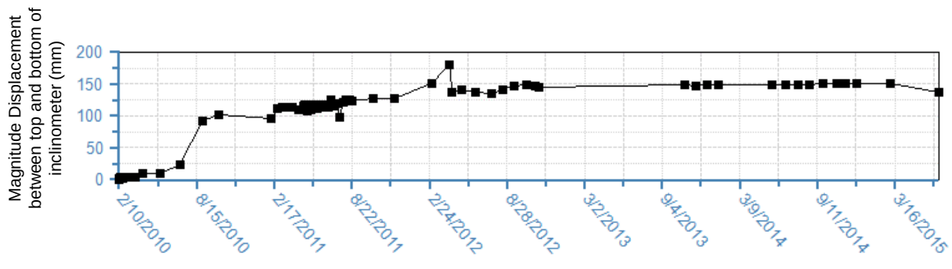




MDI-1

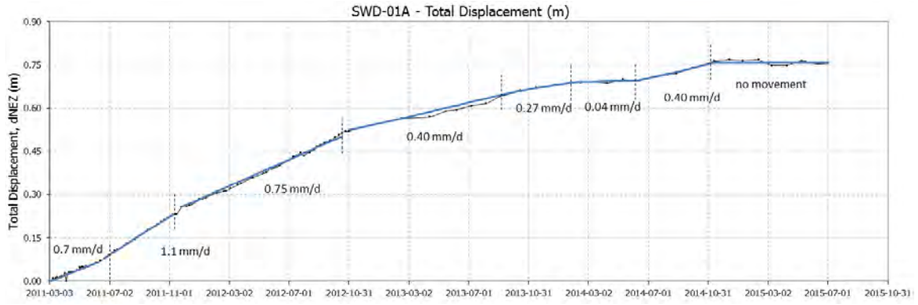


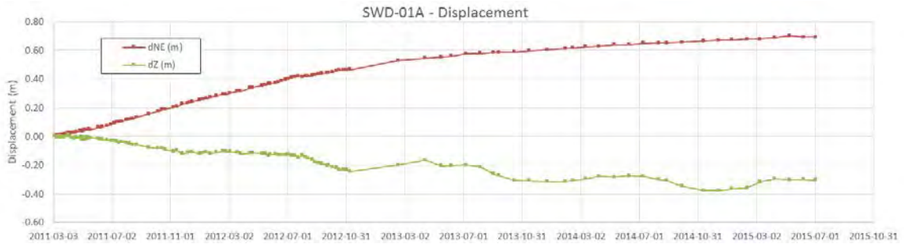




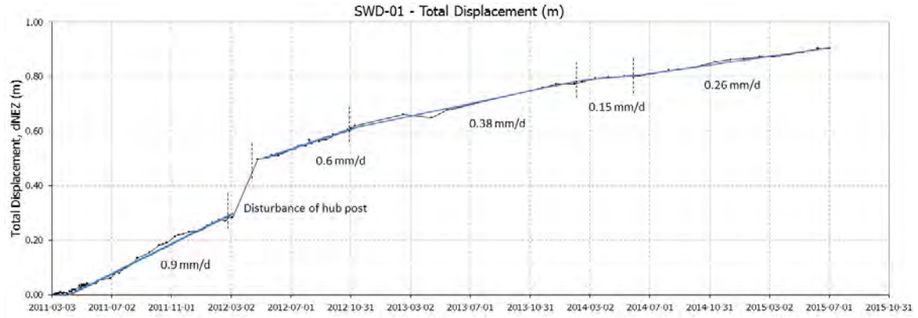
MDI-2

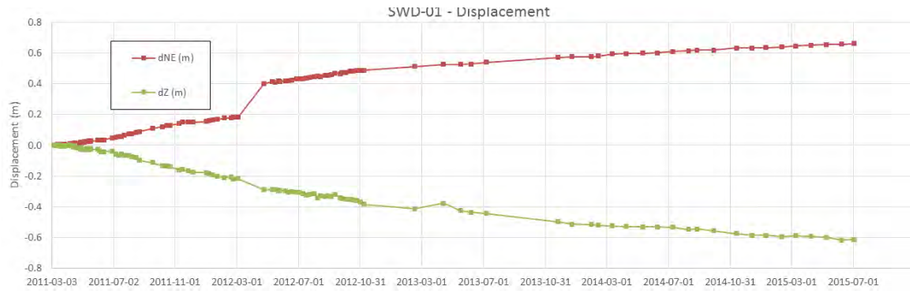
srk consulting VANCOUVER	capstone MINTO MINE OPERATED BY MINTO EXPLORATIONS LTD.	2015 Freshet Geotechnical Review	
		Main Waste Dump Inclinometers	
Job No: 1CM002.012.039 Filename: Minto_2015FreshetInspection_1CM002.039..ppt	Minto Mine	Date: July 2015	Approved: PHM / Figure: **9**

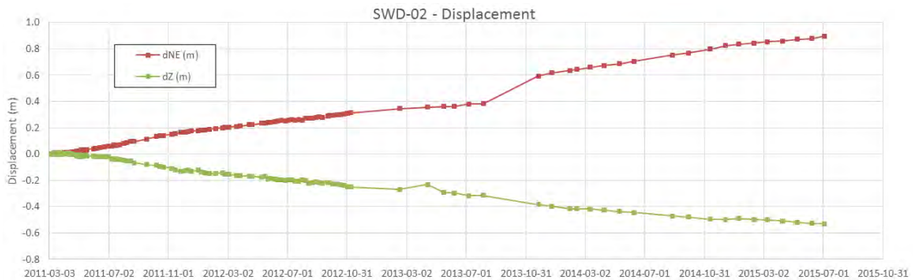




View of SWD-01A; heaved 30 cm out of the ground (Sept. 2014 photo).







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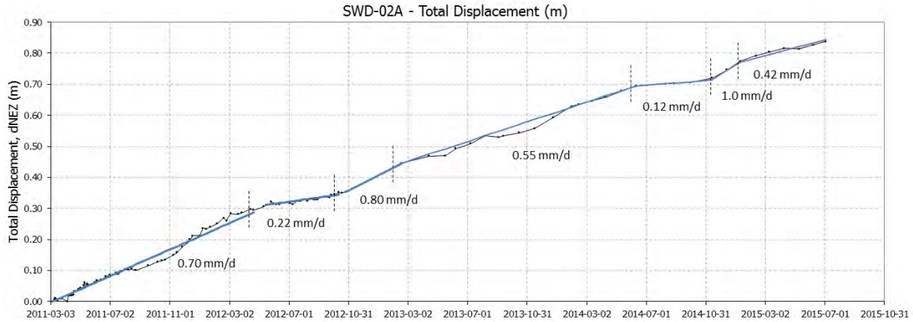
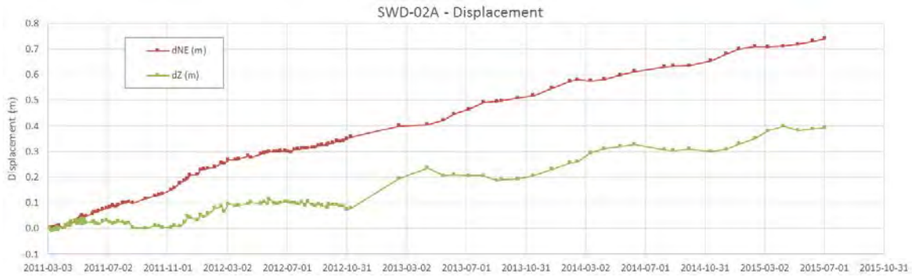
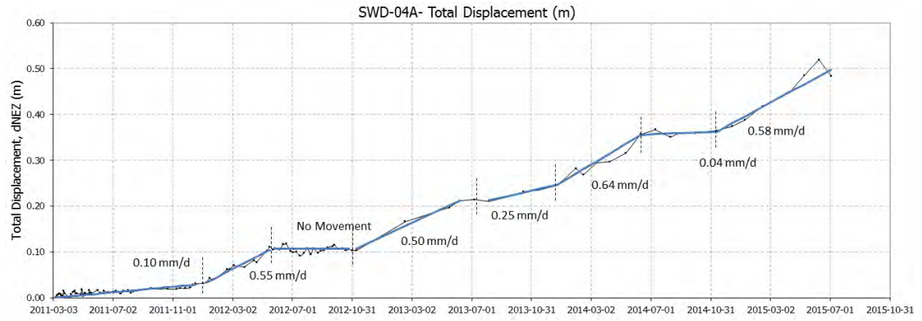
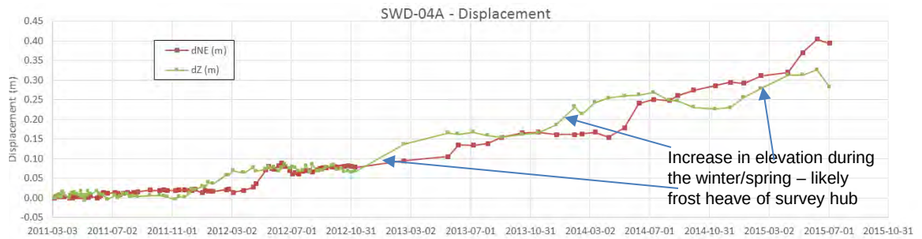
		Southwest Waste Dump Survey Hub Instrumentation (1 of 2)
Job No: 1CM002.012.039 Filename: Minto_2015FreshetInspection_1CM002.039..ppt	Minto Mine	Date: July 2015 / Approved: PHM / Figure: **10**

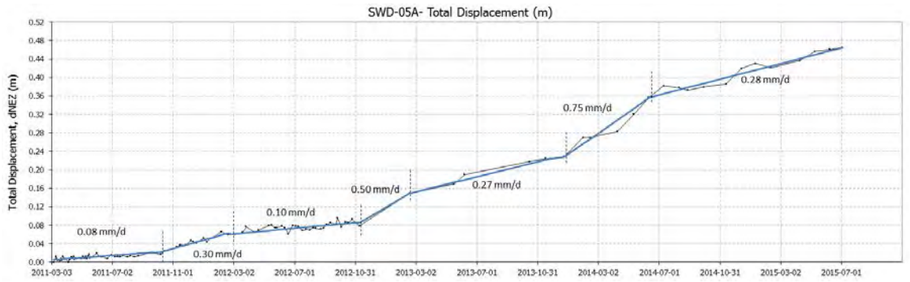


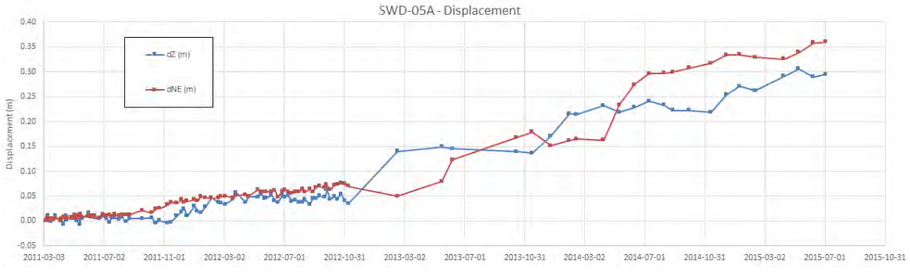






View of SWD-04A; heaved 55 cm out of the ground. (Sept. 2014 photo)





View of SWD-05A; heaved 30 cm out of the ground (Sept. 2014 photo).

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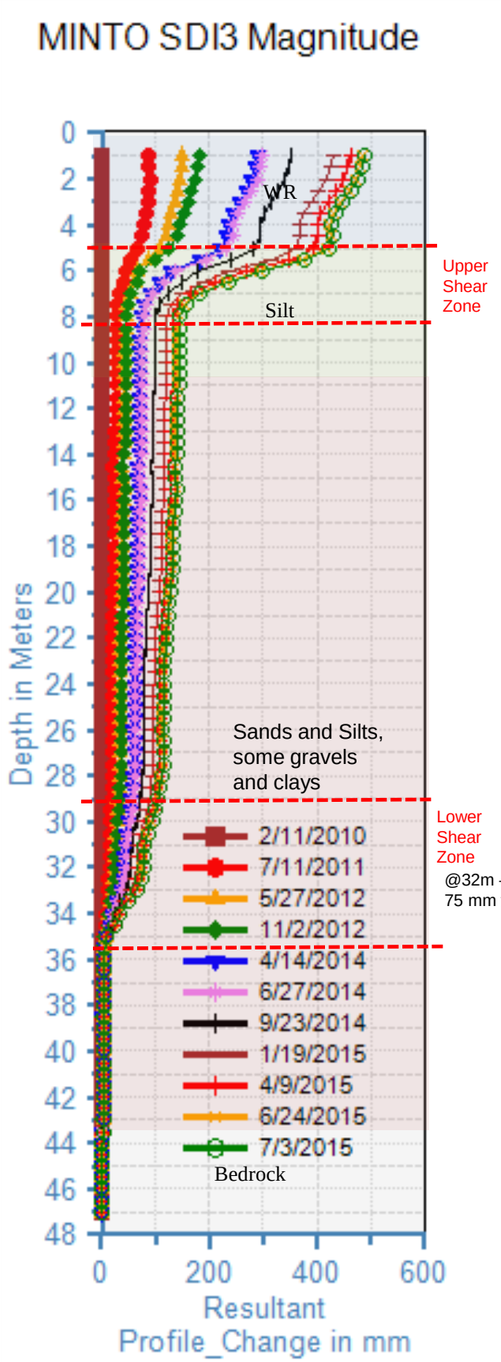
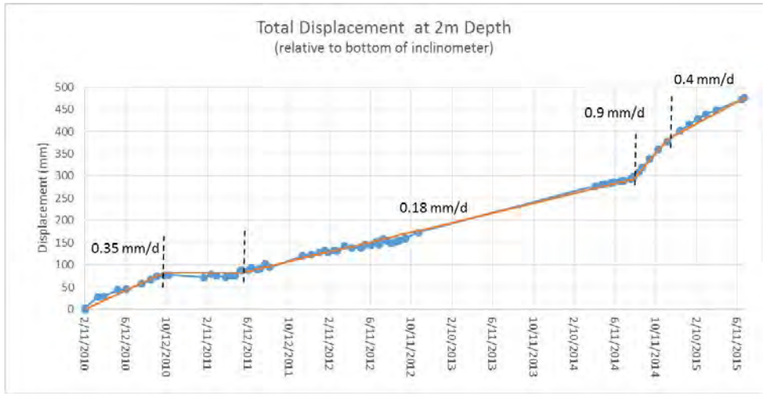
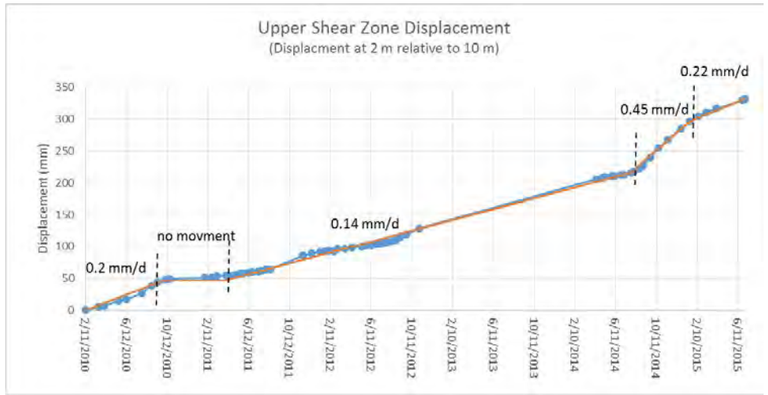
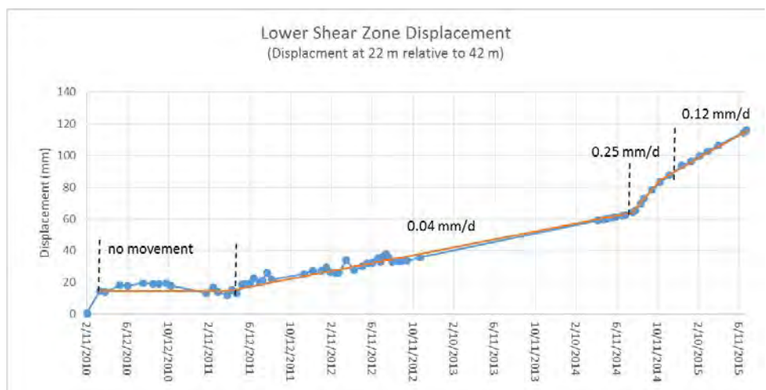
Job No: 1CM002.012.039 Filename: Minto_2015FreshetInspection_1CM002.039..ppt	Minto Mine	**Southwest Waste Dump Survey Hub Instrumentation (2 of 2)**
		Date: July 2015 / Approved: PHM / Figure: **11**

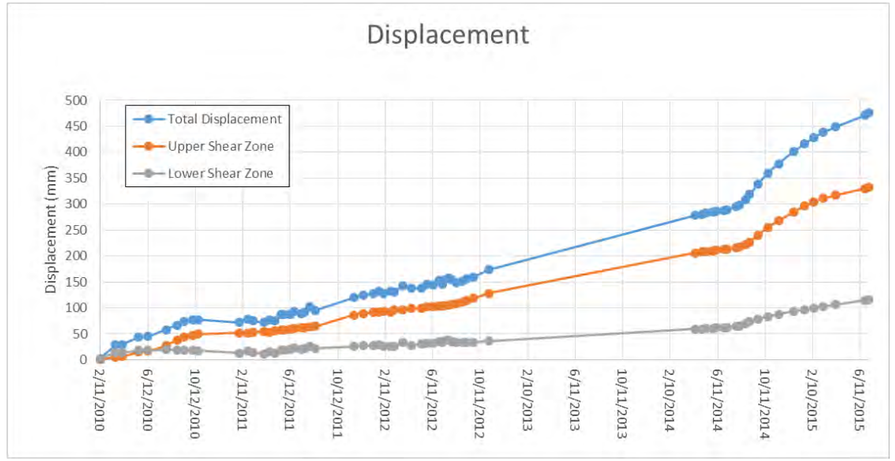


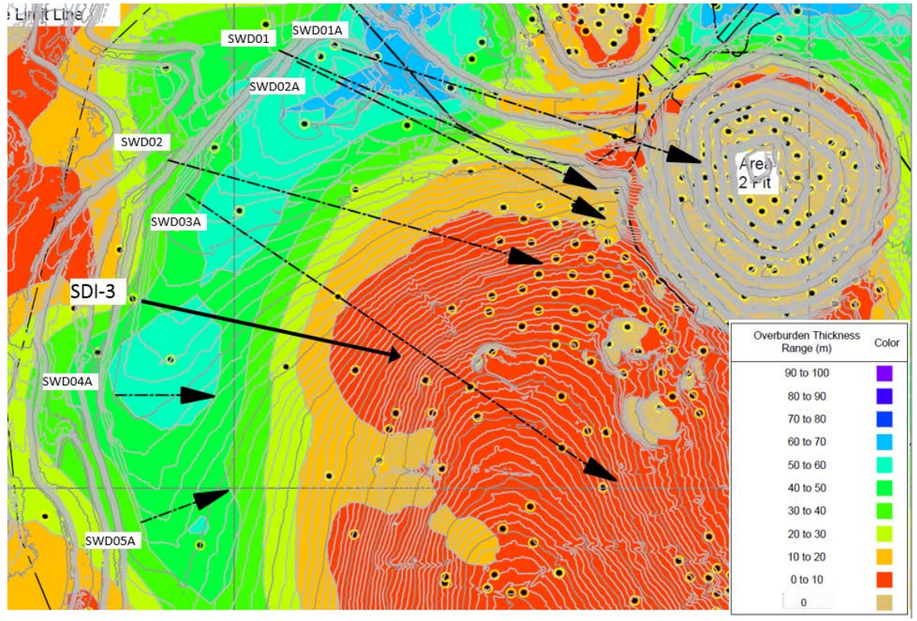
@32m –Stratified Ice, frequent 5 to 75 mm thick ice lenses











Summary of the SWD survey hub and SDI-3 inclinometer cumulative displacement vectors.

NOTES:

1. The scale of the vectors have been exaggerated and are indented only to indicate the direction of movement, which generally follows the slope of the bedrock surface.
2. The upper and lower shear zones at SDI-3 have the same direction of movement.

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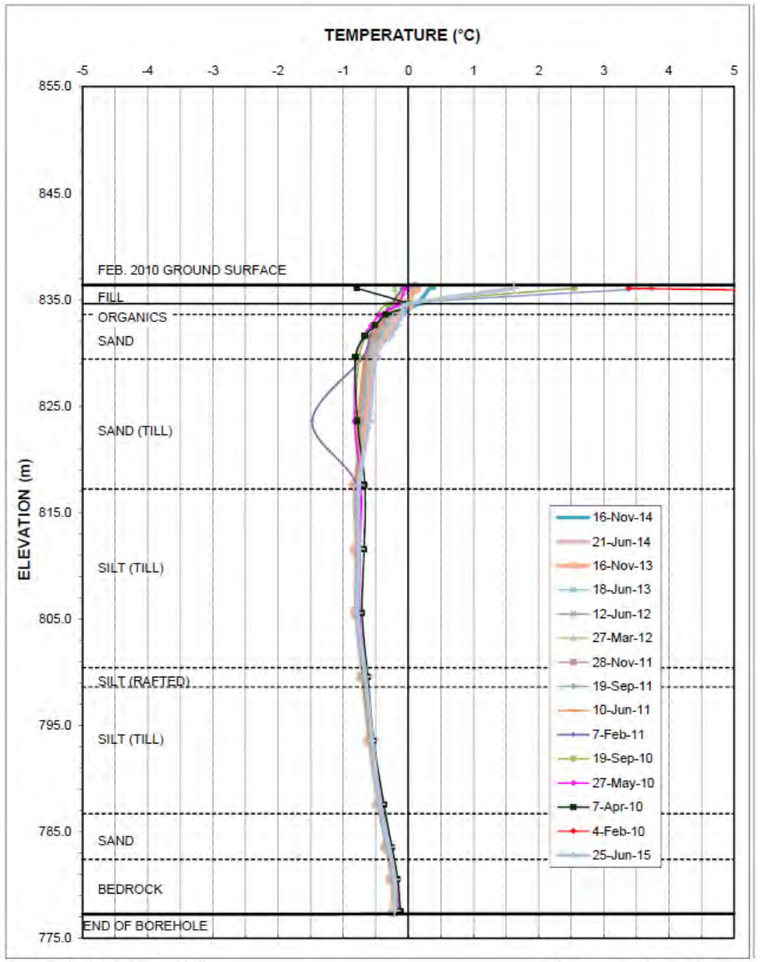
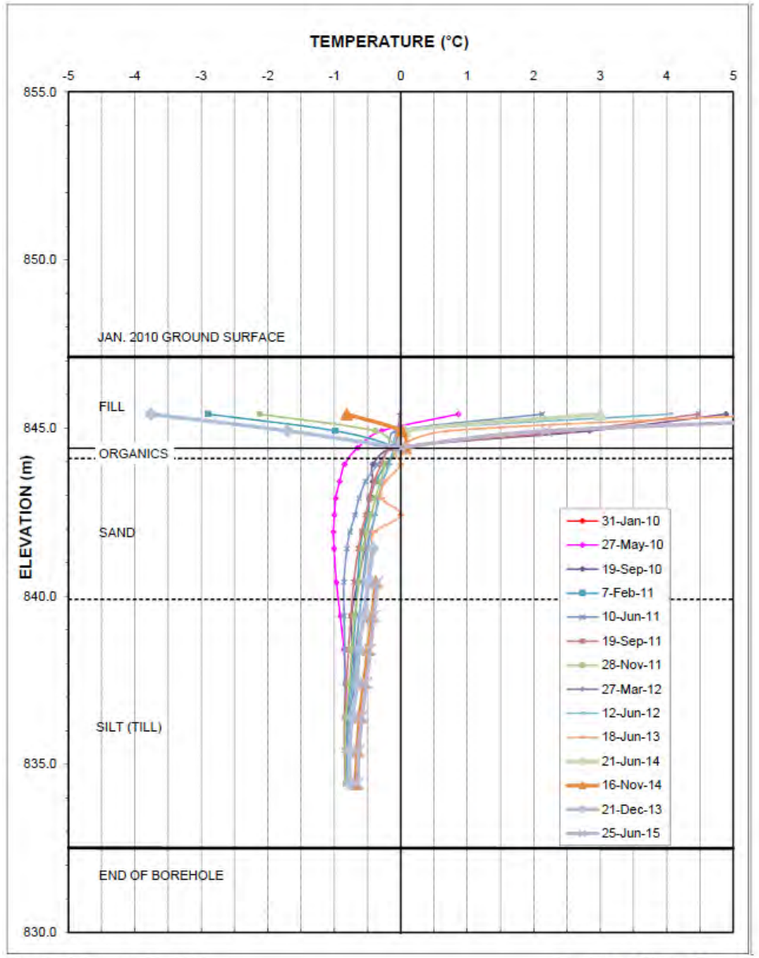
Job No: 1CM002.012.039 Filename: Minto_2015FreshetInspection_1CM002.039..ppt	Minto Mine	**Southwest Waste Dump Inclinometer (SDI-3)**
		Date: July 2015 / Approved: PHM / Figure: **12**



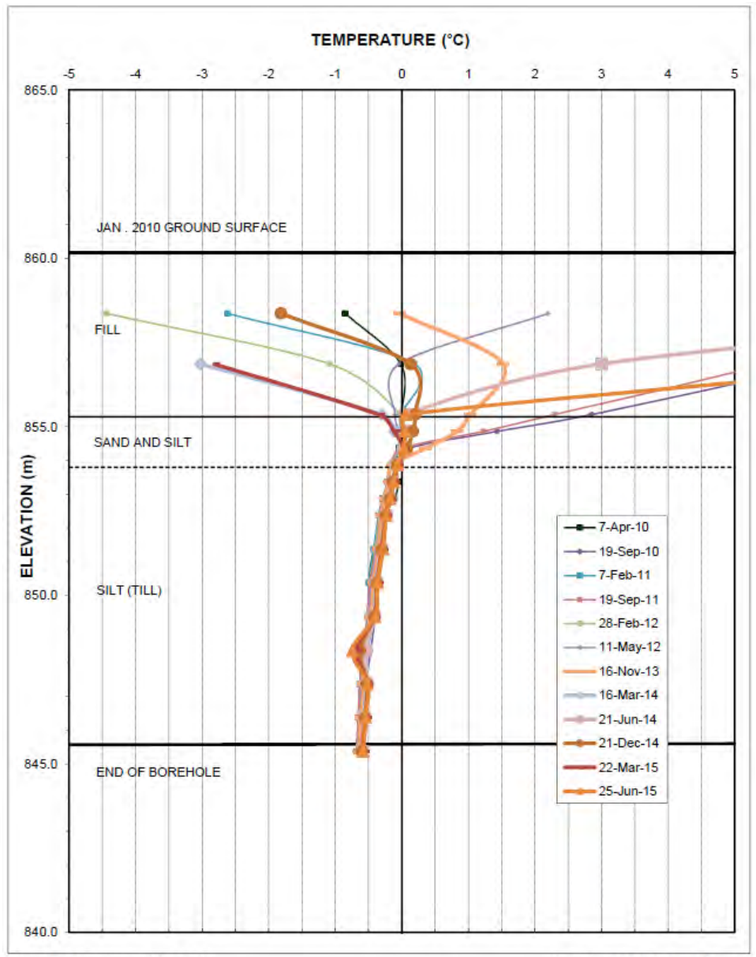
Installed: February 4, 2010

Southwest Waste Dump
Ground Temperature Profile - SDT-1



Installed: January 31, 2010

Southwest Waste Dump
Ground Temperature Profile - SDT-2



Installed: January 28, 2010

Southwest Waste Dump
Ground Temperature Profile - SDT-3

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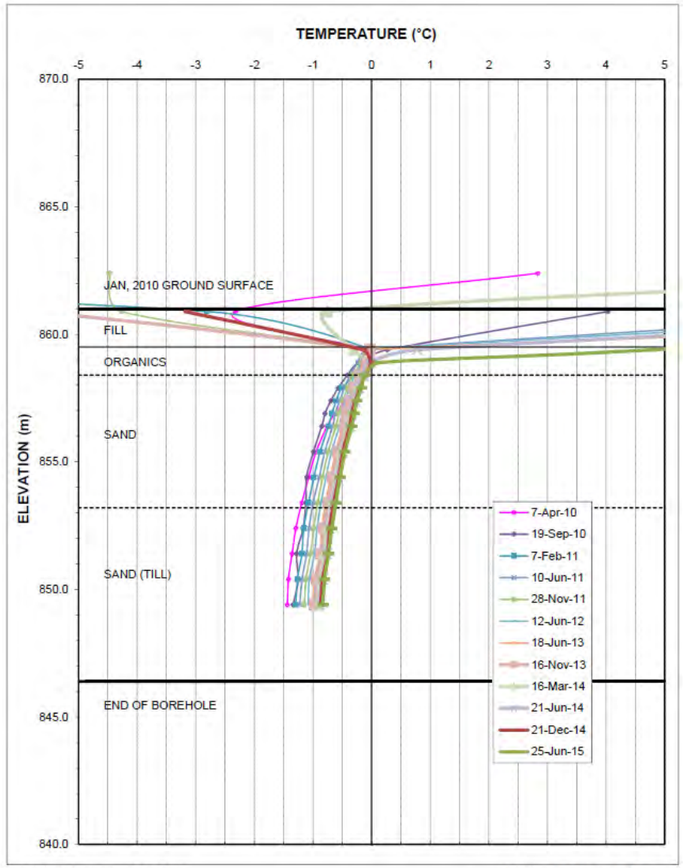
Southwest Waste Dump Ground Temperature Sensors

Job No: 1CM002.012.039
Filename: Minto_2015FreshetInspection_1CM002.039..ppt

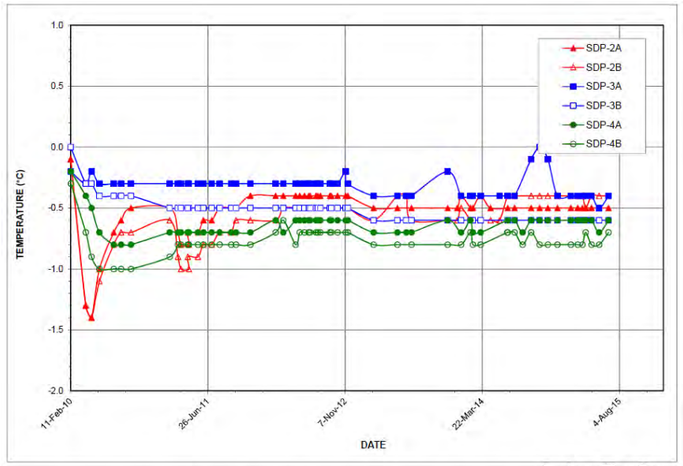
Minto Mine

Date: July 2015
Approved: PHM
Figure: **13**

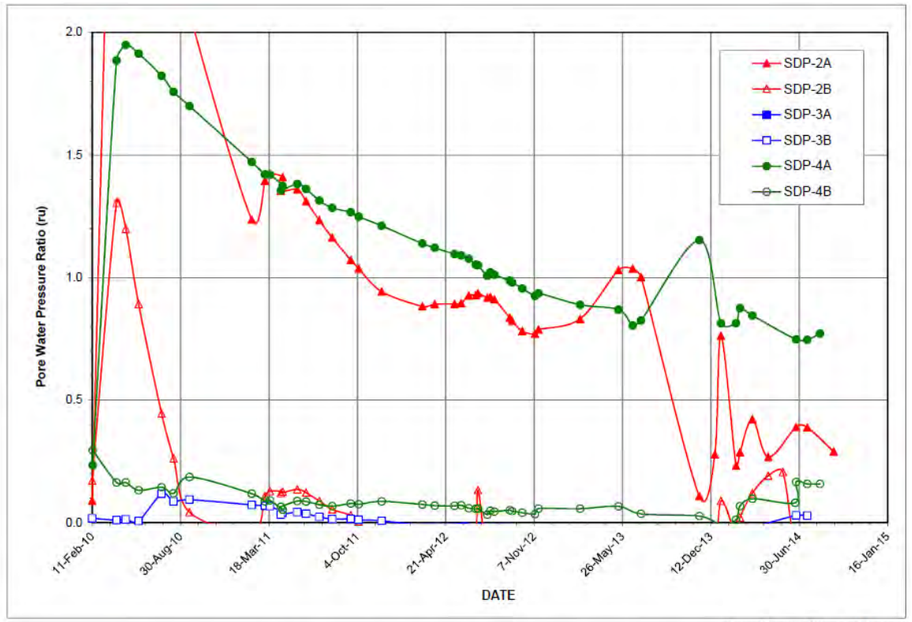


Installed: January 30, 2010

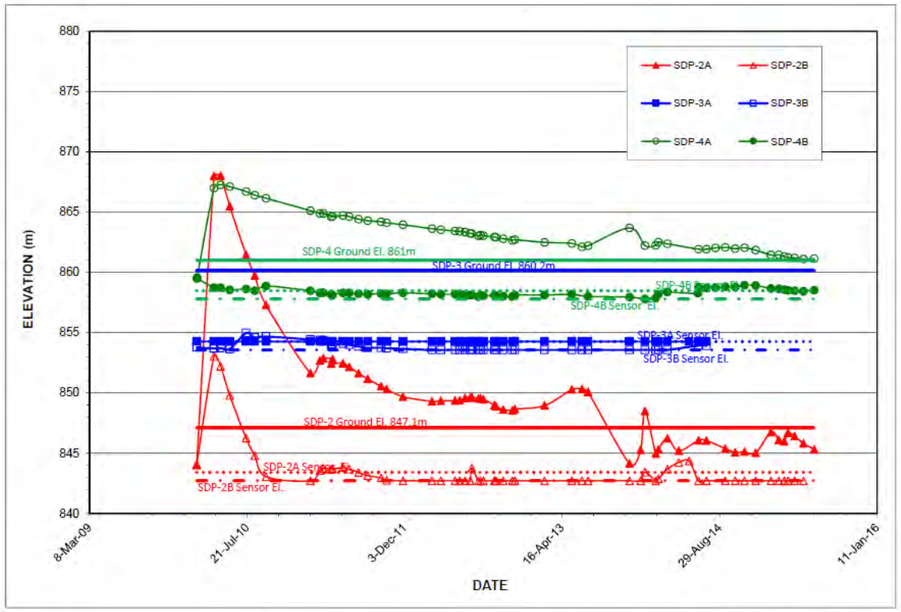
Southwest Waste Dump
Ground Temperature Profile - SDT-4



Southwest Waste Dump
VW Piezometer Sensor Temperature - SDP-2A, SDP-2B, SDP-3A, SDP-3B, SDP-4A, SDP-4B



Southwest Waste Dump
Pore Water Pressure Ratio - SDP-2A, SDP-2B, SDP-3A, SDP-3B, SDP-4A, SDP-4B



Southwest Waste Dump
Instrument Water Elevation - SDP-2A, SDP-2B, SDP-3A, SDP-3B, SDP-4A, SDP-4B

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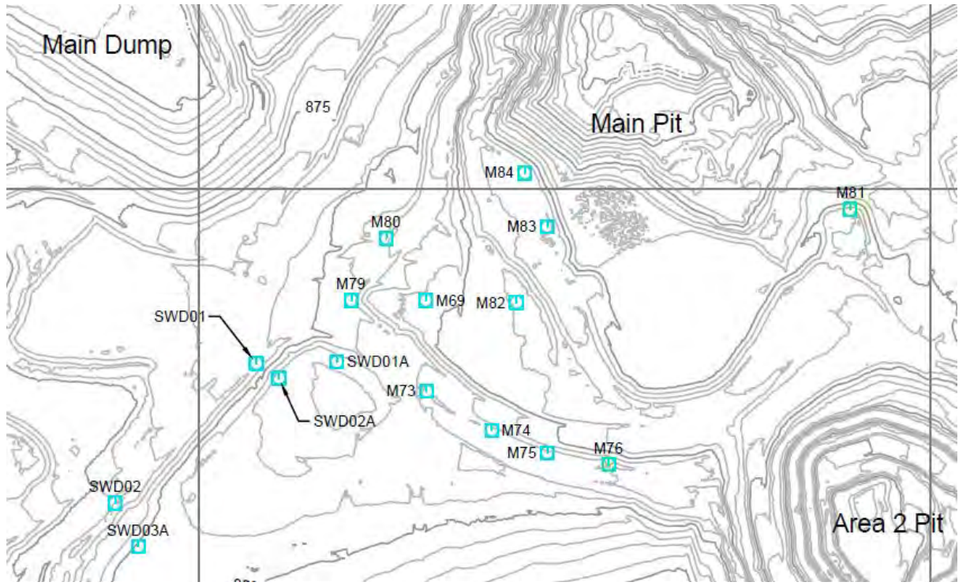
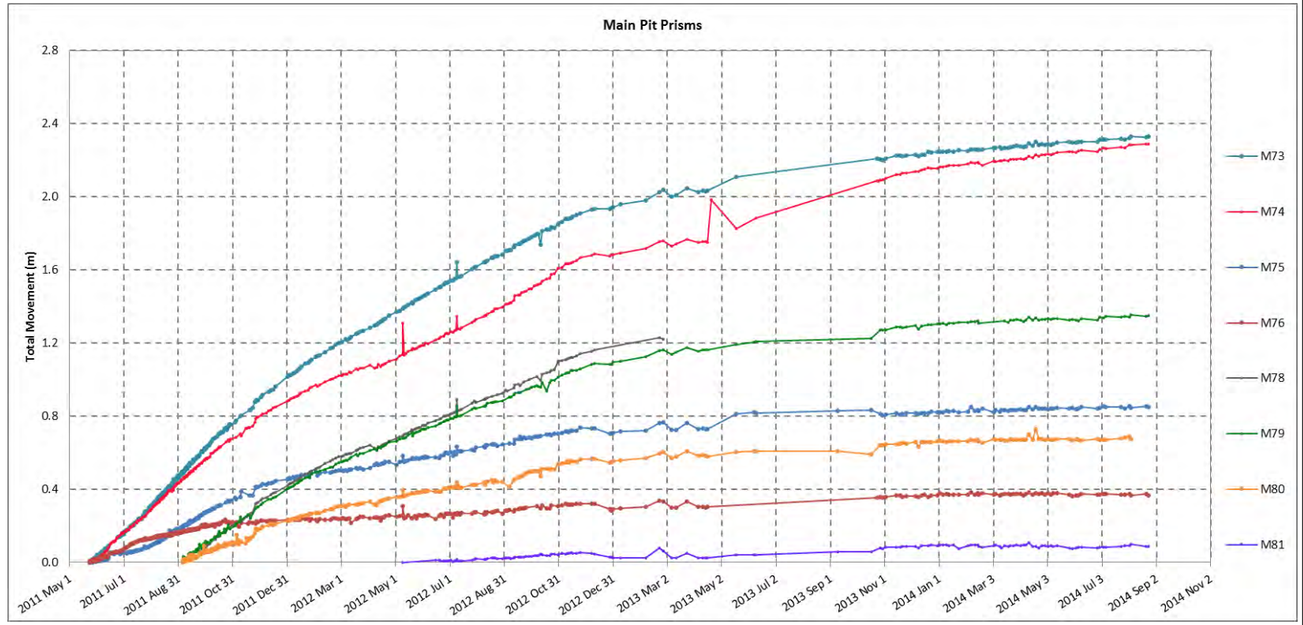
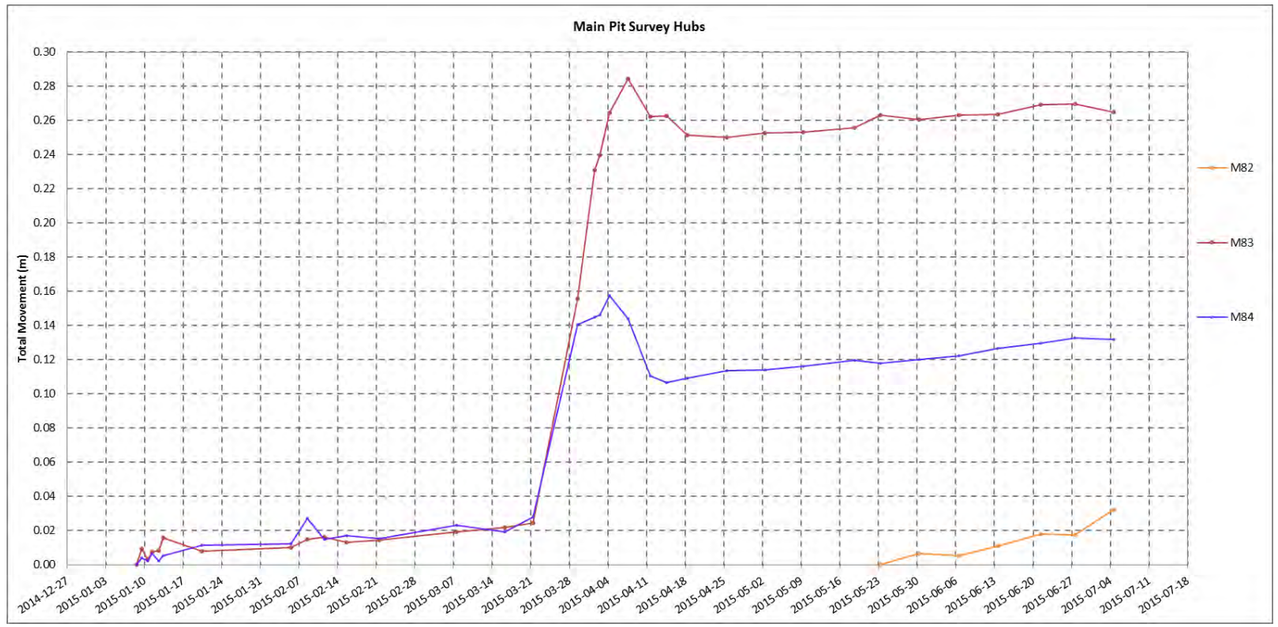
SW Waste Dump Temperature and Piezometer Sensors

Job No:	1CM002.012.039	Minto Mine	Date: July 2015	Approved: PHM	Figure: 14
Filename:	Minto_2015FreshetInspection_1CM002.039..ppt				



Survey Hub Locations





Survey Hub	Current Rate of Movement, dNEZ (mm/day)
M69	0.3
M73	0.3
M74	0.3
M75	0.1
M76	no movement
M79	0.2
M80	no movement
M81	no movement
M82	0.6
M83	0.2
M84	0.2

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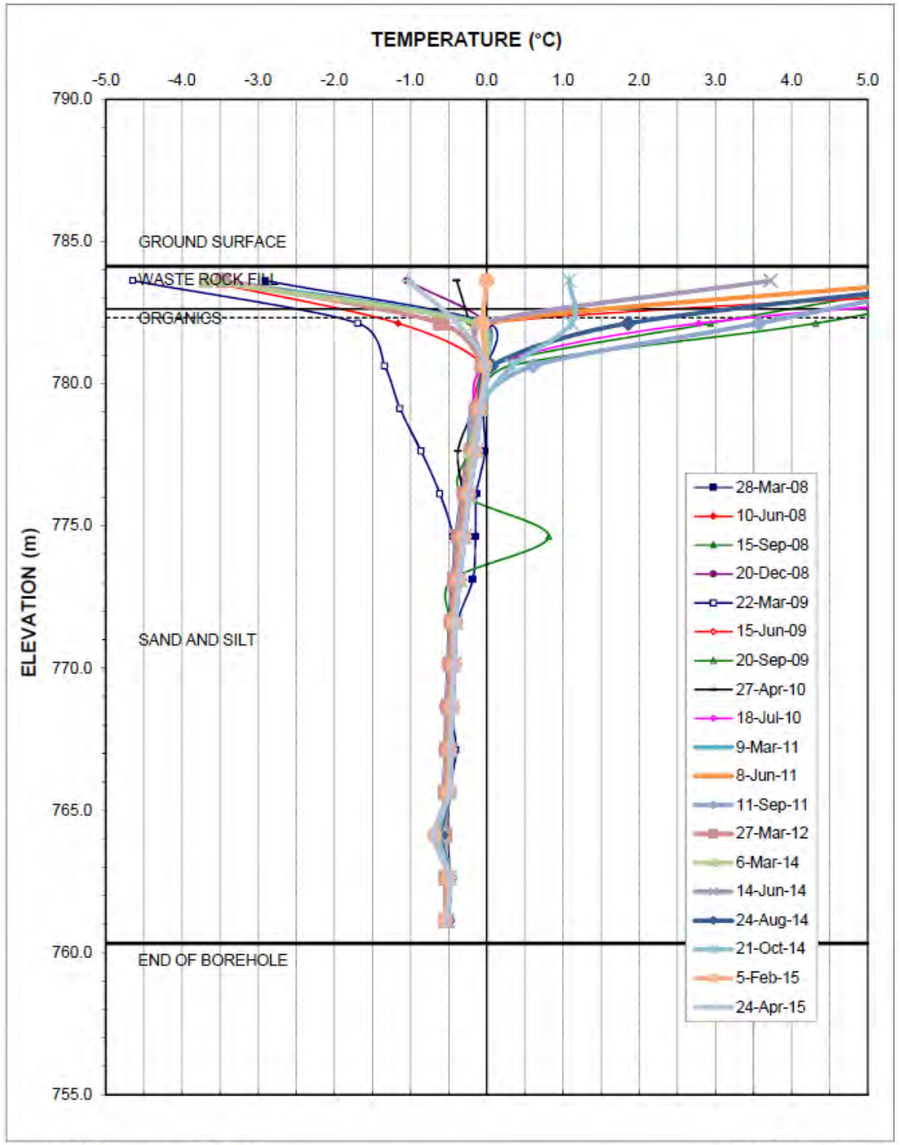
2015 Freshet Geotechnical Review

Main Pit South Wall Survey Hubs

Job No: 1CM002.012.039
Filename: Minto_2015FreshetInspection_1CM002.039..ppt

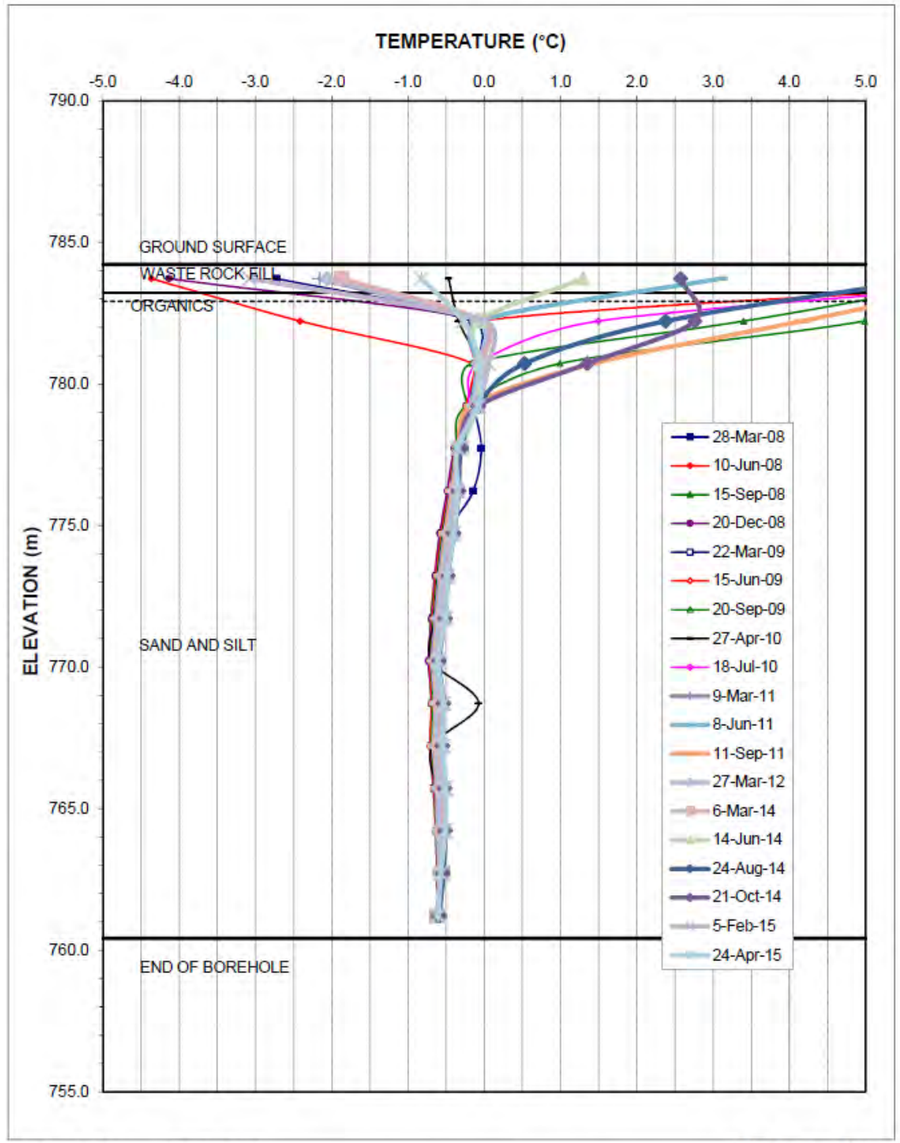
Minto Mine

Date: July 2015
Approved: PHM
Figure: **15**



Installed: November 2, 2007

Mill Water Pond
Ground Temperature Profile - MWPT-1



Installed: November 2, 2007

Mill Water Pond
Ground Temperature Profile - MWPT-2

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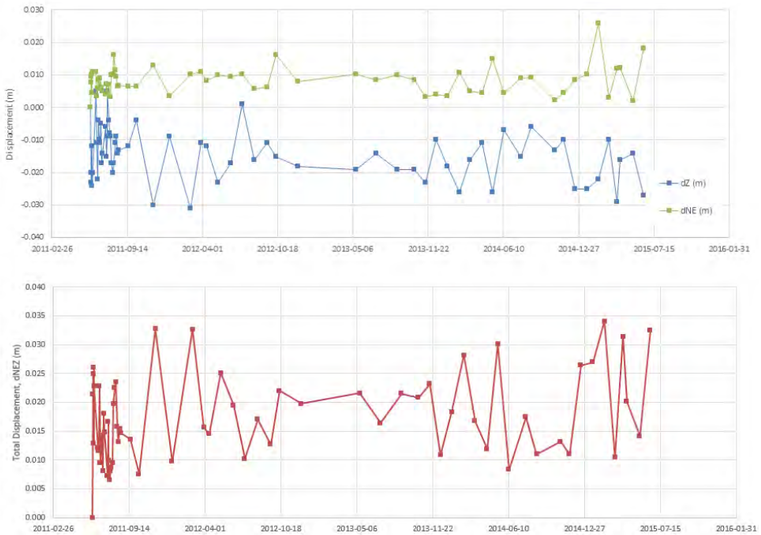
Job No: 1CM002.012.039 Filename: Minto_2015FreshetInspection_1CM002.039..ppt	Minto Mine	**Mill Water Pond Ground Temperature Sensors** Date: July 2015 · Approved: PHM · Figure: **16**

WSP-1



WSP-2

WSP-3

WSP-4

WSP-5

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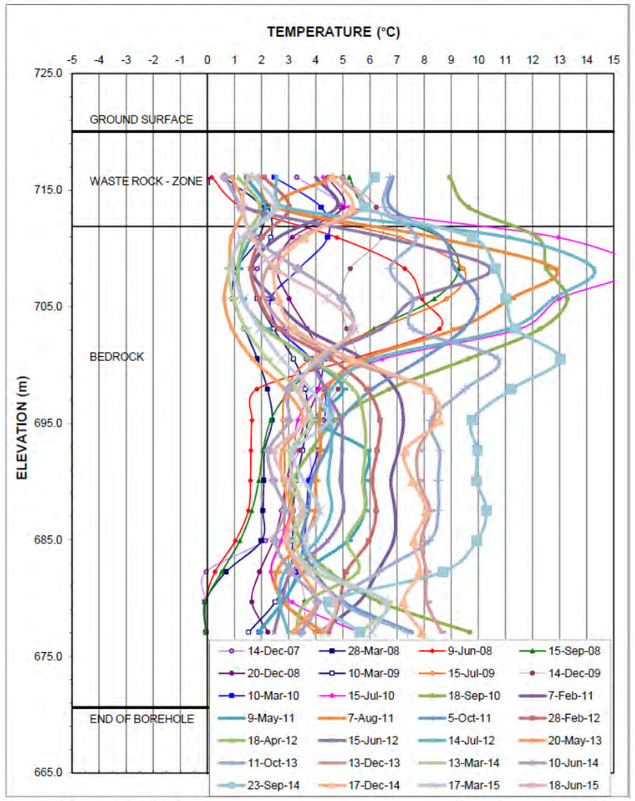
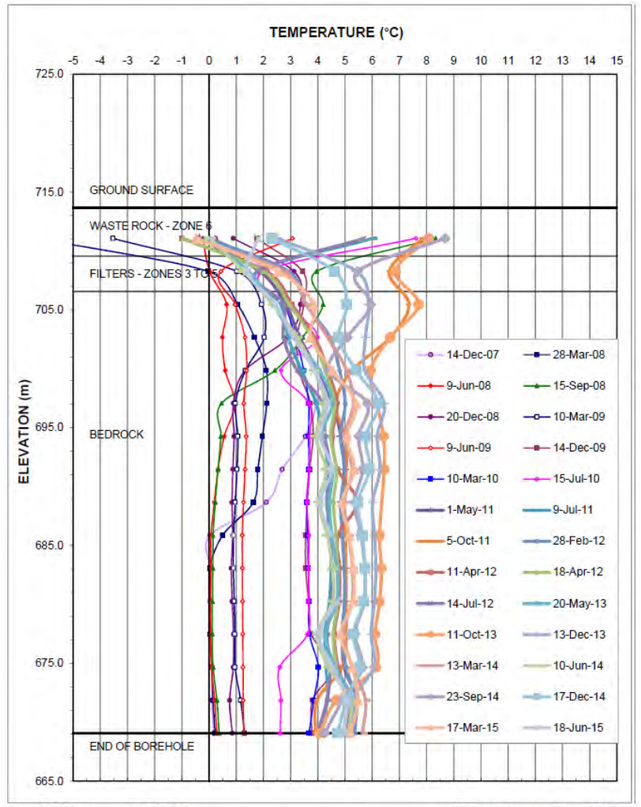
Job No: 1CM002.012.039 Filename: Minto_2015FreshetInspection_1CM002.039..ppt	Minto Mine	**Water Storage Pond Survey Hubs**
		Date: July 2015 / Approved: PHM / Figure: **17**



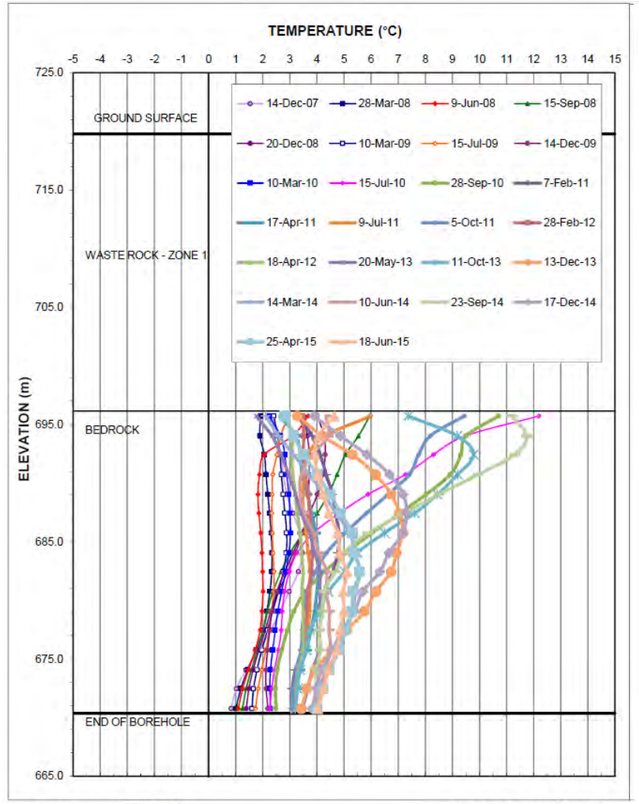
Installed: November 16, 2007

Water Storage Pond Dam
Ground Temperature Profile - WDT-1



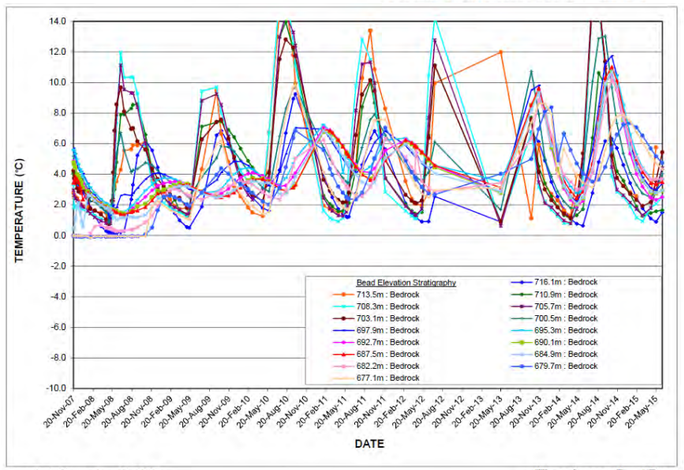
Installed: November 7, 2007

Water Storage Pond Dam
Ground Temperature Profile - WDT-2



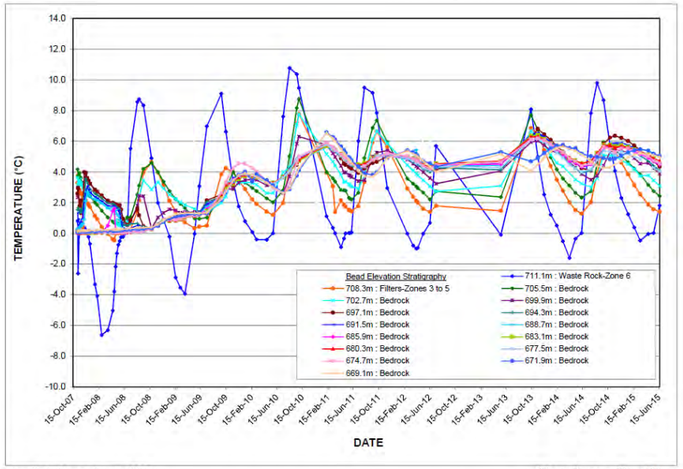
Installed: November 11, 2007

Water Storage Pond Dam
Ground Temperature Profile - WDT-3



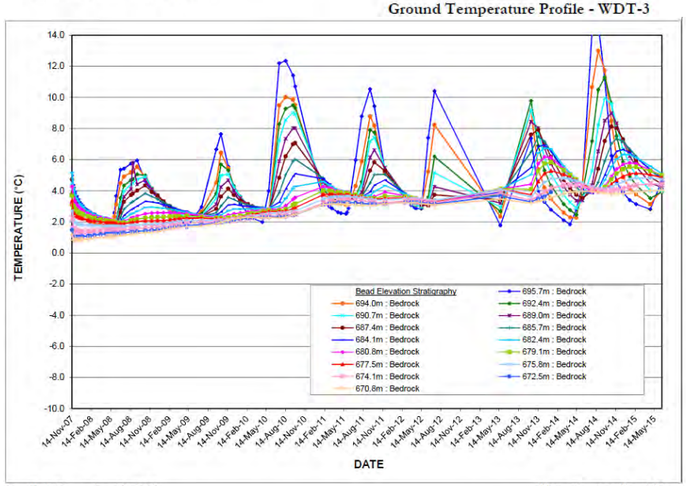
Installed: November 16, 2007

Water Storage Pond Dam
Ground Temperature Profile - WDT-1



Installed: November 7, 2007

Water Storage Pond Dam
Ground Temperature Profile - WDT-2



Installed: November 11, 2007

Water Storage Pond Dam
Ground Temperature Profile - WDT-3

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Water Storage Pond Ground Temperature Sensors (1 of 3)

Job No: 1CM002.012.039

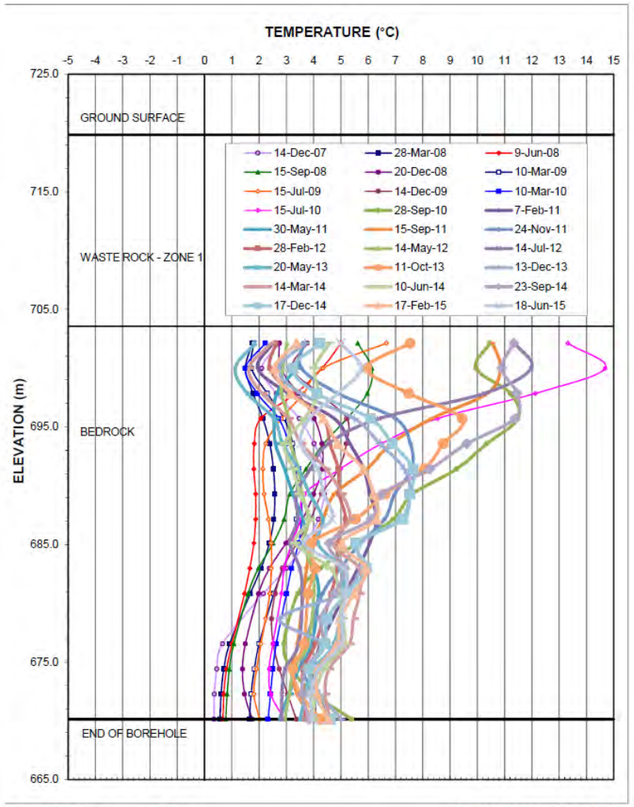
Filename: Minto_2015FreshetInspection_1CM002.039..ppt

Minto Mine

Date: July 2015

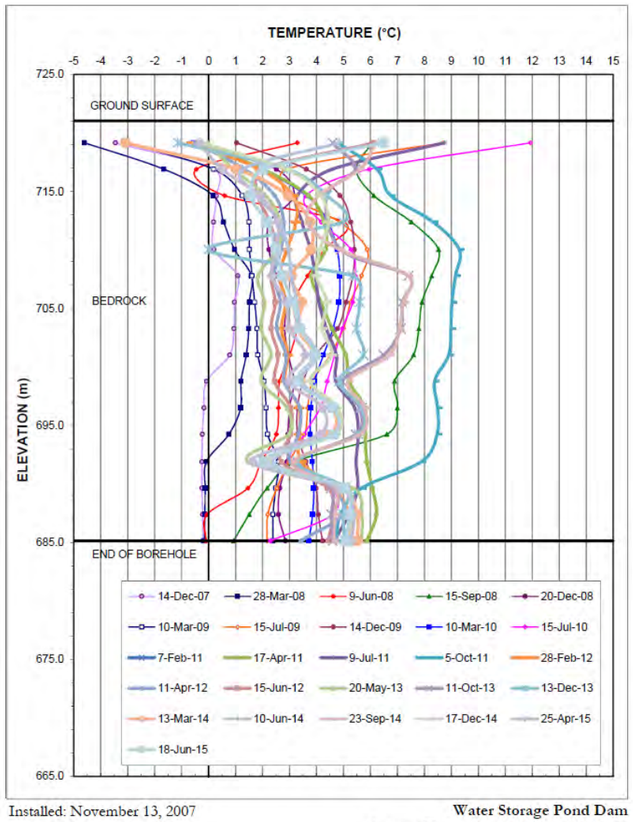
Approved: PHM

Figure: **18**



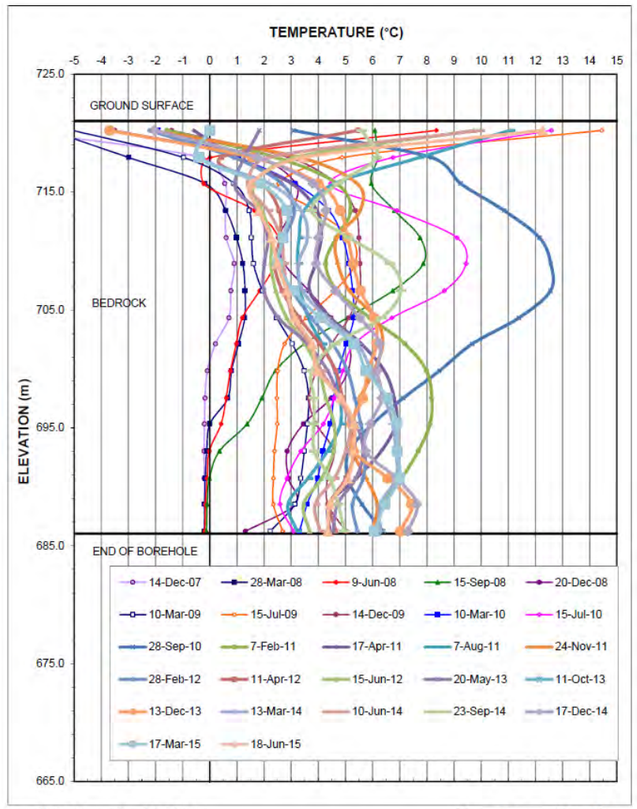
Installed: November 10, 2007

Water Storage Pond Dam
Ground Temperature Profile - WDT-4



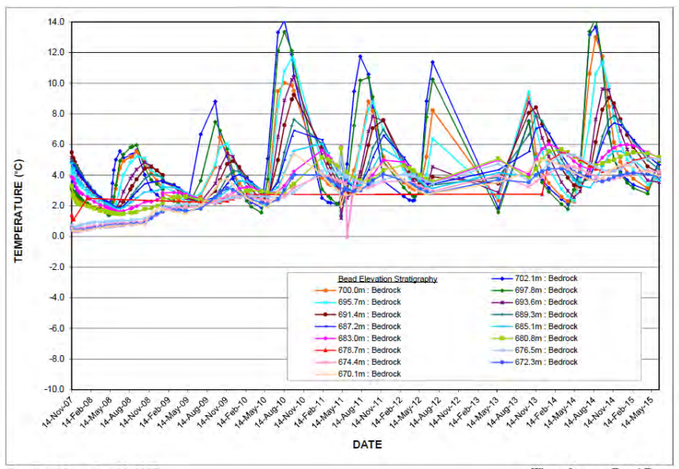
Installed: November 13, 2007

Water Storage Pond Dam
Ground Temperature Profile - WDT-5



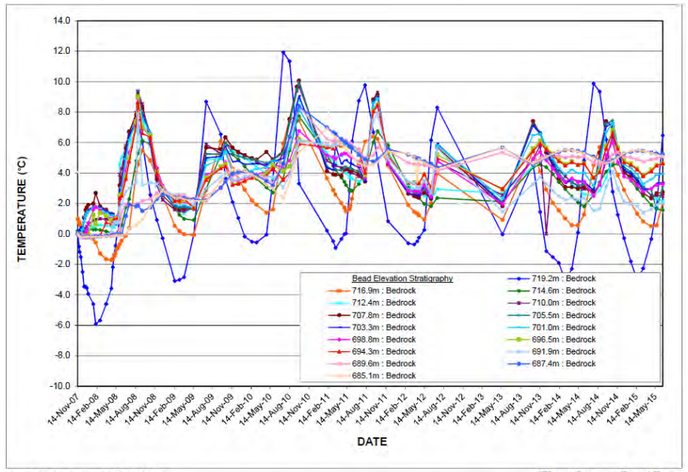
Installed: November 13, 2007

Water Storage Pond Dam
Ground Temperature Profile - WDT-6



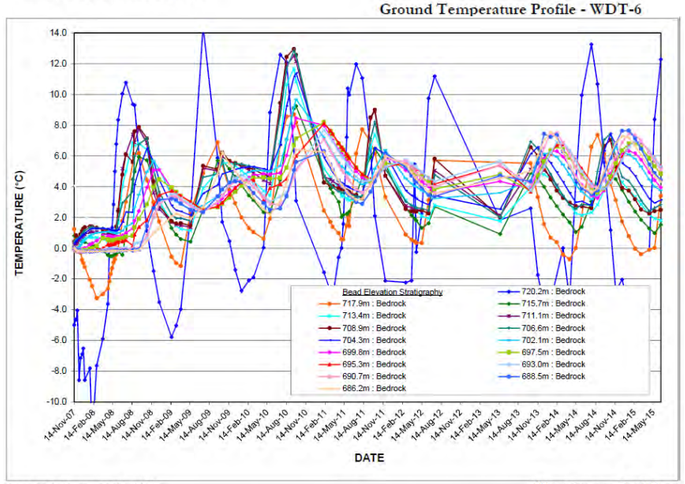
Installed: November 10, 2007

Water Storage Pond Dam
Ground Temperature Profile - WDT-4



Installed: November 13, 2007

Water Storage Pond Dam
Ground Temperature Profile - WDT-5



Installed: November 13, 2007

Water Storage Pond Dam
Ground Temperature Profile - WDT-6

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Water Storage Pond Ground Temperature Sensors (2 of 3)

Job No: 1CM002.012.039

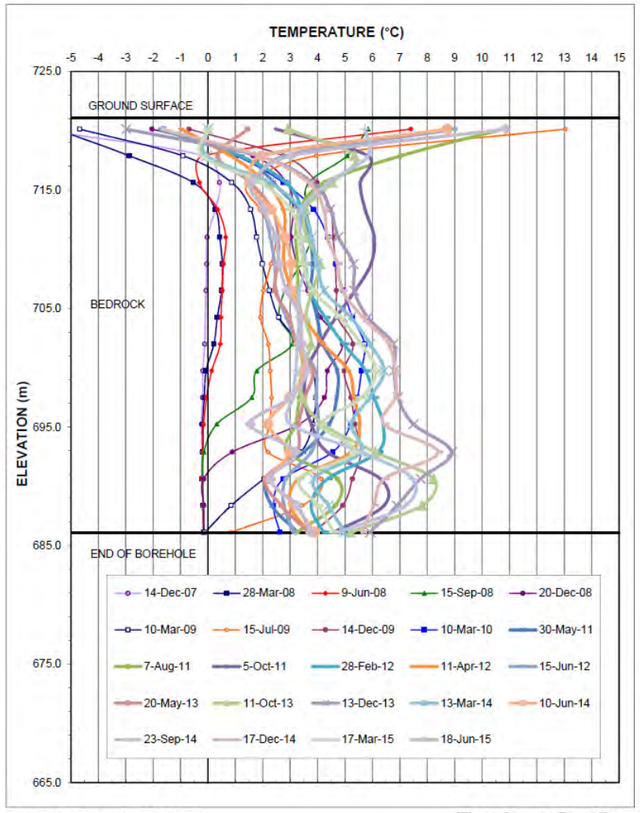
Filename: Minto_2015FreshetInspection_1CM002.039..ppt

Minto Mine

Date: July 2015

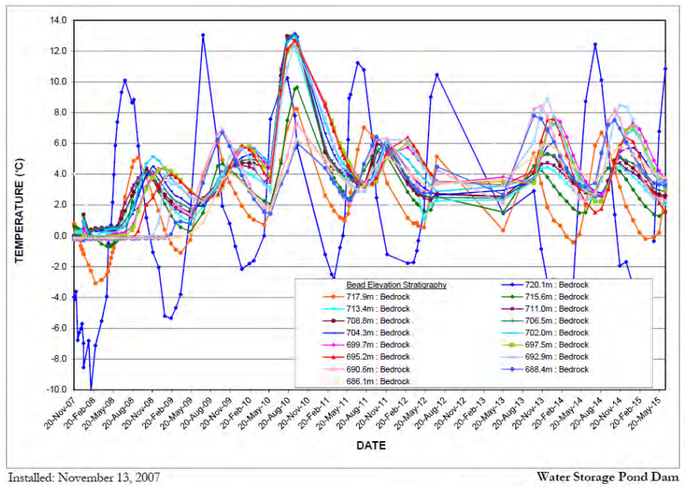
Approved: PHM

Figure: **19**



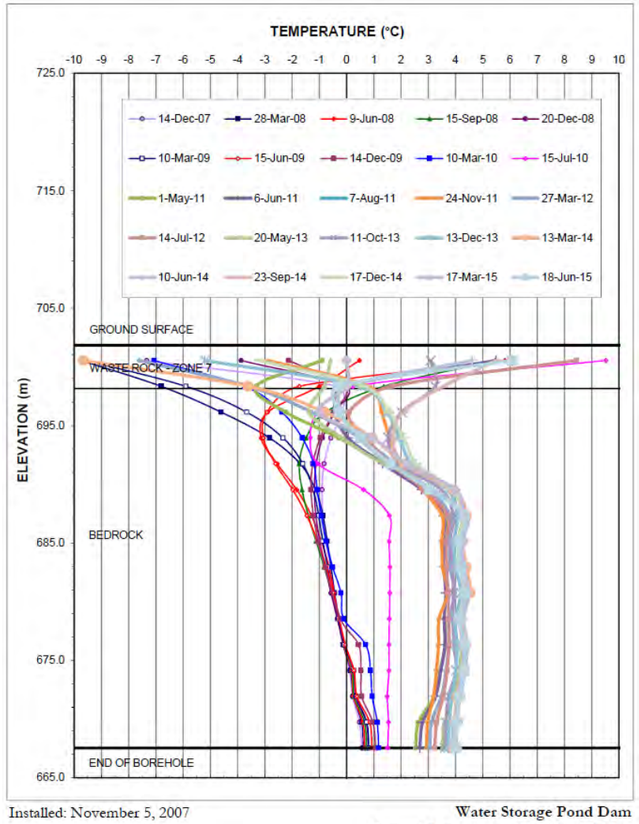
Installed: November 13, 2007

Water Storage Pond Dam
Ground Temperature Profile - WDT-7



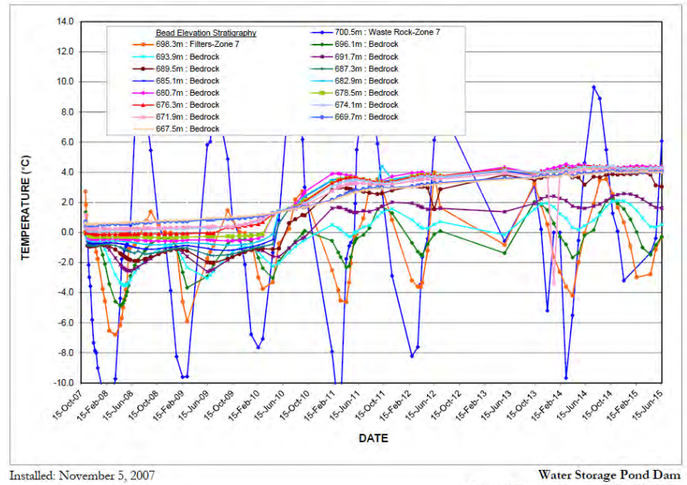
Installed: November 13, 2007

Water Storage Pond Dam
Ground Temperature Profile - WDT-7



Installed: November 5, 2007

Water Storage Pond Dam
Ground Temperature Profile - WDT-8



Installed: November 5, 2007

Water Storage Pond Dam
Ground Temperature Profile - WDT-8

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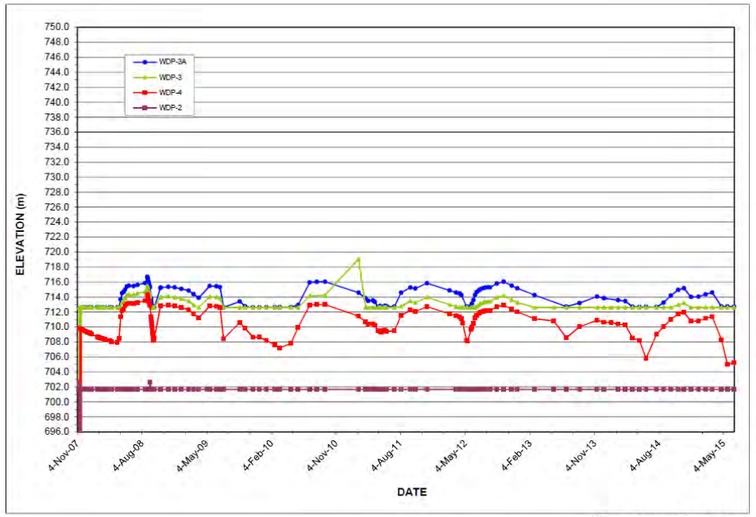
Water Storage Pond Ground Temperature Sensors (3 of 3)

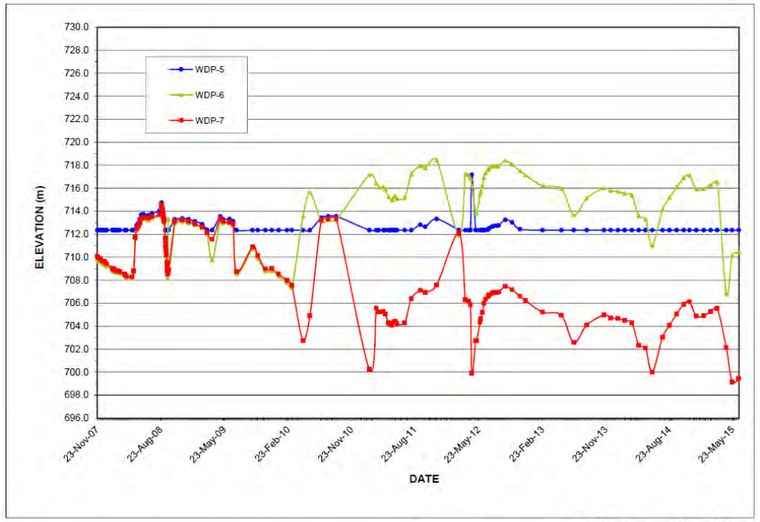
Job No: 1CM002.012.039
Filename: Minto_2015FreshetInspection_1CM002.039..ppt

Minto Mine

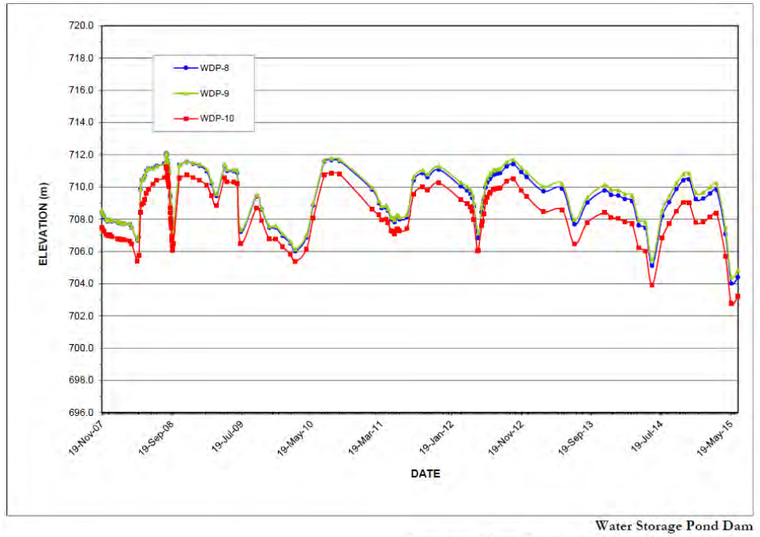
Date: July 2015
Approved: PHM
Figure: **20**



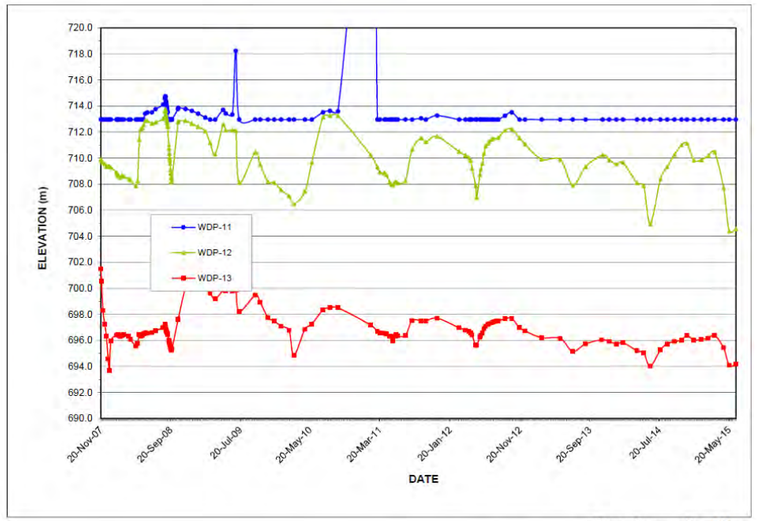
Water Storage Pond Dam
Instrument Water Elevation - WDP-3A, WDP-3, WDP-4, WDP-2



Water Storage Pond Dam
Instrument Water Elevation - WDP-5, WDP-6, WDP-7



Water Storage Pond Dam
Instrument Water Elevation - WDP-8, WDP-9, WDP-10



Water Storage Pond Dam
Instrument Water Elevation - WDP-11, WDP-12, WDP-13

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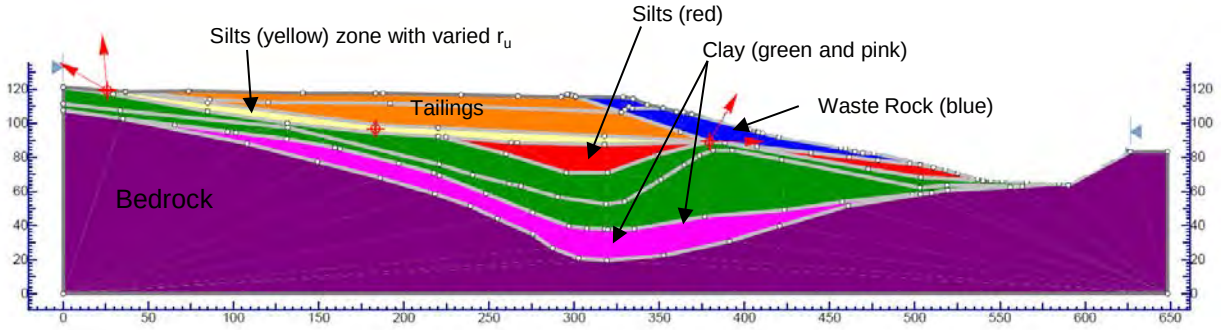
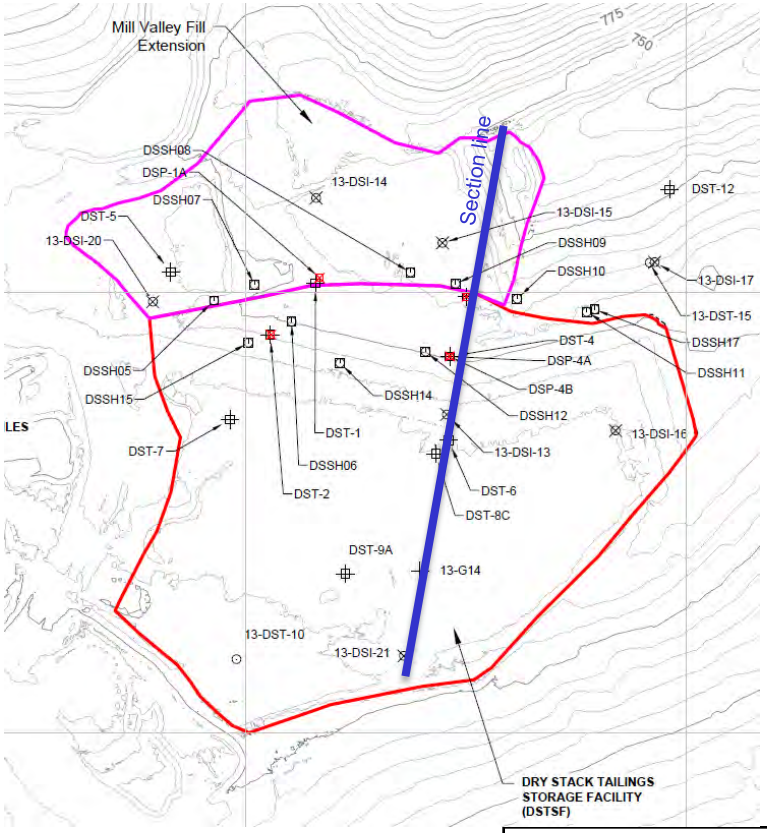
Job No: 1CM002.012.039 Filename: Minto_2015FreshetInspection_1CM002.039..ppt	Minto Mine	**Water Storage Pond Piezometer Sensors**
		Date: July 2015 / Approved: PHM / Figure: **21**

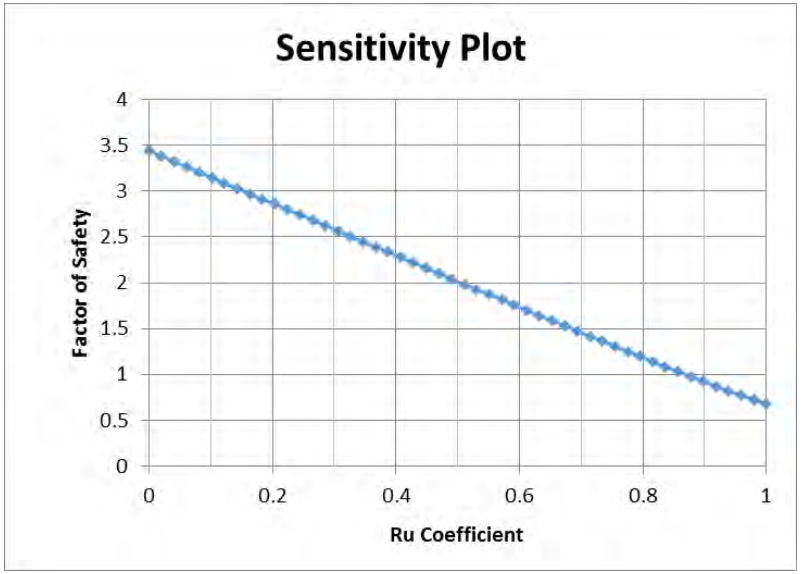
Appendix C: DSTSF Stability Analysis



a) Model geometry



b) Section location



c) Sensitivity analysis results

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Job No: 1CM002.039 Filename: AppC_DSTSF Stability Analysis.pptx	Minto Mine	**DSTSF Stability Analysis – Excess Pore Water Pressure**	
		Date: July 2015	Approved: PM / Figure: **1**