Clinton Creek Long-Term Performance Monitoring Program

2016 Survey Results

December 12, 2016

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Burnaby BC V5C 6S7
Canada

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WorleyParsons Group

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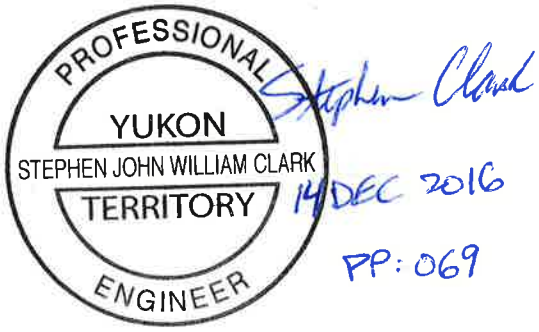

Project No: 307071-01132-00-GT-REP-0001 – Clinton Creek Long-Term Performance Monitoring Program: 2016 Survey Results

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Executive Summary

Advisian was engaged by the Government of Yukon – Energy, Mines and Resources – Assessment and Abandoned Mines (AAM) to provide engineering services for the 2016 Clinton Creek Long-Term Performance Monitoring Program (LTPMP). The LTPMP is intended to monitor the condition and performance of the various site components through qualitative (i.e., visual inspection) and quantitative (i.e., site survey) assessments. These assessments enable AAM to identify changes to site components and take action as necessary to mitigate potential impacts to the environment and to protect human health and safety.

The 2016 field program consisted of the following activities:

- Full site inspection completed by Advisian's geotechnical and hydrotechnical engineers on June 21, 2016.
- Full LTPMP survey conducted by Underhill between August 29 and September 4, 2016.

Detailed notes from the site inspection are presented in Section 2.1. The scope of the LTPMP survey is summarized in Section 2.2, and the results presented on the figures in Appendix 1.

Clinton Creek Access Road

The site access road appeared in relatively good shape in June, 2016 aside from two washed out culverts, which have since been repaired. However, several landslides and erosion caused by runoff across the road were observed at the end of August. These slides were likely to have occurred during or shortly after heavy rainfall recorded on August 6, 2016 (23 mm in one hour).

The condition of the closed section of the access road, on the south side of Clinton Creek 350 to 400 m downstream of Hudgeon Lake, does not appear to have worsened since 2015. This section of the road remains unstable and is expected to continue to fail, albeit at a slower rate than was first observed between 2012 and 2014.

Hudgeon Lake Outlet

The banks around the Hudgeon Lake outlet have shown essentially no signs of erosion or movement since 2014 aside from the diversion works completed in 2015 on the south side of the outlet. Hudgeon Lake water level peaked at 412.10 masl during the 2016 freshet, with several moderately high flow events occurring throughout the 2016 summer.

No loss of riprap was observed around the abutments. However, cracks in the soil were observed on the north side of the north log boom abutment at Hudgeon Lake outlet during a site visit completed on June 21, 2016. Survey data indicates that the north log boom abutment has moved 3.6 (±2.7) cm horizontally towards the lake and 12.2 (±3.7) cm up between 2014 and 2016. The south log boom abutment has moved 6.2 (±2.7) cm towards the lake and 4.1 (±3.7) cm up in the same period. The north log boom abutment exceeded Trigger HL-2, maximum vertical displacement of 10 cm.

The observed horizontal movements of the abutments are relatively small and can be largely attributed to overall movement of the waste rock dump, based on a comparison with nearby monitoring pins. However, the vertical displacement of the north abutment, potentially caused by frost jacking and/or the rotational failure of the waste dump, is of concern and will affect the capacity of the abutment to hold the log booms in place.

Gabion Drop Structures

On June 21, 2016 Drop Structures 1 to 3 appeared in good condition, but with a significant amount of large woody debris lodged in the gabion wire. There was no visual evidence of piping or erosion underneath the gabion baskets or damage to the gabion mesh. The debris was cleared from the drop structures on September 28, 2016.

Trigger DS-6, which identifies a reduction in drop structure cross-sectional area of 10% or more, was exceeded for DS2, DS3 and DS4. This is primarily due to an apparent change in the channel depth since the baseline survey in 2006. While there has been an apparent reduction in cross-sectional area of the drop structures, they are still able to pass design flows with adequate freeboard (trigger DS-2) and do not appear to have deformed excessively since construction based on a comparison of surveys shown on Figures 1007 to 1010 in Appendix 1. Therefore, repairing the geometry of the drop structures is not required at this time.

On the Drop Structure 4 (DS4) ACB channel, centreline mats fourth through eighth from the top have experienced some degree of sliding or buckling. This occurred in late April, 2016 during peak freshet flows. The duckbill anchors now appear to be engaged and securing the mats in place. Some erosion of the stabilized slope to the south of DS4 was observed in September, 2016 and was likely caused by either the heavy rain recorded on August 6, 2016 or an issue with the runoff diversion ditch at the crest of the slope. The hazard associated with this erosion is the subsequent deposition of eroded fines into Clinton Creek. A landslide was also observed in September and likely occurred during or shortly after the heavy rain on August 6, 2016. The landslide does not appear to have impacted the ACB channel.

Clinton Creek

No triggers were exceeded for the Clinton Creek channel, which has shown little change since 2014.

Approximately 0.75 m of scour occurred between 2014 and 2016 along the outside of the channel bend near the closed access road (Station 0+430 on Figure 1002, Appendix 1). This apparent increase in bend scour is likely to result in increased erosion of the right bank (i.e., waste rock) at Station 0+430.

A number of landslide zones have been identified based on observations made during field inspections, including one to the north of DS4. These slides likely occurred during or shortly after heavy rainfall recorded on August 6, 2016. These slides do not appear to be significantly impeding flow in the Clinton Creek channel.

Clinton Creek Waste Dump

No significant change in movement behaviour has been observed at the waste rock pile since monitoring was re-initiated in 2001, thus the waste dump, as a whole, is currently considered to be in a marginally stable condition.

Porcupine Pit and Snowshoe Pit

The average horizontal movement of the Porcupine pit monitoring points slightly increased between 2014 and 2016. However, the horizontal movement rates in this region are small and are not considered to be a risk.

Wolverine Creek

Minor bank erosion is occurring in Wolverine Creek downstream of the rock weirs, but is not a significant concern. No channel scour or degradation are evident from the surveyed creek profile. The rock weirs appeared in good condition on June 21, 2016.

Erosion of the tailings upstream of the rock weirs appears to be ongoing but has not resulted in recent and significant changes to the channel. The outlines of the Wolverine Creek Tailings Pile Ponds do not appear to have changed significantly between 2014 and 2016.

Wolverine Creek Tailings Pile

It was found that the tailings pile maintains a state of marginal instability, such that it is subject to continual very slow deformation. The north and south lobes continue to creep downslope, but with rates of movement generally decreasing with time. Continuous slow deformation currently occurs across the landslide complex at rates of between 2.0 and 27.5 cm/yr. The patterns of movement and the landslide geometry suggest that the likelihood of a rapid, catastrophic failure is low. However, it is expected that movements will continue for several decades or longer.

LTPMP Recommendations

2016 LTPMP recommendations for site maintenance and future monitoring are presented in Appendix 6. Recommendation are numbered 1 to 6 for site maintenance and 1 to 9 for future monitoring for ease of reference. Timelines and priorities are also listed in Appendix 6 to assist with planning.

1 Introduction

Advisian was engaged by the Government of Yukon – Energy, Mines and Resources – Assessment and Abandoned Mines (AAM) to provide engineering services for the Clinton Creek Long-Term Performance Monitoring Program (LTPMP). This included a site inspection and review of survey data collected by Underhill Geomatics Ltd. (Underhill) at the former Clinton Creek asbestos mine site (the Site).

The content and structure of this report are based on a LTPMP Scope of Work document provided by AAM on April 27, 2016 and Advisian's Proposal No. 307071-01065-16-EW-LET-0005_R1, Revision 1, dated May 12, 2016.

1.1 Site Overview

The Site is a former asbestos mine which was in operation between 1968 and 1978. The Site is located 80 km northwest of Dawson City, Yukon (YT), near the confluence of Fortymile River and the Yukon River (Figure A). During operation, waste rock was placed along the south valley wall of Clinton Creek, while tailings from the milling operation were placed along the west valley wall of Wolverine Creek (Figure B). Subsequent movement of the waste rock and tailings have since blocked Clinton Creek and Wolverine Creek, respectively.

The Site includes the following infrastructure and natural/anthropogenic features (the components):

- Gabion Drop Structures
- Clinton Creek Channel
- Hudgeon Lake Outlet
- Clinton Creek Access Road
- Clinton Creek Crossings
- Clinton Creek Waste Rock Piles
- Wolverine Creek Channel
- Wolverine Creek Tailings Piles
- Wolverine Creek Ponds
- Porcupine Pit
- Snowshoe Pit

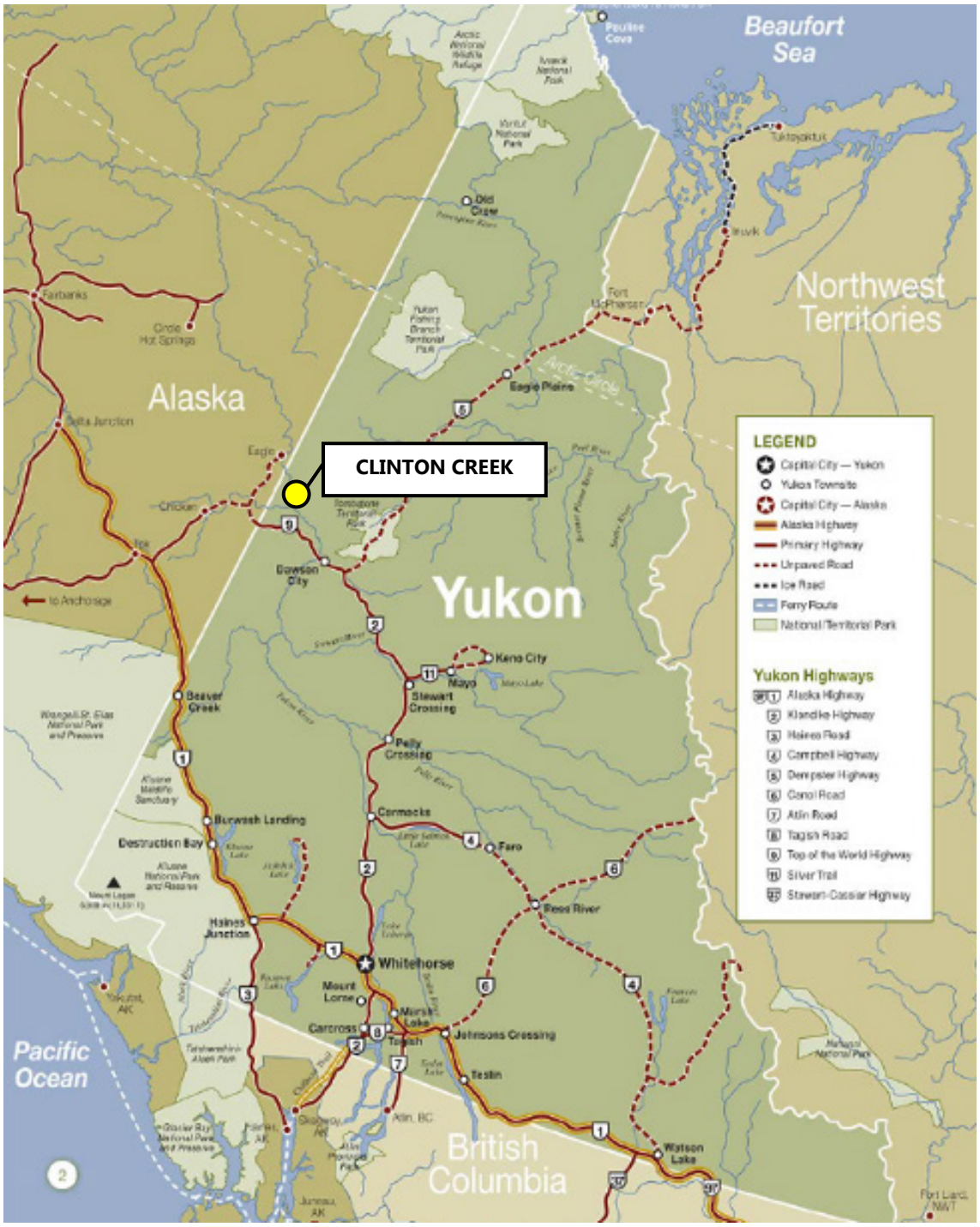


Figure A Clinton Creek Location Map

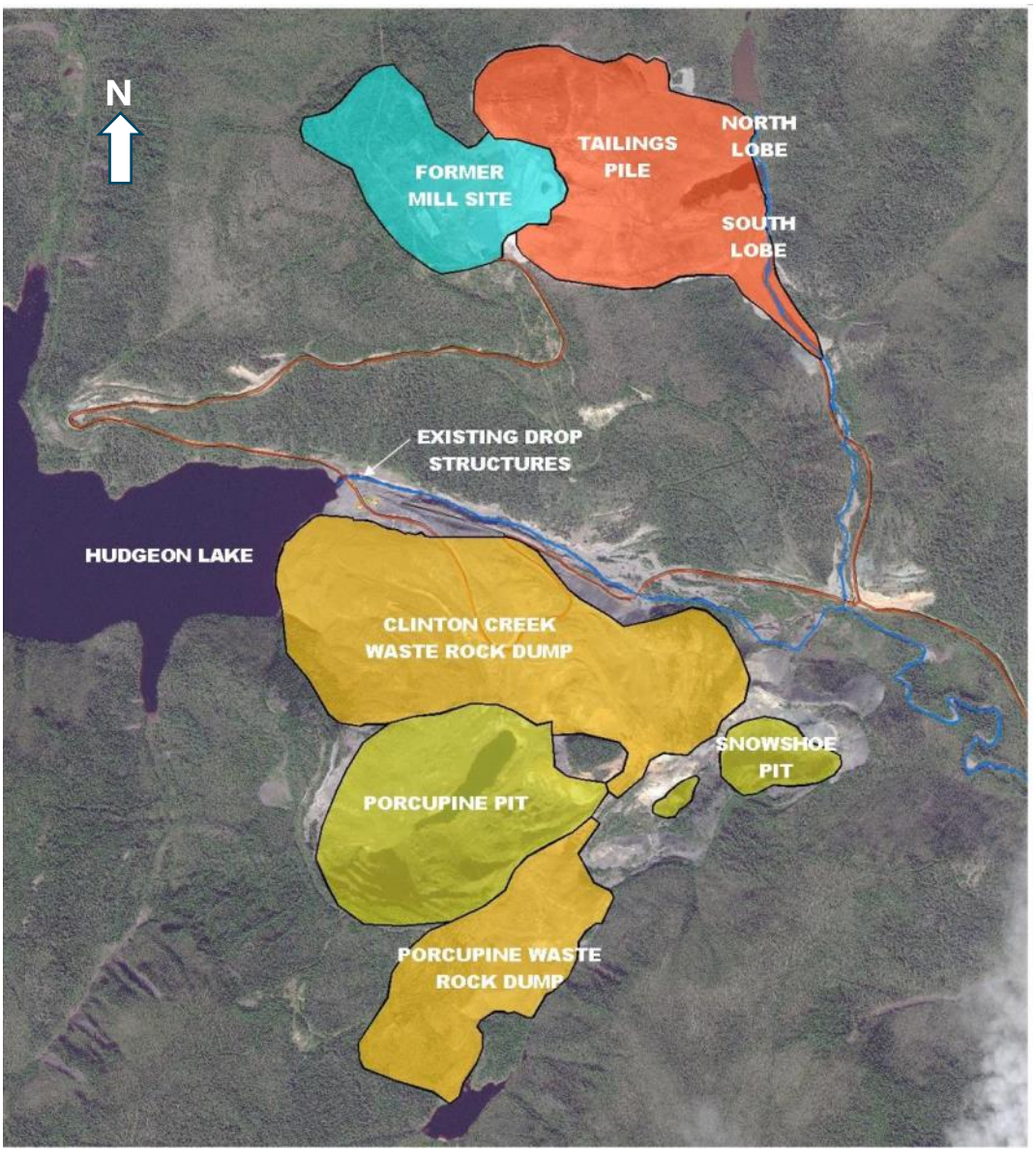


Figure B Clinton Creek Site Layout

1.1.1 Clinton Creek and Hudgeon Lake

Clinton Creek runs southeast from the Site approximately 8 km before joining Fortymile River, which is part of the Yukon River basin. The Clinton Creek drainage area is approximately 117 km^2 upstream of Wolverine Creek. The blockage of Clinton Creek created Hudgeon Lake, which impounds approximately 12 million cubic metres of water (R01, UMA 2000). Water quality testing indicates that a portion of water impounded in Hudgeon Lake is anoxic (R05, UMA 2004).

Erosion of Clinton Creek at the Hudgeon Lake outlet during a flood event could result in a sudden lowering of the lake level and rapid release of water. Drop structures were constructed at the outlet of Hudgeon Lake with the purpose of mitigating erosion. Drop Structure 1 (DS1) was constructed in 2002, followed by DS2 in 2003, and finally DS3 and DS4 in 2004. The drop structures are located between 50 m and 200 m downstream of the Hudgeon Lake outlet. Each drop structure is comprised of metal gabion baskets, each filled with 75 mm to 200 mm diameter rock, installed in steps across the creek channel.

The drop structures were damaged during high flows in the 2009 freshet, and subsequently repaired in September, 2009 (R93, AECOM 2009). Another high flow event in the summer of 2010 scoured the Clinton Creek channel downstream of DS4 by up to 4 m depth and significantly damaged DS4 itself. Damage to DS1, DS2 and DS3 was repaired in September, 2011 (R94, AECOM 2011). Repairs to DS4 were planned for 2011, but due to access and safety issues were not completed until September, 2015. The DS4 repairs included re-grading the unstable waste rock slope, backfilling the eroded creek channel and installing 40 m of articulated concrete block mats downstream of the DS4 gabion drop structure (R121, WorleyParsons 2015).

Abutments were constructed in 2013 at the outlet of Hudgeon Lake to anchor log booms, which were designed to retain large floating debris. Large floating debris leaving the lake can damage the drop structures downstream, or become caught and create a blockage to flow.

1.1.2 Waste Dumps and Open Pits

Approximately 60 million tonnes of waste rock and overburden were deposited over the south slope of the Clinton Creek valley (i.e., the Clinton Creek waste rock dump) with an additional 3 million tonnes of waste rock and overburden placed to the southeast of Porcupine Pit in the Porcupine Pit waste rock dump (R01, UMA 2000). Porcupine Pit and Snowshoe Pit are the two major open pits on the Site.

The Clinton Creek waste dump generally slopes north from a peak northwest of Porcupine Pit (approximate elevation of 477.3 m) to the south embankment of the Clinton Creek channel. The waste rock is comprised of weak argillite material composed primarily of sand and gravel sized rock fragments with some silt, cobbles and boulders removed in the course of open pit mining operations at the Porcupine Pit. Overburden materials were also excavated from the Porcupine Pit, loaded into trucks, and hauled to the Clinton dump.

Development of the dump commenced by end-dumping of materials near the crest of the north-facing slope that forms the valley wall of Clinton Creek. Shortly after development of the dump commenced, a segment of the dump began to slump, and the toe of the dump started to spread northward onto the flat valley floor of Clinton Creek. These movements continued to develop as additional material was dumped. As a result, the waste rock advanced northward across the valley bottom, resulting in blockage of the drainage course of Clinton Creek (R35, Golder 1978).

A stability analysis completed in 2002 concluded that the ongoing waste rock movement is the result of a very weak foundation layer and the thawing of permafrost underneath the waste rock (R47, UMA 2002).

1.1.3 Mill, Tailings Pile and Wolverine Creek

The former mill site is located at the top of the slope to the west of Wolverine Creek and north of Clinton Creek. Between 1968 and 1974, tailings were deposited on the upper portion of the west slope of the Wolverine Creek valley, now referred to as the south lobe. The tailings on the west slope of the Wolverine Creek valley are a silty sand reject from the crushing operation and are much coarser than traditional tailings at other mine processing operations. In 1974, the south lobe of the tailings pile failed and slid into Wolverine Creek. Later that year, water impounded in Wolverine Creek breached the failed tailings lobe. Eroded tailings from the failed lobe were deposited in the Wolverine Creek valley for several hundred meters downstream of the breach. After 1974, new tailings were deposited to the north of the failed lobe. This north lobe showed signs of instability and by 1988 had crept down the west valley wall to block Wolverine Creek upstream of the south lobe failure (R21, UMA 2003). Water is currently impounded upstream of both the failed north and south lobes of the Wolverine Creek tailings pile.

The results of a stability analysis completed in 2003 indicate that the mode of failure was a translational slide (resulting from a steep foundation slope and build-up of pore water pressure) with the failure plane located within the overburden and/or weathered argillite layers (R21, UMA 2003).

Wolverine Creek has a drainage area of approximately 29 km^2. The creek currently flows over the north and south tailings lobes, down a 250 m long rock-lined channel, and joins Clinton Creek by the site access gate. The rock-lined channel along the downstream face of the south lobe was constructed in 1978 and is still operational. The channel has a measured width of approximately 9 m and a lined depth of approximately 1.2 m. The rock armouring has a measured median diameter of approximately 0.9 m (R21, UMA 2003).

1.1.4 Site Access Road

The site is accessible through Dawson City via a gravel access road connected to the Top of the World Highway near the village of Forty Mile. The site access road crosses Clinton Creek at the following ford crossings:

- Crossing No. 1, 640 m downstream of DS4
- Crossing No. 2 at the Hudgeon Lake Outlet

Downstream of Crossing No. 1, the site access road is located on the north side of Clinton Creek. Between Crossing Nos. 1 and 2, the site access road is located adjacent to and on the waste rock dump. Past Crossing No. 2, the site access road continues along the edge of Hudgeon Lake before switching back to climb the slope above Clinton Creek. The site access road ends at the former Mill site above the tailings pile.

1.2 LTPMP Overview

Advisian was engaged by the Government of Yukon – Energy, Mines and Resources – Assessment and Abandoned Mines (AAM) to provide engineering services for the 2016 Clinton Creek Long-Term Performance Monitoring Program (LTPMP). The LTPMP is intended to monitor the condition and performance of the various site components through qualitative (i.e., visual inspection) and quantitative (i.e., survey data) assessments. These assessments enable AAM to identify changes to site components and take action as necessary to mitigate potential impacts to the environment and to protect human health and safety. The program's triggers provide threshold levels at which the AAM should consider implementing pre-established responses (e.g., repairing a drop structure, undertaking a geotechnical assessment).

The survey program began with the first round of monitoring in 2004 and the first program report prepared in 2006 (R22, UMA 2006) with subsequent monitoring occurring on a biennial basis. The survey program has expanded since 2004 and currently includes all components listed in Section 1.1. This program was recently completed in 2012 and 2014. The 2016 full survey program is presented in detail in Section 2.2.

Due to damage to the drop structures caused by the 2010 flood, the 2012 program report (R104, AE 2013) included a recommendation to conduct annual site-wide visual inspections of all site components listed in Section 1.1 and surveys of the Clinton Creek drop structures, channel alignment and profile on an annual basis. This recommendation was implemented in 2013 and 2015 and is referred to as the "small" LTPMP survey.

Recommended changes to the LTPMP program, as well as proposed scopes for the "small" 2017 LTPMP and "full" 2018 LTPMP programs are presented in Section 5 and are summarized in Appendix 6.

2 2016 Field Program

The 2016 field program consisted of the following activities:

- Full site inspection completed by Advisian's geotechnical and hydrotechnical engineers on June 21, 2016.
- Full LTPMP survey conducted by Underhill between August 29 and September 4, 2016.

2.1 Site Inspection

The observations made during the site visit are summarized in Table A. Photos from the site visit are in Appendix 3.

Table A Summary of Site Observations

Site Component	Observations
Site Access Roads – Section A: Top of the World Hwy to Forty Mile Bridge	This portion of road and the Forty Mile Bridge is maintained by the Department of Highways and Public Works in the summer and is generally in good condition. Vegetation at the sides of the road was recently cleared and a portion of the gravel road was graded on June 21, 2016. A culvert (approx. 0.6 m diameter corrugated steel pipe [CSP]) located approximately 500 m south of the Forty Mile Bridge had partially washed out. The road is reduced to single lane at this location but still passable.
Site Access Roads – Section B: Forty Mile Bridge to Gate	This portion of road is generally in fair condition and passable. The road was graded in the summer of 2015 by Sidhu with vegetation pushed back. Some low areas are located along the road where ponding was observed during the 2015 LTPMP site visit. Some rocks (less than 500 mm diameter) have rolled onto the road from adjacent rock falls at two locations along the road. One culvert (approx. 1 m diameter CSP) located 5 km from the Forty Mile Bridge is partially washed out at the downstream end. Signs of flow over the road were observed. Some debris was found at the culvert inlet, which could have contributed to the culvert backing up. The downstream-most section of CSP pipe is disconnected from the rest of the culvert. This location is currently passable by light vehicles.
Site Access Roads – Section C: Gate to Ford Crossing No. 2	This portion of road is in fair condition and passable. The road was graded in the summer of 2015 by Sidhu. Two large rocks (approx. 1 m diameter) that were originally beside the site gate post have been moved to the centre of the road. This location is barely passable by light vehicle. The two culverts conveying water from Wolverine Creek under the access road near the site gate are in fair condition. Some debris has accumulated at the inlet of the low flow (west) culvert since it was last cleared in September, 2015. Fording No. 1 was replaced by a temporary creek crossing comprised of five CSP culverts topped by coarse gravel by Sidhu during the repair of DS4 in 2015. This was removed in late September, 2015 and the crossing is now in good condition.

Site Component	Observations
Site Access Roads – Section D: Ford Crossing No. 2 to Former Mill Site	This portion of the road was in fair condition. Sidhu did not grade this portion of the road in 2015 and vegetation has encroached into the road. The road is passable, but dense vegetation and some fallen branches may cause minor damage to vehicles using the road. Fording No. 2 was temporarily replaced by a 2 m high berm composed of cobbles and coarse gravels by Sidhu during the repair of DS4 in 2015. This was removed in late September, 2015 and the crossing is now in good condition.
Closed Portion of Access Road	The channel slope adjacent to the closed portion of the access road continues to fail and topple into the Clinton Creek channel. Based on a comparison of 2015 and 2016 photos, the slope crest has receded by approximately 0.5 m in multiple areas. The slope at this location is significantly over-steepened (vertical in areas) with large tension cracks adjacent to the top of the slope. The slope will continue to fail until it reaches a naturally stable slope (i.e., FOS=1), likely at a somewhat steeper gradient than 1H:1V.
Hugdeon Lake Outlet	The lake outlet is clear with the exception of a piece of rusted metal near the north bank. The Hudgeon Lake pressure transducer and data logger appear in good condition.
Log Booms	The booms have numerous scratches and gouges up to an estimated 1 cm deep. However, this depth is a small fraction of the HDPE wall thickness of approximately 9 cm (800 cm OD, DR9). No other evidence of structural damage was observed on the booms. There appears to be some cracking in the seals at the ends of each boom where the HDPE pipe fits into the steel sleeve (Photo 15 in Appendix 3). It cannot be confirmed from this inspection whether the booms are watertight. However, the booms are filled with polystyrene and should float even in the event of a leak. No evidence of structural damage or wear was observed on the log boom abutments. Little to no evidence of erosion or loss of rock armouring around the boom abutments was observed. Top of sediment was measured to be at an elevation of approximately 411.53 cm at the north bank abutment and 411.44 cm at the south bank abutment. Small cracks observed in the soil around the north bank abutment (Photo 13 in Appendix 3) may be an indication of movement or subsidence of the abutment area. These cracks were not noted in the 2015 LTPMP report.
Drop Structures 1 to 3	Drop Structures 1 to 3 appear in good condition with minimal gabion wire damage observed. However, a significant amount of large woody debris was observed lodged in the gabion wire. Small vegetation, primarily raspberry bushes, was present in all drop structures. Clinton Creek was flowing at the time of the site visit, so the bottom of the gabion structures was not clearly visible. Drop structures were repaired in September, 2015 using PVC coated gabion wire. Debris and vegetation were removed at that time.

Site Component	Observations
Drop Structure 4	On June 21, 2016 several potential issues with the DS4 articulated concrete block (ACB) mats, constructed in September, 2015, were noted. Photos 20 to 26 in Appendix 3 show the condition of the ACB channel. Observations of DS4 include the following: ▪ The stabilized slope to the south of DS4 was in good condition with no signs of erosion. ▪ Individual concrete blocks appear to be in similar condition as installed. No instances of significant concrete cracking or spalling beyond the acceptable limits outlined in the construction specifications were observed. ▪ No signs of erosion were observed immediately downstream of DS4 when compared with photos from September, 2015, suggesting adequate energy dissipation in the stilling basin. ▪ Some small debris was lodged in the concrete blocks, including broken fragments that may have been a part of larger debris, similar to what was observed in the gabion drop structures. ▪ The centre mat fourth from the top appears to have shifted downstream by approximately one block width (0.4 m) at the channel centreline, but is held in place along the edges, which are secured with rebar and grout. The centre mat fifth mat from the top has buckled as a result. The duckbill anchors appear to be engaged and, in conjunction with the grouted edges, are holding both mats in place. ▪ The centre mat seventh from the top has buckled slightly and is held in place by the duckbill anchors and grout along the edges. ▪ Two blocks on the left bank mats eighth and tenth from the top are partially overturned, potentially as a result of the buckled mats directing more flow towards the left bank. ▪ The upstream edges of centre mats sixth and eighth from the top have lifted slightly, possibly as a result of impinging flow caused by the buckled mats upstream. ▪ The two grouted trenches running parallel to the channel banks appear to be in good condition.
Clinton Creek Channel	Observed movement of large boulders in the creek between DS4 and Fording No. 1 since September, 2015 indicated ongoing channel erosion. However, no evidence of significant channel scour or degradation was observed. Small landslides from the valley slope to the north are encroaching on the creek channel. The soil overlying bedrock on the north bank of Clinton Creek between DS4 and Fording No. 1 is oversteepened and continues to fail, sliding into Clinton Creek. Several minor slope failures in this region since September, 2015 were observed. No major slope failures (e.g., fallen trees or new landslides).

Site Component	Observations
Clinton Creek Waste Rock Pile	No indicators of recent, substantial movement (i.e., greatly in excess of mean annual movement) were observed throughout the waste rock pile. The closed portion of access road adjacent to the Clinton Creek channel continues to fail as waste rock is eroded at the toe of the slope. Localized slope erosion was observed near the eastern edge of the waste rock pile, downslope of the abandoned shovel. A delta of eroded material has formed at the toe of the waste rock slope with some material entering Clinton Creek just downstream of Fording No. 1. Erosion of this slope did not appear to be significantly worse than in 2015. Small tension cracks appear to be forming near the crest of this slope, which were not noted in the 2015 LTPMP report. Some erosion around the culvert protruding from this waste rock slope south of Fording No. 1 was noted, but does not appear to have worsened since the 2015 LTPMP site visit. The waste rock slopes to the south of DS4 are in good condition with no signs of significant erosion. The shallow ditch along the road to the south of the stabilized slope appears to be functioning properly, draining runoff west towards Hudgeon Lake. Groundwater continues to seep from the toe of the slope where permafrost was located in August, 2015 during the repair of DS4. No signs of erosion or slope movement were observed at the location of the groundwater seep.
Wolverine Creek Channel	The creek between the confluence and the rock lined channel appears to be stable with some localized bank erosion. The rock lined portion of the channel appears to be stable with no indications of erosion or loss of rock.
Wolverine Ponds	The inlet and outlet of the Wolverine South Pond were not obstructed at the time of the investigation. The North Pond was observed from the top of the tailings pile and did not appear to be obstructed. Flow in Wolverine Creek continues to scour the toe of the north and south lobes of the tailings pile.
Wolverine Creek Tailings Pile	No indicators of recent, substantial movement (i.e., greatly in excess of mean annual movement) were observed throughout the tailings pile, although signs of ongoing slumping and gullying were noted throughout. The tailings pile has many features in common with a rock glacier and is likely behaving in that fashion, with continuous low velocity flow and slump driven by deformation of ice and/or permafrost within the tailings pile.
Porcupine Pit	No observed indicators of recent slope failures. No signs of recent sloughing, creeping and seepage were evident on the slopes at the time of the inspection. The pit slopes are not vegetated. Existing or ongoing slope movement indicates the slope faces are in a critical state of stability, and will likely continue to fail in the future. Therefore, access to or below the slopes of the pit should continue to be restricted. A monitoring program will be required if access to the open pit void is needed. Pit was observed from northeast of the pit at an elevation of 420 m (approximate).

Site Component	Observations
Snowshoe Pit	No observed indicators of recent slope failures. No signs of recent sloughing, creeping and seepage were evident on the slopes at the time of the inspection. The pit slopes are not vegetated. Existing or ongoing slope movement indicates the slope face is in a critical state of stability, and will likely continue to fail in the future. Therefore, access to or below the slopes of the pit should continue to be restricted. A monitoring program will be required if access to the open pit void is needed. Pit was observed from northwest of the pit at an elevation of 420 m (approximate).

2.2 Site Survey

A summary of the 2016 LTPMP site survey, completed on September 4, 2016, is presented in Table B. A detailed description of the 2016 LTPMP Survey Field Plan is in Appendix 4. Raw survey data is in Appendix 5.

A total of 9 monitoring pins were destroyed as part of the 2015 DS4 repair work and replaced by Underhill in 2016. Destroyed pins are listed in Table C.

Underhill installed 6 new monitoring pins to monitor the DS4 concrete mat channel and 18 new monitoring pins based on recommendations provided in the report "Geotechnical Monitoring Program Review" prepared by Tetra Tech EBA on March 31, 2016. New and replacement monitoring pins are listed in Table D.

Table B Summary of 2016 Site Survey

Site Component	Description
Clinton Creek access road	▪ Survey and measurement of tensions cracks along the access road
Hudgeon Lake outlet	▪ Top of bank, water level and log boom abutments
Gabion Drop Structures 1, 2, 3 and 4	▪ Survey of drop structures and associated slope monitors installed along the channel banks ▪ 4 replacement monitoring pins installed around DS4 (replacing 1462 to 1465) ▪ 6 new monitoring pins installed around DS4 (1466 to 1471)
Clinton Creek channel profile	▪ Hudgeon Lake to confluence with Wolverine Creek
Clinton Creek cross sections	▪ Sections A, B, C, D, E and F
Clinton Creek waste rock pile	▪ 48 existing monitoring pins surveyed ▪ 5 monitoring pins (1824, 1833, 994, BH 10 (P2) and 226) were destroyed or buried ▪ 6 new monitoring pins (CC5 to CC10) were installed ▪ 5 replacement monitoring pins were installed (CC11 to CC15) to replace destroyed or buried pins
Clinton Creek natural slope	▪ 2 existing monitoring pins surveyed (183 and 184) ▪ 4 new monitoring pins installed (CC1 to CC4)

Site Component	Description
Porcupine Pit	▪ 6 existing monitoring pins were surveyed
Wolverine Creek tailings pile	▪ 53 existing monitoring pins surveyed (996 not surveyed) ▪ 6 new monitoring pins installed (WC3 to WC8)
Wolverine Creek tailings pile ponds	▪ Edge of water and cross sections at pond outlets (1, 2 and 3)
Wolverine Creek channel profile	▪ North-most pond to confluence with Clinton Creek
Wolverine Creek cross sections	▪ Sections I, J, K, L, M and N
Wolverine Creek natural slope	▪ 2 existing monitoring pins were not surveyed (160 and 163) ▪ 2 new monitoring pins installed (WC1 and WC2)

Table C Destroyed Monitoring Pins

Pin ID	Location	Cause	Replacement
1824	Waste Rock Lower Slope	Destroyed during 2015 DS4 Repairs	CC12 placed in the vicinity of 1824
1833	Waste Rock Lower Slope	Buried, likely during 2015 DS4 Repairs	CC15
994	Waste Rock Lower Slope	Destroyed during 2015 DS4 Repairs	CC13
BH 10 (P2)	Waste Rock Lower Slope	Destroyed during 2015 DS4 Repairs	CC14
226	Waste Rock Lower Slope	Destroyed during 2015 DS4 Repairs	CC11
1462	Adjacent to DS4	Destroyed during 2015 DS4 Repairs	1462 (new pin)
1463	Adjacent to DS4	Destroyed during 2015 DS4 Repairs	1463 (new pin)
1464	Adjacent to DS4	Destroyed during 2015 DS4 Repairs	1464 (new pin)
1465	Adjacent to DS4	Destroyed during 2015 DS4 Repairs	1465 (new pin)

Table D New and Replacement Monitoring Pins

Pin ID	Northing	Easting	Description
CC1	7,147,451.59	512,970.58	Clinton Creek north valley slope
CC2	7,147,385.07	513,141.67	Clinton Creek north valley slope
CC3	7,147,349.12	513,280.58	Clinton Creek north valley slope
CC4	7,147,300.99	513,387.11	Clinton Creek north valley slope
CC5	7,147,185.39	513,300.37	Waste Rock Mid Slope
CC6	7,147,087.56	513,226.70	Waste Rock Mid Slope
CC7	7,146,992.44	513,136.17	Waste Rock Mid Slope
CC8	7,146,895.65	513,157.15	Waste Rock Mid Slope

Pin ID	Northing	Easting	Description
CC9	7,146,993.52	513,615.40	Waste Rock Lower Slope
CC10	7,146,915.19	513,776.16	Waste Rock Lower Slope
CC11	7,147,309.91	513,070.41	Replacing 226
CC12	7,147,332.61	513,026.36	Replacing 1824
CC13	7,147,348.95	513,031.49	Replacing 994
CC14	7,147,360.03	513,008.84	Replacing BH 10 (P2)
CC15	7,147,299.94	512,922.21	Replacing 1833
WC1	7,148,394.09	514,023.43	Wolverine Creek east valley slope
WC2	7,148,108.05	514,031.67	Wolverine Creek east valley slope
WC3	7,148,306.83	513,390.08	Tailing Upper Slope, North Side
WC4	7,148,433.30	513,399.14	Tailing Upper Slope, North Side
WC5	7,148,539.73	513,399.94	Tailing Upper Slope, North Side
WC6	7,148,393.66	513,320.03	Tailing Upper Slope, North Side
WC7	7,148,494.31	513,248.40	Tailing Upper Slope, North Side
WC8	7,148,133.04	513,108.10	Mill Site
1462	7,147,401.92	513,033.68	Replacing lost 1462
1463	7,147,374.04	513,025.97	Replacing lost 1463
1464	7,147,369.71	513,036.60	Replacing lost 1464
1465	7,147,399.44	513,040.30	Replacing lost 1465
1466	7,147,373.22	513,043.61	Adjacent to new DS4 concrete mat channel
1467	7,147,392.79	513,047.64	Adjacent to new DS4 concrete mat channel
1468	7,147,370.30	513,058.32	Adjacent to new DS4 concrete mat channel
1469	7,147,389.87	513,062.36	Adjacent to new DS4 concrete mat channel
1470	7,147,365.73	513,068.63	Adjacent to new DS4 concrete mat channel
1471	7,147,388.30	513,073.24	Adjacent to new DS4 concrete mat channel

2.2.1 Survey Quality

The 2016 survey data is presented in NAD 83, Zone 7 UTM coordinates. Equipment precision reports provided by Underhill are summarized in Table E. Reported horizontal and vertical precision generally agree with historical survey accuracy, which includes equipment and human error. Historical survey data accuracy is summarized in Section 3.1.1.

Table E LTPMP 2016 Survey Precision Report Summary

Date	Site Components Surveyed	Horizontal Precision (95% Confidence)	Vertical Precision (95% Confidence)
August 29, 2016	▪ Tied in benchmarks	Median: 1.7 cm Max: 2.4 cm	Median: 3.1 cm Max: 5.0 cm
August 30, 2016	▪ GPS control, waste rock pile	Median: 1.5 cm Max: 3.3 cm	Median: 2.7 cm Max: 6.3 cm
August 31, 2016	▪ New pins CC1 to CC10 ▪ Ex. Pins 183 and 184 ▪ X-sections D, E, F	Median: 2.2 cm Max: 4.4 cm	Median: 3.6 cm Max: 6.3 cm
September 1, 2016	▪ Clinton Creek centreline ▪ DS1, DS2, DS3, DS4	Median: 2.0 cm Max: 4.8 cm	Median: 3.4 cm Max: 11.1 cm
September 2, 2016	▪ Closed access road ▪ Hudgeon Lake outlet and log boom abutments ▪ Clinton Creek x-sections ▪ New pins CC11 to CC15	Median: 1.7 cm Max: 5.4 cm	Median: 2.6 cm Max: 6.9 cm
September 3, 2016	▪ New pins WC1 to WC8 ▪ Wolverine Creek ponds and slope monitoring ▪ Wolverine Creek centreline and x-sections 1, 2, 3 and I	Median: 2.2 cm Max: 16.4 cm	Median: 4.2 cm Max: 38.1 cm
September 4, 2016	▪ Wolverine Creek centreline and x-sections J, K, L, M and N	Median: 2.9 cm Max: 16.0 cm	Median: 5.3 cm Max: 15.9 cm

3 Historical Survey Data

The LTPMP site survey began in 2003/2004 and has since expanded considerably since. The drop structures in Clinton Creek were first surveyed in 2006. Cross sections of Clinton Creek and Wolverine Creek date back to 2012 and 2014 respectively.

Historical survey records for monitoring pins at the Site were reviewed in order to provide a better understanding of the data available for evaluating historical trends. Table 1 to Table 8 in Appendix 2 show these survey data records for each site component.

3.1.1 Data Accuracy

Total year-over-year survey error (instrument plus human error) while surveying the monitoring pins was estimated using historical measurements at five monitoring pins along the edge of Porcupine Pit (1830, 1832, 1837, 1838 and 1839). These monitoring pins were selected as they had low observed annual movement rates (all <1.0 cm/yr) and each had been surveyed 10 times between 2003 to 2016.

Since small movements over time were observed at most pins, surveyed coordinates were normalized (i.e., zeroed) using a best fit linear regression of movement at each pin. The residual horizontal survey measurements are shown in Figure C. These residual measurements can be interpreted as measurement error.

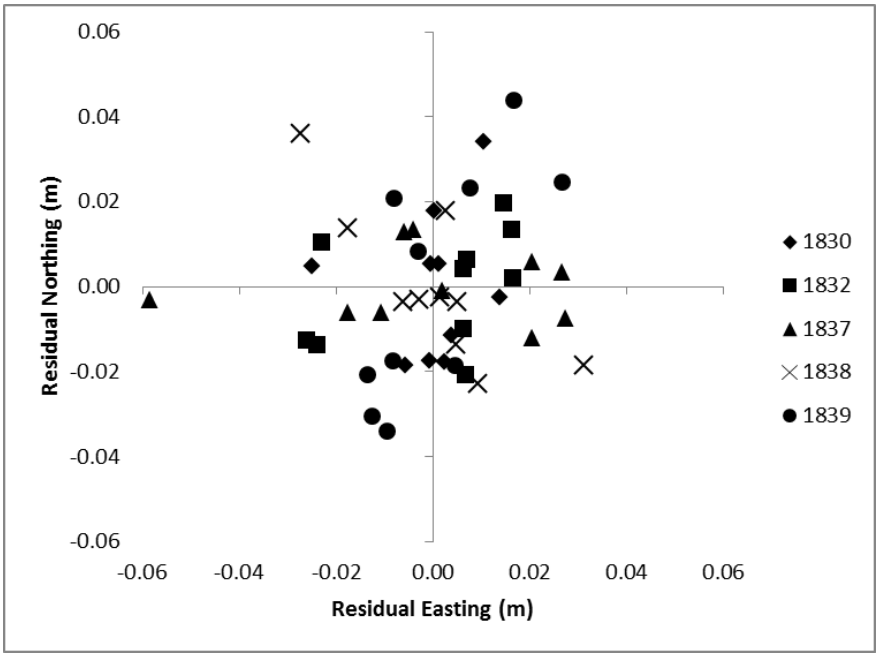


Figure C **Residual Horizontal Survey Measurements at Porcupine Pit Monitoring Pins (2003-2016)**

Both horizontal and vertical calculated measurement errors for these pins were found to follow normal distributions. From these distributions we can derive horizontal and vertical measurement confidence intervals. Horizontal error can be broken down further into directional error (e.g., north-south error only) and absolute error (distance from pin).

Table F presents confidence intervals for survey measurement error. The 95% confidence interval for horizontal directional error is generally the value of interest. Based on this analysis there 95% confidence that an individual monitoring pin is within 3.3 cm of its surveyed location along a bearing (e.g., north-south) and within a 3.9 cm radius circle of the surveyed location.

Table F Year-Over-Year Historical Survey Data Accuracy

Confidence	Directional Horizontal Error	Absolute Horizontal Error	Vertical Error
80%	± 2.2 cm	2.6 cm	± 3.0 cm
90%	± 2.8 cm	3.3 cm	± 3.9 cm
95%	± 3.3 cm	3.9 cm	± 4.6 cm

When calculated movement rates of multiple monitoring pins are averaged, the aggregate survey error is reduced by a factor of √n, where n is the number of measurements that were averaged. In Table G, survey measurement errors are presented for averages of varying numbers of points.

Table G Averaged Survey Measurement Errors (95% Confidence Interval)

No. of Points Averaged, n	Directional Horizontal Error	Absolute Horizontal Error	Vertical Error
1	±3.3 cm	3.9 cm	±4.6 cm
2	±2.3 cm	2.8 cm	±3.2 cm
5	±1.5 cm	1.8 cm	±2.1 cm
10	±1.0 cm	1.2 cm	±1.5 cm
25	±0.7 cm	0.8 cm	±0.9 cm
50	±0.5 cm	0.6 cm	±0.6 cm

When measuring movement rates, errors over the two survey periods (before and after) are combined. The minimum statistically significant surveyed movement rates are presented in Table H. These values can also be used to evaluate statistically significant changes in movement rates between monitoring periods. When comparing movement rates, both rates should be expressed in the principal direction of movement, as discussed in Section 3.1.2.

Table H Statistically Significant Movement Rates

No. of Points Averaged, n	Statistically Significant Movement Rates[1]			
	1 year period	2 year period	4 year period	10 year period
1	> 4.7 cm/yr	> 2.3 cm/yr	> 1.2 cm/yr	> 0.5 cm/yr
2	> 3.3 cm/yr	> 1.7 cm/yr	> 0.8 cm/yr	> 0.3 cm/yr
5	> 2.7 cm/yr	> 1.4 cm/yr	> 0.7 cm/yr	> 0.3 cm/yr
10	> 2.1 cm/yr	> 1.0 cm/yr	> 0.5 cm/yr	> 0.2 cm/yr
25	> 1.5 cm/yr	> 0.7 cm/yr	> 0.4 cm/yr	> 0.1 cm/yr
50	> 0.9 cm/yr	> 0.5 cm/yr	> 0.2 cm/yr	> 0.1 cm/yr

Notes:
1. Statistically significant is defined here as 95% confidence (i.e. p-value < 0.05). These values can be used to evaluate statistically significant changes in movement rates (i.e. acceleration or deceleration) in the principal direction of movement.

3.1.2 Principal Direction of Movement

For the purpose of reducing the effects of survey error on the monitoring results, surveyed movements are generally presented in what is defined here as the principal direction of movement. The principal direction of movement, illustrated in Figure D, was calculated for each monitoring point based on the surveyed coordinates in the year that the monitoring point was established and the surveyed coordinates in 2016. Incremental movements between these dates are measured only along the principle direction of movement, under the assumption that deviations from this principle direction are caused by survey error alone.

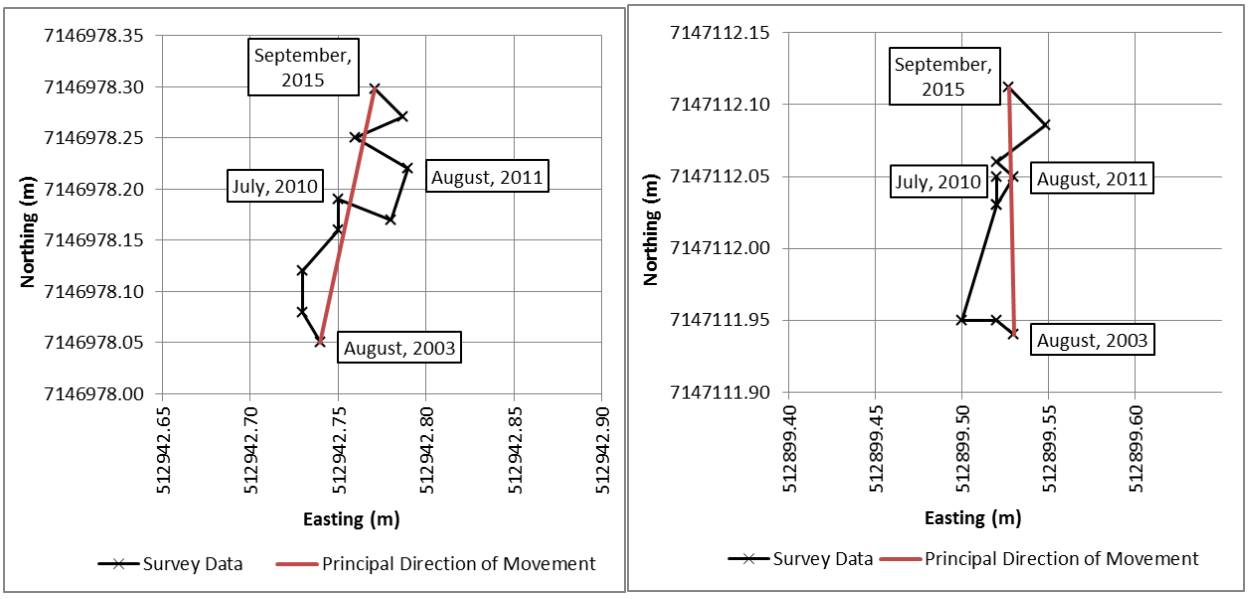


Figure D Principal Direction of Movement for Monitoring Points 223 (Left) and 1,195 (Right)

4 Performance Monitoring

This section discusses the observations made during the site inspection on June 21, 2016 (Section 2.1, Table A) and the results of the 2016 LTPMP survey completed between August 29 and September 4, 2016. Performance triggers were carried forward from the most recent LTPMP surveys, 2014 (full) and 2015 (small) and modified as necessary to suit current site conditions. Revisions to the triggers are recommended in Section 5 based on the results of the 2016 performance monitoring. A revised list of triggers with 2016 values is provided in Appendix 6.

Appendix 1 contains figures showing the site survey data. Survey data was evaluated in detail and a summary of the results are presented in this report. Recommendations based on the findings in this section are presented in Section 5.

4.1 Clinton Creek Site Access Road

Two culverts were identified as partially washed out during the site visit on June 21, 2016. One was located approximately 500 m south of the Forty Mile Bridge and the other located approximately 5 km past (northwest) of the Forty Mile Bridge. AAM repaired both of these culverts during the summer of 2016.

Based on photos taken by Underhill at the end of August, 2016, the site access road between the Forty Mile Bridge and the site gates has experienced several landslides (Photo A) and erosion caused by runoff across the road (Photo B).

Photo A Clinton Creek Site Access Road – Landslide (August 29, 2016)

Photo B Clinton Creek Site Access Road – Erosion (August 29, 2016)

4.1.1 Closed Section of Access Road

Based on observations made during the 2012 program, a portion of the Clinton Creek site access road, from Clinton Creek Stations 0+340 to 0+410, was closed due to the presence of extensive tension cracks and embankment failures. This section of the site access road was blocked off using chains attached to concrete lock blocks at the east end and an earth berm at the west end (Photo C), with the site access road relocated across the waste rock pile.

Photo C Closed Section of Clinton Creek Site Access Road – Looking West (June, 2016)

The closed section of the site access road was surveyed as part of the 2012 program. A baseline was established, offset to the south from the edge of the Clinton Creek channel embankment, with metal spikes set every 3 m. The movement of these spikes, as well as changes to the location of the edge of embankment, were calculated and are discussed in subsequent sections. Note that survey was limited to the closed portion of the site access road.

4.1.2 Survey Results and Analysis

The survey of the closed portion of the Clinton Creek site access road was accomplished by recording coordinates for the following points (established in 2012):

- Total of 23 metal spikes installed along the baseline established in 2012.
- Total of 10 metal spikes installed in 2015 to extend the baseline to the east and west (five at each end).
- Along the edge of the Clinton Creek channel bank.
- The location of visible tension cracks perpendicular to the metal spikes.

A summary of surveyed movement of the baseline and loss of the embankment between 2012 and 2016 is presented in Table I.

Table I Closed Access Road 2016 Survey Results Summary

Category	2012 to 2014 Movement (cm)	2014 to 2016 Movement (cm)	Trigger
Baseline horizontal movement towards Clinton Creek	3.0 (±0.7)	1.4 (±0.7)	AR-1 not triggered
Baseline vertical settlement (i.e., downward movement)	-2.2 (±1.0)	-0.8 (±1.0)	n/a
Average Erosion of Embankment Crest (Baseline Station 0+040 and 0+070)	71	85	AR-2 not triggered

Note:
1. 95% confidence intervals are shown in brackets, e.g. (±1.0)

No significant changes were recorded at the top of the Clinton Creek embankment between 2012 (when the baseline was established) and 2016. However, a large segment of the embankment was lost with a maximum offset from the 2014 top of embankment of 0.85 m as shown on Figure 1011 (Appendix 1). This loss of embankment material is interpreted to be a response to instability at the toe due to erosion. The baseline horizontal and vertical movement rates were similar (i.e., the baseline is moving downward at a 1H:1V slope).

Based on in situ observations, and interpreted photographic and topographic data, it is concluded that further erosion of the access road embankment may destabilize the ground farther upslope (Figure E). This could trigger a larger landslide by removing the support that is being provided by the toe of the slope, and result in significant blockage of the Clinton Creek channel.

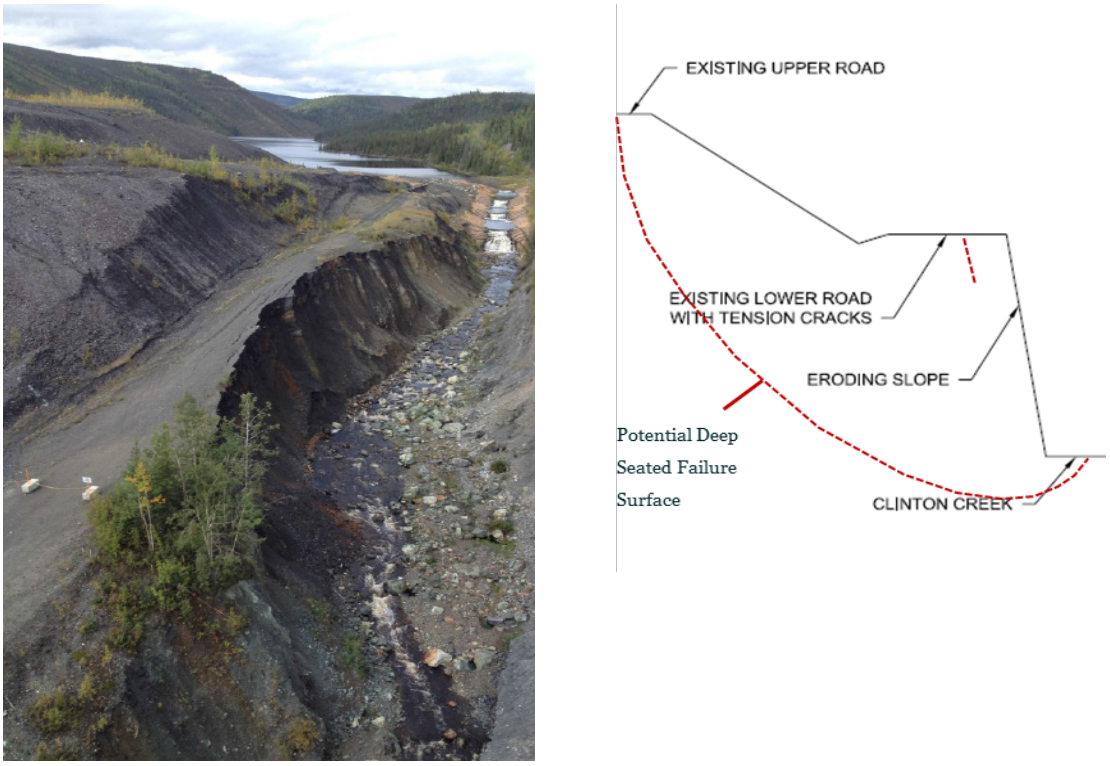


Figure E **Decommissioned access road and Clinton Creek east of DS4 looking west (left) and potential deep seated failure mechanism (right)**

In order to quantify the relative hazard posed by this potential landslide, a number of monitoring points in the vicinity were used for evaluating rate of slope movement. Plots of horizontal displacement rates are illustrated in Figure F. Displacement rates in the access (lower) road range from 0.9 to 1.9 cm/yr (monitoring points 69, 992, 993, 80-13 and P3), with rates being generally consistent throughout the observation period. Average displacement rate measured at the baseline, for the same period, is 0.7 cm/yr and thus is approximately congruent to the displacement rates measured at the monitoring points on the access (lower) road. Higher displacement rates (3.0 cm/yr) are found at the upper road, with the high values in the upper road where monitoring point 68 is located.

Analysis of the displacement direction was also carried out. The analysis shows that absolute displacement vectors of the monitoring points on the access (lower) road are towards the northeast, approximately perpendicular to the creek channel. In contrast, the displacement vector for the monitoring point on the upper road (68) is towards the northwest. Thus, displacement patterns are interpreted as two different zones that are deforming differently: a lower slope where deformation is predominantly surficial and an upper slope where deeper failure mechanisms are evident. Upper slope deformation rates are interpreted as being representative of global behaviour, while lower slope instabilities are interpreted as localized surficial accelerations that do not influence, at the present time, the entire landslide mass. As more monitoring data becomes available at this site, consideration should be given to the displacement model presented here and updated or modified as necessary.

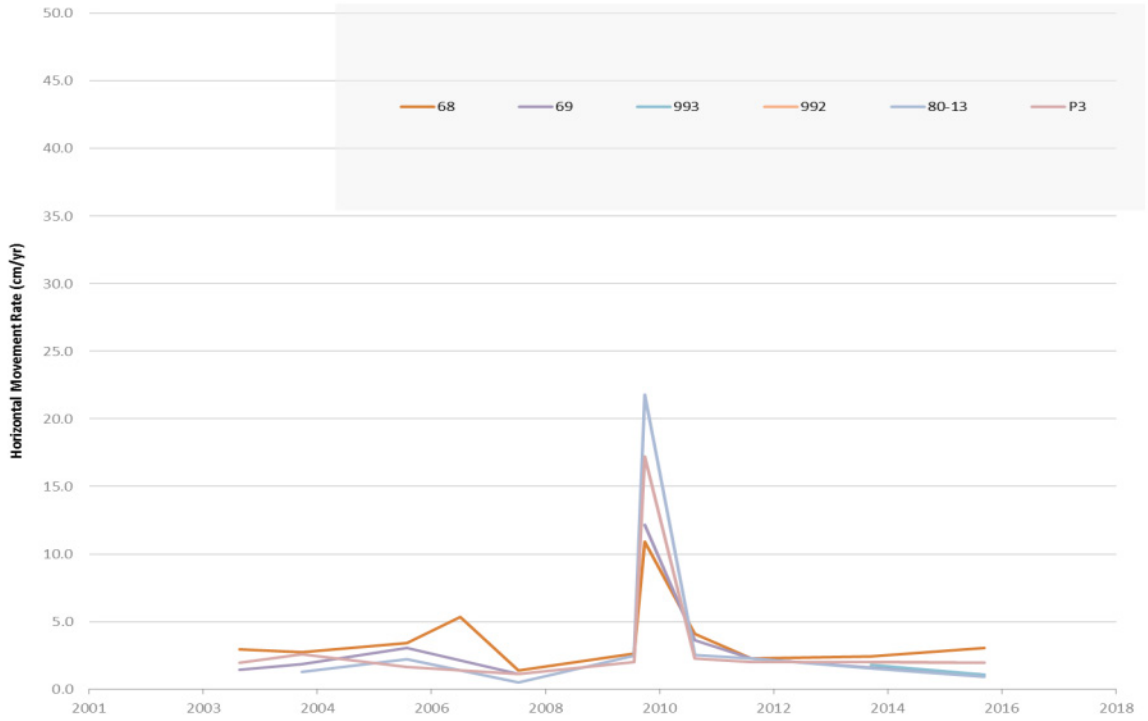


Figure F Clinton Creek Access Road (Closed Portion) Horizontal Movement Rates

4.1.3 Trigger Summary

The triggers for the closed portion of the Clinton Creek access road established in the 2014 LTMP report, along with the values observed in 2016, are presented in Table J. Triggers AR-3 and AR-4 are no longer considered relevant to the annual assessment of the access road. Recommendations for revisions to these triggers are discussed in Section 5.

Table J Clinton Creek Access Road (Closed Portion) – Summary of Existing Triggers

Trigger	Description	Trigger Value	Action	2016 Value
AR-1	Average horizontal movement of baseline from previous year	Increase of 10 cm from previous year	Develop mitigation plan	+0.7 cm/y
AR-2	Loss of embankment based on offset from previous year	1.0 m/y	Develop mitigation plan	0.42 m/y
AR-3	Total length of observed tension cracks	Increase by 20% from previous year	Develop mitigation plan	n/a
AR-4	Average number of cracks observed perpendicular to each baseline pine	Increase by 20% from previous year	Develop mitigation plan	n/a

4.2 Hudgeon Lake Outlet

During the 2016 site inspection the lake outlet was clear with the exception of a piece of rusted metal near the north bank. The Hudgeon Lake pressure transducer and data logger appear in good condition. The lake edge at the outlet has shown little to no sign of erosion since 2014 aside from the diversion works completed in 2015 on the south side of the outlet. Surveys from 2014 and 2016 are compared on Figure 1016 in Appendix 1.

Hourly rainfall data and 15-minute Hudgeon Lake water levels are measured at the Site and are summarized in Figure G. Hudgeon Lake water levels were obtained by adding 410.97 masl (based on 2016 LTPMP water level surveys) to the water depth recorded by the pressure transducer (correction for atmospheric pressure by others). The water level in Hudgeon Lake peaked on April 28, 2016 at 412.10 masl. A large storm event occurred on August 6, 2016 when 23 mm of rain was measured in one hour.

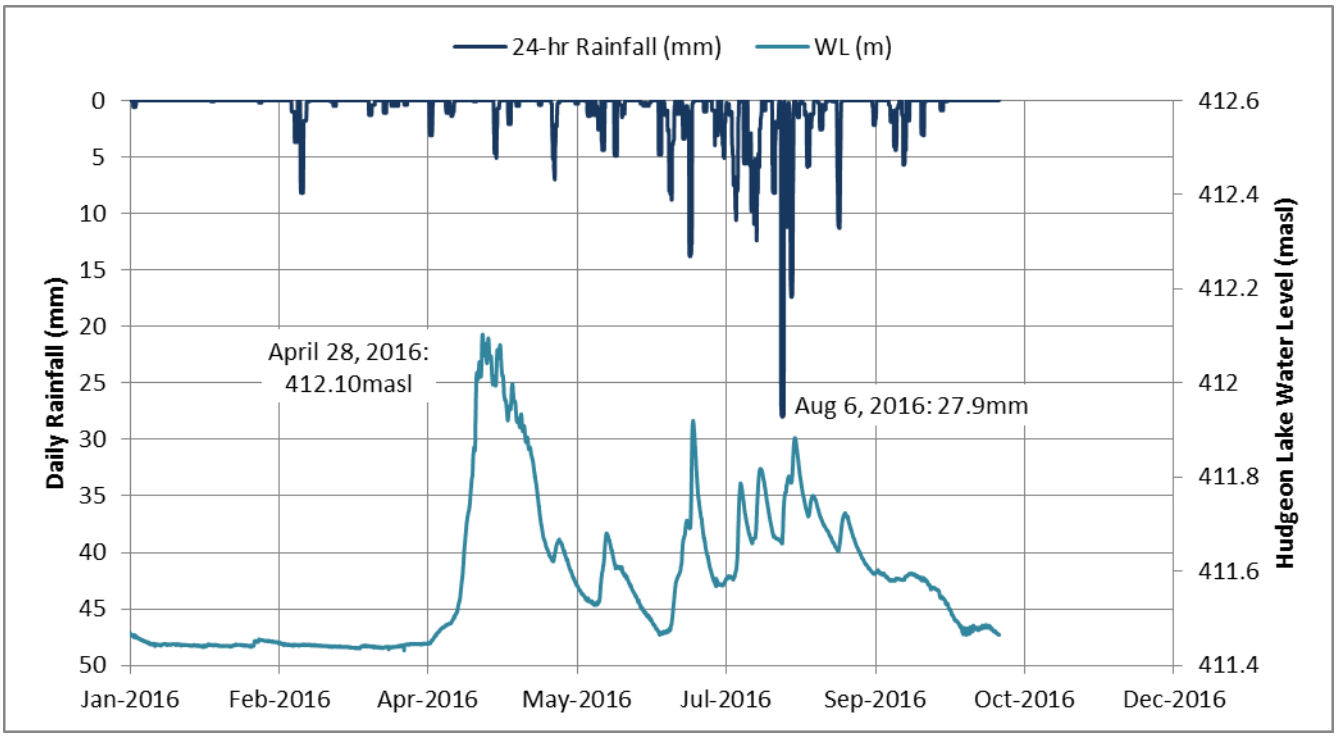


Figure G 2016 Daily Rainfall at Site and Hudgeon Lake Water Levels

4.2.1 Log Booms

Detailed observations of the 2016 site inspection are summarized in Section 2.1 (Table A). The log booms and abutments were generally in good condition. However, small cracks were observed in the soil around the north bank abutment (Photo D) and were thought to be an indication of movement or subsidence of the abutment area. These cracks were not noted in the 2015 LTPMP report.

Photo D North Boom Abutment, cracks in soil around abutment (June 21, 2016)

A comparison of the 2014 and 2016 surveys of the abutments is shown in Table K. These results indicate that both abutments are moving horizontally towards the lake, as well as vertically upwards. The crack in the soil near the north abutments corroborates the horizontal movement (3.6 cm), and the dirt line on the wood wall in Photo D corroborates the vertical displacement (12.2 cm).

Table K Log Boom Abutments 2016 Survey Results Summary

Location	2014 to 2016 Horizontal Movement	2014 to 2016 Vertical Movement
Top of North Abutment Piers (average of 3 points)	3.6 (±2.7) cm southwest	12.2 (±3.7) cm up
Top of South Abutment Piers (average of 3 points)	6.2 (±2.7) cm north	4.1 (±3.7) cm up

Note:
1. 95% confidence intervals are shown in brackets, e.g. (±1.0)

The direction and magnitude of horizontal movement of the north and south abutments between 2014 and 2016 are comparable to those of neighbouring monitoring points (228, 995, 1450, 1451, 1452 and 1453). This suggests that the horizontal displacement is largely attributable to the continuing movement of the waste rock pile.

A rotational failure of the waste dump could be contributing to the vertical displacement of the abutment piers. If the material (likely waste rock) beneath and backfilled around the abutment piers has a relatively high silt content, frost jacking is likely be a contributing factor.

4.2.2 Trigger Summary

A summary of the Hudgeon Lake and log boom abutment triggers is presented in Table L. Trigger HL-2, vertical displacement of at least 10 cm, was exceeded for the north log boom abutment.

Table L Hudgeon Lake – Summary of Existing Triggers

Trigger	Category	Trigger Value	2016 Value
HL-1	Lake water surface critical elevation	>412.0 masl	Freshet maximum of 412.10 masl on April 28, 2016 Summer maximum of 411.92 masl on July 7, 2016
HL-2	Movement of boom abutment structures from previous monitoring period	>30 cm horizontal; or >10 cm vertical	3.6 to 6.2 cm horizontal; 4.1 to ***12.2 cm*** vertical
HL-3	Loss of riprap at the boom abutments from previous monitoring period	>10% surface area	None

1. 2016 values that exceed trigger values are shown in bold and italics.

4.3 Gabion Drop Structures

All four drop structures were repaired in September, 2015, using PVC coated gabion wire and filling the baskets with additional rock. Debris and vegetation were removed at that time.

On June 21, 2016 Drop Structures 1 to 3 appeared in good condition, but with a significant amount of large woody debris lodged in the gabion wire. There was no visual evidence of piping or erosion underneath the gabion baskets (Trigger DS-4) or damage to the gabion mesh (Trigger DS-5). The debris was cleared from the drop structures on September 28, 2016.

Several potential issues with the DS4 articulated concrete block (ACB) mats, constructed in September, 2015, were noted. The condition of the ACB channel is described in Section 2.1 and shown in Table A.

Photo E Drop Structure 4 ACB Channel, looking southwest (June 21, 2016)

Time-lapse photos of DS4 and Hudgeon Lake water level measurements were supplied by AAM and reviewed by Advisian to assess potential causes of movement of the ACB mats. The following conclusions were drawn based on a review of this data:

- The bottom of the ACB-lined channel was free of snow by April 11, 2016.
- Freshet began on approximately April 21, 2016 and peaked on April 28, 2016 at approximately 6 m^3/s discharged from Hudgeon Lake. This flow estimate is based on recorded water levels in Hudgeon Lake and the rating curve presented in the DS4 Repair Construction Report (R121 WorleyParsons, 2015).
- The majority of movement of the ACB mats occurred on either April 25 or 26, 2016. Estimated flows at the outlet of Hudgeon Lake during this period reached approximately 5 m^3/s.
- High water levels in Hudgeon Lake, comparable to those recorded on April 25 and 26, 2016, persisted for approximately two weeks following movement of the ACB mats, followed by a gradual return to typical summer water levels by the middle of May, 2016.

DS4 survey data collected on September 1, 2016 is shown on Figure 1010 in Appendix 1. The results show no change to the cross section of the drop structure since the as-built survey collected in September, 2015. According to the surveyed profile, the Armorflex mats have settled by approximately 35 cm where they connect to the DS4 gabions. However, a change of this magnitude should have been observable by visual inspection and was not apparent during the June 21, 2016 site visit or in the September 1, 2016 photos. It is possible that a hole in the Armorflex block was surveyed rather than the top of mat. Regardless, this should be monitored again in the 2017 LTPMP. The channel was flowing at the time of inspection, but no loss of riprap in the upstream anchor trench was observed.

Based on the photos taken by Underhill in September, two additional potential issues were noted. The first is that there has been general erosion of the stabilized waste rock slope south of DS4 (Photo F). This could be due to either the significant storm event recorded on August 6, 2016 (23 mm in less than an hour at the meteorological station on Site), or issues with the stormwater diversion ditch at the crest of the stabilized slope. The second potential issue is a landslide on the natural valley slope north of DS4 (Photo G). This is likely a result of erosion of Clinton Creek banks between 2009 and 2015 as well as the heavy rainfall observed on August 6, 2016. The slide does not appear to have impacted the ACB channel.

Photo F Erosion of waste rock toe near DS4, looking south (September 3, 2016)

Photo G Landslide near DS4, looking north (August 31, 2016)

4.3.1 Survey Results and Analysis

Monitoring pins are located on the north and south sides of all four drop structures to track changes to the drop structures caused by waste rock movement. Cross sections between the pins, as well as the pins themselves, are surveyed annually to assess deformation of the gabion drop structures due to waste rock movements or flood events. Drop structure survey results are shown on Figures 1007 to 1010 in Appendix 1.

Table M shows a summary of historical monitoring pin distances. Table N to Table R show historical changes in the geometry of the four drop structures. The survey results show little change to the drop structures since 2014, aside from DS4 which was repaired in 2015. Detailed information on historical monitoring pin distances and drop structure geometry is presented in Appendix 6.

Table M Change to Drop Structure Geometry: Distance between Monitoring Pins

Cross-Section	Distance 2006 (m)	Distance 2012 (m)	Distance 2015 (m)	Distance 2016 (m)	Rate of Change[1] (cm/yr)
DS1 A	27.58 m	27.43 m	27.49 m	27.46 m	-1.2 (±0.5)
DS1 B	-	28.69 m	28.66 m	28.64 m	-1.1 (±1.1)
DS2 A	-	27.45 m	27.48 m	27.48 m	0.8 (±1.1)
DS2 B	28.62 m	28.23 m	28.07 m	28.02 m	-5.9 (±0.5)
DS3 A	-	26.47 m	26.37 m	26.36 m	-2.7 (±1.1)
DS3 B	-	-	27.76 m	27.71 m	-4.9 (±4.8)
DS4 A	-	-	-	28.92 m	n/a
DS4 B	-	-	-	29.95 m	n/a
DS4 C	-	-	-	19.98 m	n/a
DS4 D	-	-	-	19.98 m	n/a
DS4 E	-	-	-	23.04 m	n/a

Notes:
1. Rate of change calculated from baseline (first year of 2006, 2012 or 2015) to present (2016).
2. 95% confidence intervals are shown in brackets, e.g. (±1.0).

Table N Drop Structure 1 Geometry

Parameter	Design	2006 (Baseline)	2015	2016
Bottom width (m)	7.0	7.4	6.4	7.2
South side slope	3.0 H:1V	2.9 H:1V	3.0 H:1V	3.0 H:1V
North side slope	3.0 H:1V	2.9 H:1V	3.3 H:1V	2.9 H:1V
Channel depth (m)	2.53	2.04	2.32	2.23
X-section area (m^2)	36.91	27.21	31.80	30.75

Parameter	Design	2006 (Baseline)	2015	2016
Critical flow depth (m)	1.04	1.02	1.07	1.02
U/S Freeboard (m)	1.49	1.02	1.25	1.21

Notes:
1. Drop structure geometry, critical flow depth and freeboard shown represent the upstream end of the drop structure.
2. Critical flow depth and freeboard were calculated using the original design flow rate of 29 m^3/s (25 year return period).

Table O Drop Structure 2 Geometry

Parameter	Design	2006 (Baseline)	2015	2016
Bottom width (m)	7.0	6.4	6.7	6.1
South side slope	3.0 H:1V	3.0 H:1V	3.6 H:1V	3.3 H:1V
North side slope	3.0 H:1V	2.9 H:1V	2.5 H:1V	2.7 H:1V
Channel depth (m)	2.53	2.3	2.28	2.18
X-section area (m^2)	36.91	30.17	31.13	27.58
Critical flow depth (m)	1.04	1.08	1.05	1.10
U/S Freeboard (m)	1.49	1.22	1.23	1.08

Notes:
1. Drop structure geometry, critical flow depth and freeboard shown represent the upstream end of the drop structure.
2. Critical flow depth and freeboard were calculated using the original design flow rate of 29 m^3/s (25 year return period).

Table P Drop Structure 3 Geometry

Parameter	Design	2006 (Baseline)	2015	2016
Bottom width (m)	7.0	6.2	6.4	6.2
South side slope	3.0 H:1V	3.0 H:1V	3.2 H:1V	3.2 H:1V
North side slope	3.0 H:1V	2.8 H:1V	2.7 H:1V	2.5 H:1V
Channel depth (m)	2.53	2.5	2.13	2.07
X-section area (m^2)	36.91	33.42	27.02	24.79
Critical flow depth (m)	1.04	1.10	1.08	1.11
U/S Freeboard (m)	1.49	1.4	1.05	0.96

Notes:
1. Drop structure geometry, critical flow depth and freeboard shown represent the upstream end of the drop structure.
2. Critical flow depth and freeboard were calculated using the original design flow rate of 29 m^3/s (25 year return period).

Table Q Drop Structure 4 Geometry

Parameter	Design	2006 (Baseline)	2015	2016
Bottom width (m)	7.0	6.7	n/a	6.5
South side slope	3.0 H:1V	2.7 H:1V	n/a	2.9 H:1V
North side slope	3.0 H:1V	2.9 H:1V	n/a	3.1 H:1V
Channel depth (m)	2.53	2.79	n/a	2.38
X-section area (m^2)	36.91	40.38	n/a	32.53
Critical flow depth (m)	1.04	1.07	n/a	1.07
U/S Freeboard (m)	1.49	1.72	n/a	1.31

Notes:
1. Drop structure geometry, critical flow depth and freeboard shown represent the upstream end of the drop structure.
2. Critical flow depth and freeboard were calculated using the original design flow rate of 29 m^3/s (25 year return period).

4.3.2 Trigger Summary

There was no visual evidence of piping or erosion underneath the gabion baskets (Trigger DS-4) or damage to the gabion mesh (Trigger DS-5). A summary of the drop structure geometry triggers is presented in Table R.

Trigger DS-6, which identifies a reduction in drop structure cross-sectional area of 10% or more, was exceeded for DS2, DS3 and DS4. This is primarily due to an apparent change in the channel depth since the baseline survey in 2006. While the apparent reduction in cross-sectional area of the drop structures is concerning, they are still able to pass design flows with adequate freeboard (trigger DS-2) and do not appear to have deformed excessively since construction based on a comparison of surveys shown on Figures 1007 to 1010 in Appendix 1. Therefore, repairing the geometry of the drop structures is not required at this time.

Table R Drop Structure 2016 – Summary of Existing Geometry Triggers

Cross-Section	Trigger DS-1 (Side Slopes)	Trigger DS-2 (Freeboard)	Trigger DS-3 (Pin Dist.)	Trigger DS-6 (X-Section)
Trigger Criteria	<2H:1V	<0.30 m	>0.50 m	< -10%
DS1	2.9H:1V	1.21 m	-0.08 (±0.03)	-9%
DS2	2.7H:1V	1.08 m	-0.28 (±0.03)	***-14%***
DS3	2.5H:1V	0.96 m	-0.08 (±0.03)	***-14%***
DS4	2.9H:1V	1.31 m	n/a	***-22%***

Notes:
1. 95% confidence intervals are shown in brackets, e.g., (±1.0)
2. Trigger DS-1: Current drop structure side slopes should not exceed 2H:1V steepness. Values shown in the table are the steepest side slope surveyed in 2016 for each drop structure.
3. Trigger DS-2: Current estimated freeboard above the drop structure design flow of 29 m^3/s should be at least 0.30 m.
4. Trigger DS-3: Change in distance between survey pins on either side of each drop structure may change by no more than 0.5 m from the baseline survey (2006) or from the first year that monitoring pins were re-established.

5. Trigger DS-6: Cross-sectional area of the gabion channel may be reduced by no more than 10% of the baseline cross-section (2006).
6. 2016 values that exceed trigger values are shown in bold and italics.

4.4 Clinton Creek

Some movement of boulders in the Clinton Creek upstream of Fording 1 was observed on June 21, 2016 (comparing to site photos from previous years). However, in general very little change has occurred in the Clinton Creek channel since 2014 aside from the infilling downstream of DS4 to construct the ACB channel in 2015. A comparison of 2016 creek channel survey data with that of previous years is shown on Figures 1002 to 1003 in Appendix 1.

A summary of the triggers for Clinton Creek is presented in Table S. The baseline survey for triggers CC-1 and CC-2 was 2004 in the most recent (2015) LTPMP report. The primary purpose of these triggers is to anticipate potential damage to the drop structures caused by erosion of the Clinton Creek channel downstream. The August, 2010 flood event significantly eroded the channel, up to 4 m just downstream of DS4, and altered the channel alignment downstream of Fording No. 1. Repairs to DS4 were completed in 2015 to mitigate further damage to the drop structures. Therefore, the baseline survey year should be adjusted to specifically track future erosion of the creek channel that could affect the new DS4 repairs. The baseline survey was adjusted to September 2010 because there have been no significant changes to the creek channel since that time.

None of the triggers for Clinton Creek were exceeded. However, two noteworthy observations were made based on the 2016 survey data. The first is that approximately 0.75 m of scour occurred between 2014 and 2016 along the outside of the bend near the closed access road (Station 0+430 on Figure 1002, Appendix 1). This apparent increase in bend scour is likely to result in an increase in erosion of the right bank (i.e. waste rock) at Station 0+430. If left unmitigated, erosion of the waste rock could eventually affect stability of the currently used site access road.

The second observation is the considerable channel downcutting in the mid creek section (Station 0+675 to 0+875) between September, 2010 and September, 2014. It appears that a portion of the creek bed material that was eroded near DS4 in August 2010 was subsequently deposited in the mid channel section. This recently deposited material has eroded away between 2010 and 2016 and may continue to erode down to the July, 2010 pre-flood channel elevations in the coming years.

4.4.1 Clinton Creek Natural Slope

A review of photographic records and during field inspection along the Clinton Creek channel identified several small landslides from the valley slope to the north encroaching on the creek channel. This includes a new slide on the north slope of Clinton Creek adjacent to DS4 observed on September 1, 2016, and a smaller slide also observed in this area during spring snowmelt. No major slope failures were identified.

These landslides are attributed to small slides that originate in saturated loose colluvial soil on the escarpment. These slides typically occur when rainfall (or meltwater) and groundwater conditions generate high pore pressures in the colluvium, which lowers the effective stress and decreases local stability. Such an event may have occurred on August 6, 2016 when 23 mm of rain were recorded in one hour at the meteorological station on the Site.

Displacement monitoring in the Clinton Creek natural slopes was initiated in 2014, with the initial survey network consisting of only two monitor points (183 and 184). In 2016, the displacement monitoring network was expanded to six monitors (Figure 1017, Appendix 1). Between 2014 and 2016, surveyed horizontal displacement of monitoring pins 183 and 184 were 9 cm and 4 cm respectively, both in a south-westerly direction. These surveyed displacements are small relative to survey precision (3.9 cm radius for 95% confidence). Therefore, the actual magnitude and direction of movement could vary considerably from what was surveyed.

4.4.2 Trigger Summary

Triggers associated with Clinton Creek are presented in Table S.

Table S Clinton Creek – Summary of Existing Triggers

Trigger	Description	Trigger Value	2016 Value
CC-1	Channel downcut over the 50 m channel segment downstream of DS4 to Sta. 0+300	>0.5 m (from Sept 2010 baseline)	None
CC-2	Channel downcut over a measurable (>50 m) stretch of the channel downstream of Sta. 0+300	>1.5 m (from Sept 2010 baseline)	0.66 m average downcut in mid creek (0+675 to 0+875)
CC-3	Average channel deposition through upper/mid/lower creek section	>0.3 m from previous monitoring period (2014)	Upper: None Mid: None Lower: None
CC-4	Mid-creek channel centreline shifts south, into the waste rock dump	>5 m from previous monitoring period (2014)	None

4.5 Clinton Creek Waste Dump

All existing monitoring points on the Clinton Creek waste rock dump were surveyed in 2016. Lost, replaced and new monitoring pins are discussed in Section 2.2. A summary of available historical survey data for the waste rock dump monitoring pins is in Table 1 in Appendix 2.

Historical movement of the waste rock dump, calculated based on the difference between the 2003 coordinates of the monitoring point and the 2016 coordinates, and recent movement, calculated based on the difference between the 2014-2016 monitoring point coordinates, are shown on Figures 1017 and 1018 (Appendix 1) respectively.

Past LTPMP reports have divided the waste rock dump into three segments:

- Upper slope – above the 450 masl
- Mid slope – between the 450 masl and 420 masl
- Lower slope – below the 420 masl

Reinterpretation of structural conditions and movement patterns as new information becomes available is useful in improving our understanding of the main parameters to be considered for the detection of further slope instability. The 2016 LTPMP included in situ observations, and interpreted photographic and topographic materials with the object of developing a geometrical model of the waste rock pile as it was before the 1974 events. The chronology of the destabilizing events in terms of the kinematic processes that led to the 1974 landslide were reviewed. New insights on the geometry of the unstable mass and the kinematics of the waste rock pile landslide are presented.

From a monitoring and morphological perspective three separate units can be identified, each with its own pattern of deformation. They generally correspond with terrain classifications derived from a combination of monitoring patterns analysis and landform recognition. However, the inner boundaries of the units cannot be traced with precision and should be considered as approximate (Figure 1021, Appendix 1).

Unit 1

Unit 1 corresponds to the western side of the waste rock dump. This area consists of waste rock material placed during initial development of the Clinton waste dump in 1970, until about 1974. Evidence of instabilities in this area was evident as early as 1971. With continued consignment of waste material, a significant slope failure occurred in 1974 which resulted in the blockage of natural drainage through the Clinton Creek valley. In general, movements in this area are occurring radially outward from the central upper portion of the dump. Monitors closest to Hudgeon Lake are moving in a north westerly direction towards the lake, while other monitors are moving in a northerly direction across the former valley.

A comparison of historical and recent horizontal displacement rates for Unit 1 is presented in Table T. The horizontal displacement rates of these monitors range from 0.5 to 5.1 cm/yr between 2003 and 2016. Recent horizontal displacement rates are considerably lower than those observed prior to 1986. However, movement rates in the last four years (2012-2016) are approximately 30% higher than in the preceding 10 years (2003-2012). The 2009 and 2010 flood events that severely eroded the toe of the waste rock dump are likely to have contributed to this acceleration.

Table T Waste Rock Dump Horizontal Movement Rates – Unit 1

2003 to 2012	2012 to 2014	2014 to 2016
2.0 (±0.1) cm/yr	2.5 (±0.4) cm/yr	2.7 (±0.5) cm/yr

Note:
1. 95% confidence intervals are shown in brackets, e.g. (±1.0)

Unit 2

Unit 2 begins at the eastern margin of Unit 1, and comprises additional waste material placed on the east side of the active dump following failure in 1974. This part of the waste dump is fairly compact with no evident signs of deformation. Monitoring in this area is limited (a total of 15 monitoring points), with the majority of the monitoring points located at the toe of the waste pile.

A comparison of historical and recent horizontal displacement rates for Unit 2 is presented in Table U. The horizontal displacement rates of these monitors range from 0.6 to 2.9 cm/yr between 2003 and 2016. The exception to this is one monitor located in the upper slope area (monitor 1493), with a considerably higher displacement rate of 7.3 cm/yr. The movement of monitor 1493 is thought to be influenced by local topography and not representative of the global displacement rates in this unit. As with Unit 1, recent horizontal displacement rates are considerably lower than those observed prior to 1986. Movement rates in the last four years (2012-2016) are approximately 25% higher than in the preceding 10 years (2003-2012). The 2009 and 2010 flood events that severely eroded the toe of the waste rock dump are likely to have contributed to this acceleration.

Table U Waste Rock Dump Horizontal Movement Rates – Unit 2

2003 to 2012	2012 to 2014	2014 to 2016
1.5 (±0.2) cm/yr	1.6 (±0.5) cm/yr	2.1 (±0.6) cm/yr

Note:
1. 95% confidence intervals are shown in brackets, e.g. (±1.0)

Unit 3

The less extensive Unit 3 displays a more advanced state of instability, with morphology consistent with lateral spreading as the main type of deformation. Unfortunately, movement rates and directions in Unit 3 are unknown due to the lack of monitoring data in this area.

4.5.1 Trigger Summary

Triggers associated with the waste rock dump are presented in Table V. The intent of Trigger WR-1 is to identify acceleration of movement in the waste dump based on movement rates of the surveyed monitoring pins. The acceleration should be significant enough to warrant action to either further assess stability or mitigate risk to public safety, structures or the environment.

In the 2014 and 2015 LTPMP reports movement increases between 0% and 30% over the previous monitoring cycle warrant surveying the monitoring pins the following year, while movement increases of greater than 30% (or increases in two consecutive periods) warrant planning for a geotechnical assessment. These trigger values are flawed as they fail to take into account survey error or the initial rate of movement. For example, a 30% increase on a historical movement rate of 1 cm/year is of little concern.

Assigning a threshold value to this trigger could be misleading and potentially incorrect due to uncertainty in the results, including: potential survey error, varying movement rates throughout the waste dump, local versus global movement rates, and a lack of geotechnical data to support a stability assessment. Rather, it is recommended that survey data is reviewed by a qualified professional to determine whether there is evidence of increasing deformation rates, and if so what steps should be taken.

While the 2016 survey results show relatively small increases in movement rates over the previous monitoring cycle, the overall rate of movement of the waste rock pile is too small to raise concerns about overall slope stability. Therefore, WR-1 is not triggered in 2016.

Table V Waste Rock Dump – Summary of Existing Triggers

Trigger	Description	Value	2016 Value
WR-1	Average monitoring point horizontal movement rates	Significant increase in movement rate over historical rates, warranting further assessment of stability or mitigation measures in the opinion of a qualified professional.	Not triggered

4.6 Porcupine Pit and Snowshoe Pit

Historical movement around Porcupine Pit, calculated based on the difference between the 2003 coordinates of the monitoring point and the 2016 coordinates, and recent movement, calculated based on the difference between the 2014-2016 monitoring point coordinates, are shown on Figures 1017 and 1018 (Appendix 1) respectively.

A comparison of historical and recent horizontal displacement rates for Porcupine Pit is presented in Table W. Movement rates around Porcupine Pit are generally very low, but appear to have increased in the past two years. Considering that total movement of the pins over the past 13 years ranges from 5 to 12 cm, survey errors are likely contributing significantly to this apparent change. These rates of movement are considered too small to raise concerns about the overall stability of the pit walls.

Table W Porcupine Pit Horizontal Movement Rates

2003 to 2012	2012 to 2014	2014 to 2016
0.4 (±0.2) cm/yr	0.3 (±1.0) cm/yr	2.0 (±1.1) cm/yr

Note:
1. 95% confidence intervals are shown in brackets, e.g., (±1.0)

4.6.1 Trigger Summary

Triggers associated with the Porcupine Pit are presented in Table X. The intent of Trigger PP-1, similar to WR-1, is to identify acceleration of movement in the waste dump based on movement rates of the surveyed monitoring pins. For the same reasons as with Trigger WR-1, which is discussed in Section 4.5.1, assigning a threshold value for this trigger would be misleading and potentially incorrect. Rather, it is recommended that survey data is reviewed by a qualified professional to determine whether there is evidence of increasing deformation rates, and if so what steps should be taken.

While the surveyed horizontal movement rates of monitoring pins around Porcupine Pit have increased in the past two years, movement rates are still considered too small to be of concern. Therefore, PP-1 was not triggered in 2016.

Table X Porcupine Pit – Summary of Existing Triggers

Trigger	Description	Value	2016 Value
PP-1	Average monitoring point horizontal movement rates	Significant increase in movement rate over historical rates, warranting further assessment of stability or mitigation measures in the opinion of a qualified professional.	Not triggered

4.7 Wolverine Creek

Some bank erosion was observed in Wolverine Creek downstream of the rock weirs on June 21, 2016. However, the rock weirs appeared in good condition and the September, 2016 survey data shows little or no change in Wolverine Creek over the past two years. A comparison of 2016 creek channel survey data with that of previous years is shown on Figure 1012 in Appendix 1. Sections of Wolverine Creek and the adjacent tailings pile and natural slope are shown on Figures 1013 to 1015.

Wolverine Creek alignment has shifted slightly just upstream of the access road crossing since 2014, but nowhere upstream of this. No channel scour or degradation are evident from the surveyed creek profile. Erosion of the tailings upstream of the rock weirs appears to be ongoing but has not resulted in recent and significant changes to the channel.

The outlines of the Wolverine Creek Tailings Pile Ponds do not appear to have changed significantly between 2014 and 2016.

4.7.1 Trigger Summary

Triggers associated with Wolverine Creek are presented in Table Y. The stationing of Trigger WC-2 was modified to reflect the current Wolverine Creek profile. The wording of Trigger WC-3 was modified to specifically reflect visual inspection of the rock-lined channel.

The trigger values for WC-1 and WC-2 are the same as for the 2014 LTPMP report. These threshold values provide a reasonable threshold for assessing the risk to the rock-lined channel caused by downstream channel erosion in Wolverine Creek.

Table Y Wolverine Creek – Summary of Existing Triggers

Trigger	Description	Trigger Value	2016 Value
WC-1	Channel downcut over a measurable (>50 m) stretch of the channel from Sta. 1+025 to 1+300	>1.0 m from baseline	None
WC-2	Channel downcut over a measurable (>50 m) stretch of the channel from Sta. 0+735 to 1+025	>0.5 m from baseline	None
WC-3	Visual observations of rock-lined channel instability (Sta. 0+485 to 0+735)	Loss of rock, accumulated debris, overbank erosion, etc.	None

Trigger	Description	Trigger Value	2016 Value
WC-4	Average channel deposition through upper/mid/lower creek section	>0.3 m from previous monitoring period	None
WC-5	Channel centreline shift	>5 m (average) from previous monitoring period	None

4.8 Wolverine Creek Tailings Pile

All existing monitoring points on the Wolverine Creek tailings pile were surveyed in 2016 except for monitoring pin 996. New monitoring pins are discussed in Section 2.2. A summary of available historical survey data for the tailings pile monitoring pins is in Table 2 in Appendix 2.

Historical movement of the tailings pile, calculated based on the difference between the 2003 coordinates of the monitoring point and the 2016 coordinates, and recent movement, calculated based on the difference between the 2014-2016 monitoring point coordinates, are shown on Figures 1019 and 1020 (Appendix 1) respectively.

The lower tailings slope is divided into a north lobe and south lobe, separated by one of two ponds. Stream flow discharging from the ponds has created a channel through the tailings resulting in chronic loading of suspended tailings material in Wolverine Creek.

Past LTPMP reports have divided the tailings slope into the following segments:

- Upper Slope – above 530 masl
- Mid Slope – between 530 masl and 425 masl
- Lower Slope – below 425 masl

Kinematically, the tailings pile is considered a complex slide with at least three centres of displacement, a south lobe, a north lobe and a north-west lobe. The south lobe formed as a result of the downslope movement of a segment of the tailings pile near its southern extremity. This failure occurred at the location of a small draw in the hillside on the west side of Wolverine Creek (R35, Golder 1978). Shortly after the failure of the southern segment of the tailings pile, the belt conveyor system was shifted and the disposal of tails continued to the north of the failed mass. As this new disposal area was developed and the pile expanded, downslope movement in this area also began to take place. No sudden or catastrophic failure occurred in this area, but its continuous movement extended the toe of this portion of the pile (north lobe) to Wolverine Creek. The north-west lobe is a secondary failure and is associated with disposal operations that were carried out in this area following failure of the north lobe (Figure 1022, Appendix 1).

Although material from the north-west lobe has gradually moved, there are no displacement records available to provide rates or directions. Therefore, in the following discussion, description of deformation patterns will focus on the north and south lobes.

South Lobe

A comparison of historical and recent horizontal displacement rates for the south lobe is presented in Table Z. The upper slope is the least active area with annual movement rates of 4.2 and 5.6 cm/yr for the two monitors on the upper slope (Figure H). A slight acceleration is noticed for the last monitoring period. However, these rates are considered small. The mid slope and lower slope areas are more active. The movement rates on the mid-slope area range from 4.4 to 39.0 cm/yr between 2014 and 2016, while the movement rates on the lower slope area range from 2.6 to 23.1 m/yr (Figure I and Figure J).

Table Z Tailings Pile South Lobe Horizontal Movement Rates

Location	2006 to 2012	2012 to 2014	2014 to 2016
Upper Slope	5.3 (±0.5) cm/yr	2.2 (±1.6) cm/yr	4.9 (±1.7) cm/yr
Mid Slope	39.5 (±0.2) cm/yr	24.7 (±0.6) cm/yr	24.8 (±0.7) cm/yr
Lower Slope	24.9 (±0.2) cm/yr	15.5 (±0.6) cm/yr	13.6 (±0.7) cm/yr

Note:
1. 95% confidence intervals are shown in brackets, e.g. (±1.0)

As shown by the direction of movement vectors on Figure 1019 and 1020 (Appendix 1), the sliding, for the upper and middle slope areas, is identified towards the east in the direction of the Wolverine Creek channel. In contrast, the lower slope area is undergoing some lateral spreading. Monitoring data also indicates that the movements in the failure lobe involve a downslope stretching of the materials in the vicinity of monitor 1084. This is also supported by the irregular terrain marked by numerous extensional features as observed on the inset of Figure I. It should also be noted that the limits of the mid slope area coincides with the location of a small draw in the hillside on the west side of Wolverine Creek (Figure 1023, Appendix 1). Therefore, it is possible that as the tails move down, a boundary layer developed in the vicinity of the slopes of the draw where the effects of shearing resistance are significant. This resistance results in a reduction of local displacement rates on the surface, with the displacements rates increasing rapidly as the distance from the slopes of the draw increases. Comparison of displacement rates between monitors 24A (away from draw slope) and 2005-02, 2005-06 and NL-Base (close to draw slope) provide a good example of this boundary layer effect (Figure K).

On the lower slope area, the movement monitors at the north end are moving in a north easterly direction towards the pond. The monitors in the central area are generally moving east across the valley. The monitors at the south end are moving southward down the valley. This is consistent with previous observations of deformation patterns (R15, AECOM 2009).

The movements of the mid and lower slope areas discussed above are a result of the mounding of the tailings in the middle portion of the lower slope area which is providing passive resistance to the movement of the tailings. As the passive resistance has increased over the years the movement of the tailings has been redirected towards areas of less resistance. The most pronounced movement is towards the pond between the two lobes. As the tailings move in this north easterly direction they impart some thrust on the tailings mounded up in the middle area of the lower slope, essentially pushing them aside as the tailings move towards the pond. Crack patterns noted on the tongue of the failure lobe also seem to support this interpretation. The mounding in the middle area of the lower slope south lobe movement is illustrated on Figure L.

Although the original landslide did not encompass much of the upper slope area, displacements in the upper slope area are interpreted to be a secondary failure that was initiated by the main instability to the east. Therefore, displacement in the upper slope area is expected to remain as a result of continued displacement of the major slope failure body.

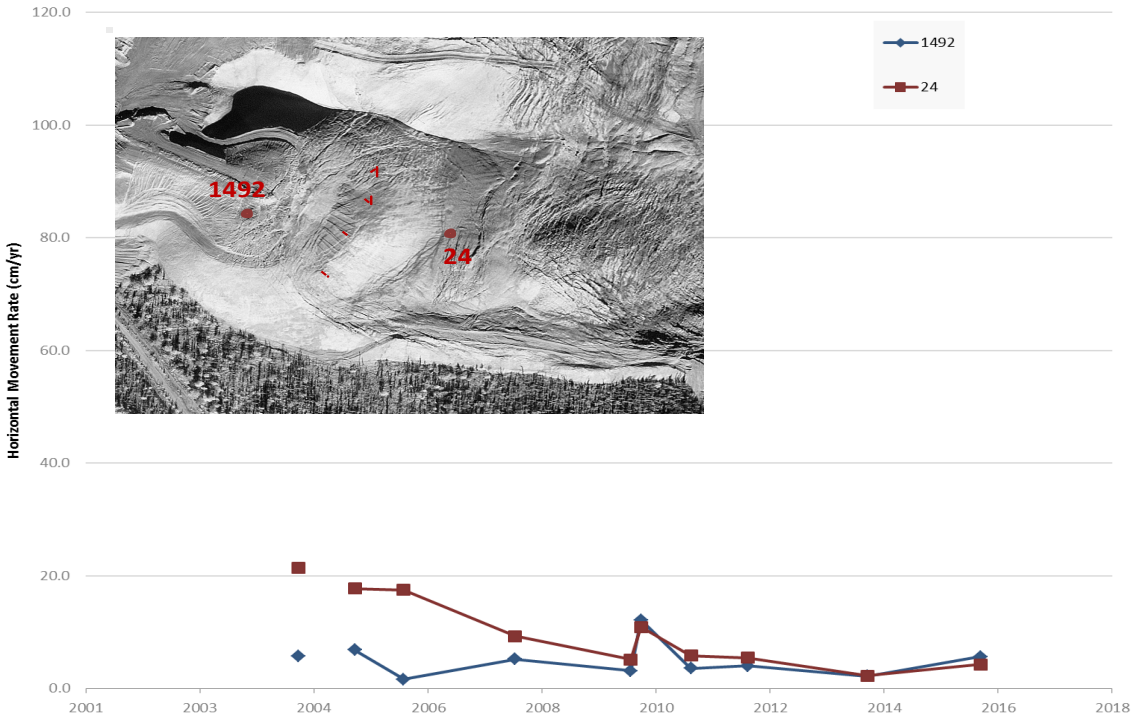


Figure H **Tailings Pile South Lobe Horizontal Movement Rates – Upper Slope (Inset, monitors 24 and 1492 location and inferred displacement pattern)**

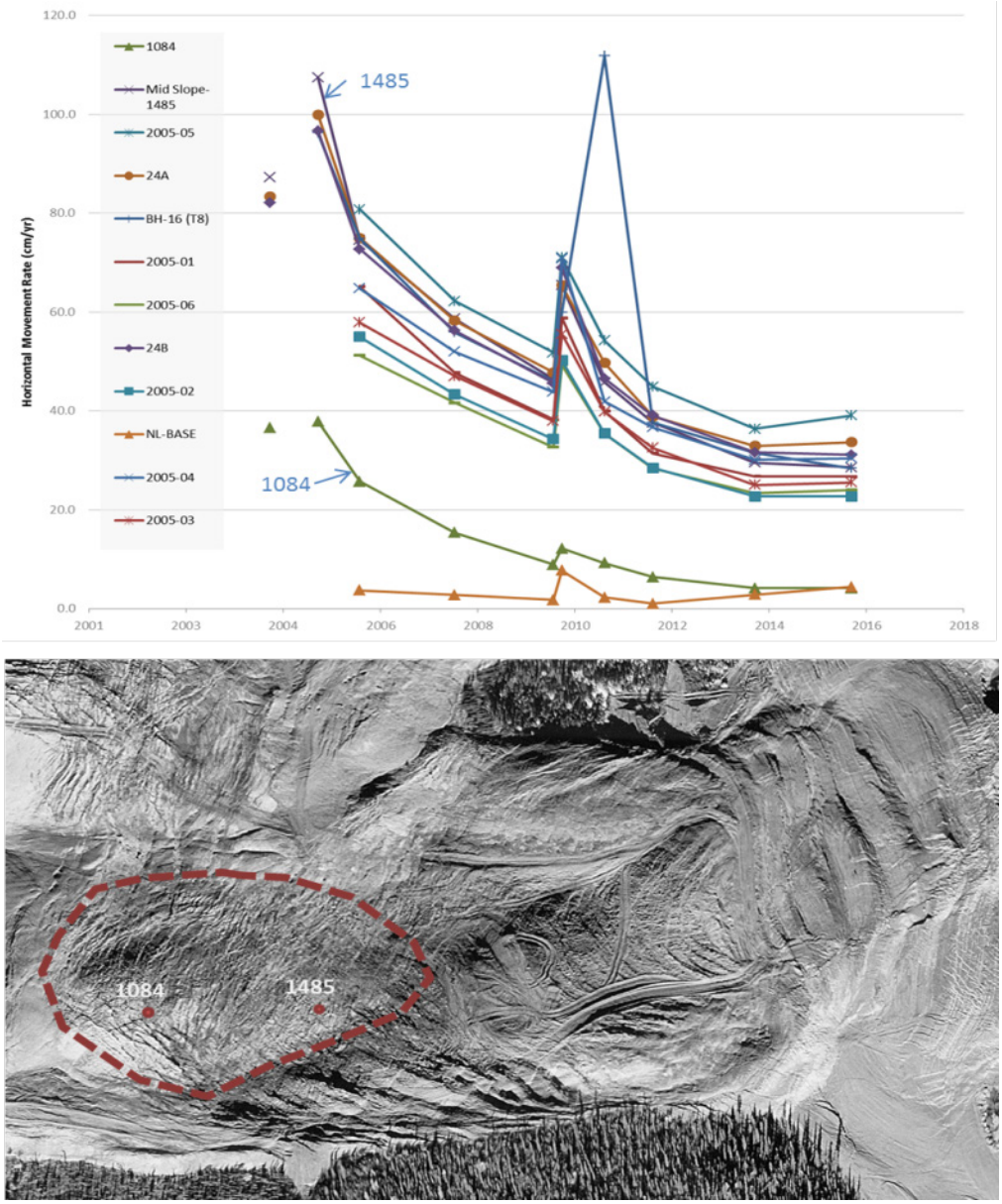


Figure I **Tailings Pile South Lobe Horizontal Movement Rates – Mid Slope (Inset, monitors 1084 and 1485 location, extensional features and inferred stretching zone)**

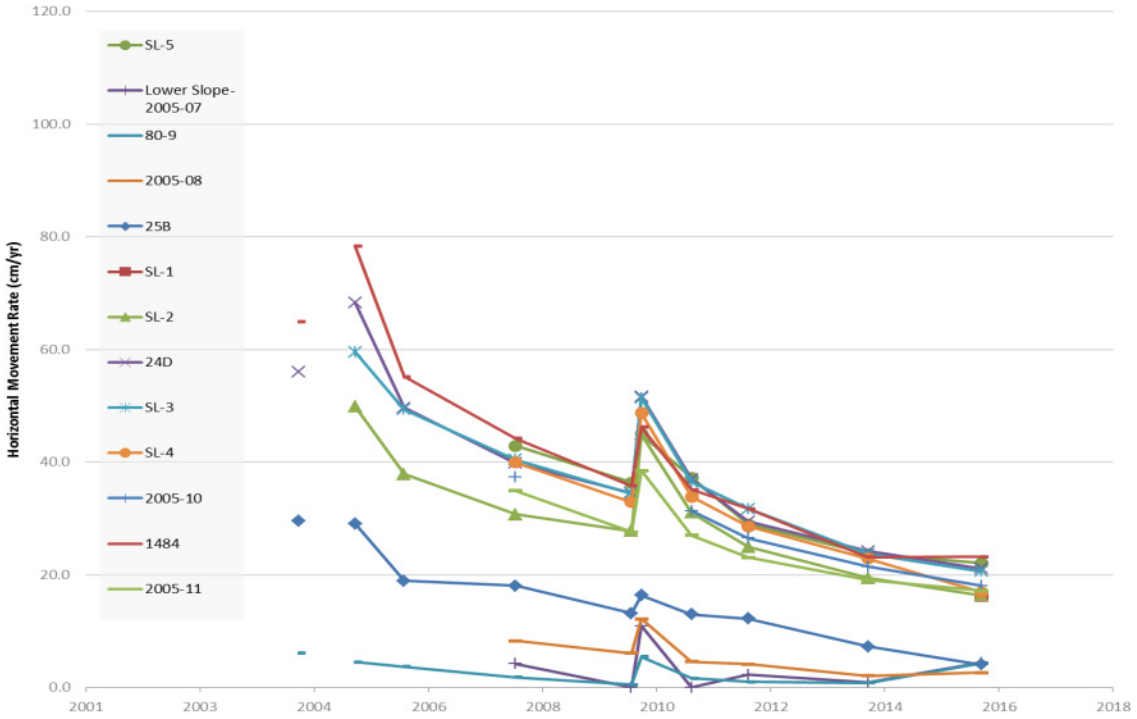


Figure J **Tailings Pile South Lobe Horizontal Movement Rates – Lower Slope**

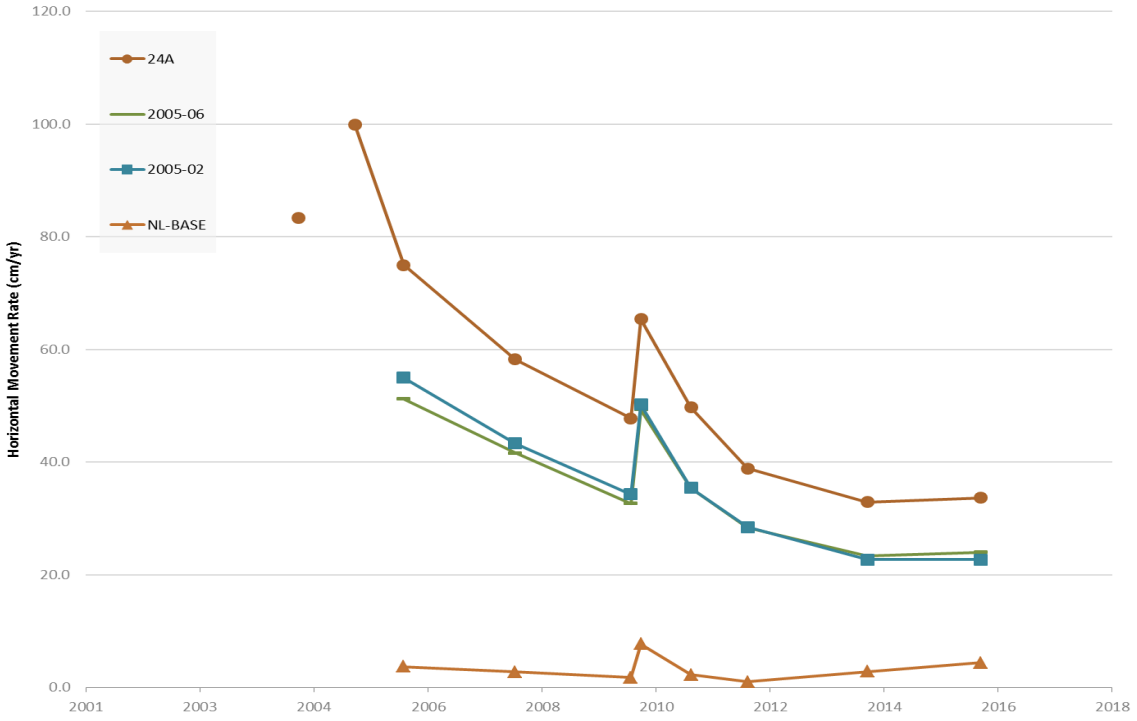


Figure K **Tailings Pile South Lobe Horizontal Movement Rates – Mid Slope (Boundary layer effects)**

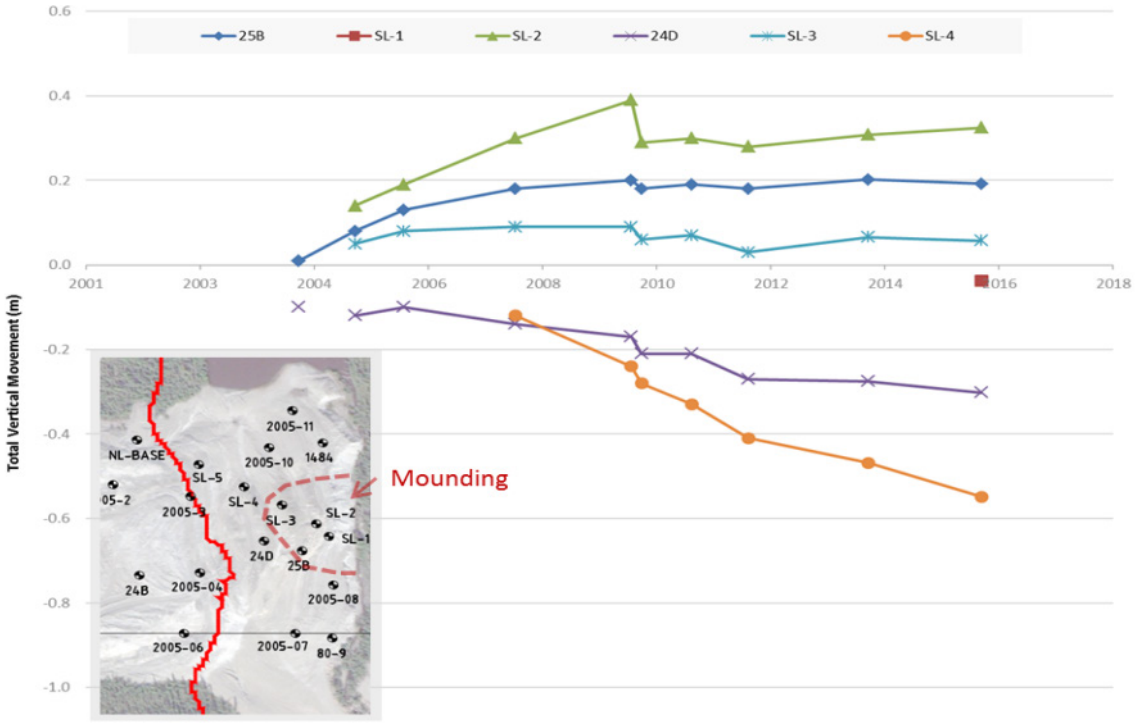


Figure L Tailings Pile South Lobe Vertical Movements – Lower Slope (Selected monitors)

North Lobe

A comparison of historical and recent horizontal displacement rates for the north lobe is presented in Table AA. The movement rates for the north lobe are less than those measured for the South lobe. Average annual movement rates have generally decreased since 2006 but have shown little change since 2012. Figures 1019 and 1020 (Appendix 1) illustrate the movement vectors and magnitudes on the North Lobe.

Table AA Tailings Pile North Lobe Horizontal Movement Rates

Location	2006 to 2012	2012 to 2014	2014 to 2016
Upper Slope	1.9 (±0.3) cm/yr	3.5 (±0.8) cm/yr	1.5 (±0.9) cm/yr
Mid Slope	8.5 (±0.2) cm/yr	5.1 (±0.7) cm/yr	6.2 (±0.7) cm/yr
Lower Slope	5.8 (±0.3) cm/yr	2.9 (±0.8) cm/yr	2.7 (±0.8) cm/yr

Note:
1. 95% confidence intervals are shown in brackets, e.g., (±1.0)

With the exception of Monitors 80-4 and 80-5 in the mid slope area, all of the monitors on the North Lobe have moved at rates ranging from 1.4 to 7.0 cm/yr. Monitors 80-4 and 80-5 in the mid slope area are relatively active, moving at rates of 24.1 and 14.3 cm/yr, respectively. Deformation patterns in this segment of the tailing pile indicate that, in general, the tailings pile in this area is tending to stretch. A similar pattern was reported by Golder (1978) on the northern part of the mid slope area. However, existing monitors (1085, 500-1, 500-2, 650-1, 650-2) indicate stretching in this area to be very small. Irregular terrain marked by numerous extensional features as observed on the inset of Figure M seem to support the interpretation of stretching in of some areas of the mid-slope zone.

The general direction of movement for the North Lobe is eastward (downslope) which is consistent with the previous monitoring reports. Monitors NL-4, NL-5 and 1489 on the south side of the lower slope area are moving in a south easterly direction towards the pond where there is less resistance to movement.

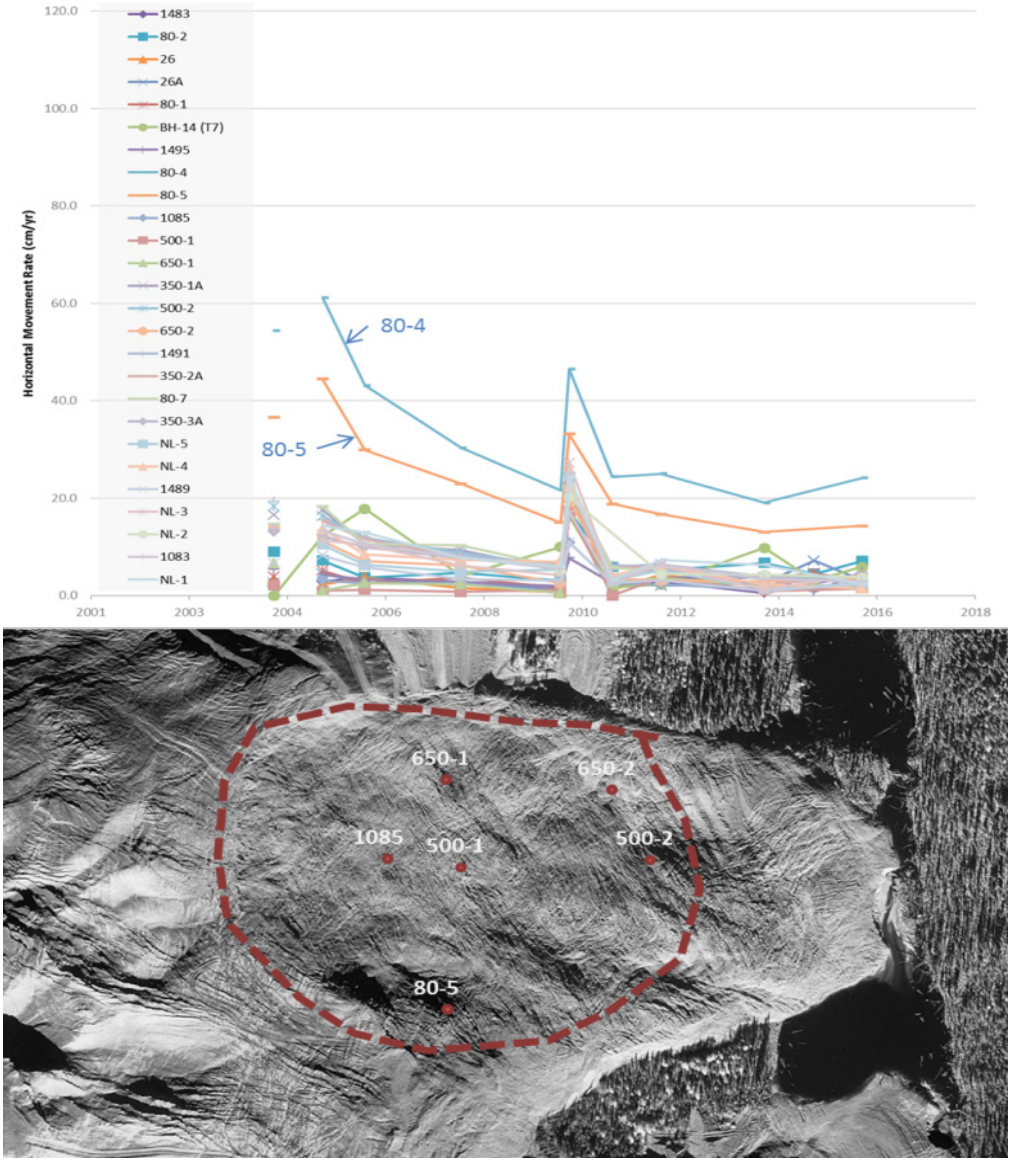


Figure M **Tailings Pile North Lobe Horizontal Movements Rates (Inset, extensional features and inferred stretching zone)**

4.8.1 Trigger Summary

Triggers associated with the tailings pile are presented in Table BB. The intent of Trigger TP-1, similar to WR-1, is to identify acceleration of movement in the waste dump based on movement rates of the surveyed monitoring pins. For the same reasons as with Trigger WR-1, which is discussed in Section 4.5.1, assigning a threshold value for this trigger would be misleading and potentially incorrect. Rather, it is recommended that survey data is reviewed by a qualified professional to determine whether there is evidence of increasing deformation rates, and if so what steps should be taken.

In general, movement rates of the tailings pile have decreased since 2006 and shown little change since 2012. Therefore, TP-1 was not triggered in 2016.

Table BB Tailings Pile - Summary of Existing Triggers

Trigger	Description	Value	2016 Value
TP-1	Average monitoring point horizontal movement rates	Significant increase in movement rate over historical rates, warranting further assessment of stability or mitigation measures in the opinion of a qualified professional.	Not triggered
WP-1	Pond surface area	>25% from previous monitoring period	No change
WP-2	Pond outlet width	>15% reduction from previous monitoring period	No change
WP-3	Pond outlet invert elevation	±0.5 m from previous monitoring period	No change

5 Conclusions and Recommendations

The conclusions presented in the following sections are based on observations made during the site inspection and analysis of the survey data. Recommendations that are discussed in this section are also summarized in Appendix 6. Recommendation are numbered 1 to 6 for site maintenance and 1 to 9 for future monitoring for ease of reference. Timelines and priorities are also listed in Appendix 6 to assist with planning.

5.1 Clinton Creek Access Road

The site access road appeared in relatively good shape in June, 2016 aside from two washed out culverts, which have since been repaired. However, several landslides and erosion caused by runoff across the road were observed at the end of August. These slides were likely to have occurred during or shortly after heavy rainfall recorded on August 6, 2016 (23 mm in one hour).

5.1.1 Closed Section of Access Road

The results of the monitoring network are important because they provide a framework of absolute displacements that helps in the interpretation of the various deformation measurements in the study area. The monitoring network in the vicinity of the access road has been in operation since 2001, with survey of monitoring points performed annually. In 2012, two additional monitoring points were added (992 and 993).

The current monitoring coverage is considered adequate to determine the boundary of a potential moving waste rock mass. Surface displacement measurements support the inference from site observations and photographic interpretation that the displacement field in the access (lower) road is localized across the tension cracks within the road, and not currently affecting the stability of the upper road slope.

5.1.2 Recommendations

The closed section of the access road should continue to be regularly inspected for signs of increased tension cracking and surveyed on an annual basis to monitor the stability of the slope and the movement of the baseline. Site observations should also include the upper road area.

Recommended changes to future monitoring and/or maintenance of the site access road are as follows:

- Landslides and erosion caused by runoff along the site access road that was observed at the end of August, 2016, should be inspected after the 2017 freshet. Large debris should be cleared and the access road should be regraded if necessary in order to maintain safe vehicle access for local residents and personnel visiting the site.
- AR-3 and AR-4 should be replaced with a single trigger, AR-5, with action taken based on significant apparent increase in risk of slope failure (as evidenced in part by tension cracks) based on visual inspection and review of survey data by a professional engineer.

5.2 Hudgeon Lake Outlet

The banks around the Hudgeon Lake outlet have shown essentially no signs of erosion or movement since 2014 aside from the diversion works completed in 2015 on the south side of the outlet. Trigger HL-1, lake water elevation exceeding 412.0 m, was exceeded during the 2016 freshet but not during the 2016 summer. This trigger was implemented in 2014 along with a recommendation to install a continuous water level monitoring system. However, the trigger itself provides little value in this report. Rather, the water level should be regularly and remotely monitored for signs of a potential blockage of flow, and particularly prior to visiting the site to verify safe access.

Cracks in the soil were observed on the north side of the north log boom abutment at Hudgeon Lake outlet during a site visit completed on June 21, 2016. Survey data indicates that the north log boom abutment has moved 3.6 (±2.7) cm horizontally towards the lake and 12.2 (±3.7) cm up between 2014 and 2016. The south log boom abutment has moved 6.2 (±2.7) cm towards the lake and 4.1 (±3.7) cm up in the same period. The north log boom abutment exceeded Trigger HL-2, maximum vertical displacement of 10 cm.

Failure of the log boom abutments would be most likely to occur under heavy debris loads or during a large flood event, and has the potential to damage the drop structures downstream by releasing large volumes of water and/or debris. The observed horizontal movements of the abutments are relatively small and can be largely attributed to overall movement of the waste rock dump, based on a comparison with nearby monitoring pins. However, the vertical displacement of the north abutment, potentially caused by frost jacking and/or the rotational failure of the waste dump, is of concern and will affect the capacity of the abutment to hold the log booms in place.

No loss of riprap was observed around the abutments, so Trigger HL-3 was not exceeded.

5.2.1 Recommendations

Recommended changes to future monitoring and/or maintenance of Hudgeon Lake outlet and log boom abutments are as follows:

- Trigger HL-1, maximum lake water surface of 412.0 masl, should be removed as it is not relevant to annual reporting. Rather, lake levels should be monitored remotely and checked prior to entering the site, as is current practice by AAM. Lake levels exceeding 412.0 masl may indicate either high flows or a blockage at the lake outlet, both of which pose a risk to the safety of personnel on site.
- As per Trigger HL-2, the stability of the log boom abutments should be reassessed based on the observed movements. Trigger HL-2 should be modified based on the results of the stability assessment to set a maximum allowable movement from the baseline before maintenance is required. If required, the north abutment should be stabilized before re-deploying the log booms.
- Trigger HL-3 should be revised to remove the >10% riprap loss from around the abutments. Action should be triggered by “significant observed or potential erosion around the base of the abutments based on visual inspection and review of survey data by a professional engineer.”

5.3 Gabion Drop Structures

On June 21, 2016 Drop Structures 1 to 3 appeared in good condition, but with a significant amount of large woody debris lodged in the gabion wire. There was no visual evidence of piping or erosion underneath the gabion baskets or damage to the gabion mesh. The debris was cleared from the drop structures on September 28, 2016.

On the DS4 ACB channel, centreline mats fourth through eighth from the top have experience some degree of sliding or buckling. This occurred in late April, 2016 during peak freshet flows. The duckbill anchors now appear to be engaged and securing the mats in place. Some erosion of the stabilized slope to the south of DS4 was observed in September, 2016 and was likely caused by either the heavy rain recorded on August 6, 2016 or an issue with the runoff diversion ditch at the crest of the slope. The hazard associated with this erosion is the subsequent deposition of eroded fines into Clinton Creek. A landslide was also observed in September and likely occurred during or shortly after the heavy rain on August 6. The landslide does not appear to have impacted the ACB channel.

Trigger DS-6, which identifies a reduction in drop structure cross-sectional area of 10% or more, was exceeded for DS2, DS3 and DS4. This is primarily due to an apparent change in the channel depth since the baseline survey in 2006. While the apparent reduction in cross-sectional area of the drop structures is concerning, they are still able to pass design flows with adequate freeboard (trigger DS-2) and do not appear to have deformed excessively since construction based on a comparison of surveys shown on Figures 1007 to 1010 in Appendix 1. Therefore, repairing the geometry of the drop structures is not required at this time.

Estimated freeboard for all drop structures was 1.0 m or greater during the estimated 25-year flood event. Trigger DS-2, which currently requires a minimum freeboard of 0.3 m, is considered to be unconservative for conditions where snow and ice accumulations are present during freshet reducing the effective channel capacity. Snow and ice buildup were thought to have contributed to the 2009 freshet flood damage (R12, AECOM 2010), in addition to a peak flow rate that likely exceeded the design flow of the drop structures, as estimated by Stilwell (R29, 2009). A minimum freeboard of 0.6 m would be a more appropriate and conservative value than 0.3 m for assessing the capacity of the existing drop structures with some snow and ice present in the channel.

5.3.1 Recommendations

Recommended changes to future monitoring and/or maintenance of the four drop structures are as follows:

- Drop Structure 4 ACB mat channel should be repaired or maintained as early as possible to mitigate risk of further damage during future high flow events.
- The runoff diversion ditch at the crest of the stabilized waste rock slope south of DS4 should be checked, and if necessary regraded, to minimize erosion of the stabilized slope.
- To further reduce erosion of the DS4 stabilized slope, consider trackwalking the slope by running tracked equipment (e.g bulldozer) up and down the slope and seeding native plant species. The slope should be seeded shortly after snowmelt to maximize the growing season.
- Trees and other large vegetation or rocks in the landslide on the north side of DS4 should be removed and disposed of elsewhere on site. Smaller debris and soil from the slide should be pushed to the toe of the failed slope and lightly compacted to reduce erosion of the currently loose soil.
- Trigger DS-6 should be removed as it is redundant with Trigger DS-2.

- Trigger DS-2 should be modified to check for a minimum freeboard of 0.6 m during the design peak flow rate of 29 m^3/s. The current allowable freeboard of 0.3 m does not adequately account for potential snow and ice build-up during freshet.

5.4 Clinton Creek

No triggers were exceeded for the Clinton Creek channel, which has shown little change since 2014.

Approximately 0.75 m of scour occurred between 2014 and 2016 along the outside of the channel bend near the closed access road (Station 0+430 on Figure 1002, Appendix 1). This apparent increase in bend scour is likely to result in increased erosion of the right bank (i.e., waste rock) at Station 0+430.

A number of landslide zones have been identified based on observations made during field inspections. These slides were likely to have occurred during or shortly after heavy rainfall recorded on August 6, 2016. These slides do not appear to be significantly impeding flow in the Clinton Creek channel.

5.4.1 Recommendations

Recommended changes to future monitoring and/or maintenance of Clinton Creek channel are as follows:

- Continue to monitor changes to the Clinton Creek channel at Station 0+430 to identify if and when mitigation measures may be required to manage erosion of the right bank (i.e., waste rock).
- Modify the baseline year of Clinton Creek to September, 2010 so that triggers reflect recent changes to the creek channel, rather than the changes that occurred during the 2009 and 2010 flood events.

5.4.2 Additional Considerations

Landslide screening studies could be conducted along the northern slopes of the Clinton Creek channel to prioritize locations for further investigation and risk assessment. This screening should include not only an inventory of past and existing slope failures, but a classification of their mode of failure, activity, and potential for complete blockage of the creek. Further investigation and risk assessment would then be carried out at those sites identified with the highest rating in the screening studies as these sites may pose unacceptable risk. Additional data collected as part of these investigations and analyses should include visual observations such as slope angle, the presence of seepage, and evidence of slope deformation. Shallow hand and mechanical auger holes should be completed to assess the thickness of colluvial soils.

For the benefit of ongoing monitoring, future efforts to expand the instrumentation network should focus on sparsely instrumented areas of the slope which are interpreted to be a high risk.

5.5 Clinton Creek Waste Dump

The results of new monitoring data, in situ observations, and interpreted photographic and topographic material have been combined with the information arising from an interpretation of historical reports on construction sequence and site observations. The combined interpretation of all these data shows at least three separate units, each with its own style of deformation can be distinguished. They generally correspond with terrain classifications derived from a combination of monitoring patterns analysis and landform recognition. These units show the following deformation patterns:

- Unit 1 shows movements that are occurring radially outward from the central upper portion of the dump.
- Unit 2 seems to be stable, with recorded displacement rates well within the accuracy of the survey.
- Unit 3, this zone is located to the north east of unit 2 and seems to be active today. However, there is no monitoring on this portion of the waste pile; thus movement rates are unknown.

No significant change in movement behaviour has been observed at the waste rock pile since monitoring was re-initiated in 2001, thus the waste dump, as a whole, is currently considered to be in a marginally stable condition. Temporal variations in movement continue to be observed on the Upper Slope, which is believed to be local and mostly influenced by infiltration. These variations may be related to precipitation and snowmelt. The overall rate of movement of the waste rock pile is too small to raise concerns about overall slope stability. However, movement monitoring should continue.

Interpretation of the differing deformation patterns of a large structure requires an understanding of how failure mechanism differs between specific areas of the slope. At the waste rock pile, deformation rates are higher at the upper slope, where surficial displacement mechanisms may be occurring. Recognition of these secondary instabilities has implications for the interpretation of monitoring data for slope hazard management. If the secondary surficial deformation rates are misinterpreted as being representative of global behaviour, the entire waste rock pile might be perceived to be moving much more rapidly than it is.

5.5.1 Recommendations

There are no recommended changes to future monitoring and/or maintenance of the Clinton Creek waste rock dump. Monitoring should continue in 2018 the same as in 2016 with new monitoring pins incorporated into the full LTPMP survey program.

5.5.2 Additional Considerations

Landslide hazard assessment of critical structures (waste rock and tailings pile) is essential, and should be continued. However, assessing landslide hazards over the entire area presents a number of logistical challenges. A helicopter-based landslide hazard assessment could be carried out for the next bi-annual monitoring event (2017). A landslide expert positioned at either side of the helicopter, would document existing landslide hazards during flight. A small video camera would be mounted to the front of the helicopter to collect high-resolution video imagery of select sections of the flight paths.

While helicopter visual inspections are necessary to compensate for lack of ground access, representative ground checks must be made to confirm terrain conditions. Field-checking should concentrate on those terrain areas identified prior from air photo interpretation or during reconnaissance flight. This documentation, along with additional attributes identified from ground-based reconnaissance, should then be used as the core information to complete the landslide hazard assessment.

Vertical aerial photographs of landslides taken with identifiable field reference points should also be used to aid in the characterization of the type of movement patterns with time at both, the waste rock pile and the tailings pile. Aerial stereo photography of landslides provide very detailed documentation and be useful for monitoring large areas. However, aerial photographs may not be sufficiently adequate for examining landslides, depending upon the scale of the photographs. Therefore, it is important, before this method is used, to verify that the scale of the photographs is adequate.

5.6 Porcupine Pit and Snowshoe Pit

The average horizontal movement of the Porcupine pit monitoring points slightly increased between 2014 and 2016. Porcupine Pit and Snowshoe Pit should continue to be surveyed and inspected on a biennial basis.

5.7 Wolverine Creek

Minor bank erosion is occurring in Wolverine Creek downstream of the rock weirs, but is not a significant concern. No channel scour or degradation is evident from the surveyed creek profile. The rock weirs appeared in good condition on June 21, 2016.

Erosion of the tailings upstream of the rock weirs appears to be ongoing but has not resulted in recent and significant changes to the channel. The outlines of the Wolverine Creek Tailings Pile Ponds do not appear to have changed significantly between 2014 and 2016.

Wolverine Creek should continue to be surveyed and inspected on a biennial basis.

5.8 Wolverine Creek Tailings Pile

The patterns of ground movement are being monitored within a large, complex landslide at the tailings pile in the abandoned Clinton Creek asbestos mine. It was found that the landslide maintains a state of marginal instability, such that it is subject to slow but steady deformation. The north and south lobes continue to creep downslope, but rates of movement are generally decreasing with time. Continuous slow deformation occurs across the landslide complex at rates of between 2.0 and 27.5 cm/yr. The patterns of movement and the landslide geometry suggest that the likelihood of a rapid, catastrophic failure is low. Future episodes of faster movement are likely during periods when pore water pressures at the basal shear surface are elevated above a critical threshold, but groundwater pressures are not available to test this possibility. It is expected that movements will continue for several decades or longer.

5.8.1 Recommendations

There are no recommended changes to future monitoring and/or maintenance of the Wolverine Creek tailings pile. Monitoring should continue in 2018 the same as in 2016 with new monitoring pins incorporated into the full LTPMP survey program.

5.8.2 Additional Considerations

The irregular nature of displacements in this large slow-moving landslide is an indication of complex landslide geometry. The magnitude of kinetic energy associated with the landslide makes it expensive to completely stop their movement. Therefore, approaches to hazard mitigation of such a landslide should aim to improve stability by reducing and controlling movement rates. Monitoring should continue to track changes in the slope behaviour.

Groundwater pressure, slide geometry, geotechnical properties, geologic setting and topography are all significant contributors to the ongoing instability of the tailings pile. For such a large landslide, the only factors that can be controlled are the groundwater pressure and slide geometry, and therefore drainage and slope regrading might be the only means available to reduce slope movement rates. However, a better understanding of the behaviour and movement rates on the tailings pile is necessary to determine the most appropriate strategy to deal with previously identified hazards. This includes a geotechnical investigation and study, and development of a model that can realistically describe the behaviour of the tailings.

5.9 Proposed 2017 and 2018 LTPMP Scopes

The 2017 LTPMP should be a "short" program consisting the following components:

- Visual inspection of all site components to identify new potential safety, environmental or maintenance issues and modify the proposed 2017 survey scope as required.
- Survey of the following critical site components
  - Clinton Creek drop structures, including the DS4 repairs completed in 2015
  - Clinton Creek channel from DS4 to Fording No. 1
  - Closed portion of the site access road downstream of DS4
  - Hudgeon Lake log boom abutments

The 2018 LTPMP should be a "full" program consisting of the same scope as the 2016 LTPMP plus all additional monitoring points installed in 2016.

6 References

[Ref 1] R01 UMA Engineering (2000). Condition Assessment Report

[Ref 2] R05 UMA Engineering (2004). Hazard Assessment Report

[Ref 3] R12 AECOM (2010). 2009 Site Inspection

[Ref 4] R15 AECOM (2009). Long Term Performance Monitoring 2008

[Ref 5] R21 UMA Engineering (2003). Environmental Liability Report

[Ref 6] R22 UMA Engineering (2006). Long-Term Performance Monitoring Results 2005

[Ref 7] R23 UMA Engineering (2008). Long Term Performance Monitoring Results 2007

[Ref 8] R24 UMA Engineering (2007). Long Term Performance Monitoring Results 2006

[Ref 9] R29 Stilwell, R. (2009). Clinton Creek Slope Area Discharge (Corresponding to brake up flood of 2009)

[Ref 10] R35 Golder (1978). Mine Waste Dump and Tailings Pile Clinton Creek Operations

[Ref 11] R47 UMA Engineering (2002). Conceptual Design Report

[Ref 12] R51 AECOM (2011). Long-Term Performance Monitoring 2010

[Ref 13] R93 AECOM (2009). Emergency Drop Structure Repairs Construction Activity Report - 2009

[Ref 14] R94 AECOM (2011). Emergency Drop Structure Repairs Construction Activity Report 2011

[Ref 15] R103 AECOM (2012), Long Term Performance Monitoring 2011

[Ref 16] R104 Associated Engineering (2013). Long Term Performance Monitoring 2012

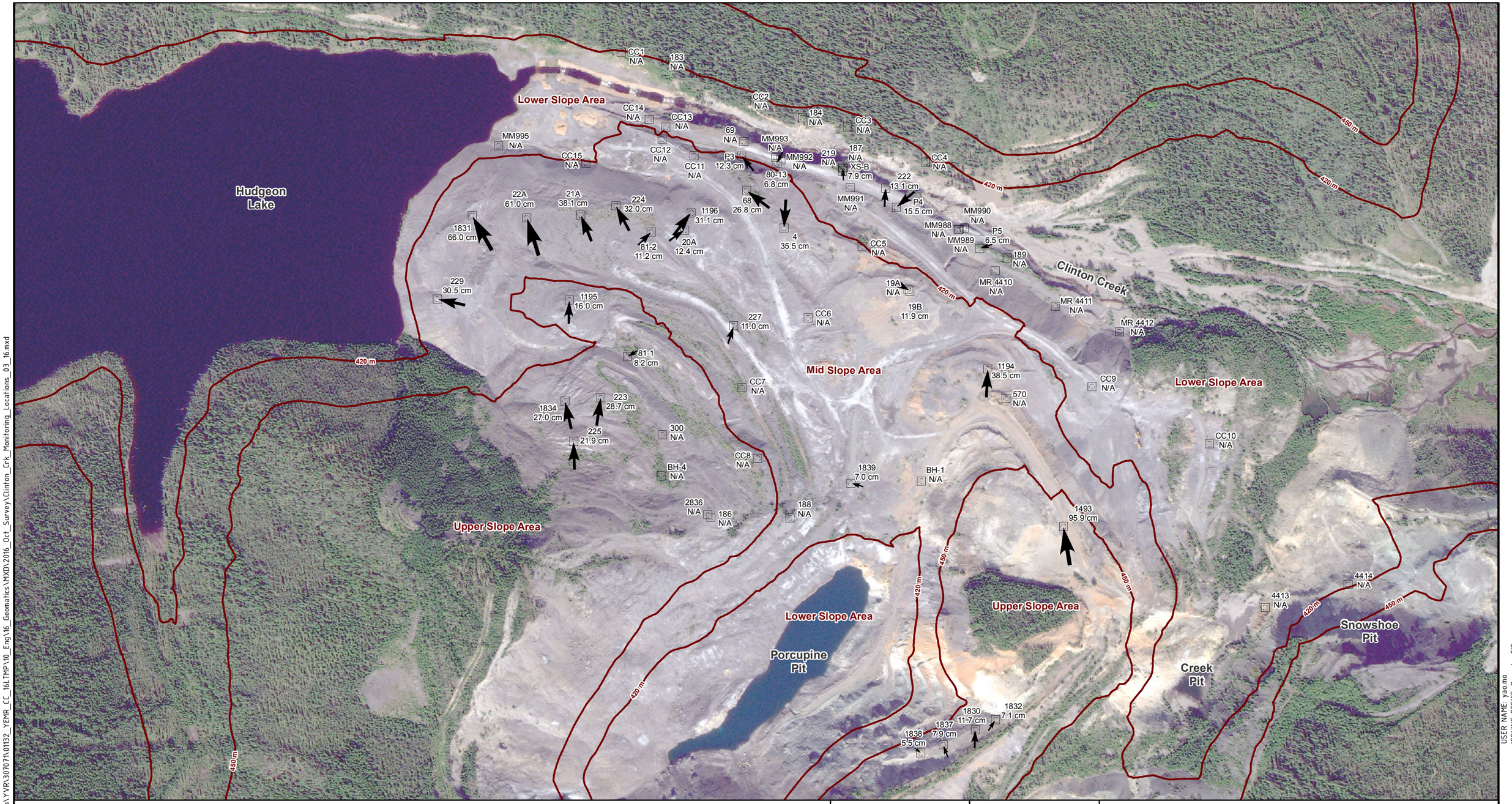
[Ref 17] R121 WorleyParsons (2015) Clinton Creek Drop Structure No. 4 Repair – Construction Report

[Ref 18] R124 TTEBA (2016). Existing Geotechnical Data Summary Report

[Ref 19] R126 TTEBA (2016). Data Gap Assumption

[Ref 20] WorleyParsons (2014). Clinton Creek Long-Term Monitoring Program - 2014 Survey Results

Appendix 1 Figures



Legend

- 2016 Monitoring Station
- Slope Zone Boundary

Upper Slope: Elevation > 450 m
Mid Slope: 420 m < Elevation < 450 m
Lower Slope: Elevation < 420 m

DRAFT

Monitoring Station Movement (cm)

- 5
- 15
- 40
- > 60

BH-1 - Monitoring Location ID
0.7 cm - Vector Movement

Note:
*: the default start/end year is 2003 - 2016 when the year is not labelled.

N

1:5,000
0 50 100
Meters

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Date:	04/11/2016
Drawn By:	Y.M.
Edited By:	S.C.
App'd By:	-

CUSTOMER: Yukon Government

WorleyParsons resources & energy

Clinton Creek Site
Long Term Monitoring Program (2016)
Clinton Creek Waste Rock Dump
Movement from 2003 - 2016

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307071-01132	1017	B

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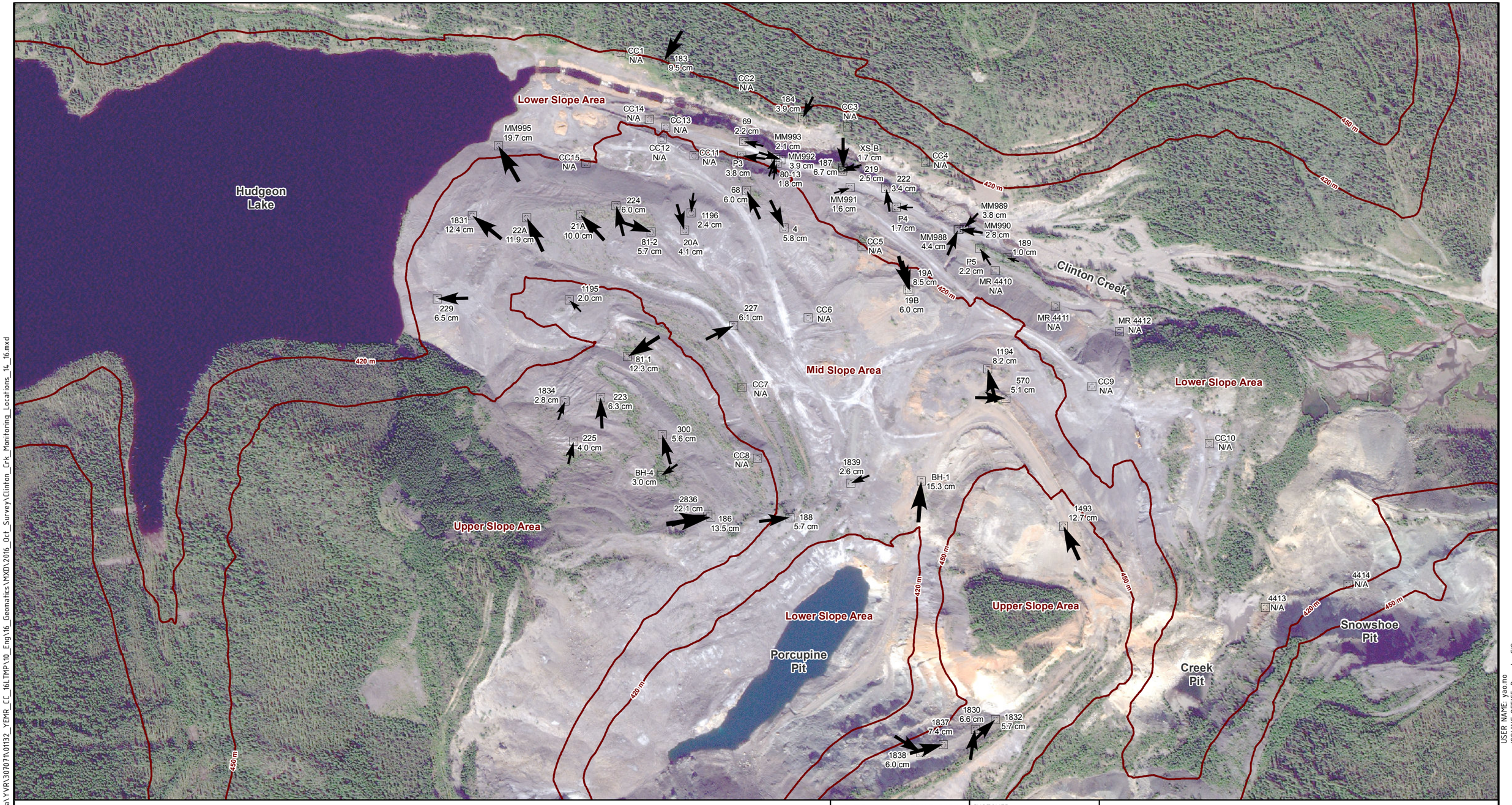

Legend

- 2016 Monitoring Station
- Slope Zone Boundary

Upper Slope: Elevation > 450 m
Mid Slope: 420 m < Elevation < 450 m
Lower Slope: Elevation < 420 m

DRAFT

Monitoring Station Movement (cm)

1
5
10
25

BH-1 - Monitoring Location ID
0.7 cm - Vector Movement

Note:
*: the default start/end year is 2014 - 2016 when the year is not labelled.

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Meters

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Clinton Creek Site
Long Term Monitoring Program (2016)
Clinton Creek Waste Rock Dump
Movement from 2014 - 2016

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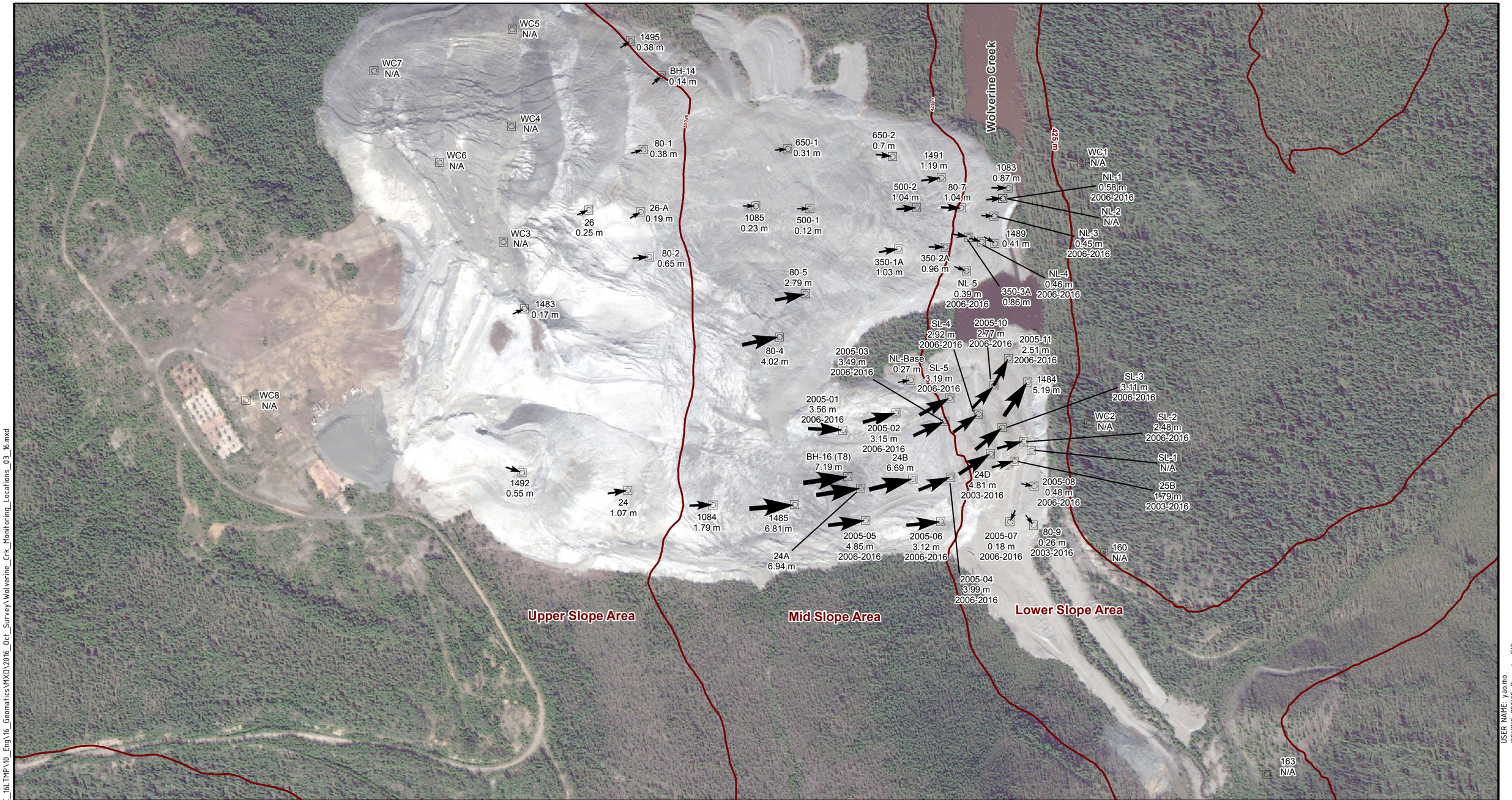

Legend

- 2016 Monitoring Station
- Slope Zone Boundary

Upper Slope: Elevation > 530 m
Mid Slope: 425 m < Elevation < 530 m
Lower Slope: Elevation < 425 m

Station 160 and 163 are located outside the visible extent.

Monitoring Station Movement (m)

- 0.5
- 1.5
- 4.0
- 7.0

DRAFT

2005-05 - Monitoring Location ID
4.85 m - Horizontal Vector Movement
2006-2016 - Start/End Year

Note:
*: the default start/end year is 2003 - 2016 when the year is not labelled.

N

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0 25 50 100

Meters

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Clinton Creek Site
Long Term Monitoring Program (2016)
Wolverine Creek Tailings Pile
Movement from 2003 – 2016

WORLEYPARSONS PROJECT No:	FIG No:	REV
307071-01009	1019	B

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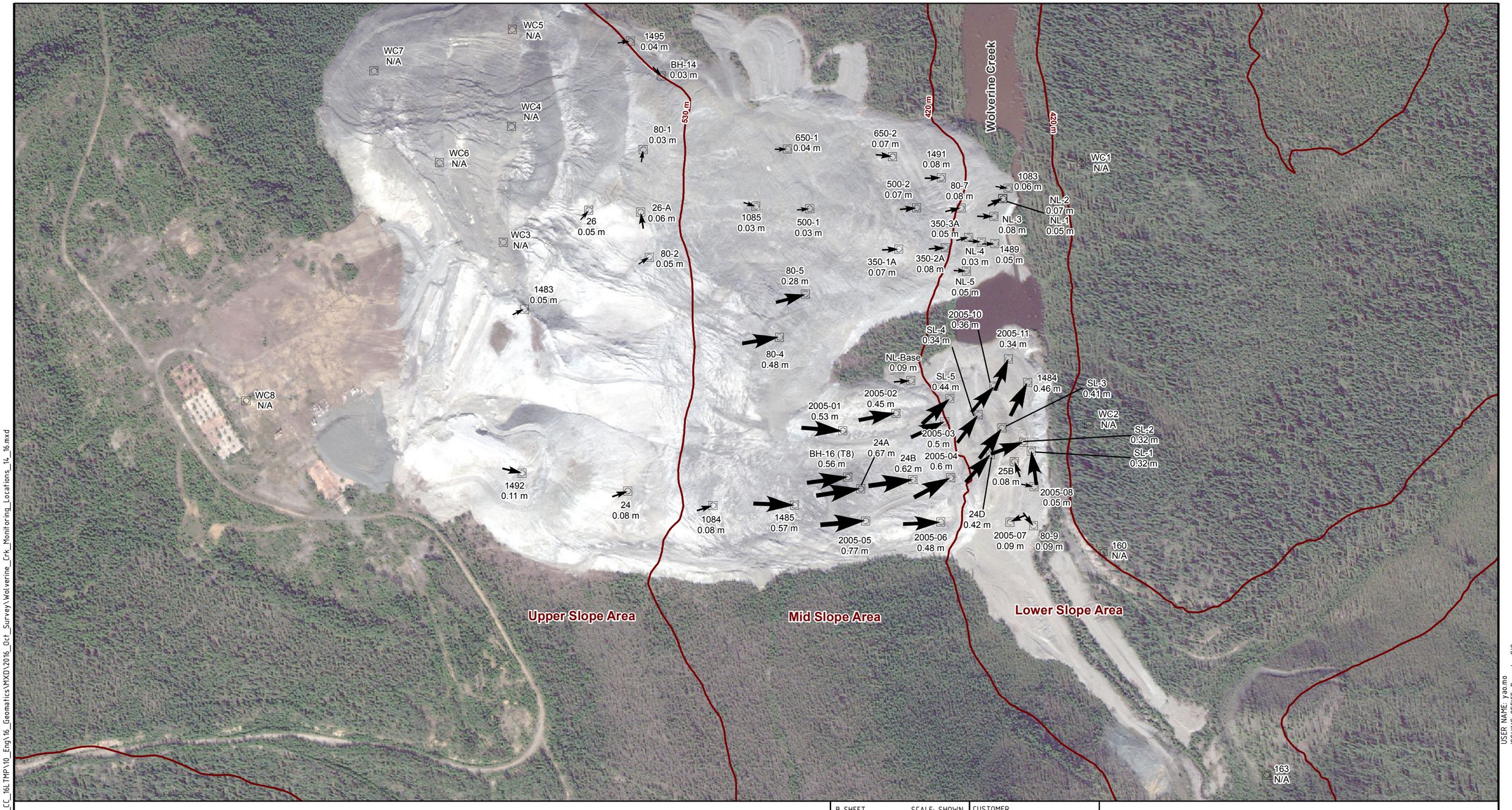

Legend

- 2016 Monitoring Location
- Slope Zone Boundary

Upper Slope: Elevation > 530 m
Mid Slope: 425 m < Elevation < 530 m
Lower Slope: Elevation < 425 m

Station 160 and 163 are located outside the visible extent.

Monitoring Station Movement (m)

- < 0.05
- 0.2
- 0.4
- 0.7

DRAFT

1492 - Monitoring Location ID
0.11 m - Horizontal Vector Movement

Note:
*: the default start/end year is 2014 - 2016 when the year is not labelled.

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Meters

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Clinton Creek Site
Long Term Monitoring Program (2016)
Wolverine Creek Tailings Pile
Movement from 2014 - 2016

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Hudgeon Lake

Lower Slope Area

Unit 1

Unit 2

Unit 3

Mid Slope Area

Upper Slope Area

Lower Slope Area

Clinton Creek

Lower Slope Area

Upper Slope Area

Porcupine Pit

Creek Pit

Snowshoe Pit

420 m

450 m

Legend

Slope Zone Boundary

Upper Slope: Elevation > 450 m
Mid Slope: 420 m < Elevation < 450 m
Lower Slope: Elevation < 420 m

Displacement Pattern

Monitoring Station Movement (2003 - 2016)

Deformation Unit Boundary

N

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0 50 100

Meters

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Clinton Creek Site
Long Term Monitoring Program (2016)
Clinton Creek Waste Rock Dump
Division of Wasterock Pile into Separate Units

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Northwest Lobe

North Lobe

South Lobe

Wolverine Creek

530 m

450 m

425 m

Upper Slope Area

Mid Slope Area

Lower Slope Area

Legend

Slope Zone Boundary

Upper Slope: Elevation > 530 m
Mid Slope: 425 m < Elevation < 530 m
Lower Slope: Elevation < 425 m

Displacement Pattern

Monitoring Station Movement (2003 - 2016)

?- - ?- - Deformation Unit Boundary

N

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0 25 50 100

Meters

DRAFT

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Clinton Creek Site
Long Term Monitoring Program (2016)
Wolverine Creek Tailings Pile
Division of Tailings Pile into Separate Units

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514000
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7148000
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64°28'0"N
64°27'0"N
140°44'0"W
140°43'0"W

Wolverine Creek Tailing Pile
North Lobe
South Lobe
Clinton Creek Waste Rock Dump
Snowshoe Pit 2
Snowshoe Pit 1
Porcupine Pit

530
450 m
420 m

N
0 90 180
Meters
1:9,000

Legend
- Monitoring Location
- Lake Boundary
- Slope Zone Boundary
- Site Plan

DRAFT

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Historical Aerial Photograph

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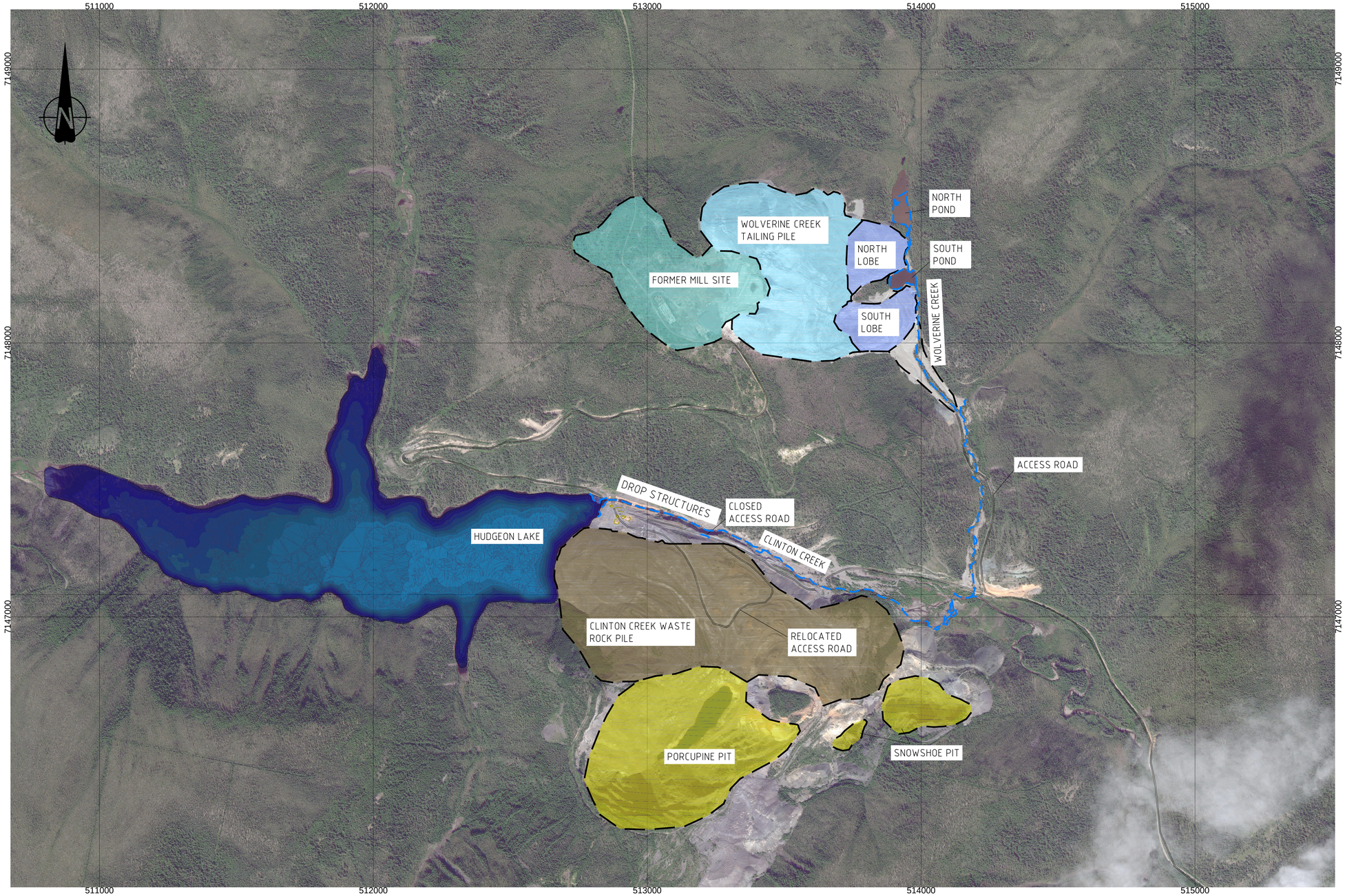

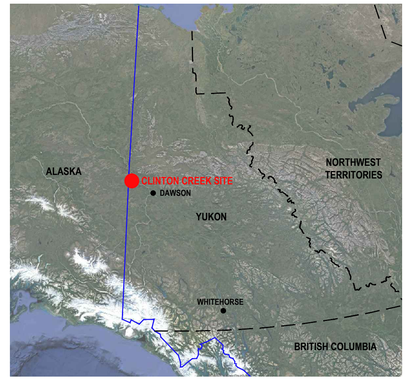

DRAWING NO.	TITLE
307071-01132-00-CI-DLP-1000	LOCATION PLAN AND DRAWING LIST
307071-01132-00-CI-DGA-1001	2016 SURVEY PROGRAM
307071-01132-00-CI-DSK-1002	CLINTON CREEK PLAN AND PROFILE
307071-01132-00-CI-DSK-1003	CLINTON CREEK PLAN AND PROFILE
307071-01132-00-CI-DSK-1004	CLINTON CREEK SECTIONS
307071-01132-00-CI-DSK-1005	CLINTON CREEK SECTIONS
307071-01132-00-CI-DSK-1006	CLINTON CREEK SECTIONS
307071-01132-00-CI-DSK-1007	CLINTON CREEK DROP STRUCTURE 1
307071-01132-00-CI-DSK-1008	CLINTON CREEK DROP STRUCTURE 2
307071-01132-00-CI-DSK-1009	CLINTON CREEK DROP STRUCTURE 3
307071-01132-00-CI-DSK-1010	CLINTON CREEK DROP STRUCTURE 4
307071-01132-00-CI-DSK-1011	CLINTON CREEK TENSION CRACKS PLAN
307071-01132-00-CI-DSK-1012	WOLVERINE CREEK PLAN AND PROFILE
307071-01132-00-CI-DSK-1013	WOLVERINE CREEK SECTIONS
307071-01132-00-CI-DSK-1014	WOLVERINE CREEK SECTIONS
307071-01132-00-CI-DSK-1015	WOLVERINE CREEK SECTIONS
307071-01132-00-CI-DSK-1016	HUDGEON LAKE OUTLET

LEGEND

- FORMER MILL SITE
- WOLVERINE CREEK TAILING PILE
- NORTH AND SOUTH LOBE – TAILINGS PILE
- CLINTON CREEK WASTE ROCK PILE
- PORCUPINE AND SNOWSHOE PIT AND WASTE ROCK PILE
- HUDGEON LAKE
- SURVEY BOUNDARY
- CLINTON CREEK AND WOLVERINE CREEK

NOTES:

1. DIMENSIONS AND ELEVATIONS ARE IN METRES.

PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Nov. 02/16 10:14 am

m 0 100 200 300 400 m
1:7,500

REV	DATE DD-MM-YY	REVISION DESCRIPTION	DRAWN	DRAFT CHK	DESIGNED	ENG CHK	APPROVED	CUSTOMER	REF DRAWING No	REFERENCE DRAWING TITLE
C	05-DEC-16	ISSUED AS FINAL	RL	-	SJC	-	-	-		
B	04-NOV-16	ISSUED FOR CLIENT REVIEW	RL	-	SJC	-	-	-		
A	26-OCT-16	ISSUED FOR INTERNAL REVIEW	RL	-	SJC	-	-	-		

D SHEET | SCALE AS SHOWN

OneWay to zero harm

WORLEYPARSONS PROJECT No
307071-01132

ENGINEERING AND PERMIT STAMPS (As Required)

CUSTOMER

Yukon Government
Department of Energy, Mines and Resources
Assessment and Abandoned Mines

WorleyParsons resources & energy

CLINTON CREEK SITE
LONG TERM MONITORING PROGRAM (2016)
LOCATION PLAN AND DRAWING LIST

DRG No 307071-01132-00-CI-DLP-1000

REV C

LOCATION: U:\YVR\307071\01132_YEMR_CC_16LTMP\11_DRAWINGS\01_CIVIL\307071-01132-00-CI-DLP-1000.DWG
USER NAME: ryan.lai
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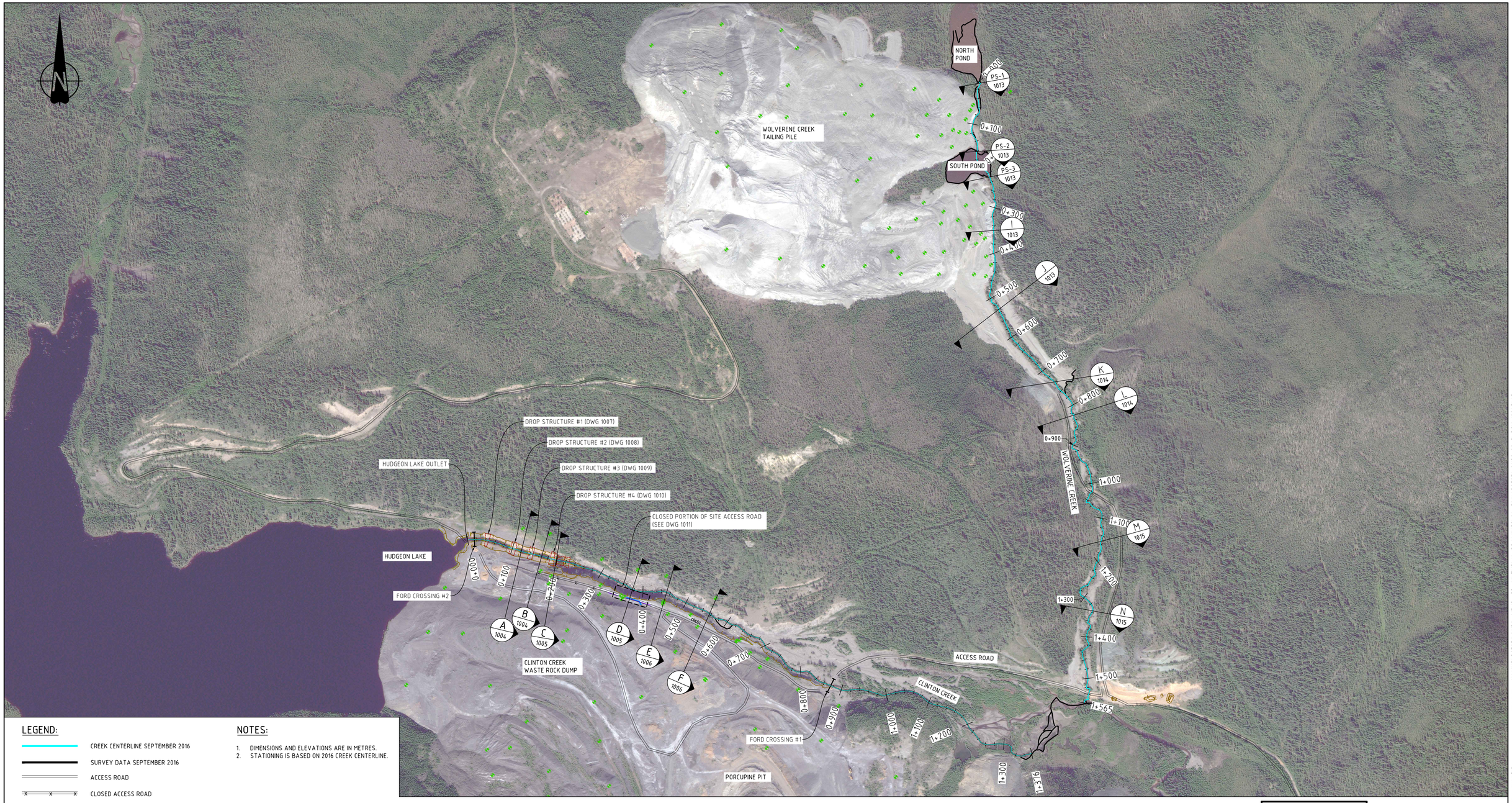

LEGEND:

- CREEK CENTERLINE SEPTEMBER 2016
- SURVEY DATA SEPTEMBER 2016
- ACCESS ROAD
- CLOSED ACCESS ROAD
- 2015 SURVEYED TOP OF CREEK EMBANKMENT
- MONITORING PIN

NOTES:

1. DIMENSIONS AND ELEVATIONS ARE IN METRES.
2. STATIONING IS BASED ON 2016 CREEK CENTERLINE.

PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Dec. 05/16 12:19pm

0m 50 100m
1:2000

REV	DATE (DD-MMM-YY)	REVISION DESCRIPTION	DRAWN	DRAFT CHK	DESIGNED	ENG CHK	APPROVED	CUSTOMER	REF DRAWING No	REFERENCE DRAWING TITLE
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B	04-NOV-16	ISSUED FOR CLIENT REVIEW	RL	-	SJC	-	-	-		
A	26-OCT-16	ISSUED FOR INTERNAL REVIEW	RL	-	SJC	-	-	-		

D SHEET SCALE 1:2000

OneWay to zero harm

WORLEYPARSONS PROJECT No
307071-01056

ENGINEERING AND PERMIT STAMPS (As Required)

CUSTOMER

Yukon Government
Department of Energy, Mines and Resources
Assessment and Abandoned Mines

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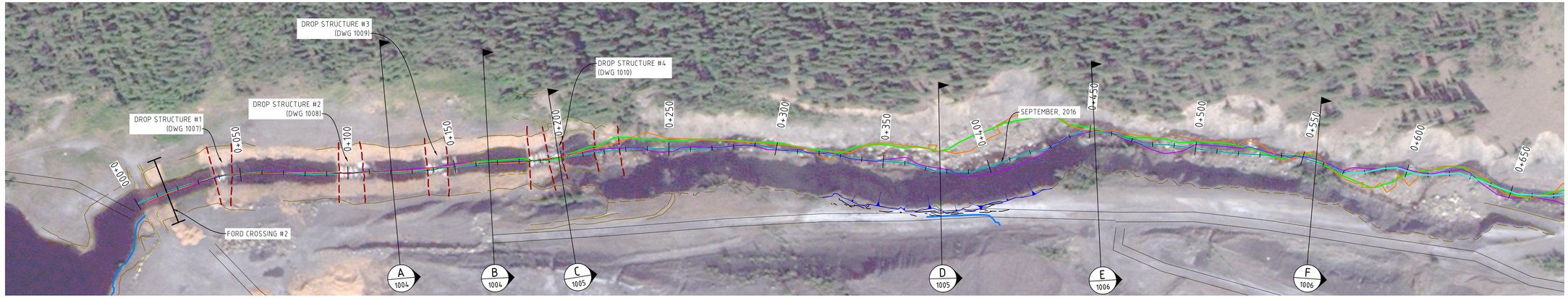
CLINTON CREEK SITE
LONG TERM MONITORING PROGRAM (2016)
2016 SURVEY PROGRAM

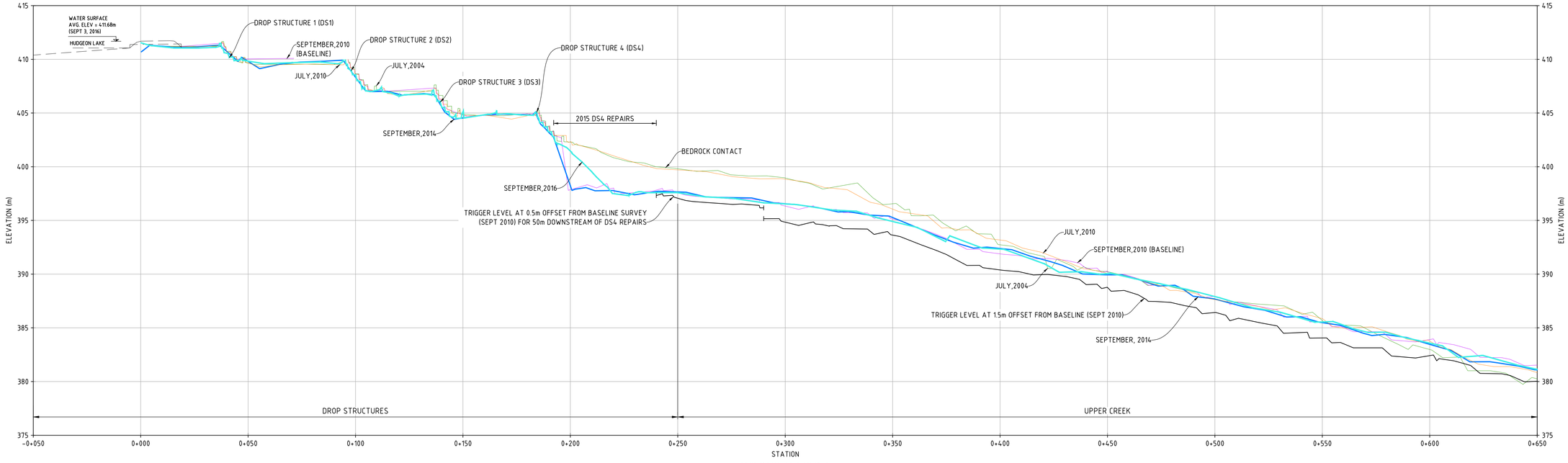
DRG No 307071-01132-00-CI-DSK-1001

REV C

LOCATION U:\YVR\307071\01132_YEMR_CC_16LTMP\11_DRAWINGS\01_CIVIL\307071-01132-00-CI-DSK-1001.DWG
USER NAME ryan.lai
PLOT DATE & TIME 5/12/2016 12:22:07 PM
SAVE DATE & TIME 5/12/2016 12:20:06 PM



PLAN VIEW
1:1000



PROFILE VIEW
H 1:1000 V 1:200

LEGEND

- PROFILE 2004
- PROFILE JULY 2010
- PROFILE SEPTEMBER 2010 (BASELINE)
- PROFILE SEPTEMBER 2014
- PROFILE SEPTEMBER 2016

NOTES:

1. DIMENSIONS AND ELEVATIONS ARE IN METRES.
2. STATIONING IS BASED ON 2016 CREEK CENTER LINE WITH THE START OF THE CENTERLINE AT STATION 0+000.
3. PROFILES OF THE CHANNEL FROM MONITORING SURVEYS COMPLETED IN 1983,1984,2001,2006,2007,2008,2011,2012 AND 2015 ARE NOT SHOWN FOR THE SAKE OF CLARITY.
4. REPAIRS TO DROP STRUCTURE 4, INCLUDING THE INSTALLATION OF AN ARTICULATED CONCRETE BLOCK DROP CHUTE, ALTERED THE CHANNEL PROFILE.

PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Nov. 02/16 10:20am

m 0 5 10 m
1:200
m 0 10 20 30 40 50 m
1:1000

REV	DATE (DD-MMM-YY)	REVISION DESCRIPTION	DRAWN	DRAFT CHK	DESIGNED	ENG CHK	APPROVED	CUSTOMER	REF DRAWING No	REFERENCE DRAWING TITLE
C	05-DEC-16	ISSUED AS FINAL	RL	-	SJC	-	-	-		
B	04-NOV-16	ISSUED FOR CLIENT REVIEW	RL	-	SJC	-	-	-		
A	26-OCT-16	ISSUED FOR INTERNAL REVIEW	RL	-	SJC	-	-	-		

D SHEET | SCALE AS SHOWN

OneWay to zero harm

WORLEYPARSONS PROJECT No
307071-01132

ENGINEERING AND PERMIT STAMPS (As Required)

CUSTOMER
Yukon Government
Department of Energy, Mines and Resources
Assessment and Abandoned Mines

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WorleyParsons resources & energy

CLINTON CREEK SITE
LONG TERM MONITORING PROGRAM (2016)
CLINTON CREEK CENTERLINE PLAN AND PROFILE
STA 0+000 TO STA 0+650

DRG No 307071-01132-00-CI-DSK-1002 | REV C

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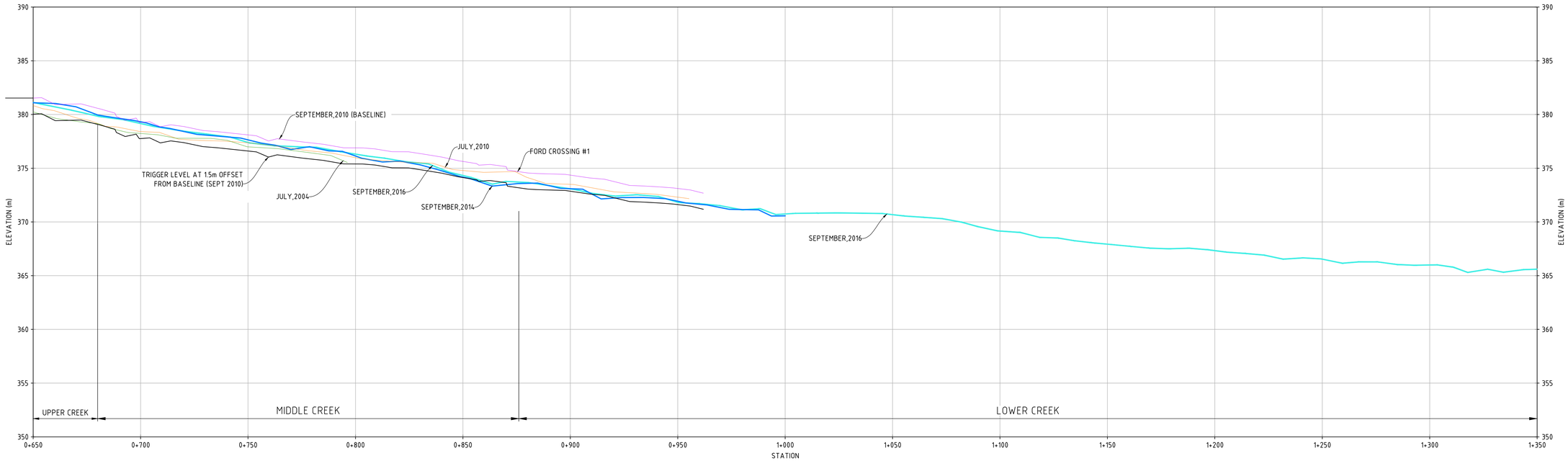
PLOT DATE & TIME: 5/12/2016 12:31:30 PM
SAVE DATE & TIME: 2/11/2016 10:20:29 AM

PLAN VIEW
1:1000



PROFILE VIEW
H 1:1000 V 1:200

LEGEND

- PROFILE 2004
- PROFILE JULY 2010
- PROFILE SEPTEMBER 2010 (BASELINE)
- PROFILE SEPTEMBER 2014
- PROFILE SEPTEMBER 2016

NOTES:

1. DIMENSIONS AND ELEVATIONS ARE IN METRES.
2. STATIONING IS BASED ON 2016 CREEK CENTER LINE WITH THE START OF THE CENTERLINE AT STATION 0+000.
3. PROFILES OF THE CHANNEL FROM MONITORING SURVEYS COMPLETED IN 1983,1984,2001,2006,2007,2008,2011,2012 AND 2015 ARE NOT SHOWN FOR THE SAKE OF CLARITY.

PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Nov. 02/16 10:20am

m 0 5 10 m
1:200

m 0 10 20 30 40 50 m
1:1000

REV	DATE (DD-MMM-YY)	REVISION DESCRIPTION	DRAWN	DRAFT CHK	DESIGNED	ENG CHK	APPROVED	CUSTOMER	REF DRAWING No	REFERENCE DRAWING TITLE
C	05-DEC-16	ISSUED AS FINAL	RL	-	SJC	-	-	-		
B	04-NOV-16	ISSUED FOR CLIENT REVIEW	RL	-	SJC	-	-	-		
A	26-OCT-16	ISSUED FOR INTERNAL REVIEW	RL	-	SJC	-	-	-		

D SHEET | SCALE AS SHOWN

OneWay to zero harm

WORLEYPARSONS PROJECT No
307071-01132

ENGINEERING AND PERMIT STAMPS (As Required)

CUSTOMER

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Department of Energy, Mines and Resources
Assessment and Abandoned Mines

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CLINTON CREEK SITE
LONG TERM MONITORING PROGRAM (2016)
CLINTON CREEK CENTERLINE PLAN AND PROFILE
STA 0+650 TO STA 0+1350

DRG No 307071-01132-00-CI-DSK-1003

REV C

LOCATION: U:\YVR\307071\01132_YEMR_CC_16LTMP\11_DRAWINGS\01_CIVIL\307071-01132-00-CI-DSK-1002-1003.DWG
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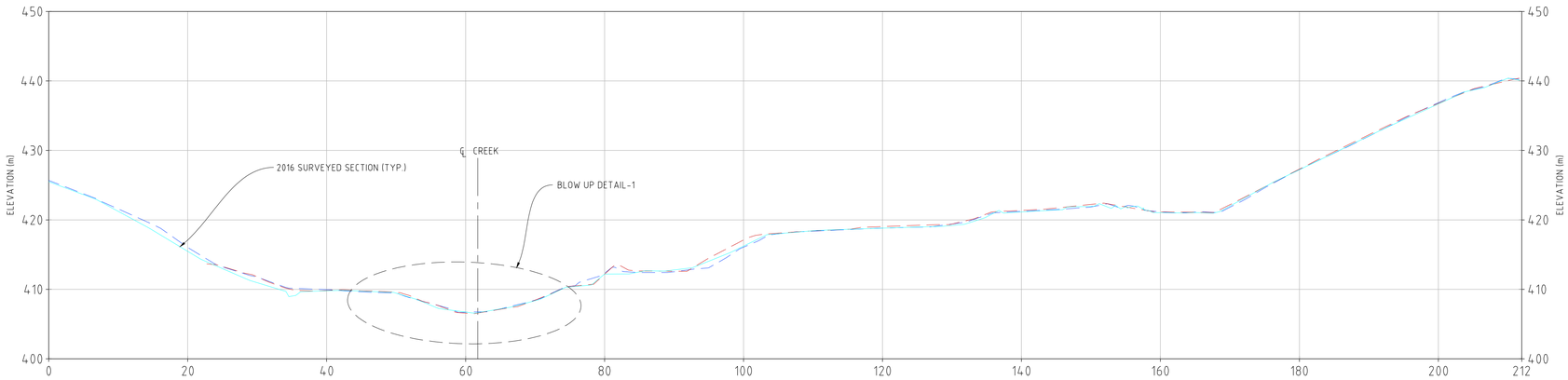

SECTION A-A
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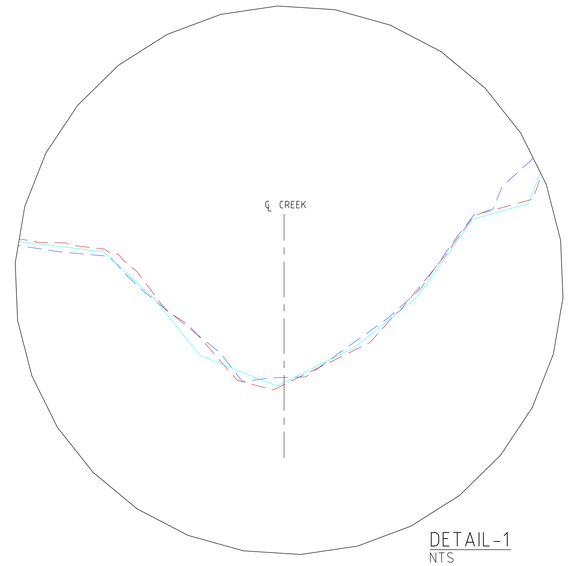
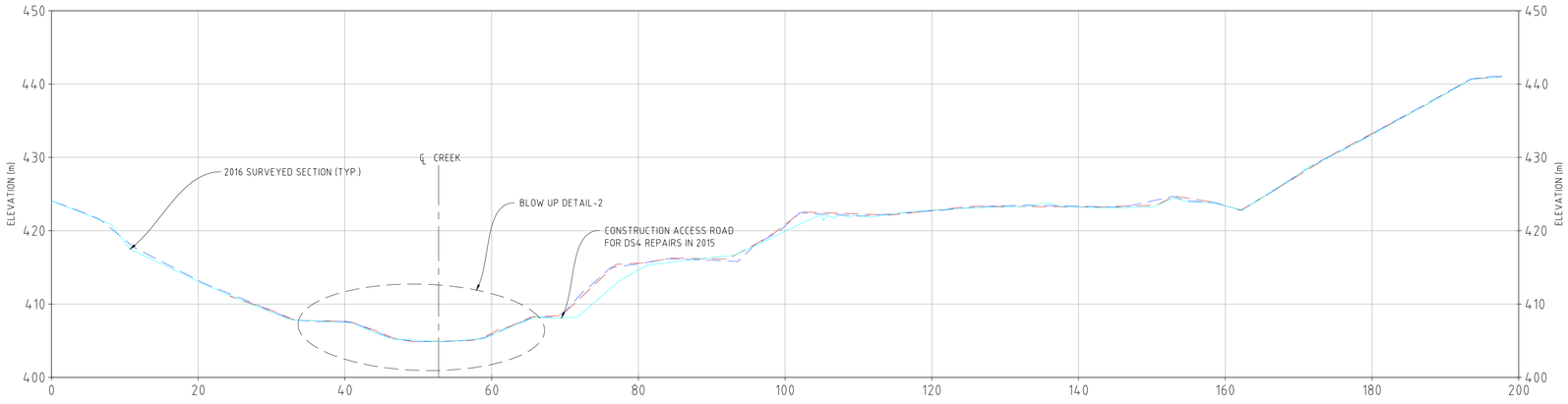


DETAIL-1
NTS



SECTION B-B
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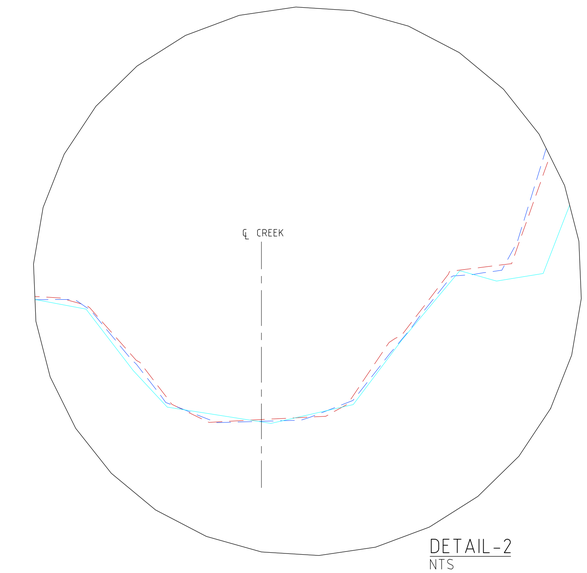

DETAIL-2
NTS

LEGEND

- 2016 SURVEYED GROUND
- 2014 SURVEYED GROUND
- 2012 SURVEYED GROUND

m 0 5 10 15 20 m
1:400

PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Nov. 02/16 10:32am

NOTES:

1. DIMENSIONS AND ELEVATIONS ARE IN METERS.
2. THE CROSS-SECTIONS SHOWN WERE RECORDED AT SLIGHTLY DIFFERENT STATIONS (OFFSET BY ±0.3m) IN EACH MONITORING PERIOD AND ARE NOT NECESSARILY REPRESENTATIVE OF THE EXACT SAME SECTION OF THE CHANNEL.

REV	DATE (DD-MMM-YY)	REVISION DESCRIPTION	DRAWN	DRAFT CHK	DESIGNED	ENG CHK	APPROVED	CUSTOMER	REF DRAWING No	REFERENCE DRAWING TITLE
C	05-DEC-16	ISSUED AS FINAL	RL	-	SJC	-	-	-		
B	04-NOV-16	ISSUED FOR CLIENT REVIEW	RL	-	SJC	-	-	-		
A	26-OCT-16	ISSUED FOR INTERNAL REVIEW	RL	-	SJC	-	-	-		

D SHEET | SCALE AS SHOWN

OneWay to zero harm

WORLEYPARSONS PROJECT No
307071-01132

ENGINEERING AND PERMIT STAMPS (As Required)

CUSTOMER

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Department of Energy, Mines and Resources
Assessment and Abandoned Mines

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CLINTON CREEK SITE
LONG TERM MONITORING PROGRAM (2016)
CLINTON CREEK
SURVEYED SECTIONS A AND B

DRG No 307071-01132-00-CI-DSK-1004 | REV C

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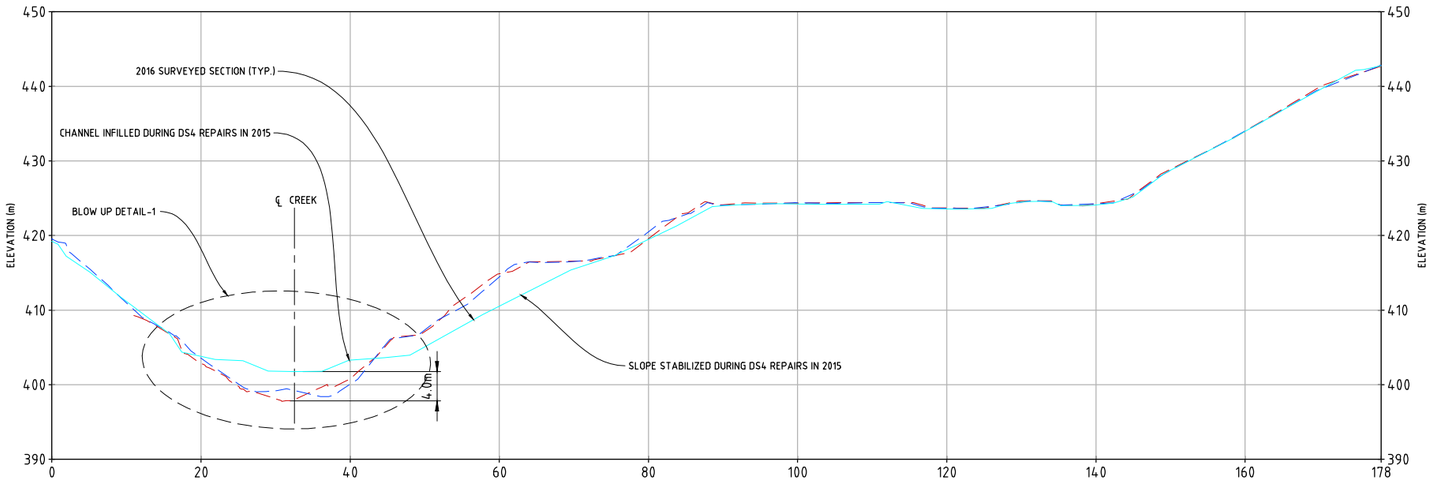

SECTION C-C
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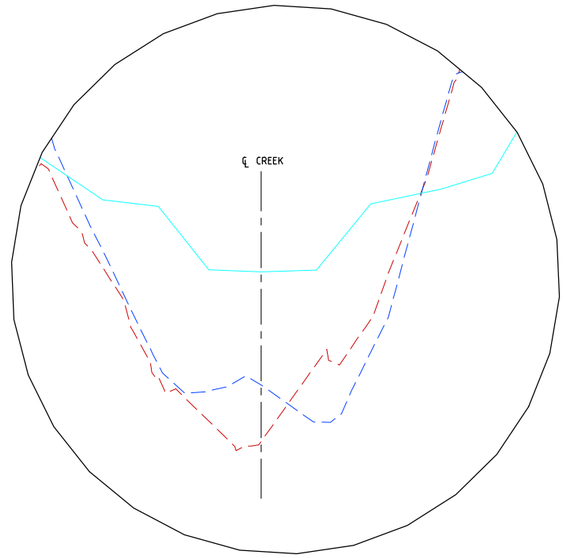
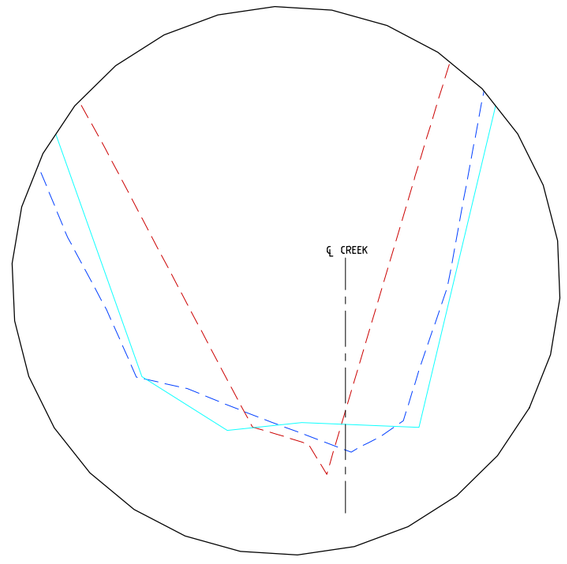


DETAIL-1
NTS

SECTION D-D
1:400



DETAIL-2
NTS

m 0 5 10 15 20 m
1:400

LEGEND

- 2016 SURVEYED GROUND
- 2014 SURVEYED GROUND
- 2012 SURVEYED GROUND

NOTES:

1. DIMENSIONS AND ELEVATIONS ARE IN METERS.
2. THE CROSS-SECTIONS SHOWN WERE RECORDED AT SLIGHTLY DIFFERENT STATIONS (OFFSET BY ±0.3m) IN EACH MONITORING PERIOD AND ARE NOT NECESSARILY REPRESENTATIVE OF THE EXACT SAME SECTION OF THE CHANNEL.
3. THE PORTIONS OF CROSS SECTIONS D, LOCATED BETWEEN THE TOP AND TOE OF THE SOUTH ACCESS ROAD EMBANKMENT WERE NOT SURVEYED DUE TO THE STEEPNESS OF THE EMBANKMENT.

PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Nov. 02/16 10:32am

REV	DATE (DD-MMM-YY)	REVISION DESCRIPTION	DRAWN	DRAFT CHK	DESIGNED	ENG CHK	APPROVED	CUSTOMER	REF DRAWING No	REFERENCE DRAWING TITLE
C	05-DEC-16	ISSUED AS FINAL	RL	-	SJC	-	-	-		
B	04-NOV-16	ISSUED FOR CLIENT REVIEW	RL	-	SJC	-	-	-		
A	26-OCT-16	ISSUED FOR INTERNAL REVIEW	RL	-	SJC	-	-	-	#	#

D SHEET | SCALE AS SHOWN

OneWay

WORLEYPARSONS PROJECT No
307071-01132

ENGINEERING AND PERMIT STAMPS (As Required)

CUSTOMER

Yukon Government
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Assessment and Abandoned Mines

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CLINTON CREEK SITE
LONG TERM MONITORING PROGRAM (2016)
CLINTON CREEK
SURVEYED SECTIONS C AND D

DRG No 307071-01132-00-CI-DSK-1005
REV C

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USER NAME: ryan.lai
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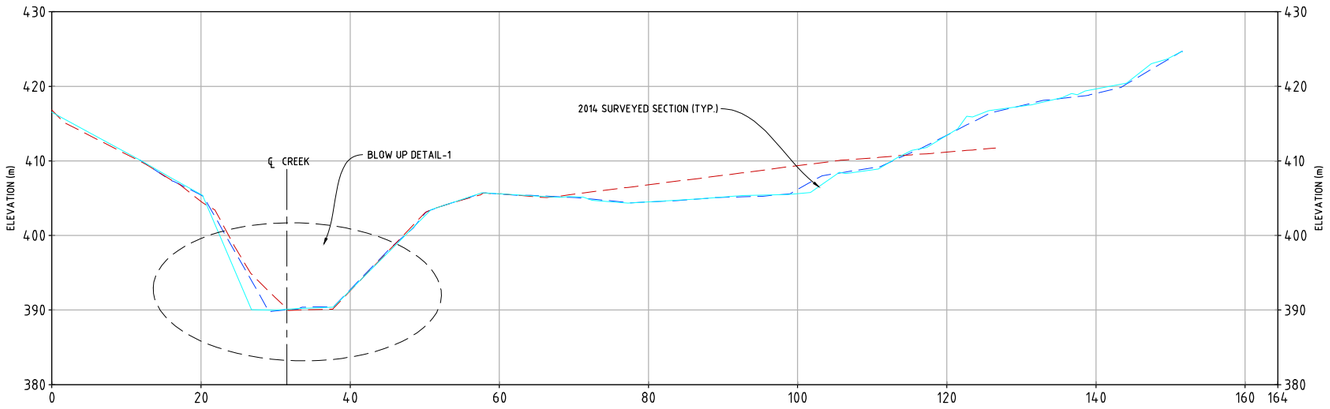

SECTION E-E
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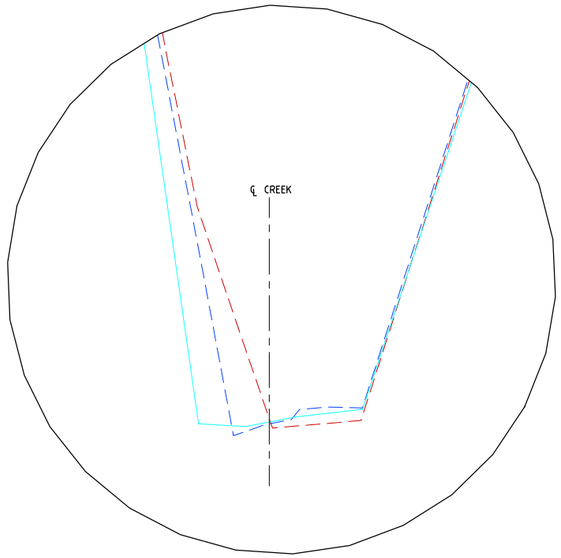
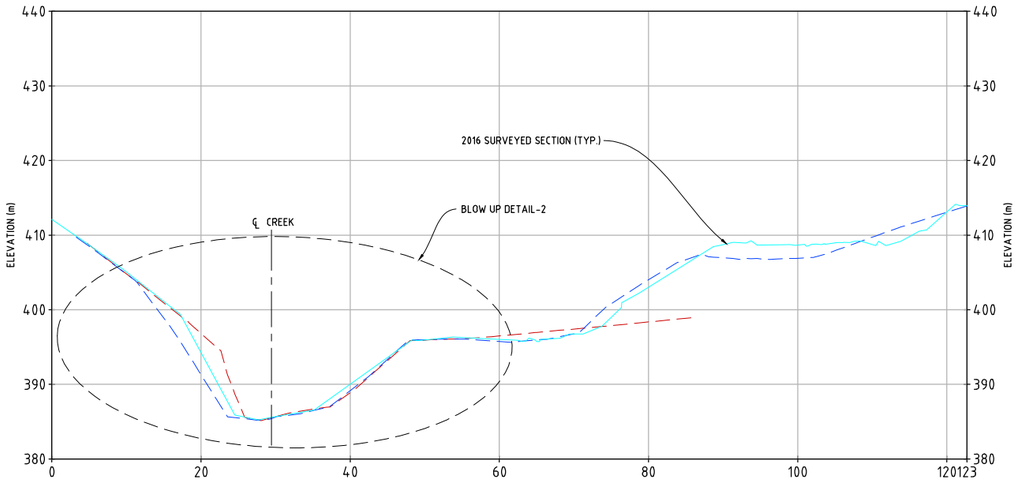


DETAIL-1
NTS



SECTION F-F
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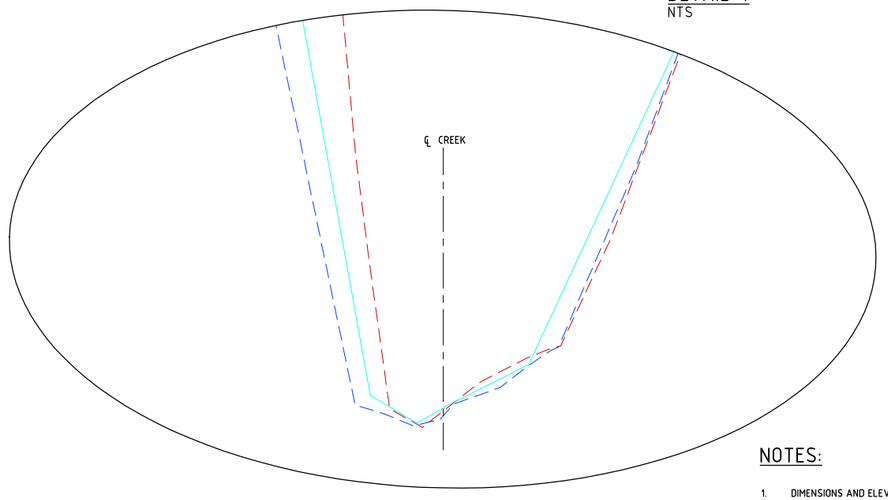

DETAIL-2
NTS

LEGEND

- 2016 SURVEYED GROUND
- 2014 SURVEYED GROUND
- 2012 SURVEYED GROUND

m 0 5 10 15 20 m
1:400

NOTES:

1. DIMENSIONS AND ELEVATIONS ARE IN METERS.
2. THE CROSS-SECTIONS SHOWN WERE RECORDED AT SLIGHTLY DIFFERENT STATIONS (OFFSET BY ±0.3m) IN EACH MONITORING PERIOD AND ARE NOT NECESSARILY REPRESENTATIVE OF THE EXACT SAME SECTION OF THE CHANNEL.
3. THE PORTIONS OF CROSS SECTIONS E AND F LOCATED BETWEEN THE TOP AND TOE OF THE EMBANKMENT WERE NOT SURVEYED DUE TO THE STEEPNESS OF THE EMBANKMENT.

PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Nov. 02/16 10:32am

REV	DATE (DD-MMM-YY)	REVISION DESCRIPTION	DRAWN	DRAFT CHK	DESIGNED	ENG CHK	APPROVED	CUSTOMER	REF DRAWING No	REFERENCE DRAWING TITLE
C	05-DEC-16	ISSUED AS FINAL	RL	-	SJC	-	-	-		
B	04-NOV-16	ISSUED FOR CLIENT REVIEW	RL	-	SJC	-	-	-		
A	26-OCT-16	ISSUED FOR INTERNAL REVIEW	RL	-	SJC	-	-	-	#	#

D SHEET TITLE: SURVEYED SECTIONS E AND F

OneWay

WORLEYPARSONS PROJECT No
307071-01132

ENGINEERING AND PERMIT STAMPS (As Required)

CUSTOMER

Yukon Government
Department of Energy, Mines and Resources
Assessment and Abandoned Mines

WorleyParsons
resources & energy

CLINTON CREEK SITE
LONG TERM MONITORING PROGRAM (2016)
CLINTON CREEK
SURVEYED SECTIONS E AND F

DRG No: 307071-01132-00-CI-DSK-1006
REV: C

LOCATION: U:\YVR\307071\01132_YEMR_CC_16LTMP\11_DRAWINGS\01_CIVIL\307071-01132-00-CI-DSK-1004-1006.DWG
USER NAME: ryan.lai
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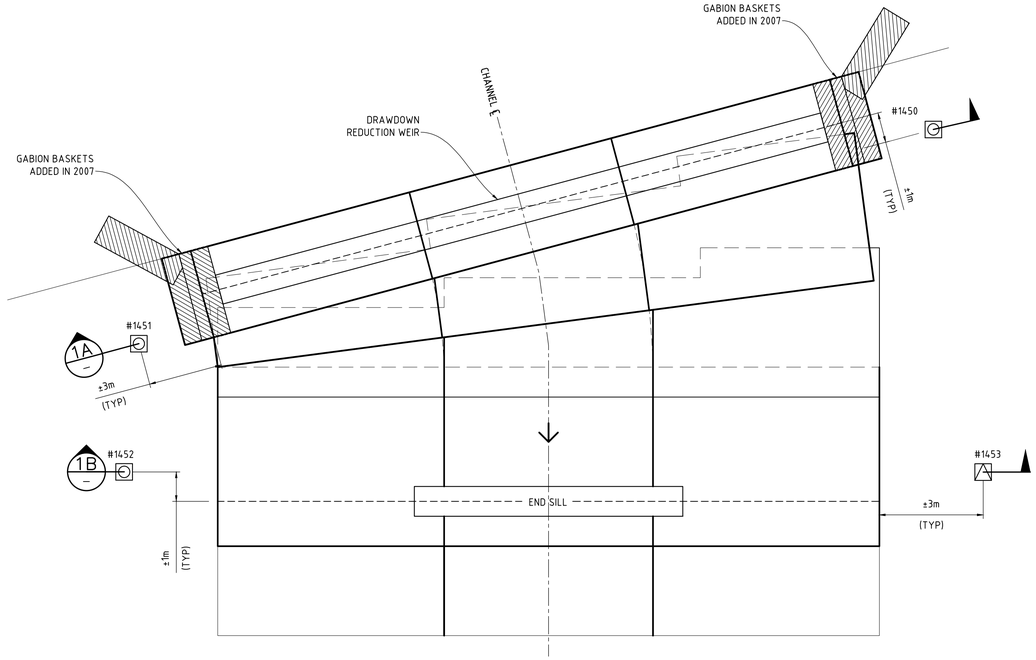
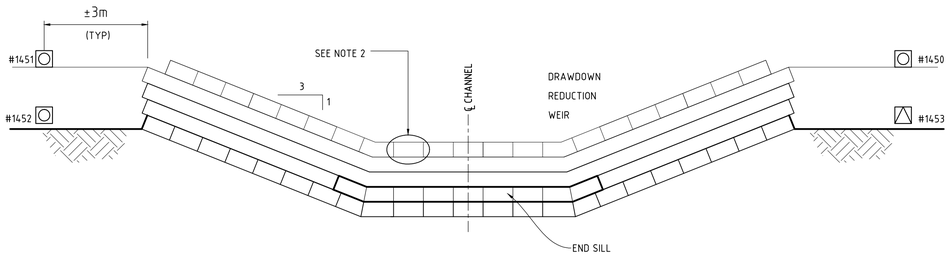


DROP STRUCTURE #1 PLAN VIEW

SCALE: 1:100



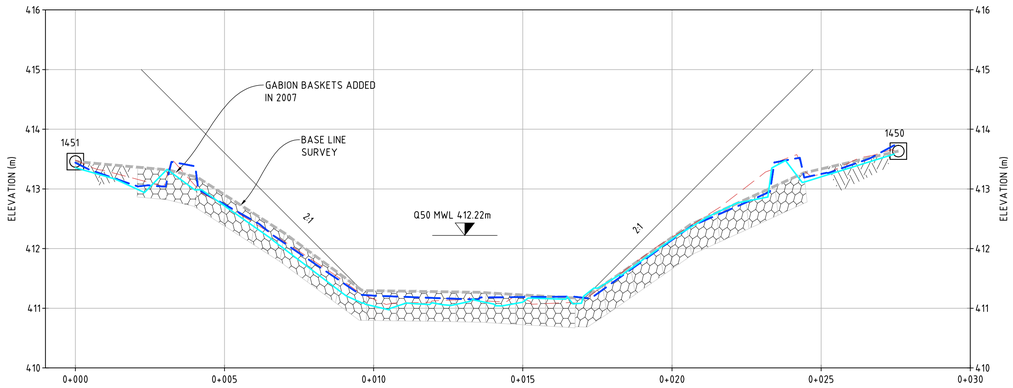
DROP STRUCTURE #1 END VIEW

SCALE: 1:100

CHANNEL CLOSURE MOVEMENT MONITOR (19mm ⌀ STEEL PIN) INSTALLED DURING 2006 SURVEY.

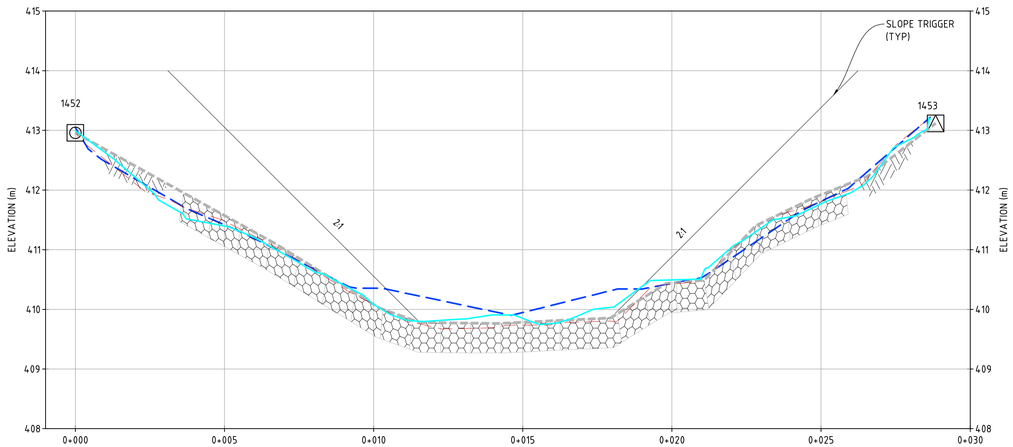
CHANNEL CLOSURE MOVEMENT MONITOR RE-ESTABLISHED IN 2012 (TYP.)

NOTE 1: GABION FILL REMOVED FROM THIS CELL OF THE DRAWDOWN WEIR IN 2007 TO FACILITATE DRAWING DOWN HUDGEON LAKE WATER LEVEL DURING LOW FLOW PERIODS.
NOTE 2: REFER TO AECOM's "FORMER CLINTON CREEK ASBESTOS MINE - EMERGENCY DROP STRUCTURE REPAIRS, CONSTRUCTION ACTIVITY REPORT, 2011" R94 FOR 2011 REPAIR DETAILS.



SECTION 1A

H 1:100 V 1:50



SECTION 1B

H 1:100 V 1:50

LEGEND

- BASELINE SURVEY (2006)
- 2016 SURVEYED GROUND
- 2014 SURVEYED GROUND
- 2012 SURVEYED GROUND

NOTES:

1. DIMENSIONS AND ELEVATIONS ARE IN METRES.
2. FREE BOARD TRIGGER SHOWN AT 300mm BELOW GABION BASKETS (REFER 2014 RECOMMENDATION DS-F).
3. FREEBOARD TRIGGER MEASURED FROM TOP OF BASKETS ADDED IN 2007.
4. Q50 MWL ESTIMATED USING 2016 SURVEYED GEOMETRY FLOW RATE OF 34CU.M/S AND CRITICAL FLOW DEPTH.

PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Nov. 02/16 10:32am

m 0 1 2 3 4 5 m
1:100

REV	DATE (DD-MMM-YY)	REVISION DESCRIPTION	DRAWN	DRAFT CHK	DESIGNED	ENG CHK	APPROVED	CUSTOMER	REF DRAWING No	REFERENCE DRAWING TITLE
C	05-DEC-16	ISSUED AS FINAL	RL	-	SJC	-	-	-		
B	04-NOV-16	ISSUED FOR CLIENT REVIEW	RL	-	SJC	-	-	-		
A	26-OCT-16	ISSUED FOR INTERNAL REVIEW	RL	-	SJC	-	-	-		

D SHEET | SCALE AS SHOWN

OneWay to zero harm

WORLEYPARSONS PROJECT No
307071-01132

ENGINEERING AND PERMIT STAMPS (As Required)

CUSTOMER

Yukon Government
Department of Energy, Mines and Resources
Assessment and Abandoned Mines

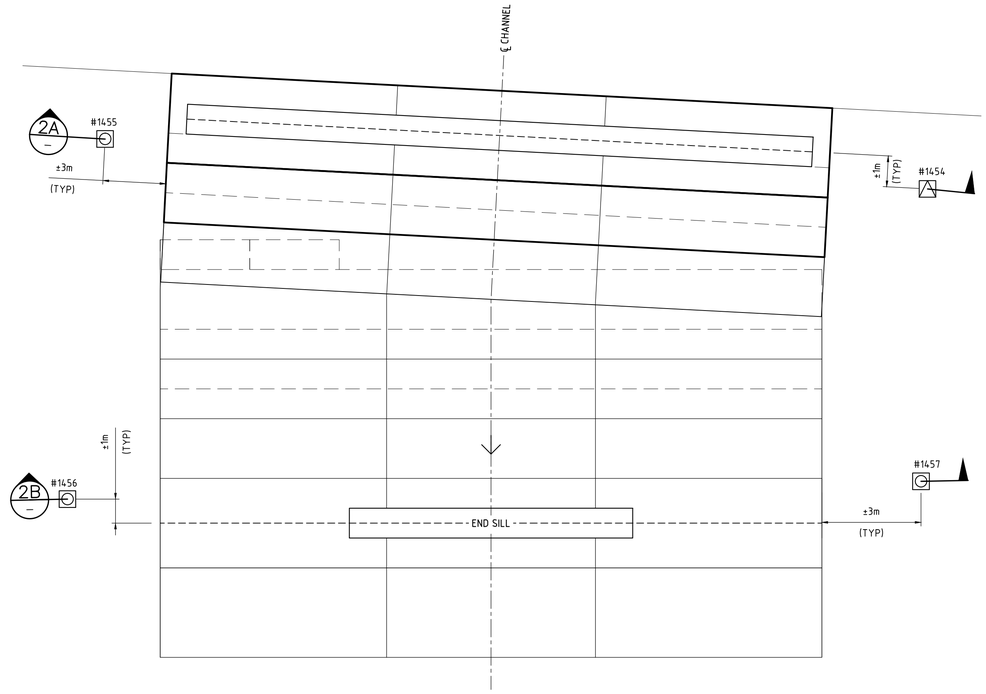
WorleyParsons resources & energy

CLINTON CREEK SITE
LONG TERM MONITORING PROGRAM (2016)
2016 - DROP STRUCTURE #1 MONITORING SECTIONS

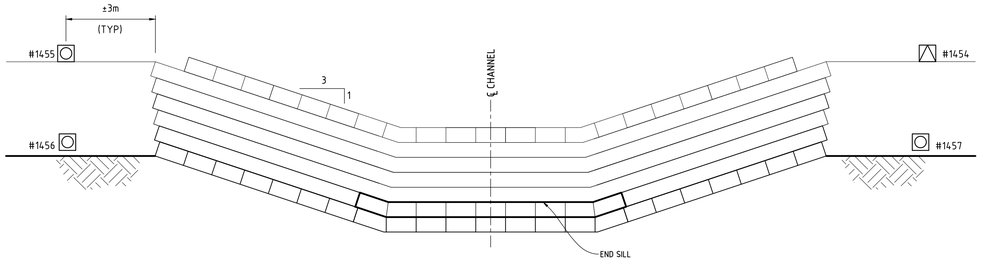
DRG No 307071-01132-00-CI-DSK-1007

REV C

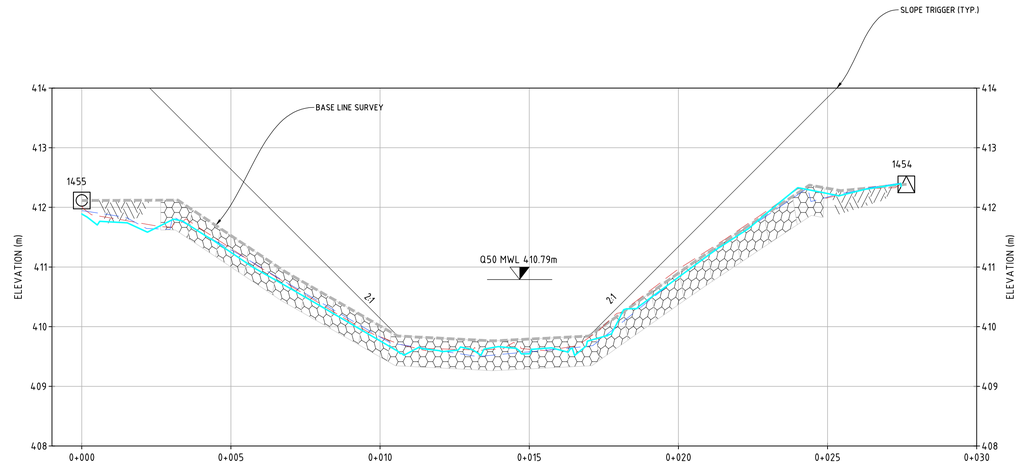
LOCATION: U:\YVR\307071\01132_YEMR_CC_16LTMP\11_DRAWINGS\01_CIVIL\307071-01132-00-CI-DSK-1007_1010.DWG
USER NAME: ryanlai
PLOT DATE & TIME: 5/12/2016 12:43:55 PM
SAVE DATE & TIME: 5/12/2016 12:41:46 PM



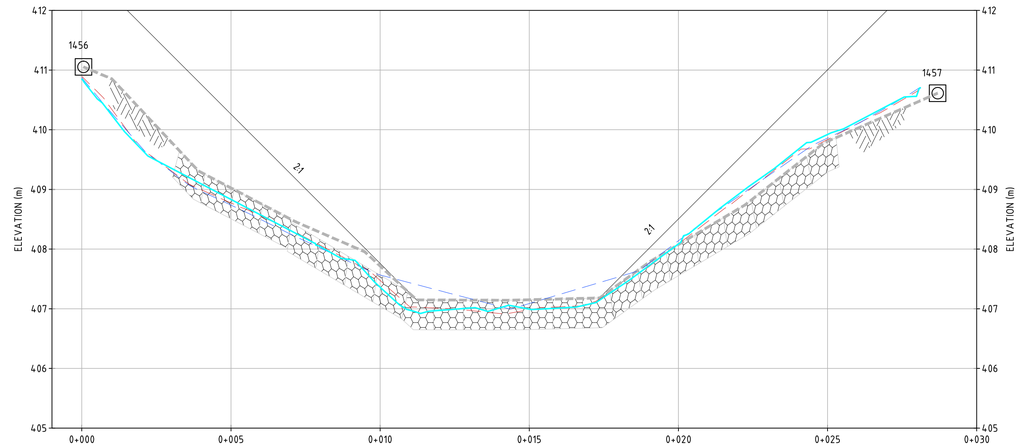
DROP STRUCTURE #2 PLAN VIEW
SCALE: 1:100



DROP STRUCTURE #2 END VIEW
SCALE: 1:100



SECTION 2A
H 1:100 V 1:50



SECTION 2B
H 1:100 V 1:50

LEGEND

- BASELINE SURVEY (2006)
- 2016 SURVEYED GROUND
- 2014 SURVEYED GROUND
- 2012 SURVEYED GROUND

CHANNEL CLOSURE MOVEMENT
MONITOR RE-ESTABLISHED IN 2012 (TYP.)

CHANNEL CLOSURE MOVEMENT
MONITOR (19mm ⌀ STEEL PIN)
INSTALLED DURING 2006 SURVEY.

NOTES:

1. DIMENSIONS AND ELEVATIONS ARE IN METRES.
2. REFER TO AECOM's "FORMER CLINTON CREEK ASBESTOS MINE - EMERGENCY DROP STRUCTURE REPAIRS, CONSTRUCTION ACTIVITY REPORT, 2011" FOR 2011 REPAIR DETAILS.
3. Q50 MWL ESTIMATED USING 2016 SURVEYED GEOMETRY FLOW RATE OF 34CU.M/S AND CRITICAL FLOW DEPTH.

PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Nov. 02/16 10:32am

m 0 1 2 3 4 5 m
1:100

REV	DATE (DD-MMM-YY)	REVISION DESCRIPTION	DRAWN	DRAFT CHK	DESIGNED	ENG CHK	APPROVED	CUSTOMER	REF DRAWING No	REFERENCE DRAWING TITLE
C	05-DEC-16	ISSUED AS FINAL	RL	-	SJC	-	-	-		
B	04-NOV-16	ISSUED FOR CLIENT REVIEW	RL	-	SJC	-	-	-		
A	26-OCT-16	ISSUED FOR INTERNAL REVIEW	RL	-	SJC	-	-	-		

D SHEET | SCALE AS SHOWN

OneWay to zero harm

WORLEYPARSONS PROJECT No
307071-01132

ENGINEERING AND PERMIT STAMPS (As Required)

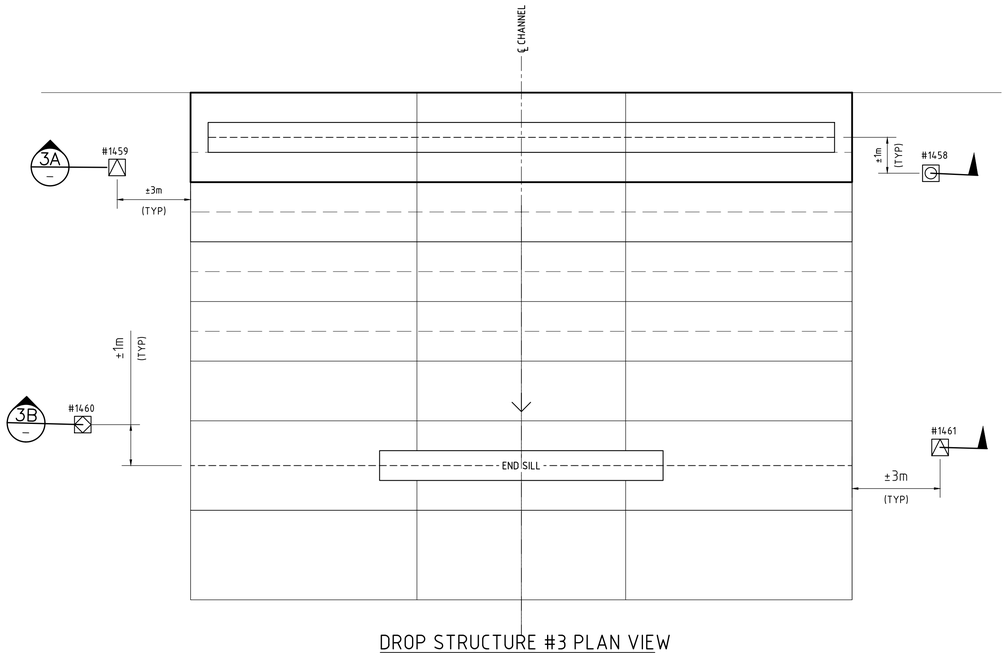
CUSTOMER
Yukon Government
Department of Energy, Mines and Resources
Assessment and Abandoned Mines

WorleyParsons resources & energy

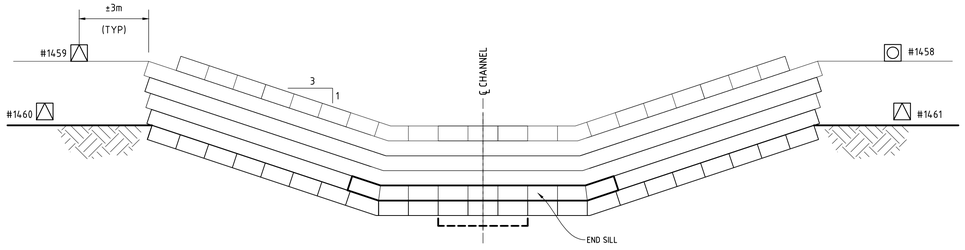
CLINTON CREEK SITE
LONG TERM MONITORING PROGRAM (2016)
2016 - DROP STRUCTURE #2 MONITORING SECTIONS

DRG No 307071-01132-00-CI-DSK-1008
REV C

LOCATION: U:\YVR\307071\01132_YEMR_CC_16LTMP\11_DRAWINGS\01_CIVIL\307071-01132-00-CI-DSK-1007-1010.DWG
USER NAME: ryan.lai
PLOT DATE & TIME: 5/12/2016 12:44:08 PM
SAVE DATE & TIME: 5/12/2016 12:41:46 PM



DROP STRUCTURE #3 PLAN VIEW
SCALE: 1:100

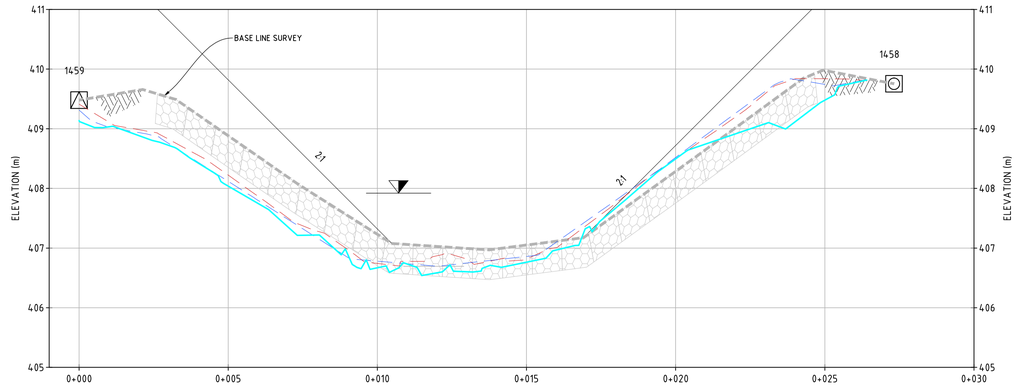


DROP STRUCTURE #3 END VIEW
SCALE: 1:100

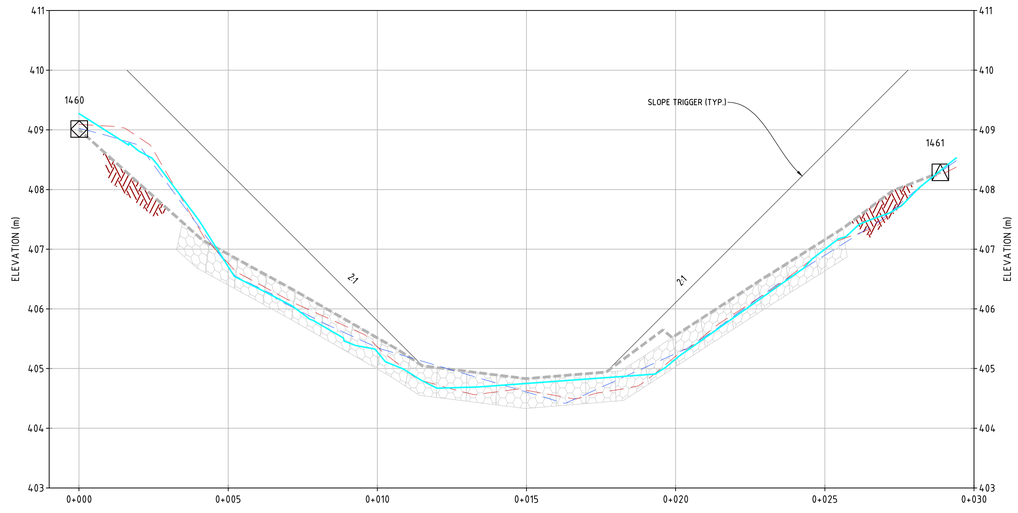
CHANNEL CLOSURE MOVEMENT
MONITOR RE-ESTABLISHED IN 2015 (TYP.)

CHANNEL CLOSURE MOVEMENT
MONITOR RE-ESTABLISHED IN 2012 (TYP.)

CHANNEL CLOSURE MOVEMENT
MONITOR (19mm Φ STEEL PIN)
INSTALLED DURING 2006 SURVEY.



SECTION 3A
H 1:100 V 1:50



SECTION 3B
H 1:100 V 1:50

LEGEND

- BASELINE SURVEY (2006)
- 2016 SURVEYED GROUND
- 2014 SURVEYED GROUND
- 2012 SURVEYED GROUND

NOTES:

1. DIMENSIONS AND ELEVATIONS ARE IN METRES.
2. REFER TO AECOM's "FORMER CLINTON CREEK ASBESTOS MINE - EMERGENCY DROP STRUCTURE REPAIRS, CONSTRUCTION ACTIVITY REPORT, 2011" FOR 2011 REPAIR DETAILS.
3. FREE BOARD TRIGGER SHOWN AT 300mm BELOW GABION BASKETS (REFER 2014 RECOMMENDATION DS-F).
4. Q50 MWL ESTIMATED USING 2016 SURVEYED GEOMETRY FLOW RATE OF 34CU.M/S AND CRITICAL FLOW DEPTH.

PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Nov. 02/16 10:32am

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1:100

REV	DATE (DD-MMM-YY)	REVISION DESCRIPTION	DRAWN	DRAFT CHK	DESIGNED	ENG CHK	APPROVED	CUSTOMER	REF DRAWING No	REFERENCE DRAWING TITLE
C	05-DEC-16	ISSUED AS FINAL	RL	–	SJC	–	–	–		
B	04-NOV-16	ISSUED FOR CLIENT REVIEW	RL	–	SJC	–	–	–		
A	26-OCT-16	ISSUED FOR INTERNAL REVIEW	RL	–	SJC	–	–	–		

D SHEET | SCALE AS SHOWN

OneWay to zero harm

WORLEYPARSONS PROJECT No
307071-01132

ENGINEERING AND PERMIT STAMPS (As Required)

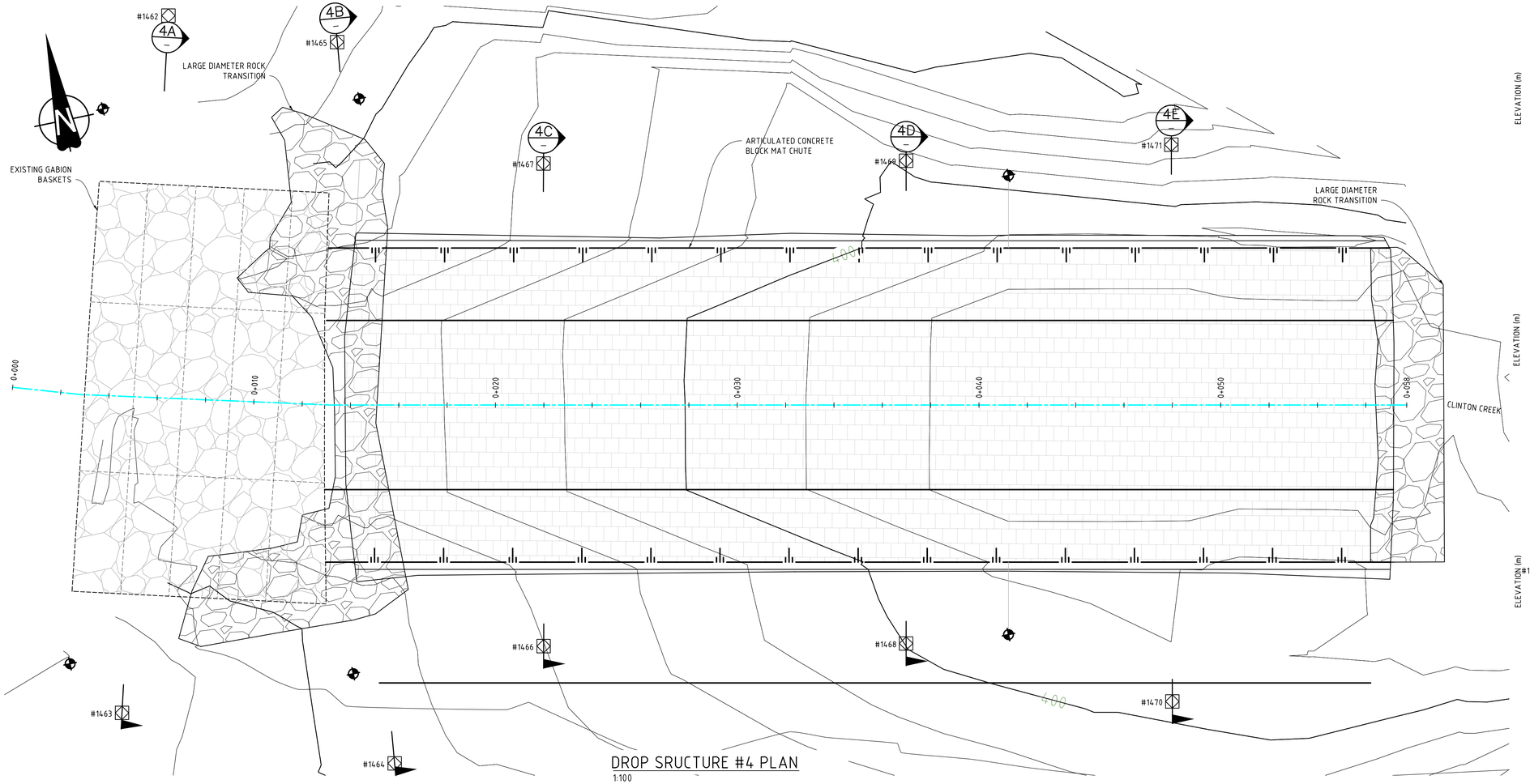
CUSTOMER
Yukon Government
Department of Energy, Mines and Resources
Assessment and Abandoned Mines

WorleyParsons resources & energy

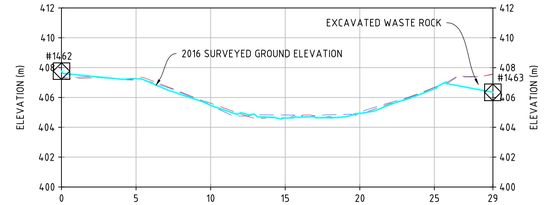
CLINTON CREEK SITE
LONG TERM MONITORING PROGRAM (2016)
2016 - DROP STRUCTURE #3
MONITORING SECTIONS

DRG No 307071-01132-00-CI-DSK-1009
REV C

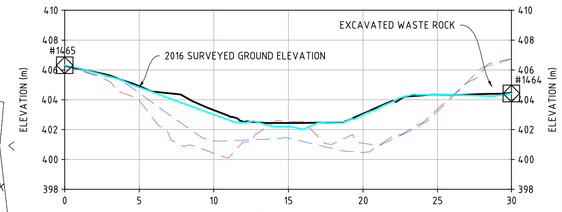
LOCATION: U:\YVR\307071\01132_YEMR_CC_16LTMP\11_DRAWINGS\01_CIVIL\307071-01132-00-CI-DSK-1009.DWG
USER NAME: ryan.lai
PLOT DATE & TIME: 5/12/2016 12:44:18 PM
SAVE DATE & TIME: 5/12/2016 12:41:46 PM



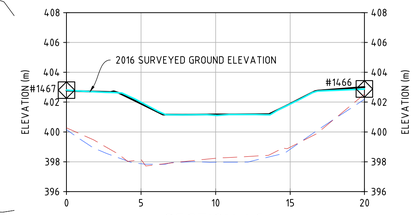
DROP SRUCTURE #4 PLAN
1:100



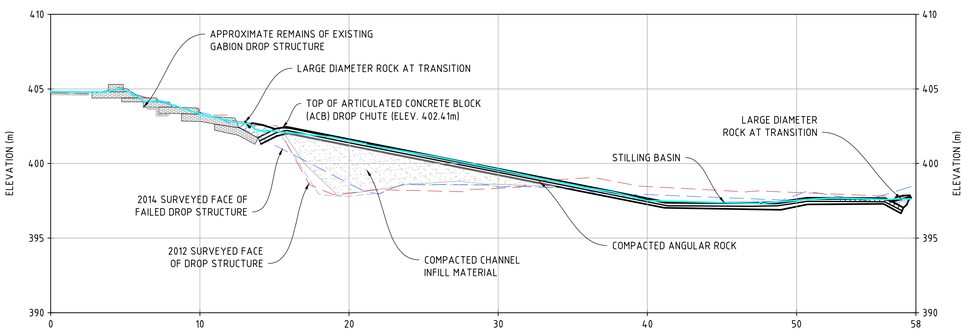
SECTION 4A
SCALE: 1:200



SECTION 4B
SCALE: 1:200



SECTION 4C
SCALE: 1:200



DROP STRUCTURE #4 PROFILE
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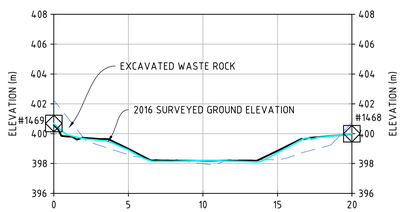
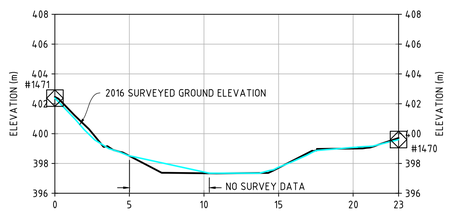


SECTION 4D
SCALE: 1:200



SECTION 4E
SCALE: 1:200

LEGEND
- 2016 SURVEYED GROUND
- 2014 SURVEYED GROUND
- 2012 SURVEYED GROUND
- 2015 AS-BUILT SURVEY
- TOP OF CHUTE CROSS-SECTION
- APPROXIMATE LOCATIONS OF FUTURE MONITORING POINTS
- CHANNEL CLOSURE MOVEMENT MONITOR INSTALLED IN 2016

NOTES:
1. DIMENSIONS AND ELEVATIONS ARE IN METRES.

PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Nov. 02/16 10:32am

m 0 1 2 3 4 5 m
1:100
m 0 5 10 m
1:200

REV	DATE (DD-MMM-YY)	REVISION DESCRIPTION	DRAWN	DRAFT CHK	DESIGNED	ENG CHK	APPROVED	CUSTOMER	REF DRAWING No	REFERENCE DRAWING TITLE
C	05-DEC-16	ISSUED AS FINAL	RL	-	SJC	-	-	-		
B	04-NOV-16	ISSUED FOR CLIENT REVIEW	RL	-	SJC	-	-	-		
A	26-OCT-16	ISSUED FOR INTERNAL REVIEW	RL	-	SJC	-	-	-		

D SHEET | SCALE AS SHOWN

OneWay to zero harm

WORLEYPARSONS PROJECT No
307071-01132

ENGINEERING AND PERMIT STAMPS (As Required)

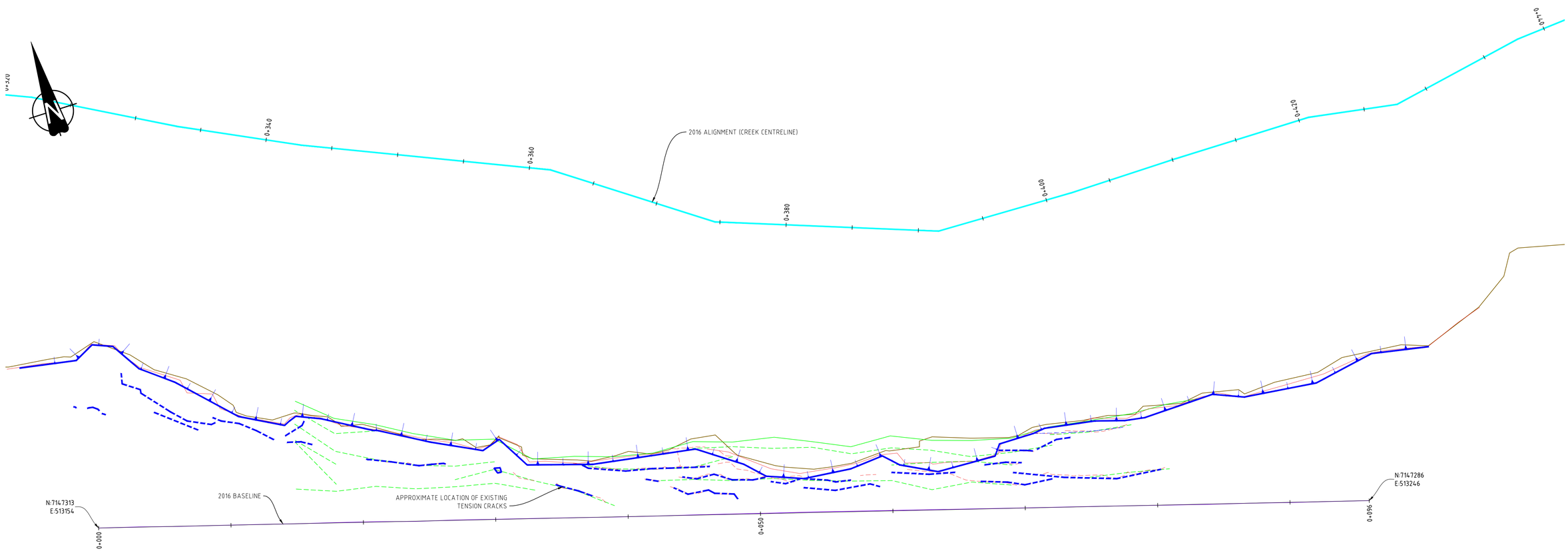
CUSTOMER
Yukon Government
Department of Energy, Mines and Resources
Assessment and Abandoned Mines

WorleyParsons resources & energy

CLINTON CREEK SITE
LONG TERM MONITORING PROGRAM (2016)
2016 - DROP STRUCTURE #4
MONITORING SECTIONS

DRG No 307071-01132-00-CI-DSK-1010
REV C

LOCATION: U:\YVR\307071\01132_YEMR_CC_16LTMP\11_DRAWINGS\01_CIVIL\307071-01132-00-CI-DSK-1007-1010.DWG
USER NAME: ryan.lai
PLOT DATE & TIME: 5/12/2016 12:44:30 PM
SAVE DATE & TIME: 5/12/2016 12:41:46 PM



2016 TENSION CRACKS PLAN

1:150

LEGEND

- 2016 TOP OF BANK
- 2015 TOP OF BANK
- 2014 TOP OF BANK
- 2012 TOP OF BANK
- 2016 TENSION CRACKS
- 2015 TENSION CRACKS
- 2012 TENSION CRACKS

NOTES:

1. DIMENSIONS AND ELEVATIONS ARE IN METRES.

PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Nov. 02/16 10:38am

m 0 1 2 3 4 5 10 m

1:150

REV	DATE (DD-MMM-YY)	REVISION DESCRIPTION	DRAWN	DRAFT CHK	DESIGNED	ENG CHK	APPROVED	CUSTOMER	REF DRAWING No	REFERENCE DRAWING TITLE
C	05-DEC-16	ISSUED AS FINAL	RL	-	SJC	-	-	-		
B	04-NOV-16	ISSUED FOR CLIENT REVIEW	RL	-	SJC	-	-	-		
A	26-OCT-16	ISSUED FOR INTERNAL REVIEW	RL	-	SJC	-	-	-		

D SHEET | SCALE 1:200

OneWay to zero harm

WORLEYPARSONS PROJECT No
307071-01132

ENGINEERING AND PERMIT STAMPS (As Required)

CUSTOMER

Yukon Government
Department of Energy, Mines and Resources
Assessment and Abandoned Mines

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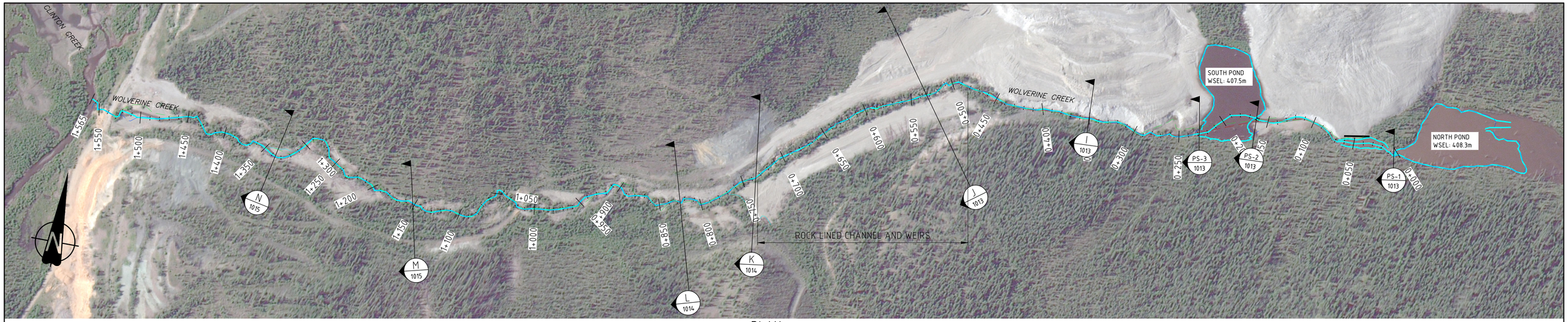
WorleyParsons resources & energy

CLINTON CREEK SITE
LONG TERM MONITORING PROGRAM (2016)
TENSION CRACKS PLAN

DRG No 307071-01132-00-CI-DSK-1011

REV C

LOCATION: U:\YVR\307071\01132_YEMR_CC_16LTMP\11_DRAWINGS\01_CIVIL\307071-01132-00-CI-DSK-1011.DWG
USER NAME: ryan.lai
PLOT DATE & TIME: 5/12/2016 1:14:59 PM
SAVE DATE & TIME: 2/11/2016 10:38:15 AM



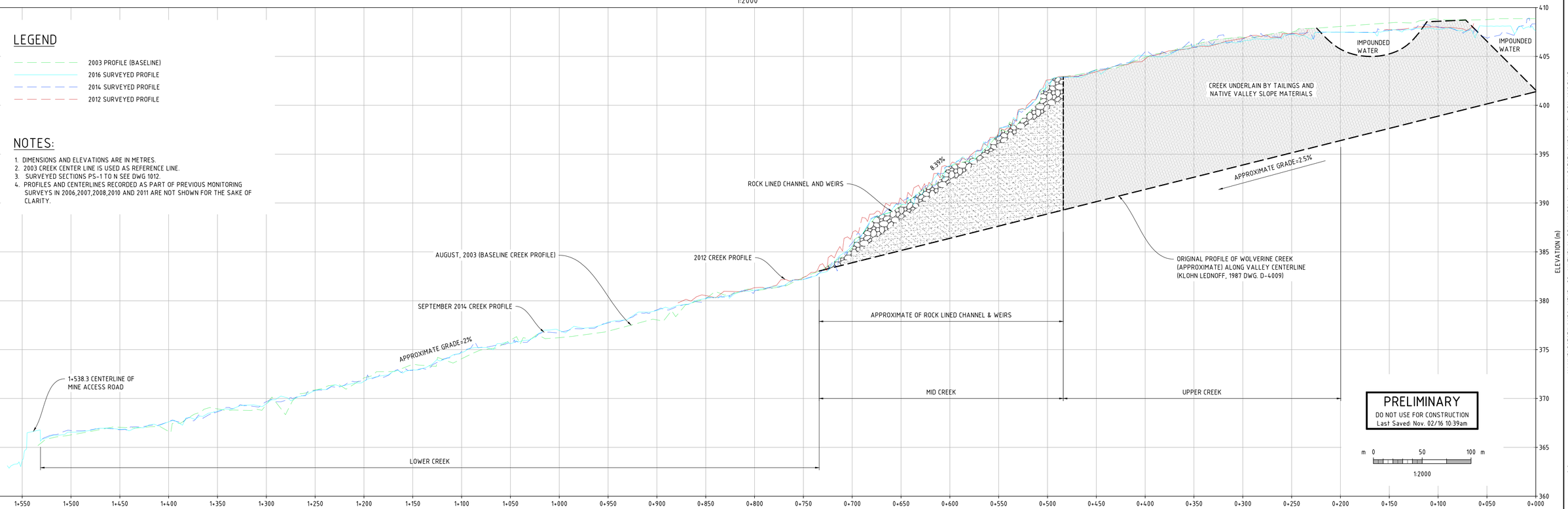
PLAN
1:2000

LEGEND

- 2003 PROFILE (BASELINE)
- 2016 SURVEYED PROFILE
- 2014 SURVEYED PROFILE
- 2012 SURVEYED PROFILE

NOTES:

1. DIMENSIONS AND ELEVATIONS ARE IN METRES.
2. 2003 CREEK CENTER LINE IS USED AS REFERENCE LINE.
3. SURVEYED SECTIONS PS-1 TO N SEE DWG 1012.
4. PROFILES AND CENTERLINES RECORDED AS PART OF PREVIOUS MONITORING SURVEYS IN 2006,2007,2008,2010 AND 2011 ARE NOT SHOWN FOR THE SAKE OF CLARITY.



PROFILE
H 1:2000 V 1:200

PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Nov. 02/16 10:39am

m 0 50 100 m
1:2000

REV	DATE (DD-MMM-YY)	REVISION DESCRIPTION	DRAWN	DRAFT CHK	DESIGNED	ENG CHK	APPROVED	CUSTOMER	REF DRAWING No	REFERENCE DRAWING TITLE
C	05-DEC-16	ISSUED AS FINAL	RL	-	SJC	-	-	-		
B	04-NOV-16	ISSUED FOR CLIENT REVIEW	RL	-	SJC	-	-	-		
A	26-OCT-16	ISSUED FOR INTERNAL REVIEW	RL	-	SJC	-	-	-		

D SHEET | SCALE AS SHOWN

OneWay to zero harm

WORLEYPARSONS PROJECT No
307071-01132

ENGINEERING AND PERMIT STAMPS (As Required)

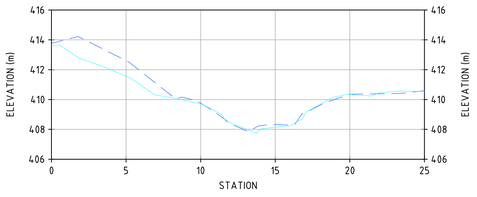
CUSTOMER
Yukon Government
Department of Energy, Mines and Resources
Assessment and Abandoned Mines

WorleyParsons resources & energy

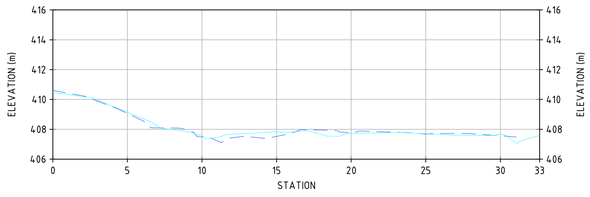
WOLVERINE CREEK SITE
LONG TERM MONITORING PROGRAM (2016)
WOLVERINE CREEK CENTERLINE PLAN AND PROFILE
STA 0+000 TO 0+800

DRG No 307071-01132-00-CI-DSK-1012
REV C

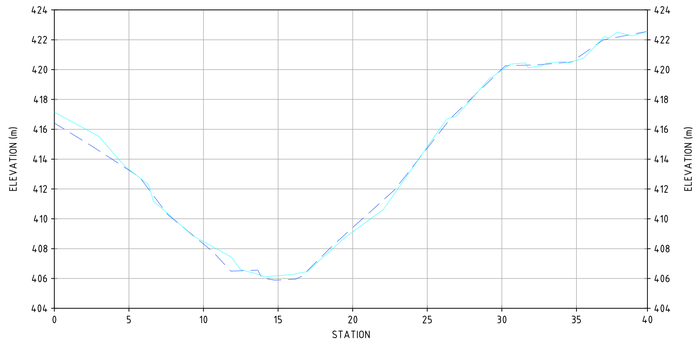
LOCATION: U:\YVR\307071\01132_YEMR_CC_16LTMP\11_DRAWINGS\01_CIVIL\307071-01132-00-CI-DSK-1012.DWG
USER NAME: ryan.lai
PLOT DATE & TIME: 5/12/2016 1:19:24 PM
SAVE DATE & TIME: 2/11/2016 10:39:57 AM



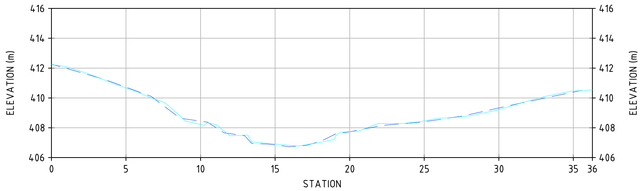
PS-1
1:200



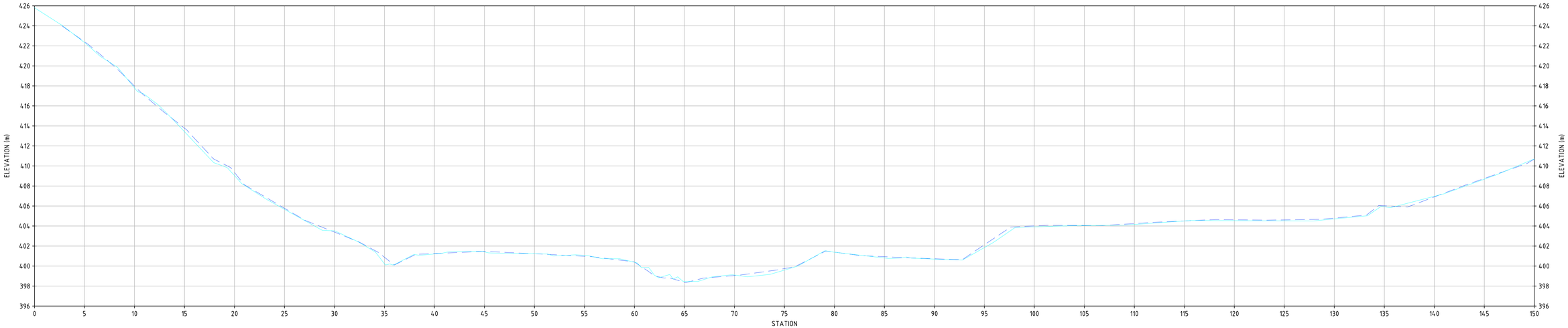
PS-2
1:200



SECTION I
1:200



PS-3
1:200



SECTION J
1:200

LEGEND

2016 SURVEYED PROFILE
2014 SURVEYED PROFILE

NOTES:

1. DIMENSIONS AND ELEVATIONS ARE IN METRES.

PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Nov. 02/16 10:41am

m 0 5 10 m
1:200

REV	DATE (DD-MMM-YY)	REVISION DESCRIPTION	DRAWN	DRAFT CHK	DESIGNED	ENG CHK	APPROVED	CUSTOMER	REF DRAWING No	REFERENCE DRAWING TITLE
C	05-DEC-16	ISSUED AS FINAL	RL	-	SJC	-	-	-		
B	04-NOV-16	ISSUED FOR CLIENT REVIEW	RL	-	SJC	-	-	-		
A	26-OCT-16	ISSUED FOR INTERNAL REVIEW	RL	-	SJC	-	-	-		

D SHEET | SCALE AS SHOWN

OneWay to zero harm

WORLEYPARSONS PROJECT No
307071-01132

ENGINEERING AND PERMIT STAMPS (As Required)

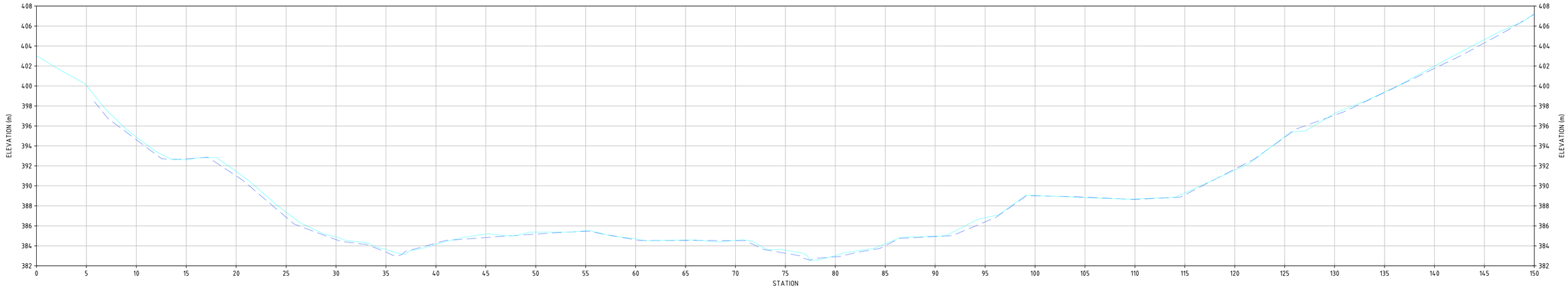
CUSTOMER
Yukon Government
Department of Energy, Mines and Resources
Assessment and Abandoned Mines

WorleyParsons resources & energy

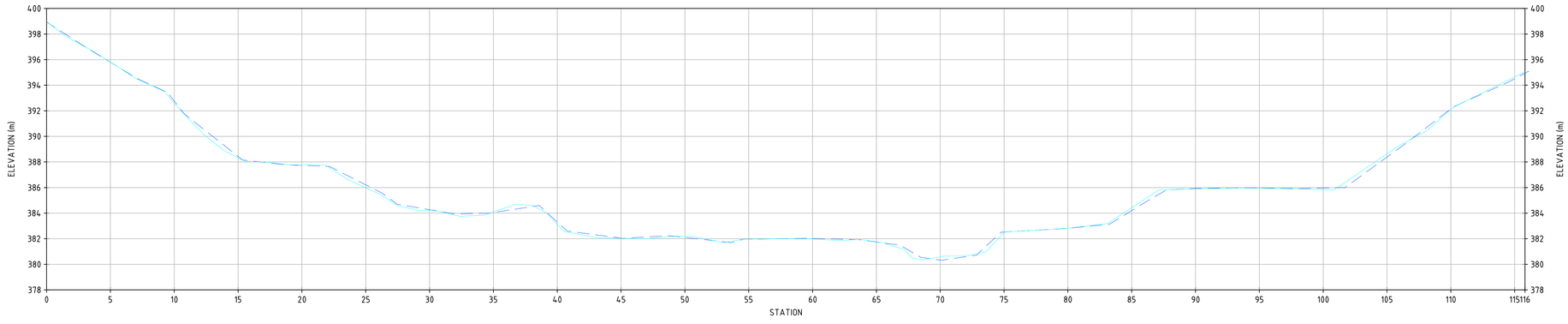
WOLVERINE CREEK SITE
LONG TERM MONITORING PROGRAM (2016)
WOLVERINE CREEK
SURVEYED SECTIONS

DRG No 307071-01132-00-CI-DSK-1013
REV C

LOCATION: U:\YVR\307071\01132_YEMR_CC_16\TMP\11_DRAWINGS\01_CIVIL\307071-01132-00-CI-DSK-1013-1015.DWG
USER NAME: ryanlai
PLOT DATE & TIME: 5/12/2016 12:4:38 PM
SAVE DATE & TIME: 5/12/2016 12:2:57 PM



SECTION K
1:200



SECTION L
1:200

LEGEND

2016 SURVEYED PROFILE
2014 SURVEYED PROFILE

NOTES:

1. DIMENSIONS AND ELEVATIONS ARE IN METRES.

PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Nov. 02/16 10:41am

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B	04-NOV-16	ISSUED FOR CLIENT REVIEW	RL	-	SJC	-	-	-		
A	26-OCT-16	ISSUED FOR INTERNAL REVIEW	RL	-	SJC	-	-	-		

D SHEET | SCALE AS SHOWN

OneWay to zero harm

WORLEYPARSONS PROJECT No
307071-01132

ENGINEERING AND PERMIT STAMPS (As Required)

CUSTOMER

Yukon
Government
Department of Energy, Mines and Resources
Assessment and Abandoned Mines

WorleyParsons resources & energy

WOLVERINE CREEK SITE
LONG TERM MONITORING PROGRAM (2016)
WOLVERINE CREEK
SURVEYED SECTIONS

DRG No 307071-01132-00-CI-DSK-1014 | REV C

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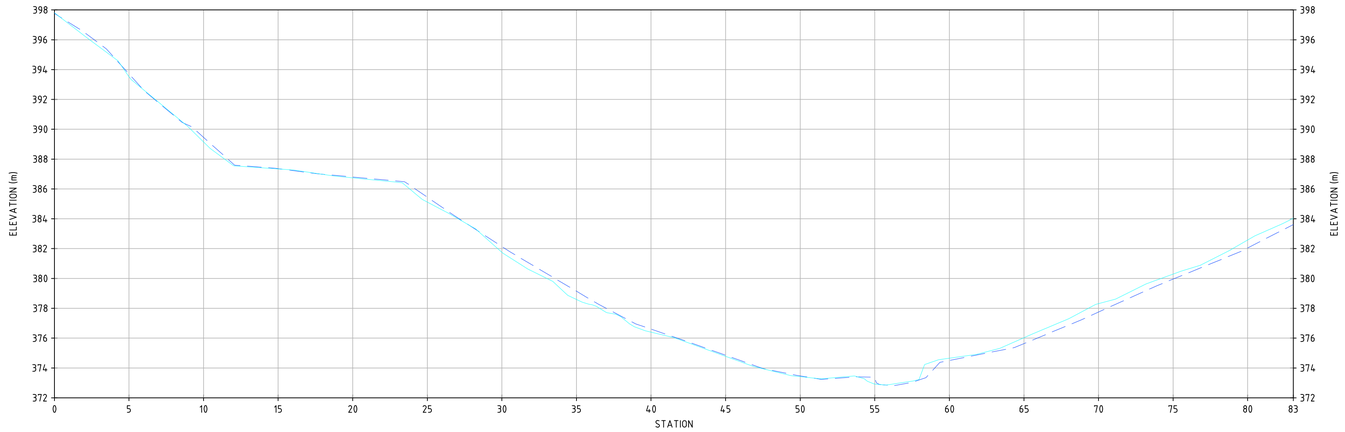

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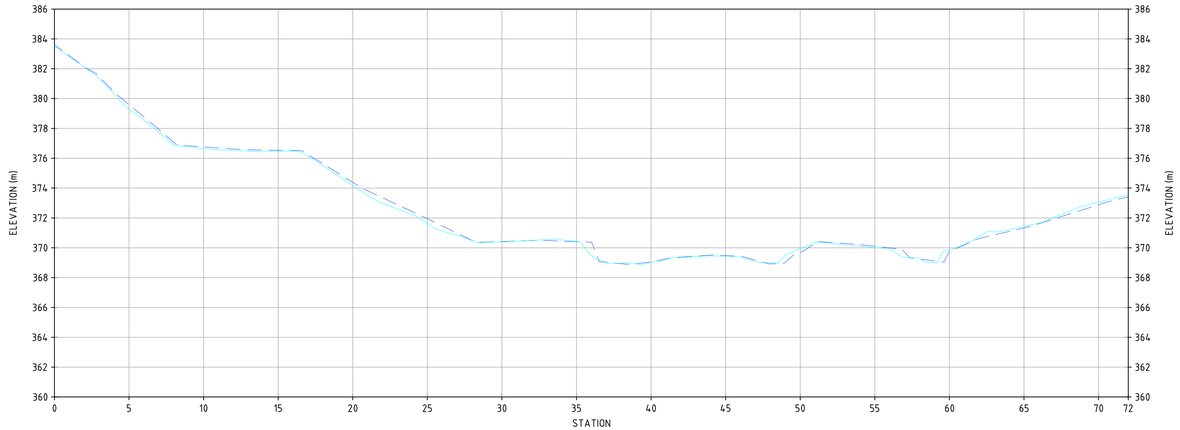

SECTION N
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LEGEND

2016 SURVEYED PROFILE

2014 SURVEYED PROFILE

NOTES:

1. DIMENSIONS AND ELEVATIONS ARE IN METRES.

PRELIMINARY
DO NOT USE FOR CONSTRUCTION
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B	04-NOV-16	ISSUED FOR CLIENT REVIEW	RL	-	SJC	-	-	-		
A	26-OCT-16	ISSUED FOR INTERNAL REVIEW	RL	-	SJC	-	-	-		

D SHEET | SCALE AS SHOWN

OneWay to zero harm

WORLEYPARSONS PROJECT No
307071-01132

ENGINEERING AND PERMIT STAMPS (As Required)

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Assessment and Abandoned Mines

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WOLVERINE CREEK SITE
LONG TERM MONITORING PROGRAM (2016)
WOLVERINE CREEK
SURVEYED SECTIONS

DRG No 307071-01132-00-CI-DSK-1015

REV C

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SAVE DATE & TIME: 5/12/2016 1:22:57 PM

PLAN VIEW - HUDGEON LAKE OUTLET
1:400

LEGEND:

- 2016 SEPTEMBER CREEK CENTRELINE
- 2014 SEPTEMBER CREEK CENTRELINE
- 2010 SEPTEMBER CREEK CENTRELINE
- 2010 JULY CREEK CENTRELINE
- 2016 SURVEYED TOP OF BANK
- 2016 SURVEYED WATERLINE (AVG. EL. = 411.71m)
- 2014 SURVEYED TOP OF BANK
- 2014 SURVEYED WATERLINE (AVG. EL. = 411.643m)

NOTES:

1. DIMENSIONS AND ELEVATIONS ARE IN METRES.

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B	04-NOV-16	ISSUED FOR CLIENT REVIEW	RL	-	SJC	-	-	-		
A	26-OCT-16	ISSUED FOR INTERNAL REVIEW	RL	-	SJC	-	-	-		

D SHEET | SCALE

OneWay to zero harm

WORLEYPARSONS PROJECT No
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WorleyParsons resources & energy

CLINTON CREEK SITE
LONG TERM MONITORING PROGRAM (2016)
HUDGEON LAKE OUTLET

DRG No 307071-01132-00-CI-DSK-1016

REV C

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Appendix 2 Tables

Table 1 Waste Rock Monitoring Pins Surveyed

Waste Rock Pin ID	2001	2003	2004	2005	2006	2007	2008	2010 (July)	2010 (Sept)	2011	2012	2014	2015	2016
4	X	X	X		X		X	X	X	X	X	X		X
19B	X	X	X				X	X	X	X	X	X		X
68	X	X	X		X	X	X	X	X	X	X	X		X
69	X	X	X		X		X	X	X	X	X	X		X
219	X	X	X		X		X	X	X	X	X	X		X
222	X	X	X		X		X	X	X	X	X	X		X
1194	X	X	X		X		X	X	X	X	X	X		X
1195	X	X	X		X	X	X	X	X	X	X	X	X	X
1196	X	X	X		X	X	X	X	X	X	X	X		X
20A	X	X	X		X	X	X	X	X	X	X	X		X
21A	X	X	X		X	X	X	X	X	X	X	X		X
22A	X	X	X		X	X	X	X	X	X	X	X		X
81-1	X	X	X		X		X	X	X	X	X	X	X	X
81-2	X	X	X		X	X	X	X	X	X	X	X		X
P3	X	X	X		X		X	X	X	X	X	X		X
P4	X	X	X		X		X	X	X	X	X	X		X
P5	X	X	X		X		X	X	X	X	X	X		X
223		X	X		X		X	X	X	X	X	X	X	X
224		X	X		X	X	X	X	X	X	X	X		X
225		X	X		X		X	X	X	X	X	X	X	X
227		X	X		X		X	X	X	X	X	X		X
229		X	X		X	X	X	X	X	X	X	X		X
1831		X	X		X	X	X	X	X	X	X	X		X
1834		X	X		X	X	X	X	X	X	X	X	X	X
80-13		X	X		X		X	X	X	X	X	X		X
XS-B		X	X		X		X	X	X	X	X	X		X
19A								X	X		X	X		X
BH-1									X		X	X		X

Waste Rock Pin ID	2001	2003	2004	2005	2006	2007	2008	2010 (July)	2010 (Sept)	2011	2012	2014	2015	2016
186											X	X	X	X
187											X	X		X
188											X	X		X
300											X	X	X	X
570											X	X		X
MM988											X	X		X
MM989											X	X		X
MM990											X	X		X
MM991											X	X		X
MM992											X	X		X
MM993											X	X		X
MM995											X	X		X
2836											X	X	X	X
BH-1 CABLE											X	X		X
BH-4											X	X	X	X
BH-4 CABLE											X	X	X	X
189												X		X
MR 4410													X	X
MR 4411													X	X
MR 4412													X	X
CC5														X
CC6														X
CC7														X
CC8														X
CC9														X
CC10														X
CC11														X
CC12														X

Waste Rock Pin ID	2001	2003	2004	2005	2006	2007	2008	2010 (July)	2010 (Sept)	2011	2012	2014	2015	2016
CC13														X
CC14														X
CC15														X

Table 2 Tailings Monitoring Pins Surveyed

Tailings Pin ID	2001	2003	2004	2005	2006	2007	2008	2010 (July)	2010 (Sept)	2011	2012	2014	2015	2016
24		X	X	X	X		X	X	X	X	X	X		X
26		X	X	X	X		X	X	X	X	X	X	X	X
1083		X	X	X	X		X	X	X	X	X	X		X
1084		X	X	X	X		X	X	X	X	X	X		X
1085		X	X	X	X		X	X	X	X	X	X		X
1483		X	X	X	X		X	X	X	X	X	X	X	X
1484		X	X	X	X		X	X	X	X	X	X		X
1485		X	X	X	X		X	X	X	X	X	X		X
1489		X	X	X	X		X	X	X	X	X	X		X
1491		X	X	X	X		X	X	X	X	X	X		X
1492		X	X	X	X		X	X	X	X	X	X		X
1495		X	X	X	X		X	X	X	X	X	X	X	X
24A		X	X	X	X		X	X	X	X	X	X		X
24B		X	X	X	X		X	X	X	X	X	X		X
24D		X	X	X	X		X	X	X	X	X	X		X
25B		X	X	X	X		X	X	X	X	X	X		X
26-A		X	X	X	X		X	X	X	X	X	X	X	X
350-1A		X	X	X	X		X	X	X	X	X	X		X
350-2A		X	X	X	X		X	X	X	X	X	X		X
350-3A		X	X	X	X		X	X	X	X	X	X		X
500-1		X	X	X	X		X	X	X	X	X	X		X
500-2		X	X	X	X		X	X	X	X	X	X		X

Tailings Pin ID	2001	2003	2004	2005	2006	2007	2008	2010 (July)	2010 (Sept)	2011	2012	2014	2015	2016
650-1		X	X	X	X		X	X	X	X	X	X		X
650-2		X	X	X	X		X	X	X	X	X	X		X
80-1		X	X	X	X		X	X	X	X	X	X	X	X
80-2		X	X	X	X		X	X	X	X	X	X	X	X
80-4		X	X	X	X		X	X	X	X	X	X		X
80-5		X	X	X	X		X	X	X	X	X	X		X
80-7		X	X	X	X		X	X	X	X	X	X		X
80-9		X	X	X	X		X	X	X	X	X	X		X
BH-14		X	X	X	X		X	X	X	X	X	X	X	X
BH-16 (T8)		X	X	X	X		X	X	X	X	X	X		X
NL-1			X	X	X		X	X	X	X	X	X		X
NL-3			X	X	X		X	X	X	X	X	X		X
NL-4			X	X	X		X	X	X	X	X	X		X
NL-5			X	X	X		X	X	X	X	X	X		X
SL-2			X	X	X		X	X	X	X	X	X		X
SL-3			X	X	X		X	X	X	X	X	X		X
2005-01				X	X		X	X	X	X	X	X		X
2005-02				X	X		X	X	X	X	X	X		X
2005-03				X	X		X	X	X	X	X	X		X
2005-04				X	X		X	X	X	X	X	X		X
2005-05				X	X		X	X	X	X	X	X		X
2005-06				X	X		X	X	X	X	X	X		X
NL-Base				X	X		X	X	X	X	X	X		X
2005-07					X		X	X	X	X	X	X		X
2005-08					X		X	X	X	X	X	X		X
2005-10					X		X	X	X	X	X	X		X
2005-11					X		X	X	X	X	X	X		X
SL-4					X		X	X	X	X	X	X		X
SL-5					X		X	X	X	X	X	X		X

Tailings Pin ID	2001	2003	2004	2005	2006	2007	2008	2010 (July)	2010 (Sept)	2011	2012	2014	2015	2016
NL-2							X	X	X		X	X		X
996											X	X		
SL-1												X		X
WC3														X
WC4														X
WC5														X
WC6														X
WC7														X

Table 3 Porcupine Pit Monitoring Pins Surveyed

Porcupine Pit Pin ID	2001	2003	2004	2005	2006	2007	2008	2010 (July)	2010 (Sept)	2011	2012	2014	2015	2016
1493		X	X		X		X	X	X	X	X	X		X
1830		X	X		X		X	X	X	X	X	X		X
1832		X	X		X		X	X	X	X	X	X		X
1837		X	X		X		X	X	X	X	X	X		X
1838		X	X		X		X	X	X	X	X	X		X
1839		X	X		X		X	X	X	X	X	X		X

Table 4 Snowshoe Pit Monitoring Pins Surveyed

Snowshoe Pit Pin ID	2001	2003	2004	2005	2006	2007	2008	2010 (July)	2010 (Sept)	2011	2012	2014	2015	2016
4413													X	
4414													X	

Table 5 Clinton Creek North Slope Monitoring Pins Surveyed

Clinton North Slope Pin ID	2001	2003	2004	2005	2006	2007	2008	2010 (July)	2010 (Sept)	2011	2012	2014	2015	2016
183												X		X
184												X		X
CC1														X
CC2														X
CC3														X
CC4														X

Table 6 Wolverine Creek East Slope Monitoring Pins Surveyed

Wolver. East Slope Pin ID	2001	2003	2004	2005	2006	2007	2008	2010 (July)	2010 (Sept)	2011	2012	2014	2015	2016
160												X		
163												X		
WC1														X
WC2														X

Table 7 Mill Area Monitoring Pins Surveyed

Mill Area Pin ID	2001	2003	2004	2005	2006	2007	2008	2010 (July)	2010 (Sept)	2011	2012	2014	2015	2016
WC8														X

Table 8 Drop Structures Monitoring Pins Surveyed

Drop Structures Pin ID	2001	2003	2004	2005	2006	2007	2008	2010 (July)	2010 (Sept)	2011	2012	2014	2015	2016
1450					X	X	X	X	X	X	X	X	X	X
1451					X	X	X	X	X	X	X	X	X	X
1452					X	X	X	X	X	X	X	X	X	X
1453											X	X	X	X
1454											X	X	X	X
1455					X	X	X	X	X	X	X	X	X	X
1456					X	X	X	X	X	X	X	X	X	X
1457					X	X	X	X	X	X	X	X	X	X
1458					X	X	X	X	X	X	X	X	X	X
1459											X	X	X	X
1460													X	X
1461											X	X	X	X
1462														X
1463														X
1464														X
1465														X
1466														X
1467														X
1468														X
1469														X
1470														X
1471														X

Appendix 3 Site Visit Photos

Site Access Roads – Section A: Top of the World Hwy to Forty Mile Bridge

Photo 1 **Washed out Culvert (looking at outlet) 500 m south of Forty Mile Bridge**

Site Access Roads – Section B: Forty Mile Bridge to Gate

Photo 2 **Typical Road Conditions**

Photo 3 **Washed out Culvert (looking at outlet) 5 km from the Forty Mile Bridge**

Photo 4 **Washed out Culvert (looking at outlet) 5 km from the Forty Mile Bridge**

Site Access Roads – Section C: Gate to Ford Crossing No 2

Photo 5 **Fording No. 1 looking north**

Photo 6 **Typical Road Conditions (looking west towards closed road)**

Photo 7 Wolverine Creek low flow culvert, inlet – lodged debris

Site Access Roads – Section D: Ford Crossing No. 2 to Former Mill Site

Photo 8 **Fording No. 2 looking south**

Closed Portion of Access Road

Photo 9 **Closed access road looking west – slope continues to slide into Clinton Creek**

Hugdeon Lake Outlet

Photo 10 **Rusted Metal at Lake Outlet**

Photo 11 **Level logger and staff gauge installed in Hudgeon Lake in 2015**

Log Booms

Photo 12 **North Boom Abutment, looking south**

Photo 13 **North Boom Abutment, cracks in soil around abutment**

Photo 14 **South Boom Abutment, looking west**

Photo 15 **Log Booms**

Photo 16 **Log Boom End – Cracking Seal**

Drop Structures 1 to 3

Photo 17 **Drop Structure 1, looking south**

Photo 18 **Drop Structure 2, looking south**

Photo 19 Drop Structure 3, looking south

Drop Structure 4

Photo 20 **Drop Structure 4, looking south**

Photo 21 **DS4 Repair – ACB Channel looking west**

Photo 22 **DS4 Repair – ACB Channel looking south at Mats 4, 5 and 6 from top**

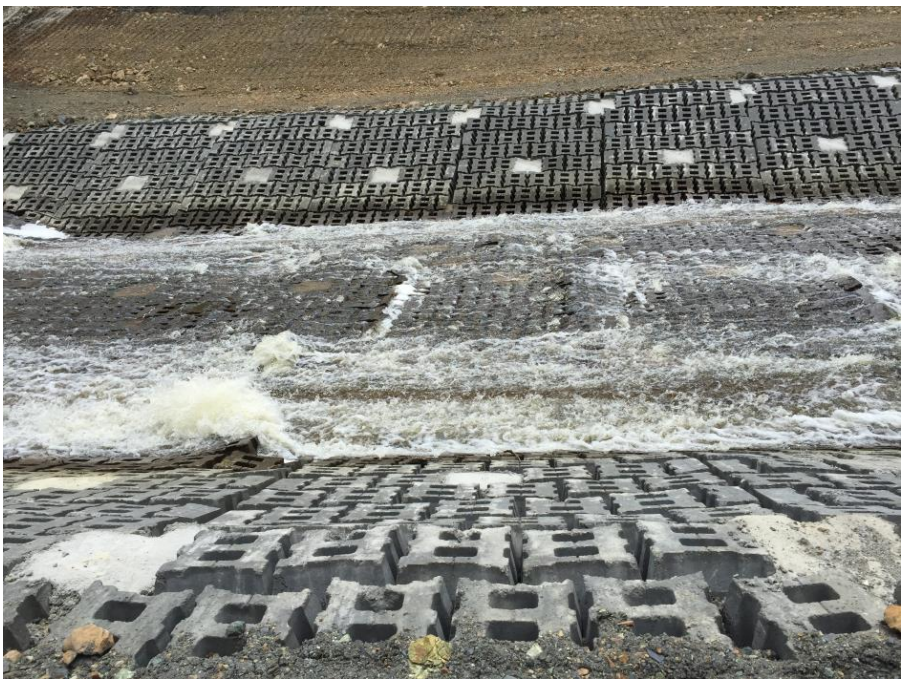

Photo 23 **DS4 Repair – ACB Channel looking south at Mats 6, 7, 8 and 9 from top**

Photo 24 **DS4 Repair – ACB Channel looking southeast at Stilling Basin**

Photo 25 **DS4 Repair – ACB channel looking north at outlet**

Photo 26 DS4 repair – ACB channel Anchor Trench

Clinton Creek Channel

Photo 27 **Downstream of DS4, looking downstream**

Photo 28 **Closed portion of Access Road, looking upstream**

Photo 29 **Minor Slope Failure, looking north**

Photo 30 **Between closed road and Fording No. 1, looking downstream – failed slope encroaching on creek**

Photo 31 Upstream of Fording No. 1, looking upstream

Photo 32 Confluence with Wolverine Creek, looking upstream

Clinton Creek Waste Rock Pile

Photo 33 **Stabilized Slope south of DS4, looking west**

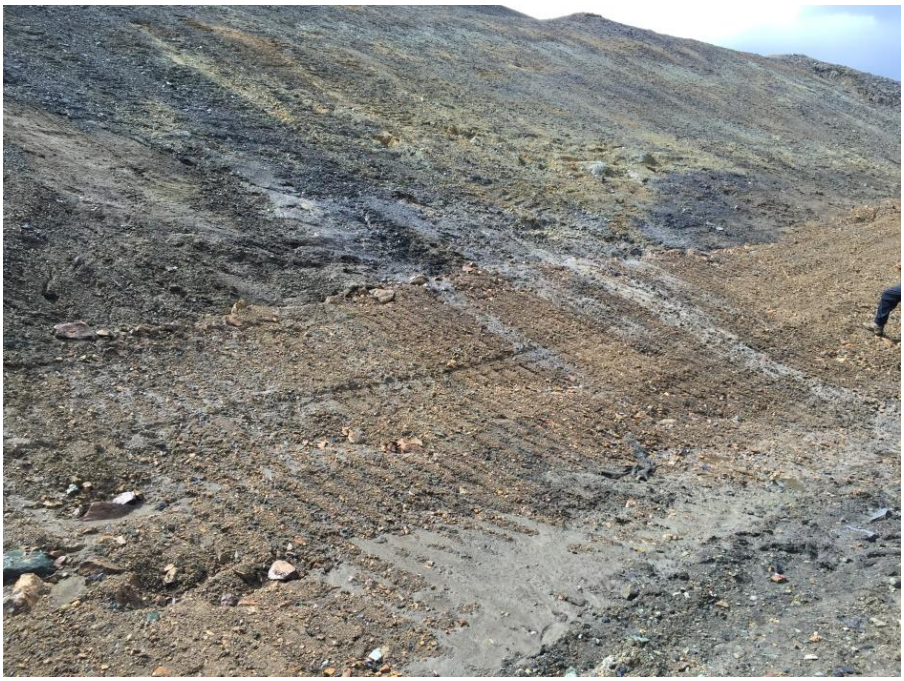

Photo 34 **Groundwater Seep at 2015 permafrost location (Slope south of DS4)**

Photo 35 **Cracks in soil at crest of slope south of Fording No. 1**

Photo 36 **Erosion of slope south of Fording No. 1, delta of eroded sediment**

Wolverine Creek Channel

Photo 37 **Lower Wolverine Creek looking downstream**

Photo 38 **Mid Wolverine Creek looking upstream – rock weirs**

Photo 39 **Upper Wolverine Creek looking downstream (South lobe)**

Photo 40 **Wolverine South Pond looking north**

Wolverine Ponds

Photo 41 **Wolverine North and South Ponds looking east**

Wolverine Creek Tailings Pile

Photo 42 **Tailings Pile Panorama from base of slope**

Photo 43 **Tailings Pile looking west near Wolverine Creek (South lobe)**

Photo 44 **Tailings Pile looking south at Wolverine Creek (South lobe)**

Photo 45 **Concentrated asbestos fibres at surface of tailings near Wolverine Creek**

Porcupine Pit

Photo 46 **Porcupine Pit looking south**

Photo 47 **Porcupine Pit looking south**

Snowshoe Pit

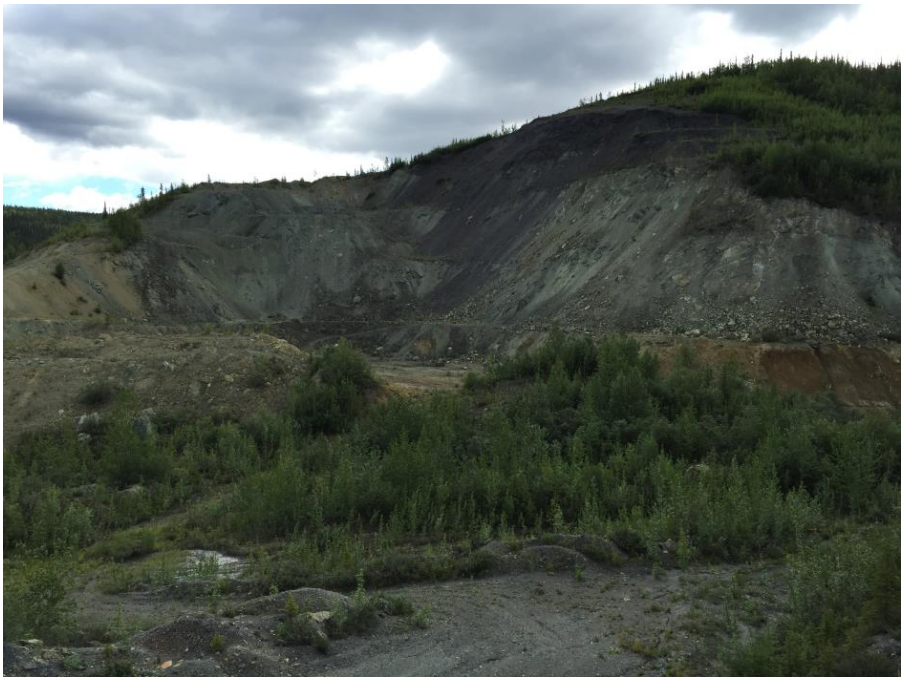

Photo 48 **Snowshoe Pit looking southeast**

Appendix 4 2016 LTPMP Survey Field Plan

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WorleyParsons Group

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07 July 2016

Steven Kromhout
Government of Yukon
Energy, Mines and Resources
Assessment and Abandones Mines
#2C, 4114-4th Avenue
P.O. Box 2703 (K-419)
Whitehorse, YT
Y1A 2C6 Canada

Dear Mr. Kromhout

CLINTON CREEK SURVEY FIELD PLAN

1. Introduction

As part of the Clinton Creek Long Term Geotechnical Monitoring Program (the Project), Energy, Mines and Resources: Assessment and Abandoned Mines (AAM) has requested that WorleyParsons Canada Services Ltd. (WorleyParsons) prepare a Survey Field Plan to support the completion of a field survey program (the Survey) to be undertaken by a Surveyor contracted to AAM. The Field Plan outlines the following elements of the Survey:

- Clinton Creek site components to be surveyed, including:
  - Description of the site component
  - Approximate location including coordinates where applicable
  - Definition of the survey information required specific to each component
- Survey benchmarks and monuments to be installed or replaced;
- Level of accuracy;
- Checklist; and
- Reporting.

2. Survey Control

To facilitate the collection of survey data using remote receivers (rovers), the following base stations have been established at Control Point Nos. 3,819 or 2,834, depending on the portion of the site being surveyed. The coordinates of the stable Control Station Nos. 1,086 and 1,192 can be held by the base station to continuously derive its coordinates using a least square adjustment of global positioning system (GPS) observations. The coordinates of the control points and control stations are presented in Table 1 (below).

Identification (ID)	Northing (m)	Easting (m)	Orthometric Height (metres above sea level [masl])
Base Stations			
No. 2834	7,148,172.671	513,447.756	606.786
No. 2835	7147272.805	513147.046	432.648
No. 3819	7,147,223.092	513,111.927	441.839
No. 3820	7,147,930.492	513,981.157	402.884
Control Stations			
No. 1086	7,147,972.219	513,176.710	590.955
No. 1192	7,147,563.984	512,278.758	441.231

1 Control Coordinates

3. New and replacement Monitoring Points

The following new monitoring points must be established in 2016 (Table 2):

- DS4 replacement monitoring points 1462 to 1465, and new monitoring points 1466 to 1471.
- Additional monitoring points on the Clinton Creek north valley slope and the Wolverine Creek east valley slope.
- Monitoring points on the northwest area of the Wolverine Creek Tailings Pile.
- Additional monitoring points along the central and east areas of the Clinton Creek Waste Rock Pile.

Table 2 (below) indicates the approximate coordinates for the proposed new and replacement Monitoring Points. Final monitoring point locations are to be confirmed on-site.

PIN ID	Northing (m)	Easting (m)	Location Description
CC 1	7,147,451.56	512,970.43	North valley slope of Clinton Creek
CC 2	7,147,390.14	513,136.22	North valley slope of Clinton Creek
CC 3	7,147,343.79	513,301.64	North valley slope of Clinton Creek
CC 4	7,147,300.83	513,387.17	North valley slope of Clinton Creek
CC 5	7,147,187.89	513,300.96	Central/East areas of Clinton Creek Waste Rock Pile
CC 6	7,147,079.24	513,219.22	Central/East areas of Clinton Creek Waste Rock Pile
CC 7	7,146,989.37	513,139.00	Central/East areas of Clinton Creek Waste Rock Pile
CC 8	7,146,904.58	513,172.00	Central/East areas of Clinton Creek Waste Rock Pile
CC9	7,146,993.64	513,615.53	Central/East areas of Clinton Creek Waste Rock Pile
CC10	7,146,917.99	513,788.91	Central/East areas of Clinton Creek Waste Rock Pile

PIN ID	Northing (m)	Easting (m)	Location Description
WC 1	7,148,394.43	514,021.58	East valley slope of Wolverine Creek
WC 2	7,148,097.95	514,038.87	East valley slope of Wolverine Creek
WC 3	7,148,315.35	513,399.28	NW area of the Wolverine Creek Tailings Pile
WC 4	7,148,436.08	513,403.37	NW area of the Wolverine Creek Tailings Pile
WC 5	7,148,542.65	513,396.99	NW area of the Wolverine Creek Tailings Pile
WC 6	7,148,391.06	513,323.24	NW area of the Wolverine Creek Tailings Pile
WC 7	7,148,494.28	513,248.30	NW area of the Wolverine Creek Tailings Pile
WC8	7,148,133.07	513,108.09	Mill Site
1462	7,147,401.86	513,033.71	DS4 Replacement Point
1463	7,147,374.04	513,026.00	DS4 Replacement Point
1464	7,147,369.71	513,036.58	DS4 Replacement Point
1465	7,147,399.42	513,040.34	DS4 Replacement Point
1466	7,144,373.21	513,043.62	DS4 New Monitoring Point
1467	7,147,392.78	513,047.66	DS4 New Monitoring Point
1468	7,147,370.28	513,058.33	DS4 New Monitoring Point
1469	7,147,389.80	513,062.36	DS4 New Monitoring Point
1470	7,147,368.02	513,069.10	DS4 New Monitoring Point
1471	7,147,387.56	513,073.13	DS4 New Monitoring Point

2 New Monitoring Points

4. Site Components

The Survey is comprised of the site components presented in Table 3 (below) and shown on Sketch Nos. 001, 002, 003 and 004 included as Appendix 1.

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Component	Description	Approximate Location(s)	Required Survey Information
Clinton Creek access road	Tension cracks located along the access road	Downstream of Drop Structure No. 4	1) Coordinates (northing, easting, elevation (NEZ)) at either end of the tension cracks or significant changes in direction of the tension crack (i.e., >30 deg. Bend in crack). 2) Photos of the cracks. 3) Any comments regarding the cracks (e.g., distance from edge approximate width and depth). 4) Offset points can be used if slope appears unstable. 5) 2012 baseline coordinates at each stake (NEZ).
Hudgeon Lake outlet	The lake water level and log boom location	The upstream end of Clinton Creek (70m upstream of Drop Structure No. 1)	1) Top of bank freeboard coordinates at minimum of five locations (NEZ). 2) Lake water elevation with a corresponding shot on and reading of the water level gauge located north of the outlet and top-of-bank freeboard. 3) Detailed pickup of log boom abutment including (but not limited to): extents of rock armouring, feature points of abutment structures, and top of bank abutments. 4) Comments regarding the condition of the abutment infrastructure including visible damage, debris collection or erosion.
Gabion Drop Structure Nos. 1, 2 and 3	Survey of drop structures and associated slope monitors installed along the channel banks	Stations 0+030, 0+120, and 0+155	1) Cross-sections (across the channel) between slope monitor pin Nos. 1,450 to 1,461 including identification of all break points, including: channel centreline, toe of bank, top of bank, and edge of baskets. 2) Survey ground level at the base of the pin on the side of the pin furthest from the creek. 3) Photos of the slope monitors. 4) Comments regarding the condition of the slope monitors

Component	Description	Approximate Location(s)	Required Survey Information
			(e.g., vertical or horizontal displacement) and gabion baskets (e.g. signs of erosion above gabion baskets, damaged gabion baskets, debris).
Gabion and Concrete Mat Drop Structure No. 4	Detailed topographic survey of the drop structure and associated slope monitors installed along the channel banks	210 m downstream of Hudgeon Lake outlet	1) Minimum of five cross-sections should be surveyed on DS4. Two cross-sections should be located on the gabions and three cross-sections on the Armorflex mats. 2) Cross-sections on the gabions should be at the upstream and downstream end of the gabions. Cross sections should extend either 10 m beyond the north and south extents of the existing gabion baskets or to top of bank, whichever is greater, and including cross-sections between slope monitor pins Nos. 1,462 to 1465. Shots to be taken at top of the slope, mid-slope, bottom of slope, centreline and at the top of every course of gabion basket. (NEZ). 3) Cross sections on the Armorflex mats should be taken between slope monitor pins Nos. 1,466 to 1471. Cross sections should extend from the toe of the natural slope on the north side of the channel to the crest of the stabilized waste rock slope on the south side of the channel (if accessible) and should include: all break points (e.g. crest of slope, toe of slope), shots every 1 m in the channel (top of concrete blocks) and every 5 m outside the channel, or better. 4) Photos looking across the channel corresponding to the cross-section location. 5) Profile surveys along top and bottom of gabion slope on both sides of the channel extending 20 m beyond the east and west extents of the existing gabion baskets and Armorflex channel.. Shots to be taken every 5 m (minimum) and at significant break points (i.e. grade change 5%) (NEZ). 6) Additional break lines defining significant topographic or infrastructure features (e.g., start of drop structure chute, damaged gabion baskets, etc.) (NEZ). 7) Photos looking upstream and downstream taken at the

Component	Description	Approximate Location(s)	Required Survey Information
			upstream and downstream ends of Drop Structure No. 4. 8) Comments regarding the condition of the slope monitors (e.g., vertical or horizontal displacement) and gabion baskets (e.g. signs of erosion above gabion baskets, damaged gabion baskets, debris). 9) Survey ground level at the base of the pin on the side of the pin furthest from the creek. 10) Photos of slope monitors.
Clinton Creek Channel Profile	Profile survey of the Clinton Creek channel invert	First ford to Hudgeon Lake (0+020 to 1+000)	1) Profile survey along the centre of the channel (or deepest part of the channel). Shots to be taken every 10 m, at significant grade breaks (5%), and at channel bends (15% change of direction). 2) Photos taken every 50 m and at significant grade breaks and channel bends. 3) Comments regarding the condition of the creek channel (e.g., erosion/failure of the north and south slopes, debris, blockages).
Clinton Creek Channel Cross-sections	Cross-sectional survey of the Clinton Creek channel	A. Immediately downstream of Drop Structure No.2 (Station 0+120) B. Immediately downstream of Drop Structure No.3 (Station 0+155) C. Immediately downstream of Drop Structure No.4 (Station 0+210) D. 250 m downstream of Gabion Drop Structure No.4 (Station 0+450) E. 360 m downstream of Gabion Drop Structure No.4 (Station 0+560) F. 200 m downstream of Gabion Drop Structure No.4 (Station	1) Cross-sectional survey extending to the top of the bank on the north side of the channel and the 420 m contour (approximately) on the south side of the channel. Shots to be taken every 5 m (minimum), and at significant grade breaks (5%) and prominent topographic features (e.g. top of the slope, mid-slope, bottom of slope and creek centreline) (NEZ). 2) Photos taken looking across the channel corresponding to the cross-section location. 3) Comments regarding the condition of the channel (e.g., signs of erosion, debris, or blockage), the access road (e.g. signs of erosion, tension cracks, or slope failures) along the cross-section. 4) Offset points can be used if slope appears to be unstable.

Component	Description	Approximate Location(s)	Required Survey Information
		0+350)	
Clinton Creek Waste Rock Pile	Survey of waste rock pile monitors	Throughout the waste rock dump	1) Slope monitor pin coordinates (NEZ). 2) Survey ground level at the base of the pin on the side of the pin furthest from the creek.
Clinton Creek natural slope	Survey of new/existing slope monitor pins located on north slope of Clinton Creek channel	Opposite waste rock pile slope	1) Slope monitor pin coordinates (NEZ). 2) Survey ground level at the base of the pin on the side of the pin furthest from the creek. 3) Location of new monitor pins discussed in Section 3.
Porcupine Pit	Survey of Porcupine Pit slope monitors	300 m east of the impounded water at the bottom of porcupine pit	1) Slope monitor pin coordinates (NEZ). 2) Survey ground level at the base of the pin on the side of the pin furthest from the creek.
Wolverine Creek Tailings Pile	Survey of tailings pile slope monitors	Throughout the tailings pile slope	1) Slope monitor pin coordinates (NEZ). 2) Survey ground level at the base of the pin on the side of the pin furthest from the creek.
Wolverine Creek tailings pile ponds	Survey of the extents of the Wolverine Creek ponds	Below the Wolverine Creek tailings pile (1,200 m upstream of the confluence with Clinton Creek)	1) Pond extents (i.e., outer boundary of standing water in the ponds) (NEZ). 2) Cross-section at the pond outlets, including the tops of slope, bottoms of slope, and centreline.
Wolverine Creek channel profile	Profile survey of the Wolverine Creek channel invert	From tailings ponds to confluence with Clinton Creek (approximately 1,300 m)	1) Profile survey along the centre of the channel (or deepest part of the channel). Shots to be taken every 10 m (minimum), at rock weirs (upstream and downstream), at significant grade breaks (>5%), and at channel bends (>15% change of direction). 2) Photos taken every 50 m and at significant grade breaks and channel bends. 3) Comments regarding the conditions of the creek channel (e.g., erosion/failure of the east and west slopes, damage to rock weirs, debris, blockages).

Component	Description	Approximate Location(s)	Required Survey Information
Wolverine Creek cross-sections	Cross-sectional survey of the Wolverine Creek channel	Every 200 m (Stations 0+200 to 1+200) from tailings pile ponds to confluence with Clinton Creek	1) Cross-sectional survey extending to the top of the bank on the undisturbed natural slopes to the east and west of the Wolverine Creek channel. Shots to be taken every 5 m (minimum), and at significant grade breaks (5%) and prominent topographic features (e.g. top of the slope, mid-slope, bottom of slope and creek centreline) (NEZ). 2) Photos taken looking across the channel corresponding to the cross-section location. 3) Comments regarding the condition of the channel (e.g., signs of erosion, debris, or blockage). 4) Offset points can be used if slope appears to be unstable. 5) Cross-section locations are to be selected based on accessibility and channel composition (i.e., cross-section should be surveyed at a location that is best representative of each 200 m of creek channel based on its width, depth, vegetative cover, distance to natural slope, and rock armouring).
Wolverine Creek natural slope	Survey of new/existing slope monitor pins located on east slope of Wolverine Creek valley	Opposite tailings pile slope	1) Slope monitor pin coordinates (NEZ). 2) Survey ground level at the base of the pin on the side of the pin furthest from the creek. 3) Location of new monitor pins discussed in Section 3.

3 Site Components to be Surveyed

Notes:

1. Clinton Creek stationing begins at the outlet of Hudgeon Lake (Station -0+020) and continues downstream to the first ford (Station 1+000).
2. NEZ acronym refers to northing/easting coordinates and elevation.

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5. Survey Pins and Monuments

The requirements for the installation and replacement of monuments and monitor pins are presented in Table 5 (below).

Type	Purpose	Installation Criteria
Existing monuments	To replace monuments destroyed, damaged, or made otherwise unstable since the completion of the 2015 survey program	Install a replacement monument as close to the location of the existing monument as practicable. If the surrounding area has become unstable, a new location will be selected that is assumed to be stable (i.e., will not be impacted by nearby slope failures) and provides line of site to control points U3819 or U2834.
Existing slope monitors	To replace monitor pins destroyed, damaged, or made otherwise unstable since the completion of the 2015 survey program	Install a replacement monitor pin as close to the location of the existing monitor pin as practicable. If the surrounding area has become unstable, a new location will be selected that is assumed to be stable (i.e., will not be impacted by nearby slope failures) and provides line of site to control points U3819 or U2834.
Clinton Creek natural slope monitors	To install pins to monitor the movement of the natural slope above Clinton Creek	Install four monitor pins on the natural slope north of Clinton Creek.
Wolverine Creek natural slope monitors	To install pins to monitor the movement of the natural slope above Wolverine Creek	Install four monitor pins on the natural slope east of Wolverine Creek.
New DS4 Monitor Pins	To replace monitor pins to match the reconfiguration of the downstream end of DS4	Install new monitor pins perpendicular to the downstream end of the new concrete revetment mats offset approximately 3 m from the top of the concrete mats.

4 Monument and Monitoring Pin Requirements

Care should be taken to install the new slope monitor pins in a location that is likely influenced by the movement of the slope but is not likely to be damaged due to a slope failure.

6. Survey Practices

6.1 Level of Accuracy

The Surveyor will maintain a maximum horizontal and vertical accuracy of ±2 cm to 3 cm. If this level of accuracy is not achievable, the Surveyor will make note of the level of accuracy achieved, the reason(s) for the loss of accuracy, (e.g., signal loss, line of site constraints, distance constraints), and which survey points were affected.

6.2 Data Collection

The Surveyor shall use Real Time Kinematic (RTK) technology to collect survey data with RTK base stations established on top of control point U3819 (for Clinton Creek surveys) or U2834 (for Wolverine Creek surveys). It is assumed that line of sight can be maintained from these control points to all site components including the drop structures and existing and proposed slope monitoring points.

Various control points located throughout the site will be checked following each set up to verify the position of the RTK base station. The recommended survey conventions to be used to complete the Survey are presented in Table 5 (below).

Component	Recommended Convention
Slope monitor pins	Survey reading should be taken at ground level at the base of the pin on the side of the pin farthest from the creek or pit
Clinton Creek access road	Face Clinton Creek when taking survey readings
Hudgeon Lake outlet	Face centre of outlet when taking survey readings
Clinton Creek drop structures, profile, cross-sections, and natural slope monitoring pins	Face Clinton Creek when taking survey readings
Waste rock pile	Face Clinton Creek when taking survey readings
Porcupine Pit	Face pit when taking survey readings
Tailings pile	Face Wolverine Creek when taking survey readings
Wolverine Creek ponds	Face centre of pond when taking survey readings

5 Survey Conventions

6.3 Geodetic Reference System

Survey results are to be provided in reference to the UTM NAD83, Zone 7 projection.

7. Checklist

A checklist detailing the site components requiring survey, slope monitor repairs / replacements, and anticipated field practices that comprise the Survey is included in Appendix 2 and as a separate digital file.

Following the final day of field activities, the Surveyor will forward the checklist to WorleyParsons. The checklist will be used by both parties to confirm that the field portion of the Survey is complete and will identify any portions of the Survey that were not completed (in addition to the site constraints that resulted in their incompletion).

8. Reporting

The Surveyor will submit the following information to WorleyParsons at, or prior to, the completion of the Survey:

- Completed checklist (refer to Appendix 2);
- Copies of field notes;
- Photos taken at the site;
- Spreadsheet, in .xls or .xlsx format, containing survey information including point identifiers, coordinates, elevations, as well as associated photo numbers and comments;
- Drawing file, in .dwg format, containing individual survey points and breaklines; and
- Detailed description of survey methodologies including quality control procedures.

WorleyParsons will include the above listed items in its report to the AAM.

9. Closure

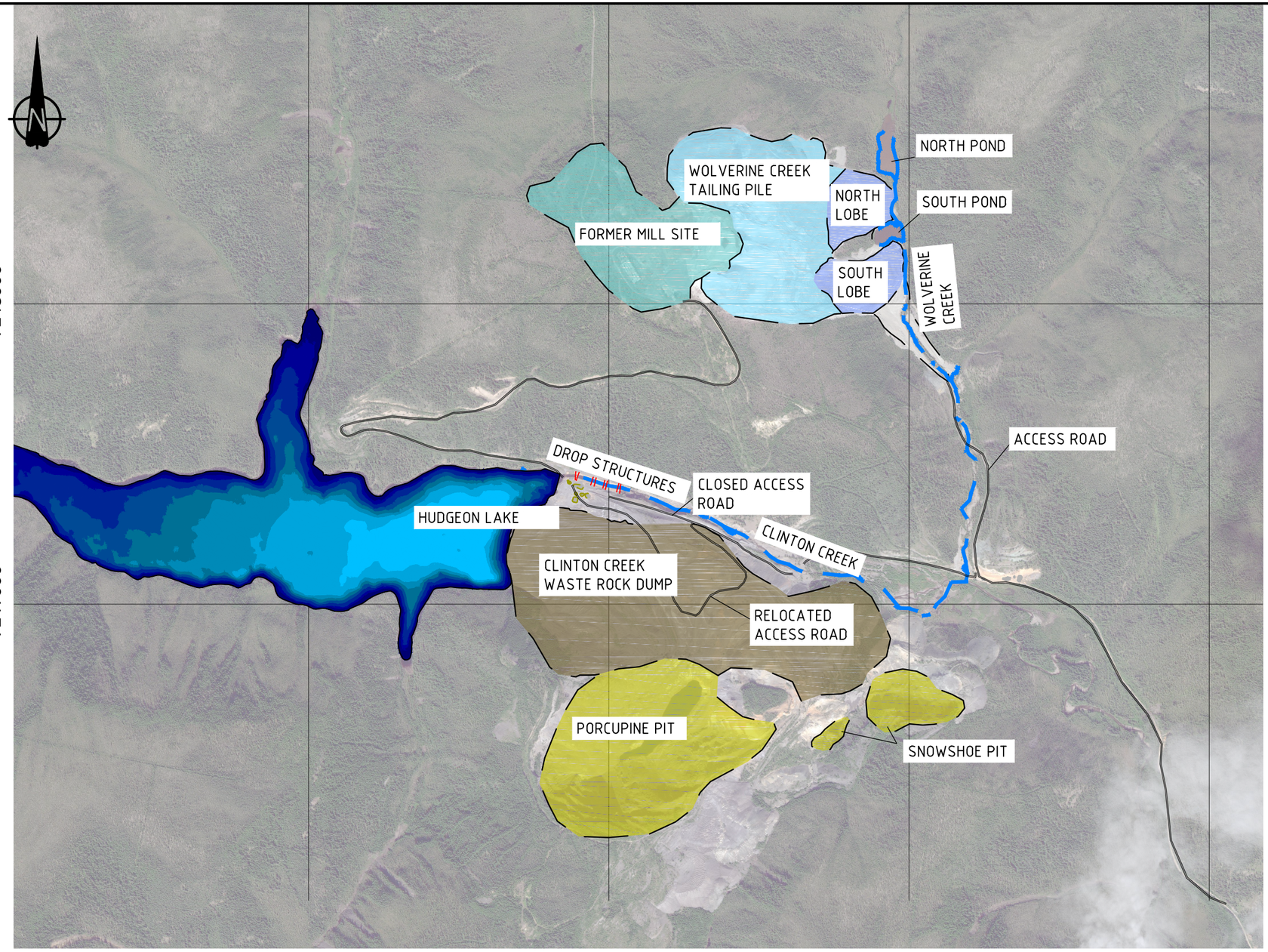
We trust that this letter provides sufficient information to support the completion of the Survey. If you have any questions or require further details, please contact the undersigned at any time.

Yours sincerely,

Amanda Rust

Amanda Rust, P.Eng.
Project Manager

cc: Francisco Moreno, Advisian



m 0 100 200 300 400 500 1000m

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LEGEND

- FORMER MILL SITE
- WOLVERINE CREEK TAILING PILE
- NORTH AND SOUTH LOBE - TAILINGS PILE
- CLINTON CREEK WASTE ROCK DUMP
- PORCUPINE AND SNOWSHOE PIT DUMP AND WASTE ROCK DUMPS
- HUDGEON LAKE

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NOTES:

1. DIMENSIONS AND ELEVATIONS ARE IN METRES.

CLINTON CREEK
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OVERALL SITEPLAN
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FIG No
FIGURE 1

REV
A

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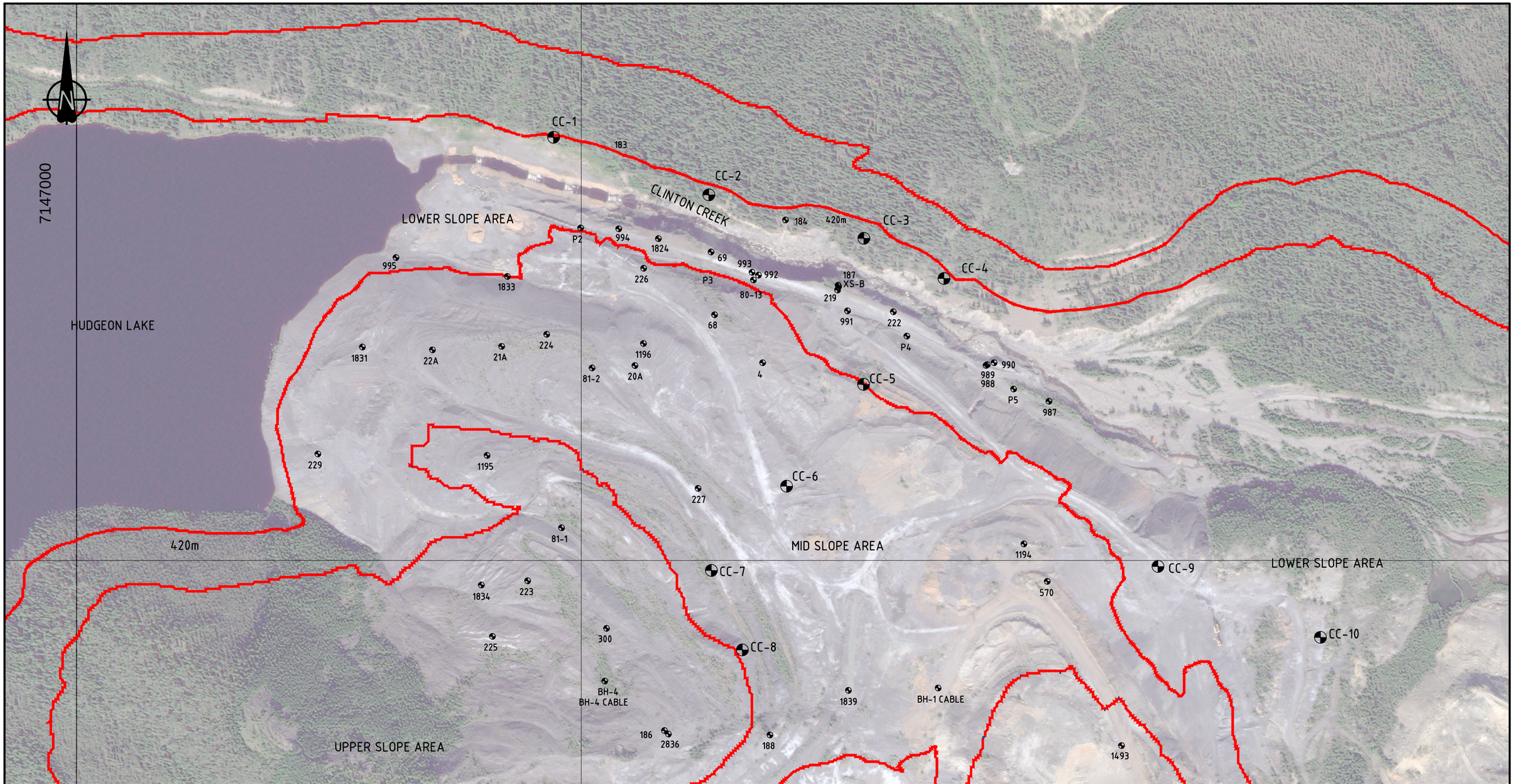

LEGEND

- NEW MONITORING LOCATION
- 2014 MONITORING LOCATION

CLINTON CRREK
LONG TERM PROGRAM (2016)
-

CLINTON CREEK MONITORING LOCATIONS

-

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FIG No **FIGURE 2**

REV **A**

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WC-5
WC-7
WC-4
WC-6
WC-3
WC-8
WC-1
WC-2
UPPER SLOPE AREA
MID SLOPE AREA
LOWER SLOPE AREA
WOLVERINE CREEK
530m
420m
420m
1495
BH-14 (T7)
80-1
26
26-A
80-2
1483
1492
24
1084
1485
650-1
650-2
1085
500-1
500-2
1491
1083
NL-2
80-7
NL-3
350-3A
NL-4
1489
350-1A
350-2A
NL-5
80-5
80-4
2005-11
NL-BASE
2005-10
1484
SL-5
2005-2
2005-3
SL-4
SL-3
SL-2
2005-1
SL-1
24D
25B
BH-16 (T8)
24B
24A
2005-04
2005-08
2005-05
2005-06
2005-07
80-9
7148000
513000
514000

LEGEND

- NEW MONITORING LOCATION
- 2014 MONITORING LOCATION

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WOLVERINE CREEK MONITORING LOCATIONS

-

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FIG No
FIGURE 3

REV
A

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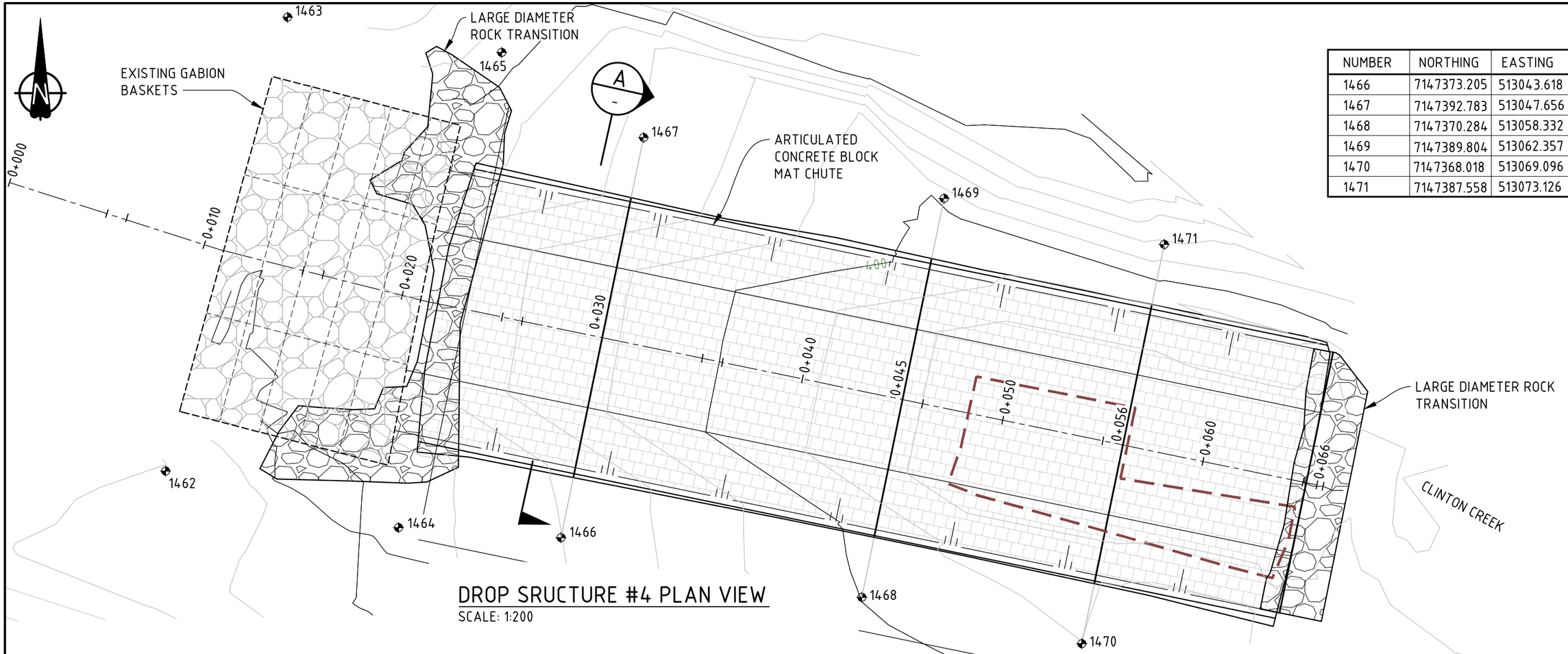
NUMBER	NORTHING	EASTING
1466	7147373.205	513043.618
1467	7147392.783	513047.656
1468	7147370.284	513058.332
1469	7147389.804	513062.357
1470	7147368.018	513069.096
1471	7147387.558	513073.126



DROP SRUCTURE #4 PLAN VIEW

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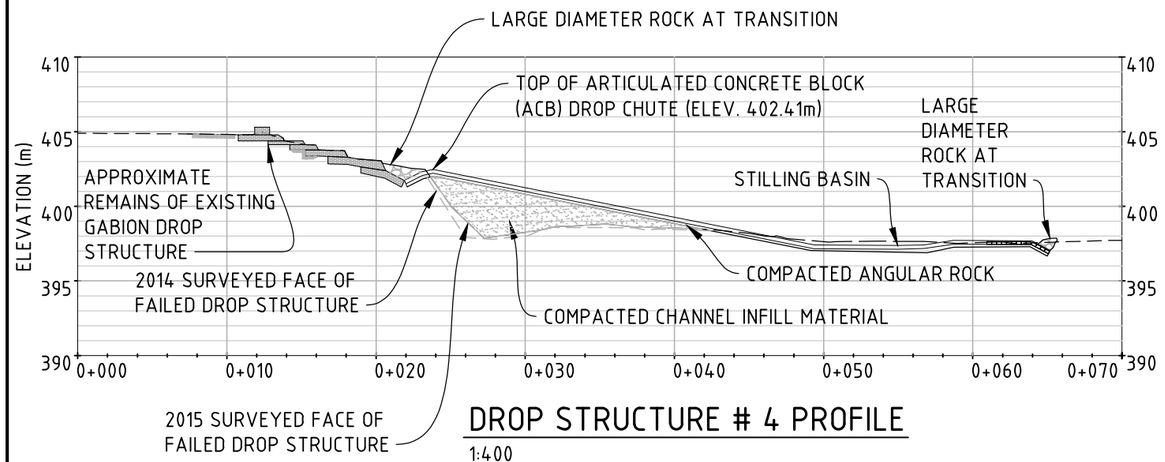

DROP STRUCTURE # 4 PROFILE

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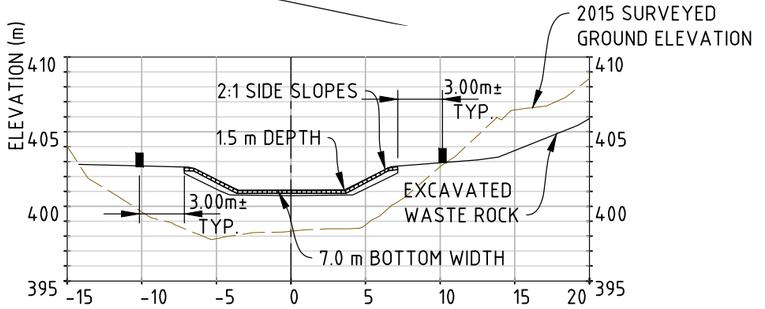

SECTION A-A

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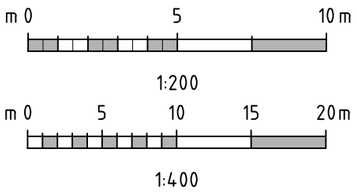

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DROP STRUCTURE #4 MONITORING LOCATIONS
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FIG No **FIGURE 4** | REV **A**

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WorleyParsons resources & energy	**Clinton Creek: Long Term Geotechnical Monitoring Program Site Component Survey Checklist**	

Underhill Surveyors			
Sheet		Project No.	**307071-00997**

Field Day 1 – __-2016			
Weather			
Hudgeon Lake WL - AM		Hudgeon Lake WL - PM	
Ford-1 WL - AM		Ford-1 WL - PM	
Estimated Flow Velocity		Estimated Flow Depth	
Site Components Surveyed			
Field Day 2 – __-2016			
Weather			
Hudgeon Lake WL - AM		Hudgeon Lake WL - PM	
Ford-1 WL - AM		Ford-1 WL - PM	
Estimated Flow Velocity		Estimated Flow Depth	
Site Components Surveyed			
Field Day 3 – __-2016			
Weather			
Hudgeon Lake WL - AM		Hudgeon Lake WL - PM	
Ford-1 WL - AM		Ford-1 WL - PM	
Estimated Flow Velocity		Estimated Flow Depth	
Site Components Surveyed			
Field Day 4 – __-2016			
Weather			
Hudgeon Lake WL - AM		Hudgeon Lake WL - PM	
Ford-1 WL - AM		Ford-1 WL - PM	
Estimated Flow Velocity		Estimated Flow Depth	
Site Components Surveyed			
Field Day 5 – __-2016			
Weather			
Hudgeon Lake WL - AM		Hudgeon Lake WL - PM	
Ford-1 WL - AM		Ford-1 WL - PM	
Estimated Flow Velocity		Estimated Flow Depth	
Site Components Surveyed			

WorleyParsons resources & energy	**Clinton Creek: Long Term Geotechnical Monitoring Program Site Component Survey Checklist**	

Underhill Surveyors			
Sheet		Project No.	**307071-00997**

Field Day 6 – __-2016			
Weather			
Hudgeon Lake WL - AM		Hudgeon Lake WL - PM	
Ford-1 WL - AM		Ford-1 WL - PM	
Estimated Flow Velocity		Estimated Flow Depth	
Site Components Surveyed			
Field Day 7 – __-2016			
Weather			
Hudgeon Lake WL - AM		Hudgeon Lake WL - PM	
Ford-1 WL - AM		Ford-1 WL - PM	
Estimated Flow Velocity		Estimated Flow Depth	
Site Components Surveyed			

Site Components				
Clinton Creek Access Road	Date Completed		All Information Collected	**Y / N**
	Not Collected			
	Reason			
Hudgeon Lake Outlet	Date Completed		All Information Collected	**Y / N**
	Not Collected			
	Reason			
Gabion DS #1	Date Completed		All Information Collected	**Y / N**
	Not Collected			
	Reason			
Gabion DSs #2 and #3	Date Completed		All Information Collected	**Y / N**
	Not Collected			
	Reason			
Gabion DS #4	Date Completed		All Information Collected	**Y / N**
	Not Collected			
	Reason			
Clinton Creek Channel Profile	Date Completed		All Information Collected	**Y / N**
	Not Collected			
	Reason			
Clinton Creek Channel Cross-Sections	Date Completed		All Information Collected	**Y / N**
	Not Collected			
	Reason			

WorleyParsons resources & energy	**Clinton Creek: Long Term Geotechnical Monitoring Program Site Component Survey Checklist**	
Underhill Surveyors		
Sheet	Project No.	**307071-00997**

Site Components (continued)				
Clinton Creek Waste Rock Pile	Date Completed		All Information Collected	**Y / N**
	Not Collected			
	Reason			
Clinton Creek Natural Slope	Date Completed		All Information Collected	**Y / N**
	Not Collected			
	Reason			
Porcupine Pit	Date Completed		All Information Collected	**Y / N**
	Not Collected			
	Reason			
Wolverine Creek Tailings Pile	Date Completed		All Information Collected	**Y / N**
	Not Collected			
	Reason			
Wolverine Creek Ponds	Date Completed		All Information Collected	**Y / N**
	Not Collected			
	Reason			
Wolverine Creek Channel Profile	Date Completed		All Information Collected	**Y / N**
	Not Collected			
	Reason			
Wolverine Creek Cross-Sections	Date Completed		All Information Collected	**Y / N**
	Not Collected			
	Reason			
Wolverine Creek Natural Slope	Date Completed		All Information Collected	**Y / N**
	Not Collected			
	Reason			
Existing Rock Stockpiles	Date Completed		All Information Collected	**Y / N**
	Not Collected			
	Reason			

	Completed By	**Confirmed By**	**Accepted By**
Survey Lead			
Organization			
Sign			
Date			

Appendix 5 Raw Survey Data

CLINTON CREEK LONG TERM PERFORMANCE MONITORING PROGRAM
(August/September 2016)

UTM COORDINATES

NAD 83, Zone 7, 141º West

CONTROL			
	NORTHING	EASTING	OTHOMETRIC HEIGHT
1086	7147972.219	513176.710	590.955
1192	7147563.984	512278.758	441.231
2834	7148172.665	513447.789	606.720
2835	7147272.816	513147.027	432.618
3819	7147223.088	513111.922	441.802
Coordinates are NAD 83 UTM grid, derived from a least squares adjustment of GPS observations holding values of stations 1192 and 1086 fixed in 3D. (See Supplied adjustment "W16153 Control Constrained.txt")			

CONTROL			
	NORTHING	EASTING	OTHOMETRIC HEIGHT
3820	7147930.475	513981.150	402.884
Coordinates of control point 3820 are derived from Real time Kinematic GPS observations holding 2016 values of control point 2834 fixed in 3D			

Extra Control set up in 2016 at the confluence of Clinton Creek end Wolverine Creek

CONTROL			
	NORTHING	EASTING	OTHOMETRIC HEIGHT
3831	7147089.201	514207.763	367.397
3832	7147112.577	514175.404	368.138
Coordinates of control point 3831 and 3832 are derived from Real time Kinematic GPS observations holding 2016 values of control point 2835 fixed in 3D			

CLINTON CREEK LONG TERM PERFORMANCE MONITORING PROGRAM (August/September 2016)

UTM COORDINATES

NAD 83, Zone 7, 141º West

CONTROL			
	NORTHING	EASTING	OTHOMETRIC HEIGHT
2835	7147272.816	513147.027	432.618

Coordinates shown below are derived from Real time Kinematic GPS observations holding 2016 values of control point 2835 fixed in 3D

CLINTON CREEK WASTE ROCK DUMP AND PORCUPINE PIT MOVEMENT MONITORING

	NORTHING	EASTING	OTHOMETRIC HEIGHT
68	7147262.194	513142.208	433.978
69	7147329.223	513138.532	416.375
P3	7147309.417	513135.504	414.810
993	7147307.463	513182.353	414.571
80-13	7147299.340	513183.808	413.135
992	7147304.479	513189.176	413.702
991	7147266.396	513284.252	403.605
222	7147265.411	513333.049	399.646
P4	7147239.399	513347.442	397.207
988	7147208.219	513432.073	388.865
989	7147209.045	513433.376	388.660
990	7147210.983	513440.562	388.376
P5	7147182.910	513461.398	387.259
189	7147169.927	513499.245	386.118
4410	7147152.258	513482.755	387.974
4411	7147103.609	513565.506	384.066
4412	7147068.500	513652.753	375.949
20-A	7147207.930	513057.242	445.362
1196 top	7147231.475	513066.372	443.565
81-2	7147205.369	513011.639	443.522
224	7147241.372	512963.179	444.472
21-A	7147228.552	512915.005	446.018
22-A	7147224.873	512841.129	444.267
1831	7147227.755	512766.326	432.275
229	7147113.597	512718.842	437.131
1195 top	7147112.100	512899.534	456.307
81-1	7147034.778	512978.860	454.989
223	7146978.334	512942.784	466.969
1834	7146973.883	512893.371	460.924
225	7146918.939	512905.215	474.944
300	7146927.628	513026.961	468.792
BH-4	7146871.252	513025.113	470.927
BH-4 cable	7146871.295	513025.183	470.911
186	7146818.546	513088.935	477.323

2836 top	7146814.777	513093.273	477.207
2016-1	7146776.851	513113.810	463.081
227	7147076.945	513124.814	439.257
995	7147323.413	512802.257	413.454
1839	7146861.369	513285.113	427.999
188	7146813.859	513201.446	443.011
BH-1	7146864.131	513381.482	422.788
BH-1 CABLE	7146864.029	513380.902	422.826
1194	7147017.704	513472.461	432.862
570	7146977.704	513497.435	436.494
1493	7146802.507	513576.508	452.448
1832	7146537.119	513483.169	473.617
1830	7146523.887	513455.683	471.659
1837	7146502.944	513411.442	470.216
1838	7146491.876	513380.563	468.360
19-B	7147124.292	513365.744	428.341
19-A	7147126.521	513363.566	428.243
4	7147210.926	513193.617	434.786
219	7147288.617	513273.579	405.605
187	7147292.148	513274.665	404.569
XS-B	7147293.729	513274.196	404.266

CLINTON CREEK LONG TERM PERFORMANCE MONITORING PROGRAM
(August/September 2016)

UTM COORDINATES
NAD 83, Zone 7, 141º West

CONTROL			
	NORTHING	EASTING	OTHOMETRIC HEIGHT
2835	7147272.816	513147.027	432.618

Coordinates shown below are derived from Real time Kinematic GPS observations holding 2016 values of control point 2835 fixed in 3D

GABION 1-4

GABION 1

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
40068	7147441.203	512890.142	413.726	1450 TOP
40069	7147441.252	512890.140	413.588	GS
40070	7147440.240	512890.122	413.421	ROCK
40071	7147438.941	512890.016	413.165	GABION
40072	7147438.143	512889.960	413.105	GABION
40073	7147438.096	512889.969	413.398	GABION
40074	7147437.586	512889.891	413.475	GABION
40075	7147437.122	512889.864	413.350	GABION
40076	7147436.993	512889.847	412.861	GABION
40077	7147435.939	512889.806	412.757	GABION
40078	7147435.022	512889.695	412.539	GABION
40079	7147434.126	512889.681	412.271	GABION
40080	7147433.037	512889.583	411.884	GABION
40081	7147432.132	512889.528	411.554	GABION
40082	7147431.387	512889.570	411.275	GABION
40083	7147430.849	512889.511	411.078	GABION
40084	7147430.078	512889.593	411.036	GABION
40085	7147429.184	512889.507	411.039	GABION
40086	7147428.628	512889.419	411.087	GABION
40087	7147427.985	512889.278	411.030	GABION
40088	7147427.222	512889.167	411.121	GABION
40089	7147426.407	512889.095	411.036	GABION
40090	7147425.627	512888.908	411.101	GABION
40091	7147424.968	512888.991	411.063	GABION
40092	7147424.369	512888.979	410.942	GABION
40093	7147423.419	512888.870	411.071	GABION
40094	7147422.834	512888.839	411.199	GABION
40095	7147422.708	512888.935	411.400	GABION
40096	7147421.625	512888.790	411.763	GABION
40097	7147420.474	512888.616	412.131	GABION
40098	7147419.187	512888.541	412.566	GABION
40099	7147418.119	512888.458	412.875	GABION
40100	7147417.917	512888.381	413.310	GABION
40101	7147417.357	512888.331	413.392	GABION
40102	7147416.930	512888.301	413.347	GABION
40103	7147416.812	512888.253	412.899	GABION
40104	7147416.165	512888.276	412.945	GABION
40105	7147415.199	512888.101	413.203	ROCK
40106	7147414.139	512888.046	413.305	ROCK
40107	7147413.821	512888.107	413.266	GS
40108	7147413.815	512888.128	413.360	1451 TOP

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
40109	7147411.930	512891.976	412.999	1452 TOP
40110	7147411.911	512891.965	412.812	GS
40111	7147413.108	512892.339	412.316	GS
40112	7147414.201	512892.751	411.873	GS
40113	7147415.024	512893.074	411.743	ROCK
40114	7147415.207	512893.135	411.711	ROCK
40115	7147415.461	512893.240	411.514	GABION
40116	7147415.522	512893.288	411.613	GABION
40117	7147415.945	512893.473	411.611	GABION
40118	7147416.783	512893.808	411.354	GABION
40119	7147417.629	512894.184	411.144	GABION
40120	7147418.572	512894.637	410.857	GABION
40121	7147419.149	512894.846	410.648	GABION
40122	7147419.468	512894.919	410.613	GABION
40123	7147420.196	512895.155	410.413	GABION
40124	7147420.936	512895.368	410.217	GABION
40125	7147421.693	512895.650	409.973	GABION
40126	7147422.439	512895.940	409.836	GABION
40127	7147423.382	512896.490	409.817	GABION
40128	7147423.883	512896.842	409.831	GABION
40129	7147424.882	512897.266	409.917	GABION
40130	7147425.808	512897.416	409.909	GABION
40131	7147426.760	512897.630	409.720	GABION
40132	7147428.033	512898.044	409.999	GABION
40133	7147429.060	512898.274	410.054	GABION
40134	7147430.207	512898.632	410.501	GABION
40135	7147431.261	512899.003	410.434	GABION
40136	7147431.897	512899.196	410.523	GABION
40137	7147432.031	512899.220	410.707	GABION
40138	7147432.892	512899.578	411.097	GABION
40139	7147433.850	512899.869	411.448	GABION
40140	7147434.598	512900.107	411.519	GABION
40141	7147435.035	512900.290	411.514	ROCK
40142	7147435.556	512900.378	411.765	ROCK
40143	7147435.920	512900.622	411.762	ROCK
40144	7147436.333	512900.701	411.899	ROCK
40145	7147436.760	512900.878	412.036	GS
40146	7147437.088	512900.980	412.198	GS
40147	7147437.800	512901.122	412.701	GS
40148	7147438.716	512901.373	412.945	GS
40149	7147438.905	512901.438	413.024	GS
40150	7147438.952	512901.480	413.213	1453 TOP

GABION 2

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
40151	7147423.157	512948.573	412.396	1454 TOP
40152	7147423.197	512948.600	412.261	GS
40153	7147422.023	512948.222	412.301	GS
40154	7147421.145	512947.997	412.181	ROCK
40155	7147420.296	512947.662	412.124	GABION
40156	7147420.153	512947.597	412.297	GABION
40157	7147419.876	512947.452	412.332	GABION
40158	7147419.101	512947.133	412.018	GABION
40159	7147418.240	512946.852	411.634	GABION
40160	7147417.397	512946.582	411.343	GABION
40161	7147416.587	512946.260	411.018	GABION
40162	7147415.889	512946.071	410.850	GABION
40163	7147414.856	512945.742	410.356	GABION
40164	7147414.343	512945.652	410.289	GABION

40165	7147413.965	512945.497	409.885	GABION
40166	7147413.175	512945.308	409.718	GABION
40167	7147412.447	512945.185	409.464	GABION
40168	7147411.732	512945.046	409.488	GABION
40169	7147411.142	512944.733	409.528	GABION
40170	7147410.442	512944.524	409.550	GABION
40171	7147409.869	512944.280	409.537	GABION
40172	7147409.447	512944.118	409.545	GABION
40173	7147408.995	512943.978	409.589	GABION
40174	7147408.503	512943.759	409.573	GABION
40175	7147407.930	512943.634	409.574	GABION
40176	7147407.335	512943.318	409.524	GABION
40177	7147406.941	512943.223	409.723	GABION
40178	7147406.192	512942.992	409.800	GABION
40179	7147405.836	512942.865	410.054	GABION
40180	7147404.924	512942.571	410.293	GABION
40181	7147403.873	512942.179	410.598	GABION
40182	7147402.544	512941.723	411.000	GABION
40183	7147401.558	512941.481	411.326	GABION
40184	7147401.075	512941.204	411.533	GABION
40185	7147400.362	512940.951	411.784	GABION
40186	7147400.052	512940.871	411.809	GABION
40187	7147399.986	512940.820	411.568	GABION
40188	7147399.214	512940.592	411.589	GABION
40189	7147398.590	512940.326	411.756	GS
40190	7147397.961	512940.176	411.658	GS
40191	7147397.031	512939.991	411.774	GS
40192	7147397.064	512939.943	411.890	1455 TOP

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
40193	7147393.181	512951.354	410.824	1456 TOP
40194	7147393.192	512951.325	410.701	GS
40195	7147393.800	512951.511	410.446	GS
40196	7147394.675	512951.884	409.841	GS
40197	7147395.289	512951.938	409.540	ROCK
40198	7147395.819	512952.101	409.264	ROCK
40199	7147396.696	512952.365	408.939	GABION
40200	7147397.396	512952.605	408.916	GABION
40201	7147398.431	512952.889	408.576	GABION
40202	7147399.415	512953.120	408.309	GABION
40203	7147400.130	512953.319	408.102	GABION
40204	7147400.477	512953.408	408.095	GABION
40205	7147401.281	512953.568	407.868	GABION
40206	7147401.769	512953.714	407.830	GABION
40207	7147402.114	512953.854	407.657	GABION
40208	7147402.688	512954.004	407.604	GABION
40209	7147403.150	512954.099	407.177	GABION
40210	7147403.546	512954.313	407.047	GABION
40211	7147404.104	512954.735	406.998	GABION
40212	7147404.790	512954.951	406.883	GABION
40213	7147405.544	512955.070	407.001	GABION
40214	7147406.154	512955.050	406.925	GABION
40215	7147407.009	512955.110	407.057	GABION
40216	7147407.867	512955.274	406.974	GABION
40217	7147408.921	512955.517	407.008	GABION
40218	7147409.874	512955.994	407.134	GABION
40219	7147411.140	512956.368	407.574	GABION
40220	7147411.891	512956.482	407.799	GABION
40221	7147413.119	512956.645	408.316	GABION
40222	7147414.307	512957.037	408.809	GABION
40223	7147415.259	512957.230	409.156	GABION

40224	7147416.506	512957.383	409.677	GABION
40225	7147416.661	512957.403	409.686	GABION
40226	7147417.350	512957.607	409.846	ROCK
40227	7147418.216	512957.720	409.925	ROCK
40228	7147418.910	512957.831	410.279	ROCK
40229	7147419.442	512957.876	410.453	ROCK
40230	7147419.876	512957.927	410.536	ROCK
40231	7147420.320	512957.932	410.564	GS
40232	7147420.408	512957.964	410.697	1457 TOP

GABION 3

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
40233	7147412.093	512986.905	409.815	1458 TOP
40234	7147412.098	512986.915	409.661	GS
40235	7147411.044	512986.611	409.696	GS
40236	7147409.810	512986.222	409.849	GS
40237	7147409.183	512986.071	409.719	GABION
40238	7147408.539	512985.885	409.535	GABION
40239	7147408.163	512985.791	409.309	GABION
40240	7147407.271	512985.581	408.939	GABION
40241	7147406.264	512985.366	408.637	GABION
40242	7147405.313	512985.122	408.281	GABION
40243	7147404.344	512984.862	407.847	GABION
40244	7147403.490	512984.612	407.483	GABION
40245	7147402.982	512984.574	407.323	GABION
40246	7147402.824	512984.594	407.031	GABION
40247	7147402.089	512984.540	406.877	GABION
40248	7147401.264	512984.315	406.704	GABION
40249	7147400.614	512984.145	406.749	GABION
40250	7147400.017	512983.965	406.670	GABION
40251	7147399.413	512983.778	406.593	GABION
40252	7147398.732	512983.638	406.606	GABION
40253	7147397.938	512983.532	406.638	GABION
40254	7147397.295	512983.411	406.451	GABION
40255	7147396.667	512983.223	406.584	GABION
40256	7147395.989	512982.958	406.555	GABION
40257	7147395.447	512982.952	406.609	GABION
40258	7147394.870	512982.690	406.838	GABION
40259	7147394.040	512982.462	407.236	GABION
40260	7147393.493	512982.317	407.232	GABION
40261	7147393.290	512982.285	407.396	GABION
40262	7147392.676	512982.072	407.558	GABION
40263	7147392.595	512981.995	407.667	GABION
40264	7147391.747	512981.747	407.943	GABION
40265	7147390.972	512981.462	408.158	GABION
40266	7147390.942	512981.462	408.252	GABION
40267	7147390.168	512981.226	408.508	GABION
40268	7147389.669	512981.150	408.678	GABION
40269	7147389.176	512980.975	408.774	GABION
40270	7147388.545	512980.817	408.923	ROCK
40271	7147387.854	512980.642	408.867	GS
40272	7147387.091	512980.484	409.006	GS
40273	7147386.533	512980.362	409.118	GS
40274	7147386.558	512980.381	409.225	1459A TOP

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
40275	7147383.233	512988.952	408.782	1460A TOP
40276	7147383.238	512988.922	408.744	GS
40277	7147383.442	512988.879	408.689	GS
40278	7147383.621	512988.947	408.633	ROCK
40279	7147384.039	512989.106	408.514	ROCK

40280	7147384.712	512989.487	408.013	ROCK
40281	7147385.551	512989.907	407.371	ROCK
40282	7147386.206	512990.148	406.672	ROCK
40283	7147386.775	512990.162	406.386	GABION
40284	7147387.706	512990.358	406.162	GABION
40285	7147388.747	512990.664	405.870	GABION
40286	7147389.731	512990.984	405.559	GABION
40287	7147390.125	512991.110	405.480	GABION
40288	7147390.929	512991.230	405.393	GABION
40289	7147391.356	512991.284	405.149	GABION
40290	7147392.026	512991.421	405.010	GABION
40291	7147392.580	512991.468	404.839	GABION
40292	7147393.073	512991.741	404.706	GABION
40293	7147393.796	512992.003	404.461	GABION
40294	7147398.541	512993.669	404.550	GABION
40295	7147399.843	512994.055	404.866	GABION
40296	7147400.779	512994.328	405.159	GABION
40297	7147401.306	512994.297	405.313	GABION
40298	7147402.582	512994.584	405.783	GABION
40299	7147403.812	512994.914	406.221	GABION
40300	7147405.089	512995.143	406.700	GABION
40301	7147406.048	512995.330	407.034	GABION
40302	7147406.586	512995.408	407.286	GABION
40303	7147406.886	512995.497	407.342	GABION
40304	7147407.351	512995.605	407.424	ROCK
40305	7147408.104	512995.638	407.662	GS
40306	7147408.871	512995.714	408.050	GS
40307	7147410.040	512995.927	408.269	GS
40308	7147410.061	512995.887	408.520	1461 TOP

GABION 4

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
40309	7147401.955	513033.661	407.621	GS
40063	7147401.917	513033.682	407.769	1462 TOP
40310	7147400.588	513033.139	407.605	GS
40311	7147399.269	513032.732	407.424	GS
40312	7147398.162	513032.393	407.320	GS
40313	7147397.656	513032.261	407.212	ROCK
40314	7147397.230	513032.189	407.264	ROCK
40315	7147396.766	513032.022	407.217	GABION
40316	7147396.625	513031.993	407.240	GABION
40317	7147395.913	513031.795	406.930	GABION
40318	7147394.923	513031.527	406.490	GABION
40319	7147393.911	513031.388	406.106	GABION
40320	7147392.884	513031.148	405.698	GABION
40321	7147391.900	513030.939	405.330	GABION
40322	7147391.034	513030.773	405.099	GABION
40323	7147390.528	513030.640	404.848	GABION
40324	7147389.733	513030.504	404.605	GABION
40325	7147389.052	513030.323	404.570	GABION
40326	7147388.326	513030.179	404.524	GABION
40327	7147387.778	513029.930	404.537	GABION
40328	7147386.940	513029.736	404.547	GABION
40329	7147386.546	513029.517	404.582	GABION
40330	7147385.379	513029.226	404.611	GABION
40331	7147384.447	513028.810	404.651	GABION
40332	7147383.478	513028.648	404.651	GABION
40333	7147382.531	513028.370	404.934	GABION
40334	7147381.644	513028.139	405.098	GABION
40335	7147380.699	513027.801	405.519	GABION
40336	7147379.541	513027.493	405.899	GABION

40337	7147378.494	513027.221	406.301	GABION
40338	7147377.704	513027.059	406.603	GABION
40339	7147376.967	513026.951	406.888	GABION
40340	7147376.644	513026.670	406.864	GS
40341	7147376.206	513026.531	406.535	GS
40342	7147375.134	513026.213	406.350	GS
40058	7147374.040	513025.972	406.348	1463 TOP
40343	7147373.940	513025.933	406.248	GS

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
40064	7147399.435	513040.298	406.318	1465 TOP
40370	7147399.417	513040.291	406.274	GS
40369	7147398.675	513040.186	406.176	GS
40368	7147397.118	513039.960	405.744	GS
40367	7147395.775	513039.769	405.397	GS
40366	7147395.054	513039.768	405.046	LARGE ROCKS
40365	7147394.087	513039.635	404.699	LARGE ROCKS
40364	7147392.691	513039.385	404.418	LARGE ROCKS
40363	7147391.671	513039.252	404.040	LARGE ROCKS
40362	7147389.879	513039.000	403.401	LARGE ROCKS
40361	7147388.260	513038.876	402.542	LARGE ROCKS
40360	7147386.848	513038.541	402.610	LARGE ROCKS
40359	7147385.593	513038.408	402.241	LARGE ROCKS
40358	7147384.473	513038.211	402.228	LARGE ROCKS
40357	7147383.389	513038.002	401.995	LARGE ROCKS
40356	7147382.439	513038.077	402.483	LARGE ROCKS
40355	7147381.182	513037.567	402.658	LARGE ROCKS
40354	7147379.971	513037.481	403.012	LARGE ROCKS
40353	7147379.739	513037.500	402.815	CONC BLOCKS
40352	7147378.630	513037.520	403.427	CONC BLOCKS
40351	7147377.454	513037.335	403.926	CONC BLOCKS
40350	7147377.025	513037.300	404.185	LARGE ROCKS
40349	7147376.103	513037.139	404.419	LARGE ROCKS
40348	7147375.949	513037.076	404.291	LARGE ROCKS
40347	7147374.822	513036.989	404.326	GS
40346	7147372.892	513036.880	404.327	GS
40345	7147370.923	513036.719	404.247	GS
40059	7147369.713	513036.597	404.426	1464 TOP
40344	7147369.661	513036.585	404.346	GS

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
40065	7147392.789	513047.642	402.804	1467 TOP
40371	7147392.738	513047.667	402.740	GS
40372	7147391.467	513047.359	402.727	GS
40373	7147390.230	513047.134	402.671	GS
40374	7147389.573	513046.960	402.653	CONC BLOCKS
40375	7147389.155	513046.879	402.618	CONC BLOCKS
40376	7147388.386	513046.637	402.267	CONC BLOCKS
40377	7147387.560	513046.316	401.774	CONC BLOCKS
40378	7147386.895	513046.115	401.481	CONC BLOCKS
40380	7147385.487	513045.737	401.224	CONC BLOCKS
40381	7147384.623	513045.317	401.268	CONC BLOCKS
40382	7147383.825	513045.060	401.286	CONC BLOCKS
40383	7147383.062	513044.801	401.248	CONC BLOCKS
40384	7147382.082	513044.427	401.354	CONC BLOCKS
40385	7147381.153	513044.292	401.343	CONC BLOCKS
40386	7147380.151	513043.976	401.343	CONC BLOCKS
40387	7147379.666	513043.886	401.338	CONC BLOCKS
40388	7147378.764	513043.820	401.846	CONC BLOCKS
40389	7147377.682	513043.700	402.414	CONC BLOCKS
40390	7147377.047	513043.644	402.713	CONC BLOCKS

40391	7147376.403	513043.798	402.844	CONC BLOCKS
40392	7147374.899	513043.671	402.851	GS
40393	7147373.576	513043.609	402.862	GS
40394	7147373.265	513043.607	402.874	GS
40060	7147373.223	513043.614	402.885	1466 TOP

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
40419	7147389.923	513062.315	400.652	GS
40066	7147389.871	513062.359	400.682	1469 TOP
40418	7147389.175	513062.072	399.976	GS
40417	7147388.029	513061.599	399.733	GS
40416	7147386.708	513061.242	399.628	CONC BLOCKS
40415	7147386.317	513061.218	399.554	CONC BLOCKS
40414	7147385.795	513061.129	399.339	CONC BLOCKS
40413	7147384.731	513060.891	398.730	CONC BLOCKS
40411	7147383.106	513059.763	398.359	CONC BLOCKS
40410	7147382.371	513059.690	398.373	CONC BLOCKS
40409	7147381.196	513059.740	398.298	CONC BLOCKS
40408	7147379.738	513058.898	398.441	CONC BLOCKS
40407	7147378.826	513058.880	398.424	CONC BLOCKS
40406	7147378.088	513058.740	398.335	CONC BLOCKS
40405	7147377.281	513058.962	398.263	CONC BLOCKS
40404	7147376.482	513058.979	398.282	CONC BLOCKS
40403	7147376.178	513058.900	398.441	CONC BLOCKS
40402	7147375.322	513058.820	398.828	CONC BLOCKS
40401	7147374.445	513058.720	399.245	CONC BLOCKS
40400	7147373.553	513058.633	399.743	CONC BLOCKS
40399	7147373.151	513058.540	399.800	CONC BLOCKS
40398	7147372.890	513058.528	399.648	GS
40397	7147372.353	513058.464	399.810	GS
40396	7147371.556	513058.374	399.862	GS
40061	7147370.300	513058.323	399.995	1468 TOP
40395	7147370.238	513058.276	399.940	GS

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
40420	7147388.424	513073.250	402.318	GS
40067	7147388.303	513073.239	402.381	1471 TOP
40421	7147388.027	513073.233	402.232	GS
40422	7147387.088	513073.190	401.110	GS
40423	7147385.856	513072.595	399.663	GS
40424	7147384.816	513072.407	399.005	GS
40425	7147384.487	513072.305	398.898	CONC BLOCKS
40426	7147384.126	513072.296	398.791	CONC BLOCKS
40427	7147383.659	513072.212	398.599	CONC BLOCKS
40700	7147379.072	513070.931	397.324	CONC BLOCKS
40701	7147377.334	513070.516	397.310	CONC BLOCKS
40702	7147375.690	513070.207	397.315	CONC BLOCKS
40703	7147375.029	513070.094	397.316	CONC BLOCKS
40704	7147373.705	513069.986	397.616	CONC BLOCKS
40705	7147372.658	513069.801	398.145	CONC BLOCKS
40706	7147371.791	513069.479	398.641	CONC BLOCKS
40707	7147371.272	513069.377	398.872	CONC BLOCKS
40708	7147370.943	513069.351	398.947	GS
40709	7147369.108	513069.269	399.041	GS
40710	7147367.236	513069.096	399.179	GS
40711	7147366.455	513068.895	399.267	GS
40712	7147365.777	513068.699	399.542	GS
40062	7147365.726	513068.625	399.602	1470 TOP

GABION 1-4 Profile North TOP

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
40496	7147442.894	512858.831	413.963	TOP N PROFILE ROCKS
40495	7147439.447	512858.984	413.566	TOP N PROFILE ROCKS
40494	7147439.786	512862.487	413.807	TOP N PROFILE ROCKS
40493	7147440.918	512866.599	413.995	TOP N PROFILE ROCKS
40492	7147441.047	512867.068	414.108	TOP N PROFILE GS
40491	7147440.154	512870.128	413.822	TOP N PROFILE GS
40490	7147440.049	512874.667	413.862	TOP N PROFILE GS
40489	7147439.792	512879.149	413.826	TOP N PROFILE GS
40488	7147439.220	512883.666	413.498	TOP N PROFILE GS
40487	7147441.569	512885.200	413.691	TOP N PROFILE GS
40486	7147442.252	512887.731	413.657	TOP N PROFILE GS
40485	7147440.895	512892.045	413.500	TOP N PROFILE GS
40484	7147439.444	512895.656	413.192	TOP N PROFILE GS
40483	7147439.533	512898.588	413.091	TOP N PROFILE GS
40482	7147438.823	512903.177	413.100	TOP N PROFILE GS
40481	7147437.676	512907.578	413.033	TOP N PROFILE GS
40480	7147435.352	512911.134	412.820	TOP N PROFILE GS
40479	7147432.494	512913.959	412.604	TOP N PROFILE GS
40478	7147432.046	512917.724	412.553	TOP N PROFILE GS
40477	7147431.327	512921.500	412.398	TOP N PROFILE GS
40476	7147429.670	512924.869	412.300	TOP N PROFILE GS
40475	7147427.657	512929.153	412.180	TOP N PROFILE GS
40474	7147426.122	512934.143	412.250	TOP N PROFILE GS
40473	7147425.196	512939.198	412.306	TOP N PROFILE GS
40472	7147423.702	512943.537	412.358	TOP N PROFILE GS
40471	7147421.767	512946.813	412.341	TOP N PROFILE GS
40470	7147420.450	512949.671	411.994	TOP N PROFILE GS
40469	7147420.259	512952.492	411.419	TOP N PROFILE GS
40468	7147420.754	512956.250	410.816	TOP N PROFILE GS
40467	7147419.961	512959.105	410.233	TOP N PROFILE GS
40466	7147419.059	512961.101	410.252	TOP N PROFILE GS
40465	7147416.891	512964.918	409.731	TOP N PROFILE GS
40464	7147414.814	512968.664	409.578	TOP N PROFILE GS
40463	7147412.770	512973.120	409.522	TOP N PROFILE GS
40462	7147411.466	512977.670	409.499	TOP N PROFILE GS
40461	7147410.429	512981.975	409.647	TOP N PROFILE GS
40460	7147409.800	512985.970	409.875	TOP N PROFILE GS
40459	7147409.601	512988.458	409.261	TOP N PROFILE GS
40458	7147410.154	512992.041	408.600	TOP N PROFILE GS
40457	7147408.945	512994.843	407.926	TOP N PROFILE GS
40456	7147408.413	512996.311	408.055	TOP N PROFILE GS
40455	7147407.701	512999.783	407.959	TOP N PROFILE GS
40454	7147406.522	513003.745	407.788	TOP N PROFILE GS
40453	7147405.182	513007.874	407.654	TOP N PROFILE GS
40452	7147403.519	513011.187	407.499	TOP N PROFILE GS
40451	7147403.358	513014.027	407.449	TOP N PROFILE GS
40450	7147402.249	513018.167	407.383	TOP N PROFILE GS
40449	7147401.087	513022.920	407.335	TOP N PROFILE GS
40448	7147400.169	513027.853	407.573	TOP N PROFILE GS
40447	7147398.005	513030.873	407.427	TOP N PROFILE GS
40446	7147398.698	513033.506	407.214	TOP N PROFILE GS
40445	7147398.934	513035.540	407.286	TOP N PROFILE GS
40444	7147397.878	513037.305	406.725	TOP N PROFILE GS
40443	7147396.358	513039.203	405.740	TOP N PROFILE GS
40441	7147390.846	513040.837	403.864	TOP N PROFILE CONC BLOCKS
40442	7147394.708	513041.259	404.523	TOP N PROFILE GS
40440	7147390.314	513043.870	403.247	TOP N PROFILE CONC BLOCKS
40439	7147389.529	513046.883	402.645	TOP N PROFILE CONC BLOCKS
40438	7147388.865	513050.962	401.827	TOP N PROFILE CONC BLOCKS

40437	7147388.294	513054.195	401.170	TOP N PROFILE CONC BLOCKS
40436	7147387.464	513057.587	400.411	TOP N PROFILE CONC BLOCKS
40435	7147386.908	513061.040	399.738	TOP N PROFILE CONC BLOCKS
40434	7147386.220	513064.501	398.993	TOP N PROFILE CONC BLOCKS
40433	7147385.892	513066.592	398.843	TOP N PROFILE CONC BLOCKS
40432	7147385.073	513069.788	398.821	TOP N PROFILE CONC BLOCKS
40431	7147384.185	513073.660	398.900	TOP N PROFILE CONC BLOCKS
40430	7147383.634	513077.348	398.983	TOP N PROFILE CONC BLOCKS
40429	7147382.763	513080.636	398.942	TOP N PROFILE CONC BLOCKS
40428	7147382.591	513081.056	398.790	TOP N PROFILE CONC BLOCKS

GABION 1-4 Profile North TOE

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
40497	7147442.524	512857.236	413.578	TOE N PROFILE
40499	7147436.428	512857.468	412.053	TOE N PROFILE
40498	7147438.570	512857.489	412.514	TOE N PROFILE
40500	7147433.442	512857.668	411.659	TOE N PROFILE
40504	7147433.331	512857.773	411.647	TOE N PROFILE
40505	7147431.826	512859.656	411.544	TOE N PROFILE
40506	7147431.411	512861.907	411.366	TOE N PROFILE
40507	7147431.040	512864.230	411.235	TOE N PROFILE
40508	7147431.263	512867.660	411.119	TOE N PROFILE
40509	7147430.713	512871.252	411.219	TOE N PROFILE
40510	7147430.403	512873.925	411.245	TOE N PROFILE
40511	7147430.355	512876.576	411.161	TOE N PROFILE
40512	7147430.785	512879.625	411.097	TOE N PROFILE
40513	7147430.786	512882.352	411.136	TOE N PROFILE
40514	7147429.841	512884.507	411.119	TOE N PROFILE
40515	7147431.014	512886.814	411.270	TOE N PROFILE
40516	7147431.142	512887.922	411.417	TOE N PROFILE GA
40517	7147430.984	512888.242	411.639	TOE N PROFILE GA
40518	7147430.952	512888.557	411.672	TOE N PROFILE GA
40519	7147430.815	512889.088	411.455	TOE N PROFILE GA
40520	7147430.692	512889.222	411.092	TOE N PROFILE GA
40521	7147430.687	512889.954	411.091	TOE N PROFILE GA
40522	7147430.572	512890.040	410.737	TOE N PROFILE GA
40523	7147430.520	512890.888	410.659	TOE N PROFILE GA
40524	7147430.211	512891.970	410.721	TOE N PROFILE GA
40525	7147430.044	512892.728	410.797	TOE N PROFILE GA
40526	7147429.973	512892.886	410.357	TOE N PROFILE GA
40527	7147429.576	512894.647	410.298	TOE N PROFILE GA
40528	7147429.490	512895.193	410.403	TOE N PROFILE GA
40529	7147429.486	512895.591	410.288	TOE N PROFILE GA
40530	7147429.404	512895.797	410.030	TOE N PROFILE GA
40531	7147428.826	512897.284	410.003	TOE N PROFILE GA
40532	7147428.812	512898.345	409.994	TOE N PROFILE GA
40533	7147428.882	512898.713	410.336	TOE N PROFILE GA
40534	7147428.789	512899.418	410.265	TOE N PROFILE GA
40535	7147428.722	512899.567	410.094	TOE N PROFILE GA
40536	7147428.406	512900.799	409.725	TOE N PROFILE GA
40537	7147428.206	512901.588	409.578	TOE N PROFILE GA
40538	7147427.487	512902.964	409.575	TOE N PROFILE GABION
40539	7147427.147	512903.718	409.457	TOE N PROFILE GABION
40540	7147427.322	512904.868	409.471	TOE N PROFILE GABION
40541	7147427.165	512905.812	409.446	TOE N PROFILE GABION
40542	7147427.214	512906.842	409.430	TOE N PROFILE GABION
40543	7147426.820	512907.780	409.458	TOE N PROFILE GABION
40544	7147426.857	512909.357	409.406	TOE N PROFILE GABION
40545	7147426.419	512910.373	409.507	TOE N PROFILE GABION
40546	7147426.287	512911.667	409.569	TOE N PROFILE GABION

40547	7147426.203	512913.632	409.618	TOE N PROFILE GABION
40548	7147425.853	512915.067	409.628	TOE N PROFILE GABION
40549	7147424.802	512916.794	409.578	TOE N PROFILE GABION
40550	7147424.565	512918.592	409.699	TOE N PROFILE GABON
40551	7147424.081	512920.280	409.644	TOE N PROFILE GABON
40552	7147423.513	512922.234	409.688	TOE N PROFILE GABON
40553	7147422.893	512924.195	409.726	TOE N PROFILE GABON
40554	7147421.556	512925.026	409.839	TOE N PROFILE GABON
40555	7147420.518	512926.333	409.787	TOE N PROFILE GABON
40556	7147419.790	512928.443	409.827	TOE N PROFILE GABON
40557	7147418.851	512930.232	409.861	TOE N PROFILE GABON
40558	7147418.114	512931.884	409.859	TOE N PROFILE
40559	7147416.907	512934.008	409.835	TOE N PROFILE
40560	7147415.698	512935.906	409.836	TOE N PROFILE
40561	7147415.013	512938.488	409.763	TOE N PROFILE
40562	7147414.419	512940.972	409.860	TOE N PROFILE
40563	7147414.020	512942.828	409.854	TOE N PROFILE GABION
40564	7147413.612	512943.828	409.757	TOE N PROFILE GABION
40565	7147413.462	512944.120	410.356	TOE N PROFILE GABION
40566	7147413.397	512944.627	410.271	TOE N PROFILE GABION
40567	7147413.241	512944.905	410.023	TOE N PROFILE GABION
40568	7147413.074	512945.067	409.568	TOE N PROFILE GABION
40569	7147412.847	512945.821	409.537	TOE N PROFILE GABION
40570	7147412.815	512945.966	409.222	TOE N PROFILE GABION
40571	7147412.580	512946.624	409.084	TOE N PROFILE GABION
40572	7147412.291	512947.412	409.212	TOE N PROFILE GABION
40573	7147412.136	512947.656	409.120	TOE N PROFILE GABION
40574	7147412.060	512947.769	408.708	TOE N PROFILE GABION
40575	7147411.719	512948.620	408.636	TOE N PROFILE GABION
40576	7147411.550	512949.393	408.781	TOE N PROFILE GABION
40577	7147411.441	512949.668	408.138	TOE N PROFILE GABION
40578	7147410.859	512951.240	408.127	TOE N PROFILE GABION
40579	7147410.874	512951.443	407.715	TOE N PROFILE GABION
40580	7147410.569	512952.251	407.646	TOE N PROFILE GABION
40581	7147410.403	512952.873	407.686	TOE N PROFILE GABION
40582	7147410.275	512953.301	407.128	TOE N PROFILE GABION
40583	7147409.865	512954.734	407.070	TOE N PROFILE GABION
40584	7147409.421	512956.203	407.027	TOE N PROFILE GABION
40585	7147408.730	512957.713	407.032	TOE N PROFILE GABION
40586	7147408.410	512959.165	407.272	TOE N PROFILE GABION
40587	7147408.299	512959.879	407.541	TOE N PROFILE GABION
40588	7147408.140	512960.627	407.443	TOE N PROFILE GABION
40589	7147407.929	512960.706	407.031	TOE N PROFILE GABION
40590	7147407.550	512962.490	406.896	TOE N PROFILE GA
40591	7147407.027	512964.516	406.941	TOE N PROFILE GA
40592	7147406.338	512966.609	406.868	TOE N PROFILE GA
40593	7147405.784	512968.511	406.892	TOE N PROFILE GA
40594	7147405.168	512970.166	406.534	TOE N PROFILE GA
40595	7147404.225	512972.080	406.758	TOE N PROFILE GA
40596	7147404.083	512975.150	407.014	TOE N PROFILE
40597	7147402.309	512977.113	406.958	TOE N PROFILE
40598	7147402.067	512979.434	406.858	TOE N PROFILE
40599	7147401.736	512981.316	406.874	TOE N PROFILE
40600	7147401.562	512982.563	406.848	TOE N PROFILE GABION
40601	7147401.566	512982.821	407.295	TOE N PROFILE GABION
40602	7147401.487	512983.689	407.123	TOE N PROFILE GABION
40603	7147401.340	512983.948	406.789	TOE N PROFILE GABION
40604	7147401.242	512984.747	406.691	TOE N PROFILE GABION
40605	7147401.267	512984.967	406.374	TOE N PROFILE GABION
40606	7147401.095	512985.722	406.157	TOE N PROFILE GABION
40607	7147400.912	512986.310	406.448	TOE N PROFILE GABION

40608	7147400.890	512986.827	405.907	TOE N PROFILE GABION
40609	7147400.726	512987.712	405.669	TOE N PROFILE GABION
40610	7147400.560	512988.546	405.830	TOE N PROFILE GABION
40611	7147400.486	512988.898	405.273	TOE N PROFILE GABION
40612	7147400.535	512989.662	405.320	TOE N PROFILE GABION
40613	7147400.390	512990.542	405.311	TOE N PROFILE GABION
40614	7147400.390	512990.795	404.844	TOE N PROFILE GABION
40615	7147399.828	512992.342	404.644	TOE N PROFILE GABION
40616	7147398.797	512994.037	404.677	TOE N PROFILE GABION
40617	7147398.484	512995.879	404.709	TOE N PROFILE GABION
40618	7147398.425	512996.120	405.326	TOE N PROFILE GABION
40619	7147398.293	512996.649	405.316	TOE N PROFILE GABION
40620	7147398.242	512997.105	404.671	TOE N PROFILE GABION
40621	7147398.091	512998.426	404.716	TOE N PROFILE GABION
40622	7147397.690	513000.453	404.885	TOE N PROFILE GABION
40623	7147396.945	513002.616	404.872	TOE N PROFILE GABION
40624	7147396.160	513004.843	404.858	TOE N PROFILE GABION
40625	7147395.930	513006.860	404.891	TOE N PROFILE GABION
40626	7147395.932	513008.491	404.783	TOE N PROFILE
40627	7147396.058	513010.511	405.021	TOE N PROFILE
40628	7147396.297	513013.022	404.894	TOE N PROFILE
40629	7147396.864	513015.141	404.973	TOE N PROFILE
40630	7147396.461	513017.630	405.020	TOE N PROFILE
40631	7147395.434	513020.308	404.905	TOE N PROFILE
40632	7147394.484	513022.914	404.906	TOE N PROFILE
40633	7147392.905	513025.404	404.900	TOE N PROFILE
40634	7147391.606	513027.383	404.795	TOE N PROFILE
40635	7147391.054	513028.129	404.682	TOE N PROFILE GABION
40636	7147391.010	513028.241	404.876	TOE N PROFILE GABION
40637	7147390.448	513029.179	404.830	TOE N PROFILE GABION
40638	7147390.250	513029.409	405.371	TOE N PROFILE GABION
40639	7147389.894	513030.152	405.214	TOE N PROFILE GABION
40640	7147389.747	513030.379	404.711	TOE N PROFILE GABION
40641	7147389.532	513030.874	404.572	TOE N PROFILE GABION
40642	7147389.544	513031.139	404.232	TOE N PROFILE GABION
40643	7147389.435	513031.929	404.174	TOE N PROFILE GABION
40644	7147389.052	513032.663	404.163	TOE N PROFILE GABION
40645	7147389.055	513032.947	403.738	TOE N PROFILE GABION
40646	7147389.313	513033.654	403.892	TOE N PROFILE GABION
40647	7147389.294	513034.866	403.666	TOE N PROFILE GABION
40648	7147389.235	513035.111	403.186	TOE N PROFILE GABION
40649	7147388.892	513035.998	403.009	TOE N PROFILE GABION
40650	7147388.605	513036.646	403.027	TOE N PROFILE GABION
40651	7147388.289	513037.594	402.005	TOE N PROFILE GABION
40653	7147387.978	513039.073	402.318	CONC BLOCKS
40654	7147387.799	513039.654	402.489	CONC BLOCKS
40655	7147387.459	513040.614	402.287	CONC BLOCKS
40656	7147387.034	513043.176	401.807	CONC BLOCKS
40657	7147386.497	513045.725	401.212	CONC BLOCKS
40379	7147386.297	513046.005	401.214	CONC BLOCKS
40658	7147386.039	513048.155	400.802	CONC BLOCKS
40659	7147385.534	513050.762	400.278	CONC BLOCKS
40660	7147385.191	513053.575	399.777	CONC BLOCKS
40661	7147384.906	513055.155	399.428	CONC BLOCKS
40662	7147384.736	513055.879	399.247	CONC BLOCKS
40663	7147384.245	513058.114	398.825	CONC BLOCKS
40664	7147383.751	513060.250	398.356	CONC BLOCKS
40412	7147383.443	513060.592	398.280	CONC BLOCKS
40665	7147383.452	513061.259	398.093	CONC BLOCKS
40666	7147383.199	513061.886	397.972	CONC BLOCKS
40667	7147382.823	513063.122	397.673	CONC BLOCKS

40668	7147382.655	513063.824	397.534	CONC BLOCKS
40669	7147382.451	513065.464	397.351	CONC BLOCKS
40670	7147382.100	513067.427	397.294	CONC BLOCKS
40671	7147381.714	513069.598	397.339	CONC BLOCKS
40672	7147381.345	513071.417	397.295	CONC BLOCKS
40673	7147380.802	513073.254	397.468	CONC BLOCKS
40674	7147380.328	513075.150	397.664	CONC BLOCKS
40675	7147379.792	513077.364	397.650	CONC BLOCKS
40676	7147379.488	513079.278	397.643	CONC BLOCKS
40677	7147379.531	513079.706	397.541	CONC BLOCKS
40678	7147378.889	513080.908	397.590	TOE N PROFILE
40679	7147379.911	513082.274	397.959	TOE N PROFILE
40680	7147377.969	513084.213	397.870	TOE N PROFILE
40681	7147376.885	513086.899	397.969	TOE N PROFILE
40682	7147375.503	513089.857	397.761	TOE N PROFILE
40683	7147375.197	513092.341	397.733	TOE N PROFILE SLIDE AREA
40684	7147373.996	513094.369	397.588	TOE N PROFILE SLIDE AREA
40685	7147370.975	513095.106	397.403	TOE N PROFILE SLIDE AREA
40686	7147370.330	513096.324	397.486	TOE N PROFILE SLIDE AREA
40687	7147369.968	513097.245	397.355	TOE N PROFILE SLIDE AREA
40688	7147368.479	513099.594	397.351	TOE N PROFILE SLIDE AREA
40681	7147374.251	513090.156	398.725	TOE N PROFILE

GABION 1-4 Profile South TOP

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
40713	7147369.229	513077.891	398.940	TOP S PROFILE CONC BLOCKS
40714	7147369.550	513077.342	399.217	TOP S PROFILE CONC BLOCKS
40715	7147370.211	513073.631	399.184	TOP S PROFILE CONC BLOCKS
40716	7147371.036	513069.913	398.875	TOP S PROFILE CONC BLOCKS
40717	7147371.903	513066.170	398.762	TOP S PROFILE CONC BLOCKS
40718	7147372.557	513062.786	398.959	TOP S PROFILE CONC BLOCKS
40719	7147373.114	513059.795	399.552	TOP S PROFILE CONC BLOCKS
40720	7147373.957	513056.054	400.262	TOP S PROFILE CONC BLOCKS
40721	7147374.726	513052.182	401.005	TOP S PROFILE CONC BLOCKS
40722	7147375.500	513048.935	401.814	TOP S PROFILE CONC BLOCKS
40723	7147376.132	513045.118	402.552	TOP S PROFILE CONC BLOCKS
40724	7147376.707	513041.239	403.352	TOP S PROFILE CONC BLOCKS
40725	7147377.445	513038.163	404.009	TOP S PROFILE CONC BLOCKS
40726	7147376.168	513037.632	404.358	TOP S PROFILE LARGE ROCKS
40727	7147375.993	513036.002	404.700	TOP S PROFILE LARGE ROCKS
40728	7147376.141	513033.270	405.150	TOP S PROFILE LARGE ROCKS
40729	7147376.029	513030.184	405.726	TOP S PROFILE LARGE ROCKS
40730	7147376.327	513028.947	405.716	TOP S PROFILE GABION
40731	7147376.567	513028.100	406.287	TOP S PROFILE GABION
40732	7147376.673	513027.568	406.521	TOP S PROFILE GABION
40733	7147376.896	513027.392	406.930	TOP S PROFILE GABION
40734	7147377.116	513026.639	406.972	TOP S PROFILE GABION
40735	7147377.186	513026.634	407.235	TOP S PROFILE GABION
40736	7147377.454	513025.656	407.215	TOP S PROFILE GABION
40737	7147377.340	513024.317	407.087	TOP S PROFILE ROCKS
40738	7147377.398	513020.405	407.477	TOP S PROFILE ROCKS
40739	7147378.299	513017.548	407.608	TOP S PROFILE ROCKS
40740	7147379.059	513013.909	407.862	TOP S PROFILE ROCKS
40741	7147379.199	513011.384	408.019	TOP S PROFILE ROCKS
40742	7147378.981	513007.495	408.268	TOP S PROFILE GS
40743	7147380.323	513002.299	408.354	TOP S PROFILE GS
40744	7147381.493	512997.610	408.352	TOP S PROFILE GS
40745	7147382.214	512993.312	408.425	TOP S PROFILE GS
40746	7147383.020	512989.639	408.760	TOP S PROFILE GS
40747	7147384.985	512984.771	408.942	TOP S PROFILE GS

40748	7147386.423	512980.711	409.074	TOP S PROFILE GS
40749	7147387.768	512975.993	409.581	TOP S PROFILE GS
40750	7147388.537	512970.611	409.889	TOP S PROFILE GS
40751	7147389.181	512966.078	410.116	TOP S PROFILE GS
40752	7147390.341	512961.805	410.580	TOP S PROFILE GS
40753	7147390.869	512957.373	410.841	TOP S PROFILE GS
40754	7147391.039	512954.250	411.046	TOP S PROFILE GS
40755	7147392.905	512949.559	411.249	TOP S PROFILE GS
40756	7147393.824	512945.823	411.402	TOP S PROFILE GS
40757	7147396.985	512943.176	411.244	TOP S PROFILE GS
40758	7147398.900	512939.440	411.846	TOP S PROFILE GS
40759	7147400.624	512935.066	412.257	TOP S PROFILE GS
40760	7147401.649	512930.147	412.301	TOP S PROFILE GS
40761	7147402.662	512925.207	412.511	TOP S PROFILE GS
40762	7147403.703	512921.496	412.828	TOP S PROFILE ROCKS
40763	7147403.734	512918.130	413.590	TOP S PROFILE ROCKS
40764	7147403.617	512914.033	413.661	TOP S PROFILE ROCKS
40765	7147403.497	512911.680	413.474	TOP S PROFILE GS
40766	7147404.841	512907.635	413.452	TOP S PROFILE GS
40767	7147405.828	512903.417	413.330	TOP S PROFILE GS
40768	7147408.374	512898.699	413.145	TOP S PROFILE GS
40769	7147407.563	512898.264	413.348	TOP S PROFILE GS
40770	7147409.839	512895.460	413.004	TOP S PROFILE GS
40771	7147410.555	512895.434	413.511	TOP S PROFILE ROCKS
40772	7147411.255	512893.933	413.615	TOP S PROFILE ROCKS
40773	7147410.949	512891.694	413.744	TOP S PROFILE ROCKS
40774	7147411.116	512889.835	413.799	TOP S PROFILE ROCKS
40775	7147412.395	512888.474	413.345	TOP S PROFILE GS
40776	7147414.792	512886.590	413.473	TOP S PROFILE GS
40777	7147413.659	512883.603	413.544	TOP S PROFILE GS
40778	7147415.202	512881.950	413.498	TOP S PROFILE GS
40779	7147416.056	512877.288	413.371	TOP S PROFILE GS
40780	7147415.559	512871.552	413.418	TOP S PROFILE GS
40781	7147415.354	512867.006	413.402	TOP S PROFILE GS
40782	7147415.834	512861.266	413.280	TOP S PROFILE GS

GABION 1-4 Profile South TOE

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
40791	7147421.404	512858.154	411.657	TOE S PROFILE
40792	7147422.764	512861.511	411.340	TOE S PROFILE
40793	7147423.947	512865.339	411.242	TOE S PROFILE
40794	7147424.214	512868.626	410.990	TOE S PROFILE
40795	7147424.639	512871.907	411.141	TOE S PROFILE
40796	7147425.011	512875.106	411.032	TOE S PROFILE
40797	7147425.237	512877.931	410.996	TOE S PROFILE
40798	7147425.236	512880.977	411.054	TOE S PROFILE
40799	7147425.186	512884.367	411.123	TOE S PROFILE
40800	7147424.780	512887.178	411.195	TOE S PROFILE GABION
40801	7147424.535	512887.610	411.493	TOE S PROFILE GABION
40802	7147424.420	512888.398	411.361	TOE S PROFILE GABION
40803	7147424.221	512888.659	411.067	TOE S PROFILE GABION
40804	7147424.036	512889.453	411.041	TOE S PROFILE GABION
40805	7147423.895	512889.713	410.666	TOE S PROFILE GABION
40806	7147423.660	512890.840	410.856	TOE S PROFILE GABION
40807	7147423.336	512891.344	410.709	TOE S PROFILE GABION
40808	7147423.270	512891.640	410.277	TOE S PROFILE GABION
40809	7147422.919	512892.861	410.462	TOE S PROFILE GABION
40810	7147422.836	512893.145	410.408	TOE S PROFILE GABION
40811	7147422.781	512893.505	409.859	TOE S PROFILE GABION
40812	7147422.452	512895.101	409.770	TOE S PROFILE GABION
40813	7147422.153	512895.902	409.873	TOE S PROFILE GABION

40814	7147422.053	512896.250	410.198	TOE S PROFILE GABION
40815	7147421.719	512896.964	410.190	TOE S PROFILE GABION
40816	7147421.613	512897.095	409.845	TOE S PROFILE GABION
40817	7147421.256	512898.991	409.592	TOE S PROFILE GABION
40818	7147420.671	512900.871	409.680	TOE S PROFILE GABION
40819	7147420.433	512903.122	409.584	TOE S PROFILE
40820	7147419.616	512906.159	409.396	TOE S PROFILE
40821	7147418.683	512908.884	409.397	TOE S PROFILE
40822	7147417.964	512911.509	409.733	TOE S PROFILE
40823	7147417.613	512913.998	409.707	TOE S PROFILE
40824	7147417.165	512916.469	409.738	TOE S PROFILE
40825	7147415.840	512919.562	409.820	TOE S PROFILE
40826	7147414.701	512922.897	409.733	TOE S PROFILE
40827	7147413.463	512925.861	409.501	TOE S PROFILE
40828	7147411.784	512929.120	409.582	TOE S PROFILE
40829	7147410.732	512931.264	409.566	TOE S PROFILE
40830	7147409.768	512933.342	409.661	TOE S PROFILE
40831	7147409.519	512936.473	409.468	TOE S PROFILE
40832	7147408.820	512938.484	409.518	TOE S PROFILE
40833	7147408.253	512940.167	409.522	TOE S PROFILE
40834	7147407.824	512941.703	409.625	TOE S PROFILE GABION
40835	7147407.635	512942.244	410.228	TOE S PROFILE GABION
40836	7147407.328	512942.720	410.099	TOE S PROFILE GABION
40837	7147407.082	512943.091	409.643	TOE S PROFILE GABION
40838	7147406.852	512943.698	409.623	TOE S PROFILE GABION
40839	7147406.674	512943.836	409.180	TOE S PROFILE GABION
40840	7147406.439	512944.744	409.029	TOE S PROFILE GABION
40841	7147406.257	512945.513	409.087	TOE S PROFILE GABION
40842	7147406.242	512945.740	408.662	TOE S PROFILE GABION
40843	7147405.838	512946.883	408.708	TOE S PROFILE GABION
40844	7147405.669	512947.372	408.599	TOE S PROFILE GABION
40845	7147405.614	512947.600	408.153	TOE S PROFILE GABION
40846	7147405.150	512948.628	408.182	TOE S PROFILE GABION
40847	7147405.039	512949.461	408.163	TOE S PROFILE GABION
40848	7147405.021	512949.793	407.604	TOE S PROFILE GABION
40849	7147404.657	512951.352	407.628	TOE S PROFILE GABION
40850	7147404.526	512951.736	407.150	TOE S PROFILE GABION
40851	7147403.853	512953.572	406.939	TOE S PROFILE GABION
40852	7147403.538	512955.704	407.058	TOE S PROFILE GABION
40853	7147403.144	512957.689	407.273	TOE S PROFILE GABION
40854	7147402.865	512958.452	407.281	TOE S PROFILE GABION
40855	7147402.821	512959.238	407.421	TOE S PROFILE GABION
40856	7147402.840	512959.455	407.036	TOE S PROFILE GABION
40857	7147402.265	512961.199	406.878	TOE S PROFILE
40858	7147401.264	512963.121	406.829	TOE S PROFILE
40859	7147399.933	512965.153	406.684	TOE S PROFILE
40860	7147399.190	512968.086	406.645	TOE S PROFILE
40861	7147398.550	512970.025	406.683	TOE S PROFILE
40862	7147397.823	512973.267	406.787	TOE S PROFILE
40863	7147396.836	512976.332	406.866	TOE S PROFILE
40864	7147396.113	512978.724	406.788	TOE S PROFILE
40865	7147396.229	512981.223	406.635	TOE S PROFILE GABION
40866	7147395.871	512981.679	407.127	TOE S PROFILE GABION
40867	7147395.619	512982.347	407.208	TOE S PROFILE GABION
40868	7147395.571	512982.585	406.690	TOE S PROFILE GABION
40869	7147395.433	512983.196	406.564	TOE S PROFILE GABION
40870	7147395.293	512983.553	406.173	TOE S PROFILE GABION
40871	7147395.014	512984.728	406.337	TOE S PROFILE GABION
40872	7147394.949	512985.163	406.167	TOE S PROFILE GABION
40873	7147394.892	512985.453	405.700	TOE S PROFILE GABION
40874	7147394.524	512986.794	405.677	TOE S PROFILE GABION

40875	7147394.462	512987.168	405.557	TOE S PROFILE GABION
40876	7147394.232	512987.527	405.222	TOE S PROFILE GABION
40877	7147393.906	512988.780	405.165	TOE S PROFILE GABION
40878	7147393.776	512989.074	404.749	TOE S PROFILE GABION
40879	7147393.672	512990.954	404.575	TOE S PROFILE GABION
40880	7147393.015	512992.700	404.760	TOE S PROFILE GABION
40881	7147392.527	512994.214	404.861	TOE S PROFILE GABION
40882	7147392.134	512994.612	405.366	TOE S PROFILE GABION
40883	7147392.069	512995.240	405.229	TOE S PROFILE GABION
40884	7147392.060	512995.445	404.783	TOE S PROFILE GABION
40885	7147391.798	512997.512	404.798	TOE S PROFILE GABION
40886	7147391.420	512999.734	404.890	TOE S PROFILE GABION
40887	7147390.930	513002.691	404.825	TOE S PROFILE GABION
40888	7147390.241	513005.176	404.696	TOE S PROFILE GABION
40889	7147389.557	513007.214	404.801	TOE S PROFILE
40890	7147388.306	513009.716	404.937	TOE S PROFILE
40891	7147386.812	513011.553	405.042	TOE S PROFILE
40892	7147386.048	513015.062	404.889	TOE S PROFILE
40893	7147385.082	513018.128	404.978	TOE S PROFILE
40894	7147384.262	513021.674	404.877	TOE S PROFILE
40895	7147383.779	513024.874	404.788	TOE S PROFILE
40896	7147383.844	513025.924	404.757	TOE S PROFILE GABION
40897	7147383.701	513027.279	404.736	TOE S PROFILE GABION
40898	7147383.627	513027.552	405.233	TOE S PROFILE GABION
40899	7147383.464	513028.259	405.080	TOE S PROFILE GABION
40900	7147383.440	513028.675	404.681	TOE S PROFILE GABION
40901	7147383.469	513029.117	404.529	TOE S PROFILE GABION
40902	7147383.374	513029.498	404.181	TOE S PROFILE GABION
40903	7147382.719	513030.894	404.260	TOE S PROFILE GABION
40904	7147382.525	513031.237	403.777	TOE S PROFILE GABION
40905	7147382.171	513032.773	403.890	TOE S PROFILE GABION
40906	7147382.127	513033.086	403.343	TOE S PROFILE GABION
40907	7147382.270	513034.638	403.373	TOE S PROFILE GABION
40908	7147381.985	513035.061	402.836	TOE S PROFILE GABION
40909	7147381.625	513036.147	402.706	TOE S PROFILE GABION
40910	7147381.464	513036.399	401.821	TOE S PROFILE GABION
40911	7147381.335	513036.652	402.642	TOE S PROFILE ROCKS
40912	7147380.801	513037.889	402.520	TOE S PROFILE CONC BLOCKS
40913	7147380.628	513038.247	402.566	TOE S PROFILE CONC BLOCKS
40914	7147380.058	513040.963	402.058	TOE S PROFILE CONC BLOCKS
40915	7147379.546	513043.732	401.384	TOE S PROFILE CONC BLOCKS
40916	7147379.054	513046.465	400.855	TOE S PROFILE CONC BLOCKS
40917	7147378.487	513049.599	400.203	TOE S PROFILE CONC BLOCKS
40918	7147377.743	513052.753	399.595	TOE S PROFILE CONC BLOCKS
40919	7147377.246	513055.963	398.896	TOE S PROFILE CONC BLOCKS
40920	7147376.545	513058.671	398.310	TOE S PROFILE CONC BLOCKS
40921	7147376.193	513059.929	398.033	TOE S PROFILE CONC BLOCKS
40922	7147375.780	513062.148	397.669	TOE S PROFILE CONC BLOCKS
40923	7147375.143	513063.986	397.402	TOE S PROFILE CONC BLOCKS
40924	7147374.908	513066.472	397.411	TOE S PROFILE CONC BLOCKS
40925	7147374.814	513067.966	397.346	TOE S PROFILE CONC BLOCKS
40926	7147374.032	513070.417	397.568	TOE S PROFILE CONC BLOCKS
40927	7147373.861	513072.892	397.568	TOE S PROFILE CONC BLOCKS
40928	7147373.330	513075.238	397.680	TOE S PROFILE CONC BLOCKS
40929	7147372.618	513078.314	397.590	TOE S PROFILE CONC BLOCKS
40930	7147372.650	513079.284	397.468	TOE S PROFILE
40699	7147365.293	513081.082	398.463	TOE S PROFILE
40931	7147371.570	513081.659	397.805	TOE S PROFILE
40932	7147369.686	513084.605	397.897	TOE S PROFILE
40698	7147365.564	513085.775	398.240	TOE S PROFILE
40933	7147368.869	513087.429	397.704	TOE S PROFILE

40697	7147366.443	513088.808	398.053	TOE S PROFILE
40696	7147367.277	513091.058	397.832	TOE S PROFILE
40695	7147367.822	513093.094	397.602	TOE S PROFILE
40694	7147367.612	513095.326	397.643	TOE S PROFILE
40693	7147367.042	513096.900	397.629	TOE S PROFILE
40897.6077	7147367.244	513089.165	398.747	TOE S PROFILE
40898.18193	7147366.837	513090.645	398.652	TOE S PROFILE
40898.75616	7147366.431	513092.126	398.558	TOE S PROFILE

Extra Breaklines

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
40501	7147434.565	512858.390	412.136	BRK2
40502	7147436.324	512858.437	412.770	BRK2
40503	7147439.078	512858.510	413.449	BRK2
40783	7147415.566	512861.183	413.319	BKR3
40784	7147413.109	512861.210	413.606	BKR3
40785	7147410.851	512861.491	413.830	BKR3
40786	7147408.939	512862.049	413.885	BKR3
40787	7147408.157	512861.106	413.374	BKR4
40788	7147411.457	512860.025	413.065	BKR4
40789	7147415.845	512859.303	412.678	BKR4
40790	7147418.032	512860.987	412.416	BKR4
140972	7147443.165	512852.691	413.725	BRK5
140973	7147440.317	512852.849	413.041	BRK5
140974	7147437.426	512853.119	412.246	BRK5
140975	7147435.269	512853.142	411.724	BRK5

CLINTON CREEK LONG TERM PERFORMANCE MONITORING PROGRAM
(August/September 2016)

UTM COORDINATES
NAD 83, Zone 7, 141º West

CONTROL			
	NORTHING	EASTING	OTHOMETRIC HEIGHT
2835	7147272.816	513147.027	432.618

Coordinates shown below are derived from Real time Kinematic GPS observations holding 2016 values of control point 2835 fixed in 3D

CROSS SECTION A, B, C, D, E AND F

XS A

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
50480	7147462.221	512982.052	425.500	X SEC A
50479	7147455.642	512980.374	422.977	X SEC A
50478	7147448.305	512978.175	418.834	X SEC A
50477	7147441.021	512976.604	414.336	X SEC A
50476	7147434.209	512974.940	411.286	X SEC A
50475	7147429.077	512973.915	409.710	X SEC A
50474	7147428.714	512973.728	408.956	X SEC A
50473	7147427.720	512973.547	409.122	X SEC A
50472	7147427.031	512973.443	409.675	X SEC A
50471	7147421.350	512971.954	409.870	X SEC A
50470	7147414.084	512970.107	409.570	X SEC A
50469	7147410.779	512969.335	408.527	X SEC A
50468	7147407.759	512968.709	407.251	X SEC A
50467	7147402.734	512967.430	406.568	X SEC A
50357	7147397.704	512966.209	407.429	X SEC A
50358	7147393.650	512965.112	408.559	X SEC A
50359	7147390.031	512964.237	410.297	X SEC A
50360	7147386.429	512963.357	410.640	X SEC A
50361	7147384.572	512962.914	412.211	X SEC A
50362	7147381.153	512962.187	412.220	X SEC A
50363	7147378.826	512961.614	412.681	X SEC A
50364	7147376.139	512960.966	412.630	X SEC A
50365	7147372.264	512959.987	413.118	X SEC A
50366	7147366.903	512958.617	415.346	X SEC A
50367	7147361.862	512957.442	417.878	X SEC A
50368	7147354.848	512955.721	418.487	X SEC A
50369	7147346.372	512953.658	418.791	X SEC A
50370	7147337.269	512951.408	419.081	X SEC A
50371	7147334.287	512950.640	419.369	X SEC A
50372	7147331.371	512949.983	420.324	X SEC A
50373	7147329.432	512949.507	421.371	X SEC A
50374	7147328.784	512949.397	420.976	X SEC A
50375	7147324.399	512948.255	421.266	X SEC A
50376	7147320.529	512947.334	421.468	X SEC A
50377	7147319.916	512947.172	421.859	X SEC A
50378	7147316.137	512946.342	421.951	X SEC A

50379	7147315.405	512946.085	422.338	X SEC A
50380	7147313.734	512945.677	421.660	X SEC A
50381	7147312.413	512945.367	421.582	X SEC A
50382	7147311.505	512945.141	421.705	X SEC A
50383	7147310.797	512944.948	421.950	X SEC A
50384	7147310.027	512944.759	421.994	X SEC A
50385	7147308.963	512944.537	421.392	X SEC A
50386	7147308.532	512944.454	421.366	X SEC A
50387	7147307.833	512944.282	421.047	X SEC A
50388	7147303.258	512943.150	420.996	X SEC A
50389	7147302.234	512942.900	421.065	X SEC A
50390	7147299.546	512942.187	420.965	X SEC A
50391	7147298.546	512941.969	421.195	X SEC A
50392	7147291.131	512940.179	425.395	X SEC A
50393	7147284.182	512938.524	428.834	X SEC A
50394	7147275.685	512936.448	433.077	X SEC A
50395	7147264.261	512933.598	438.444	X SEC A
50396	7147261.586	512933.020	439.027	X SEC A
50397	7147258.270	512932.161	440.401	X SEC A
50398	7147256.637	512931.785	440.103	X SEC A

XS B

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
50481	7147442.223	513026.361	424.065	X SEC B
50482	7147434.740	513023.269	420.882	X SEC B
50483	7147432.251	513022.430	417.486	X SEC B
50484	7147425.350	513020.346	414.098	X SEC B
50485	7147423.320	513019.792	413.053	X SEC B
50486	7147417.259	513018.360	410.355	X SEC B
50487	7147411.056	513016.560	407.840	X SEC B
50488	7147407.468	513015.468	407.695	X SEC B
50489	7147403.136	513014.117	407.410	X SEC B
50490	7147400.081	513013.297	406.036	X SEC B
50491	7147397.882	513012.708	405.222	X SEC B
50492	7147391.121	513011.105	404.858	X SEC B
50435	7147385.809	513009.588	405.277	X SEC B
50434	7147382.718	513008.588	406.718	X SEC B
50433	7147378.985	513007.469	408.270	X SEC B
50432	7147376.607	513006.829	408.037	X SEC B
50431	7147373.578	513006.069	408.207	X SEC B
50430	7147368.026	513004.486	413.171	X SEC B
50429	7147364.349	513003.554	415.299	X SEC B
50428	7147357.850	513001.641	416.146	X SEC B
50427	7147352.987	513000.279	416.630	X SEC B
50426	7147347.007	512998.624	419.570	X SEC B
50425	7147341.436	512997.147	422.275	X SEC B
50424	7147340.693	512996.992	422.007	X SEC B
50423	7147340.189	512996.826	421.952	X SEC B
50422	7147340.100	512996.799	421.766	X SEC B
50421	7147339.787	512996.665	421.717	X SEC B
50420	7147339.490	512996.561	421.990	X SEC B
50419	7147338.749	512996.277	422.062	X SEC B
50418	7147337.897	512996.063	421.816	X SEC B
50417	7147335.173	512995.195	421.843	X SEC B
50416	7147329.411	512993.658	422.619	X SEC B
50415	7147323.270	512991.878	423.051	X SEC B

50414	7147318.133	512990.416	423.236	X SEC B
50413	7147313.711	512989.169	423.378	X SEC B
50412	7147312.674	512988.909	423.769	X SEC B
50411	7147311.445	512988.555	423.713	X SEC B
50410	7147310.245	512988.306	423.314	X SEC B
50409	7147304.591	512986.502	423.114	X SEC B
50408	7147297.975	512984.795	423.234	X SEC B
50407	7147295.314	512984.067	424.512	X SEC B
50406	7147293.670	512983.557	423.988	X SEC B
50405	7147290.066	512982.640	423.772	X SEC B
50404	7147286.297	512981.520	422.795	X SEC B
50403	7147277.793	512979.019	428.498	X SEC B
50402	7147269.640	512976.872	432.894	X SEC B
50401	7147261.702	512974.508	437.473	X SEC B
50400	7147256.291	512973.098	440.637	X SEC B
50399	7147252.250	512971.940	440.991	X SEC B

XS C

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
50503	7147415.450	513048.404	419.248	X SEC C
50502	7147414.616	513048.459	418.823	X SEC C
50501	7147413.593	513048.098	417.236	X SEC C
50500	7147410.432	513047.558	415.066	X SEC C
50499	7147406.368	513047.027	411.754	X SEC C
50498	7147399.840	513046.151	406.809	X SEC C
50497	7147398.386	513045.449	404.384	X SEC C
50496	7147393.988	513044.655	403.377	X SEC C
50495	7147390.319	513043.973	403.229	X SEC C
50494	7147387.023	513043.230	401.814	X SEC C
50493	7147383.584	513042.540	401.770	X SEC C
50436	7147379.913	513042.081	401.807	X SEC C
50437	7147376.294	513041.675	403.287	X SEC C
50438	7147371.616	513040.844	403.619	X SEC C
50439	7147368.315	513040.076	403.972	X SEC C
50440	7147358.634	513038.558	409.426	X SEC C
50441	7147347.080	513036.324	415.365	X SEC C
50442	7147341.279	513035.507	417.310	X SEC C
50443	7147333.104	513033.946	421.278	X SEC C
50444	7147328.407	513033.060	423.875	X SEC C
50445	7147325.940	513032.918	424.092	X SEC C
50446	7147321.087	513031.852	424.295	X SEC C
50447	7147313.261	513030.436	424.177	X SEC C
50448	7147306.242	513029.483	424.227	X SEC C
50449	7147305.282	513029.145	424.560	X SEC C
50450	7147300.642	513028.170	423.624	X SEC C
50451	7147296.190	513027.411	423.547	X SEC C
50452	7147291.494	513026.889	423.645	X SEC C
50453	7147289.234	513026.451	424.270	X SEC C
50454	7147287.191	513026.059	424.551	X SEC C
50455	7147284.978	513025.798	424.600	X SEC C
50456	7147283.465	513025.421	424.506	X SEC C
50457	7147282.394	513025.215	423.992	X SEC C
50458	7147278.293	513024.418	424.031	X SEC C
50459	7147275.417	513023.940	424.336	X SEC C
50460	7147272.846	513023.668	425.174	X SEC C
50461	7147268.664	513022.662	428.385	X SEC C

50462	7147259.709	513021.478	432.971	X SEC C
50463	7147251.815	513020.002	437.529	X SEC C
50464	7147243.433	513018.517	442.167	X SEC C
50441	7147240.642	513017.925	432.441	X SEC C
50440	7147236.093	513017.131	433.130	X SEC C

XS D

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
11131	7147199.137	513247.631	424.647	X-SEC D
11172	7147332.475	513287.614	410.087	X-SEC D
50072	7147343.923	513290.625	416.529	X-SEC D
50073	7147328.441	513286.478	407.698	X-SEC D
50074	7147325.043	513284.077	405.385	X-SEC D
50191	7147318.812	513281.924	390.055	X SEC D
50192	7147315.801	513281.043	389.992	X SEC D
50193	7147312.540	513280.345	390.209	X SEC D
50194	7147308.132	513279.401	390.380	X SEC D
50525	7147295.666	513275.428	403.451	X SEC D
50526	7147289.003	513273.856	405.731	X SEC D
50527	7147281.282	513272.262	405.269	X SEC D
50528	7147278.896	513271.641	405.105	X SEC D
50529	7147277.638	513271.213	405.218	X SEC D
50530	7147275.928	513270.451	405.168	X SEC D
50531	7147274.782	513270.008	404.712	X SEC D
50532	7147270.092	513268.899	404.300	X SEC D
50533	7147260.791	513266.251	404.927	X SEC D
50534	7147255.433	513264.638	405.357	X SEC D
50535	7147249.654	513262.506	405.491	X SEC D
50536	7147246.735	513261.795	405.778	X SEC D
50537	7147242.998	513260.714	408.469	X SEC D
50538	7147242.168	513260.562	408.312	X SEC D
50539	7147237.965	513259.321	408.908	X SEC D
50540	7147235.556	513258.326	410.469	X SEC D
50541	7147233.736	513257.889	411.426	X SEC D
50542	7147231.784	513257.500	411.790	X SEC D
50543	7147227.806	513256.263	414.315	X SEC D
50544	7147226.689	513255.781	416.006	X SEC D
50545	7147225.919	513255.727	415.898	X SEC D
50546	7147223.907	513254.907	416.745	X SEC D
50547	7147218.386	513253.463	417.522	X SEC D
50548	7147214.339	513252.390	418.502	X SEC D
50549	7147213.217	513251.939	419.037	X SEC D
50550	7147212.515	513251.643	418.870	X SEC D
50551	7147211.500	513251.310	419.362	X SEC D
50552	7147206.138	513249.823	420.442	X SEC D
50553	7147203.055	513248.671	423.047	X SEC D
50554	7147201.016	513248.106	423.647	X SEC D
50555	7147199.134	513247.498	424.589	X SEC D

XS E

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
50076	7147294.002	513386.524	412.131	X-SEC E
11169	7147290.890	513385.417	409.718	X-SEC E
50077	7147290.264	513385.237	409.400	X-SEC E
50078	7147285.675	513382.209	405.478	X-SEC E

50079	7147279.854	513380.269	400.654	X-SEC E
50080	7147278.379	513379.555	399.396	X-SEC E
50202	7147272.377	513375.351	385.866	X SEC E
50203	7147269.610	513373.911	385.250	X SEC E
50204	7147267.909	513372.583	385.658	X SEC E
50205	7147263.397	513369.709	386.559	X SEC E
50621	7147250.619	513366.911	395.949	X SEC E
50620	7147249.855	513366.655	395.862	X SEC E
50619	7147248.437	513365.979	396.004	X SEC E
50618	7147245.621	513364.569	396.355	X SEC E
50617	7147240.833	513362.622	396.080	X SEC E
50616	7147237.569	513361.170	395.914	X SEC E
50615	7147237.077	513360.917	395.748	X SEC E
50614	7147236.626	513360.725	395.830	X SEC E
50613	7147236.259	513360.503	396.201	X SEC E
50612	7147235.537	513360.092	395.930	X SEC E
50611	7147235.359	513360.068	395.750	X SEC E
50610	7147235.080	513359.841	395.745	X SEC E
50609	7147234.882	513359.795	396.025	X SEC E
50608	7147232.578	513358.723	396.184	X SEC E
50607	7147231.369	513358.319	396.734	X SEC E
50606	7147229.704	513357.558	396.742	X SEC E
50605	7147227.388	513356.466	397.815	X SEC E
50604	7147222.838	513354.457	402.226	X SEC E
50603	7147218.414	513352.406	405.276	X SEC E
50602	7147213.786	513350.324	408.479	X SEC E
50601	7147213.007	513349.888	408.648	X SEC E
50600	7147211.443	513349.126	409.053	X SEC E
50599	7147209.813	513348.523	408.923	X SEC E
50598	7147209.208	513348.219	409.236	X SEC E
50597	7147208.534	513347.782	408.678	X SEC E
50596	7147206.059	513346.729	408.696	X SEC E
50595	7147203.743	513345.922	408.616	X SEC E
50594	7147202.599	513345.439	408.781	X SEC E
50593	7147202.479	513345.299	408.545	X SEC E
50592	7147202.310	513345.192	408.538	X SEC E
50591	7147201.782	513345.082	408.754	X SEC E
50590	7147201.198	513344.840	408.811	X SEC E
50589	7147200.976	513344.729	408.756	X SEC E
50588	7147200.610	513344.448	408.732	X SEC E
50587	7147200.281	513344.289	408.856	X SEC E
50586	7147198.764	513343.513	408.998	X SEC E
50585	7147197.181	513342.802	409.010	X SEC E
50584	7147196.691	513342.528	409.160	X SEC E
50583	7147195.865	513342.196	409.216	X SEC E
50582	7147194.059	513341.319	408.612	X SEC E
50581	7147192.838	513340.695	408.610	X SEC E
50580	7147191.030	513339.828	409.159	X SEC E
50579	7147188.741	513338.954	410.535	X SEC E
50578	7147187.815	513338.580	410.698	X SEC E
50577	7147184.343	513336.824	414.154	X SEC E
50576	7147183.832	513336.581	413.962	X SEC E
50575	7147180.412	513334.974	413.899	X SEC E
50574	7147178.213	513333.922	415.668	X SEC E
50573	7147176.429	513333.308	415.523	X SEC E
50572	7147174.012	513332.180	415.750	X SEC E

50571	7147172.486	513331.409	416.541	X SEC E
50570	7147171.656	513330.974	417.360	X SEC E
50569	7147170.579	513330.622	417.312	X SEC E
50568	7147170.294	513330.455	416.996	X SEC E
50567	7147168.757	513329.633	417.206	X SEC E
50566	7147166.413	513328.503	419.041	X SEC E
50565	7147165.093	513327.976	419.182	X SEC E
50564	7147163.142	513327.152	419.454	X SEC E
50563	7147161.673	513326.562	419.229	X SEC E
50562	7147159.241	513325.379	419.630	X SEC E
50561	7147157.822	513324.654	419.499	X SEC E
50560	7147156.427	513323.921	419.648	X SEC E
50559	7147154.647	513323.188	419.561	X SEC E
50558	7147151.485	513321.679	420.957	X SEC E
50557	7147147.059	513319.668	422.280	X SEC E
11163	7147142.464	513317.791	425.399	X SEC E
49574	7147144.036	513318.659	421.421	X-SEC E

XS F

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
50068	7147359.452	513220.561	418.271	185 TOP
50069	7147356.297	513219.693	416.433	GS
50070	7147353.422	513218.468	414.706	GS
50180	7147332.812	513212.728	394.634	X SEC F
50181	7147327.396	513210.879	393.429	X SEC F
50182	7147322.912	513208.686	393.609	X SEC F
50183	7147315.597	513205.809	393.498	X SEC F
50524	7147301.870	513202.299	412.186	X SEC F
50523	7147299.758	513201.671	412.066	X SEC F
50522	7147296.879	513200.775	411.880	X SEC F
50521	7147293.253	513199.526	411.261	X SEC F
50520	7147292.805	513199.385	411.011	X SEC F
50519	7147291.753	513198.879	411.007	X SEC F
50518	7147285.523	513196.807	415.909	X SEC F
50517	7147279.934	513195.261	420.946	X SEC F
50516	7147275.663	513193.922	422.355	X SEC F
50515	7147268.858	513191.562	424.634	X SEC F
50514	7147263.048	513189.921	426.563	X SEC F
50513	7147262.331	513189.802	426.490	X SEC F
50512	7147261.624	513189.726	426.986	X SEC F
50511	7147255.981	513187.639	428.682	X SEC F
50510	7147254.837	513187.209	428.655	X SEC F
50509	7147253.107	513186.722	429.285	X SEC F
50508	7147252.655	513186.596	429.202	X SEC F
50507	7147251.142	513186.283	429.945	X SEC F
50506	7147249.923	513185.845	429.635	X SEC F
50505	7147248.477	513185.223	430.088	X SEC F
50504	7147247.095	513184.833	430.019	182 TOP

CLINTON CREEK LONG TERM PERFORMANCE MONITORING PROGRAM (August/September 2016)

UTM COORDINATES
NAD 83, Zone 7, 141º West

CONTROL			
	NORTHING	EASTING	OTHOMETRIC HEIGHT
2835	7147272.816	513147.027	432.618

Coordinates shown below are derived from Real time Kinematic GPS observations holding 2016 values of control point 2835 fixed in 3D

Hudgeon Lake and Log Boom Locations

Log Boom

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
141009	7147418.064	512821.634	413.301	TOP BLD
141010	7147416.310	512819.481	413.285	TOP BLD
141011	7147419.653	512814.884	411.810	ROCK LIMIT
141012	7147420.576	512815.033	412.153	ROCK LIMIT
141013	7147420.865	512816.505	412.472	ROCK LIMIT
141014	7147419.118	512818.970	412.247	ROCK LIMIT
141015	7147418.003	512821.762	412.258	ROCK LIMIT
141016	7147417.853	512822.484	412.112	ROCK LIMIT
141017	7147416.262	512822.871	411.904	ROCK LIMIT
141018	7147415.273	512822.435	411.747	ROCK LIMIT
141076	7147395.360	512829.096	411.732	ROCK LIMIT
141077	7147394.777	512830.272	412.588	ROCK LIMIT
141078	7147393.361	512830.620	412.492	ROCK LIMIT
141079	7147390.523	512829.307	412.547	ROCK LIMIT
141080	7147389.936	512828.196	412.362	ROCK LIMIT
141081	7147387.448	512826.681	412.477	ROCK LIMIT
141082	7147387.517	512824.821	411.814	ROCK LIMIT
141083	7147390.623	512829.441	413.348	TOP BLD
141084	7147393.171	512830.510	413.273	TOP BLD
141085	7147392.849	512827.778	413.290	TOP BLD
50004	7147419.043	512819.040	413.282	TOP BLD

Hudgeon Lake

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
140942	7147454.624	512794.524	415.886	TOP
140943	7147452.801	512796.960	415.680	TOP
140944	7147451.559	512799.984	415.119	TOP
140945	7147448.073	512802.063	414.690	TOP
140946	7147444.085	512803.891	414.394	TOP
140947	7147440.161	512805.414	414.365	TOP
140948	7147435.703	512805.758	414.333	TOP
140949	7147431.828	512805.662	414.174	TOP
140950	7147429.537	512806.689	414.025	TOP
140951	7147427.470	512809.182	413.840	TOP
140952	7147424.882	512811.405	413.246	TOP
140953	7147422.219	512813.990	412.566	TOP
140954	7147420.908	512815.413	412.293	TOP
140955	7147418.974	512816.655	412.176	TOP
140956	7147419.241	512818.908	412.264	TOP
140957	7147418.215	512821.811	412.314	TOP
140958	7147419.005	512823.466	412.218	TOP
140959	7147419.994	512825.290	412.201	TOP
140960	7147422.647	512825.191	412.525	TOP
140961	7147426.321	512825.520	412.880	TOP
140962	7147430.566	512826.649	413.291	TOP
140963	7147432.624	512829.326	413.473	TOP
140964	7147434.120	512832.488	413.674	TOP
140965	7147434.737	512837.124	413.482	TOP
140966	7147435.770	512841.049	413.418	TOP
140967	7147436.692	512845.229	413.315	TOP
140968	7147437.335	512848.435	413.283	TOP
140969	7147438.650	512850.459	413.340	TOP

140970	7147441.158	512851.383	413.557	TOP
140971	7147444.061	512851.563	413.874	TOP
140976	7147434.495	512852.866	411.717	WE
140977	7147433.611	512849.032	411.715	WE
140978	7147432.618	512844.572	411.702	WE
140979	7147431.278	512840.265	411.713	WE
140980	7147430.058	512836.354	411.689	WE
140981	7147428.786	512832.763	411.706	WE
140982	7147428.002	512830.098	411.709	WE
140983	7147426.936	512828.837	411.701	WE
140984	7147423.292	512827.712	411.685	WE
140985	7147419.476	512826.789	411.705	WE
140986	7147416.689	512826.192	411.704	WE
140987	7147415.450	512825.135	411.712	WE
140988	7147415.155	512821.786	411.703	WE
140989	7147416.492	512820.084	411.698	WE
140990	7147417.276	512817.089	411.705	WE
140991	7147419.100	512814.838	411.699	WE
140992	7147420.098	512814.163	411.702	WE
140993	7147421.845	512811.001	411.698	WE
140994	7147423.980	512808.337	411.699	WE
140995	7147426.210	512804.707	411.698	WE
140996	7147428.946	512802.633	411.723	WE
140997	7147432.021	512801.493	411.731	WE
140998	7147434.173	512801.270	411.732	WE
140999	7147436.814	512800.235	411.729	WE
141000	7147436.228	512799.460	411.721	WE
141001	7147438.611	512799.593	411.711	WE
141002	7147441.763	512798.822	411.713	WE
141003	7147444.775	512796.117	411.709	WE
141004	7147447.371	512793.083	411.724	WE
141005	7147450.485	512788.648	411.720	WE
141027	7147418.107	512854.218	412.328	TOP2
141028	7147414.525	512850.976	412.713	TOP2
141029	7147410.334	512849.244	412.897	TOP2
141030	7147405.720	512849.839	413.500	TOP2
141031	7147402.719	512847.745	413.745	TOP2
141032	7147399.550	512844.765	413.741	TOP2
141033	7147397.841	512842.545	413.768	TOP2
141034	7147400.282	512837.974	412.845	TOP2
141035	7147398.465	512834.034	412.636	TOP2
141036	7147396.222	512832.124	412.758	TOP2
141037	7147393.777	512832.128	412.984	TOP2
141038	7147390.490	512830.487	413.051	TOP2
141039	7147386.857	512829.934	413.131	TOP2
141040	7147382.473	512828.698	412.881	TOP2
141041	7147379.396	512830.892	413.439	TOP2
141042	7147378.373	512833.159	413.732	TOP2
141043	7147376.171	512834.265	413.696	TOP2
141044	7147374.165	512833.953	413.618	TOP2
141045	7147369.820	512831.543	413.678	TOP2
141046	7147366.693	512827.743	413.764	TOP2
141047	7147363.266	512823.901	413.890	TOP2
141048	7147361.739	512820.041	413.691	TOP2
141049	7147364.967	512817.619	411.707	WE2
141050	7147366.721	512820.727	411.712	WE2
141051	7147368.358	512823.987	411.705	WE2
141052	7147370.846	512827.400	411.693	WE2
141053	7147373.738	512829.624	411.701	WE2
141055	7147375.826	512829.042	411.715	WE2
141056	7147378.972	512827.422	411.697	WE2
141057	7147381.506	512826.646	411.706	WE2
141058	7147382.412	512825.324	411.695	WE2
141059	7147384.704	512825.040	411.707	WE2
141060	7147387.026	512824.114	411.703	WE2
141061	7147389.849	512825.268	411.711	WE2
141062	7147391.147	512826.649	411.710	WE2
141063	7147391.572	512827.473	411.706	WE2
141064	7147393.350	512828.355	411.719	WE2
141065	7147394.412	512827.986	411.713	WE2
141066	7147397.665	512829.895	411.711	WE2
141067	7147400.742	512832.794	411.708	WE2

141068	7147402.286	512835.582	411.720	WE2
141069	7147402.753	512837.452	411.713	WE2
141070	7147404.786	512840.050	411.708	WE2
141071	7147407.072	512842.769	411.706	WE2
141072	7147411.286	512844.635	411.714	WE2
141073	7147415.456	512846.542	411.699	WE2
141074	7147418.224	512848.371	411.699	WE2
141075	7147420.444	512852.789	411.705	WE2

CLINTON CREEK LONG TERM PERFORMANCE MONITORING PROGRAM (August/September 2016)

UTM COORDINATES
NAD 83, Zone 7, 141º West

CONTROL			
	NORTHING	EASTING	OTHOMETRIC HEIGHT
2835	7147272.816	513147.027	432.618

Coordinates shown below are derived from Real time Kinematic GPS observations holding 2016 values of control point 2835 fixed in 3D

ROAD BASELINE AND CRACKS

BASELINE

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
6032	7147312.901	513154.379	415.311	Spike (NEW 2015)
6031	7147312.075	513157.251	415.340	Spike (NEW 2015)
6030	7147311.202	513160.117	415.398	Spike (NEW 2015)
6029	7147310.362	513163.009	415.478	Spike (NEW 2015)
6028	7147309.523	513165.885	415.472	Spike (NEW 2015)
5001	7147308.682	513168.766	415.438	Rebar
5002	7147307.843	513171.701	415.262	Spike
5003	7147307.012	513174.523	415.063	Spike
5004	7147306.142	513177.397	414.827	Spike
5005	7147305.334	513180.262	414.540	Spike
5006	7147304.474	513183.173	414.213	Spike
5007	7147303.628	513186.042	413.886	Spike
5008	7147302.781	513188.917	413.552	Spike
5009	7147301.923	513191.799	413.232	Spike
5010	7147301.085	513194.672	412.892	Spike
5011	7147300.261	513197.554	412.578	Spike
5012	7147299.418	513200.437	412.223	Spike
5013	7147298.585	513203.328	411.847	Spike
5014	7147297.754	513206.194	411.481	Spike
5015	7147296.898	513209.078	411.115	Spike
5016	7147296.051	513211.953	410.746	Spike
5017	7147295.202	513214.813	410.405	Spike
5018	7147294.354	513217.673	410.051	Spike
5019	7147293.504	513220.550	409.727	Spike
5020	7147292.649	513223.427	409.385	Spike
5021	7147291.800	513226.316	409.026	Spike
5022	7147290.947	513229.182	408.723	Spike
5000	7147290.076	513232.057	408.433	Rebar
6027	7147289.238	513234.932	408.112	Spike (NEW 2015)
6026	7147288.392	513237.806	407.846	Spike (NEW 2015)
6025	7147287.543	513240.690	407.577	Spike (NEW 2015)
6024	7147286.709	513243.560	407.353	Spike (NEW 2015)
6023	7147285.863	513246.451	407.097	Spike (NEW 2015)

CRACKS

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
50622	7147302.054	513195.263	412.894	DC
50623	7147301.197	513197.875	412.556	DC
50624	7147300.837	513197.745	412.599	GS
50625	7147301.505	513197.864	412.596	GS
50626	7147300.835	513200.832	412.229	GS
50627	7147300.480	513200.762	412.188	DC
50628	7147300.070	513200.649	412.230	GS
50629	7147299.169	513203.488	411.859	GS

50630	7147299.612	513203.595	411.787	DC
50631	7147299.993	513203.655	411.872	GS
50632	7147299.127	513206.578	411.487	GS
50633	7147298.757	513206.473	411.370	DC
50634	7147298.315	513206.326	411.499	GS
50635	7147297.390	513209.218	411.126	GS
50636	7147297.822	513209.335	411.028	DC
50637	7147298.269	513209.410	411.120	GS
50638	7147297.429	513212.496	410.755	GS
50639	7147297.033	513212.343	410.661	DC
50640	7147296.570	513212.137	410.736	GS
50641	7147295.652	513214.949	410.396	GS
50642	7147296.128	513215.113	410.322	DC
50643	7147296.610	513215.222	410.412	GS
50644	7147295.706	513218.169	410.093	GS
50645	7147295.254	513217.990	409.985	DC
50646	7147294.802	513217.867	410.070	GS
50647	7147293.796	513220.657	409.740	GS
50648	7147294.233	513220.833	409.678	DC
50649	7147294.624	513220.978	409.771	GS
50650	7147293.773	513222.997	409.507	GS
50651	7147293.208	513222.699	409.452	DC
50652	7147292.810	513222.403	409.489	GS
50653	7147291.135	513223.618	409.221	GS
50654	7147291.344	513223.892	409.173	DC
50655	7147291.606	513224.158	409.199	GS
50656	7147289.788	513225.000	408.918	GS
50657	7147289.367	513224.481	408.820	DC
50658	7147289.019	513224.195	408.907	GS
50659	7147288.535	513225.404	408.711	GS
50660	7147288.702	513225.663	408.663	DC
50661	7147288.981	513225.994	408.785	GS
50662	7147287.492	513225.852	408.348	DC
50663	7147291.003	513226.869	408.889	GS
140073	7147311.532	513180.188	415.036	TOP10
140074	7147313.644	513176.394	415.207	TOP10
140075	7147315.687	513172.892	415.624	TOP10
140076	7147316.451	513171.117	415.389	TOP10
140077	7147316.047	513170.095	415.464	TOP10
141097	7147295.591	513254.271	407.183	TOP10
141098	7147296.400	513249.983	407.503	TOP10
141099	7147295.545	513245.339	407.762	TOP10
141100	7147296.177	513239.832	408.312	TOP10
141101	7147297.099	513237.611	408.486	TOP10
141102	7147296.969	513232.190	408.930	TOP10
141103	7147297.212	513230.698	409.069	TOP10
141104	7147297.869	513228.529	409.310	TOP10
141105	7147298.489	513224.747	409.702	TOP10
141106	7147298.390	513221.149	410.052	TOP10
141107	7147297.619	513220.547	410.048	TOP10
141108	7147297.803	513216.091	410.445	TOP10
141109	7147299.168	513213.474	410.774	TOP10
141110	7147300.205	513212.438	410.966	TOP10
141111	7147299.996	513209.860	411.222	TOP10
141112	7147300.361	513206.284	411.540	TOP10
141113	7147301.395	513203.614	411.835	TOP10
141114	7147302.761	513202.282	412.263	TOP10
141115	7147304.965	513199.149	412.770	TOP10
141116	7147305.505	513195.769	413.173	TOP10
141117	7147306.216	513191.376	413.622	TOP10
141118	7147307.671	513186.656	414.193	TOP10
141119	7147310.143	513185.210	414.491	TOP10
141120	7147309.708	513183.801	414.626	TOP10
141121	7147313.582	513176.638	415.209	TOP10
141122	7147316.244	513170.529	415.413	TOP10

141123	7147317.745	513166.982	415.502	TOP10
141124	7147321.668	513163.178	415.211	TOP10
141125	7147323.460	513160.906	415.437	TOP10
141126	7147325.648	513159.543	414.808	TOP10
141127	7147326.237	513158.083	414.913	TOP10
141128	7147325.474	513156.579	415.252	TOP10
141129	7147326.220	513152.331	415.852	TOP10
141130	7147322.207	513155.333	415.624	CRACK
141131	7147322.049	513155.482	415.643	CRACK
141132	7147322.122	513155.480	415.373	DEPTH
141133	7147321.782	513156.285	415.645	CRACK
141134	7147321.332	513157.102	415.622	CRACK
141135	7147321.070	513157.217	415.620	CRACK
141136	7147320.896	513157.466	415.598	CRACK
141137	7147321.778	513156.435	415.508	DEPTH
141138	7147321.727	513156.704	415.577	DEPTH
141139	7147321.481	513157.024	415.558	DEPTH
141140	7147320.962	513157.387	415.501	DEPTH
141141	7147323.529	513159.527	415.502	CRACK
141142	7147322.743	513159.356	415.474	CRACK
141143	7147321.914	513160.533	415.380	CRACK
141144	7147321.646	513160.496	415.372	CRACK
141145	7147319.623	513162.196	415.331	CRACK
141146	7147318.589	513163.188	415.379	CRACK
141147	7147317.786	513164.843	415.435	CRACK
141148	7147317.826	513165.174	415.456	CRACK
141149	7147318.251	513165.104	415.367	CRACK
141150	7147317.814	513165.635	415.459	CRACK
141151	7147317.224	513166.866	415.489	CRACK
141152	7147316.320	513167.946	415.474	CRACK
141153	7147315.268	513169.001	415.472	CRACK
141154	7147317.691	513163.770	415.460	CRACK
141155	7147319.962	513161.008	415.431	CRACK
141156	7147315.280	513169.910	415.461	CRACK
141157	7147315.648	513171.362	415.457	CRACK
141158	7147315.906	513171.604	415.559	CRACK
141159	7147314.772	513169.898	415.527	CRACK
141160	7147314.491	513170.914	415.416	CRACK
141161	7147314.041	513171.647	415.481	CRACK
141162	7147311.762	513175.217	415.360	CRACK
141163	7147309.600	513180.805	414.853	CRACK
141164	7147311.685	513175.312	415.138	DEPTH
141165	7147311.662	513175.406	415.344	DEPTH
141166	7147310.998	513176.938	415.130	DEPTH
141167	7147310.080	513178.861	415.023	DEPTH
141168	7147309.887	513179.807	414.880	DEPTH
141169	7147309.688	513180.673	414.832	DEPTH
141170	7147314.562	513170.965	415.347	DEPTH
141171	7147314.321	513170.811	415.557	GS
141172	7147314.700	513170.646	415.491	GS
141173	7147314.739	513171.138	415.494	GS
141174	7147314.351	513171.273	415.476	GS
141175	7147308.188	513184.207	414.456	GS
141176	7147308.078	513184.649	414.418	GS
141177	7147307.734	513184.644	414.382	GS
141178	7147307.768	513184.351	414.410	GS
141179	7147307.785	513184.611	414.081	DEPTH
141180	7147305.594	513188.274	413.876	CRACK
141181	7147303.517	513191.305	413.405	CRACK
141182	7147305.395	513188.551	413.726	DEPTH
141183	7147304.609	513189.791	413.561	DEPTH
141184	7147303.959	513190.634	413.227	DEPTH
141185	7147303.863	513190.408	413.526	GS
141186	7147304.531	513189.449	413.676	GS
141187	7147305.197	513188.335	413.823	GS

141188	7147306.391	513190.630	413.667	DEPTH
141189	7147306.034	513190.986	413.528	DEPTH
141190	7147304.979	513193.615	413.237	DEPTH
141191	7147304.548	513195.579	412.903	DEPTH
141192	7147304.177	513196.868	412.809	DEPTH
141193	7147303.658	513198.723	412.564	DEPTH
141194	7147303.394	513199.763	412.429	DEPTH
141195	7147303.924	513194.887	413.022	DEPTH
141196	7147303.494	513195.732	412.882	DEPTH
141197	7147302.671	513196.700	412.770	DEPTH
141198	7147301.889	513197.569	412.637	DEPTH
141199	7147301.721	513199.147	412.456	DEPTH
141200	7147301.348	513199.512	412.252	DEPTH
141201	7147300.848	513200.903	412.169	DEPTH
141202	7147300.411	513201.049	412.125	DEPTH
141203	7147303.255	513197.564	412.723	DEPTH
141204	7147302.793	513198.547	412.382	DEPTH
141205	7147302.735	513199.898	412.315	DEPTH
141206	7147301.916	513201.079	412.167	DEPTH
141207	7147301.432	513202.588	411.913	DEPTH
141208	7147301.338	513203.521	411.814	DEPTH
141209	7147300.631	513202.698	412.036	GS
141210	7147301.591	513200.376	412.373	GS
141211	7147302.608	513197.538	412.763	GS
141212	7147303.312	513194.630	413.106	GS
141213	7147304.095	513191.429	413.455	GS
141214	7147305.231	513187.806	413.866	GS
141215	7147306.726	513184.120	414.338	GS
141216	7147300.903	513203.830	411.920	CRACK
141217	7147300.415	513204.845	411.792	CRACK
141218	7147300.438	513205.979	411.599	CRACK
141219	7147300.338	513206.329	411.550	DEPTH
141220	7147299.719	513207.931	411.329	DEPTH
141221	7147299.399	513208.492	411.264	DEPTH
141222	7147299.185	513209.608	411.020	DEPTH
141223	7147299.719	513206.057	411.578	CRACK
141224	7147298.802	513208.259	411.286	CRACK
141225	7147298.471	513210.920	410.992	CRACK
141226	7147298.056	513211.560	410.888	CRACK
141227	7147298.809	513212.727	410.850	CRACK
141228	7147297.817	513215.391	410.527	CRACK
141229	7147297.366	513217.298	410.308	CRACK
141230	7147296.124	513218.947	410.070	CRACK
141231	7147295.456	513220.873	409.858	CRACK
141232	7147294.875	513222.044	409.699	CRACK
141233	7147294.677	513224.143	409.499	CRACK
141234	7147297.227	513219.599	410.092	CRACK
141235	7147296.934	513221.172	409.931	CRACK
141236	7147296.540	513222.307	409.815	CRACK
141237	7147297.952	513220.931	409.941	DEPTH
141238	7147297.370	513222.753	409.734	DEPTH
141239	7147297.217	513223.195	409.231	DEPTH
141240	7147297.123	513223.378	409.722	DEPTH
141241	7147298.371	513223.790	409.478	DEPTH
141242	7147297.546	513226.715	409.277	DEPTH
141243	7147297.114	513228.497	408.828	DEPTH
141244	7147296.770	513230.425	408.913	DEPTH
141245	7147297.153	513223.728	409.734	CRACK
141246	7147297.415	513225.349	409.601	CRACK
141247	7147297.240	513226.382	409.488	CRACK
141248	7147296.025	513221.476	409.839	CRACK
141249	7147294.501	513225.079	409.309	CRACK
141250	7147293.216	513228.809	408.907	CRACK
141251	7147292.883	513232.176	408.625	CRACK
141252	7147294.113	513232.581	408.723	GS

CLINTON CREEK LONG TERM PERFORMANCE MONITORING PROGRAM (August/September 2016)

UTM COORDINATES

NAD 83, Zone 7, 141º West

CONTROL			
	NORTHING	EASTING	OTHOMETRIC HEIGHT
2835	7147272.816	513147.027	432.618

Coordinates shown below are derived from Real time Kinematic GPS observations holding 2016 values of control point 2835 fixed in 3D

CAMERAS

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
141020	7147437.837	512809.063	414.227	CAMERA LOCATION LEG
141021	7147438.537	512807.448	414.265	CAMERA LOCATION LEG
141022	7147436.970	512806.728	414.260	CAMERA LOCATION LEG
141023	7147436.200	512808.302	414.194	CAMERA LOCATION LEG
141025	7147435.234	512808.406	414.169	CAMERA DIRECTION
141026	7147437.642	512807.769	414.297	CAMERA
141091	7147306.194	513070.485	426.478	CAMERA LOCATION LEG
141092	7147305.079	513071.848	426.532	CAMERA LOCATION LEG
141093	7147306.468	513072.937	426.558	CAMERA LOCATION LEG
141094	7147307.563	513071.560	426.516	CAMERA LOCATION LEG
141095	7147306.512	513071.285	426.482	CAMERA
141096	7147309.886	513069.464	426.241	CAMERA DIRECTION

CLINTON CREEK LONG TERM PERFORMANCE MONITORING PROGRAM
(August/September 2016)

UTM COORDINATES
NAD 83, Zone 7, 141º West

CONTROL			
	NORTHING	EASTING	OTHOMETRIC HEIGHT
2835	7147272.816	513147.027	432.618

Coordinates shown below are derived from Real time Kinematic GPS observations holding 2016 values of control point 2835 fixed in 3D

CLINTON CREEK CENTRELINE

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
50091	7147427.557	512855.562	411.289	CL
50092	7147427.602	512866.704	411.055	CL
50093	7147427.416	512877.061	411.043	CL
50094	7147426.670	512886.157	411.112	CL
50095	7147426.535	512887.610	411.186	CL
50096	7147426.538	512887.954	411.468	CL
50097	7147426.614	512888.526	411.500	CL
50098	7147426.484	512888.888	411.098	CL
50099	7147426.495	512889.480	411.056	CL
50100	7147426.488	512890.047	410.621	CL
50101	7147426.375	512891.827	410.538	CL
50102	7147426.344	512892.463	410.173	CL
50103	7147426.098	512894.088	410.237	CL
50104	7147425.959	512894.647	409.881	CL
50105	7147424.830	512897.678	410.118	CL
50106	7147424.735	512898.322	409.913	CL
50107	7147422.609	512908.053	409.597	CL
50108	7147418.147	512920.782	409.696	CL
50109	7147413.251	512932.808	409.744	CL
50110	7147410.654	512941.206	409.572	CL
50111	7147410.392	512942.332	409.744	CL
50112	7147410.216	512942.742	409.861	CL
50113	7147410.155	512943.012	410.107	CL
50114	7147410.005	512943.589	410.074	CL
50115	7147409.793	512944.140	409.516	CL
50116	7147409.947	512944.667	409.537	CL
50117	7147409.870	512944.946	409.157	CL
50118	7147409.082	512946.239	408.953	CL
50119	7147409.007	512946.824	408.576	CL

50120	7147408.557	512948.232	408.554	CL
50121	7147408.432	512948.829	408.024	CL
50122	7147407.694	512950.210	407.938	CL
50123	7147407.586	512950.963	407.244	CL
50124	7147407.299	512952.131	407.421	CL
50125	7147407.156	512952.562	407.071	CL
50126	7147405.799	512959.151	407.191	CL
50127	7147405.759	512959.408	407.305	CL
50128	7147405.667	512959.821	407.425	CL
50129	7147405.245	512960.144	407.003	CL
50130	7147401.371	512969.567	406.705	CL
50131	7147398.757	512979.449	406.765	CL
50132	7147398.218	512981.795	406.671	CL
50133	7147398.033	512981.997	407.063	CL
50134	7147397.936	512982.601	407.150	CL
50135	7147397.868	512983.050	406.596	CL
50136	7147397.727	512983.732	406.604	CL
50137	7147397.681	512984.195	406.099	CL
50138	7147397.175	512985.474	406.111	CL
50139	7147397.022	512986.295	405.521	CL
50140	7147396.969	512987.544	405.530	CL
50141	7147396.934	512988.065	405.105	CL
50142	7147396.719	512989.547	405.128	CL
50143	7147396.751	512989.962	404.704	CL
50144	7147395.254	512995.103	404.524	CL
50145	7147395.340	512995.367	404.904	CL
50146	7147395.235	512996.077	405.201	CL
50147	7147395.029	512996.211	404.534	CL
50148	7147392.817	513007.187	404.887	CL
50149	7147388.877	513021.974	404.819	CL
50150	7147387.087	513027.539	404.790	CL
50151	7147386.869	513028.026	404.934	CL
50152	7147386.709	513028.508	405.072	CL
50153	7147386.485	513028.973	405.077	CL
50154	7147386.426	513029.459	404.630	CL
50155	7147386.342	513029.889	404.523	CL
50156	7147386.481	513030.271	404.123	CL
50157	7147385.801	513031.547	404.130	CL
50158	7147385.645	513032.075	403.713	CL
50159	7147385.223	513033.592	403.708	CL
50160	7147385.131	513034.006	403.277	CL
50161	7147384.845	513035.515	403.238	CL
50162	7147384.780	513035.983	402.820	CL
50163	7147384.444	513036.713	402.796	CL
50164	7147384.273	513037.031	402.351	CL
50165	7147384.218	513039.354	402.094	CL
50166	7147382.167	513049.489	400.430	CL

50167	7147379.872	513060.973	398.099	CL
50168	7147379.424	513063.275	397.514	CL
50169	7147375.711	513078.847	397.587	CL
50170	7147370.731	513092.127	397.591	CL
50171	7147366.717	513103.514	397.214	CL
50172	7147363.026	513117.240	397.052	CL
50173	7147359.691	513130.654	396.644	CL
50174	7147351.958	513143.928	396.480	CL
50175	7147345.406	513159.420	395.966	CL
50176	7147340.023	513169.156	395.856	CL
50177	7147335.848	513177.643	395.266	CL
50178	7147328.348	513195.088	394.339	CL
50179	7147320.872	513205.705	393.034	CL
50184	7147315.094	513221.601	392.442	CL
50185	7147314.813	513231.996	392.306	CL
50186	7147314.885	513240.355	391.715	CL
50187	7147314.826	513250.875	390.954	CL
50188	7147313.741	513257.497	390.175	CL
50189	7147315.682	513267.721	390.228	CL
50190	7147316.325	513275.978	390.002	CL
50195	7147309.775	513290.737	389.591	CL
50196	7147301.650	513299.913	389.101	CL
50197	7147297.189	513311.912	388.562	CL
50198	7147290.241	513325.625	387.767	CL
50199	7147283.989	513338.620	386.893	CL
50200	7147278.750	513351.030	386.445	CL
50201	7147273.320	513365.793	385.525	CL
50206	7147262.601	513380.541	384.915	CL
50207	7147258.016	513385.267	384.576	CL
50208	7147250.791	513389.748	384.556	CL
50213	7147255.625	513392.978	384.602	CL 1
50209	7147241.291	513398.406	383.762	CL
50214	7147254.529	513402.314	384.077	CL 1
50215	7147252.718	513408.444	383.807	CL 1
50210	7147234.860	513411.470	383.461	CL
50211	7147235.746	513416.813	383.240	CL
50216	7147246.233	513417.223	383.318	CL 1
50212	7147240.467	513421.397	382.904	CL
50217	7147243.760	513424.150	382.254	CL 1
50218	7147240.958	513435.204	382.432	CL 1
50219	7147230.926	513447.325	381.553	CL 1
50220	7147223.134	513457.098	381.001	CL 1
50221	7147217.378	513470.803	380.402	CL 1
50222	7147214.478	513483.321	379.816	CL 1
50223	7147205.535	513490.380	379.521	CL 1
50224	7147193.428	513496.251	378.917	CL 1
50225	7147186.469	513508.848	378.451	CL 1

50226	7147181.524	513519.249	378.169	CL 1
50227	7147175.429	513527.786	377.883	CL 1
50228	7147168.396	513532.754	377.363	CL 1
50229	7147158.367	513538.339	377.100	CL 1
50230	7147150.349	513546.255	376.997	CL 1
50231	7147146.037	513553.599	376.952	CL 1
50232	7147141.488	513563.732	376.544	CL 1
50233	7147142.637	513576.006	376.141	CL 1
50234	7147143.835	513584.327	375.934	CL 1
50235	7147139.667	513592.355	375.627	CL 1
50236	7147131.082	513599.955	375.390	CL 1
50237	7147124.158	513606.100	374.649	CL 1
50238	7147119.314	513615.559	374.132	CL 1
50239	7147116.599	513624.758	373.517	CL 1
50240	7147114.315	513630.735	373.774	CL 1
50241	7147110.000	513640.239	373.669	CL 1
50242	7147105.733	513650.381	373.343	CL 1
50243	7147102.480	513660.246	373.025	CL 1
50244	7147101.492	513668.481	372.660	CL 1
50245	7147103.084	513678.853	372.407	CL 1
50246	7147104.086	513689.242	372.536	CL 1
50247	7147104.545	513699.253	372.364	CL 1
50248	7147102.904	513708.392	371.810	CL 1
50249	7147100.818	513718.142	371.697	CL 1
50250	7147097.986	513726.969	371.521	CL 1
50251	7147094.881	513736.820	371.125	CL 1
50252	7147092.120	513744.729	371.238	CL 1
50253	7147091.165	513751.914	370.692	CL 1
50254	7147093.080	513761.100	370.803	CL 1
50255	7147095.647	513770.795	370.826	CL 1
50256	7147098.053	513780.144	370.841	CL 1
50257	7147100.044	513790.985	370.817	CL 1
50258	7147100.663	513800.663	370.786	CL 1
50259	7147099.718	513810.814	370.550	CL 1
50260	7147096.990	513819.208	370.434	CL 1
50261	7147093.265	513827.198	370.308	CL 1
50262	7147087.605	513834.482	369.967	CL 1
50263	7147082.778	513839.536	369.577	CL 1
50264	7147076.581	513846.567	369.170	CL 1
50265	7147072.169	513856.410	369.022	CL 1
50266	7147070.027	513864.935	368.568	CL 1
50267	7147067.751	513873.342	368.506	CL 1
50268	7147066.349	513880.426	368.263	CL 1
50269	7147064.330	513888.785	368.063	CL 1
50270	7147060.293	513898.314	367.873	CL 1
50271	7147056.994	513904.988	367.728	CL 1
50272	7147052.045	513912.422	367.562	CL 1

50273	7147046.715	513919.201	367.506	CL 1
50274	7147038.939	513925.470	367.554	CL 1
50275	7147031.373	513930.391	367.403	CL 1
50276	7147023.836	513933.542	367.193	CL 1
50277	7147016.118	513938.262	367.062	CL 1
50278	7147010.854	513945.038	366.913	CL 1
50279	7147004.026	513950.400	366.537	CL 1
50280	7146996.153	513955.704	366.655	CL 1
50281	7146989.372	513960.393	366.561	CL 1
50282	7146985.456	513969.386	366.162	CL 1
50283	7146984.598	513977.185	366.284	CL 1
50284	7146985.256	513985.918	366.282	CL 1
50285	7146986.442	513994.710	366.041	CL 1
50286	7146986.401	514002.529	365.973	CL 1
50287	7146985.790	514013.503	366.004	CL 1
50288	7146983.772	514020.774	365.788	CL 1
50290	7146970.584	514025.522	365.597	CL 1
50289	7146979.974	514026.100	365.306	CL 1
50291	7146964.899	514029.921	365.322	CL 1
50292	7146961.258	514038.810	365.568	CL 1
50296	7146957.444	514046.680	365.557	CL2
50293	7146959.873	514049.555	365.625	CL 1
50297	7146954.136	514054.126	365.282	CL2
50298	7146952.530	514057.567	365.095	CL2
50294	7146963.346	514058.856	365.238	CL 1
50299	7146957.305	514065.463	364.977	CL2
50300	7146962.895	514069.529	364.755	CL2
50295	7146965.644	514069.992	364.639	CL 1
50301	7146970.554	514074.970	364.461	CL2
50302	7146974.399	514080.972	365.131	CL2
50317	7146973.311	514081.498	364.993	CL4
50303	7146982.845	514084.016	365.003	CL2
50304	7146992.786	514084.626	364.938	CL2
50311	7146984.207	514085.494	365.086	CL3
50318	7146973.847	514087.201	365.145	CL4
50305	7147001.592	514087.350	364.809	CL2
50312	7146990.789	514089.975	365.053	CL3
50306	7147008.997	514092.201	364.942	CL2
50319	7146969.861	514094.376	364.652	CL4
50329	7147014.176	514096.026	364.998	CL5
50320	7146974.205	514096.557	364.699	CL4
50313	7146998.329	514096.645	364.721	CL3
50321	7146983.486	514097.262	364.694	CL4
50307	7147014.761	514099.635	364.871	CL2
50330	7147020.423	514099.798	364.962	CL5
50314	7147000.937	514103.443	364.599	CL3
50322	7146991.923	514104.213	364.843	CL4

50331	7147025.135	514104.695	364.993	CL5
50332	7147034.109	514106.524	364.554	CL5
50333	7147046.934	514107.173	364.338	CL5
50315	7147007.702	514108.880	364.464	CL3
50308	7147015.564	514109.683	364.399	CL2
50334	7147052.695	514110.883	363.939	CL5
50341	7147063.448	514111.276	363.488	CL6
50323	7146997.182	514111.682	364.780	CL4
50342	7147073.061	514112.309	363.422	CL6
50335	7147056.337	514113.114	364.039	CL5
50340	7147056.000	514113.238	364.103	CL6
50316	7147013.986	514113.477	364.386	CL3
50309	7147015.715	514114.316	363.958	CL2
50339	7147049.871	514114.933	364.091	CL6
50338	7147041.999	514115.762	364.228	CL6
50337	7147033.994	514116.890	363.949	CL6
50343	7147079.998	514117.322	363.824	CL6
50324	7147002.164	514118.359	364.782	CL4
50336	7147026.102	514119.206	363.669	CL6
50310	7147024.610	514122.657	363.498	CL2
50344	7147086.870	514123.362	363.226	CL6
50328	7147024.931	514124.954	364.281	CL4
50325	7147007.324	514126.426	364.669	CL4
50327	7147024.181	514127.315	363.930	CL4
50326	7147016.020	514127.354	364.476	CL4
50345	7147077.372	514131.494	363.347	CL6
50346	7147073.911	514140.341	363.401	CL6
50347	7147070.021	514148.811	363.427	CL6
50348	7147069.342	514158.905	363.298	CL6
50349	7147069.858	514170.181	363.173	CL6
50350	7147072.207	514181.189	363.039	CL6
50351	7147074.423	514190.562	363.002	CL6
50352	7147074.394	514202.251	362.803	CL6

CLINTON CREEK LONG TERM PERFORMANCE MONITORING PROGRAM (August/September 2016)

UTM COORDINATES
NAD 83, Zone 7, 141º West

CONTROL			
	NORTHING	EASTING	OTHOMETRIC HEIGHT
2835	7147272.816	513147.027	432.618

Coordinates shown below are derived from Real time Kinematic GPS observations holding 2016 values of control point 2835 fixed in 3D

CLINTON CREEK NATURAL SLOPE

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
50064	7147439.725	513029.334	422.921	183 TOP
50066	7147357.312	513195.005	413.944	FD ROD A0301
50067	7147362.137	513218.849	419.903	184 TOP

CLINTON CREEK LONG TERM PERFORMANCE MONITORING PROGRAM
(August/September 2016)

UTM COORDINATES
NAD 83, Zone 7, 141º West

CONTROL			
	NORTHING	EASTING	OTHOMETRIC HEIGHT
2835	7147272.816	513147.027	432.618

Coordinates shown below are derived from Real time Kinematic GPS observations holding 2016 values of control point 2835 fixed in 3D

NEW MONITORING POINTS

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
CC1	7147451.593	512970.579	420.456	rebar 1.5m long - 0.32 above ground
CC2	7147385.073	513141.666	417.646	rebar 1.5m long -0.38 above ground
CC3	7147349.115	513280.582	416.412	rebar 1.5m long - 0.40 above ground
CC4	7147300.991	513387.107	416.328	rebar 1.5m long - 0.35 above ground
CC5	7147185.394	513300.371	418.779	rebar 1.5m long - 0.40 above ground
CC6	7147087.555	513226.702	436.574	rebar 1.5m long - 0.40 above ground
CC7	7146992.438	513136.170	438.459	rebar 1.5m long - 0.40 above ground
CC8	7146895.652	513157.147	455.536	rebar 1.5m long - 0.40 above ground
CC9	7146993.517	513615.405	411.906	rebar 1.5m long - 0.40 above ground
CC10	7146915.189	513776.157	402.652	rebar 1.5m long - 0.40 above ground
CC11	7147309.906	513070.411	426.255	rebar 1.52m long - 0.28 above ground
CC12	7147332.608	513026.356	423.913	rebar 1.52m long - 0.28 above ground
CC13	7147348.947	513031.489	416.432	rebar 1.52m long - 0.24 above ground
CC14	7147360.033	513008.841	416.237	rebar 1.52m long - 0.27 above ground
CC15	7147299.938	512922.206	419.899	rebar 0.60m long

CONTROL			
	NORTHING	EASTING	OTHOMETRIC HEIGHT
2834	7148172.665	513447.789	606.720

Coordinates shown below are derived from Real time Kinematic GPS observations holding 2016 values of control point 2834 fixed in 3D

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
WC1	7148394.088	514023.428	432.806	Elevation Top of rebar
WC2	7148108.046	514031.674	436.092	-
WC3	7148306.830	513390.079	603.905	1.70m long square rod - 0.41 above ground
WC4	7148433.295	513399.137	593.824	1.70m long square rod - 0.41 above ground
WC5	7148539.725	513399.941	558.815	1.70m long square rod - 0.41 above ground
WC6	7148393.664	513320.031	607.340	1.70m long square rod - 0.41 above ground
WC7	7148494.308	513248.404	584.890	1.70m long square rod - 0.41 above ground
WC8	7148133.036	513108.103	595.031	rebar 0.60m long

WATER LEVEL

SEE SITE COMPONENT SURVEY CHECKLIST

	NORTHING	EASTING	OTHOMETRIC HEIGHT	
40001	7147375.366	512829.207	411.739	Water Level
40004	7147442.255	512798.628	411.747	Water Level
40008	7147106.373	513638.248	373.950	Water Level
40009	7147114.362	513641.708	373.969	Water Level
40051	7147442.244	512798.631	411.738	Water Level
40052	7147375.365	512829.223	411.748	Water Level
40053	7147106.644	513638.584	373.950	Water Level
40054	7147114.821	513641.020	374.015	Water Level
40934	7147442.116	512798.430	411.700	Water Level
40935	7147375.548	512829.215	411.688	Water Level
41569	7147441.818	512798.658	411.692	Water Level
41570	7147375.579	512829.119	411.682	Water Level
41571	7147107.132	513638.004	373.967	Water Level
41572	7147114.417	513641.230	373.950	Water Level
50001	7147376.144	512828.747	411.770	Water Level
50002	7147441.342	512799.378	411.762	Water Level
50008	7147106.299	513638.322	373.978	Water Level
50035	7147114.668	513641.484	373.984	Water Level
50038	7147107.013	513637.854	373.959	Water Level
50039	7147114.837	513640.722	373.994	Water Level
50040	7147375.508	512829.223	411.702	Water Level
50041	7147441.963	512798.494	411.732	Water Level
50081	7147442.066	512798.373	411.713	Water Level
50082	7147375.547	512829.248	411.718	Water Level
50083	7147106.774	513638.478	373.963	Water Level
50084	7147114.437	513641.205	373.965	Water Level
50087	7147106.787	513638.513	373.950	Water Level
50088	7147114.239	513641.335	373.952	Water Level
50089	7147375.419	512829.196	411.706	Water Level
50090	7147441.890	512798.579	411.721	Water Level
50353	7147106.790	513638.482	373.951	Water Level
50354	7147114.241	513641.383	373.957	Water Level
50668	7147106.891	513638.523	373.941	Water Level
50669	7147114.188	513641.301	373.932	Water Level
50672	7147375.371	512829.156	411.696	Water Level
50673	7147441.886	512798.432	411.665	Water Level
140938	7147106.795	513638.509	373.938	Water Level
140939	7147114.233	513641.345	373.957	Water Level
140940	7147375.778	512829.071	411.708	Water Level
140941	7147441.883	512798.658	411.715	Water Level
141255	7147106.805	513638.511	373.951	Water Level
141256	7147114.219	513641.352	373.952	Water Level

141257	7147375.417	512829.130	411.702	Water Level
141258	7147441.886	512798.486	411.706	Water Level
50903	7147375.381	512829.154	411.698	Water Level
50904	7147441.873	512798.418	411.703	Water Level
50906	7147106.884	513638.545	373.948	Water Level
50907	7147114.210	513641.327	373.956	Water Level

CLINTON CREEK LONG TERM PERFORMANCE MONITORING PROGRAM (August/September 2016)

UTM COORDINATES
NAD 83, Zone 7, 141º West

CONTROL			
	NORTHING	EASTING	OTHOMETRIC HEIGHT
2834	7148172.665	513447.789	606.720

Coordinates shown below are derived from Real time Kinematic GPS observations holding 2016 values of control point 2834 fixed in 3D

WOLVERINE TAILING PILE

	NORTHING	EASTING	OTHOMETRIC HEIGHT
1483	7148233.077	513412.829	608.685
26	7148341.552	513483.754	574.829
80-2	7148290.099	513550.061	552.037
26-A	7148339.394	513540.663	557.498
80-1	7148408.090	513543.402	555.239
1495	7148526.807	513529.230	528.941
BH-14	7148488.457	513563.116	530.311
650-1	7148408.755	513701.572	483.682
500-1	7148343.223	513725.651	474.013
1085	7148346.051	513666.638	488.750
80-5	7148249.852	513721.076	480.473
80-4	7148202.413	513692.751	500.201
350-A1	7148298.757	513823.473	447.662
500-2	7148344.439	513843.105	437.754
650-2	7148400.192	513816.649	439.434
1491	7148377.005	513869.972	431.951
350-2A	7148300.492	513874.626	428.317
NL-5	7148274.996	513897.460	415.222
350-3A	7148312.070	513899.847	417.097
NL-4	7148306.981	513913.632	415.857
NL-3	7148334.736	513927.527	416.956
1083	7148354.090	513937.233	413.892
NL-2	7148354.382	513937.411	413.811
80-7	7148343.978	513891.773	422.164
1487	7148305.010	513928.796	413.502
NL-1	7148365.702	513943.278	412.851
1492 TOP	7148053.565	513410.430	609.255
24	7148034.000	513526.397	549.050
1084	7148018.026	513619.743	515.688
1485	7148018.430	513709.160	477.741
BH-16	7148049.446	513767.426	462.945
BH-16 CABLE	7148049.267	513766.973	462.782
24-A	7148036.314	513781.545	463.061
61	7148001.260	513787.050	463.203
62	7148099.955	513762.010	462.885

63	7148119.148	513820.450	446.496
24-B	7148046.641	513838.770	443.895
65	7148000.050	513869.323	432.159
66	7148048.783	513880.255	427.243
64	7148109.784	513873.759	426.837
NL BASE	7148154.826	513836.496	431.344
SL-5	7148135.428	513879.298	421.769
SL-4	7148117.606	513910.282	416.271
24 D	7148074.199	513924.089	422.088
68	7147999.906	513945.314	416.279
80-9	7147996.231	513970.847	411.113
483 TOP	7148020.694	513982.254	412.454
67	7148038.709	513971.529	415.847
25-B	7148066.169	513950.017	422.212
SL-2	7148087.724	513960.077	422.785
SL-1 REP 175	7148077.588	513968.756	420.482
SL-3	7148103.115	513936.373	420.837
71	7148148.943	513927.599	411.845
1484	7148152.765	513964.465	417.671
70	7148178.655	513943.533	412.050

CLINTON CREEK LONG TERM PERFORMANCE MONITORING PROGRAM (August/September 2016)

UTM COORDINATES

NAD 83, Zone 7, 141º West

CONTROL			
	NORTHING	EASTING	OTHOMETRIC HEIGHT
2834	7148172.665	513447.789	606.720
3831	7147089.201	514207.763	367.397

Coordinates shown below are derived from Real time Kinematic GPS observations holding 2016 values of control point 2834 AND 3831 fixed in 3D

WOLVERINE CREEK CENTRELINE AND PONDS

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
41426	7148551.744	513947.137	408.304	WE30
41427	7148551.317	513944.517	408.269	WE30
41425	7148550.232	513949.344	408.338	WE30
41428	7148549.525	513941.475	408.289	WE30
41424	7148546.866	513949.758	408.316	WE30
41429	7148546.059	513938.019	408.238	WE30
41430	7148543.832	513933.954	408.269	WE30
41423	7148541.795	513949.390	408.338	WE30
41431	7148541.443	513929.219	408.285	WE30
41433	7148539.389	513922.203	408.261	WE30
41432	7148538.436	513925.631	408.261	WE30
41422	7148537.423	513947.907	408.310	WE30
41434	7148534.865	513918.318	408.285	WE30
41421	7148531.406	513946.814	408.300	WE30
41435	7148530.379	513919.007	408.281	WE30
41420	7148527.308	513946.860	408.279	WE30
41447	7148526.401	513905.367	408.309	WE30A
41436	7148525.904	513919.789	408.303	WE30
41448	7148525.457	513900.368	408.311	WE31
41419	7148521.552	513946.735	408.288	WE30
41437	7148521.529	513918.528	408.294	WE30
41449	7148519.810	513900.792	408.299	WE31
41446	7148518.606	513907.162	408.319	WE30A
41438	7148517.034	513920.755	408.286	WE30
41418	7148515.919	513947.341	408.270	WE30
41439	7148513.765	513919.741	408.287	WE30
41445	7148512.132	513908.590	408.299	WE30A
41417	7148511.398	513949.428	408.291	WE30
41450	7148510.706	513901.508	408.299	WE31
41440	7148509.122	513914.921	408.301	WE30
41416	7148506.001	513950.967	408.307	WE30
41441	7148505.810	513913.426	408.295	WE30
41444	7148504.884	513910.180	408.323	WE30A
41442	7148501.813	513914.254	408.291	WE30
41415	7148501.176	513951.699	408.306	WE30
41443	7148500.843	513912.279	408.185	WE30A
41414	7148496.754	513953.366	408.281	WE30
41413	7148491.206	513954.637	408.269	WE30
41451	7148489.686	513897.714	408.300	WE31A
41412	7148486.737	513955.447	408.306	WE30
41452	7148483.971	513897.105	408.306	WE31A
41411	7148482.348	513957.611	408.288	WE30
41453	7148480.142	513897.131	408.293	WE31A
41410	7148477.973	513960.179	408.292	WE30
41454	7148476.234	513898.855	408.283	WE31A

41455	7148472.849	513900.682	408.284	WE31A
41409	7148472.003	513961.303	408.283	WE30
41456	7148468.988	513898.083	408.284	WE31A
41408	7148467.147	513961.495	408.331	WE30
41457	7148465.919	513897.665	408.290	WE31A
41407	7148461.312	513961.614	408.319	WE30
41458	7148461.228	513898.245	408.289	WE31A
41459	7148457.133	513898.669	408.313	WE31A
41406	7148455.481	513962.070	408.321	WE30
41460	7148453.687	513897.594	408.337	WE31A
41461	7148450.632	513896.793	408.315	WE31A
41405	7148449.508	513961.832	408.284	WE30
41462	7148445.549	513897.350	408.283	WE31A
41404	7148444.426	513962.002	408.308	WE30
41463	7148442.553	513902.427	408.288	WE31A
41464	7148440.617	513904.985	408.294	WE31A
41465	7148439.678	513908.995	408.294	WE31A
41403	7148438.184	513961.447	408.308	WE30
41466	7148438.178	513914.062	408.277	WE31A
41467	7148436.031	513918.647	408.326	WE31A
41402	7148435.052	513961.460	408.262	WE30
41469	7148434.958	513924.704	408.325	WE31A
41468	7148434.557	513921.984	408.262	WE31A
41470	7148434.081	513929.196	408.269	WE31A
41472	7148433.228	513937.435	408.274	WE31A
41471	7148433.087	513932.395	408.289	WE31A
41473	7148432.172	513940.977	408.290	WE31A
41474	7148430.329	513943.400	408.297	WE31A
41401	7148429.661	513960.329	408.300	WE30
41475	7148426.193	513946.848	408.349	WE31A
41400	7148425.353	513959.560	408.332	WE30
41399	7148422.635	513958.317	408.313	WE30
41476	7148422.581	513949.942	408.328	WE31A
41477	7148418.553	513951.269	408.300	WE31A
41398	7148418.365	513957.415	408.307	WE30
41370	7148416.001	513955.803	407.599	CRKCL
41397	7148415.480	513958.560	408.279	WE30
41478	7148415.036	513953.236	408.318	WE31A
41369	7148414.372	513957.373	407.811	CRKCL
41479	7148413.930	513955.768	408.302	WE31A
41368	7148412.343	513959.520	407.933	CRKCL
41367	7148410.568	513958.406	408.038	CRKCL
41366	7148408.313	513956.936	407.966	CRKCL
41480	7148405.896	513952.656	408.186	WE21
41365	7148405.619	513956.489	407.815	CRKCL
41364	7148404.503	513955.501	408.064	CRKCL
41481	7148403.068	513949.946	408.107	WE21
41363	7148401.673	513953.993	408.102	CRKCL
41482	7148400.977	513948.684	408.129	WE21
41360	7148400.245	513955.685	408.097	WE20
41362	7148400.015	513953.119	407.647	CRKCL
41483	7148398.114	513947.924	408.131	WE21
41361	7148397.786	513952.473	407.287	CRKCL
41359	7148397.385	513956.114	408.051	WE20
41484	7148394.974	513947.895	408.121	WE21
41358	7148393.133	513955.686	408.097	WE20
41485	7148390.288	513946.689	408.125	WE21
41357	7148389.057	513957.026	408.080	WE20
41486	7148385.835	513945.959	408.115	WE21
41356	7148385.424	513957.097	408.112	WE20
41355	7148382.599	513957.683	408.090	WE20
41487	7148381.973	513947.259	408.072	WE21
41488	7148379.021	513948.549	408.105	WE21

41354	7148377.710	513959.265	408.039	WE20
41489	7148376.064	513950.075	408.109	WE21
41353	7148373.859	513958.899	408.099	WE20
41490	7148372.176	513951.368	408.100	WE21
41352	7148371.033	513959.210	408.076	WE20
41351	7148367.039	513959.921	408.093	WE20
41491	7148365.813	513951.894	408.106	WE21
41492	7148362.410	513952.281	408.157	WE21
41350	7148362.298	513960.111	408.087	WE20
41348	7148357.743	513955.937	406.887	CRKCL
41349	7148356.940	513959.672	408.070	WE20
41493	7148356.807	513954.525	408.109	WE21
41347	7148356.753	513956.298	407.144	CRKCL
41346	7148355.152	513956.769	407.603	CRKCL
41494	7148353.029	513955.759	408.120	WE21
41345	7148352.613	513957.591	407.826	CRKCL
41344	7148349.218	513956.727	407.529	CRKCL
41343	7148347.032	513955.691	407.472	CRKCL
41342	7148345.832	513954.005	407.711	CRKCL
41341	7148344.200	513952.288	407.607	CRKCL
41340	7148342.497	513950.697	407.649	CRKCL
41339	7148340.059	513948.801	407.795	CRKCL
41338	7148336.726	513946.879	407.929	CRKCL
41337	7148333.370	513945.315	407.891	CRKCL
41336	7148328.741	513943.915	407.791	CRKCL
41335	7148324.295	513942.994	407.780	CRKCL
41334	7148319.845	513941.935	407.837	CRKCL
41333	7148316.025	513940.898	407.899	CRKCL
41332	7148311.908	513940.283	407.825	CRKCL
41331	7148307.807	513940.505	407.838	CRKCL
41330	7148304.098	513941.375	407.856	CRKCL
41329	7148301.780	513945.287	407.884	CRKCL2
41328	7148300.821	513943.181	407.856	CRKCL
41326	7148299.207	513946.915	407.718	CRKCL2
41327	7148298.188	513945.025	407.791	CRKCL
41325	7148295.912	513948.028	407.751	CRKCL2
41324	7148295.260	513946.668	407.748	CRKCL
41323	7148292.256	513948.763	407.700	CRKCL
41322	7148290.578	513949.890	407.491	CRKCL
41321	7148287.549	513950.979	407.623	CRKCL
41320	7148284.017	513952.260	407.739	CRKCL
41319	7148280.874	513952.493	407.738	CRKCL
41318	7148276.408	513952.221	407.591	CRKCL
41317	7148272.647	513952.374	407.576	CRKCL
50753	7148272.176	513939.779	407.436	WE
50754	7148271.957	513940.977	407.436	WE
50755	7148270.781	513941.990	407.430	WE
50752	7148269.807	513933.904	407.443	WE
50756	7148269.273	513946.179	407.432	WE
41316	7148268.810	513952.648	407.483	CRKCL
50751	7148267.384	513930.803	407.450	WE
41495	7148267.257	513951.557	407.553	WE40
41315	7148266.334	513951.986	407.166	CRKCL
41497	7148266.319	513952.612	407.500	WE41
41496	7148265.662	513950.749	407.504	WE40
41314	7148265.062	513951.561	407.132	CRKCL
50757	7148265.029	513949.969	407.431	WE
50770	7148264.851	513973.157	407.445	WE
50766	7148264.771	513968.333	407.452	WE
41498	7148264.442	513952.222	407.505	WE41
50750	7148264.408	513926.692	407.482	WE
50769	7148264.406	513972.560	407.437	WE
50765	7148264.028	513967.245	407.439	WE

50767	7148263.942	513970.539	407.475	WE
50749	7148263.817	513922.534	407.436	WE
41313	7148263.355	513950.956	407.439	CRKCL
50764	7148262.992	513967.607	407.470	WE
50768	7148262.458	513972.312	407.445	WE
50771	7148262.427	513974.725	407.440	WE
50758	7148261.634	513953.446	407.442	WE
50763	7148261.018	513966.803	407.456	WE
50748	7148260.616	513915.165	407.431	WE
50762	7148259.964	513964.386	407.453	WE
50772	7148258.774	513976.485	407.503	WE
50759	7148258.706	513957.903	407.491	WE
50747	7148258.646	513913.086	407.452	WE
50761	7148258.377	513962.727	407.450	WE
50760	7148257.973	513960.470	407.480	WE
50746	7148257.609	513911.199	407.477	WE
50745	7148254.512	513907.503	407.492	WE
50773	7148253.727	513977.815	407.409	WE
50744	7148253.324	513904.314	407.454	WE
50774	7148251.717	513977.540	407.429	WE
50743	7148251.519	513902.681	407.480	WE
50742	7148248.418	513895.926	407.476	WE
50775	7148246.185	513978.660	407.507	WE
50741	7148244.840	513888.666	407.479	WE
50740	7148241.205	513887.399	407.489	WE
50776	7148240.826	513979.504	407.486	WE
50777	7148238.777	513980.556	407.439	WE
50778	7148237.216	513980.286	407.482	WE
50739	7148237.196	513886.176	407.478	WE
50779	7148236.849	513981.270	407.477	WE
50780	7148234.126	513981.950	407.451	WE
50738	7148231.981	513885.140	407.470	WE
50781	7148230.296	513980.937	407.477	WE
50737	7148226.715	513884.324	407.514	WE
50736	7148224.612	513885.223	407.449	WE
50782	7148224.211	513981.497	407.502	WE
50783	7148222.873	513982.551	407.443	WE
50784	7148222.121	513981.549	407.485	WE
50735	7148219.463	513884.369	407.465	WE
50720	7148219.093	513947.372	407.481	WE
50719	7148218.160	513952.779	407.486	WE
50785	7148218.081	513980.975	407.432	WE
50721	7148217.920	513940.480	407.483	WE
50722	7148216.870	513938.345	407.499	WE
50718	7148214.986	513958.878	407.490	WE
50734	7148214.787	513885.035	407.498	WE
50715	7148214.397	513965.155	407.500	WE
50714	7148214.394	513966.608	407.482	WE
50786	7148213.325	513981.583	407.487	WE
50716	7148212.974	513964.784	407.482	WE
50713	7148211.925	513970.877	407.484	WE
50712	7148211.863	513974.613	407.455	WE
50717	7148211.742	513964.956	407.471	WE
50787	7148210.497	513981.766	407.419	WE
50723	7148210.376	513933.345	407.483	WE
50788	7148208.388	513979.768	406.727	CL
50733	7148207.506	513885.168	407.409	WE
50724	7148203.705	513928.117	407.490	WE
50732	7148203.539	513886.470	407.490	WE
50789	7148201.976	513982.186	407.173	CL
50731	7148200.043	513887.813	407.484	WE
50725	7148199.277	513922.553	407.482	WE
50730	7148198.929	513890.599	407.487	WE

50729	7148198.312	513895.900	407.467	WE
50726	7148197.602	513916.722	407.457	WE
50790	7148197.430	513984.057	407.054	CL
50728	7148197.053	513903.599	407.447	WE
50727	7148196.169	513911.483	407.466	WE
50791	7148191.725	513986.237	407.268	CL
50792	7148185.936	513987.235	407.219	CL
50793	7148182.827	513987.026	407.208	CL
50794	7148180.226	513985.814	406.785	CL
50795	7148174.420	513988.725	406.903	CL
50796	7148167.607	513990.409	406.723	CL
50797	7148160.275	513988.224	406.762	CL
50798	7148154.825	513992.637	406.817	CL
50799	7148151.772	513992.935	406.667	CL
50800	7148146.209	513991.351	406.636	CL
50801	7148142.339	513990.179	406.485	CL
50802	7148136.550	513987.707	406.380	CL
50803	7148131.374	513985.649	406.480	CL
50804	7148124.930	513984.856	406.395	CL
50805	7148118.075	513986.495	406.299	CL
50806	7148108.907	513988.145	406.073	CL
50807	7148103.931	513988.158	406.176	CL
50808	7148096.898	513987.100	405.944	CL
50809	7148090.505	513988.102	405.750	CL
50810	7148081.824	513988.427	405.776	CL
50811	7148068.922	513987.730	405.121	CL
50812	7148062.498	513986.703	404.940	CL
50813	7148055.086	513987.572	404.958	CL
50814	7148047.007	513987.317	405.060	CL
50815	7148038.693	513990.310	405.135	CL
50816	7148027.289	513990.851	404.203	CL
50817	7148019.576	513990.599	404.135	CL
50818	7148007.243	513990.550	403.745	CL
50819	7148001.136	513988.527	403.182	CL
50820	7147996.289	513986.986	403.609	CL
50821	7147981.777	513983.409	402.851	CL
50822	7147971.632	513982.577	402.870	CL
50823	7147963.478	513980.773	402.921	CL
50824	7147953.913	513978.483	402.811	CL
50825	7147951.486	513979.929	402.683	CL
50826	7147950.963	513980.022	402.075	CL
50827	7147947.361	513982.145	402.520	CL
50828	7147946.527	513983.026	401.622	CL
50829	7147944.787	513984.157	401.767	CL
50830	7147941.693	513982.096	401.558	CL
50831	7147941.158	513982.671	401.248	CL
50832	7147940.337	513983.435	400.850	CL
50833	7147939.180	513984.302	400.601	CL
50834	7147937.508	513987.585	400.289	CL
50835	7147933.527	513993.992	399.621	CL
50836	7147928.041	513997.595	399.525	CL
50837	7147926.483	513997.599	398.569	CL
50838	7147922.866	513999.735	398.740	CL
50839	7147921.593	513999.998	397.799	CL
50840	7147917.908	514001.819	397.772	CL
50841	7147910.715	514006.144	397.715	CL
50842	7147909.455	514006.524	396.782	CL
50843	7147906.824	514007.947	396.662	CL
50844	7147901.589	514010.448	396.509	CL
50845	7147900.423	514010.959	395.651	CL
50846	7147895.590	514013.073	396.257	CL
50847	7147894.484	514013.857	395.193	CL
50848	7147888.567	514016.363	395.306	CL

50849	7147887.569	514016.944	394.441	CL
50850	7147881.642	514019.092	394.152	CL
50851	7147877.072	514022.909	394.737	CL
50852	7147868.462	514024.088	394.024	CL
50853	7147860.789	514029.393	393.642	CL
50854	7147859.672	514029.823	392.461	CL
50855	7147854.761	514033.944	393.036	CL
50856	7147848.511	514041.053	391.736	CL
50857	7147841.482	514045.250	390.770	CL
50858	7147837.505	514048.322	390.928	CL
50859	7147836.762	514050.182	389.829	CL
50860	7147832.230	514054.275	390.491	CL
50861	7147831.987	514055.644	389.835	CL
50862	7147824.225	514063.300	389.859	CL
50863	7147820.744	514068.824	388.997	CL
50864	7147815.382	514074.063	388.788	CL
50865	7147806.837	514081.083	388.357	CL
50866	7147797.490	514087.811	386.410	CL
241815	7147793.655	514164.579	383.713	CRKCL20
241814	7147791.897	514162.592	383.804	CRKCL20
241813	7147789.053	514159.882	383.602	CRKCL20
50867	7147787.662	514095.158	385.187	CL
241812	7147785.941	514157.118	383.534	CRKCL20
241811	7147782.595	514157.223	383.405	CRKCL20
50868	7147782.043	514102.744	384.547	CL
241810	7147781.797	514158.979	383.304	CRKCL20
241809	7147780.829	514160.668	383.413	CRKCL20
241808	7147778.364	514160.395	383.133	CRKCL20
241807	7147774.882	514160.032	383.175	CRKCL20
50869	7147774.135	514111.934	382.989	CL
241806	7147770.443	514158.556	382.917	CRKCL20
241804	7147769.294	514152.692	382.970	CRKCL20
241802	7147768.663	514145.485	382.770	CRKCL20
241803	7147768.435	514150.486	382.893	CRKCL20
241805	7147768.318	514156.009	382.948	CRKCL20
50870	7147767.818	514120.093	382.593	CL
241801	7147765.963	514143.728	382.776	CRKCL20
241800	7147763.706	514144.735	382.680	CRKCL20
241799	7147762.411	514146.693	382.542	CRKCL20
241798	7147761.890	514146.470	382.221	CRKCL20
241797	7147761.226	514145.987	382.357	CRKCL20
241796	7147759.392	514144.211	382.148	CRKCL20
50871	7147758.531	514124.581	382.265	CL
241795	7147757.567	514143.323	382.172	CRKCL20
241794	7147754.534	514141.692	382.244	CRKCL20
241793	7147753.917	514141.649	381.644	CRKCL20
50872	7147752.915	514127.995	382.110	CL
241792	7147752.687	514141.591	381.998	CRKCL20
241791	7147749.052	514141.648	381.880	CRKCL20
50873	7147747.374	514134.399	382.124	CL
241790	7147745.931	514142.326	381.629	CRKCL20
241789	7147742.852	514142.603	381.531	CRKCL20
50874	7147742.336	514141.107	381.537	CL
50875	7147733.473	514148.485	381.463	CL
50876	7147725.837	514154.718	381.259	CL
50877	7147717.008	514159.443	381.064	CL
50878	7147713.244	514155.712	380.971	CL
50879	7147706.623	514155.304	380.964	CL
50880	7147698.813	514156.716	380.664	CL
50881	7147697.854	514161.382	380.247	CL
50882	7147689.638	514160.749	380.362	CL
50883	7147681.683	514165.898	380.334	CL
50884	7147671.981	514169.630	380.157	CL

50885	7147666.862	514166.823	380.034	CL
50886	7147661.590	514162.052	379.665	CL
50887	7147649.445	514163.857	379.515	CL
50888	7147641.900	514166.179	379.203	CL
50889	7147637.940	514165.038	379.346	CL
50890	7147633.573	514159.335	379.051	CL
50891	7147628.794	514157.337	378.916	CL
50892	7147624.720	514157.165	378.836	CL
50893	7147619.893	514167.262	378.852	CL
50894	7147608.199	514171.295	378.035	CL
50895	7147598.073	514176.612	377.953	CL
50896	7147593.800	514182.826	377.817	CL
50897	7147592.585	514186.870	377.598	CL
50898	7147584.036	514190.588	377.312	CL
50899	7147573.130	514194.835	377.178	CL
50900	7147563.860	514197.337	377.393	CL
250969	7147555.219	514198.262	376.714	CL
250970	7147545.655	514199.813	377.092	CL
250971	7147538.963	514201.794	377.000	CL
250972	7147533.206	514201.508	376.980	CL
250973	7147530.566	514200.673	376.764	CL
250974	7147529.482	514197.903	376.629	CL
250975	7147528.408	514196.783	376.322	CL
250976	7147522.905	514194.440	376.077	CL
250977	7147522.179	514194.155	375.982	CL
250978	7147516.726	514191.956	375.951	CL
250979	7147512.179	514188.447	375.779	CL
250980	7147509.635	514187.678	375.918	CL
250982	7147507.646	514192.227	375.597	CL
250981	7147507.461	514188.764	375.703	CL
250983	7147506.944	514194.641	375.784	CL
250984	7147501.701	514198.530	375.622	CL
250985	7147498.557	514201.429	375.612	CL
250986	7147496.418	514204.753	374.978	CL
250987	7147493.508	514210.595	375.213	CL
250988	7147491.332	514216.668	375.214	CL
250989	7147486.834	514220.456	375.205	CL
250990	7147481.492	514222.030	375.127	CL
250991	7147476.353	514221.681	374.803	CL
250992	7147471.367	514220.625	374.588	CL
250993	7147465.160	514219.128	374.465	CL
250994	7147459.388	514219.784	374.115	CL
250995	7147452.096	514222.221	373.837	CL
250996	7147449.085	514223.368	373.966	CL
250997	7147445.050	514224.983	373.536	CL
250998	7147438.707	514224.968	373.191	CL
250999	7147434.977	514223.537	373.082	CL
251000	7147432.574	514221.151	372.949	CL
251001	7147428.450	514221.317	372.906	CL
251002	7147421.838	514219.189	372.850	CL
251003	7147419.082	514218.176	372.812	CL
251004	7147416.396	514219.105	372.594	CL
251005	7147411.714	514220.002	372.878	CL
251006	7147406.563	514220.216	372.758	CL
251007	7147402.127	514218.852	372.410	CL
251008	7147394.760	514214.293	372.303	CL
251009	7147388.516	514213.786	372.160	CL
251010	7147382.170	514215.115	371.987	CL
251011	7147378.175	514209.938	371.579	CL
251012	7147372.173	514207.681	371.583	CL
251013	7147365.423	514205.747	371.429	CL
251014	7147362.046	514205.169	371.340	CL
251015	7147357.713	514206.376	371.228	CL

251016	7147352.899	514207.455	371.406	CL
251017	7147348.899	514206.119	371.263	CL
251018	7147346.116	514201.105	370.906	CL
251019	7147339.951	514197.594	370.911	CL
251020	7147334.529	514194.155	370.707	CL
251021	7147329.031	514191.412	370.390	CL
251022	7147326.787	514182.883	370.156	CL
251023	7147322.855	514176.684	369.770	CL
251024	7147319.917	514174.895	370.064	CL
251025	7147313.150	514174.422	370.243	CL
251026	7147307.795	514175.703	369.887	CL
251027	7147305.712	514179.094	369.868	CL
251028	7147300.202	514186.899	369.162	CL
251029	7147294.244	514193.131	369.345	CL
251035	7147293.236	514192.557	369.322	CL1
251030	7147288.586	514197.889	369.322	CL
251036	7147287.188	514192.907	369.400	CL1
251037	7147283.051	514191.865	369.157	CL1
251031	7147282.818	514201.319	369.273	CL
251038	7147278.356	514193.356	368.884	CL1
251032	7147276.100	514202.640	368.965	CL
251039	7147271.121	514193.546	368.932	CL1
251033	7147268.316	514199.634	368.946	CL
251040	7147263.274	514194.135	368.682	CL1
251034	7147259.027	514193.696	368.623	CL
251041	7147252.891	514192.093	368.486	CL
251042	7147247.703	514190.993	368.168	CL
251043	7147246.181	514194.028	368.204	CL
251044	7147241.973	514196.822	367.861	CL
251045	7147237.235	514196.508	368.045	CL
251046	7147233.373	514194.380	368.013	CL
251047	7147231.331	514191.673	367.264	CL
251048	7147222.674	514189.042	367.793	CL
251049	7147214.161	514188.526	367.492	CL
251050	7147207.298	514190.798	367.190	CL
251051	7147203.725	514193.264	367.377	CL
251052	7147198.599	514193.729	367.294	CL
251053	7147194.865	514189.276	367.005	CL
251054	7147190.808	514183.858	367.037	CL
251055	7147185.317	514178.008	366.690	CL
251056	7147182.111	514179.866	366.888	CL
251057	7147175.906	514180.195	366.846	CL
251058	7147166.706	514183.019	366.965	CL
251059	7147155.897	514186.261	366.947	CL
251060	7147146.043	514188.975	366.704	CL
251061	7147135.008	514190.524	366.558	CL
251062	7147124.335	514191.875	366.543	CL
251063	7147121.707	514190.803	366.320	CL
251064	7147114.638	514189.417	366.230	CL
251065	7147108.959	514188.470	366.210	CL
251066	7147107.109	514188.729	366.115	CL
251067	7147106.341	514190.707	366.032	CL
251068	7147105.842	514194.159	365.898	CL
241940	7147103.366	514196.019	365.826	CRKCL50
241939	7147102.212	514195.540	365.612	INVERT
241938	7147102.024	514195.380	366.787	TOP
241937	7147089.100	514191.362	366.486	TOP
241936	7147089.017	514191.244	365.330	INVERT
241935	7147088.590	514191.223	364.843	CRKCL50
241934	7147086.419	514191.479	364.645	CRKCL50
241933	7147085.228	514191.736	363.798	CRKCL50
241932	7147084.379	514192.014	363.735	CRKCL50
241931	7147082.695	514192.293	363.022	CRKCL50

241930	7147082.277	514190.558	363.517	CRKCL50
241929	7147081.898	514189.357	363.325	CRKCL50
241925	7147081.666	514188.039	363.305	CRKCL50 INT
241924	7147081.113	514185.706	363.269	CRKCL50
241926	7147079.251	514187.240	363.183	CRKCL
241923	7147078.093	514184.149	363.094	CRKCL50
241927	7147076.916	514187.512	363.014	CRKCL
241922	7147076.600	514183.403	362.874	CRKCL50
241928	7147075.929	514187.914	362.926	CRKCL
241921	7147074.699	514182.946	363.122	CRKCL50

CLINTON CREEK LONG TERM PERFORMANCE MONITORING PROGRAM
(August/September 2016)

UTM COORDINATES
NAD 83, Zone 7, 141º West

CONTROL			
	NORTHING	EASTING	OTHOMETRIC HEIGHT
2834	7148172.665	513447.789	606.720

Coordinates shown below are derived from Real time Kinematic GPS observations holding 2016 values of control point 2834 fixed in 3D

POND OUTLET CROSS SECTIONS

XS1

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
41396	7148412.045	513947.492	410.535	X-SEC 1
41395	7148412.323	513949.593	410.565	X-SEC 1
41394	7148412.486	513950.838	410.430	X-SEC 1
41393	7148412.528	513951.298	410.233	X-SEC 1
41392	7148412.733	513952.923	410.356	X-SEC 1
41391	7148412.878	513953.934	410.118	X-SEC 1
41390	7148413.179	513955.659	409.144	X-SEC 1
41389	7148413.141	513955.882	408.709	X-SEC 1
41388	7148413.352	513956.534	408.331	WE
41387	7148413.370	513956.672	408.251	X-SEC 1
41386	7148413.596	513958.573	408.048	X-SEC 1
41385	7148413.676	513958.911	407.751	X-SEC 1
41384	7148413.777	513960.320	408.302	WE
41383	7148413.868	513960.628	408.454	X-SEC 1
41382	7148413.974	513960.940	408.554	X-SEC 1
41381	7148413.992	513961.171	408.988	X-SEC 1
41380	7148414.171	513962.491	409.680	X-SEC 1
41379	7148414.322	513963.289	409.867	X-SEC 1
41378	7148414.501	513964.373	410.103	X-SEC 1
41377	7148414.636	513965.650	410.325	X-SEC 1
41376	7148414.836	513967.275	411.455	X-SEC 1
41375	7148415.044	513969.091	412.216	X-SEC 1
41374	7148415.400	513970.659	412.780	X-SEC 1
41373	7148415.583	513971.860	413.609	X-SEC 1
41372	7148415.632	513972.481	413.633	X-SEC 1

XS2

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.

41287	7148265.147	513950.131	407.577	X-SEC 2
41288	7148265.439	513951.655	407.063	X-SEC 2
41289	7148265.418	513952.387	407.611	X-SEC 2
41290	7148265.423	513952.914	407.680	X-SEC 2
41291	7148265.432	513952.984	407.592	X-SEC 2
41292	7148265.632	513955.929	407.611	X-SEC 2
41293	7148265.806	513959.588	407.795	X-SEC 2
41294	7148266.100	513963.064	407.708	X-SEC 2
41295	7148266.201	513963.479	407.530	X-SEC 2
41296	7148266.127	513964.299	407.540	X-SEC 2
41297	7148266.252	513965.675	407.919	X-SEC 2
41298	7148266.347	513966.890	407.792	X-SEC 2
41299	7148266.424	513967.804	407.835	X-SEC 2
41300	7148266.575	513971.070	407.647	X-SEC 2
41301	7148266.717	513971.595	407.455	X-SEC 2
41302	7148266.760	513972.441	407.373	X-SEC 2
41303	7148266.834	513972.675	407.584	X-SEC 2
41304	7148266.887	513973.009	407.634	X-SEC 2
41305	7148266.876	513973.246	407.754	X-SEC 2
41306	7148266.763	513974.049	407.897	X-SEC 2
41307	7148266.845	513974.606	407.982	X-SEC 2
41308	7148267.006	513975.423	408.083	X-SEC 2
41309	7148266.956	513975.935	408.450	X-SEC 2
41310	7148267.110	513977.814	409.226	X-SEC 2
41311	7148267.207	513979.968	410.105	X-SEC 2
41312	7148267.381	513982.601	410.469	X-SEC 2

XS3				
	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
41531	7148206.363	513958.815	410.541	X-SEC 3
41530	7148206.600	513960.265	410.446	X-SEC 3
41529	7148206.926	513961.910	410.110	X-SEC 3
41528	7148207.171	513963.371	409.708	X-SEC 3
41527	7148207.600	513965.064	409.189	X-SEC 3
41526	7148207.893	513966.846	408.805	X-SEC 3
41525	7148208.145	513968.014	408.679	X-SEC 3
41524	7148208.281	513969.022	408.637	X-SEC 3
41523	7148208.545	513970.100	408.412	X-SEC 3
41522	7148208.837	513971.341	408.279	X-SEC 3
41521	7148209.071	513972.912	408.288	X-SEC 3
41520	7148209.357	513974.191	407.780	X-SEC 3
41519	7148209.680	513975.383	407.693	X-SEC 3
41518	7148209.714	513975.673	407.474	WE
41517	7148209.623	513975.758	407.215	X-SEC 3
41516	7148209.830	513976.577	407.039	X-SEC 3
41515	7148210.270	513978.099	406.778	X-SEC 3
41514	7148210.483	513980.531	406.994	X-SEC 3

41513	7148210.725	513981.156	407.052	X-SEC 3
41512	7148210.768	513981.361	407.483	WE
41511	7148210.805	513981.487	407.508	X-SEC 3
41510	7148211.091	513982.543	407.468	X-SEC 3
41509	7148211.234	513983.471	408.212	X-SEC 3
41508	7148211.321	513984.083	408.343	X-SEC 3
41507	7148211.297	513984.238	408.164	X-SEC 3
41506	7148211.657	513985.433	408.441	X-SEC 3
41505	7148211.884	513986.789	409.673	X-SEC 3
41504	7148212.148	513987.835	410.058	X-SEC 3
41503	7148212.344	513988.788	410.472	X-SEC 3
41502	7148212.432	513989.976	410.884	X-SEC 3
41501	7148212.795	513991.887	411.635	X-SEC 3
41500	7148213.204	513993.378	412.118	X-SEC 3
41499	7148213.385	513994.261	412.238	X-SEC 3

CLINTON CREEK LONG TERM PERFORMANCE MONITORING PROGRAM
(August/September 2016)

UTM COORDINATES
NAD 83, Zone 7, 141º West

CONTROL			
	NORTHING	EASTING	OTHOMETRIC HEIGHT
2834	7148172.665	513447.789	606.720
3831	7147089.201	514207.763	367.397

Coordinates shown below are derived from Real time Kinematic GPS observations holding 2016 values of control point 2834 AND 3831 fixed in 3D

WOLVERINE CREEK CENTRELINE AND PONDS

XS I

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
41532	7148093.058	513962.625	422.557	REBAR 157
41534	7148093.137	513963.651	422.257	X-SEC I
41535	7148093.284	513964.639	422.516	X-SEC I
41536	7148093.314	513965.191	422.115	X-SEC I
41537	7148093.358	513965.484	422.217	X-SEC I
41538	7148093.455	513966.863	420.784	X-SEC I
41539	7148093.587	513967.808	420.464	X-SEC I
41540	7148093.667	513968.275	420.542	X-SEC I
41541	7148093.801	513969.366	420.423	X-SEC I
41542	7148093.837	513969.687	420.247	X-SEC I
41543	7148093.951	513970.575	420.135	X-SEC I
41544	7148093.989	513970.73	420.458	X-SEC I
41545	7148094.095	513971.75	420.361	X-SEC I
41546	7148094.267	513973.141	419.393	X-SEC I
41547	7148094.556	513975.35	416.872	X-SEC I
41548	7148094.572	513975.983	416.698	X-SEC I
41549	7148094.921	513980.203	410.636	X-SEC I
41550	7148095.383	513982.771	408.727	X-SEC I
41551	7148095.634	513985.29	406.452	X-SEC I
41552	7148095.634	513985.756	406.383	WE
41553	7148095.684	513986.205	406.27	X-SEC I
41554	7148096.017	513988.135	406.114	X-SEC I
41555	7148096.026	513988.474	406.275	X-SEC I
41556	7148096.047	513989.7	406.595	X-SEC I
41557	7148096.081	513990.331	407.437	X-SEC I
41558	7148096.497	513992.866	408.868	X-SEC I
41559	7148096.694	513995.511	411.197	X-SEC I
41560	7148096.802	513995.798	412.282	X-SEC I
41561	7148097.022	513997.359	413.5	X-SEC I
41562	7148096.985	513997.85	414.055	X-SEC I
41563	7148097.198	513999.076	415.507	X-SEC I
41565	7148097.528	514002.073	417.156	REBAR 179

XS J

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
250930	7147872.122	513931.415	411.211	GS
250929	7147875.311	513935.238	409.122	GS
250928	7147878.576	513939.32	407.227	GS

250927	7147881.847	513943.555	405.835	GS
250926	7147882.477	513944.297	405.955	TAILINGS
250925	7147883.403	513945.283	405.03	TAILINGS
250924	7147886.852	513949.473	404.512	TAILINGS
250923	7147890.77	513954.262	404.527	TAILINGS
250922	7147894.534	513958.976	404.551	TAILINGS
250921	7147898.606	513964.043	404.094	TAILINGS
250920	7147902.403	513968.777	404.009	TAILINGS
250919	7147905.607	513972.66	403.849	TAILINGS
250918	7147907.034	513974.287	402.357	TAILINGS
250917	7147908.885	513976.776	400.596	TAILINGS
250916	7147910.085	513978.317	400.661	TAILINGS
250915	7147912.024	513980.829	400.798	TAILINGS
250914	7147912.178	513981.298	400.905	TAILINGS
250913	7147912.566	513981.57	400.802	TAILINGS
250912	7147913.538	513982.468	400.759	TAILINGS
250911	7147917.137	513986.618	401.397	TAILINGS
250910	7147917.909	513986.912	401.536	TAILINGS
241576	7147919.059	513989.377	399.996	TAILINGS
241577	7147920.436	513991.79	399.171	GS
241578	7147921.898	513993.524	398.924	GS
241579	7147923.013	513994.503	399.139	GS
241580	7147924.355	513995.995	398.926	GS
241581	7147924.511	513996.225	398.845	WE
241582	7147925.286	513997.132	398.455	GS
241583	7147926.152	513998.345	398.475	GS
241584	7147926.512	513998.718	398.921	GS
241585	7147926.832	513999.053	398.695	GS
241586	7147927.093	513999.242	399.162	GS
241587	7147927.822	514000.093	398.829	GS
241588	7147928.217	514000.314	399.113	WE
241589	7147928.63	514000.661	399.86	WE
241590	7147929.141	514001.201	399.843	GS
241591	7147929.19	514001.63	400.32	GS
241592	7147930.174	514003.064	400.722	TAILINGS
241593	7147931.187	514004.487	400.735	TAILINGS
241594	7147932.175	514005.49	401.037	TAILINGS
241666	7147932.833	514006.419	401.113	TAILINGS
241566	7147932.916	514006.445	401.123	TAILINGS
241667	7147934.162	514008.301	401.005	TAILINGS
241668	7147934.486	514008.779	401.198	TAILINGS
241669	7147935.971	514010.611	401.25	TAILINGS
241670	7147937.589	514012.388	401.279	TAILINGS
241671	7147938.368	514013.239	401.316	TAILINGS
241672	7147938.825	514013.795	401.482	TAILINGS
241673	7147940.32	514015.721	401.436	TAILINGS
241674	7147940.883	514016.291	401.427	TAILINGS
241675	7147941.354	514016.868	401.265	TAILINGS
241676	7147942.698	514018.6	401.077	TAILINGS
241677	7147943.039	514019.053	401.157	TAILINGS
241678	7147944.356	514020.636	400.092	TAILINGS
241679	7147944.511	514020.956	400.208	TAILINGS
241680	7147944.821	514021.255	400.103	GS
241681	7147945.52	514021.981	401.405	GS
241682	7147946.675	514023.355	402.463	GS
241683	7147947.985	514025.219	403.518	GS
241684	7147948.802	514026.149	403.566	GS
241685	7147950.57	514028.379	405.141	GS
241686	7147952.328	514030.545	406.698	GS

241687	7147953.794	514032.463	408.235	GS
241688	7147954.848	514033.484	409.844	GS
241689	7147955.672	514034.541	410.336	GS
241690	7147957.095	514036.338	412.754	GS
241691	7147958.203	514037.892	414.771	GS
241692	7147959.112	514038.867	416.1	GS
241693	7147960.018	514040.023	417.209	GS
241694	7147960.525	514040.384	417.438	GS
241695	7147961.538	514042.099	419.852	GS
241696	7147962.706	514043.422	420.984	GS
241697	7147963.416	514044.266	421.994	GS
241698	7147965.014	514046.305	423.997	REBAR 158
241699	7147967.769	514047.018	425.816	REBAR 160

XS K

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
250953	7147754.034	514033.657	415.495	REBAR 162
250952	7147754.76	514039.092	413.235	GS
250951	7147755.775	514044.672	410.116	GS
250950	7147756.838	514049.966	406.443	GS
250949	7147757.26	514052.223	405.446	GS
250948	7147758.358	514057.197	402.791	GS
250947	7147758.955	514062.066	400.128	GS
250946	7147759.852	514065.161	398.616	GS
250945	7147760.4	514068.303	397.329	GS
250944	7147760.754	514071.422	395.469	GS
250943	7147761.209	514072.723	395.408	GS
250942	7147762.039	514076.85	392.212	GS
250941	7147763.015	514084.144	388.86	GS
250940	7147763.561	514088.842	388.664	GS
250939	7147764.422	514092.795	388.813	GS
250938	7147765.416	514098.878	389.082	GS
250937	7147765.915	514101.611	387.098	GS
250936	7147766.331	514103.631	386.66	GS
250935	7147766.82	514106.809	385.003	GS
250934	7147767.982	514111.18	384.845	GS
250933	7147768.077	514113.827	383.742	GS
250932	7147768.658	514116.774	383.307	GS
250931	7147769.054	514117.665	382.979	WE
241700	7147769.277	514119.121	382.611	GS
241701	7147769.493	514120.133	382.521	GS
241702	7147769.497	514120.272	382.93	WE
241703	7147769.635	514120.674	383.23	GS
241704	7147769.934	514122.98	383.648	GS
241705	7147770.191	514124.315	383.612	TAILINGS
241706	7147770.547	514125.658	384.433	TAILINGS
241707	7147770.803	514126.646	384.613	TAILINGS
241708	7147771.114	514129.213	384.391	TAILINGS
241709	7147771.548	514131.452	384.582	TAILINGS
241710	7147771.98	514134.072	384.551	TAILINGS
241711	7147772.43	514136.218	384.496	TAILINGS
241712	7147772.565	514137.457	384.742	TAILINGS
241713	7147772.916	514139.507	384.965	TAILINGS
241714	7147773.352	514141.848	385.544	TAILINGS
241715	7147773.703	514143.734	385.37	TAILINGS
241716	7147773.944	514145.844	385.37	TAILINGS
241717	7147774.382	514147.798	385.362	TAILINGS
241718	7147774.522	514149.027	385.016	TAILINGS
241719	7147774.893	514150.295	385.016	TAILINGS

241720	7147775.143	514151.654	385.218	TAILINGS
241721	7147775.454	514153.921	384.895	TAILINGS
241722	7147775.862	514156.037	384.417	TAILINGS
241723	7147776.249	514158.031	383.802	TAILINGS
241724	7147776.504	514159.558	383.475	GS
241725	7147776.595	514159.67	383.335	WE
241726	7147776.654	514159.821	383.171	GS
241727	7147776.568	514160.347	383.212	GS
241728	7147776.814	514160.869	383.339	WE
241729	7147776.937	514161.758	383.642	GS
241730	7147777.103	514162.707	383.851	GS
241731	7147777.193	514163.209	384.136	GS
241732	7147777.364	514163.969	384.359	GS
241733	7147777.544	514165.669	384.512	GS
241734	7147777.854	514166.682	384.91	GS
241735	7147778.002	514167.797	385.157	GS
241736	7147778.446	514170.204	386.3	GS
241737	7147778.851	514172.562	388.118	GS
241738	7147779.337	514175.447	390.652	GS
241739	7147779.825	514178.452	392.828	GS
241740	7147780.125	514180.55	392.797	GS
241741	7147780.295	514181.167	392.598	GS
241742	7147780.695	514182.984	392.684	GS
241743	7147781.05	514184.563	393.536	GS
241744	7147781.461	514187.243	395.577	GS
241745	7147781.744	514189.403	397.676	GS
241746	7147782.139	514191.417	400.212	GS
241747	7147782.662	514194.183	401.778	GS
241748	7147782.91	514196.219	403.031	REBAR 161

XS L

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
250967	7147682.303	514117.657	395.036	REBAR 165
250966	7147683.162	514120.169	393.749	GS
250965	7147684.115	514122.959	392.283	GS
250964	7147684.662	514124.996	390.436	GS
250963	7147685.3	514127.136	389.235	GS
250962	7147687.476	514131.647	385.821	GS
250961	7147688.135	514134.08	385.888	GS
250960	7147689.517	514138.466	385.969	GS
250959	7147691.989	514144.576	385.827	GS
250958	7147692.949	514148.505	383.187	GS
250957	7147693.854	514151.459	382.825	GS
250956	7147695.477	514156.172	382.519	GS
250955	7147696.048	514157.526	380.95	GS
250954	7147696.669	514158.937	380.661	WE
241788	7147696.677	514160.649	380.644	GS
241787	7147697.253	514162.264	380.335	GS
241786	7147697.357	514163.031	380.48	GS
241785	7147697.5	514163.185	380.683	WE
241784	7147697.624	514163.589	381.146	GS
241783	7147698.285	514165.178	381.703	GS
241782	7147698.771	514166.888	381.944	GS
241781	7147699.237	514168.321	381.857	GS
241780	7147699.957	514170.502	381.986	GS
241779	7147700.95	514173.311	381.998	GS
241778	7147701.57	514175.668	381.95	GS
241777	7147702.158	514176.906	381.691	GS
241776	7147702.944	514179.347	382.187	GS

241775	7147703.345	514180.508	382.193	GS
241774	7147704.048	514182.664	381.997	GS
241773	7147705.259	514186.366	382.088	GS
241772	7147706.145	514188.823	382.565	GS
241771	7147706.681	514190.069	384.007	GS
241770	7147706.909	514191.101	384.59	GS
241769	7147707.457	514192.377	384.698	GS
241768	7147708.063	514194.735	383.85	GS
241767	7147708.767	514196.48	383.748	GS
241766	7147709.378	514198.525	384.259	GS
241765	7147709.653	514199.587	384.184	GS
241764	7147710.259	514201.167	384.598	GS
241763	7147710.794	514202.432	385.472	GS
241762	7147711.436	514204.854	386.622	GS
241761	7147712.125	514206.49	387.77	GS
241760	7147712.582	514208.098	387.803	GS
241759	7147712.791	514208.653	387.706	GS
241758	7147713.501	514210.613	387.972	GS
241757	7147714.12	514212.471	388.057	GS
241756	7147714.688	514214.087	388.939	GS
241755	7147715.094	514215.554	390.173	GS
241754	7147715.647	514216.999	391.775	GS
241753	7147716.105	514218.478	393.533	GS
241752	7147716.743	514220.495	394.481	GS
241751	7147717.658	514223.548	396.518	GS
241750	7147718.445	514225.853	397.852	GS
241749	7147718.978	514227.204	398.981	REBAR 164

XS M

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
241867	7147417.58	514195.035	384.039	REBAR 181
241866	7147417.719	514195.714	383.685	GS
241865	7147418.489	514197.469	382.842	GS
241864	7147418.911	514198.991	381.924	GS
241863	7147419.564	514200.888	380.9	GS
241862	7147419.934	514202.249	380.459	GS
241861	7147420.628	514204.365	379.648	GS
241860	7147421.229	514206.375	378.608	GS
241859	7147421.748	514207.556	378.273	GS
241858	7147422.225	514209.314	377.305	GS
241857	7147422.941	514211.545	376.323	GS
241856	7147423.521	514213.786	375.307	GS
241855	7147424.055	514215.164	374.924	GS
241854	7147424.727	514217.665	374.557	GS
241853	7147425.077	514218.554	374.227	GS
241852	7147425.153	514218.92	373.226	GS
241851	7147425.268	514219.309	373.123	WE
241850	7147425.919	514220.998	372.852	GS
241849	7147426.089	514221.764	372.923	GS
241848	7147426.116	514222.249	373.121	WE
241847	7147426.242	514222.362	373.275	GS
241846	7147426.423	514223.01	373.463	GS
241845	7147427.085	514225.147	373.274	GS
241844	7147427.898	514226.983	373.479	GS
241843	7147428.628	514229.472	374.122	GS
241842	7147430.186	514234.444	376.019	GS
241841	7147430.767	514236.351	376.495	GS
241840	7147431.019	514237.201	376.828	GS
241839	7147431.381	514238.028	377.57	GS

241838	7147431.595	514238.774	377.704	GS
241837	7147431.867	514239.577	378.222	GS
241836	7147431.993	514240.148	378.3	GS
241835	7147432.395	514241.262	378.866	GS
241834	7147432.715	514242.201	379.796	GS
241833	7147433.254	514243.798	380.624	GS
241832	7147433.753	514245.41	381.708	GS
241831	7147434.287	514247.15	383.326	GS
241830	7147434.767	514248.893	384.365	GS
241829	7147435.344	514250.567	385.298	GS
241828	7147435.747	514251.856	386.423	GS
241827	7147437.226	514256.029	386.842	GS
241816	7147437.632	514257.657	387.096	GS
241817	7147437.998	514258.826	387.291	GS
241818	7147439.162	514262.672	387.575	GS
241819	7147439.652	514264.165	388.739	GS
241820	7147440.143	514265.517	390.176	GS
241821	7147440.493	514267.117	391.284	GS
241822	7147440.854	514268.301	392.857	GS
241823	7147441.399	514269.48	393.668	GS
241824	7147441.731	514270.487	395.089	GS
241825	7147442.54	514273.109	397.129	GS
241826	7147442.79	514274.071	397.812	REBAR 180

XS N

	NORTHING	EASTING	OTHOMETRIC HEIGHT	DESC.
241868	7147279.334	514169.659	373.549	REBAR 167
241869	7147279.207	514170.952	373.244	GS
241870	7147279.05	514172.769	372.78	GS
241871	7147278.332	514175.377	371.683	GS
241872	7147277.837	514178.348	371.046	GS
241873	7147277.695	514178.923	371.097	GS
241874	7147277.514	514179.987	370.447	GS
241875	7147277.208	514181.086	369.96	GS
241876	7147277.127	514181.84	369.758	GS
241877	7147277.091	514182.257	368.989	GS
241878	7147276.98	514183.01	369.061	GS
241879	7147276.922	514183.513	369.32	GS
241880	7147276.724	514184.51	369.351	GS
241881	7147276.513	514185.314	369.918	GS
241882	7147275.922	514188.183	370.197	GS
241883	7147275.612	514190.226	370.389	GS
241884	7147275.342	514192.173	369.547	GS
241885	7147275.18	514192.656	369.047	WE
241886	7147275.224	514192.671	368.965	GS
241887	7147275.253	514193.411	369.005	GS
241888	7147275.268	514193.916	369.008	GS
241889	7147275.28	514194.229	369.083	WE
241890	7147274.774	514195.233	369.408	GS
241891	7147274.479	514197.057	369.457	GS
241892	7147273.845	514199.661	369.312	GS
241893	7147273.805	514200.295	369.127	WE
241894	7147273.707	514201.06	369.013	GS
241895	7147273.607	514201.66	368.863	GS
241896	7147273.398	514202.441	368.987	GS
241897	7147273.14	514203.867	368.942	GS
241898	7147273.116	514204.145	369.111	WE
241899	7147273.08	514204.438	369.123	GS
241900	7147273.061	514205.103	369.627	GS

241901	7147272.919	514205.604	370.4	GS
241902	7147272.435	514207.322	370.586	GS
241903	7147272.059	514210.449	370.405	GS
241904	7147271.425	514212.308	370.349	GS
241905	7147271.357	514213.347	370.725	GS
241906	7147271.119	514215.061	371.225	GS
241907	7147270.831	514216.411	372.131	GS
241908	7147270.545	514218.912	373.08	GS
241909	7147270.173	514220.375	374.03	GS
241910	7147269.506	514223.64	376.239	GS
241911	7147269.394	514224.228	376.484	GS
241912	7147269.232	514226.687	376.439	GS
241913	7147268.482	514229.672	376.574	GS
241914	7147267.96	514232.357	376.865	GS
241915	7147267.833	514233.696	378.036	GS
241916	7147267.395	514235.649	379.558	GS
241917	7147267.303	514236.46	380.503	GS
241918	7147266.991	514237.478	381.564	GS
241919	7147266.778	514239.053	382.679	GS
241920	7147266.528	514240.214	383.507	REBAR 166

Appendix 6 Trigger and Recommendations Summary Tables

2016 LTPMP Trigger Summary

ID	Description	Trigger Value	Action if Triggered	2016 Value	Status	Discussion
AR-1 (2014)	Average horizontal movement of baseline from previous year	10 cm less the average reported accuracy of baseline shots	Develop mitigation plan	+0.7 cm/y	Not triggered	Continue monitoring
AR-2 (2014)	Loss of embankment based on horizontal offset from previous year	1.0 m	Develop mitigation plan	0.42 m/y	Not triggered	Continue monitoring
~~AR-3 (2014)~~	~~Total length of observed tension cracks~~	~~Increase by 20% from previous year~~	~~Develop mitigation plan~~	~~n/a~~	Trigger removed	Trigger removed in 2016 and replaced with Trigger AR-5
~~AR-4 (2014)~~	~~Average number of cracks observed perpendicular to each baseline pin~~	~~Increase by 20% from previous year~~	~~Develop mitigation plan~~	~~n/a~~	Trigger removed	Trigger removed in 2016 and replaced with Trigger AR-5
AR-5 (new)	Significant apparent increase in risk of slope failure	Based on visual inspection and review of survey data by a professional engineer	Develop mitigation plan	No change	Not triggered	Trigger added in 2016 to replace previous triggers AR-3 and AR-4

ID	Description	Trigger Value	Action if Triggered	2016 Value	Status	Discussion
~~HL-1 (2014)~~	~~Lake water surface critical elevation~~	~~>412.0 masl~~	~~Mobilize to site to check outlet for blockage, remove blockage if present, and inspect downstream infrastructure (e.g., drop structures and channel)~~	~~Freshet maximum of 412.10 masl on April 28, 2016~~ ~~Summer maximum of 411.92 masl on July 7, 2016~~	Trigger removed	Trigger removed in 2016 as it is not relevant to annual reporting. Lake levels should be monitored remotely and checked prior to entering the site, as is current practice by AAM.
HL-2 (2014)	Movement of boom abutment structures from previous monitoring period	H: 0.30 m less reported horizontal accuracy of abutment shots And/or V: 0.10 m less reported vertical accuracy of abutment shots	Investigate base structure and develop mitigation plan as required	North: 3.6 cm horizontal; 12.2 cm vertical South: 6.2 cm horizontal; 4.1 cm vertical	Triggered for north abutment vertical movement	Trigger value should be revised based the results of a re-assessment of stability of the abutment structures.
HL-3 (2014)	Significant observed or potential erosion around the base of the abutments	Based on visual inspection and review of survey data by a professional engineer	Construct additional erosion protection and stabilize structure if necessary	No change	Not triggered	Trigger was revised since 2014 report to be a more generic review of erosion around the abutments.
DS-1 (2005)	Change to drop structure geometry: steepened side slope	<2H:1V	Develop mitigation plan for drop structures at which trigger has been exceeded	DS1 2.9H:1V DS2 2.7H:1V DS3 2.5H:1V DS4 2.9H:1V	Not triggered	Continue monitoring

ID	Description	Trigger Value	Action if Triggered	2016 Value	Status	Discussion
DS-2 (2005)	Change to drop structure geometry: minimum freeboard at design flow	<0.60 m	Develop mitigation plan for drop structures at which trigger has been exceeded	DS1 1.21 m DS2 1.08 m DS3 0.96 m DS4 1.31 m	Not triggered	Revised minimum freeboard to 0.60 m from 0.30 m to provide allowance for snow and ice build-up, which likely contributed to the flood damage during 2009 freshet.
DS-3 (2005)	Change in distance between monitoring pins from baseline	>0.50 m	Develop mitigation plan for drop structures at which trigger has been exceeded	DS1 0.08 m DS2 0.28 m DS3 0.08 m DS4 n/a	Not triggered	Continue monitoring
DS-4 (2005)	Water flowing below the gabion baskets or undermining piping between DS1 and DS4	Visual evidence	Immediate appropriate repair prior to the end of the construction season	No undermining observed	Not triggered	Continue monitoring
DS-5 (2005)	Damage to gabion mesh	Visual evidence	Repair wire mesh and SPENAX rings as appropriate prior to the end of construction season	No damage observed	Not triggered	Continue monitoring
~~DS-6 (2014)~~	~~Change to cross-sectional end area since previous monitoring period~~	~~>10% RPC~~	~~Develop mitigation plan for drop structures at which trigger has been exceeded~~	~~-7.2% to 1.1%~~	Trigger removed	Redundant with trigger DS-2

ID	Description	Trigger Value	Action if Triggered	2016 Value	Status	Discussion
CC-1 (2005)	Channel downcut over the 50 m channel segment downstream of DS4 to Sta. 0+300	>0.5 m (from Sept 2010 baseline)	Begin planning for channel and waste rock stabilization	None	Not triggered	Revised baseline to September 2010 in order to monitor future channel erosion
CC-2 (2005)	Channel downcut over a measurable (>50 m) stretch of the channel downstream of Sta. 0+300	>1.5 m (from Sept 2010 baseline)	Planning for channel and waste rock stabilization	0.66 m average downcut in mid creek (0+675 to 0+875)	Not triggered	Revised baseline to September 2010 in order to monitor future channel erosion
CC-3 (2014)	Average channel deposition through upper/mid/lower creek section	>0.3 m from previous monitoring period	Develop localized mitigation plan	Upper: None Mid: None Lower: None	Not triggered	Continue monitoring
CC-4 (2014)	Mid-creek channel centerline shifts south, into the waste rock dump	>5 m (average) from previous monitoring period	Develop localized mitigation plan	None	Not triggered	Continue monitoring

ID	Description	Trigger Value	Action if Triggered	2016 Value	Status	Discussion
WR-1 (2014)	Average monitoring point horizontal movement rates	Significant increase in movement rate over historical rates, warranting further assessment of stability or mitigation measures in the opinion of a qualified professional.	Stability assessment and, if warranted, mitigation measures	25% to 30% increase since 2012 (+0.3 to +0.6 cm/yr)	Not triggered	Trigger modified to be a more general review of movement rates by a qualified professional. Overall rate of movement is too small to raise concerns about overall slope stability. Survey error could have a significant contribution to this apparent acceleration.
PP-1 (2014)	Average monitoring point horizontal movement rates	Significant increase in movement rate over historical rates, warranting further assessment of stability or mitigation measures in the opinion of a qualified professional.	Stability assessment and, if warranted, mitigation measures	300% increase since 2012 (+1.1 cm/yr)	Not triggered	Trigger modified to be a more general review of movement rates by a qualified professional. Overall rate of movement is too small to raise concerns about overall slope stability. Survey error could have a significant contribution to this apparent acceleration.
WC-1 (2005)	Channel downcut over a measurable (>50 m) stretch of the channel from Sta. 1+025 to 1+300	>1.0 m from baseline	Begin planning for channel stabilization works	None	Not triggered	Continue monitoring

ID	Description	Trigger Value	Action if Triggered	2016 Value	Status	Discussion
WC-2 (2005)	Channel downcut over a measurable (>50 m) stretch of the channel from Sta. 0+735 to 1+025	>0.5 m from baseline	Begin planning for channel stabilization works	None	Not triggered	Continue monitoring
WC-3 (2005)	Visual observations of channel instability	Indications of erosion at top of channel bank or channel re-alignment	Begin planning for channel stabilization works	None	Not triggered	Continue monitoring
WC-4 (2014)	Average channel deposition through upper/mid/lower creek section	>0.3 m from previous monitoring period	Develop localized mitigation plan	None	Not triggered	Continue monitoring
WC-5 (2014)	Channel centreline shift	>5 m (average) from previous monitoring period	Develop localized mitigation plan	None	Not triggered	Continue monitoring
TP-1 (2014)	Average monitoring point horizontal movement rates	Significant increase in movement rate over historical rates, warranting further assessment of stability or mitigation measures in the opinion of a qualified professional.	Stability assessment and, if warranted, mitigation measures	No increase since 2012	Not triggered	Trigger modified to be a more general review of movement rates by a qualified professional.
WP-1 (2014)	Pond surface area	>25% from previous monitoring period	Develop localized mitigation plan	No change	Not triggered	Continue monitoring

ID	Description	Trigger Value	Action if Triggered	2016 Value	Status	Discussion
WP-2 (2014)	Pond outlet width	>15% reduction from previous monitoring period	Develop localized mitigation plan	No change	Not triggered	Continue monitoring
WP-3 (2014)	Pond outlet invert elevation	±0.5 m from previous monitoring period	Develop localized mitigation plan	No change	Not triggered	Continue monitoring

2016 LTPMP Maintenance Activity Recommendations

ID	Site Component	Description	Implementation
1	Site access road	Landslides and erosion caused by runoff along the site access road that was observed at the end of August, 2016, should be inspected after the 2017 freshet. Large debris should be cleared and the access road should be regraded if necessary in order to maintain safe vehicle access for local residents and personnel visiting the site.	High priority Inspect after 2017 snowmelt and complete maintenance in early summer, 2017 once access to site is available
2	Log boom abutments	As per Trigger HL-2, the stability of the log boom abutments should be reassessed based on the observed movements. Trigger HL-2 should be modified based on the results of the stability assessment to set a maximum allowable movement from the baseline before maintenance is required. If required, the north abutment should be stabilized before re-deploying the log booms.	Medium priority Complete prior to reinstating the log booms, ideally prior to 2017 freshet
3	Drop Structure 4	Drop Structure 4 ACB mat channel should be repaired or maintained as early as possible to mitigate risk of further damage during future high flow events.	High priority As early as possible and ideally prior to 2017 freshet in order to mitigate risk of further damage during high flow events
4	Waste rock dump	The runoff diversion ditch at the crest of the stabilized waste rock slope south of DS4 should be checked, and if necessary regraded, to minimize erosion of the stabilized slope.	Medium priority Summer 2017
5	Waste rock dump	To further reduce erosion of the DS4 stabilized slope, consider trackwalking the slope by running tracked equipment (e.g., bulldozer) up and down the slope and seeding native plant species. The slope should be seeded shortly after snowmelt to maximize the growing season.	Low priority Summer 2017

ID	Site Component	Description	Implementation
6	Clinton Creek	Trees and other large vegetation or rocks in the landslide on the north side of DS4 should be removed and disposed of elsewhere on site. Smaller debris and soil from the slide should be pushed to the toe of the failed slope and lightly compacted to reduce erosion of the currently loose soil.	Medium priority Summer 2017

2016 LTPMP Future Monitoring Recommendations

ID	Site Component	Description	Implementation
1	Site access road	AR-3 and AR-4 should be replaced with a single trigger, AR-5, with action taken based on significant apparent increase in risk of slope failure (as evidenced in part by tension cracks) based on visual inspection and review of survey data by a professional engineer.	Implement in 2017 LTPMP
2	Hudgeon Lake outlet triggers	Trigger HL-1, maximum lake water surface of 412.0 masl, should be removed as it is not relevant to annual reporting. Rather, lake levels should be monitored remotely and checked prior to entering the site, as is current practice by AAM. Lake levels exceeding 412.0 masl may indicate either high flows or a blockage at the lake outlet, both of which pose a risk to the safety of personnel on site.	Implement in 2018 LTPMP
3	Hudgeon Lake outlet	Trigger HL-3 should be revised to remove the >10% riprap loss from around the abutments. Action should be triggered by "significant observed or potential erosion around the base of the abutments based on visual inspection and review of survey data by a professional engineer."	Implement in 2018 LTPMP
4	Drop structures	Trigger DS-6 should be removed as it is redundant with Trigger DS-2.	Implement in 2017 LTPMP
5	Drop structures	Trigger DS-2 should be modified to check for a minimum freeboard of 0.6 m during the design peak flow rate of 29 m3/s. The current allowable freeboard of 0.3 m does not adequately account for potential snow and ice build-up during freshet, which was thought to have contributed to the 2009 freshet flood damage (R12, AECOM 2010).	Implement in 2017 LTPMP
6	Clinton Creek	Continue to monitor changes to the Clinton Creek channel at Station 0+430 to identify if and when mitigation measures may be required to manage erosion of the right bank (i.e., waste rock).	Implement in 2017 LTPMP

ID	Site Component	Description	Implementation
7	Clinton Creek	Modify the baseline year of Clinton Creek to September, 2010 so that triggers reflect recent changes to the creek channel, rather than the changes that occurred during the 2009 and 2010 flood events.	Implement in 2017 LTPMP
8	2017 LTPMP Scope	The 2017 LTPMP should be a "short" program consisting of the following components: ▪ Visual inspection of all site components to identify new potential safety, environmental or maintenance issues and modify the proposed 2017 survey scope as required. ▪ Survey of the following critical site components – Clinton Creek drop structures, including the DS4 repairs completed in 2015 – Clinton Creek channel from DS4 to Fording No. 1 – Closed portion of the site access road downstream of DS4 – Hudgeon Lake log boom abutments	Visual inspection should be completed after freshet, 2017 with recommendations for maintenance to be completed in the summer of 2017. Survey program should be completed in the summer of 2017
9	2018 LTPMP Scope	The 2018 LTPMP survey should be a "full" program consisting of the same scope as the 2016 LTPMP plus all additional monitoring points installed in 2016.	Visual inspection should be completed after freshet, 2018 with recommendations for maintenance to be completed in the summer of 2018. Survey program should be completed in the summer of 2018.