2013 WATER QUALITY MONITORING REPORT – TOM VALLEY PROPERTY

WATER LICENCE QZ13-034

March 2014

Prepared for:

HUDSON BAY MINING AND SMELTING CO., LIMITED

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ACCESS CONSULTING GROUP SIGNATURES

Report prepared by:

Leia Fougere
Environmental Engineer (EIT)

Report prepared by:

Holly Goulding
Environmental Engineer (EIT)

Report reviewed by:

Kai Woloshyn
Environmental Manager

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1 INTRODUCTION

Access Consulting Group is pleased to provide the 2013 Water Quality Monitoring Report for the Tom Valley property, Macmillan Pass, Yukon. This monitoring report has been prepared on behalf of Hudson Bay Mining & Smelting Co., Limited (HBMS) in fulfillment of the water licence requirements (QZ13-034). The 2013 monitoring program included the four required monthly site visits (June 24th 2013, July 30th – 31st 2013, August 13th – 14th 2013, and September 17th – 18th 2013) as well as a late fall trip on October 3rd 2013.

1.1 BACKGROUND

The Tom Valley property consists of a sedimentary-exhalative style lead-zinc deposit located in the Macmillan Pass area of Yukon, near the border with the Northwest Territories (Figure 1-1). The site is located in the remote Selwyn Mountains and accessed seasonally via the North Canol Road. The North Canol Road is a gravel road that is typically open from mid to late-June to late-September. The Tom Valley deposit is located at the northeast end of the road, approximately 175 km northeast of the community of Ross River. The Macmillan Pass area lies within the Ross River Dena's Traditional Territory. The Tom Valley property is held under a series of leases to Hudson Bay Exploration & Development Company Limited of Flin Flon, Manitoba.

Details of the site history are presented in the "*Tom Valley Property 2000 Water Quality Study*" (Gartner Lee Limited, 2001). As part of the site work in 2000, a site clean-up was conducted, signage was posted, and a stainless steel barricade installed across the adit preventing access to the underground. Since that time, HBMS has conducted annual site inspections, water quality monitoring, installation of an adit plug and associated workings, and a waste rock cover.

Water Licence QZ99-046 for the site was issued on December 17, 2002 by the Yukon Water Board and became effective January 1, 2003. The current licence, Water Licence QZ13-034 (Yukon Water Board, 2013) is a renewal of QZ99-046 as amended, and took effect January 1, 2014. The Licence requires that HBMS continue its monitoring program, as outlined in the Water Licence & Tom Valley Final Adaptive Management Plan, and submit a Final Closure Plan prior to June 30, 2015.

Since the issuance of Water Licence QZ99-046, HBMS has conducted several investigations for the purposes of characterizing anthropogenic and natural metal loading observed in the Upper South Macmillan River area. Water quality of the adit discharge frequently exceeds the Effluent Quality Standards (EQS) specified in the site's water licence, which came into effect on October 1, 2012. However, natural background conditions also frequently exceed EQS and this natural metal loading contributes to the majority of zinc captured in the receiving environment, the South Macmillan River. Naturally elevated metals in the area have been well documented in studies completed over the past 30 years. Investigations and studies show the adit's contribution to metal loading at downstream locations with known fish presence is insignificant. In spite of this, discussions with various regulators and agencies have suggested that the status quo of the adit discharge was not acceptable; therefore, a remediation plan was developed and submitted to YESAB on February 2, 2008 to address this issue. A revised EQS for total zinc of 26.4 mg/L was applied for as part of amendment application QZ12-042. As part of the reasons for decision for issuance of QZ12-042, the board acknowledge they agreed with the methodology, but were requesting one year of additional monitoring data for a total of three year post adit plug installation data. The Board encouraged HBMS to incorporate a change in the zinc EQS once sufficient data had been collected and interpreted (Yukon Water Board, 2012b). The Board did not consider interim measures for the zinc EQS prior to three years of data and

HBMS indicated the discharge would not be able to meet the zinc EQS that came into effect on October 1, 2012. It is also not a suitable EQS for the site based on the site specific conditions of the Sekie Creek #2 watershed. As part of the renewed water licence the Effluent Quality Standards for the adit discharge at W5 come into effect after September 30, 2014.

HBMS submitted a remediation plan to the Yukon Water Board on November 18, 2008 to plug the adit at the Tom property for the purposes of flooding the underground workings in efforts to reduce acid rock drainage (ARD) and metal leaching (ML), and improve water quality of the discharge from the adit. The construction of the adit plug was completed on August 28th, 2010. Between August 28th and September 13th, 2010 water flooded the underground workings with discharge resuming from the adit at approximately 1:00PM on September 13th, 2010. The adit discharge is now isolated from the waste rock dump and flows through a high density polyethylene (HDPE) lined channel. An impermeable cover consisting of HDPE liner and a half meter of local material was installed over the top of the north and south waste rock dumps. The objective of the cover is to reduce the infiltration of surface runoff and precipitation into the waste rock dump, reducing potential non-point source metal loadings into the Sekie Creek #2 drainage. The construction of a sludge pond was initiated in July 2009 when it was dug out and lined with a 60mm HDPE liner. The sludge pond was filled with ~1000 m^3 of sludge on August 7th, 2009 and was left over winter to freeze dry.

In the summer of 2009, the location of the high grade ore pile was confirmed at the toe of the south waste rock dump. Upon confirmation of the location of the ore pile, a strategy to relocate it was determined to enhance the reclamation plan and address the material that poses the greatest ARD and metal leaching potential in the waste rock dump. It was decided the ore would be relocated into the sludge pond and at the top of the south waste rock pile. In July 2010 the sludge pond was dewatered to facilitate the relocation of the ore. The sludge pond was then filled to the top with approximately 1,000 m^3 of ore and then covered with a geotextile membrane. The remaining 600 m^3 of Tom ore was relocated to the top of the south waste rock dump. In September 2010, the sludge pond and the top of the south waste rock dump were covered with an HPDE liner and a protective layer composed of a half a meter of local talus material. Additionally, as part of the commitments made during the YESAB and Water Board processes, flowing boreholes FS1 and PH1 were grouted shut on August 12, 2010 and are no longer flowing, but will continue to be monitored for presence of seepage as outlined in the site's AMP.

HBMS has adopted an Adaptive Management approach for ensuring the effectiveness of the installation of the adit plug and associated workings. Adaptive management begins by using predictive modelling based on present knowledge to inform management decisions. As new information is obtained through monitoring, the models will be updated and further actions will be proposed in response to the results obtained through the monitoring program. Actions can then be implemented accordingly. Continued monitoring, as required in the existing Water Licence (QZ13-034), with additional sampling noted in the Final Adaptive Management Plan (AECOM 2010), is expected to be sufficient to determine whether the remediation plan is achieving its objective of improving adit and downstream receiving water quality, or if further corrective action is required.

The current Water Licence for the Tom Property (QZ13-034) provides primarily for the implementation and monitoring of the proposed remediation plan to the end of 2015, when a Final Closure and Reclamation Plan is scheduled to be in place. The licenced remediation plan addresses specifically water and facilities that require active management to ensure that adequate environmental protection is provided in the short term (i.e., to end of 2015). A management strategy is therefore required to monitor the success of the remediation plan and if there is a potential degradation of conditions to the point where active intervention might be necessary prior to the end of

2015 and to provide a framework for ensuring that appropriate management actions are implemented. Such a strategy is provided for in the Water Licence through the AMP.

1.2 SCOPE OF 2013 MONITORING

The scope of the 2013 monitoring program included:

1. Site inspection – to ensure the security of the barricaded adit and inspect general site conditions.
2. Five water quality sampling events as per Water Licence QZ13-034, water quality samples were collected from the Tom adit discharge and receiving environment. At the same time, stream flow measurements were collected.
3. Groundwater sampling of three monitoring wells installed in the waste rock dump and surrounding area.
4. Aquatic monitoring in the South Macmillan River including sediment and benthic invertebrate sampling.
5. Monitoring and reporting outlined in the Adaptive Management Plan.
6. Reporting interpretation and presentation of 2013 monitoring results.

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FIGURE 1-1

TOM PROPERTY PROJECT LOCATION

ACCESS

2 METHODOLOGY

2.1 SAMPLING LOCATIONS

The sampling locations included in the 2013 monitoring program as outlined in water licence (QZ13-034) are shown on Figure 2-1. Table 2-1 summarizes the sampling locations used in this program as well as UTM coordinates for each station. UTM coordinates are displayed as NAD83 UTM Zone 9.

The aquatic environments of Sekie Creek #2 and South Macmillan River are quite different. The South Macmillan River is a broad meandering stream flowing through a series of wetlands originating from headwaters near Macmillan Pass. The pH in the South Macmillan River is often low (typically between pH 4 and 6.5) and varies from location to location along the length of the river (Kwong and Whitley 1992). Recent fisheries investigations conducted in 2004, and 2007- 2013 by HBMS determined limited fish presence in the Upper South Macmillan River and associated tributaries. Fish have not observed until approximately 40 km and 80 km downstream of Sekie Creek #2, respectively (GLL 2005 and GLL 2007).

The Sekie Creek #2 drainage is a steep alpine stream that often has high velocities and is subject to violent storm or freshet flow events. This is demonstrated by the coarse angular nature of the streambed and the abundant flood levees that have formed along the length of the stream. The Sekie Creek #2 is very acidic, typically with a pH around 3 and has never contained any fish or suitable fish habitat.

436000 437000 438000 439000 440000 441000 442000 443000 444000 445000 446000 447000 448000

7007000 7006000 7005000 7004000 7003000 7002000 7001000

N W E S

W11 W8 W12 W9 S2 T5 W13

AIRSTRIP

Sekie Creek #2

Macintosh Creek

Unnamed Creek

Tom Creek

JASON PROPERTY

Rat Creek

South MacMillan River

NORTH CANOL ROAD

Sekie Creek #1

TO INSET 2 (3.8 KM)

INSET 1

1:32,076 (when printed on 11 x17 inch paper)

0 250 500 1,000 1,500 Meters

INSET 2

TO MAIN MAP (3.8 KM)

1:20,000 (when printed on 11 x17 inch paper)

0 95 190 380 570 Meters

INSET 1

T4 W6 FS2 BH04-05 BH01-05 BH03-05 W5 FS1 Adit Plug Bypass Raise W2 Tom Weather Station W3 W3B PH1

Bypass Raise

Adit Plug

Adit Floor

(Artistic Representation)

Tom Creek

Sekie Creek #2

Unnamed Creek

1:8,000 (when printed on 11 x17 inch paper)

0 50 100 200 300 400 Meters

National Topographic Data Base (NTDB) compiled by Natural Resources Canada at a scale of 1:50,000. Cadastral data compiled by Natural Resources Canada. Reproduced underlicense from Her Majesty the Queen in Right of Canada, Department of Natural Resources Canada. All rights reserved.

Datum: NAD 83; Map Projection: UTM Zone 9N

Satellite imagery acquired on September 12, 2011

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Water Monitoring Stations

- Surface water
- Groundwater
- Seep
- Not Active

- Weather Station
- Adit Plug
- Undergroud Workings

- Covered Waste Rock
- Uncovered Waste Rock
- Line Discharge Channel
- Covered Sludge Pond

HBMS

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FIGURE 2-1
TOM PROPERTY
WATER QUALITY MONITORING LOCATIONS

DRAWN BY MD	NOVEMBER 2012	VERIFIED BY KW

I:\Tom_and_Jason\Maps\1_Overview_Maps\WQ_Stations\WQ_TomStns_wt_Aerial_20121122.mxd
(Last edited by: jpan;11/22/2012/11:08 AM)

Table 2-1. Surface Water and Groundwater Monitoring Sites

Site ID	Location	Description	Easting*	Northing*
Sekie Creek #2 Watershed				
W2	Tom Creek	First upstream tributary from Tom adit. Site is approximately 200 m. from confluence with Sekie Creek #2.	441,463	7,003,964
W3B	Sekie Creek #2 u/s of site	Upstream of Tom adit approximately 800 m. Upstream of W3 and series of small waterfalls on Sekie Creek #2.	441,949	7,003,773
W3	Sekie Creek #2 u/s of site	Upstream of Tom adit approximately 500 m. Just upstream of historic exploration camp and small waterfall on Sekie Creek #2.	441,765	7,003,914
W5	Tom adit discharge	Discharge from Tom adit. Sample collected <10 m from portal.	441,645	7,004,218
W6	Sekie Creek #2 d/s of adit	Located about 200 m downstream of confluence of Tom adit discharge and Sekie Creek #2. Site is down-gradient of waste rock dump.	441,541	7,004,314
W8	Sekie Creek #2 at North Canol Road crossing	North Canol Road crossing of Sekie Creek #2 – located approximately 3 km downstream from Tom adit.	439,443	7,005,615
S2	Sekie Creek #2 upstream of Tributary T5	Sekie Creek #2 approximately 1.5 Km downstream of W6 and upstream of T5.	440,337	7,005,106
T4	Tributary of Sekie Creek #2 downstream of W6	Tributary of Sekie Creek #2 approximately 200 m downstream of W6 and upstream of road crossing.	441,436	7,004,645
T5	Tributary of Sekie Creek #2 downstream of S2	Tributary of Sekie Creek #2 approximately 20 m downstream of S2.	440,325	7,005,073
South Macmillan River				
W11	South Macmillan River u/s of Sekie Creek #2	Meander in River adjacent to airstrip. Site is 800 m upstream from mouth of Sekie Creek #2.	439,279	7,006,052
W12	South Macmillan River d/s of Sekie Creek #2	Straight section of River adjacent to North Canol Road. Site is 950 m downstream from mouth of Sekie Creek #2 and 1.3 km upstream from Macintosh Creek.	439,100	7,005,164
W13	South Macmillan River #2 bridge crossing	Located at Macmillan River bridge crossing #2. ~15 km downstream from mouth of Sekie Creek #2.	439,210	6,996,140
Groundwater				
BH01-05	Screened in bedrock	Groundwater well located up gradient of north waste rock dump.	441,624	7,004,236
BH03-05	Screened in bedrock and waste rock	Groundwater well located down gradient of south waste rock dump.	441,588	7,004,147
BH04-05	Screened in bedrock and waste rock	Groundwater well located down gradient of north waste rock dump.	441,583	7,004,220
FS1	Hill above covered south Adit	Previously flowing exploration borehole grouted shut on August 12, 2011.	441,683	7,004,117
PH-1	Upper Sekie Creek #2	Previously flowing exploration borehole grouted shut on August 12, 2011	442,148	7,003,596

** UTM Zone 9 NAD83.*

2.2 DATA COLLECTION

During the sampling events in the 2013 sampling season, each surface water samples were analyzed for general chemical parameters, as well as total and dissolved metals, and nutrients. Groundwater samples were analyzed for general chemical parameters, dissolved metals, and nutrients. Field measurements were collected for conductivity, pH, ORP, dissolved oxygen and temperature. Stream flow measurements or stream flow estimates were made for all sites. Field replicate samples were collected during each field visit and replicates were collected in order to quantify natural variability between simultaneous grab samples. Site conditions such as adit barricade condition and debris were noted as part of the site inspection. Photographic records of the sampling sites (as required by the water licence) are provided in Appendix A.

2.3 HYDROLOGY

As part of the Tom water monitoring program, measurements or field estimates of creek and river flows were completed. Flows were determined by one of two methods depending on site conditions and are shown in Table 2-2. For those flows measured using the Marsh-McBirney Flo-Mate flows were calculated using the United States Geological Survey mid-section method.

Table 2-2. Hydrology Method for 2013 Sampling Events

Site	Jun. 24	Jul. 30	Aug.14	Sep. 17	Oct. 3
W2	M	M	M	M	-[3]
W3	M	M	M	M	-[3]
W3B	M	M	M	M	-[3]
W5	M	M	M	M	M
W6	M	M	M	M	-[3]
W8	-[1]	M	M	M	M
S2	M	M	M	M	-[3]
T4	M	Dry	Dry	Dry	-[3]
T5	M	M	M	M	-[3]
South Macmillan River					
W11	M	M	M	M	M
W12	M	M	M	M	M
W13	-	M[2]	M[2]	M[2]	-[3]

M = Marsh-McBirney Flo-Mate

- = Not measured due to unsafe water levels or snow/ice conditions

[1] Marsh-McBirney not working

[2] Measurement collected from the bridge with the Marsh-McBirney

[3] Measurements not collected due to limited time

2.4 CLIMATE

A HOBO Weather Station was installed on June 22, 2010 upstream of the confluence of Tom Creek and Sekie Creek #2, near surface water sampling station W2. The weather station includes the following:

- Temperature and relative humidity sensor including radiation shield;
- Wind speed and direction sensor;
- Two silicon pyranometres (solar radiation);
- Barometric pressure sensor;
- Rain-gauge sensor;
- Three meter tower; and
- 6W solar panel.

The weather station records measurements on an hourly basis. Recorded data was last downloaded on October 3, 2013. The units, range and accuracy for the parameters recorded by the HOBO Weather Station are presented in Table 2-3.

Table 2-3. HOBO Weather Station Specifications

Parameter	Unit	Range	Accuracy
Temperature	°C	-40 to 75°C	± 0.7°C @ 25°C
Relative humidity	%	0 to 100%	± 3% over the range of 0° to 50°C
Rainfall	mm	10 cm/hr	± 1% at up to 20 mm/hr
Wind speed	km/hr	0 to 44 m/s	± 0.5 m/s or ± 4% of reading, whichever is greater
Wind direction	°	0 to 358°	± 5°
Barometric pressure	kPa	660 to 1070 mb	± 1.5 mbar over full pressure range at 25°C
Solar radiation	W/m^2	0 to 1280 W/m^2	± 10 W/m^2 or ± 5% of reading, whichever is greater

2.5 SURFACE WATER AND GROUNDWATER

At each of the surface water monitoring stations samples were collected for analysis of general chemical parameters, total metals and dissolved metals, and nutrients. Samples for dissolved metals samples were filtered in the field using 0.45 µm disposable filterware. Samples for total and dissolved metals were preserved in the field with laboratory supplied nitric acid. Samples for nutrients were collected and preserved with laboratory supplied sulphuric acid.

At each groundwater well, samples were collected for analysis of general chemical parameters, nutrients and dissolved metals when sufficient water was encountered. Samples for dissolved metals samples were filtered in the field using 0.45 µm disposable filterware. Samples for dissolved metals were preserved in the field with nitric acid. Samples for nutrients were preserved with sulphuric acid.

In-situ water pH, conductivity and temperature were measured and recorded at each surface water station and groundwater monitoring well. Water and substrate appearance (colour, turbidity) was also noted for surface water stations and purge volumes and groundwater levels were noted for groundwater wells. Field data is presented in Appendix B.

All samples were stored in coolers with freezer packs to remain cold (4°C), but not frozen during sampling at site and during transport to Maxxam Analytic Laboratories in Vancouver for analysis. Maxxam Analytic is certified with the Canadian Association for Environmental Analytical Laboratories (CAEAL). Laboratory reports are provided in Appendix C and these reports specify analytical methods used.

2.6 BENTHIC INVERTEBRATE

Benthic invertebrate communities were sampled at monitoring stations W11, W12 and W13 on the South Macmillan River on August 15, 2013. Station W11 is located upstream of Sekie Creek #2 which currently acts as the receiving environment for the Tom Valley Property Adit discharge. W11 monitoring station is here considered as a reference site and W12 an impacted monitoring site. Benthic invertebrates were sampled from areas of riffle habitat with similar stream depths and velocities using a circular Hess sampler with an area of 0.0934 m^2 and 250 µm mesh net. The organisms caught in the mesh were then washed into a sample bottle and preserved with 10% formalin solution. The methods were repeated two more times at nearby areas to obtain three replicate samples

at each site. Benthic invertebrate samples were shipped to Cordillera Consulting, in Summerland British Columbia for taxonomic identification to the lowest practical taxonomic level. Chain of Custody forms accompanied all samples.

Basic indexes such as taxonomic richness were calculated for each sample based on distinct number of taxa identified in the sample. EPT richness and Simpson's Index of diversity (1-D) as well as organism density of benthic invertebrates was calculated by dividing the total number of organisms enumerated from a sample by the sampling area of the Hess sampler of 0.0934 m^2.

2.7 SEDIMENT

Sediment samples were collected at W11, W12 and W13 in the South Macmillan River on August 15, 2013. Sediment samples were collected in replicates of three from the active channel directly into plastic jars using an aluminum scoop. Samples were stored in coolers with freezer packs at site and during transport to Maxxam Analytic Laboratories in Vancouver for analysis. Sediment samples were analysed for grain size using the ASTM-E11-61 method. Sediments from a sub sample composed of the materials passing through the 100 mesh number sieve were analysed for metals and loss on ignition at 600°C.

2.8 FISH

Fish sampling was conducted in the South Macmillan River as part of baseline studies for the Tom Property under Scientific Collection Permit XR 196 2013. The only capture method used was gee type minnow traps over two events: 30 July 2013, and 13 August 2013. Traps were positioned on the river side channels, deep pools and eddy where fish would potentially occur. Two traps were set per location. Minnow traps were baited with frozen salmon roe contained in a perforated plastic bag. Table 2-4 describes the locations that were part of the Tom property fish sampling program.

Table 2-4. Summary of the 2013 fish sampling locations on the MacMillan River.

Date In	Location	Easting*	Northing*
30 July 2013 and 13 August 2013	W13	439,279	7,006,052
	Jason Bridge	437,442	7,002,940
	W12	439,100	7,005,164
	W11	439,210	6,996,140

** UTM Zone 9*

3 RESULTS

3.1 HYDROLOGY

Surface water stream flow measurements from 2013 are presented in Table 3-1 below:

Table 3-1. Surface Water Stream Flow Measurements

Site ID	Location	Jun. 25	July 17	Aug. 14-15	Sep. 13	Oct. 3
W2	Tom Creek	98	27.5	15.0	50.77	
W3	Sekie Creek #2 u/s of site	91	30.6	13.0	28.76	
W3B	Sekie Creek #2 u/s of W3	49.9	16.6	10.6	15.43	
W5	Adit discharge	8.6	8.1	9.1	14.59	12.94
W6	Sekie Creek #2 d/s of adit	145	64.5	49	89.92	
T4	Tributary of Sekie Creek #2	2.37	dry	dry	dry	
S2	Sekie Creek #2 u/s of T5	245	128	96.4	136.8	
T5	Tributary of Sekie Creek #2	16	5.05	8.10	7.27	
W8	Sekie Creek #2 u/s of Road crossing	*	112	94	182.4	134.9
W11	Macmillan R. u/s of Sekie Creek #2	6844	1972	1760	3042	2230
W12	Macmillan R. d/s of Sekie Creek #2	7395	2358	1992	3573	2537
W13	Macmillan R.~ 15 km d/s of W8	-	8443	3717	6273	

*- = Not measured due to unsafe water levels; * = Not measured due to equipment malfunction; all flow measurements in L/s*

The weather during and prior to each sampling event was recorded in order to account for variability in sample results.

- Weather encountered on June 24th was sunny and temperatures averaging approximately 18°C. Water flows in all creeks gauged, particularly in the South Macmillan River, were the highest of the season, but did not appear to be representative of freshet conditions. Surface water site W13, on the South Macmillan River, was not gauged due to overly deep and fast flowing water.
- The July 30th and 31st sampling event was sunny with an average temperature of 15°C.
- The weather on August 12th- 14th was partly sunny to cloudy with temperatures averaging 17°C and periods of rain overnight on the 13th.
- The weather was cloudy with light snow in the evenings. It was cloudy on September 17th and partially cloudy on September 18th with an average temperature of 6°C.
- The one day October 3rd sampling event was overcast with snow on the mountains but not down in the valleys. Temperatures were around 7°C.

3.2 CLIMATE

Average daily climate data (temperature, relative humidity, barometric pressure, wind speed, wind direction, solar radiation) collected between January 1st, 2013 and October 3rd, 2013 is presented in Appendix B4a. Average monthly climate data collected between 2010 and 2013 is presented in Appendix B4b. Temperature and relative humidity data was not collected from February 11nd, 2013 to June 27th, 2013 due to a malfunctioning sensor. The

malfunction was discovered during the first site visit on June 24th and the entire station was down until the replacement and repairs were made during a follow-up trip 3 days later on June 27th.

3.3 CONDITION OF ADIT ENTRANCE AND SPILLWAY

During the first visit to the site on June 24th it was noticed that the HDPE liner along the slope of the spillway had ripped diagonally and collapsed on itself over the winter, as seen in Photo 1 of the maintenance photolog provided as Figure 3-1. This caused the water from the adit to flow under the liner for a short period along the slope of the discharge channel. An effort was made at this time to divert the water back onto the liner by pulling the liner back into place until resources could be collected to secure the liner in place. A separate trip was organised three days later, on June 27th to assess the damage to the HDPE liner, and make repairs that would hold until a more permanent fix could be installed. Repairs included removing a portion of exposed liner that was not being used and placing it in the gaps, as seen in Photo 2. The upper and lower portions of the liner were "stitched" together by piercing the liner and tying them together with rope. This was effective in flattening the channel and preventing the reroute of water onto the bank causing erosion.

In August a maintenance trip was completed to address the adit structural repairs recommended in BGC's 2012 report and to assess the June repairs to the spillway liner. Inspection of the spillway repair work completed in June found that the earlier temporary fix had failed and that a new rip had occurred. A more permanent repair was completed at this time that was designed to last over winter. This work included stitching the ripped flap, weighing it down with sandbags, burying the edge of the liner in cover material, and then weighing down the buried edge with large timber that was spiked into place. Photos 3 and 4 show the sandbag placement and the buried edge and heavy timber weights placed on the edge, respectively.

Repair work on the adit included the addition of new timber sets inside five of the existing steel sets that were deteriorating from acid water damage. The timber-caps were wide enough to also support the 6x6 blocking at the back between the steel sets. Some blocking had fallen earlier so this was a safety measure as well as supporting the steel sets and the rock above. Support and repair work to the adit entrance are shown in Photos 5 and 6.

BGC completed a site visit and geotechnical inspection on August 13th, 2013, which included a general inspection of the Tom Property, assessing the condition of the water retention plug within the Tom adit, and a visual geotechnical inspection of the waste rock dump covers and the slopes adjacent to the adit portal, checking for signs of instability and seepage, in accordance with the protocols provided in the Adaptive Management Plan.

A permanent repair of the discharge channel is planned for 2014 to repair the damaged liner and channel. BGC Engineering is currently working on refining the discharge channel design to ensure that failure does not occur in the future. The channel repairs are anticipated to occur over a two week period in July or August 2014. HBMS will submit the design modification at least 10 days prior to commencing the repair as required in Condition 27 of the licence.

Photo 1: Ripped and collapsed liner along the slope of the spilway as found during the first trip to site on June 24th 2013.

Photo 2: Temporary fix of the liner to redirect the water completed during the maintenance trip on June 27th, 2013.

Photo 3: The stiched liner was weighted down with sandbags during the August maintenance trip.

Photo 4: Heavy lengths of timber were used to weigh down the liner to prevent liner movement, which was then partially buried

Photo 5: Support timbers were added to the entrance, as well as reshaping the channel to contain the outflow.

Photo 6: New timber sets were installed inside each of the 5 steel sets that were deteriorating due to acid damage.

Figure 3-1-1. Photos of 2013 Adit and Spillway Maintenance

3.4 WATER QUALITY

3.4.1 Quality Assurance

Quality assurance/quality control measures implemented as part of this program generally consisted of:

- Collection, handling, storage and chemical analysis in accordance with "Standard Methods for Examination of Water and Wastewater" and Access Consulting Protocols.
- Establishment of Data Quality Objectives and documentation of sample variability due to natural variability and analytical variability.

Prior to describing the results of the QA/QC component of the sampling program, it is important to understand how variability is determined. The Relative Percent Difference (RPD) is used to determine variability. The RPD is the difference between the sample result and replicate result, divided by the average of the sample result and replicate result. This number is then multiplied by 100 (to make the number a percentage) and the outcome is the RPD. The RPD is not considered further where one or both of the results being compared are less than the practical quantitation limit (PQL). The PQL is three times the Method Detection Limit (MDL) and is defined as the minimum concentration that can be measured within specified limits of precision and accuracy. A constituent with results below the PQL means that the constituent being analyzed is not present in a sufficient amount to be reliably quantified. Typically, as parameters approach their detection limit, high variability is more likely to occur. Where applicable, the RPD of <25% can be used as a benchmark whereby an RPD of greater than 25% warrants further comment or consideration.

3.4.1.1 Analytical Variability

Laboratory duplicates were used to measure laboratory analytical variability. Results of quality assurance analysis are included in Appendix B. The laboratory duplicates for 5 sampling events met the lab quality control limit of 20% relative percent difference (RPD) for all parameters tested (nitrate plus nitrite is 25%). Maxxam Analytic also ran analysis on matrix spikes, spiked blanks and method blanks with internal Data Quality Objectives achieved for all samples ensuring data precision and accuracy.

3.4.1.2 Field Variability

During the monitoring program field replicates were collected to measure field variability between simultaneous grab samples. A total of 10 field replicates were collected in 2013. The highest variability was observed for ammonia for July W5 sample with a RPD of 104%. The following parameters had a RPD value greater than 25% and met the PQL:

- W5, July, ammonia (104%)
- W6, August, chloride (40%)
- W6, September, ammonia (37%), nitrate (30%)

The following parameters had an RPD value greater than 25% and didn't meet the PQL:

- W2, June, total silver (29%)

- W5, June, dissolved silver (64%)
- W5, July, nitrite & nitrate (33%), nitrite (45%)
- W5, August, nitrate (65%), nitrite & nitrate (51%), nitrite (33%)
- W6, August, molybdenum (158%), dissolved silver (55%)
- W5, September, Nitrite & nitrate (30%), nitrate (30%)
- W6, September, dissolved silver (32%)

These results show relatively low variability between simultaneous grab samples, but do indicate that there is measurable, natural variability at any given sampling location. This natural variability appears to be slightly more significant than variability introduced from the laboratory analytical methods.

3.4.1.3 Field and Travel Blanks

Additional field quality control samples include field blanks and trip blanks, where de-ionized water is handled, processed and analyzed in the same manner as the site water samples. Blanks can provide indication of sample contamination occurring in the field (field blank) or lab (method blanks) and at any point in between (trip blanks). Concentrations of parameters should not be detectable, though a PQL of ≤ two-times the reportable detection limit allows for slight "noise" around the detection limit.

A field blank is processed by taking de-ionized water (analyte free media) to the sample station, opening it and exposing it to ambient air and 'collecting' it in the sample bottles. These samples are treated the same as the actual water samples, preserved and filtered as necessary, and their analysis can provide an indication of contamination that may be affecting the actual samples. Five field blanks were analyzed in 2013 for the June, July, August, September, and October sampling events; the field blank data is provided in Appendix B.

Trip blanks (sample of de-ionized water) are supplied and prepared by the lab and are meant to accompany the sample bottles provided by the lab for the monitoring program. The trip blank travels with the sample bottles to the sample stations and is returned unopened back to the lab with the collected samples. The purpose of the trip blank is to identify any potential contamination (e.g. cross contamination from other samples or ambient air conditions) to which the samples may be exposed. Five trip blanks were analyzed in 2013 for the June, July, August, September, and October sample events; the results of the Trip Blanks are presented in Appendix B.

3.4.2 Surface Water Quality

The surface water chemistry analytical results from this program are summarized in tabular format in Appendix B1 and original laboratory reports are provided in Appendix C.

For reference purposes, reported chemical parameters have been compared to two sets of water quality guidelines:

- the Canadian Council of Ministers of the Environment (CCME) for the Protection of Aquatic Life (2010); and
- the Effluent Quality Standards (EQS) outlined in Water Licence QZ13-034.

Neither of the above sets of guidelines is entirely applicable to this study, but has been used for general guidance and discussion purposes. There is no documentation of fish resources in the South Macmillan River upstream of Sekie Creek #1 or in the Sekie Creek #2 watershed. Steep stream gradients, high velocity, and shallow water, in addition to poor water quality, make the upper South MacMillan River and Sekie Creek #2 unsuitable fish habitat. Furthermore, very minimal to non-existent benthic invertebrate communities have been documented in Sekie Creek #2 (Soroka and Jack 1983). Therefore, applying the CCME Aquatic Life guideline to the South MacMillan River and Sekie Creek #2 is not entirely appropriate. The Effluent Quality Standards (EQS) outlined in Water Licence QZ13-034 are for a grab sample of any waste discharged at station W5, and any other point of entry of a waste discharge into receiving waters, after September 30, 2014. Thus, the comparison of the 2013 results at W5, or the results at any other receiving water station, to the EQS is not strictly valid, but is used to provide a point of comparison.

Reported concentrations for several parameters exceeded the CCME guidelines and/or the EQS in many of the water samples collected in the study area. CCME Aquatic Life guidelines were exceeded for pH, nitrite, aluminum, arsenic, cadmium, chromium, copper, iron, lead, nickel, selenium, silver, thallium, uranium, and zinc in the South Macmillan River and Sekie Creek #2. The EQS were exceeded for total nickel and zinc in Sekie Creek #2. The exceeded values are highlighted in the summary tables of Appendix B1.

Figure 3-2 to Figure 3-22 graphically illustrates total copper, lead, nickel and zinc concentrations, dissolved arsenic concentrations, stream flow data, and zinc loadings for each of the surface water monitoring locations. Figure 3-23 and Figure 3-24 graphically illustrate the acidity and sulphate concentrations for the Tom adit (W5), respectively. From these figures and summary tables the following observations are apparent:

- Generally, metal concentrations in the 2013 samples collected from Sekie Creek #2 and the South Macmillan River were within the ranges observed since 2000.
- Background concentrations in upper Sekie Creek #2 (sites W2, W3B and/or W3) of total aluminum, cadmium, chromium, copper, iron, lead, nickel, selenium, thallium, uranium, and zinc, as well as pH continue to exceeded CCME aquatic life guidelines. Only at W2 did concentrations of arsenic exceed the CCME guideline. Total silver exceeded the guideline at W3 and W3B but not at W2.
- Background concentrations in upper Sekie Creek #2 for total copper exceeded EQS (1.4 mg/L) at W2 in August and October, with concentrations of 1.6 and 1.54 mg/L respectively. Total zinc exceeded EQS (12.6 mg/L) at W3B in October with a concentration of 12.9 mg/L.
- Background total zinc concentrations at station T5 exceeded EQS (12.6 mg/L) during all months (July to October) with exception of the June sampling event with results ranging from 11.4 to 42.0 mg/L. The EQS for total nickel (2.1 mg/L) was exceeded at station T5 during July, August, September, and October, but not June with results ranging from 1.2 to 4.25 mg/L.
- Concentrations of total aluminum, cadmium, chromium, copper, nickel, and thallium in adit discharge samples (W5) are within the natural range of concentrations for those metals in upstream background and reference waters (sites W2, W3B, W3 and T5). Total selenium and silver concentrations at the adit are below the range observed in background samples. Concentrations of total arsenic, iron, and lead in adit discharge samples (W5) are elevated above concentrations in the upstream waters (sites W2, W3B and W3). Total zinc concentrations at the adit are elevated above concentrations observed at W2, W3B or W3, however, similar or higher concentrations to those from the adit are observed at station T5. The adit pH is better than the upstream background and reference stations.

- Total zinc concentrations in adit discharge samples collected in 2013 consistently exceeded the EQS set out in the Licence which came into effect October 1, 2012. Zinc concentrations in discharge samples in 2013 are similar to those observed between 2003 and 2012. The concentrations of zinc in the adit water remain elevated compared to pre-2002 water quality. The adit's zinc concentrations post adit plug fluctuated from 19.7 to 25.4 mg/L in 2013. The EQS for the renewed licence do not come into effect until October 1, 2014.
- Generally, water quality draining from the adit (site W5) appears to be similar in quality since 2002. Concentrations of aluminum, iron and nickel, however, remain elevated in relation to pre-2002 data. Acidity concentrations dropped after the adit was plugged on August 28th, 2010, but continue to show a return to near historic concentrations in 2013, as was the case in 2011 and 2012. Sulphate continues to exhibit a slight increasing trend. Dissolved arsenic, total copper and total lead are slightly elevated in 2013 in comparison to 2008 to 2010 results, continuing the trend observed since 2011.
- The acidity data exhibits a distinct seasonal variation seen in previous years, with the seasonal maximum occurring in spring and minimum seen in the fall. In contrast, for the zinc results, a similar seasonal trends was observed from June to September, however the seasonal maximum occurred in the fall, with the October sample.
- The average adit pH before the plug was installed on August 28, 2010 was 3.34. Since the plug, the pH range has been 4.0 (January 28, 2011) to 4.42 (August, 2012).
- Peak total zinc concentrations up to 12.9 mg/L in the upper Sekie Creek #2 watershed stations was observed during the October 2013 sampling event for W3B. The highest total zinc concentration for a background station in 2013 was 42.0 mg/L at station T5 in October.
- Overall, the elevated and increasing trends of metal concentrations in background (Upper Sekie #2 and reference station T5) water samples during the lower flow conditions in September continue to indicate that background water quality in the region is influenced by naturally occurring elevated concentrations of metals from local massive sulphide-dominated geology.
- Post adit water quality of metals significantly decreased during the first month following the resumption of adit discharge in 2010. The adit metal concentrations from 2011 to 2013 have since returned to historic concentration ranges, while metal concentrations in the background stations continue to consistently exceed the EQS.

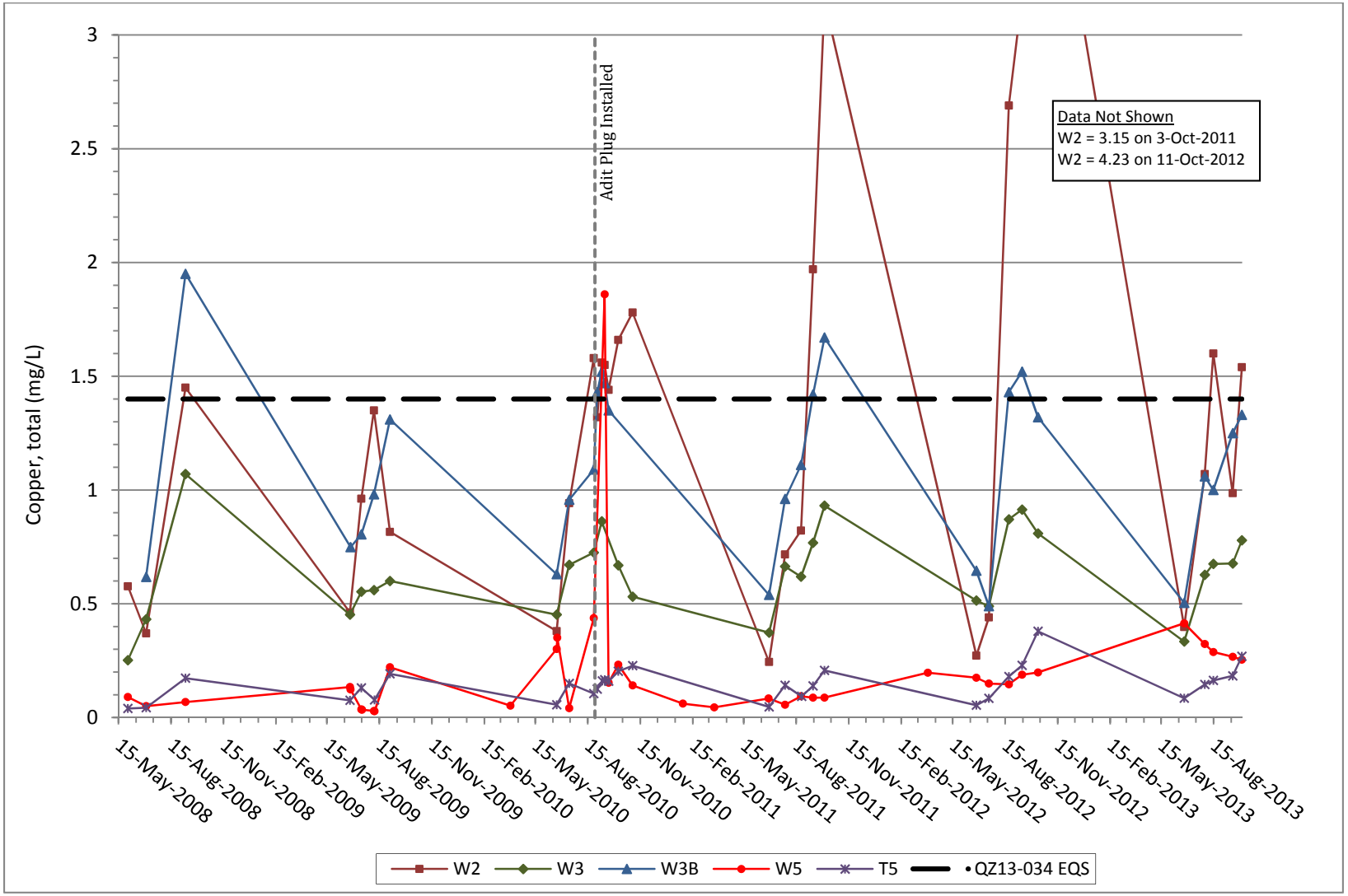

Figure 3-2. Total Copper in the Upper Sekie Creek #2 Watershed, 2008-2013

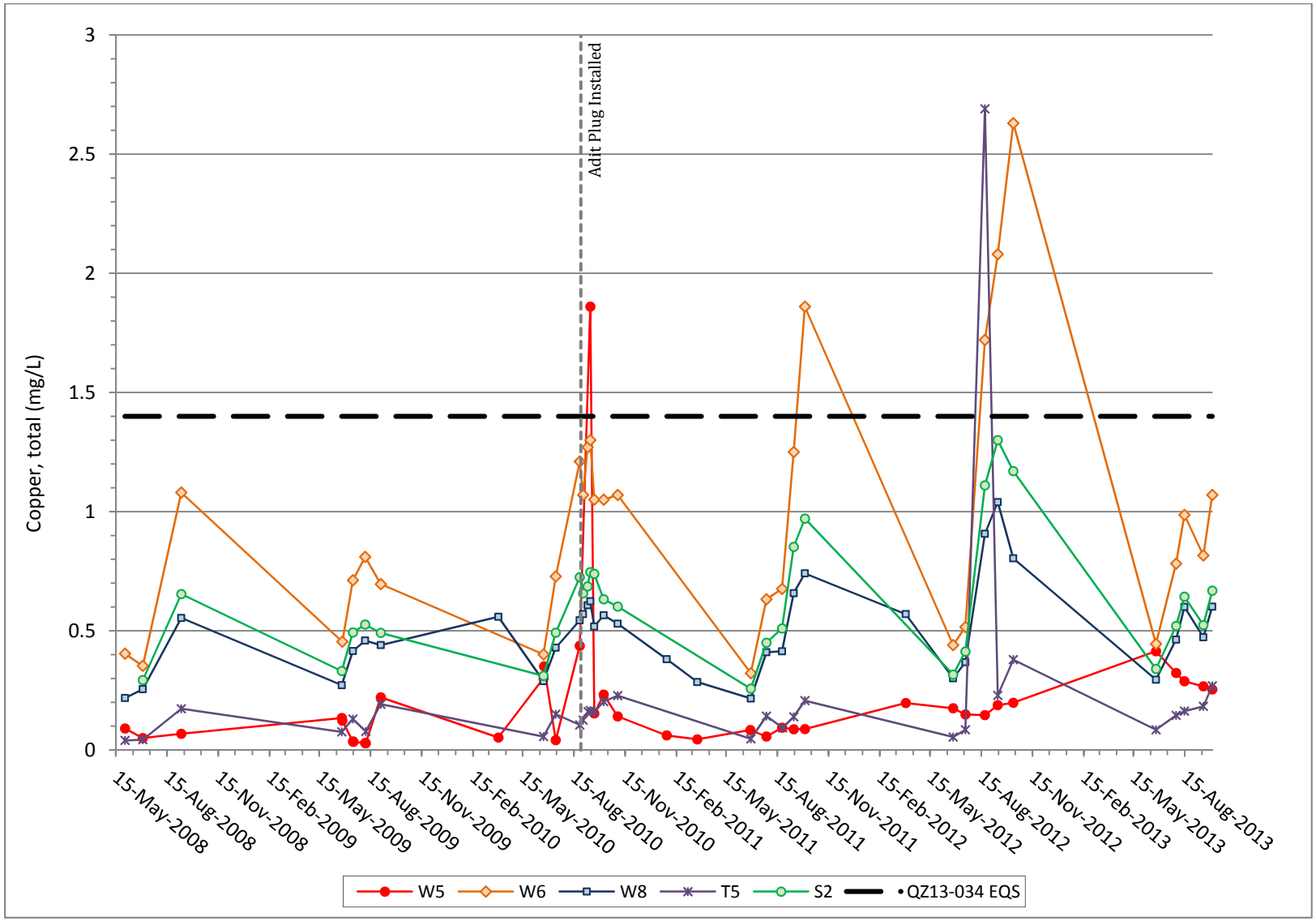

Figure 3-3. Total Copper in the Lower Sekie Creek #2 Watershed, 2008-2013

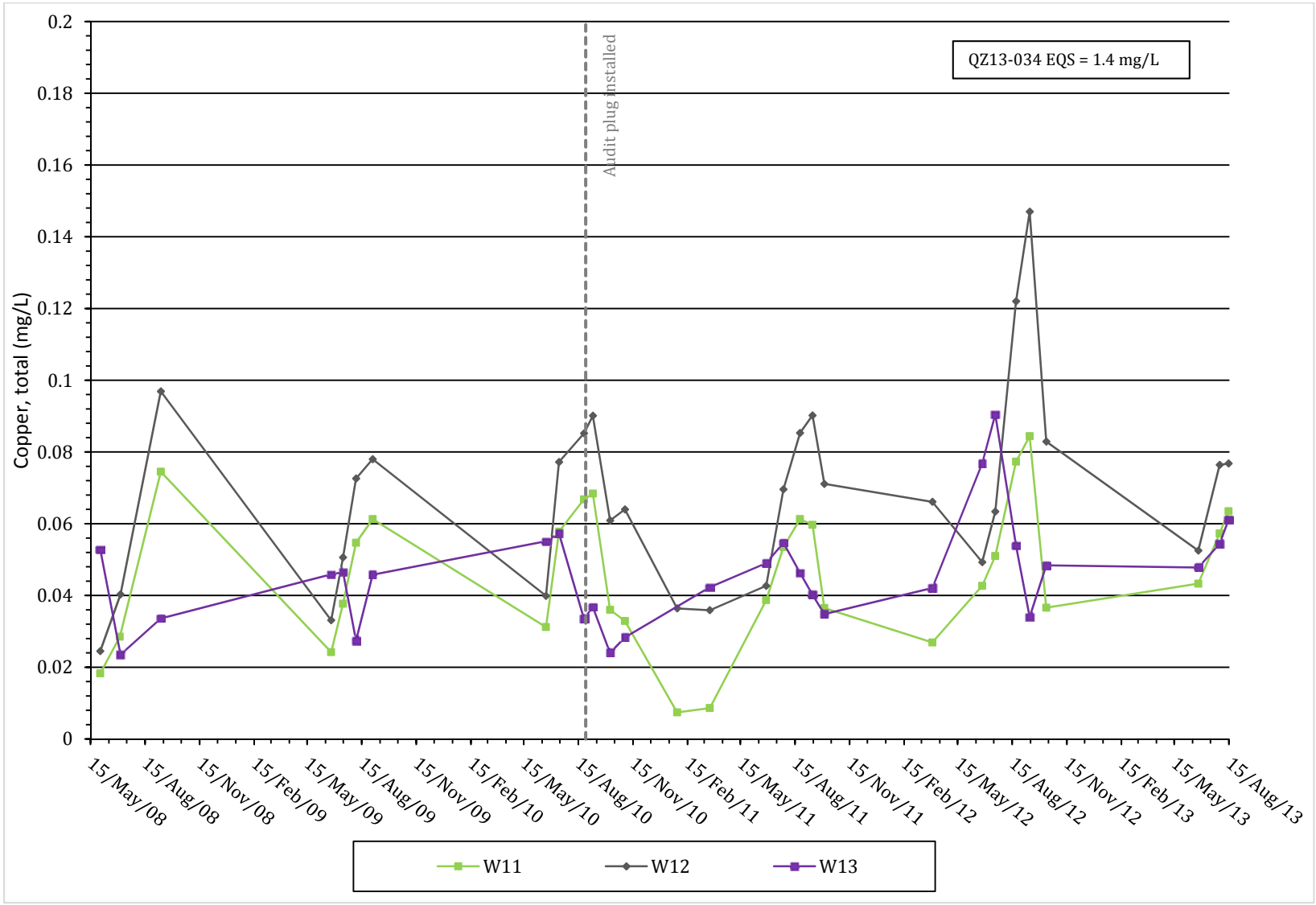

Figure 3-4. Total Copper in the Upper South Macmillan River, 2008-2013

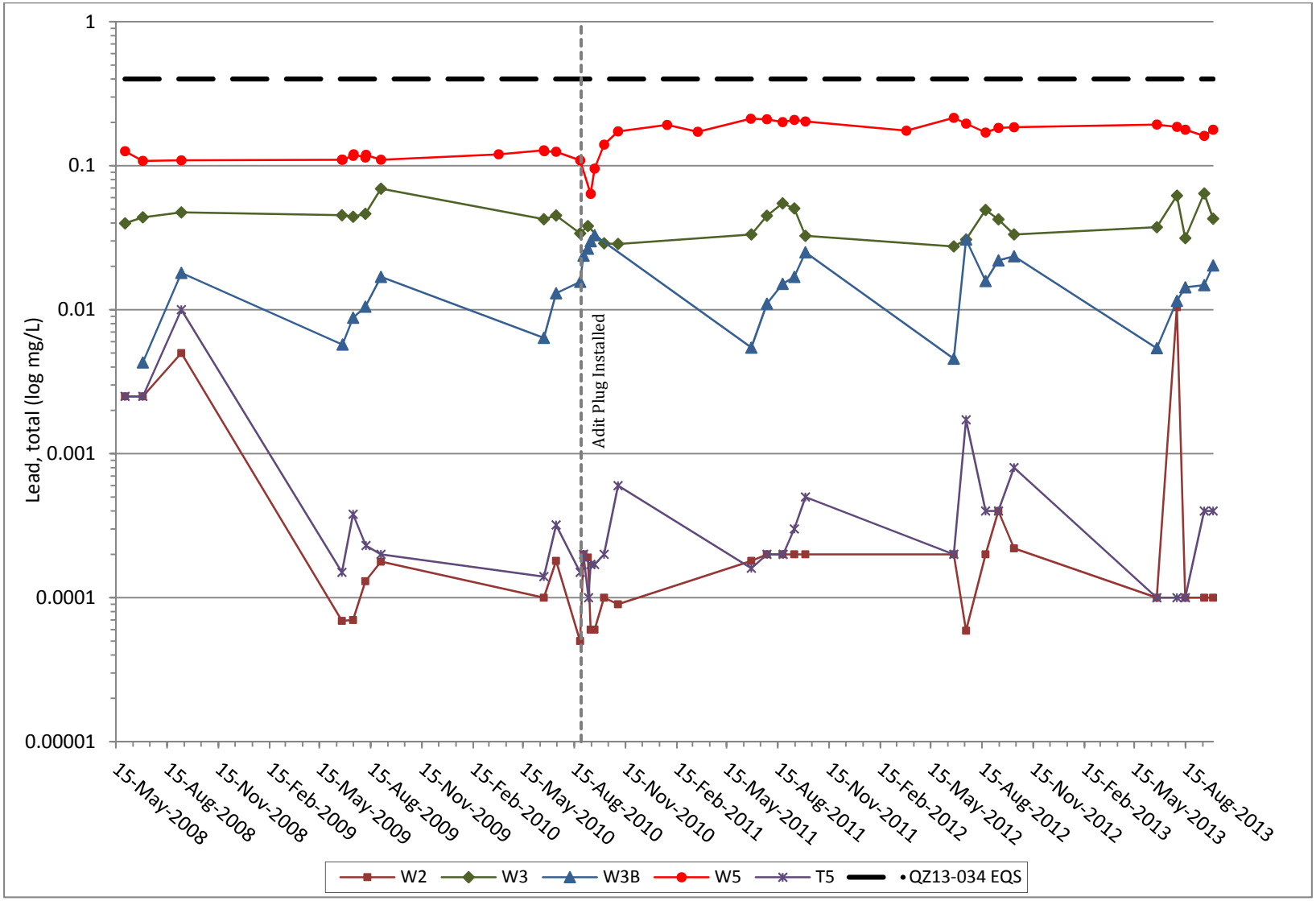

Figure 3-5. Total Lead in the Upper Sekie Creek #2 Watershed, 2008-2013

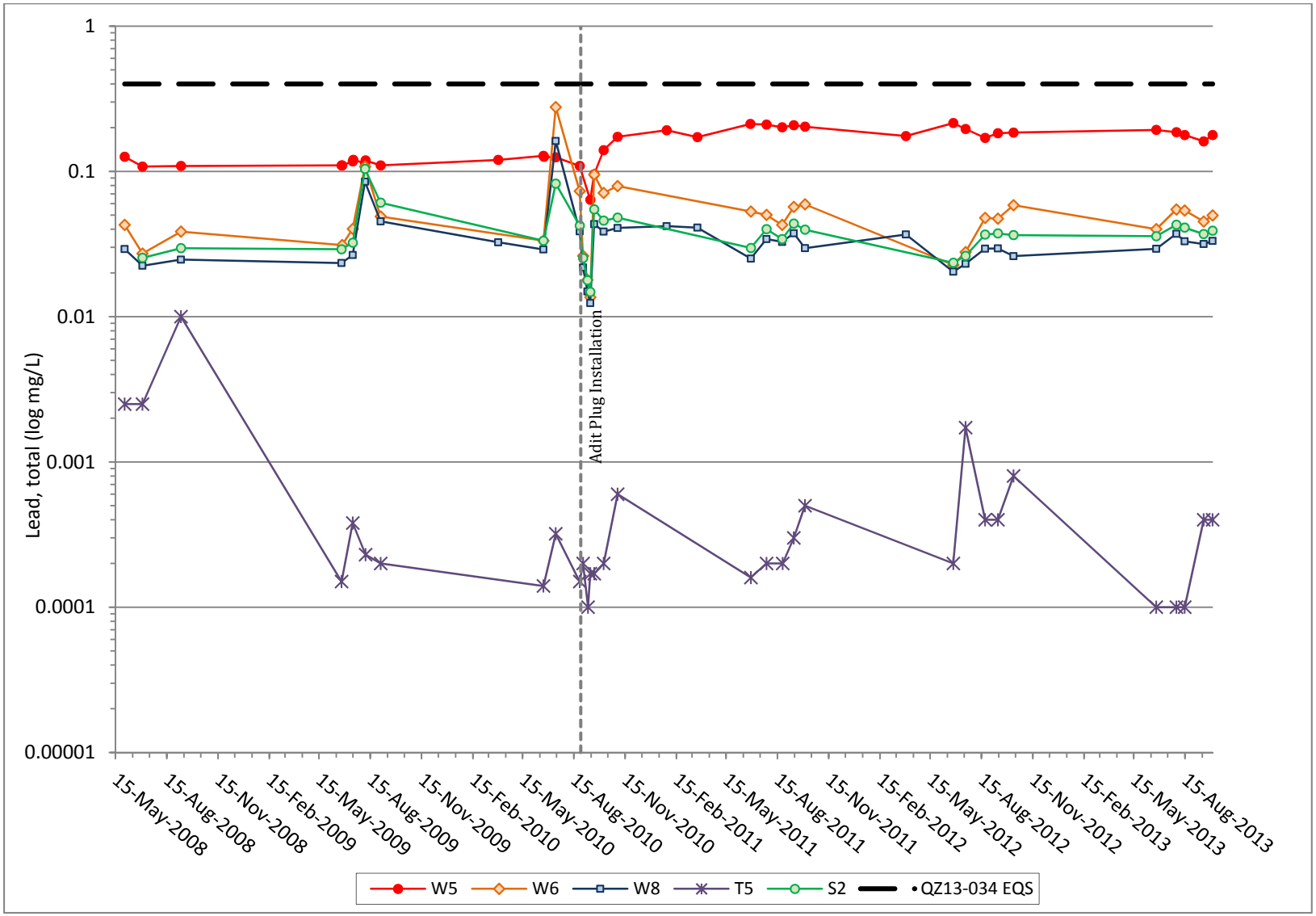

Figure 3-6. Total Lead in the Lower Sekie Creek #2 Watershed, 2008-2013

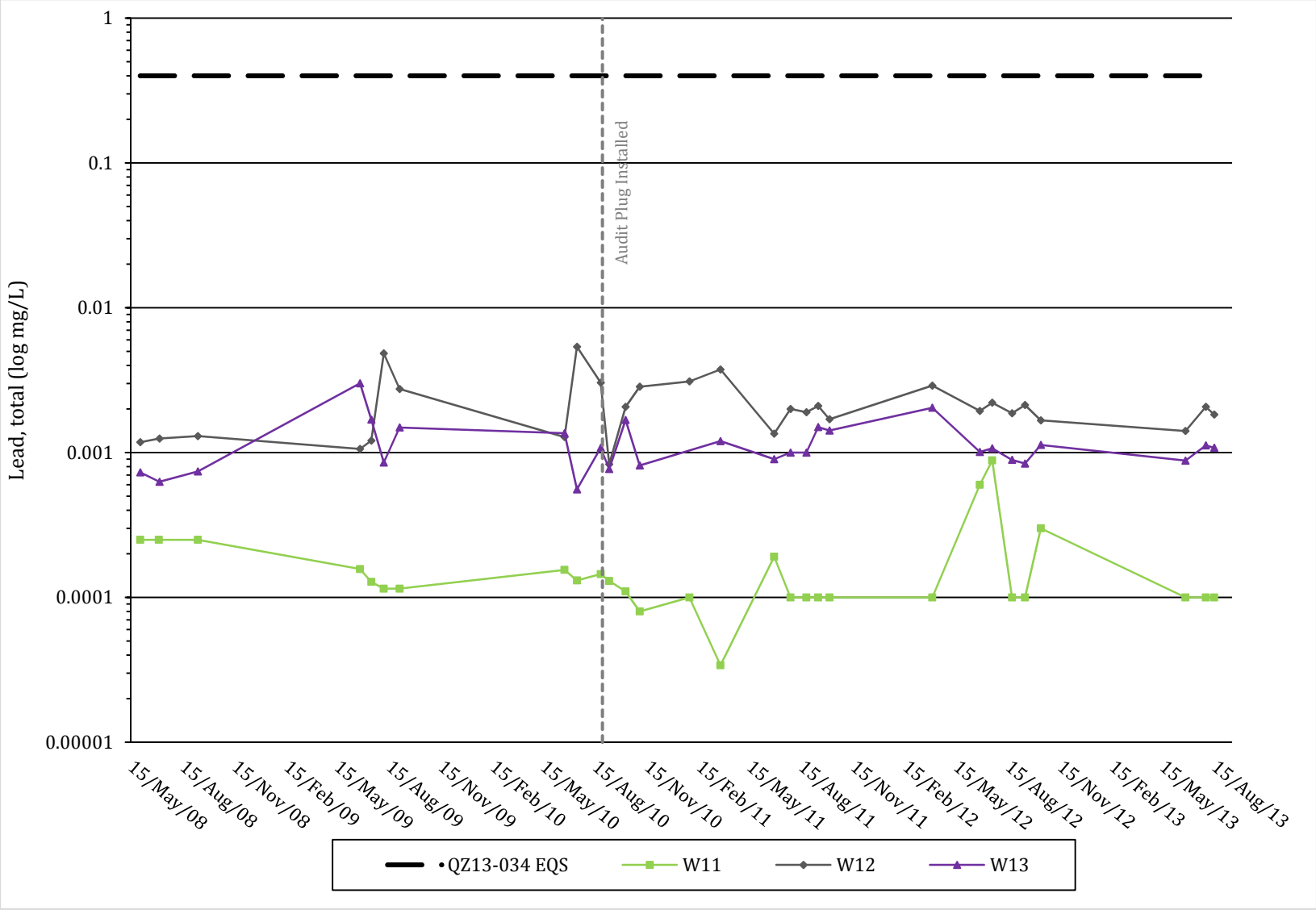

Figure 3-7. Total Lead in the Upper South Macmillan River, 2008-2013

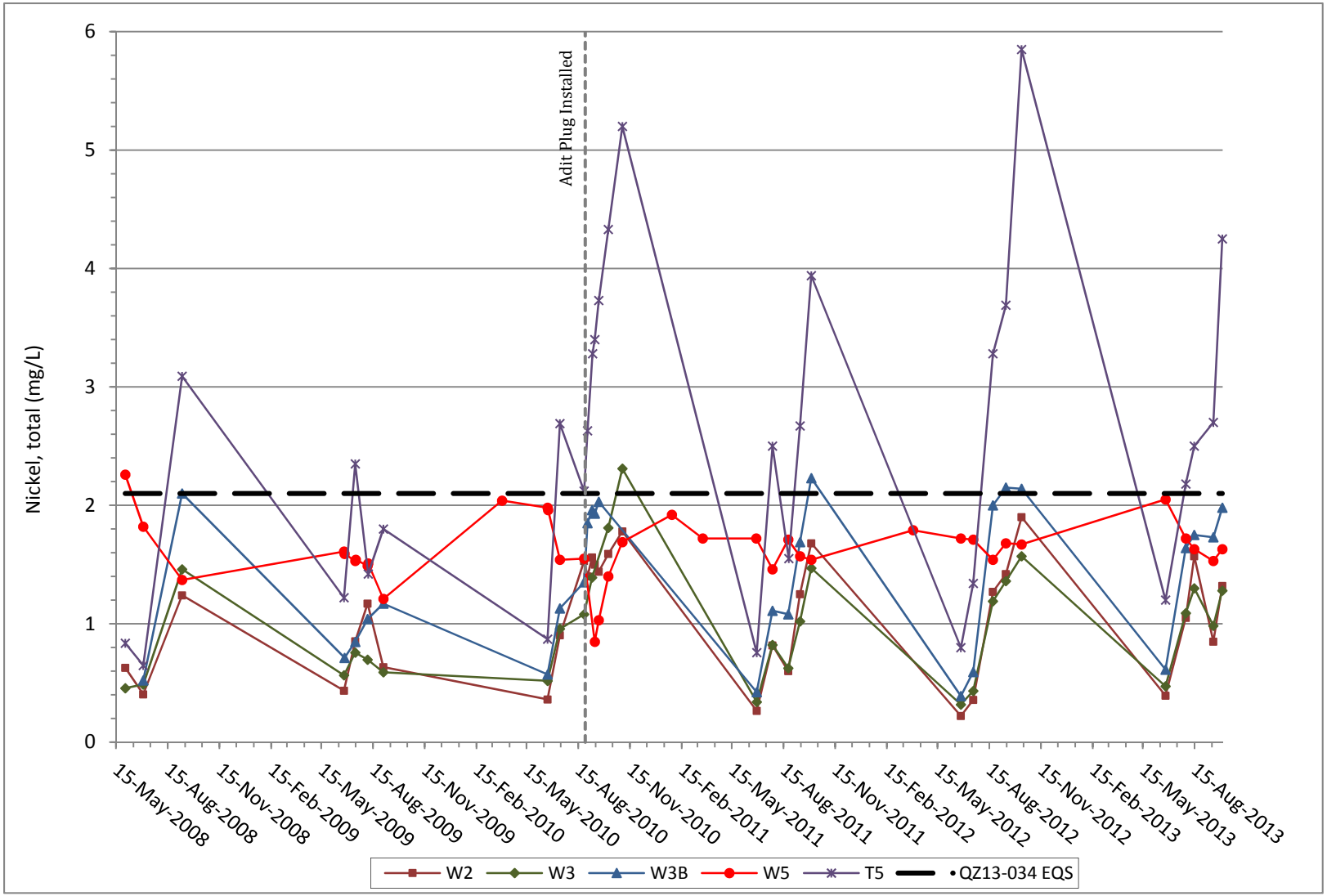

Figure 3-8. Total Nickel in the Upper Sekie Creek #2 Watershed, 2008-2013

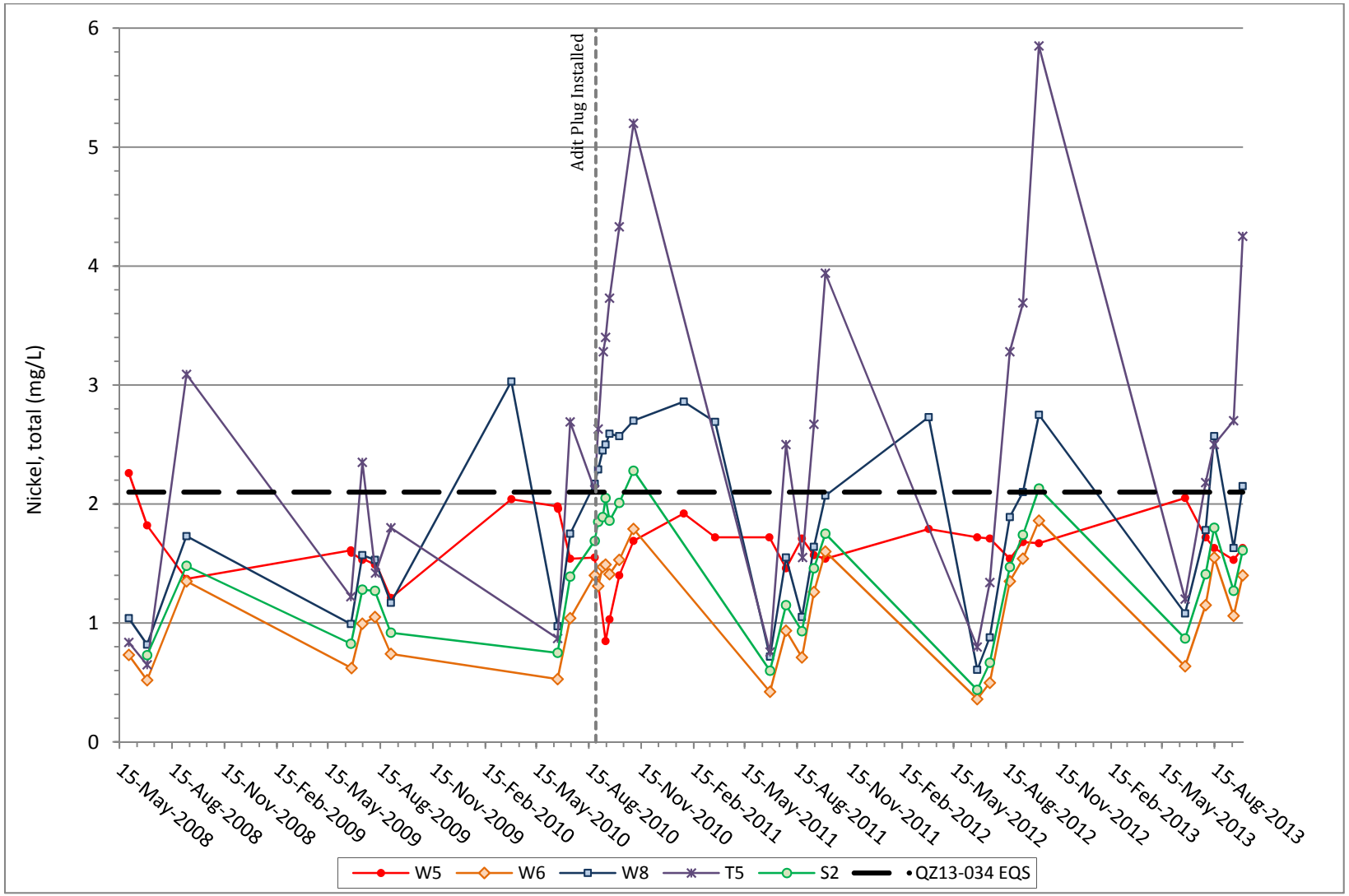

Figure 3-9. Total Nickel in the Lower Sekie Creek #2 Watershed, 2008-2013

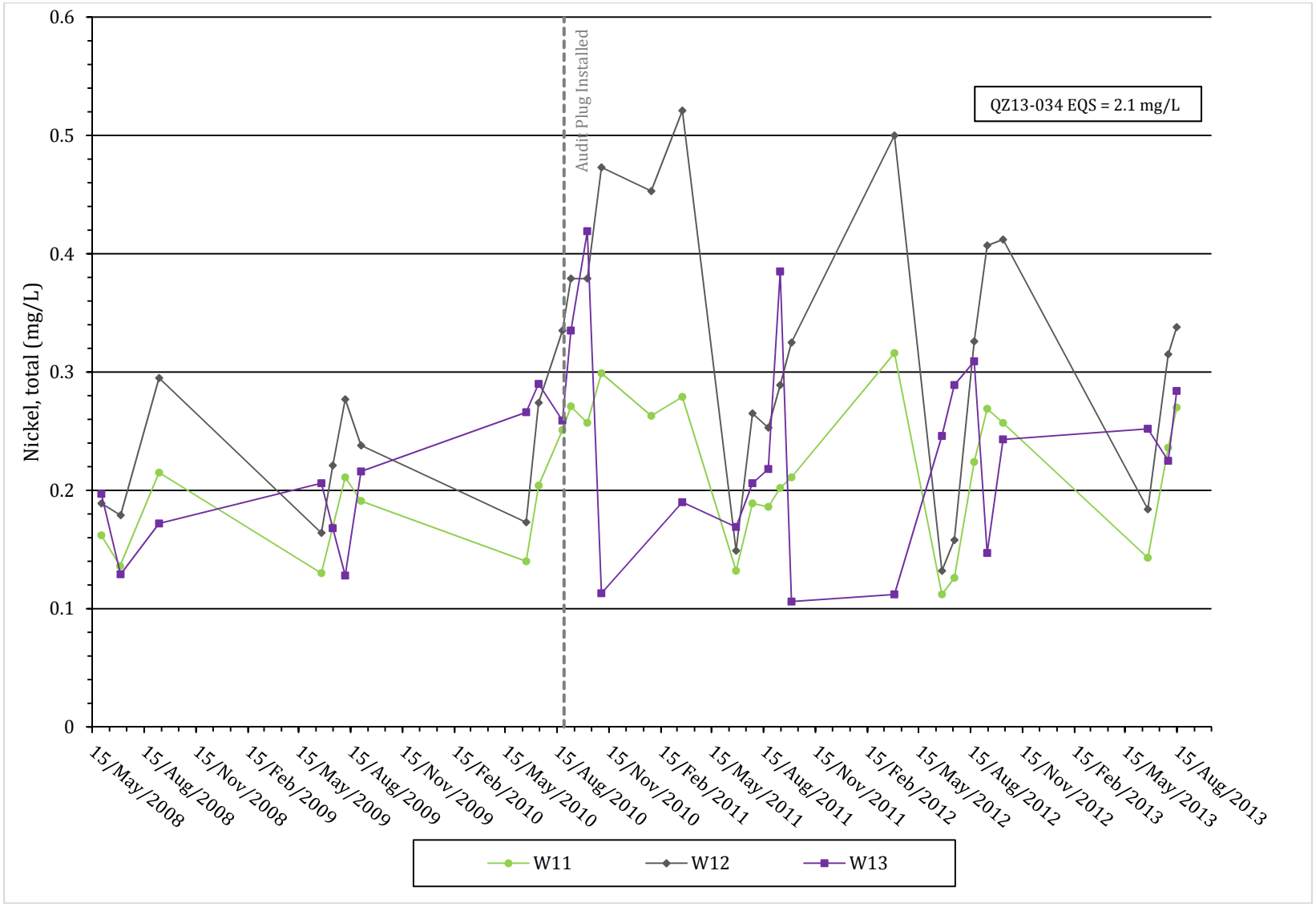

Figure 3-10. Total Nickel in the Upper South Macmillan River, 2008-2013

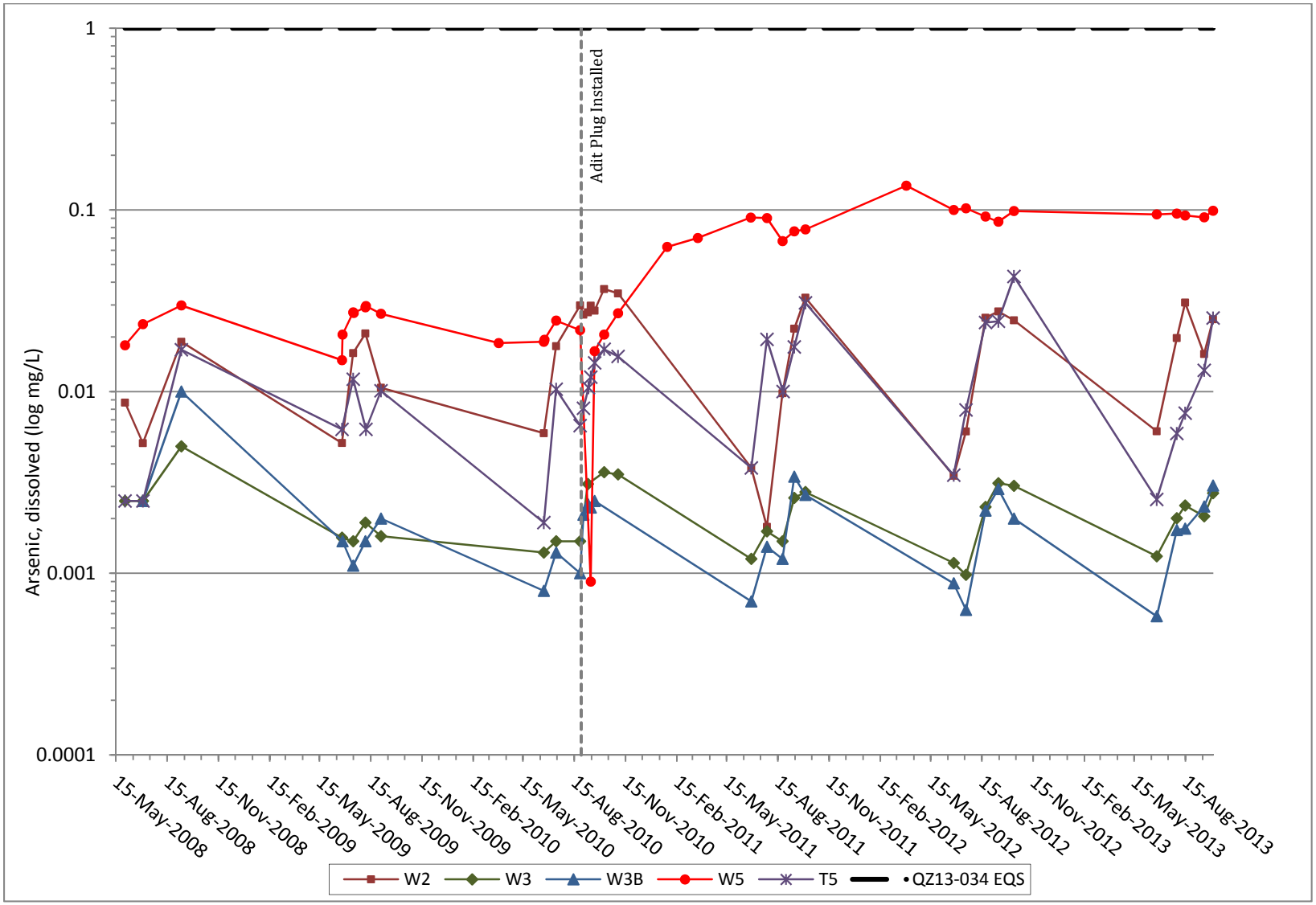

Figure 3-11. Dissolved Arsenic in the Upper Sekie Creek #2 Watershed, 2008-2013

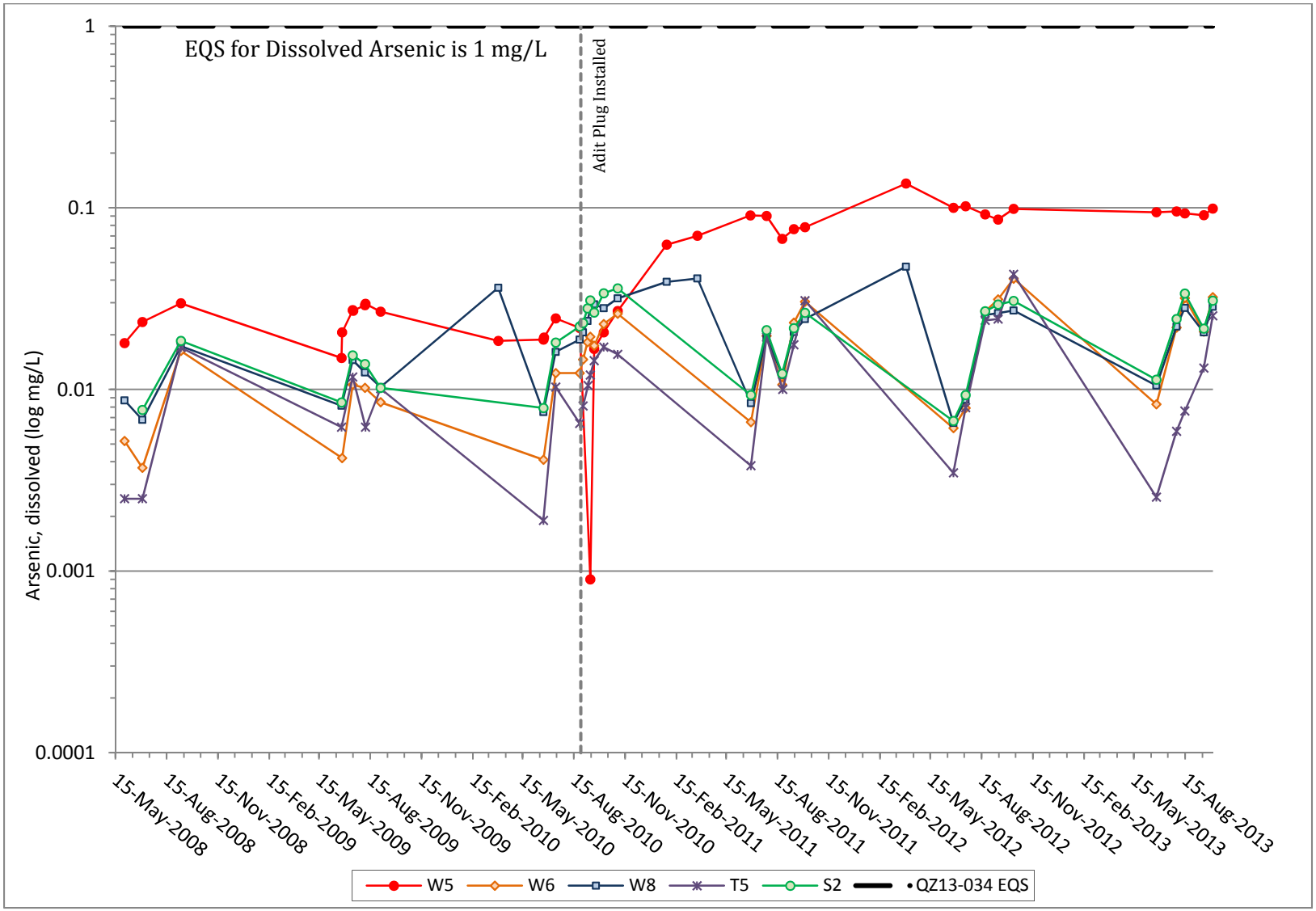

Figure 3-12. Dissolved Arsenic in the Lower Sekie Creek #2 Watershed, 2008-2013

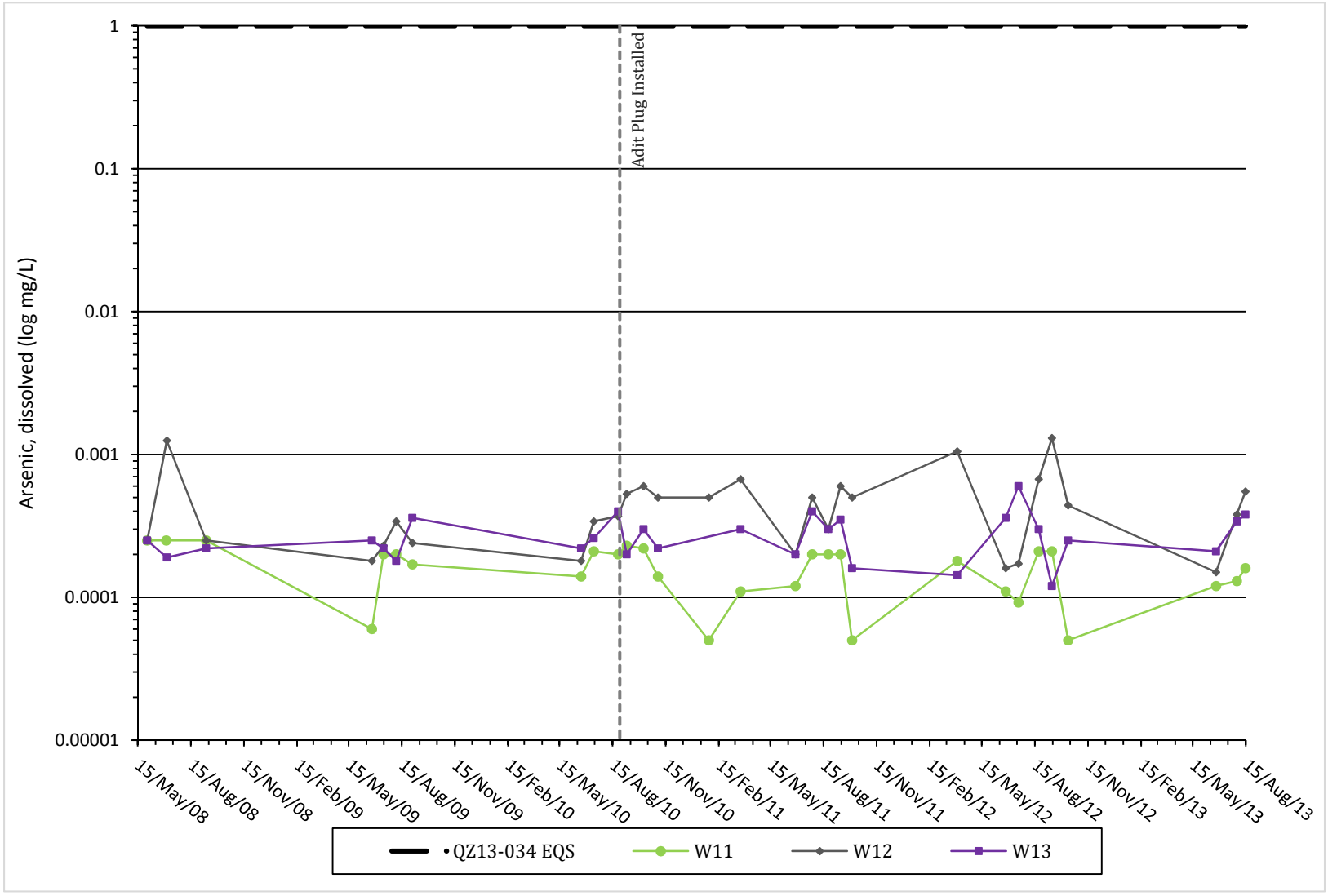

Figure 3-13. Dissolved Arsenic in the Upper South Macmillan River, 2008-2013

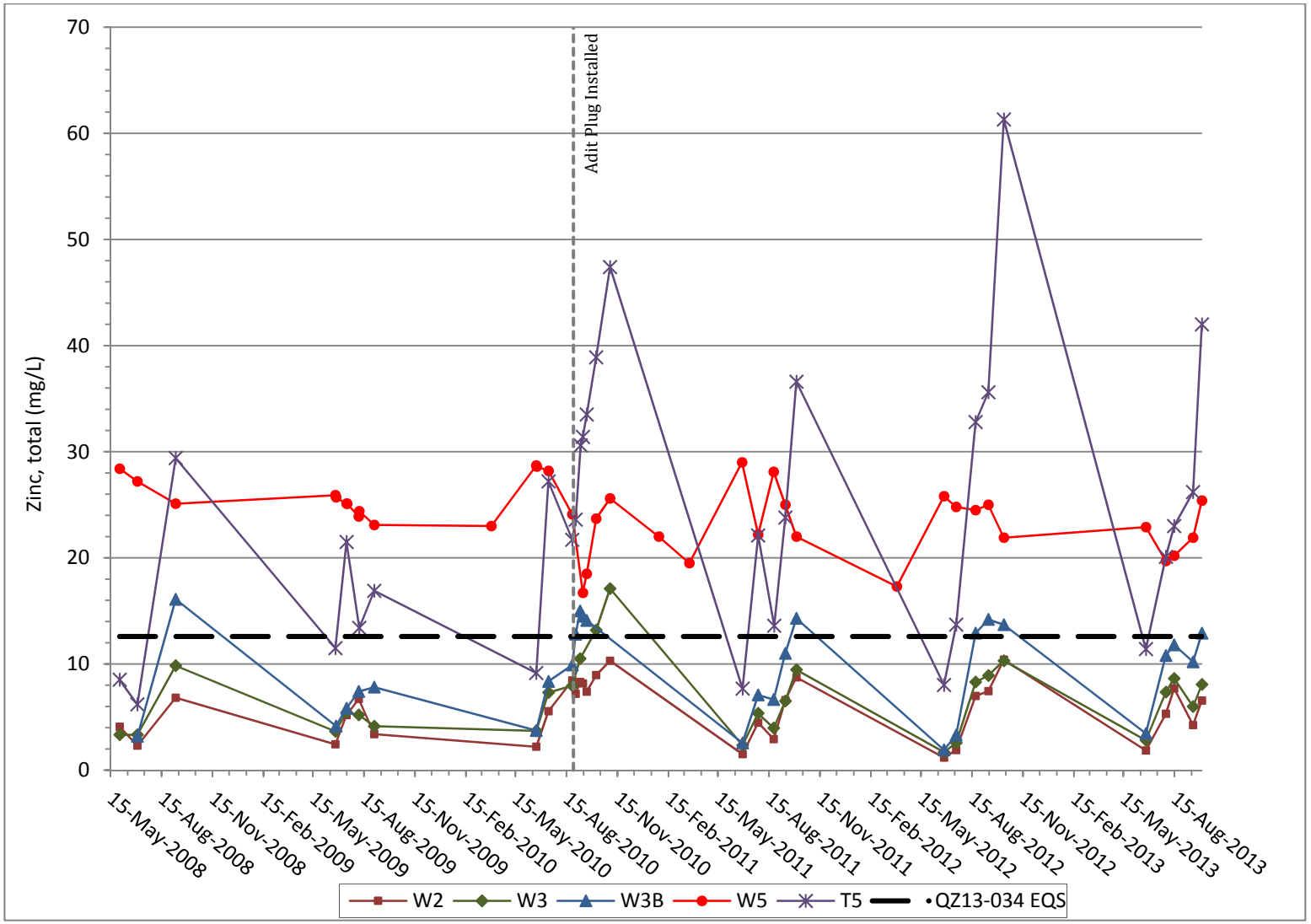

Figure 3-14. Total Zinc in the Upper Sekie Creek #2 Watershed, 2008-2013

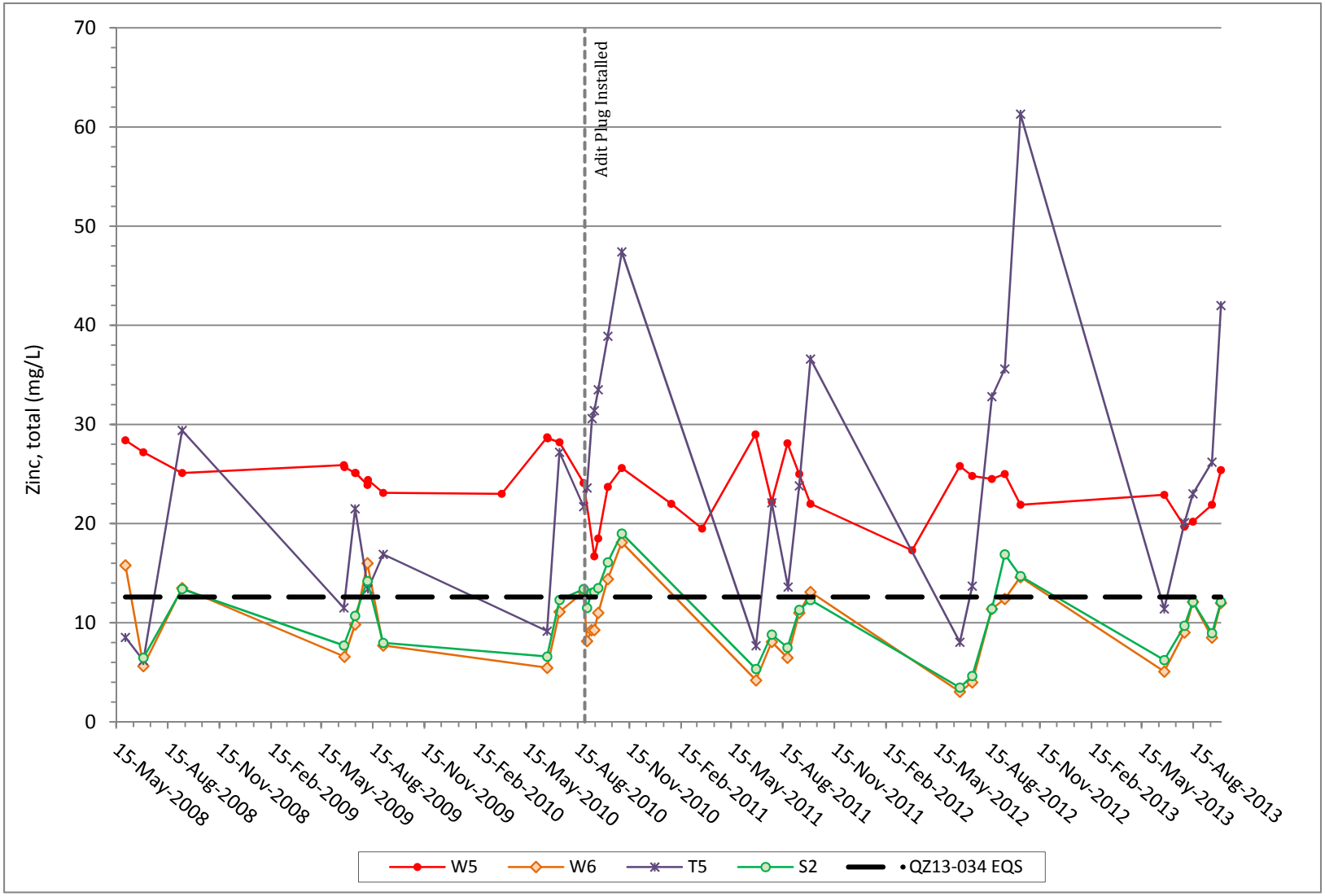

Figure 3-15. Total Zinc in the Lower Sekie Creek #2 Watershed, 2008-2013

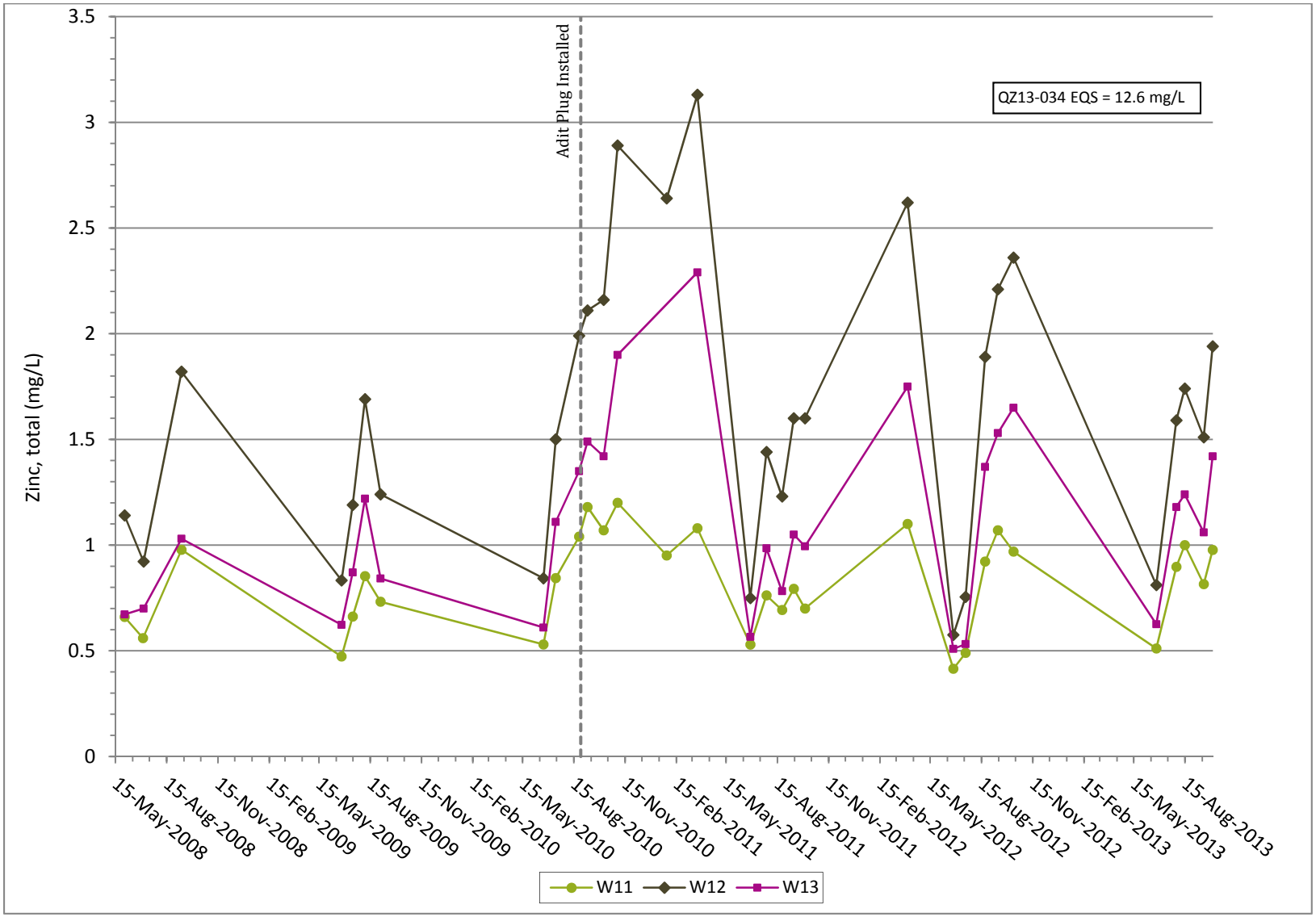

Figure 3-16. Total Zinc in the Upper South Macmillan River, 2008-2013

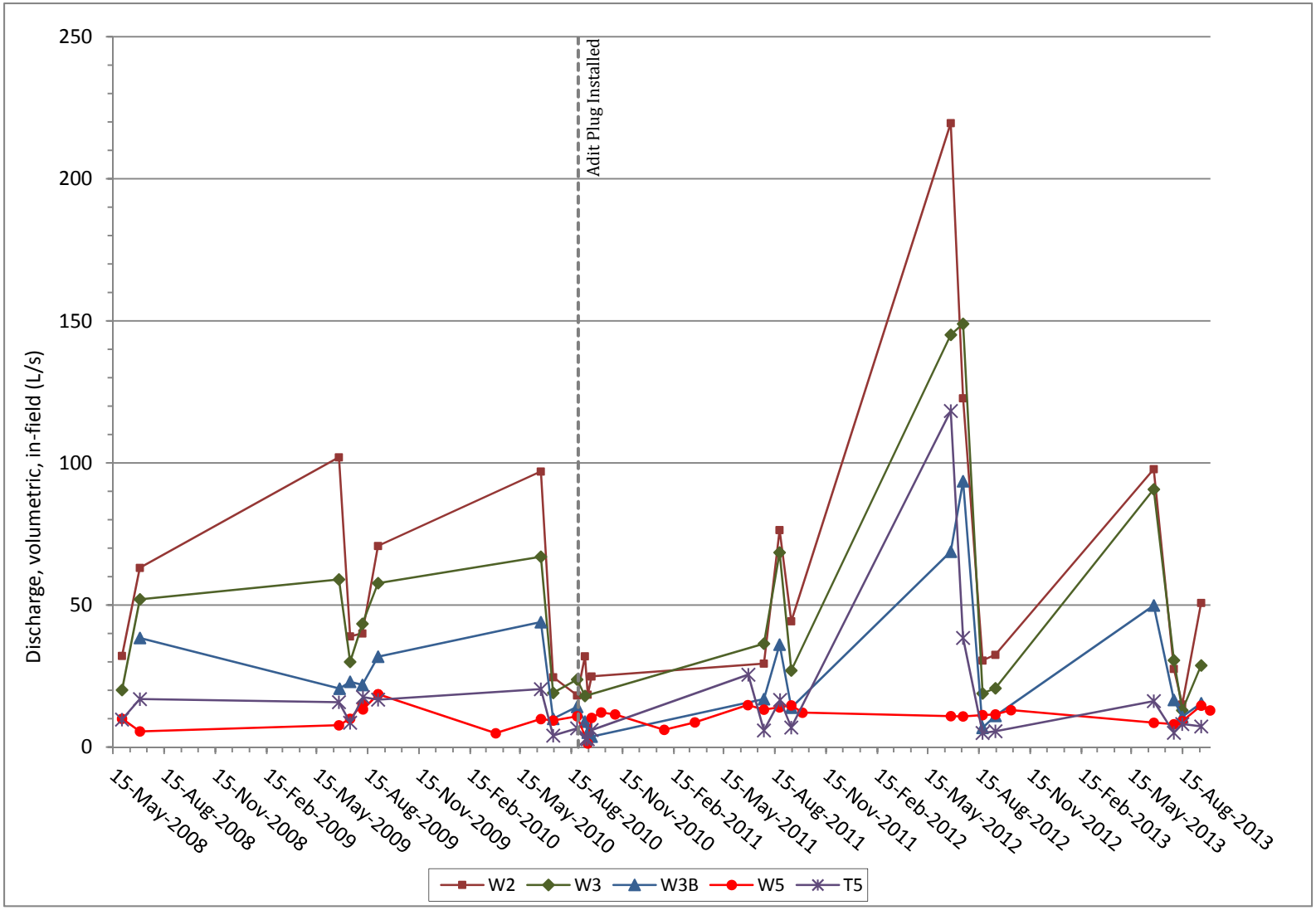

Figure 3-17. Stream Flow in the Upper Sekie Creek #2 Watershed, 2008-2013

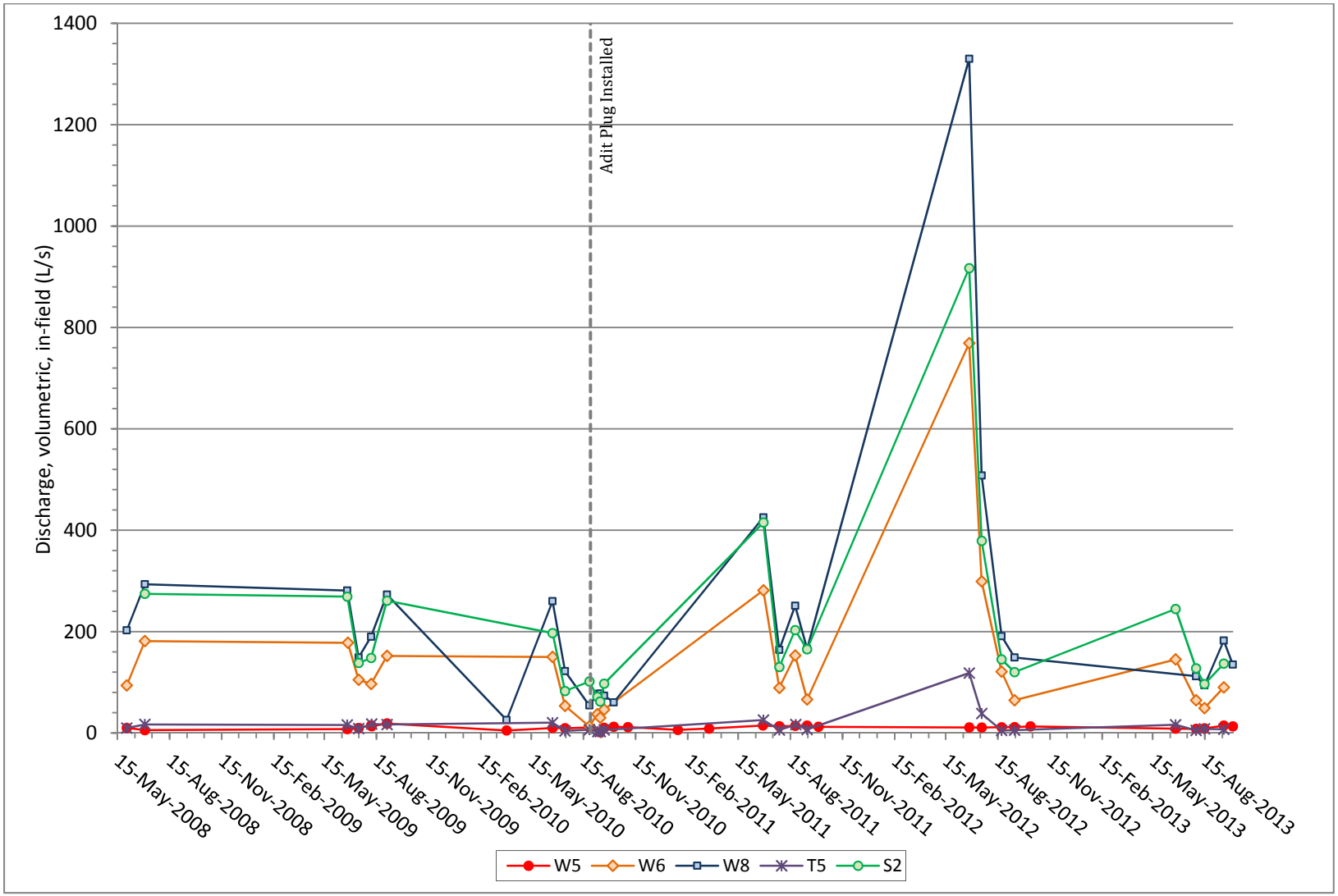

Figure 3-18. Stream Flow in the Lower Sekie Creek #2 Watershed, 2008-2013

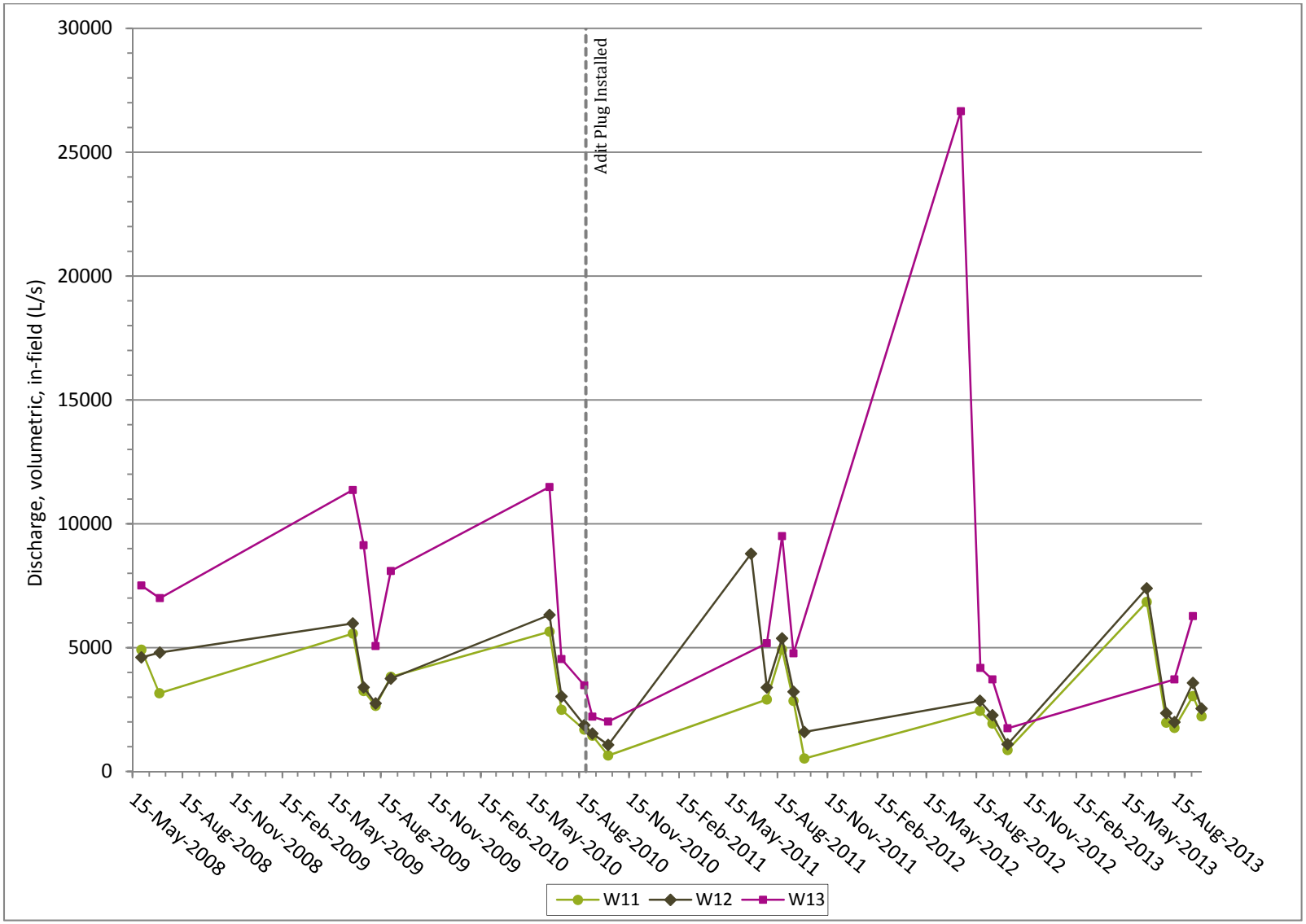

Figure 3-19. Stream Flow in the Upper South Macmillan River, 2008-2013

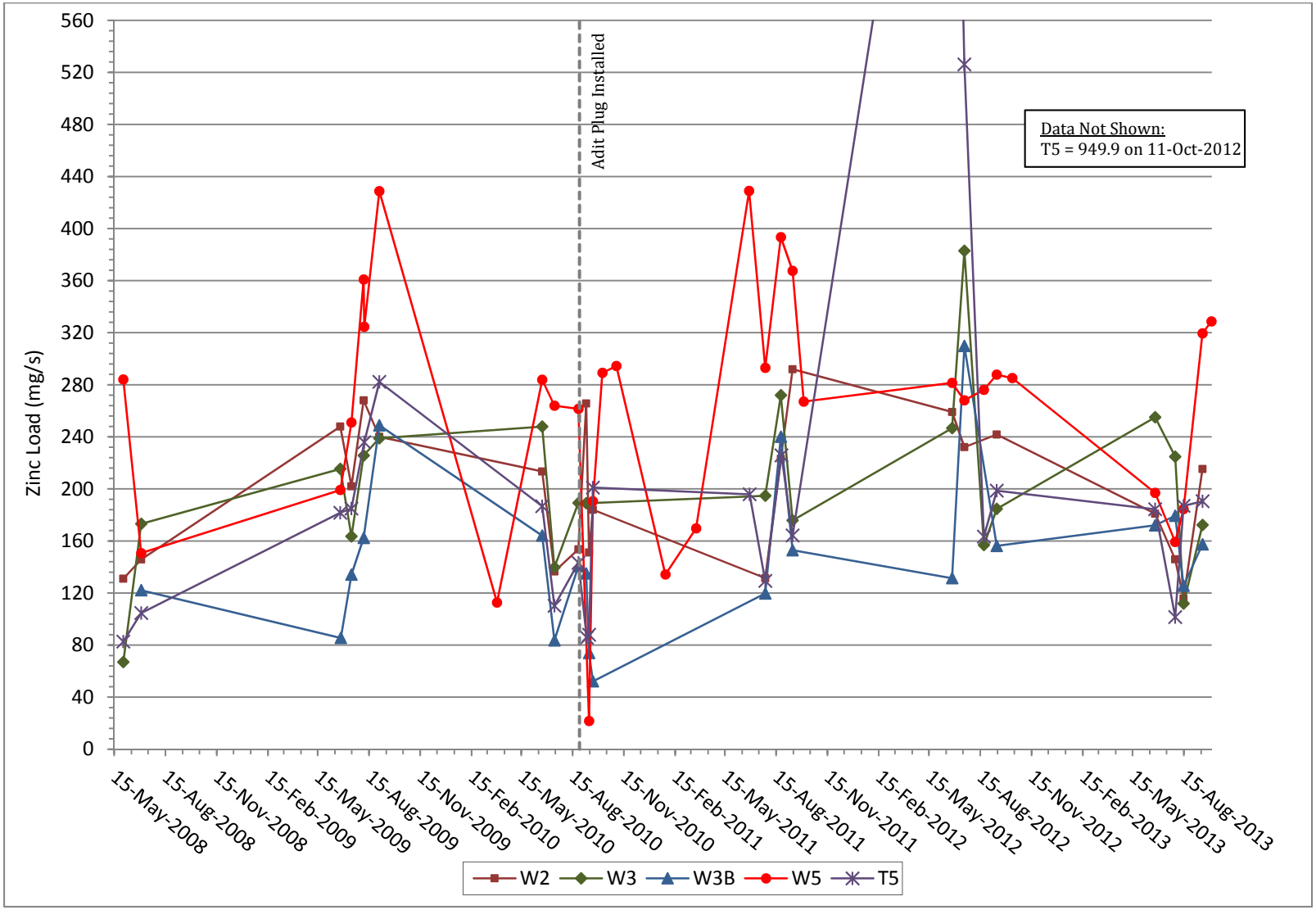

Figure 3-20. Zinc Loading in the Upper Sekie Creek #2 Watershed, 2008-2013

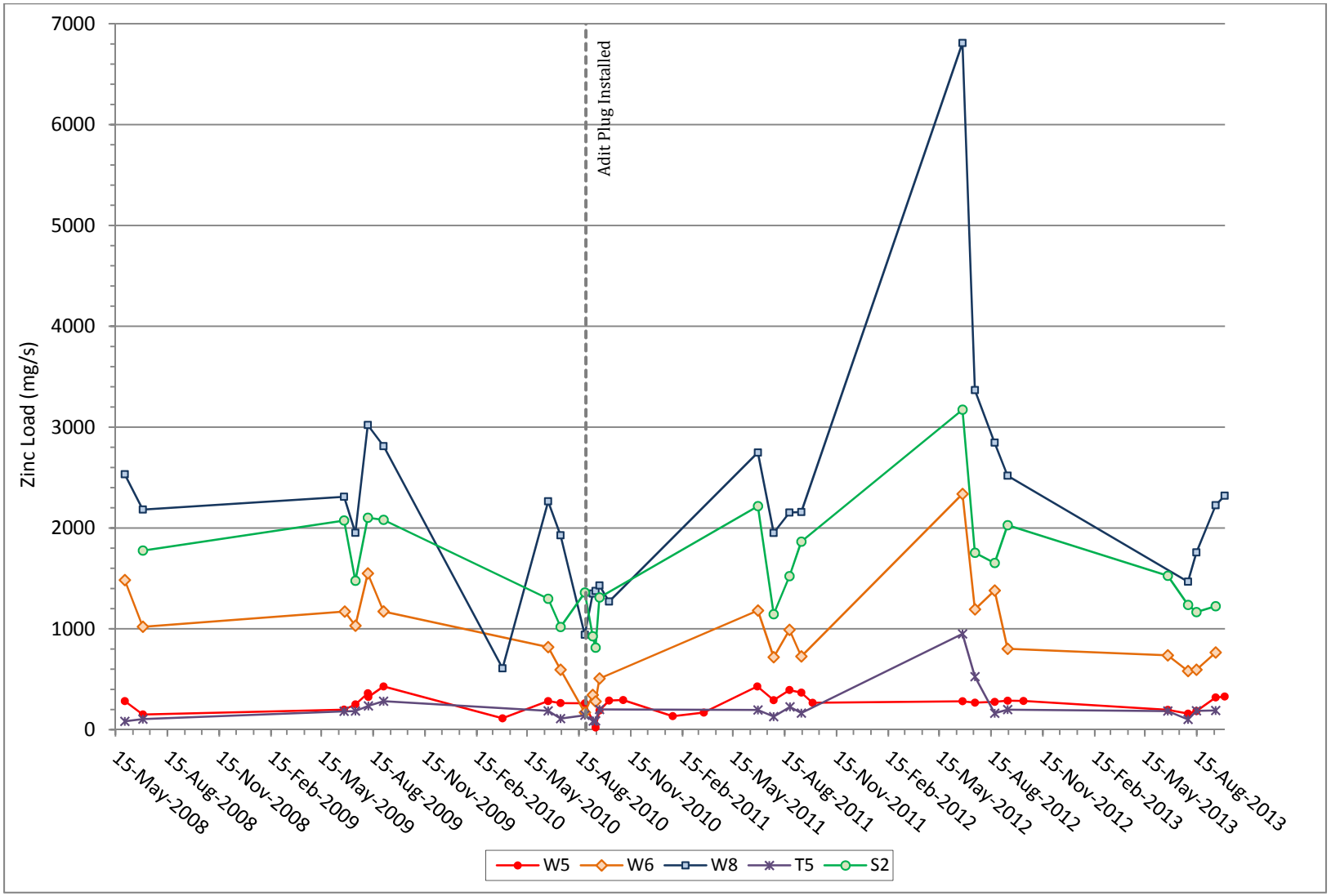

Figure 3-21. Zinc Loading in the Lower Sekie Creek #2 Watershed, 2008-2013

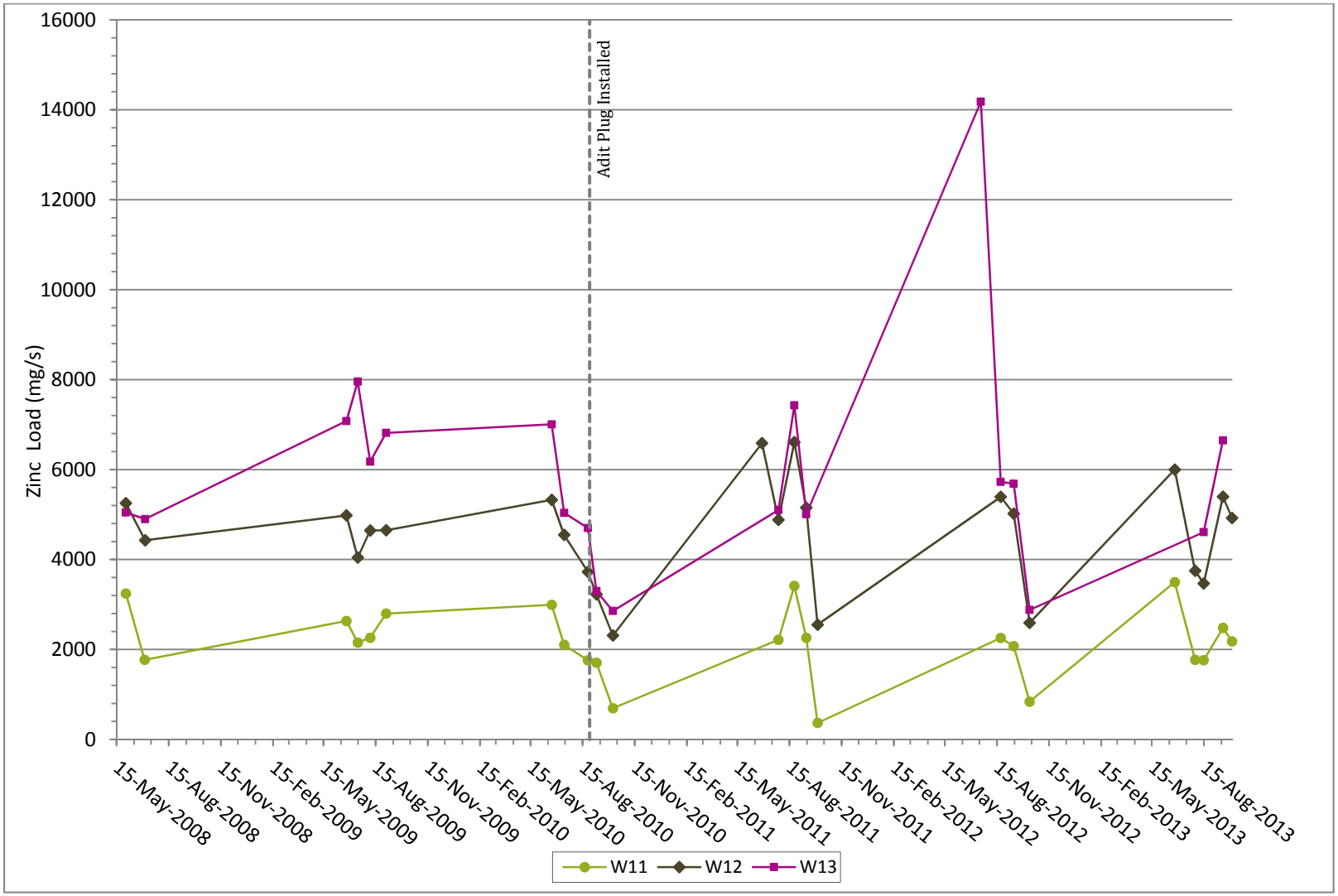

Figure 3-22. Zinc Loading in the Upper South Macmillan River, 2008-2013

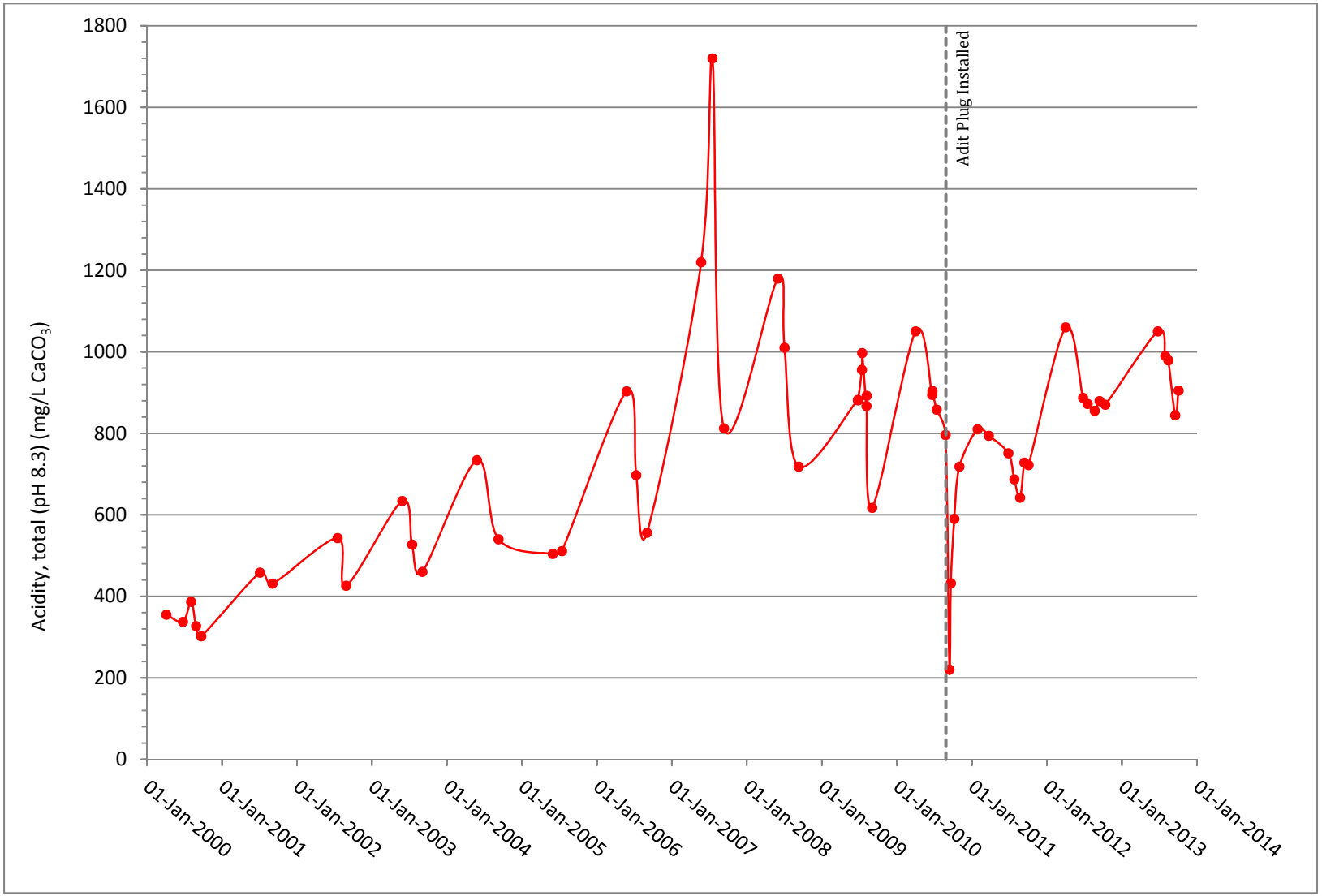

Figure 3-23. Acidity Concentrations at W5 (Adit), 2000-2013

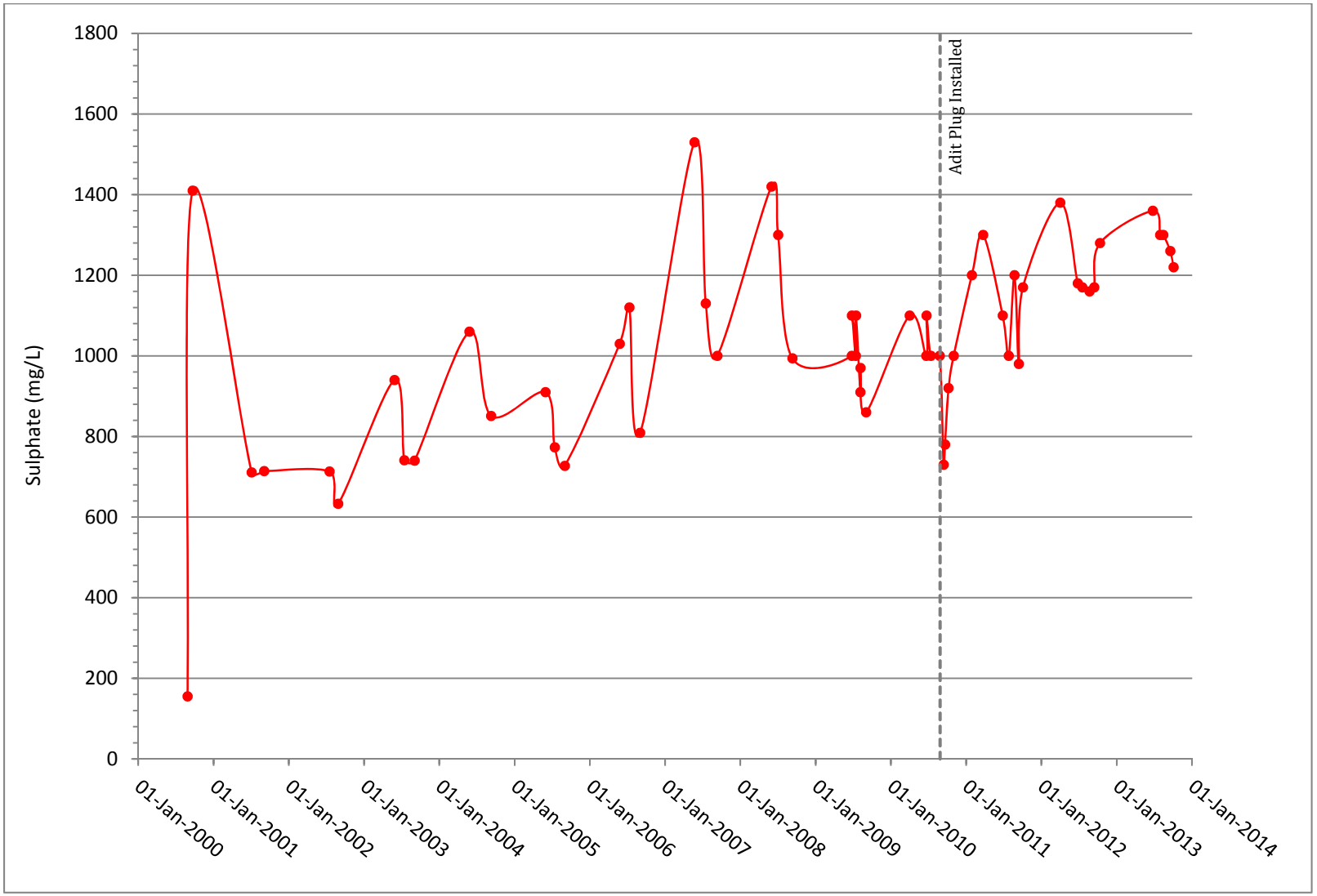

Figure 3-24. Sulphate Concentrations at W5 (Adit), 2001-2013

3.5 METAL LOADING CALCULATIONS

Zinc loadings calculations were completed for the Sekie Creek #2 and South Macmillan River watersheds based on the June, July, August and September 2013 water quality and flow data. The methodology for the metal loading calculations is detailed in *the Tom Valley Property 2000 Water Quality Study* (Gartner Lee Limited 2001) previously submitted to the Board. The purpose of the zinc loading model is to complete contaminant mass balances for the watershed to investigate the observed water quality trends. The results of the metal loading calculations are presented in Table 3-2 and Table 3-3.

The model shows that the locations upstream of the adit (W2 and W3) contributed approximately 59%, 64%, 38% and 51% of zinc loadings at station W6 on June 24th, July 31st, August 14th and September 17th, 2013, respectively. The June, July, August, and September 2013 zinc loading models indicate that there is significant zinc loading between W6 and the mouth of Sekie Creek #2 (W8). The calculated concentration of zinc in natural discharge to Sekie Creek #2 between W6 and W8 in June, July, August and September 2013 were 12.9 mg/L, 18.6 mg/L, 25.9 mg/L and 15.8 mg/L, respectively. The zinc loading from the adit (W5) at W6 was 27%, 27%, 31%, and 42% in June, July, August and September 2013, respectively. The zinc loading from the adit (W5) at W8 was 9%, 11%, 10%, and 14% in June, July, August and September 2013, respectively

For the South Macmillan River, the loading model indicates that, similar to previous years, there is a significant contribution of zinc loading to the system between the monitoring location downstream of the confluence with Sekie Creek #2 (W12) and the MacMillan #2 Bridge (W13), ranging from approximately 1139 mg/s to 1443 mg/s. Overall the adit discharge is estimated to contribute approximately 2.8% to 4.8% of the total zinc loading at the Macmillan #2 Bridge (W13) from June to September 2013.

Table 3-2 Zinc Loading Model for Sekie Creek #2, 2013

	Sample Date	June 24, 2013			July 31, 2013		
		Zinc Concentration (mg/L)	Flow (L/s)	Zinc Load (mg/s)	Zinc Concentration (mg/L)	Flow (L/s)	Zinc Load (mg/s)
1	Tom Creek (W2)	1.85	97.8	181	5.30	27.5	146
2	Upper Sekie Creek #2 (W3)	2.81	90.8	255	7.35	30.6	225
3	Total Contribution Upstream of Tom Adit (=W2 + W3)	2.31	188.6	436	6.38	58.1	371
4	Tom Adit Discharge (W5)	22.9	8.6	197	19.7	8.1	159
5	Combined Upstream and Adit (=W2+W3+W5)	3.20	197.2	633	8.00	66.2	530
6	Sekie Creek #2 Downstream of Tom Adit Discharge (W6)	5.08	145.1	737	9.02	64.5	582
7	Groundwater Contribution at Confluence (=W6 - (W2+W3+W5)	**-2.00**	-52.1	104	**-31.1**	-1.7	52
8	Sekie Creek #2 at S2 upstream of T5	6.24	244.7	1527	9.70	127.6	1238
9	Downstream Tributary of Sekie Creek #2 (T5)	11.4	16.2	184	20.1	5.1	102
10	Sekie Creek #2 at North Canol Road Crossing (W8)	8.36	*250*	2090	13.1	112.0	1467
11	Downstream Natural Contribution (=W8 - W6)	**12.9**	104.9	1353	**18.6**	47.5	886
12	Total Natural Contribution (between adit confluence and W8) (=Lines 7+11)	**27.6**	52.8	1457	**20.5**	45.8	938

	Sample Date	August 14, 2013			September 17, 2013		
		Zinc Concentration (mg/L)	Flow (L/s)	Zinc Load (mg/s)	Zinc Concentration (mg/L)	Flow (L/s)	Zinc Load (mg/s)
1	Tom Creek (W2)	7.70	15.0	116	4.24	50.8	215
2	Upper Sekie Creek #2 (W3)	8.64	13.0	112	5.99	28.8	172
3	Total Contribution Upstream of Tom Adit (=W2 + W3)	8.13	28.0	228	4.87	79.5	388
4	Tom Adit Discharge (W5)	20.2	9.1	184	21.9	14.6	320
5	Combined Upstream and Adit (=W2+W3+W5)	11.1	37.1	412	7.50	94.1	707
6	Sekie Creek #2 Downstream of Tom Adit discharge (W6)	12.1	49.2	595	8.50	89.9	765
7	Groundwater Contribution at Confluence (=W6 - (W2+W3+W5)	**15.2**	12.0	183	**-13.8**	-4.2	58
8	Sekie Creek #2 at S2 upstream of T5	12.1	96.4	1166	9.00	136.8	1224
9	Downstream Tributary of Sekie Creek #2 (T5)	23.0	8.1	187	26.2	7.3	190
10	Sekie Creek #2 at North Canol Road Crossing (W8)	18.7	94.0	1758	12.2	182.4	2225
11	Downstream Natural Contribution (=W8 - W6)	**25.9**	44.9	1163	**15.8**	92.5	1460
12	Total Natural Contribution (between adit confluence and W8) (=Lines 7+11)	**23.7**	56.9	1346	**17.2**	88.3	1518

Notes:

shading	*indicates calculated values*
bold	*indicates calculated zinc concentrations in contributing waters (surface + groundwater discharge to Sekie Creek #2)*
italics	*indicates estimated values*

Table 3-3. Zinc Loading Model for South Macmillan River, 2013

Sample Date		June 24, 2013			July 30, 2013			August 14, 2013			September 17, 2013		
		Zinc Concentration (mg/L)	Flow (L/s)	Zinc Load (mg/s)	Zinc Concentration (mg/L)	Flow (L/s)	Zinc Load (mg/s)	Zinc Concentration (mg/L)	Flow (L/s)	Zinc Load (mg/s)	Zinc Concentration (mg/L)	Flow (L/s)	Zinc Load (mg/s)
1	South Macmillan River (W11) Upstream of Sekie Creek #2 Confluence (W8)	0.51	6844	3497	0.90	1972	1769	1.00	1760	1760	0.82	3042	2479
2	Sekie Creek #2 (W8) at North Canol Road	8.36	*250*	2090	13.1	112	1467	18.70	94	1758	12.20	182	2225
3	Total Upstream (=W8 + W11)	0.79	7094	5587	1.55	2084	3236	1.90	1854	3518	1.46	3224	4705
5	South Macmillan River ~1KM Downstream of Sekie Creek #2 Confluence (W12)	0.81	7395	5997	1.59	2358	3749	1.74	1992	3466	1.51	3573	5395
6	Groundwater Contribution at Confluence (=W12 - (W8+W11)	**1.36**	301	410	**1.87**	274	513	**-0.37**	138	-52	**1.98**	349	691
7	South Macmillan River at MacMillan Bridge #2 (W13)	0.63	*11400*	7136	1.18	*4400*	5192	1.24	3717	4609	1.06	6273	6649
8	Downstream Natural Contribution (=W13 - W12)	**0.28**	4005	1139	**0.71**	2042	1443	**0.66**	1725	1143	**0.46**	2700	1254
9	Total Natural Contribution in South Macmillan River at W13 without Tom Adit (W5)	**0.61**	11391	6939	**1.15**	4392	5033	**1.19**	3708	4425	**1.01**	6258	6330
10	% Contribution of Tom Adit (W5) to Zinc Loading in South MacMillan River at W13		0.08%	2.8%		0.18%	3.1%		0.25%	4.0%		0.23%	4.8%

Notes:

shading	*indicates calculated values*
bold	*indicates calculated zinc concentrations in contributing waters (surface + groundwater discharge)*
italics	*indicates estimated values*

3.6 GROUNDWATER QUALITY

Groundwater well BH01-05 is located up gradient of the waste rock dump and wells BH03-05 and BH04-05 are located down gradient of the waste rock dump (Figure 2-1). Groundwater levels were measured at the three wells during each monthly monitoring event (June to September). Groundwater samples were collected during the June, July, August, and September 2013 monitoring events, when there was sufficient water to sample. The groundwater quality data is presented in Appendix B2. Groundwater levels, dissolved zinc and sulphate concentrations from 2005 to 2013 are presented in Figure 3-25, Figure 3-26 and Figure 3-27, respectively.

The down gradient wells (BH03-05 and BH04-05) have elevated concentrations of dissolved aluminum, cadmium, chromium, copper, iron, lead, nickel, selenium, silver, thallium, uranium (BH03-05 only), and zinc in comparison to the up gradient well BH01-05. Average dissolved zinc at the upgradient well BH01-05 in 2013 is 0.21 mg/L, while at BH03-05 and BH04-05 it is 7.2 mg/L and 57.1 mg/L respectively. Upgradient groundwater in BH01-05 exceeds the CCME guideline for aluminum, cadmium, copper, lead, selenium, and zinc in at least one sampling event in 2013.

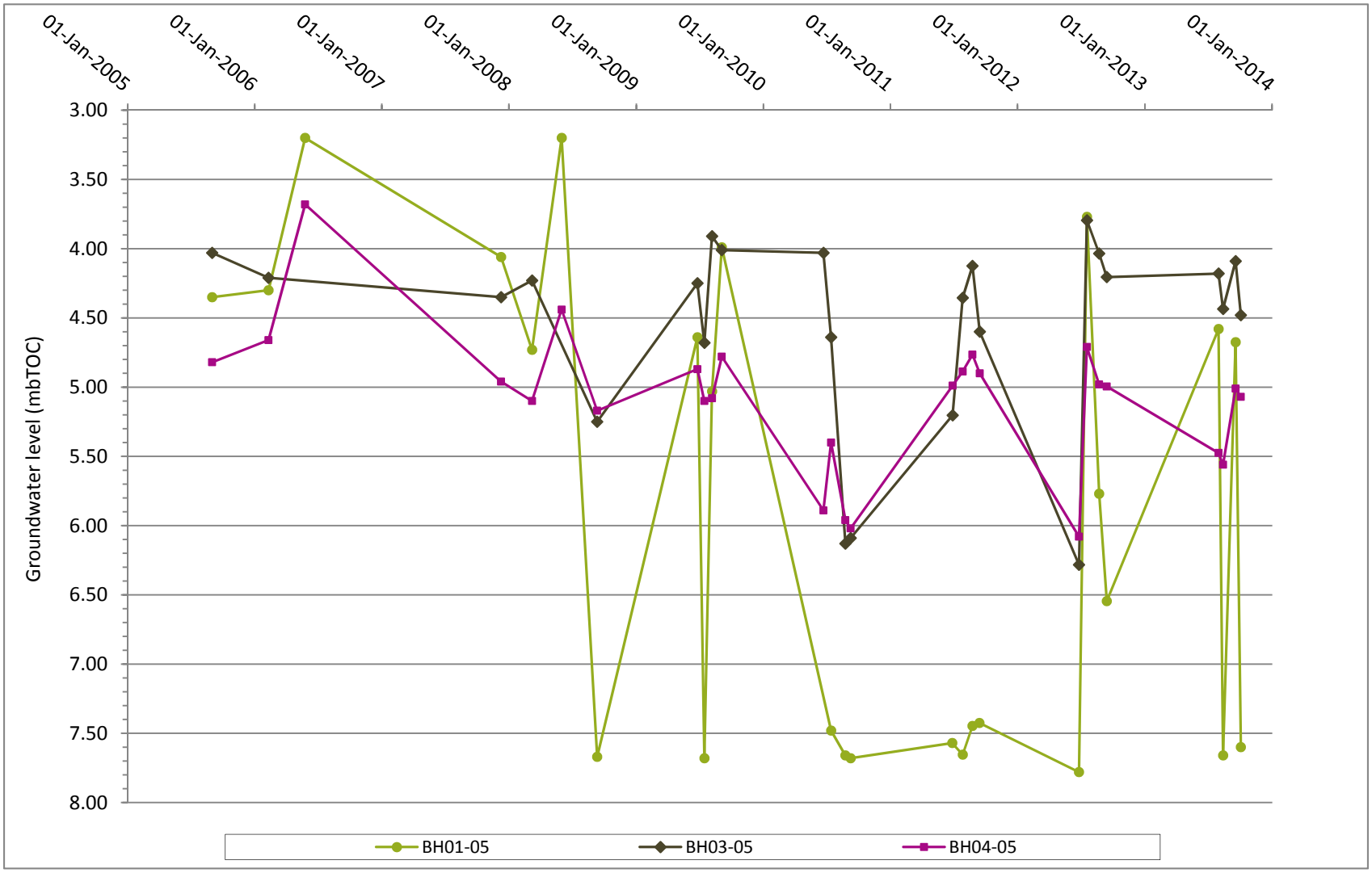

Figure 3-25. Groundwater Levels, 2005-2013

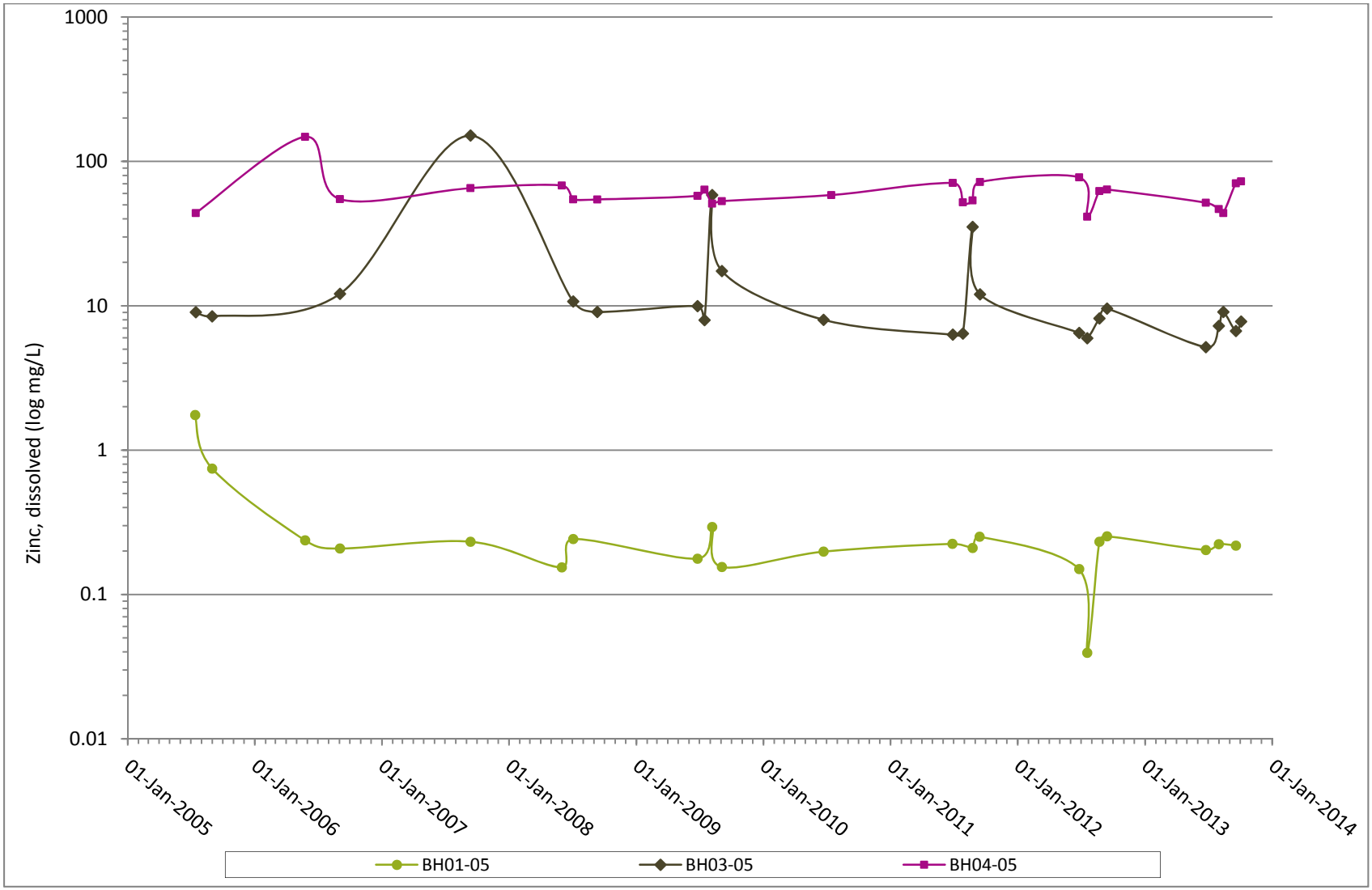

Figure 3-26. Dissolved Zinc in Groundwater Wells, 2005-2013

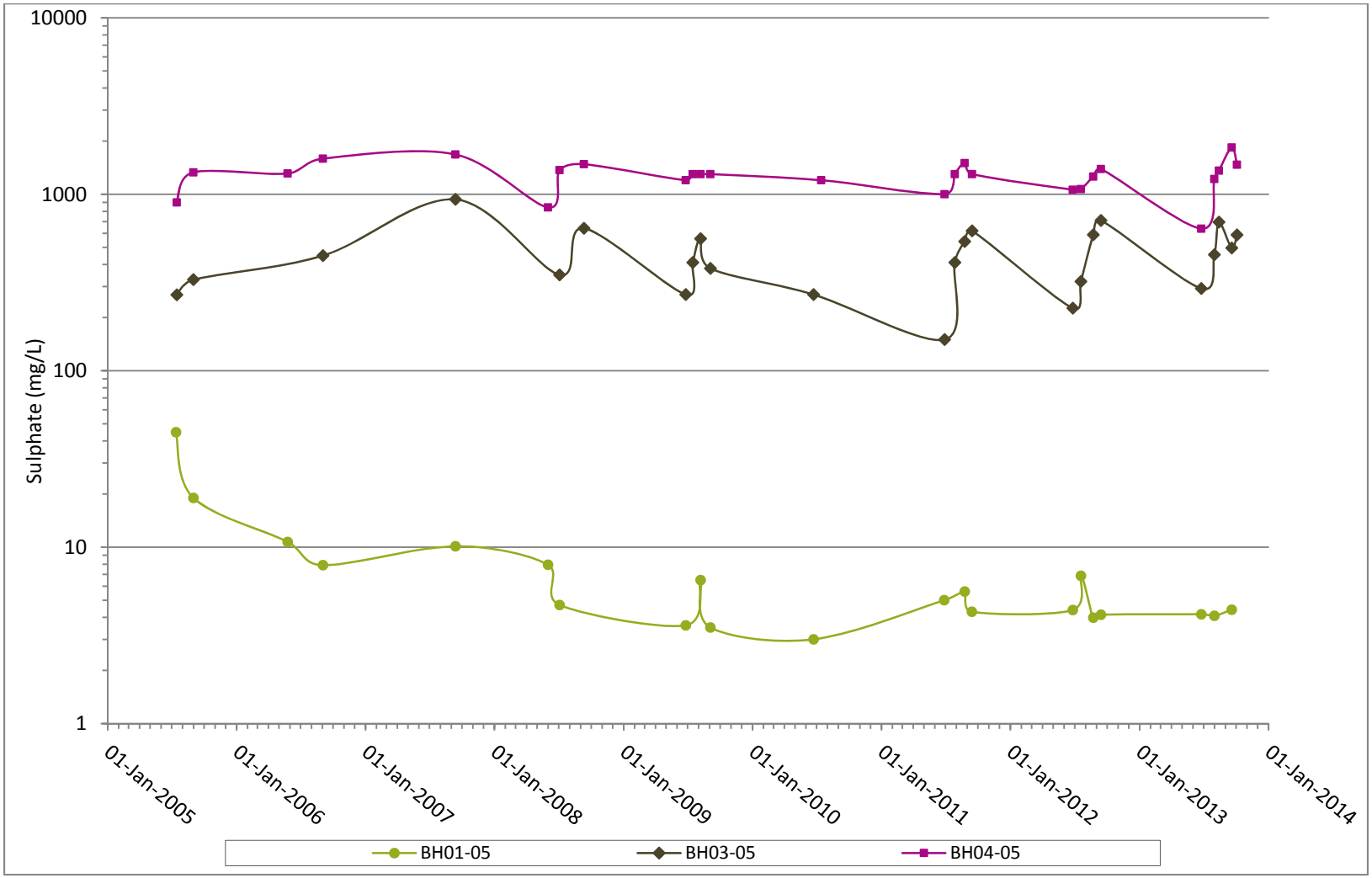

Figure 3-27. Sulphate in Groundwater Wells, 2005-2013

3.7 SEDIMENT MONITORING RESULTS

Sediment monitoring was conducted at stations W11, W12 and W13 in the South Macmillan River on August 14-15, 2013. The sediment samples were collected in triplicate and analysed for grain size, total metals and loss on ignition at 600°C. The data is presented in Appendix B3.

The stream sediment results were compared to the CCME Sediment Quality Guidelines for the Protection of Aquatic Life (CCME 2002). The sediment CCME guidelines were exceeded for seven total metals: arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), mercury (Hg) and zinc (Zn). The 2009 to 2013 sediment quality parameters exceeding the CCME guidelines are summarized in Table 3-4.

Table 3-4 Sediment Quality Parameters Exceeding CCME Guidelines, South Macmillan River, 2009 – 2013

Site	Interim Freshwater Sediment Quality Guideline (ISQG)				
	2009	2010	2011	2012	2013
W11-1	Cu, Hg	Cu	-	Cu	Cd, Cr
W11-2	Hg	Cu	-	Hg	Cd, Cr
W11-3	Cu, Hg	Cu	-	-	-
W12-1	Cd, Cu, Hg	Cd, Cr, Cu, Hg	Cd, Cu, Pb, Hg	Cd, Cu, Pb, Hg	Cd, Cr
W12-2	Cu,	Cd, Cu, Pb	Cd, Cu, Pb, Hg	Cd, Cu, Pb, Hg	Cd, Cr, Hg
W12-3	Cr, Cu	Cd, Cu, Pb	Cd, Cu, Pb, Hg	Cd, Cu, Pb, Hg	Cd, Cr, Hg
W13-1	Cd, Cu, Pb	Cd, Cu, Pb	Cd, Cu, Pb	Cd, Pb	Cd, Cr
W13-2	Cd, Cu, Pb	Cd, Cu, Pb	Cd, Cu, Pb	Cd, Cu	Cd, Cr
W13-3	Cd, Cu, Hg, Pb	Cd, Cu	Cd, Cu, Pb	Cd, Cu, Pb	Cd, Cr
Site	Probable Effects Level (PEL)				
	2009	2010	2011	2012	2013
W11-1	As, Cd, Zn	As, Cd, Zn	As, Cd, Cu, Zn	As, Cd, Zn	As, Cu, Pb, Zn
W11-2	As, Cd, Cu, Zn	As, Cd, Zn	As, Cd, Cu, Zn	As, Cd, Cu, Zn	As, Cu, Pb, Zn
W11-3	As, Cd, Zn	As, Cd, Zn	As, Cd, Cu, Zn	As, Cd, Cu, Zn	As, Cd, Cu, Pb, Zn
W12-1	As, Pb, Zn	As, Pb, Zn	As, Zn	As, Zn	As, Cu, Pb, Zn
W12-2	As, Cd, Pb, Hg, Zn	As, Zn	As, Zn	As, Zn	As, Cu, Pb, Zn
W12-3	As, Cd, Pb, Hg, Zn	As, Zn	As, Zn	As, Zn	As, Cu, Pb, Zn
W13-1	As, Zn	As, Zn	As, Zn	As, Cu, Zn	As, Cu, Pb, Zn
W13-2	As, Zn	As, Zn	As, Zn	As, Zn	As, Cu, Pb, Zn
W13-3	As, Zn	As, Zn	As, Zn	As, Zn	As, Cu, Pb, Zn

3.8 BENTHIC MACROINVERTEBRATE COMMUNITIES

Benthic invertebrate samples were collected from the South Macmillan River at stations W11, W12, and W13 in replicates of three. The following section present a summary of the benthic communities sampled in 2013 followed by historical data (2010-2012). Supporting information such as river flow, water chemistry and in situ water parameters were also collected and are presented in Section 3.1 and 0. The raw data and metrics provided by the taxonomist (Cordillera Consulting Inc.) are presented in Appendix B5.

Replicate samples were aggregated as a sample to compensate for the high intra-site variability. Six different community descriptors were calculated and are presented in the following table.

Table 3-5. Summary of Benthic invertebrate community metrics from the South MacMillan River, 2013.

Community Descriptor	W11	W12	W13
Taxonomic Richness	14	19	13
Average number of organisms	10	36	9
Average Density (# organisms/m^2)	111	389	100
EPT (average % community)	38.4%	18.9%	48.33%
Simpson's Index of Diversity (1-D)	.77	.73	.59
Dominant Taxa	*Plecoptera*	*Metriocnemus sp.*	*Chironomidae*

In 2013, the invertebrate community of the South MacMillan River was found to be similar in abundance and diversity in terms of taxonomic richness, when compared to 2012. Total species richness per site varied between thirteen and nineteen. This value was calculated by computing the different taxa within the replicates at each sampling site. The total number of taxa recorded at all of the sampling sites was thirty three (Figure 3-28). Organism density was calculated based on a sampling surface of 0.0934 m^2, and varied between 100 ($\pm$ 9.4, n=3) at W13 and 389 ($\pm$ 65.5, n=3) organisms/m^2 at W12 (Figure 3-29). The most abundant species enumerated were *Metriocnemus sp.* and *Euryhapsis sp*. both from the chrinomidae family, which is also the most represented family at these locations of the MacMillan River. The EPT group was present at all of the sites, ranging from 18.9% at W11 to 48.3% at W13. Simpson's Index of diversity (1-D) was calculated for each replicate; the value of the index ranges between 0 and 1, where 1 indicates the most diversity. W11 and W12 have similar indices (0.77 and 0.73, respectively), where W13 is lower at 0.59.

Although the taxonomic richness is similar from one site to the other, there is an important variability between the densities of organisms between the replicates of each site. This may reflect the challenging sampling conditions (high flow, water level and turbidity) and the nature of the substrate limiting habitat features for invertebrates. W11 and W12 are located in a section of the river that is meandering with some side channels. At W13, the water is more channelized, fast running and relatively deep all along. Depending on water level on a given year, sampling may occur in more depositional zone of the riverbed, which may explain the high diversity between the years and amongst the replicates.

As mentioned in the methods, W11 is acting as a reference site as it is located upstream of Sekie Creek #2. W13 and W12, located downstream of Sekie #2 have very similar community descriptors aside from the Simpson's index indicating a less diverse benthic community at W13.

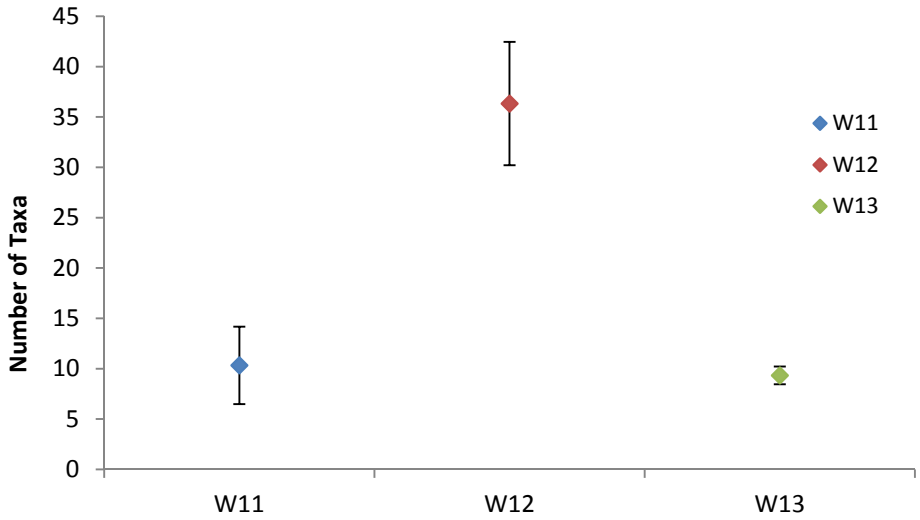

Figure 3-28. Abundance of benthic invertebrates at W11, W12 and W13.

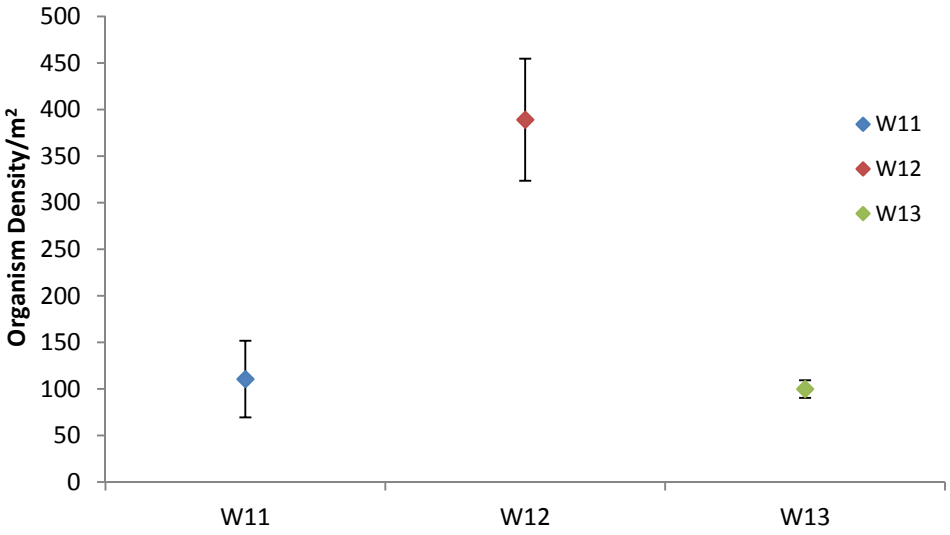

Figure 3-29. Organism density of benthic invertebrates at W11, W12 and W13.

In previous years, low numbers of benthic invertebrates were found. Table 3-6 describes the historical benthic data from the three South Macmillan sampling sites from 2010 to 2013. The average density of benthic organisms in 2010 and 2011 is low at all sites and varied between from 7 to 182 org/m^2. W12 is relatively more densely populated and diverse that W11 and W13. The sampling occurred in a gravel dominant substrate rather than sand, which may explain part of the difference among the sites. The sampling period has varied between August and September over the past 4 years, as well as potential inconsistency in the methodology (duration of the actual sampling, sampler, substrate size, etc.) may explain part of the variability between the years.

Table 3-6. South Macmillan Historical Benthic Data (2010-2013)

Community Descriptor	Year	W11	W12	W13
Taxonomic Richness	2010	4	2	2
	2011	5	17	2
	2012	15	14	15
	2013	14	19	13
Average number of organisms	2010	2	3	1
	2011	2	17	1
	2012	22	24	11
	2013	10	36	9
Average Density (nbr organisms/m^2)	2010	25	28	7
	2011	18	182	11
	2012	236	257	118
	2013	111	389	100
EPT (average % community)	2010	0%	0%	0%
	2011	0%	28%	0%
	2012	9%	9%	35%
	2013	38%	19%	48%
Simpson's Index of Diversity (1-D)	2010	-	-	-
	2011	1	0.79	-
	2012	0.56	0.82	0.88
	2013	0.77	0.73	0.59
Dominant Taxa	2010	*Chironomidae*	*Chironomidae*	*n/a*
	2011	*N/a*	*Chironomidae*	*Ostracoda*
	2012	*Diamesa sp.*	*Metriocnecus sp.*	*Diamesa sp.*
	2013	*Plecoptera*	*Metriocnemus sp.*	*Chironomidae*

3.9 FISH MONITORING RESULTS

Fish sampling was conducted in the South Macmillan river as part of baseline studies for the Tom and Jason Properties under scientific collection permit XR 196 2013. The main capture method used was gee type minnow traps. In accordance with previous years of sampling, no fish were caught. Table 3-7 describes the exact locations, efforts and results of the 2013 fish sampling program.

Table 3-7. Summary of 2013 minnow trapping data on the South MacMillan River.

Date	Location	Method (#)	Effort (hr)	Captures	Mortality
30-July	W13	Gee trap (2)	24.3	0	0
	Jason Bridge	Gee trap (2)	25.3	0	0
	W12	Gee trap (2)	24.9	0	0
	W11	Gee trap (2)	24.5	0	0
13 August	W13	Gee trap (2)	23.8	0	0
	Jason Bridge	Gee trap (2)	23.9	0	0
	W12	Gee trap (2)	24.3	0	0
	W11	Gee trap (2)	24.3	0	0

4 SITE PLANS

4.1 ADAPTIVE MANAGEMENT PLAN

The Final Adaptive Management Plan (AECOM 2010) was submitted to the Yukon Water Board (YWB) on November 29, 2010. A summary of activities carried out under the AMP in 2014 is provided below.

4.1.1 AMP Component 1, Adit Water Quality Predictions

Water samples were collected at the adit (W5) five times in 2013. Table 4-1 presents a summary of flushing phase adit water quality from September 13th, 2010 to September 17th 2013. Adit total lead concentrations have exceeded the flushing phase threshold established in the Final AMP during every sampling event since the first one on September 13th, 2010. The consecutive lead exceedances at W5 triggered a review of the site data and an investigation into the cause of the elevated lead concentrations was initiated. The concentrations observed at W5 are below the EQS and the associated lead concentrations at W6 have all been below the AMP threshold of 0.107 mg/L. The adit (W5) total lead concentration does not show an increasing trend as seen in Figure 3-5. The W8 AMP threshold (0.0431 mg/L) was exceeded on September 20, 2010, but has not been exceeded since. In the receiving environment in the South MacMillan River at W13 the AMP lead threshold (0.00106 mg/L) was exceeded nine times out of seventeen sampled, with two exceedances in 2013, in July and September.

The lead threshold for the flushing phase (0.0663 mg/L) is conservative in comparison to the short term phase threshold (0.108 mg/L). The flushing phase threshold was established from the maximum lead concentration observed from the shake flask tests done in 2008 using adit wall rock and adit discharge water in comparison to the short term phase threshold established from the adit discharge's upper 75th percentile lead concentration from the from 2000 to 2008 period. The findings of the investigation are that the adit's elevated lead concentrations in the fall-winter may be due to seasonal trends rather than the installation of the adit plug and the lead concentrations in the receiving environment are below the CCME guidelines. As part of a contingency plan, to address if the adit water quality is worse than predicted during the flushing phase, additional water sampling occurred on January 28th, 2011, March 24th, 2011, October 3rd, 2011, April 1, 2012, October 11, 2012, and October 3, 2013 to further investigate and characterize the flushing phase adit water quality. Additional sampling will be completed in April/early May 2014 to continue to further characterize the lead concentrations during the winter low flow period.

4.1.2 AMP Component 2, Receiving Environment Water Quality

Water samples were collected at W8 and W13 in June, July, August, September, and October in 2013. Table 4-2 presents a summary of receiving environment water quality for September 20th, 2011 to September 17th, 2013. The receiving environment AMP thresholds at W13 were exceeded in 2013 on repetitive occurrences for total copper and total lead, while at W8 one exceedance for copper occurred. At W6 three consecutive exceedances in dissolved arsenic occurred. The consecutive exceedances at the receiving environment stations (W8 and W13) triggered a review of the site data and an investigation into the cause of the elevated concentrations was initiated.

Total Copper

Both W8 and W13 have consecutive exceedances of their respective AMP threshold. Sekie Creek #2 at W8 exceeded the threshold consecutively during 2012 monitoring events and once during 2013 monitoring events. The South MacMillan River at W13 had four consecutive copper concentrations (0.034 to 0.0544 mg/L) above the AMP threshold in 2013, in June, July, August, and September, consistent with 2011 and 2012. The W8 and W13 copper AMP threshold exceedances can be attributed to the elevated background copper concentrations at W2 and W3B, both of which were consistently higher than the copper concentration recorded at the adit (W5) in 2013, with two exceedances of the copper EQS at W2. The adit discharge (W5) in 2013 represented 4.5 to 5% of the copper load at W8 in Sekie Creek #2 and 0.9 to 1.5% of the copper load in the South Macmillan River at W13. Therefore the exceedance of the AMP threshold for the receiving environment is not deemed significant and no response was required.

Total Lead

The total lead AMP threshold (0.00106 mg/L) for the South MacMillan River at W13 was exceeded twice in 2013, in July (0.00113 mg/L) and September (0.00112 mg/L). The lead concentration in the South MacMillan River in June and August 2013 did not exceed the AMP threshold. The July and September 2013 lead loadings from the Tom adit (W5) represented 30% and 33%, respectively, of the total lead load in the South Macmillan River at W13, which is consistent with loadings prior to the installation of the adit plug. This exceedance of the threshold is deemed not significant and no response was required.

Dissolved Arsenic

The dissolved arsenic AMP threshold (0.0174 mg/L) for W6 was exceeded for three consecutive monitoring events in July (0.0219 mg/L), August (0.0318 mg/L) and September (0.0208 mg/L) 2013. No exceedance of the dissolved arsenic AMP threshold occurred on Sekie Creek #2 at W8 or in the South MacMillan River at W13. Therefore the exceedance of the AMP threshold for the receiving environment is not deemed significant and no response was required.

Table 4-1. Summary of Flushing Phase Adit Water Quality, September 13th, 2010 to September 17th, 2013

Parameter	Unit	Flushing Threshold[a]	EQS[b]	13-Sep-10	20-Sep-10	7-Oct-10	1-Nov-10	28-Jan-11	24-Mar-11	27-Jun-11	26-Jul-11	23-Aug-11	13-Sep-11	3-Oct-11	2-Apr-12	25-Jun-12	25-Jul-12	21-Aug-12	13-Sep-12	24-Jun-13	30-Jul-13	14-Aug-13	17-Sep-13
Physical Parameters																							
Flow	L/s			1.3	10.3	12.2	11.5	6.1	8.7	14.7	13.2	14.0	14.8	12.1	~10	10.9	10.8	11.3	11.5	8.6	8.1	9.1	14.59
pH (field)	pH	3.1		4.9	4.8	4.3	4.2	4.0	4.1	4.4	4.4	4.4	4.5	4.4	4.3	-	4.3	4.4	4.3	4.1	-	4.3	4.3
Conductivity (field)	uS/cm	5124		1325	1352	1509	1613	1705	1782	1648	1620	1623	1622	1673	1970	-	1757	1752	1605	1662	1808	1799	1599
Acidity	mg/L $CaCO_3$	2800		220	432	590	718	810	794	751	687	642	728	722	1060	887	872	855	879	1050	990	979	844
Sulphate	mg/L	3200		730	780	920	1000	1200	1300	1100	1000	1200	980	1170	1380	1180	1170	1160	1440	1360	1300	1300	1260
Metals																							
Total Aluminum	mg/L	117		1.20	18.0	34.6	50.4	73.5	70.7	61.9	50.6	54.4	48.2	48.1	78	72	69	56.1	57.6	78.2	74.1	65.7	49.6
Total Arsenic	mg/L	0.429		0.0150	0.0196	0.0262	0.0356	0.0778	0.0688	0.0947	0.0898	0.089	0.0835	0.0821	0.14	0.11	0.113	0.095	0.0927	0.112	0.113	0.0988	0.0952
Total Cadmium	mg/L	0.488		0.0555	0.0706	0.146	0.141	0.0905	0.076	0.115	0.102	0.101	0.0852	0.0799	0.094	0.0928	0.0855	0.0791	0.0855	0.105	0.0962	0.0924	0.0853
Total Chromium	mg/L	0.135		0.0030	0.0058	0.015	0.0282	0.045	0.044	0.043	0.034	0.036	0.031	0.031	0.05	0.049	0.0465	0.0388	0.0364	0.0609	0.0466	0.0418	0.035
Total Copper	mg/L	2.12	1.4	*1.86*	0.153	0.232	0.141	0.0611	0.0446	0.0838	0.0563	0.0936	0.0871	0.0874	0.205	0.175	0.149	0.146	0.188	0.414	0.323	0.288	0.267
Total Iron	mg/L	858		109	162	176	205	251	260	222	223	255	230	220	314	271	271	287	288	331	322	310	289
Total Lead	mg/L	0.0663	0.4	0.0637	*0.0955*	*0.140*	*0.173*	*0.192*	*0.172*	*0.212*	*0.210*	*0.201*	*0.208*	*0.203*	*0.180*	*0.215*	*0.196*	*0.170*	*0.183*	*0.193*	*0.186*	*0.178*	*0.161*
Total Nickel	mg/L	2.78	2.1	0.848	1.03	1.40	1.69	1.92	1.72	1.72	1.46	1.71	1.57	1.54	1.88	1.72	1.71	1.54	1.68	2.05	1.72	1.63	1.53
Total Selenium	mg/L	0.023		0.0019	0.0002	0.0004	0.0004	0.0002	0.00005	0.0005	0.0001	<0.0003	0.0002	<0.0001	0.0002	<0.00010	<0.00031	0.00028	0.00024	<0.00020	0.00031	<0.00020	0.00015
Total Silver	mg/L	0.00164		0.00008	0.00003	0.00005	0.00003	0.00004	0.00005	<0.00005	<0.00001	<0.00005	0.00003	<0.00002	<0.00003	<0.00002	<0.000025	<0.00004	<0.00004	<0.000040	0.00002	<0.000040	0.000034
Total Thallium	mg/L	0.0333		0.00079	0.00137	0.00285	0.00381	0.00359	0.00361	0.00472	0.00403	0.0043	0.00376	0.00395	0.00328	0.00436	0.00375	0.00341	0.00342	0.00361	0.00327	0.00304	0.00287
Total Zinc	mg/L	31.4	12.6	*16.7*	*18.5*	*23.7*	*25.6*	*22.0*	*19.5*	*29.0*	*22.2*	*28.1*	*25.0*	*22.0*	*21*	*25.8*	*24.8*	*24.5*	*25*	*22.9*	*19.7*	*20.2*	*21.9*
Dissolved Arsenic	mg/L	0.429	1.0	0.0009	0.0167	0.0206	0.027	0.0626	0.0701	0.0908	0.0902	0.0674	0.0763	0.0781	0.135	0.1	0.102	0.0919	0.0861	0.0945	0.0955	0.0932	0.091

Notes:

a) Flushing Thresholds developed from Maximum concentration observed from 7 adit wall rock samples extracted with adit water

b) Effluent Quality Standards as described in Water Licence QZ09-087 that come into effect on October 1, 2012

Italic	*Results exceed Flushing Thresholds*
Italic	*Results exceed Water Licence EQS*
Bold	*Results exceed Flushing Thresholds and Water License EQS*

Table 4-2. Summary of Flushing Phase Receiving Environment Water Quality, September 20th, 2010 to September 17th, 2013

Parameter	Unit	AMP Threshold[a]	EQS[b]	W6																
		W6		20-Sep-10	7-Oct-10	1-Nov-10	27-Jun-11	26-Jul-11	23-Aug-11	13-Sep-11	3-Oct-11	25-Jun-12	17-Jul-12	21-Aug-12	13-Sep-12	11-Oct-12	24-Jun-13	30-Jul-13	14-Aug-13	17-Sep-13
Physical Parameters																				
pH	pH			3.01	3.06	3.2	3.15	3.11	3.06	3.11	3.01	3.12	3.08	3.03	3.02	2.97	3.02	-	2.84	3.02
Specific Conductance	µS/cm			1445	1543	1565	618	434	927	1312	1633	654	773	1450	1383	1638	682	1244	1500	1095
Acidity	mg/L $CaCO_3$			690	751	813	214	465	352	613	931	215	278	782	851	974	322	629	834	609
Sulphate	mg/L	826		770	*890*	*930*	220	490	450	690	*1080*	194	244	819	*901*	*1140*	354	689	*931*	649
Metals																				
Total Aluminum	mg/L			83	75.7	82.6	22.6	50.4	40	70.6	87.2	20.8	29.2	81.3	85.6	98.2	31	68.2	83.5	53.4
Total Arsenic	mg/L			0.0228	0.0253	0.0298	0.0088	0.0192	0.011	0.0225	0.0328	0.00663	0.00814	0.0287	0.0324	0.0434	0.00956	0.0253	0.0334	0.022
Total Cadmium	mg/L			0.253	0.262	0.269	0.0624	0.145	0.0998	0.17	0.207	0.0482	0.0669	0.19	0.2	0.228	0.0867	0.175	0.217	0.138
Total Chromium	mg/L			0.0808	0.079	0.089	0.0233	0.055	0.045	0.086	0.118	0.0224	0.0293	0.0936	0.103	0.122	0.0304	0.0609	0.0868	0.0614
Total Copper	mg/L	1.23	1.4	1.05	1.05	1.07	0.322	0.632	0.676	*1.25*	**1.86**	0.44	0.516	**1.72**	**2.05**	**2.63**	0.445	0.782	0.986	0.816
Total Iron	mg/L	115		*120*	*131*	*157*	29.7	80.9	55.3	106	*146*	30.6	36.4	*129*	*141*	*179*	49	105	*145*	103
Total Lead	mg/L	0.107	0.4	0.095	0.0711	0.0792	0.0529	0.0501	0.0428	0.0569	0.0593	0.0227	0.0278	0.0478	0.048	0.0585	0.04	0.0547	0.0538	0.0452
Total Nickel	mg/L	1.43	2.1	1.41	*1.53*	*1.79*	0.421	0.935	0.71	1.26	*1.6*	0.36	0.497	1.35	*1.55*	*1.86*	0.636	1.15	*1.55*	1.06
Total Selenium	mg/L			0.0038	0.003	0.0024	0.0036	0.003	0.0038	0.0038	0.0043	0.00262	0.00322	0.00524	0.00475	0.00575	0.00252	0.00329	0.00334	0.00361
Total Silver	mg/L			0.00004	<0.0001	<0.00005	0.00024	0.00008	0.00009	0.00007	0.00004	0.00009	0.000125	0.000061	0.000083	0.000052	0.000091	0.000036	0.000044	0.000066
Total Thallium	mg/L			0.00344	0.00377	0.00443	0.00101	0.00233	0.00164	0.0024	0.00336	0.000936	0.00122	0.00303	0.00335	0.00416	0.00153	0.00286	0.0035	0.00255
Total Zinc	mg/L	16.5	12.6	11	14.4	18.1	4.2	8.07	6.47	11	13.1	3.04	3.99	11.4	12.4	14.6	5.08	9.02	12.1	8.51
Dissolved Arsenic	mg/L	0.0174	1.0	0.0174	0.0229	0.0261	0.0066	0.0297	0.0106	0.0233	0.0304	0.00612	0.0079	0.0269	0.0313	0.0407	0.00828	*0.0219*	*0.0318*	*0.0208*

Parameter	Unit	AMP Threshold[a]	EQS[b]	W8																
		W8		20-Sep-10	7-Oct-10	1-Nov-10	28-Jan-11	24-Mar-11	27-Jun-11	26-Jul-11	23-Aug-11	13-Sep-11	3-Oct-11	2-Apr-12	25-Jun-12	17-Jul-12	21-Aug-12	13-Sep-12	24-Jun-13	30-Jul-13	14-Aug-13	17-Sep-13
Physical Parameters																				
pH	pH			2.93	2.92	3.06	2.90	2.78	3.16	3.09	3.00	3.08	2.93	2.78	3.03	2.98	3.05	2.99	2.96	-	2.82	3.02
Specific Conductance	µS/cm			2081	2077	2035	2270	2280	871	1445	1194	1550	1890	2340	836	1030	1664	1617	963	1526	1793	1364
Acidity	mg/L $CaCO_3$			1330	1310	1370	1400	1380	366	809	549	895	1100	1550	332	454	996	1160	569	941	1180	842
Sulphate	mg/L	1300		1300	1300	1300	*1600*	*1400*	370	760	680	900	1270	1580	316	407	992	1340	543	959	1190	926
Metals																				
Total Aluminum	mg/L			142	141	148	160	155	40.2	84.9	61.2	94.3	112	144	34.4	59	109	119	57.3	106	134	87.3
Total Arsenic	mg/L			0.0302	0.0325	0.0344	0.0441	0.0416	0.0086	0.0189	0.0123	0.0192	0.0232	0.0495	0.00715	0.00902	0.024	0.0258	0.0116	0.0243	0.0328	0.0201
Total Cadmium	mg/L			1.02	0.937	0.948	0.975	0.98	0.237	0.505	0.333	0.536	0.696	0.884	0.19	0.273	0.628	0.709	0.38	0.649	0.834	0.573
Total Chromium	mg/L			0.145	0.139	0.145	0.15	0.137	0.038	0.086	0.062	0.097	0.123	0.137	0.0356	0.0481	0.112	0.126	0.0604	0.1	0.141	0.0944
Total Copper	mg/L	0.562	1.4	0.518	*0.565*	*0.530*	*0.381*	*0.285*	0.216	0.410	0.414	*0.658*	*0.741*	0.547	0.301	0.368	*0.907*	*1.04*	0.295	0.463	*0.6*	0.473
Total Iron	mg/L	256.6		*257*	244	253	*291*	*288*	58	138	89.8	143	183	*276*	51.4	67	177	190	92.8	169	223	155
Total Lead	mg/L	0.0431	0.4	*0.0434*	0.0385	0.0408	0.042	0.041	0.0251	0.0342	0.0327	0.0375	0.0296	0.0354	0.0204	0.0231	0.0294	0.0295	0.0293	0.0372	0.033	0.0316
Total Nickel	mg/L	2.69	2.1	*2.59*	*2.57*	**2.70**	**2.86**	*2.69*	0.717	1.55	1.05	1.64	2.07	2.62	0.606	0.879	1.89	2.1	1.08	1.78	*2.57*	1.63
Total Selenium	mg/L			0.0072	0.0063	0.005	0.0017	0.0012	0.0043	0.006	0.0056	0.0066	0.008	0.0017	0.00364	0.00507	0.00879	0.00982	0.0054	0.00644	0.00761	0.00576
Total Silver	mg/L			0.00004	0.0001	0.00005	0.00003	0.00005	0.0001	0.00008	0.0001	0.00006	0.00005	<0.00003	0.000102	0.000111	0.000083	0.00007	0.000089	0.000031	0.000048	0.000074
Total Thallium	mg/L			0.00406	0.00401	0.00437	0.00466	0.00439	0.00104	0.00252	0.00168	0.00221	0.00279	0.00464	0.00107	0.00138	0.00285	0.00314	<0.0050	0.00304	0.00384	0.00263
Total Zinc	mg/L	22.6	12.6	*19.4*	*21.0*	**22.8**	*20.8*	*20.5*	6.46	11.9	8.6	*13.0*	*15.3*	*19.3*	5.1	6.63	*14.9*	*16.9*	8.36	*13.1*	*18.7*	12.2
Dissolved Arsenic	mg/L	0.0315	1.0	0.0294	0.0280	*0.0317*	*0.0391*	*0.0408*	0.0084	0.0195	0.0120	0.0207	0.0244	0.0474	0.00654	0.00878	0.0257	0.0263	0.0105	0.0222	0.0281	0.0206

Parameter	Unit	AMP Threshold[a]	EQS[b]	W13																
		W13		7-Oct-10	1-Nov-10	24-Mar-11	27-Jun-11	26-Jul-11	23-Aug-11	13-Sep-11	3-Oct-11	2-Apr-12	25-Jun-12	17-Jul-12	21-Aug-12	13-Sep-12	24-Jun-13	30-Jul-13	14-Aug-13	17-Sep-13
Physical Parameters																				
pH	pH			4.20	4.33	3.62	5.11	4.87	4.79	4.7	4.85	3.73	5.16	4.89	4.65	4.75	4.97	-	4.53	5.02
Specific Conductance	µS/cm			262	439	599	344	318	290	350	349	577	209	206	375	363	209	338	361	357
Acidity	mg/L $CaCO_3$			65.7	69.7	109	20.3	36.7	29.8	42.6	39.7	117	7.61	12.8	48.5	68.9	24.5	44.6	57.1	47.1
Sulphate	mg/L	208		170	*210*	*290*	99	160	130	160	163	*266*	95.1	88.2	184	199	112	170	179	176
Metals																				
Total Aluminum	mg/L			9.38	11.1	13.5	3.64	6.96	6.1	7.51	7.84	14	3.51	5.62	9.58	10.7	4.52	9.07	9.35	7.77
Total Arsenic	mg/L			0.0015	0.0009	0.0025	0.00137	0.0014	0.0014	0.0012	0.0013	0.0024	0.00247	0.000208	0.00166	0.00165	0.0011	0.0019	0.00183	0.00129
Total Cadmium	mg/L			0.0422	0.0528	0.0652	0.0139	0.0297	0.022	0.0286	0.0292	0.0614	0.0126	0.0134	0.0401	0.0452	0.0177	0.039	0.0411	0.0321
Total Chromium	mg/L			0.0044	0.0033	0.0064	0.0017	0.003	0.003	0.004	0.005	0.007	0.0018	0.0421	0.0053	0.0063	0.0018	0.0041	0.0042	0.0043
Total Copper	mg/L	0.0366	1.4	0.0335	*0.0368*	0.024	0.0283	*0.0423*	*0.049*	*0.0547*	*0.0463*	*0.0402*	0.0348	*0.0421*	*0.0768*	*0.0905*	*0.034*	*0.0484*	*0.0478*	*0.0544*
Total Iron	mg/L	8.83		*8.92*	7.03	*16.1*	3.11	6.64	5.09	6.36	8.83	*16.8*	3.79	6.89	8.11	9.59	3.87	7.23	7.06	7.49
Total Lead	mg/L	0.00106	0.4	*0.00108*	0.00077	*0.00168*	0.000815	*0.0012*	0.0009	0.0010	0.0010	*0.0015*	*0.00142*	*0.00204*	0.00101	*0.00107*	0.00084	*0.00113*	0.00088	*0.00112*
Total Nickel	mg/L	0.331	2.1	0.259	*0.335*	*0.419*	0.113	0.19	0.169	0.206	0.218	0.385	0.106	0.112	0.246	0.289	0.147	0.243	0.252	0.225
Total Selenium	mg/L			0.0014	0.0015	0.0014	0.00145	0.0014	0.0015	0.0015	0.0015	0.0014	0.00154	0.00142	0.00181	0.00182	0.00178	0.00148	0.00137	0.00144
Total Silver	mg/L			0.000030	0.00003	0.00003	0.000016	0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0.000047	0.000071	0.000026	0.00005	<0.000020	<0.000020	<0.000020	0.000027
Total Thallium	mg/L			0.00022	0.00027	0.000323	0.000119	0.0002	0.00017	0.00017	0.00018	0.00037	0.000105	0.000126	0.000252	0.00027	0.000153	0.000234	0.000228	0.000218
Total Zinc	mg/L	1.88	12.6	1.42	*1.90*	*2.29*	0.566	0.985	0.782	1.05	0.994	*2.06*	0.509	0.532	1.37	1.53	0.626	1.18	1.24	1.06
Dissolved Arsenic	mg/L	0.0004	1.0	0.0004	0.0002	0.0003	0.00022	0.0003	0.0002	0.0004	0.0003	0.00035	0.00016	0.000143	0.00036	0.0006	0.00012	0.00025	0.00021	0.00034

Notes:

a) AMP Thresholds = 95th percentile for reference period of 2000 to September 13, 2010

b) Effluent Quality Standards as described in Water Licence QZ09-087 that come into effect on October 1, 2012

Italic	*Results exceed Flushing Thresholds*
Italic	*Results exceed Water Licence EQS*
Bold	*Results exceed Flushing Thresholds and Water License EQS*

4.1.3 AMP Component 3, Seepage from Base of Waste Rock Dump and Slopes Influenced by Flooding of the Underground Workings

On-site observations were made during every trip in 2013. No new or increased seepage was observed at the base of the waste rock dump (including FS2) and the slopes influenced by flooding the underground workings in 2013. No zones of instability were observed on hillside slopes associated with a higher groundwater table as mentioned in Appendix D. Grouted exploration borehole FS1 was inspected during the August 2013 geotechnical inspection and no seepage was observed.

4.1.4 AMP Component 4, Seepage from Exploration Boreholes

Exploration boreholes FS1 and PH1 were grouted shut on August 12, 2010 and are no longer flowing. On-site observations were made in 2011, 2012 and 2013. No seepage from the historic exploration boreholes has been observed following the grouting on August 12, 2010.

4.1.5 AMP Component 5, Hydrostatic Pressure behind the Adit Plug

A data logger was installed behind the adit plug on August 28, 2010 to record the hydrostatic pressure (water level) behind the plug at hourly intervals. The data was last downloaded on September 17th, 2013. Figure 5-1 presents the hydrostatic pressure behind the adit plug from August 2010 to September 17th, 2013. On September 5th, 2010 the underground workings behind the adit plug up to the bypass raise was filled. The hydrostatic pressure remained relatively stable between September 13th, 2010 and September 17th, 2013 ranging from 23.5 m to 24.2 m behind the plug.

Adit discharge flow rates were also monitored during each site visit following the adit plug installation. No significant discharge flow increases or decreases were noted, indicating that the adit bypass raise is functioning properly. No threshold was exceeded for the hydrostatic pressure behind the adit plug in 2013.

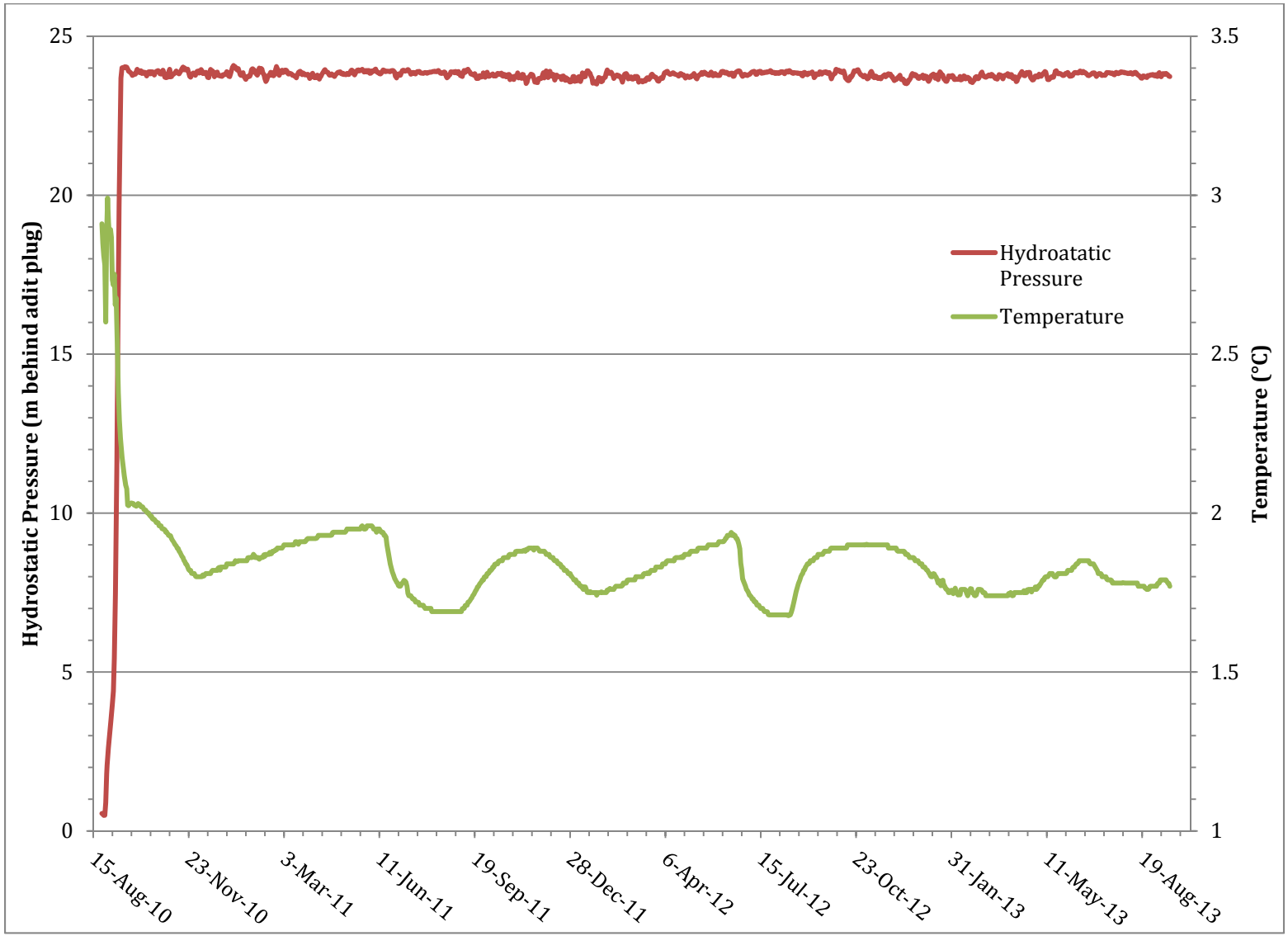

Figure 4-1. Hydrostatic Pressure and Water Temperature behind the Adit Plug

4.1.6 AMP Component 6, Water Levels in the Groundwater Wells

Water levels in groundwater wells BH01-05, BH03-05 and BH04-05 were monitored during each monthly monitoring event following the installation of the adit plug, with the exception of the November 2010, January 2011, March 2011, October 2011 and October 2012 site visits. Table 4-3 presents water levels for the three groundwater wells from 2005 to 2013. In 2013, only the June groundwater level at BH04-05 exceeded the AMP threshold, likely due to localized snowmelt influences. Subsequently, the level dropped below the threshold for the remainder of the year. No visual evidence for development of slope instability (i.e. cracking, displacement, slumping, sloughing, toe bulging) was found in 2013.

Table 4-3. Summary of Groundwater levels in Wells at the Tom Property, 2005 – 2013

Monitoring Date	BH01-05	BH03-05	BH04-05
31-Aug-05	4.35	4.03	4.82
25-May-06	3.20	*Buried by Snow*	3.68
9-Feb-06	4.30	4.21	4.66
9-Dec-07	4.06	4.35	4.96
31-May-08	3.20	*Buried by Snow*	4.44
7-Mar-08	4.73	4.23	5.10
10-Sep-08	7.67	5.25	5.17
25-Jun-09	4.64	4.25	4.87
15-Jul-09	7.68	4.68	5.10
6-Aug-09	5.03	3.91	5.08
3-Sep-09	3.99	4.01	4.78
22-Jun-10	N/A	4.03	5.89
14-Jul-10	7.48	4.64	5.40
24-Aug-10	7.66	6.13	5.96
8-Sep-10	7.68	6.09	6.02
22-Jun-11	7.57	4.20	4.94
14-Jul-11	7.65	4.36	4.89
24-Aug-11	7.45	4.13	4.77
13-Sep-11	7.43	4.60	4.90
25-Jun-12	3.889	4.558	3.738
18-Jul-12	3.77	3.795	4.710
22-Aug-12	5.77	4.035	4.980
13-Sep-12	6.545	4.558	4.995
24-Jun-13	N/A	N/A	1.770
31-Jul-13	4.580	4.180	6.070
13-Aug-13	7.660	4.435	6.130
18-Sep-13	4.675	4.090	6.070
3-Oct-13	7.600	4.480	6.065

4.1.7 AMP Component 7, Waste Rock Cover Physical Effectiveness

In 2013, the waste rock cover's physical effectiveness was monitored by the groundwater monitoring wells and in Sekie Creek #2 at W6. The water quality at W6 is summarized in AMP Component 2, Section 5.1.2.

Groundwater levels were measured during all monthly visits and groundwater samples were collected at BH01-05, BH03-05 and at BH04-05 for June, July, August and September 2013 site visits. Additionally, data loggers collected hourly water levels in all three monitoring wells. The monitoring results shown in Table 5-3 for AMP component 6, Section 5.1.6 were above the groundwater level threshold at BH04-05 during June 2013 likely due to localized snowmelt influences. The 2013 groundwater monitoring results, shown in Table 5-4 exceed the AMP thresholds three consecutive times at BH03-05 for sulphate, dissolved copper and dissolved nickel, and two consecutive times for dissolved iron. The sulphate, iron, copper and nickel concentrations collected at W6 for July, August and September 2013 did not exceed the receiving environment AMP threshold, with the exception of sulphate, iron and nickel in August 2013.

4.1.8 AMP Component 8, Physical Site Stability

The physical site stability component was initiated in the summer of 2010 by Holger Hartmaier of BGC Engineering to collect baseline information including: visual inspections of the slopes above and below the portal, identification of seepage sources and review of air photographs. A site inspection was performed on August 13th, 2013 by Holger Hartmaier to evaluate any change to the physical site stability. The inspection report did not find any significant change to physical site stability and the findings of the inspection are detailed in Appendix D.

4.1.9 AMP Component 9, Adit Plug Physical Integrity

During each site visit following the installation of the adit plug, the plug and adjacent rock wall faces were inspected for new seeps, and two major seeps have been identified downstream of the plug on the rock wall. On August 13th, 2013, Holger Hartmaier did a complete inspection of the plug and no significant change to the adit plug physical integrity was found. In 2013, all of the specific indicators outlined in component 9 of the final AMP were collected during each monitoring trip and did not exceed the thresholds.

4.2 WASTE ROCK COVER MONITORING PLAN

The installation of the waste rock cover began in August 2009 and was completed in September 2010. The HDPE liner and minimum half meter talus cover was placed on the north and south waste rock dumps. Following the completion of the waste rock cover and submission of the final AMP, the waste rock cover monitoring plan (component 7 of the conceptual AMP) was implemented. The waste rock cover was visually inspected during all monthly monitoring trips from June through September, including the site inspection by BGC Engineering on August 13th, 2013 (Appendix D).

4.3 FINAL CLOSURE PLAN

An assessment of the performance of the Remediation and Closure Plan undertaken in 2009 and 2010 (adit plug and associated workings) is currently underway that will review the first three years of post-reclamation monitoring data. The results of the assessment will inform the development of the Final Closure Plan that will be submitted to the Board prior to June 30, 2015. Water quality and other site data will continue to be collected in 2014 to further evaluate the performance of the remediation plan as part of the AMP.

Table 4-4. Summary of Post Adit Plug Groundwater Quality, June 28th, 2011 to September 18th, 2013

Parameter	Unit	AMP Thresholds[a]	EQS[b]	BH01-05											
		BH01-05		28-Jun-11	27-Jul-11	24-Aug-11	13-Sep-11	25-Jun-12	18-Jul-12	22-Aug-12	13-Sep-12	24-Jun-13	31-Jul-13	13-Aug-13	18-Sep-13
Physical Parameters															
Groundwater Level	mbTOC	4.06		7.57	7.65	7.45	7.43	*3.89*	*3.77*	5.77	6.55	-	4.58	7.66	4.68
pH	pH			4.2	-	4.1	4.3	4.3	3.9	4.7	4.3	4.4	-	-	4.0
Conductivity	µS/cm			26	-	33	33	35	35	25.3	39	16	103	-	26
Acidity	mg/L $CaCO_3$			9.6	-	7.3	13.2	7.67	8.66	7.4	11.5	7.19	3.25	-	3.21
Sulphate	mg/L	14.9		5	-	5.6	4.3	4.4	6.88	3.98	4.14	4.16	4.08	-	4.42
Metals															
Dissolved Aluminum	mg/L			0.105	-	0.127	0.149	0.109	0.0404	0.189	0.00091	0.114	0.167	-	0.116
Dissolved Arsenic	mg/L	0.0009	1	0.00009	-	0.0001	0.0001	<0.0001	<0.00002	0.00012	0.00011	0.00018	0.00021	-	0.0002
Dissolved Cadmium	mg/L			0.000210	-	0.00026	0.00027	0.000157	0.000043	0.00021	0.000285	0.000291	0.00034	-	0.000246
Dissolved Chromium	mg/L			0.0004	-	<0.001	<0.001	<0.001	0.00013	<0.001	0.001	<0.0010	<0.0010	-	<0.0010
Dissolved Copper	mg/L	0.00618	1.4	0.00050	-	0.0006	0.0011	0.00062	0.000442	0.00166	0.0002	0.00336	0.00193	-	0.00297
Dissolved Iron	mg/L	0.725		0.130	-	0.128	0.186	0.308	0.0888	0.262	0.035	0.153	0.164	-	0.0598
Dissolved Lead	mg/L	0.0009	0.4	*0.000967*	-	*0.0024*	*0.001*	0.00036	*0.00175*	*0.00123*	0.00055	0.00053	*0.00164*	-	0.00057
Dissolved Manganese	mg/L			0.00607	-	0.009	0.008	0.0066	0.00164	0.0073	0.0076	0.0094	0.0089	-	0.0068
Dissolved Nickel	mg/L	0.0244	2.1	0.00375	-	0.006	0.006	0.0049	0.00148	0.0064	0.0046	0.0042	0.0045	-	0.0042
Dissolved Selenium	mg/L			0.00496	-	0.0043	0.0045	0.00398	0.000865	0.00563	0.00472	0.00456	0.00473	-	0.00505
Dissolved Silver	mg/L			0.000041	-	0.00004	0.00006	0.00007	0.000014	0.000046	0.000047	0.00004	<0.000020	-	0.000031
Dissolved Thallium	mg/L			0.000171	-	0.0002	0.0002	0.000147	0.000035	0.000183	0.000207	0.000139	0.000159	-	0.000197
Dissolved Zinc	mg/L	0.493	12.6	0.224	-	0.21	0.251	0.15	0.0394	0.232	0.253	0.203	0.223	-	0.218

Parameter	Unit	AMP Thresholds[a]	EQS[b]	BH03-05											
		BH03-05		28-Jun-11	27-Jul-11	24-Aug-11	14-Sep-11	25-Jun-12	18-Jul-12	22-Aug-12	13-Sep-12	24-Jun-13	31-Jul-13	13-Aug-13	18-Sep-13
Physical Parameters															
Groundwater Level	mbTOC	4.03		4.20	4.36	4.13	4.60	4.56	*3.80*	4.06	4.56	-	4.18	4.44	4.09
pH	pH			2.8	2.8	2.8	2.8	3.0	2.7	2.9	2.9	2.6	-	2.5	2.7
Conductivity	µS/cm			869	1120	1251	1383	789	1084	1290	1440	808	1319	1439	1218
Acidity	mg/L $CaCO_3$			215	372	424	561	218	339	601	686	252	466	466	481
Sulphate	mg/L	399		150	*410*	*540*	*620*	226	320	*589*	*710*	252	*454*	*695*	*496*
Metals															
Dissolved Aluminum	mg/L			22.4	49.9	54.3	73.3	21.5	44.3	76.2	89.9	25.2	58.2	75.7	55.9
Dissolved Arsenic	mg/L	0.0050	1	0.0008	0.0004	0.0006	0.0011	0.00044	0.000701	0.00074	0.00147	0.00072	0.00074	0.00076	0.0008
Dissolved Cadmium	mg/L			0.0723	0.135	0.277	0.184	0.0671	0.107	0.186	0.223	0.0748	0.159	0.208	0.133
Dissolved Chromium	mg/L			0.0125	0.026	0.033	0.046	0.0137	0.0269	0.0495	0.0653	0.0174	0.0436	0.0565	0.0429
Dissolved Copper	mg/L	0.483	1.4	0.300	*0.508*	*0.645*	*0.82*	0.364	*0.597*	*0.874*	*1.03*	0.338	*0.637*	*0.787*	*0.629*
Dissolved Iron	mg/L	10.4		6.11	6.35	6.87	7.35	7.05	7.56	10.4	*13.3*	8.83	9.76	*11.3*	*10.6*
Dissolved Lead	mg/L	0.0247	0.4	0.0140	0.0052	0.0198	0.0156	0.00991	0.00584	*0.0629*	0.00784	0.00863	0.0224	0.0147	0.00905
Dissolved Manganese	mg/L			0.472	0.686	1.18	0.958	0.523	0.624	0.916	1.1	0.491	0.825	0.972	0.811
Dissolved Nickel	mg/L	0.660	2.1	0.359	*0.816*	*0.896*	*1.17*	0.324	*0.669*	*1.14*	*1.37*	0.414	*0.929*	*1.25*	*0.862*
Dissolved Selenium	mg/L			0.0025	0.0050	0.0062	0.0095	0.00248	0.00433	0.00666	0.00856	0.00284	0.00621	0.00865	0.00569
Dissolved Silver	mg/L			0.00010	0.00015	0.00023	0.00021	0.00184	0.000148	0.000219	0.000183	0.000213	0.000095	0.000187	0.000203
Dissolved Thallium	mg/L			0.00057	0.00125	0.0013	0.00182	0.000647	0.00144	0.00238	0.00257	0.000766	0.00217	0.00216	0.00205
Dissolved Zinc	mg/L	11.4	12.6	6.31	6.42	**35.2**	***12.0***	6.5	6.0	8.17	9.55	5.2	7.2	9.1	6.7

Parameter	Unit	AMP Thresholds[a]	EQS[b]	BH04-05											
		BH04-05		28-Jun-11	27-Jul-11	24-Aug-11	14-Sep-11	25-Jun-12	18-Jul-12	22-Aug-12	13-Sep-12	24-Jun-13	31-Jul-13	13-Aug-13	18-Sep-13
Physical Parameters															
Groundwater Level	mbTOC	4.79		4.94	4.89	*4.77*	4.900	*3.738*	*4.710*	4.980	4.995	*1.770*	5.475	5.560	5.010
pH	pH			2.7	2.9	2.9	2.7	3.0	2.8	3.0	3.0	2.7	-	2.6	2.9
Conductivity	µS/cm			1962	2294	2551	2584	1870	2043	2090	2300	1328	2294	2397	2666
Acidity	mg/L $CaCO_3$			667	569	452	749	789	542	700	721	397	469	365	408
Sulphate	mg/L	1425		1000	1300	*1500*	1300	1060	1070	1260	1390	638	1220	1360	*1840*
Metals															
Dissolved Aluminum	mg/L			60.2	52.2	44.7	60.0	69.7	40.0	57.0	62.5	19.7	26.3	20.6	37.1
Dissolved Arsenic	mg/L	0.0608	1	0.0145	0.0179	0.0144	0.0221	0.0172	0.0141	0.0216	0.0142	0.00614	0.00473	0.00248	0.00274
Dissolved Cadmium	mg/L			0.235	0.169	0.149	0.192	0.251	0.14	0.182	0.179	0.123	0.127	0.092	0.14
Dissolved Chromium	mg/L			0.049	0.044	0.037	0.039	0.0641	0.0353	0.0387	0.032	0.0114	0.0153	0.0095	0.012
Dissolved Copper	mg/L	0.592	1.4	*0.602*	0.397	0.347	0.476	0.47	0.236	0.443	0.421	0.423	0.36	0.235	0.258
Dissolved Iron	mg/L	100		86.3	64.4	51.6	66.6	*112*	55	63.2	51.5	39.3	44.2	29.9	21.6
Dissolved Lead	mg/L	0.0193	0.4	0.00431	0.0040	0.003	0.0028	0.00406	0.00287	0.00413	0.00369	0.0106	0.0101	0.00511	0.00143
Dissolved Manganese	mg/L			7.26	5.17	4.97	7.15	7.65	4.4	6.47	6.88	4.12	3.63	3	7.06
Dissolved Nickel	mg/L	1.41	2.1	1.29	1.14	1.18	1.37	1.31	0.781	1.23	1.36	0.561	0.717	0.66	1.26
Dissolved Selenium	mg/L			0.0085	0.0135	0.0166	0.0216	0.00624	0.0112	0.0179	0.0272	0.00953	0.0158	0.0183	0.0291
Dissolved Silver	mg/L			0.00105	0.00052	0.0004	0.00062	0.000629	0.000326	0.000282	0.000368	0.000891	0.000224	0.000084	0.000161
Dissolved Thallium	mg/L			0.00154	0.0023	0.0017	0.0017	0.00266	0.00224	0.00206	0.00181	0.0004	0.000418	0.00049	0.00084
Dissolved Zinc	mg/L	59.6	12.6	**71**	*52.1*	*53.7*	***72.0***	***77.5***	*41.4*	***62.3***	***63.9***	*51.8*	*46.8*	*43.9*	***70.5***

Notes:

All units mg/L unless otherwise noted

a) AMP Thresholds = 75th percentile for reference period of 2005 to August 24th, 2010

b) Effluent Quality Standards as described in water licence QZ09-087 for station W5 that come into effect on October 1, 2012

Italic	*Results exceed Flushing Thresholds*
Italic	*Results exceed Water Licence EQS for W5*
Bold	*Results exceed Flushing Thresholds and Water License EQS for W5*

5 CONCLUSIONS

Based on the findings of the 2013 work, the following conclusions are offered:

1. Similar to previous years, background station samples from upper Sekie Creek #2 watershed (W2, W3 and W3B) exhibit elevated concentrations of total zinc ranging from 1.85 to 12.9 mg/L. The zinc EQS (12.6 mg/L) was exceeded at W3B in October 2013 (12.9 mg/L). The total copper EQS (1.4 mg/L) was also exceeded at W2 in August and October. Background station T5 exhibited zinc concentrations between 20.1 mg/L and 42 mg/L, exceeding the EQS four out of five samples in 2013. Elevated zinc concentrations at T5 correspond with elevated nickel concentrations, which also exceed the EQS (2.1 mg/L) during the same four events.

2. Total zinc concentrations in the adit discharge (location W5) water prior to adit plug installation consistently exceeded the EQS guideline and ranged from 23.0 to 28.7 mg/L from April 1st to August 25th, 2010. Zinc concentrations in the adit discharge after the adit plug installation was completed ranged from 16.7 to 25.6 mg/L in 2010, 19.5 mg/L to 30 mg/L in 2011 and 20.4 mg/L and 25.8 mg/L in 2012, always exceeding the EQS. In 2013, a similar trend was observed with zinc concentrations between 19.5 and 25.4 mg/L.

3. Based on the zinc loading model, there appears to be significant zinc contribution to Sekie Creek #2 between the adit discharge point and the mouth of the creek. The concentration of zinc in natural discharge to Sekie Creek #2 appears to range between 12.9 and 27.6 mg/L. This range is consistent with previous years' observations.

4. In 2013, the adit discharge is estimated to have contributed approximately 2.8% to 4.8% of the total zinc loading at the Macmillan #2 Bridge (W13) from June to September 2013. Total zinc concentrations in the South Macmillan River at this site in 2013 ranged from 0.63 to 1.18 mg/L. The adit discharge is estimated to have contributed approximately 0.9% to 1.5% of the total copper loading at the Macmillan #2 Bridge (W13) from June to September 2013. Total copper concentrations in the South Macmillan River at this site ranged from 0.034 to 0.0544 mg/L in 2013. This location in the past has been interpreted to be the upstream extent of the South Macmillan River potentially frequented by fish, but no fish have been observed there in the 2004, 2007, 2009, 2011, 2012, and 2013 fish studies.

5. Groundwater wells (BH03-05 and BH04-05) down gradient of the covered waste rock piles continue to exhibit elevated concentrations of parameters in comparison to the upgradient well (BH01-05).

6. Sediment samples from the South Macmillan River (W11, W12 and W13) exceeded the CCME sediment quality guidelines for total arsenic, cadmium, chromium, copper, lead and zinc. The total mercury guideline was exceeded at W12 only.

7. Over the four years of benthic invertebrate sampling increasing taxonomic richness, average number and density of organisms, and diversity have been reported for all sites on the South Macmillan River (W11, W12 and W13). Poor stream health was reported in 2010 and 2011 based on the results of the benthic invertebrate sampling, but since 2012 and 2013 considerably better results may point to an improvement in stream health at all sites.

8. The fall-winter sampling period (October 2013) during the low flow conditions encountered historic maximum metal concentrations in the background stations that consistently exceeded the EQS. This sampling period had not been previously used in the development of the current EQS and AMP thresholds. The AMP and EQS for the Water Licence will be re-evaluated by HBMS considering the elevated background late fall and winter data collected in 2010, 2011, 2012 and 2013. These data will also inform the Final Closure Plan to be submitted to the board in 2015.

APPENDIX A

PHOTOLOG

Photo 1. Site W13 looking upstream on June 24, 2013.

Photo 2. Site W13 looking downstream on June 24, 2013.

Photo 3. Site W12 looking upstream on June 24, 2013.

Photo 4. Site W12 looking downstream on June 24, 2013.

Photo 5. Site W8 looking upstream on June 24, 2013.

Photo 6. Site W8 looking downstream on June 24, 2013.

Photo 7. Site W11 looking upstream on June 24, 2013.

Photo 8. Site W11 looking downstream on June 24, 2013.

Photo 9. Site W5 looking downstream on June 24, 2013.

Photo 10. Site W5 looking upstream on June 24, 2013.

Photo 11. Site W6 looking upstream on June 24, 2013.

Photo 12. Site W6 looking downstream on June 24, 2013.

Photo 13. Site W3 looking upstream on June 24, 2013.

Photo 14. Site W3 looking downstream on June 24, 2013.

Photo 15. Site W3B looking upstream on June 24, 2013.

Photo 16. Site W3B looking downstream on June 24, 2013.

Photo 17. Site T5 looking upstream on June 24, 2013.

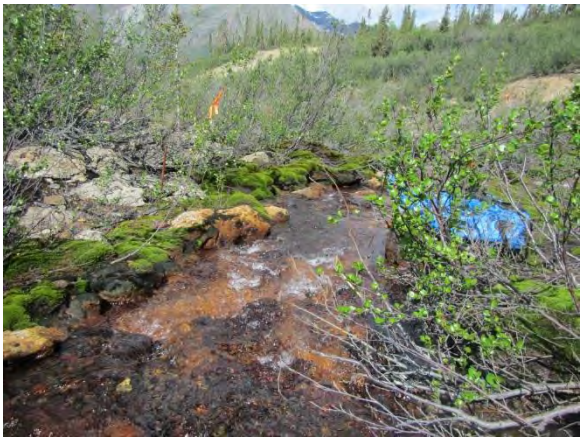

Photo 18. Site T5 looking downstream on June 24, 2013.

Photo 19. Site S2 looking upstream on June 24, 2013.

Photo 20. Site S2 looking downstream on June 25, 2012.

Photo 21. Damage to lined discharge channel on June 24, 2013.

Photo 22. Damage to lined discharge channel on June 24, 2013.

Photo 23. Aerial view of damage to lined discharge channel on June 24, 2013.

Photo 24. Site T4 looking downstream on June 24, 2013.

Photo 26. Site T4 looking upstream on June 24, 2013.

Photo 25. Aerial photo of Jason Bridge on June 24, 2013.

Photo 1. Liner with diagonal tear before repair efforts on June 27, 2013.

Photo 2. Liner with diagonal tear before repair efforts on June 27, 2013.

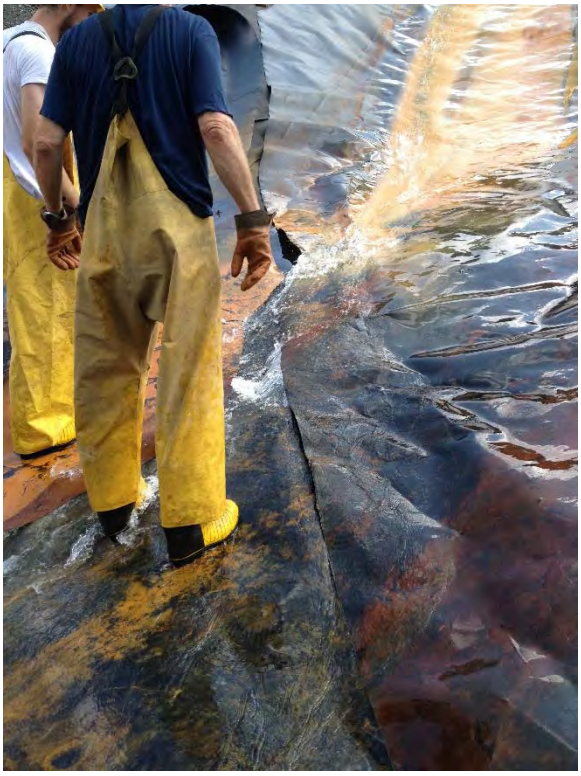

Photo 3. Placement of liner removed from the bank at gap caused by the tear on June 27, 2013.

Photo 4. “Stitching” of the liner using rope along the diagonal tear on June 27, 2013.

Photo 5. Flattened ripple on lower portion of liner on June 27, 2013. Water does not infiltrate the liner.

Photo 7. Significantly reduced flow from under the liner at the base of the waste rock dump after repairs were made on June 27, 2013

Photo 6. Water flowing from under the liner at the base of the waste rock dump before repairs on June 24, 2013.

Photo 8. Edge of tear of liner on June 27, 2013.

Photo 9. Finished repairs of liner looking up gradient on June 27, 2013. Note the flattened ripple caused by the cut at its base.

Photo 10. Finished repairs looking down gradient on June 27, 2013.

Photo 1. Site W13 looking upstream on July 30, 2013.

Photo 2. Site W13 looking downstream on July 30, 2013.

Photo 3. Site W12 looking upstream on July 30, 2013.

Photo 4. Site W12 looking downstream on July 30, 2013.

Photo 5. Site W11 looking upstream on July 30, 2013.

Photo 6. Site W11 looking downstream on July 30, 2013.

Photo 7. Site W8 looking upstream on July 30, 2013.

Photo 8. Site W8 looking downstream on July 30, 2013.

Photo 9. Site W5 looking upstream on July 30, 2013.

Photo 10. Site W5 looking downstream on July 30, 2013.

Photo 11. Site W6 looking upstream on July 30, 2013.

Photo 12. Site W6 looking downstream on July 30, 2013.

Photo 13. Site W3 looking upstream on July 30, 2013.

Photo 14. Site W3 looking downstream on July 30, 2013.

Photo 15. Site W3B looking upstream on July 30, 2013.

Photo 16. Site W3B looking downstream on July 30, 2013.

Photo 17. Site W2 looking upstream on July 30, 2013.

Photo 18. Site W2 looking downstream on July 30, 2013.

Photo 19. Site T5 looking upstream on July 30, 2013.

Photo 20. Site T5 looking downstream on July 30, 2013.

Photo 21. Site S2 looking upstream on July 30, 2013.

Photo 22. Site S2 looking downstream on July 30, 2012.

Photo 23. Jason Bridge site looking upstream on July 30, 2013.

Photo 24. Jason Bridge site looking downstream on July 30, 2013.

Photo 25. W5 settling tests on July 30, 2013.

Photo 26. W5 settling tests on July 31, 2013.

Photo 27. W5 settling tests on Aug 1, 2013.

Photo 28. Field bins at the adit on Aug 1, 2013.

Photo 29. Repaired lined discharge channel on Aug 1, 2013.

Photo 30. Repaired confined flow channel across the road on July 31, 2013.

Photo 1. Site W13 looking upstream on Aug 14, 2013.

Photo 2. Site W13 looking downstream on Aug 14, 2013.

Photo 3. Site W12 looking upstream on Aug 14, 2013.

Photo 4. Site W12 looking downstream on Aug 14, 2013.

Photo 5. Site W11 looking upstream on Aug 14, 2013.

Photo 6. Site W11 looking downstream on Aug 14, 2013.

Photo 7. Site W8 looking upstream on Aug 14, 2013.

Photo 8. Site W8 looking downstream on Aug 14, 2013.

Photo 9. Site W5 looking upstream on Aug 14, 2013.

Photo 10. Site W5 looking downstream on Aug 14, 2013.

Photo 11. Site W6 looking upstream on Aug 14, 2013.

Photo 12. Site W6 looking downstream on Aug 14, 2013.

Photo 13. Site W3 looking upstream on Aug 14, 2013.

Photo 14. Site W3 looking downstream on Aug 14, 2013.

Photo 15. Site W3B looking upstream on Aug 14, 2013.

Photo 16. Site W3B looking downstream on Aug 14, 2013.

Photo 17. Site W2 looking upstream on Aug 14, 2013.

Photo 18. Site W2 looking downstream on Aug 14, 2013.

Photo 19. Site T5 looking upstream on Aug 14, 2013.

Photo 20. Site T5 looking downstream on Aug 14, 2013.

Photo 21. Site S2 looking upstream on Aug 14, 2013.

Photo 22. Site S2 looking downstream on Aug 14, 2013.

Photo 23. Jason Bridge site looking upstream on Aug 14, 2013.

Photo 24. Jason Bridge site looking downstream on Aug 14, 2013.

Photo 25. Modifying the field bin stands on Aug 13, 2013.

Photo 26. Completed field bins at down-gradient corner of waste rock pile on Aug 13, 2013.

Photo 27. Completed field bins at up-gradient corner of waste rock pile on Aug 13, 2013.

Photo 28. Channelization of adit flow on Aug 14, 2013.

Photo 1. Site W13 looking upstream on Sept 17, 2013.

Photo 2. Site W13 looking downstream on Sept 17, 2013.

Photo 3. Site W12 looking upstream on Sept 17, 2013.

Photo 4. Site W12 looking downstream on Sept 17, 2013.

Photo 5. Site W11 looking upstream on Sept 17, 2013.

Photo 6. Site W11 looking downstream on Sept 17, 2013.

Photo 7. Site W8 looking upstream on Sept 17, 2013.

Photo 8. Site W8 looking downstream on Sept 17, 2013.

Photo 9. Site W5 looking upstream on Sept 17, 2013.

Photo 10. Site W5 looking downstream on Sept 17, 2013.

Photo 11. Site W6 looking upstream on Sept 17, 2013.

Photo 12. Site W6 looking downstream on Sept 17, 2013.

Photo 13. Site W3 looking upstream on Sept 17, 2013.

Photo 14. Site W3 looking downstream on Sept 17, 2013.

Photo 15. Site W3B looking upstream on Sept 17, 2013.

Photo 16. Site W3B looking downstream on Sept 17, 2013.

Photo 17. Site W2 looking upstream on Sept 17, 2013.

Photo 18. Site W2 looking downstream on Sept 17, 2013.

Photo 19. Site T5 looking upstream on Sept 17, 2013.

Photo 20. Site T5 looking downstream on Sept 17, 2013.

Photo 21. Site S2 looking upstream on Sept 17, 2013.

Photo 22. Site S2 looking downstream on Sept 17, 2013.

Photo 23. Jason Bridge site looking upstream on Sept 17, 2013.

Photo 24. Jason Bridge site looking downstream on Sept 17, 2013.

Photo 25. Leachate from OWRB2 on Sept 18, 2013.

Photo 26. Leachate from NWRB5 on Sept 18, 2013.

Photo 1. Site W13 looking upstream on Oct 3, 2013.

Photo 2. Site W13 looking downstream on Oct 3, 2013.

Photo 3. Site W12 looking upstream on Oct 3, 2013.

Photo 4. Site W12 looking downstream on Oct 3, 2013.

Photo 5. Site W11 looking upstream on Oct 3, 2013.

Photo 6. Site W11 looking downstream on Oct 3, 2013.

Photo 7. Site W8 looking upstream on Oct 3, 2013.

Photo 8. Site W8 looking downstream on Oct 3, 2013.

Photo 9. Site W5 looking upstream on Oct 3, 2013.

Photo 10. Site W5 looking downstream on Oct 3, 2013.

Photo 11. Site W6 looking upstream on Oct 3, 2013.

Photo 12. Site W6 looking downstream on Oct 3, 2013.

Photo 13. Site W3 looking upstream on Oct 3, 2013.

Photo 14. Site W3 looking downstream on Oct 3, 2013.

Photo 15. Site W3B looking upstream on Oct 3, 2013.

Photo 16. Site W3B looking downstream on Oct 3, 2013.

Photo 17. Site W2 looking upstream on Oct 3, 2013.

Photo 18. Site W2 looking downstream on Oct 3, 2013.

Photo 19. Site T5 looking upstream on Oct 3, 2013.

Photo 20. Site T5 looking downstream on Oct 3, 2013.

Photo 21. Site S2 looking upstream on Oct 3, 2013.

Photo 22. Site S2 looking downstream on Oct 3, 2013.

Photo 23. Jason Bridge site looking upstream on Oct 3, 2013.

Photo 24. Jason Bridge site looking downstream on Oct 3, 2013.

Photo 25. Damaged Jason Meteorological Station on Oct 3, 2013.

Photo 26. Leachate from OWRB2 on Oct 3, 2013.

APPENDIX B

MONITORING RESULTS

Appendix B1. 2013 Surface Water Monitoring Results for QZ13-034

	Sample Date	Sample Class	pH (field)	pH (lab)	Field Specific Conductance	Lab Specific Conductance	Temp-F	Dissolved Oxygen	Dissolved Oxygen	ORP-F	Discharge	TSS	Total Hardness	Dissolved Hardness	Total Alkalinity	Total Acidity	Acidity (pH 4.5)	Chloride	Sulphate	N-NH3	N-NO2	N-NO3	Al-T	Sb-T	As-T	Ba-T	Be-T	Bi-T	B-T	Cd-T	Ca-T	Cr-T	Co-T	Cu-T	Fe-T	Pb-T
			pH units	pH units	µS/cm	µS/cm	C	mg/L	%	mV	L/s	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CCME-AL			**6.5-9**	**6.5-9**				**5.5**										**120**		**102**	**0.06**	**2.935**	*		**0.005**				**1.5**	*		**0.001**		*	**0.3**	*
CCME-AL-DM			**6.5-9**	**6.5-9**				**5.5**										**120**		**102**	**0.06**	**2.935**														
QZ13-034 EQS																																		**1.4**		**0.4**
W2	24-Jun-13	P	**3.2**	**3.15**	442.7	595	8.9	10.1	105	435.7	97.816	38.9	33.3	33.1	<0.50	196	97.8	0.53	192	0.34	<0.0050	0.094	**19.3**	<0.00050	**0.00631**	0.113	0.00065	<0.0010	<0.050	**0.0646**	8.44	**0.0219**	0.0455	**0.398**	**30.7**	<0.00020
W2	24-Jun-13	QD		**3.14**		596						38.2	35.4	33.5	<0.50	192	96.7	0.57	192	0.38	<0.0050	0.094	**19.7**	<0.00050	**0.00663**	0.12	0.00071	<0.0010	<0.050	**0.0667**	9.07	**0.0225**	0.0475	**0.411**	**32.2**	<0.00020
W2	30-Jul-13	P		**2.87**	1069	1270	9.4	8.6	89	451.7	27.53	34.5	91.4	84.3	<0.50	557	346	<0.50	579	1.4	0.02	0.0901	**61.3**	<0.00050	**0.0208**	0.0412	0.00199	<0.0010	<0.050	**0.182**	21.6	**0.0712**	0.119	**1.07**	**91.9**	**0.0104**
W2	14-Aug-13	P	**2.88**	**2.8**	1421	1620	7.1	8.9	88	450.6	15.04	63.6	116	115	<0.50	837	475	2.1	830	1.7	0.0171	0.0752	**93**	0.0005	**0.0312**	0.0186	0.003	<0.0010	<0.050	**0.269**	27.1	**0.116**	0.173	**1.6**	**144**	<0.00020
W2	17-Sep-13	P	**3.08**	**3.12**	935	1040	1.7	11.6	99	413.1	50.77	9.6	70.4	76.2	<0.50	526	227	0.67	531	0.92	0.026	0.11	**47.7**	<0.00050	**0.0156**	0.0372	0.00149	<0.0010	<0.050	**0.129**	16.9	**0.0643**	0.0938	**0.986**	**76.1**	<0.00020
W2	3-Oct-13	P	**3.23**	**3.01**	1211	1330	1.2	11.5	98	414.7		46	102	97	<0.50	775	351	0.81	744	1.5	<0.020	0.111	**76.7**	<0.00050	**0.0248**	0.024	0.0024	<0.0010	<0.050	**0.211**	24.5	**0.101**	0.146	**1.54**	**124**	<0.00020
W3	24-Jun-13	P	**2.95**	**3.15**	570.8	668	8.9	10.1	104	489.3	90.7555	4.4	35.9	35.8	<0.50	262	130	1.4	239	0.58	<0.0050	0.116	**27.9**	<0.00050	0.00151	0.0477	0.00098	<0.0010	<0.050	**0.0787**	8.38	**0.0261**	0.0521	**0.334**	**25.1**	**0.0374**
W3	30-Jul-13	P		**2.91**	1108	1240	11.1	8.1	88	522.6	30.58	1.2	89.2	81.1	<0.50	590	370	1	584	1.5	0.0152	0.0927	**72**	<0.00050	0.00204	0.0247	0.00258	<0.0010	<0.050	**0.204**	20	**0.0618**	0.119	**0.627**	**56.2**	**0.0619**
W3	14-Aug-13	P	**2.73**	**2.85**	1290	1430	9.7	8.4	89	516.8	12.95	4.3	98.1	104	<0.50	675	439	<0.50	720	1.9	0.0107	0.158	**81.5**	<0.00050	0.00232	0.0158	0.00287	<0.0010	<0.050	**0.251**	22.6	**0.074**	0.141	**0.675**	**65.3**	**0.0314**
W3	17-Sep-13	P	**2.94**	**2.97**	979	1120	2	11.4	99	480.7	28.76	1.5	80.2	79.2	<0.50	486	245	0.68	530	1.4	<0.020	0.114	**57.7**	<0.00050	0.00187	0.0235	0.00217	<0.0010	<0.050	**0.157**	18.6	**0.0582**	0.107	**0.677**	**50.2**	**0.0642**
W3	3-Oct-13	P	**3.08**	**2.88**	1176	1360	1.2	11.5	97	479.8		22.3	115	111	<0.50	728	417	1.1	709	1.8	0.055	0.04	**80.3**	<0.00050	0.00252	0.0187	0.00313	<0.0010	<0.050	**0.236**	26.5	**0.0754**	0.144	**0.779**	**76.3**	**0.0428**
W3B	24-Jun-13	P	**2.86**	**3.13**	684.6	758	7.9	10.2	104	498.3	49.865	2.2	41.3	40.8	<0.50	316	163	0.75	284	0.76	<0.0050	0.087	**35**	<0.00050	0.00054	0.0317	0.00121	<0.0010	<0.050	**0.092**	9.52	**0.0345**	0.0656	**0.504**	**26.9**	**0.0054**
W3B	30-Jul-13	P		**2.9**	1502	1550	10.9	8	86	540.9	16.61	1.2	120	118	<0.50	901	588	0.67	864	2.3	0.0238	0.0713	**107**	<0.00050	0.00176	0.0067	0.00386	<0.0010	<0.050	**0.301**	27	**0.096**	0.176	**1.06**	**78.5**	**0.0115**
W3B	14-Aug-13	P	**2.63**	**2.86**	1570	1630	11.7	7.8	87	541	10.64	1.1	123	128	<0.50	910	593	<0.50	924	2.5	0.0156	0.0693	**113**	<0.00050	0.00184	0.0061	0.00389	<0.0010	<0.050	**0.344**	28.3	**0.103**	0.19	**1**	**80.5**	**0.0143**
W3B	17-Sep-13	P	**2.77**	**2.93**	1450	1510	0.1	11.7	98	487.9	15.43	<1.0	123	117	<0.50	859	496	<0.50	942	2.4	0.046	0.028	**99.6**	<0.00050	0.00223	0.0039	0.00359	<0.0010	<0.050	**0.272**	28.1	**0.105**	0.184	**1.25**	**85.7**	**0.0148**
W3B	3-Oct-13	P	**2.91**	**2.85**	1607	1740	0.3	11.4	95	491.5		14.1	162	155	<0.50	1090	629	<0.50	1020	2.8	0.049	<0.020	**123**	<0.00050	0.00299	0.0039	0.00471	<0.0010	<0.050	**0.375**	37	**0.117**	0.222	**1.33**	**110**	**0.0203**
W5	24-Jun-13	P	**4.13**	**3.4**	1662	1990	2.5	11.2	99	291.3	8.599	66.3	367	346	<0.50	1050	230	0.68	1360	1.8	<0.0050	<0.020	**78.2**	<0.0010	**0.112**	0.0076	0.0061	<0.0020	<0.10	**0.105**	75.5	**0.0609**	0.349	**0.414**	**331**	**0.193**
W5	24-Jun-13	QD		**3.31**		2040						75.4	369	349	<0.50	1090	241	0.6	1340	1.7	<0.0050	<0.020	**80.1**	<0.0010	**0.114**	0.0078	0.00595	<0.0020	<0.10	**0.108**	77.1	**0.0618**	0.355	**0.416**	**341**	**0.204**
W5	30-Jul-13	P		**3.29**	1808	1970	2.4	10	87	306.3	8.08	81.7	385	360	<0.50	990	262	<0.50	1300	3.8	0.0053	0.0022	**74.1**	0.00054	**0.113**	0.0075	0.006	<0.0010	<0.050	**0.0962**	80.4	**0.0466**	0.301	**0.323**	**322**	**0.186**
W5	30-Jul-13	QD		**3.18**		2000						75	388	361	<0.50	958	266	<0.50	1290	1.2	0.0084	<0.0020	**74.6**	0.00056	**0.113**	0.0078	0.00595	<0.0010	<0.050	**0.0969**	81.3	**0.0464**	0.303	**0.325**	**329**	**0.187**
W5	14-Aug-13	P	**4.32**	**3.17**	1799	1980	2.7	10.3	92	287.7	9.13	95.4	366	363	<0.50	979	174	<0.50	1300	1.7	0.002	0.0021	**65.7**	<0.0010	**0.0988**	0.0077	0.00554	<0.0020	<0.10	**0.0924**	75.7	**0.0418**	0.286	**0.288**	**310**	**0.178**
W5	14-Aug-13	QD		**3.15**		1990						94.3	370	377	<0.50	956	188	<0.50	1330	1.5	0.0028	0.0041	**67.1**	<0.0010	**0.101**	0.0073	0.00588	<0.0020	<0.10	**0.0935**	78.1	**0.0429**	0.295	**0.297**	**311**	**0.18**
W5	17-Sep-13	P	**4.32**	**3.87**	1599	1770	2.2	10.9	96	253.5	14.59	25.1	347	368	<0.50	844	94.3	0.72	1260	1.6	<0.0020	0.0045	**49.6**	0.00062	**0.0952**	0.0072	0.0048	<0.0010	<0.050	**0.0853**	71.6	**0.035**	0.281	**0.267**	**289**	**0.161**
W5	17-Sep-13	QD		**3.9**		1780						27.7	373	369	<0.50	841	82.2	<0.50	1240	1.3	<0.0020	0.0061	**55.1**	<0.0010	**0.0979**	0.007	0.00525	<0.0020	<0.10	**0.0919**	76.2	**0.0349**	0.279	**0.283**	**307**	**0.169**
W5	3-Oct-13	P	**4.28**	**3.61**	1617	1770	2.2	10.6	93	262.9	12.94	98.3	417	389	<0.50	905	97.8	<0.50	1220	1.6	<0.020	<0.020	**56.2**	<0.0010	**0.105**	0.0084	0.00563	<0.0020	<0.10	**0.0979**	87	**0.0337**	0.301	**0.254**	**327**	**0.178**
W5	3-Oct-13	QD		**3.64**		1780						103	403	385	<0.50	888	108	<0.50	1190	1.6	<0.020	<0.020	**53.9**	<0.0010	**0.101**	0.0088	0.00548	<0.0020	<0.10	**0.0943**	82.7	**0.0342**	0.295	**0.248**	**314**	**0.172**
W6	24-Jun-13	P	**3.02**	**3.02**	681.9	858	8.9	9.8	101	457.1	145.09	15.6	70.9	68.4	<0.50	322	169	1.8	354	0.65	0.0052	0.097	**31**	<0.00050	**0.00956**	0.0667	0.00139	<0.0010	<0.050	**0.0867**	16.3	**0.0304**	0.0811	**0.445**	**49**	**0.04**
W6	30-Jul-13	P		**2.85**	1244	1420	11.3	8.3	89	466.3	64.49	12.1	142	130	<0.50	629	385	<0.50	689	1.2	0.0261	0.0821	**68.2**	<0.00050	**0.0253**	0.0272	0.0028	<0.0010	<0.050	**0.175**	31.2	**0.0609**	0.146	**0.782**	**105**	**0.0547**
W6	30-Jul-13	QD		**2.85**		1420						14.9	152	134	<0.50	635	391	<0.50	824	1.5	0.0282	0.083	**67**	<0.00050	**0.025**	0.0272	0.00276	<0.0010	<0.050	**0.175**	36.3	**0.0611**	0.147	**0.774**	**124**	**0.0533**
W6	14-Aug-13	P	**2.84**	**2.81**	1500	1680	7.2	9	89	458	49.15	42.7	174	172	<0.50	834	411	2.7	931	1.4	0.019	0.0826	**83.5**	<0.00050	**0.0334**	0.0136	0.00345	<0.0010	<0.050	**0.217**	38.9	**0.0868**	0.19	**0.986**	**145**	**0.0538**
W6	14-Aug-13	QD		**2.78**		1710						46.6	178	166	<0.50	850	462	1.8	894	1.6	0.0194	0.0807	**84.1**	<0.00050	**0.0333**	0.0136	0.00349	<0.0010	<0.050	**0.217**	38.6	**0.0833**	0.194	**1.01**	**147**	**0.0535**
W6	17-Sep-13	P	**3.02**	**3.08**	1095	1200	2.7	11.2	99	424.1	89.92	8.6	128	128	<0.50	609	264	<0.50	649	0.89	0.039	0.106	**53.4**	<0.00050	**0.022**	0.0265	0.00229	<0.0010	<0.050	**0.138**	28.8	**0.0614**	0.136	**0.816**	**103**	**0.0452**
W6	17-Sep-13	QD		**3.03**		1240						10	132	124	<0.50	590	261	1.2	651	1.3	<0.020	0.144	**55.7**	<0.00050	**0.0216**	0.0271	0.00239	<0.0010	<0.050	**0.143**	29.7	**0.0617**	0.133	**0.84**	**104**	**0.0459**
W6	3-Oct-13	P	**3.07**	**2.96**	1329	1510	1.8	11.5	98	423.9		56.6	176	171	<0.50	784	315	0.55	837	1.6	<0.020	0.118	**76.3**	<0.0010	**0.0338**	0.0179	0.00333	<0.0020	<0.10	**0.194**	38.5	**0.0806**	0.179	**1.07**	**146**	**0.0497**
W8	24-Jun-13	P	**2.96**	**2.95**	963	1160	5.9	10.9	102	446.4		19	80.7	77.8	<0.50	569	304	1.7	543	0.88	0.0135	0.098	**57.3**	<0.00050	**0.0116**	0.043	0.00189	<0.0010	<0.050	**0.38**	16	**0.0604**	0.127	**0.295**	**92.8**	**0.0293**
W8	30-Jul-13	P		**2.79**	1526	1720	10.8	8.5	88	467.6	112	19.8	147	140	<0.50	941	622	<0.50	959	2.1	0.0387	0.0742	**106**	<0.00050	**0.0243**	0.0185	0.00335	<0.0010	<0.050	**0.649**	28.8	**0.1**	0.205	**0.463**	**169**	**0.0372**
W8	14-Aug-13	P	**2.82**	**2.77**	1793	1990	6.6	9.5	90	461.6	94.02	24.3	182	167	<0.50	1180	716	1.8	1190	2.4	0.0306	0.0613	**134**	<0.00050	**0.0328**	0.0104	0.00404	<0.0010	<0.050	**0.834**	34.5	**0.141**	0.276	**0.6**	**223**	**0.033**
W8	17-Sep-13	P	**3.02**	**2.92**	1364	1570	3.4	11.5	100	426.3	182.4	24.6	131	130	<0.50	842	401	2.3	926	1.3	0.051	0.078	**87.3**	<0.00050	**0.0201**	0.0183	0.00287	<0.0010	<0.050	**0.535**	26.3	**0.0944**	0.182	**0.473**	**155**	**0.0316**
W8	3-Oct-13	P	**3.07**	**2.84**	1607	1850	2.4	11.6	98	429.7	134.9	82.3	170	166	<0.50	1080	537	1.1	1110	2	0.057	0.04	**118**	<0.0010	**0.0295**	0.013	0.0037	<0.0020	<0.10	**0.767**	31.8	**0.122**	0.248	**0.601**	**200**	**0.0332**
W8	3-Oct-13	QD		**2.84**		1850						68.3	170	162	<0.50	1090	540	0.99	1140	1.6	0.05	0.037	**119**	<0.0010	**0.0285**	0.0125	0.00394	<0.0020	<0.10	**0.747**	32.6	**0.118**	0.239	**0.574**	**208**	**0.0322**
W11	24-Jun-13	P	**5.55**	**5.77**	214.1	247	6	10.7	100	221.6	6844.42	18	106	105	1.32	13.7	<0.50	0.89	116	0.021	<0.0050	0.055	**3.45**	<0.00050	0.00076	0.0291	0.00026	<0.0010	<0.050	**0.011**	24.8	<0.0010	0.0172	**0.0433**	**1.7**	<0.00020
W11	30-Jul-13	P		**5.09**	345.5	363	9.9	8.4	85	284.2	1972	26	179	160	<0.50	12.7	<0.50	<0.50	168	0.033	<0.0020	0.05	**6.32**	<0.00050	0.00075	0.0359	0.00044	<0.0010	<0.050	**0.0234**	40.9	**0.0018**	0.028	**0.0573**	**2.78**	<0.00020
W11	14-Aug-13	P	**5.36**	**4.9**	370	391	11.1	7.9	83	213.5	1760	27.3	187	166	<0.50	10.5	<0.50	0.53	171	0.34	<0.0020	0.0557	**6.87**	<0.00050	0.00078	0.0379	0.00044	<0.0010	<0.050	**0.0261**	43	**0.0021**	0.0315	**0.0635**	**3.39**	<0.00020
W11	17-Sep-13	P	**5.47**	**5.36**	340.9	371	3.3	10.9	94	220.5	3042	27.6	170	169	0.54	17.3	<0.50	<0.50	180	0.035	<0.0020	0.0659	**6.22**	<0.00050	0.00067	0.0334	0.0004	<0.0010	<0.050	**0.0205**	39.1	**0.002**	0.0281	**0.0634**	**2.99**	<0.00020
W11	3-Oct-13	P	**5.22**	**5.53**	363.2	388	2.7	11	94	259.2	2230	31.7	186	182	0.84	15.1	<0.50	0.61	178	0.05	<0.020	0.052	**7.5**	<0.00050	0.00084	0.0361	0.00042	<0.0010	<0.050	**0.0255**	42.6	**0.0023**	0.0308	**0.067**	**3.79**	<0.00020
W12	24-Jun-13	P	**4.74**	**4.61**	247.5	285	10.5	9.6	99	309.9	7394.99	21.6	115	108	<0.50	32.3	<0.50	<0.50	139	0.062	<0.0050	0.057	**5.5**	<0.00050	0.00126	0.0342	0.00029	<0.0010	<0.050	**0.0231**	26.4	**0.0027**	0.0218	**0.0525**	**4.92**	0.00141
W12	30-Jul-13	P		**4.18**	445.3	452	9.8	9.3	84	419.7	2358	25.4	175	157	<0.50	68	3.98	<0.50	231	0.11	<0.0020	0.0499	**12.5**	<0.00050	0.00201	0.0331	0.00054	<0.0010	<0.050	**0.0578**	40	**0.0081**	0.0371	**0.0764**	**12.5**	0.00207
W12	14-Aug-13	P	**3.76**	**4.11**	489.9	488	11	7.9	83	425.1	1992	30.6	168	177	<0.50	81.9	9.24	<0.50	230	0.14	<0.0020	0.0542	**13**	<0.00050	0.00205	0.0327	0.00064	<0.0010	<0.050	**0.0642**	38.3	**0.008**	0.0391	**0.0768**	**13.5**	0.00183
W12	17-Sep-13	P	**4.1**	**4.41**	413	446	2.9	10.9	94	365.7	3573	26.8	168	166	<0.50	76.3	<0.50	<0.50	230	0.096	<0.0020	0.0696	**11.6**	<0.00050	0.00156	0.0323	0.00056	<0.0010	<0.050	**0.0498**	38.1	**0.0071**	0.0358	**0.0856**	**11.9**	0.00187
W12	3-Oct-13	P	**4.06**	**4.26**	462.8	483	2.6	10.7	91	379.2	2537	35.8	192	181	<0.50	77.5	<0.50	0.55	255	0.2	<0.020	0.065	**13.8**	<0.00050	0.00238	0.0334	0.00066	<0.0010	<0.050	**0.0652**	43.2	**0.0091**	0.0439	**0.0944**	**16.1**	0.00194
W13	24-Jun-13	P	**4.97**	**4.68**	208.8	241	11.4	9.9	104	277.4		20.1	99.5	92.7	<0.50	24.5	<0.50	0.72	112	0.049	<0.0050	0.048	**4.52**	<0.00050	0.0011	0.0384	0.00026	<0.0010	<0.050	**0.0177**	23.9	**0.0018**	0.0169	**0.034**	**3.87**	0.00084
W13	30-Jul-13	P		**4.43**	337.8	353	8.7	9	88	347.4	8443	18.9	141	122	<0.50	44.6	<0.50	0.79	170	0.093	<0.0020	0.0391	**9.07**	<0.00050	0.0019	0.0393	0.0005	<0.0010	<0.050	**0.039**	33	**0.0041**	0.0269	**0.0484**	**7.23**	0.00113
W13	14-Aug-13	P	**4.53**	**4.36**	361.1	385	11.5	8.5	90	340.6	3717	19.9	134	134	<0.50	57.1	4.95	<0.50	179	0.096	<0.0020	0.0528	**9.35**	<0.00050	0.00183	0.0359	0.00043	<0.0010	<0.050	**0.0411**	31.8	**0.0042**	0.0283	**0.0478**	**7.06**	0.00088
W13	17-Sep-13	P	**5.02**	**4.53**	323.8	357	2.6	11.4	97	252.3	6273	24	138	135	<0.50	47.1	<0.50	<0.50	176	0.069	<0.0020	0.0611	**7.77**	<0.00050	0.00129	0.0375	0.00039	<0.0010	<0.050	**0.0321**	32.6	**0.0043**	0.0255	**0.0544**	**7.49**	0.00112
W13	3-Oct-13	P	**5.42**	**4.32**	366.7	400	2.3	11.9	99	264.9		25.7	164	152	<0.50	49.7	<0.50	0.51	193	0.14	<0.020	0.037	**10.5**	<0.00050	0.00155	0.0424	0.00047	<0.0010	<0.050	**0.0443**	38.7	**0.0054**	0.0314	**0.061**	**10.3**	0.00108
T5	24-Jun-13	P	**2.73**	**2.98**	1040	1120	6.4	10.6	102	491.3	16.169	1.1	46.2	45.6	<0.50	591	328	1.1	530	1	0.0103	0.188	**58**	<0.00050	0.0025	0.0186	0.00179	<0.0010	<0.050	**0.783**	6.68	**0.0816**	0.124	**0.0848**	**75**	<0.00020
T5	30-Jul-13	P		**2.8**	1713	1770	9.8	8.7	89	509.6	5.05	<1.0	93.5	88.1	<0.50	1150	766	<0.50	1010	2.7	0.0467	0.165	**122**	<0.00050	**0.00602**	0.0103	0.00357	<0.0010	<0.050	**1.52**	13.6	**0.15**	0.216	**0.145**	**152**	<0.00020
T5	14-Aug-13	P	**2.47**	**2.78**	1976	1930	5.5	9.6	89	507.2	8.13	<1.0	97.6	105	<0.50	1370	827	0.77	1240	2	0.0431	0.15	**138**	<0.00050	**0.00743**	0.0069	0.00426	<0.0010	<0.050	**1.77**	13.9	**0.176**	0.25	**0.163**	**171**	<0.00020
T5	17-Sep-13	P	**2.77**	**2.87**	1869	1970	2.2	11.2	96	449.3	7.27	<1.0	119	120	<0.50	1490	867	0.5	1480	2.2	0.0416	0.155	**142**	<0.00050	**0.0136**	0.0078	0.00419	<0.0010	<0.050	**1.57**	18	**0.211**	0.274	**0.183**	**226**	0.0004
T5	3-Oct-13	P	**2.76**	**2.81**	2461	2570	1.7	11.1	94	448.4		48.8	193	179	<0.50	1940	1090	<0.50	1900	3.4	**0.096**	0.058	**230**	<0.0020	**0.0264**	0.0042	0.00673	<0.0040	<0.20	**2.52**	29.9	**0.32**	0.429	**0.269**	**361**	<0.00080
S2	24-Jun-13	P	**2.97**	**2.96**	854	1050	7.8	10.4	102	446.9	244.655	27.7	76.4	72.3	<0.50	460	244	1.8	448	0.75	0.0089	0.092	**47.4**	<0.00050	**0.0127**	0.053	0.00173	<0.0010	<0.050	**0.262**	15.7	**0.0509**	0.109	**0.34**	**76**	**0.0358**
S2	30-Jul-13	P		**2.82**	1387	1570	11.2	8.4	89	463.6	127.6	26.5	135	122	<0.50	798	512	<0.50	852	2.1	0.0346	0.0728	**87.6**	<0.00050	**0.0266**	0.0246	0.00305	<0.0010	<0.050	**0.473**	26.6	**0.085**	0.172	**0.52**	**132**	**0.0429**
S2	14-Aug-13	P	**2.85**	**2.8**	1648	1830	6.5	9.4	90	455.5	96.36	28.7	162	162	<0.50	989	587	1.6	1080	1.8	0.0203	0.0737	**105**	<0.00050	**0.0332**	0.0113	0.00348	<0.0010	<0.050	**0.607**	32.5	**0.11**	0.218	**0.643**	**177**	**0.041**
S2	17-Sep-13	P	**3.01**	**3.04**	1130	1350	3.1	11.1	98	423.6	136.8	16	116	118	<0.50	776	376	<0.50	802	1.2	0.044	0.1	**70.4**	<0.00050	**0.0214**	0.0204	0.00236	<0.0010	<0.050	**0.393**	23.7	**0.0753**	0.154	**0.524**	**118**	**0.037**
S2	3-Oct-13	P	**3.05**	**2.92**	1428	1620	2.2	11.6	98	425.9		61.3	155	151	<0.50	875	410	<0.50	945	1.7	0.035	0.048	**93.6**	<0.0010	**0.0318**	0.0151	0.00344	<0.0020	<0.10	**0.546**	31.5	**0.1**	0.197	**0.668**	**165**	**0.0391**
T4	24-Jun-13	P	**3.76**	**3.99**	86.4	89.6	5.1	10.9	102	482.2	2.3735	<1.0	3.09	3.18	<0.50	28.2	5.7	<0.50	25.5	0.021	<0.0050	0.04	**3.44**	<0.00050	0.00014	0.0932	0.00022	<0.0010	<0.050	**0.00223**	0.669	<0.0010	0.00541	**0.0491**	0.227	**0.0407**
T4	30-Jul-13	P									0																									
T4	14-Aug-13	P									0																									
T4	17-Sep-13	P									0																									
FB	24-Jun-13	QFB		**5.31**		1						<1.0	<0.50	<0.50	0.89	<0.50	<0.50	0.73	<0.50	0.014	<0.0050	<0.020	**0.012**	<0.00050	<0.00010	<0.0010	<0.00010	<0.0010	<0.050	**<0.000010**	<0.050	<0.0010	<0.00050	<0.00020	<0.0050	<0.00020
FB	30-Jul-13	QFB		**5.09**		2.2						<1.0	2.16	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.015	<0.0020	<0.0020	**0.0061**	<0.00050	<0.00010	<0.0010	<0.00010	<0.0010	<0.050	**<0.000010**	0.866	<0.0010	<0.00050	<0.00020	0.0243	<0.00020
FB	14-Aug-13	QFB		**5.44**		1.6						<1.0	<0.50	<0.50	0.96	<0.50	<0.50	<0.50	1.08	0.034	<0.0020	<0.0020	<0.0030	<0.00050	<0.00010	<0.0010	<0.00010	<0.0010	<0.050	**<0.000010**	<0.050	<0.0010	<0.00050	<0.00020	<0.0050	<0.00020
FB	17-Sep-13	QFB		**4.74**		6.1						<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.46	0.013	<0.0020	<0.0020	**0.013**	<0.00050	<0.00010	<0.0010	<0.00010	<0.0010	<0.050	**0.000014**	<0.050	<0.0010	<0.00050	0.00084	**0.561**	<0.00020
FB	3-Oct-13	QFB		**4.59**		11.6						<1.0	<0.50	<0.50	<0.50	0.75	<0.50	<0.50	<0.50	0.011	<0.0020	<0.0020	**0.0346**	<0.00050	<0.00010	<0.0010	<0.00010	<0.0010	<0.050	**0.00012**	0.106	<0.0010	<0.00050	0.00071	0.0727	<0.00020
TB	30-Jul-13	QTB		**4.82**		1.3						<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.0195	<0.0020	<0.0020	<0.0030	<0.00050	<0.00010	<0.0010	<0.00010	<0.0010	<0.050	**<0.000010**	<0.050	<0.0010	<0.00050	<0.00020	<0.0050	<0.00020
TB	17-Aug-13	QTB		**5.09**

Appendix B1. 2013 Surface Water Monitoring Results for QZ13-034

	Sample Date	Sample Class	Li-T	Mg-T	Mn-T	Hg-T	Mo-T	Ni-T	P-T	K-T	Se-T	Si-T	Ag-T	Na-T	Sr-T	S-T	Tl-T	Sn-T	Ti-T	U-T	V-T	Zn-T	Zr-T	Al-D	Sb-D	As-D	Ba-D	Be-D	Bi-D	B-D	Cd-D	Ca-D	Cr-D	Co-D	Cu-D	Fe-D
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CCME-AL						**0.00003**	**0.073**	*			**0.001**		**0.0001**				**0.0008**			**0.015**		**0.03**				**0.005**											
CCME-AL-DM																								*		**0.005**				**1.5**	*		**0.001**		*	**0.3**
QZ13-034 EQS								**2.6**														**12.6**				**1**										
W2	24-Jun-13	P	0.0073	2.95	0.277	<0.000010	<0.0010	**0.393**	0.415	2	**0.00229**	3.46	0.000041	0.174	0.0362	71.8	**0.00124**	<0.0050	<0.0050	0.0105	0.122	**1.85**	<0.00050	**19.9**	<0.00050	**0.00605**	0.0901	0.00073	<0.0010	<0.050	**0.0627**	8.57	**0.0202**	0.0422	**0.384**	**28.4**
W2	24-Jun-13	QD	0.0076	3.1	0.284	<0.000010	<0.0010	**0.407**	0.415	2.07	**0.00252**	3.67	0.000055	0.169	0.0373	74.6	**0.00122**	<0.0050	<0.0050	0.011	0.125	**1.9**	<0.00050	**19.8**	<0.00050	**0.00618**	0.0929	0.00073	<0.0010	<0.050	**0.0628**	8.54	**0.0207**	0.043	**0.384**	**28.2**
W2	30-Jul-13	P	0.0221	9.08	0.713	<0.000010	0.0016	**1.05**	1.55	5.25	**0.00389**	8.88	<0.000020	0.303	0.0803	224	**0.0033**	<0.0050	<0.0050	**0.0336**	0.37	**5.3**	<0.00050	**59.8**	<0.00050	**0.0197**	0.039	0.00197	<0.0010	<0.050	**0.18**	19.5	**0.0716**	0.121	**1.12**	**84.9**
W2	14-Aug-13	P	0.0275	11.8	0.93	<0.000010	0.0027	**1.57**	2.39	6.91	**0.00411**	10.4	0.000023	0.326	0.108	299	**0.00468**	<0.0050	<0.0050	**0.0524**	0.56	**7.7**	<0.00050	**86**	<0.00050	**0.0309**	0.0185	0.00277	<0.0010	<0.050	**0.263**	25.7	**0.118**	0.173	**1.72**	**141**
W2	17-Sep-13	P	0.0168	6.84	0.571	<0.000010	0.0012	**0.849**	1.17	3.74	**0.00386**	6.56	0.000022	0.29	0.0664	169	**0.00252**	<0.0050	<0.0050	**0.0286**	0.307	**4.24**	<0.00050	**54.3**	<0.00050	**0.0161**	0.042	0.00175	<0.0010	<0.050	**0.145**	18.3	**0.0693**	0.103	**1.08**	**80.4**
W2	3-Oct-13	P	0.0221	10	0.811	<0.000010	0.0022	**1.32**	1.98	5.74	**0.00505**	10.2	<0.000020	0.271	0.0927	269	**0.00352**	<0.0050	<0.0050	**0.0464**	0.478	**6.55**	<0.00050	**76.7**	<0.00050	**0.025**	0.023	0.00245	<0.0010	<0.050	**0.214**	22.4	**0.102**	0.147	**1.55**	**116**
W3	24-Jun-13	P	0.0117	3.64	0.366	<0.000010	<0.0010	**0.472**	0.052	1.58	**0.00269**	3.87	**0.000151**	0.192	0.0357	89.8	**0.00116**	<0.0050	<0.0050	0.0087	0.0409	**2.81**	<0.00050	**29.3**	<0.00050	0.00124	0.0387	0.00113	<0.0010	<0.050	**0.0766**	8.35	**0.0239**	0.0482	**0.312**	**23.5**
W3	30-Jul-13	P	0.0292	9.54	0.872	<0.000010	<0.0010	**1.09**	0.123	3.81	**0.00384**	8.41	0.000069	0.424	0.0669	240	**0.00252**	<0.0050	<0.0050	**0.0204**	0.0795	**7.35**	<0.00050	**66.1**	<0.00050	0.00201	0.0234	0.00225	<0.0010	<0.050	**0.191**	18.2	**0.0605**	0.119	**0.624**	**52.3**
W3	14-Aug-13	P	0.029	10.1	0.94	<0.000010	<0.0010	**1.3**	0.131	4.35	**0.00308**	8.2	0.00008	0.395	0.0676	268	**0.00278**	<0.0050	<0.0050	**0.0229**	0.109	**8.64**	<0.00050	**81.7**	<0.00050	0.00236	0.0154	0.0028	<0.0010	<0.050	**0.253**	23.8	**0.0758**	0.145	**0.71**	**70.7**
W3	17-Sep-13	P	0.0251	8.22	0.878	<0.000010	<0.0010	**0.983**	0.121	3.55	**0.00368**	6.92	0.000089	0.417	0.0661	198	**0.00224**	<0.0050	<0.0050	**0.0179**	0.0833	**5.99**	<0.00050	**59.7**	<0.00050	0.00206	0.0237	0.00242	<0.0010	<0.050	**0.164**	17.6	**0.0557**	0.101	**0.688**	**48.7**
W3	3-Oct-13	P	0.0331	11.7	1.18	<0.000010	<0.0010	**1.28**	0.179	4.75	**0.00309**	9.46	0.000046	0.388	0.0869	288	**0.00292**	<0.0050	<0.0050	**0.023**	0.128	**8.07**	<0.00050	**82.5**	<0.00050	0.00276	0.02	0.00313	<0.0010	<0.050	**0.243**	24.8	**0.078**	0.149	**0.813**	**74.1**
W3B	24-Jun-13	P	0.0145	4.25	0.418	<0.000010	<0.0010	**0.613**	0.043	1.73	**0.00328**	4.19	**0.000165**	0.194	0.0369	112	**0.0012**	<0.0050	<0.0050	0.0118	0.031	**3.45**	<0.00050	**36.1**	<0.00050	0.00058	0.0257	0.00138	<0.0010	<0.050	**0.0923**	9.31	**0.0328**	0.0609	**0.459**	**25.2**
W3B	30-Jul-13	P	0.0457	12.7	1.14	<0.000010	<0.0010	**1.64**	0.161	5.05	**0.00618**	10.3	**0.00011**	0.416	0.0773	344	**0.00317**	<0.0050	<0.0050	**0.03**	0.0969	**10.8**	<0.00050	**107**	<0.00050	0.00173	0.0062	0.00376	<0.0010	<0.050	**0.3**	26.7	**0.0964**	0.179	**1.03**	**77.4**
W3B	14-Aug-13	P	0.038	12.8	1.14	<0.000010	<0.0010	**1.75**	0.142	5.26	**0.00436**	9.88	**0.000126**	0.399	0.0708	343	**0.00318**	<0.0050	<0.0050	**0.0311**	0.113	**11.8**	<0.00050	**109**	<0.00050	0.00176	0.0059	0.00378	<0.0010	<0.050	**0.344**	29.1	**0.101**	0.188	**1.06**	**80**
W3B	17-Sep-13	P	0.0439	12.8	1.37	<0.000010	<0.0010	**1.73**	0.193	5.48	**0.00606**	9.16	**0.000108**	0.485	0.0808	325	**0.00338**	<0.0050	<0.0050	**0.031**	0.143	**10.2**	<0.00050	**110**	<0.00050	0.00233	0.004	0.00396	<0.0010	<0.050	**0.287**	26	**0.102**	0.181	**1.19**	**75.3**
W3B	3-Oct-13	P	0.0518	16.9	1.63	<0.000010	<0.0010	**1.98**	0.269	7.03	**0.00427**	11.5	0.000074	0.416	0.0969	416	**0.00394**	<0.0050	<0.0050	**0.0366**	0.18	**12.9**	<0.00050	**124**	<0.00050	0.00304	0.0034	0.00479	<0.0010	<0.050	**0.372**	34.2	**0.126**	0.224	**1.34**	**108**
W5	24-Jun-13	P	0.059	43.3	11.5	<0.000010	<0.0020	**2.05**	0.465	8.01	<0.00020	5.73	<0.000040	0.48	0.305	476	**0.00361**	<0.010	<0.010	0.0104	0.347	**22.9**	<0.0010	**83.2**	<0.00050	**0.0945**	0.0074	0.00655	<0.0010	<0.050	**0.102**	73.6	**0.0521**	0.31	**0.376**	**313**
W5	24-Jun-13	QD	0.063	43	11.7	<0.000010	<0.0020	**2.1**	0.468	8.14	<0.00020	5.84	<0.000040	0.48	0.316	472	**0.004**	<0.010	<0.010	0.0108	0.349	**22.8**	<0.0010	**83**	<0.00050	**0.0952**	0.0075	0.00655	<0.0010	<0.050	**0.103**	74.4	**0.0555**	0.323	**0.374**	**311**
W5	30-Jul-13	P	0.0602	44.8	11.8	<0.000010	<0.0010	**1.72**	0.38	7.81	0.00031	6.48	0.00002	0.443	0.312	486	**0.00327**	<0.0050	<0.0050	0.0094	0.283	**19.7**	<0.00050	**72.9**	<0.00050	**0.0955**	0.0073	0.00583	<0.0010	<0.050	**0.0928**	75.7	**0.044**	0.307	**0.326**	**306**
W5	30-Jul-13	QD	0.0597	44.8	11.9	<0.000010	<0.0010	**1.72**	0.374	7.78	0.00037	6.54	<0.000020	0.463	0.316	483	**0.0034**	<0.0050	<0.0050	0.00947	0.284	**19.5**	<0.00050	**71.4**	<0.00050	**0.0961**	0.0073	0.00582	<0.0010	<0.050	**0.0927**	74.5	**0.0442**	0.308	**0.331**	**306**
W5	14-Aug-13	P	0.045	42.9	11.6	<0.000010	<0.0020	**1.63**	0.292	6.85	<0.00020	5.78	<0.000040	0.38	0.311	437	**0.00304**	<0.010	<0.010	0.00818	0.253	**20.2**	<0.0010	**61.4**	<0.0010	**0.0932**	0.0071	0.0051	<0.0020	<0.10	**0.091**	75.9	**0.0387**	0.281	**0.289**	**304**
W5	14-Aug-13	QD	0.047	42.5	11.8	<0.000010	<0.0020	**1.69**	0.32	6.9	<0.00020	5.8	<0.000040	0.48	0.304	446	**0.00318**	<0.010	<0.010	0.00817	0.254	**21**	<0.0010	**64.8**	<0.0010	**0.0971**	0.0075	0.00554	<0.0020	<0.10	**0.0927**	78.3	**0.04**	0.297	**0.303**	**309**
W5	17-Sep-13	P	0.0466	40.8	12.5	<0.000010	<0.0010	**1.53**	0.257	6.04	0.00015	4.69	0.000034	0.367	0.295	381	**0.00287**	<0.0050	<0.0050	0.00767	0.215	**21.9**	<0.00050	**57.9**	<0.0010	**0.091**	0.0078	0.00534	<0.0020	<0.10	**0.0938**	75.3	**0.0333**	0.297	**0.288**	**296**
W5	17-Sep-13	QD	0.049	44.4	12.9	<0.000010	<0.0020	**1.53**	0.266	6.26	<0.00020	4.77	<0.000040	0.44	0.313	376	**0.00304**	<0.010	<0.010	0.00795	0.223	**25**	<0.0010	**53.7**	<0.0010	**0.0943**	0.0078	0.00575	<0.0020	<0.10	**0.0934**	74	**0.0348**	0.306	**0.286**	**296**
W5	3-Oct-13	P	0.046	48.4	14	<0.000010	<0.0020	**1.63**	0.27	6.65	0.0002	6.36	<0.000040	0.35	0.336	435	**0.00322**	<0.010	<0.010	0.00776	0.214	**25.4**	<0.0010	**54.1**	<0.0010	**0.0989**	0.0081	0.0054	<0.0020	<0.10	**0.0961**	79.6	**0.0312**	0.304	**0.253**	**307**
W5	3-Oct-13	QD	0.044	47.7	13.5	<0.000010	<0.0020	**1.59**	0.267	6.46	<0.00020	6.06	<0.000040	0.4	0.338	444	**0.00299**	<0.010	<0.010	0.00744	0.211	**24.4**	<0.0010	**51.8**	<0.0010	**0.0963**	0.0078	0.00579	<0.0020	<0.10	**0.0967**	77.8	**0.0304**	0.295	**0.252**	**306**
W6	24-Jun-13	P	0.0147	7.34	1.31	<0.000010	<0.0010	**0.636**	0.267	2.3	**0.00252**	4.36	0.000091	0.239	0.0661	126	**0.00153**	<0.0050	<0.0050	0.0122	0.0941	**5.08**	<0.00050	**30.7**	<0.00050	**0.00828**	0.0596	0.00137	<0.0010	<0.050	**0.0833**	15.7	**0.0275**	0.0729	**0.396**	**44.3**
W6	30-Jul-13	P	0.0305	15.6	2.69	<0.000010	0.001	**1.15**	0.739	4.85	**0.00329**	8.34	0.000036	0.37	0.124	273	**0.00286**	<0.0050	<0.0050	**0.0255**	0.206	**9.02**	<0.00050	**64.9**	<0.00050	**0.0219**	0.0254	0.00262	<0.0010	<0.050	**0.166**	28.2	**0.0597**	0.149	**0.794**	**95.9**
W6	30-Jul-13	QD	0.0304	14.9	2.71	<0.000010	<0.0010	**1.17**	0.738	4.78	**0.00382**	9.85	0.000032	0.364	0.119	269	**0.0028**	<0.0050	<0.0050	**0.025**	0.208	**9.07**	<0.00050	**65.7**	<0.00050	**0.0226**	0.0259	0.00263	<0.0010	<0.050	**0.169**	29.3	**0.0622**	0.15	**0.793**	**102**
W6	14-Aug-13	P	0.0341	18.7	3.49	<0.000010	0.0093	**1.55**	1.04	5.59	**0.00334**	9.41	0.000044	0.334	0.141	329	**0.0035**	<0.0050	<0.0050	**0.0322**	0.299	**12.1**	<0.00050	**80.1**	<0.00050	**0.0318**	0.0133	0.00343	<0.0010	<0.050	**0.216**	36.2	**0.0828**	0.189	**1.1**	**145**
W6	14-Aug-13	QD	0.0337	19.9	3.51	<0.000010	0.0011	**1.54**	1.04	5.73	**0.00314**	9.1	0.000043	0.373	0.146	334	**0.00345**	<0.0050	<0.0050	**0.0321**	0.304	**11.7**	<0.00050	**77.6**	<0.00050	**0.0312**	0.0126	0.00321	<0.0010	<0.050	**0.212**	35.9	**0.081**	0.183	**1.02**	**139**
W6	17-Sep-13	P	0.0254	13.7	2.8	<0.000010	<0.0010	**1.06**	0.648	3.99	**0.00361**	7.07	0.000066	0.366	0.111	229	**0.00255**	<0.0050	<0.0050	**0.0236**	0.215	**8.51**	<0.00050	**55.2**	<0.00050	**0.0208**	0.028	0.00248	<0.0010	<0.050	**0.148**	28.5	**0.0589**	0.132	**0.819**	**96.9**
W6	17-Sep-13	QD	0.0259	14.1	2.76	<0.000010	<0.0010	**1.06**	0.627	4.01	**0.00354**	7.27	0.000074	0.382	0.114	222	**0.00248**	<0.0050	<0.0050	**0.0241**	0.216	**8.94**	<0.00050	**56.5**	<0.00050	**0.0207**	0.0277	0.00258	<0.0010	<0.050	**0.144**	26.9	**0.0582**	0.131	**0.829**	**96.8**
W6	3-Oct-13	P	0.033	19.4	3.76	<0.000010	<0.0020	**1.4**	1.09	5.29	**0.00393**	9.27	<0.000040	0.31	0.143	327	**0.00328**	<0.010	<0.010	**0.033**	0.32	**12**	<0.0010	**76.2**	<0.00050	**0.0322**	0.0169	0.00339	<0.0010	<0.050	**0.193**	37.1	**0.0818**	0.179	**1.11**	**145**
W8	24-Jun-13	P	0.0243	9.91	1.18	<0.000010	<0.0010	**1.08**	0.623	2.8	**0.0054**	5.83	0.000089	0.301	0.0709	208	**0.00178**	<0.0050	<0.0050	0.0134	0.244	**8.36**	<0.00050	**57.7**	<0.00050	**0.0105**	0.0378	0.00196	<0.0010	<0.050	**0.353**	15.4	**0.0552**	0.116	**0.274**	**84.6**
W8	30-Jul-13	P	0.0463	18.3	2.11	<0.000010	<0.0010	**1.78**	1.33	5.05	**0.00644**	10.4	0.000031	0.467	0.116	391	**0.00304**	<0.0050	<0.0050	**0.0235**	0.425	**13.1**	<0.00050	**103**	<0.00050	**0.0222**	0.0182	0.00318	<0.0010	<0.050	**0.632**	26.1	**0.102**	0.21	**0.472**	**157**
W8	14-Aug-13	P	0.056	23.4	3.13	<0.000010	<0.0010	**2.57**	1.78	5.75	**0.00761**	11.1	0.000048	0.441	0.144	496	**0.00384**	<0.0050	<0.0050	**0.0273**	0.596	**18.7**	<0.00050	**123**	<0.00050	**0.0281**	0.01	0.00371	<0.0010	<0.050	**0.819**	30.7	**0.125**	0.243	**0.556**	**199**
W8	17-Sep-13	P	0.0378	15.9	2.07	<0.000010	<0.0010	**1.63**	1.04	4.2	**0.00576**	8.83	0.000074	0.42	0.106	316	**0.00263**	<0.0050	<0.0050	**0.0206**	0.406	**12.2**	<0.00050	**89.3**	<0.00050	**0.0206**	0.0193	0.00286	<0.0010	<0.050	**0.569**	24.6	**0.0946**	0.192	**0.491**	**148**
W8	3-Oct-13	P	0.043	22	2.76	<0.000010	<0.0020	**2.15**	1.67	5.66	**0.00739**	10.8	<0.000040	0.44	0.131	451	**0.00315**	<0.010	<0.010	**0.0267**	0.57	**17.2**	<0.0010	**116**	<0.00050	**0.0285**	0.0124	0.00368	<0.0010	<0.050	**0.772**	31.7	**0.127**	0.242	**0.59**	**208**
W8	3-Oct-13	QD	0.047	21.5	2.69	<0.000010	<0.0020	**2.07**	1.58	5.35	**0.00697**	11.3	<0.000040	0.47	0.128	426	**0.00315**	<0.010	<0.010	**0.0262**	0.549	**16.6**	<0.0010	**118**	<0.00050	**0.0294**	0.0123	0.00378	<0.0010	<0.050	**0.747**	31.2	**0.121**	0.253	**0.578**	**198**
W11	24-Jun-13	P	0.0102	10.7	0.295	<0.000010	<0.0010	**0.143**	0.025	0.54	**0.00157**	2.28	<0.000020	0.172	0.0902	34.4	0.000096	<0.0050	<0.0050	0.00153	<0.0050	**0.511**	<0.00050	**0.514**	<0.00050	0.00012	0.029	0.00017	<0.0010	<0.050	**0.0113**	25	<0.0010	0.0162	**0.0344**	**0.635**
W11	30-Jul-13	P	0.0182	18.8	0.496	<0.000010	<0.0010	**0.236**	0.027	0.889	**0.00181**	4.38	<0.000020	0.373	0.145	63.7	0.000191	<0.0050	<0.0050	0.00272	<0.0050	**0.897**	<0.00050	**1.19**	<0.00050	0.00013	0.0335	0.00026	<0.0010	<0.050	**0.0222**	36.9	<0.0010	0.0269	**0.0503**	0.263
W11	14-Aug-13	P	0.0196	19.4	0.538	<0.000010	<0.0010	**0.27**	0.034	0.892	**0.00166**	4.6	0.000025	0.291	0.156	66.8	0.000226	<0.0050	<0.0050	0.00283	<0.0050	**1**	<0.00050	**1.36**	<0.00050	0.00016	0.0335	0.00027	<0.0010	<0.050	**0.024**	38.3	<0.0010	0.0287	**0.0517**	0.174
W11	17-Sep-13	P	0.0157	17.7	0.486	<0.000010	0.001	**0.225**	0.034	0.764	**0.00171**	3.42	0.000024	0.322	0.136	59.9	0.000161	<0.0050	<0.0050	0.00259	<0.0050	**0.815**	<0.00050	**1.24**	<0.00050	0.00017	0.0336	0.00023	<0.0010	<0.050	**0.021**	38.7	<0.0010	0.0283	**0.0546**	**0.515**
W11	3-Oct-13	P	0.0149	19.2	0.52	<0.000010	0.0011	**0.258**	0.038	0.849	**0.00188**	4.42	<0.000020	0.364	0.152	68.2	0.000187	<0.0050	<0.0050	0.00303	<0.0050	**0.977**	<0.00050	**1.73**	<0.00050	0.00024	0.0363	0.00026	<0.0010	<0.050	**0.0259**	42.5	<0.0010	0.0317	**0.06**	**0.473**
W12	24-Jun-13	P	0.0121	11.8	0.335	<0.000010	<0.0010	**0.184**	0.043	0.654	**0.00165**	2.72	0.000027	0.188	0.0962	44.5	0.000169	<0.0050	0.0062	0.00198	0.0096	**0.811**	<0.00050	**2.4**	<0.00050	0.00015	0.0291	0.00025	<0.0010	<0.050	**0.0228**	25.6	<0.0010	0.0201	**0.0432**	**2.59**
W12	30-Jul-13	P	0.0186	18.4	0.547	<0.000010	<0.0010	**0.315**	0.1	1.08	**0.00214**	4.8	<0.000020	0.36	0.139	80.6	0.000352	<0.0050	<0.0050	0.00364	0.0247	**1.59**	<0.00050	**7.76**	<0.00050	0.00038	0.032	0.00047	<0.0010	<0.050	**0.0573**	35.3	**0.0035**	0.0374	**0.0735**	**6.73**
W12	14-Aug-13	P	0.0183	17.7	0.566	<0.000010	<0.0010	**0.338**	0.117	1.1	**0.00189**	4.49	<0.000020	0.286	0.134	84.6	0.000359	<0.0050	<0.0050	0.00395	0.0273	**1.74**	<0.00050	**8.52**	<0.00050	0.00055	0.0314	0.00048	<0.0010	<0.050	**0.0638**	41.9	**0.0042**	0.0404	**0.0773**	**7.98**
W12	17-Sep-13	P	0.017	17.7	0.548	<0.000010	<0.0010	**0.308**	0.085	0.949	**0.00197**	3.88	0.000024	0.322	0.134	74.7	0.0003	<0.0050	<0.0050	0.00366	0.0273	**1.51**	<0.00050	**6.89**	<0.00050	0.00051	0.0315	0.00039	<0.0010	<0.050	**0.0518**	38.4	**0.003**	0.0371	**0.0802**	**6.86**
W12	3-Oct-13	P	0.0168	20.5	0.634	<0.000010	<0.0010	**0.373**	0.133	1.1	**0.00237**	5.02	<0.000020	0.321	0.145	85.2	0.000354	<0.0050	<0.0050	0.00419	0.0357	**1.94**	<0.00050	**9.13**	<0.00050	0.00079	0.0328	0.00052	<0.0010	<0.050	**0.0671**	41.2	**0.004**	0.0418	**0.0892**	**9.86**
W13	24-Jun-13	P	0.0105	9.68	0.27	<0.000010	<0.0010	**0.147**	0.034	0.598	**0.00178**	3.04	<0.000020	0.267	0.0895	38.2	0.000153	<0.0050	<0.0050	0.00152	0.0061	**0.626**	<0.00050	**1.66**	<0.00050	0.00012	0.0318	0.00021	<0.0010	<0.050	**0.0168**	22.6	<0.0010	0.0158	**0.0297**	**1.74**
W13	30-Jul-13	P	0.0153	14.2	0.41	<0.000010	<0.0010	**0.243**	0.068	0.969	**0.00148**	4.61	<0.000020	0.545	0.12	61.9	0.000234	<0.0050	<0.0050	0.00269	0.0142	**1.18**	<0.00050	**6.85**	<0.00050	0.00025	0.0356	0.00041	<0.0010	<0.050	**0.0376**	28.2	<0.0010	0.0265	**0.0457**	**2.06**
W13	14-Aug-13	P	0.014	13.3	0.412	<0.000010	<0.0010	**0.252**	0.065	0.948	**0.00137**	4.39	<0.000020	0.44	0.113	65.4	0.000228	<0.0050	<0.0050	0.00267	0.0157	**1.24**	<0.00050	**7.89**	<0.00050	0.00021	0.0358	0.00043	<0.0010	<0.050	**0.0421**	31.4	<0.0010	0.0284	**0.0494**	**1.74**
W13	17-Sep-13	P	0.013	13.8	0.404	<0.000010	<0.0010	**0.225**	0.056	0.823	**0.00144**	3.63	0.000027	0.469	0.115	58.9	0.000218	<0.0050	<0.0050	0.00261	0.0155	**1.06**	<0.00050	**5**	<0.00050	0.00034	0.0386	0.00035	<0.0010	<0.050	**0.0341**	32.6	<0.0010	0.0264	**0.0514**	**3.24**
W13	3-Oct-13	P	0.0142	16.4	0.474	<0.000010	<0.0010	**0.284**	0.08	0.914	**0.00188**	5.09	<0.000020	0.511	0.133	74.3	0.000252	<0.0050	<0.0050	0.00305	0.0208	**1.42**	<0.00050	**7.59**	<0.00050	0.00038	0.0401	0.00044	<0.0010	<0.050	**0.0435**	35.9	<0.0010	0.0303	**0.0562**	**4.28**
T5	24-Jun-13	P	0.0244	7.16	0.519	<0.000010	<0.0010	**1.2**	0.233	1	**0.0231**	5.48	**0.000112**	0.335	0.0483	204	0.000646	<0.0050	<0.0050	0.0124	0.197	**11.4**	<0.00050	**61.8**	<0.00050	0.00255	0.0178	0.00206	<0.0010	<0.050	**0.764**	6.58	**0.0784**	0.117	**0.0816**	**69.2**
T5	30-Jul-13	P	0.0523	14.5	0.973	<0.000010	<0.0010	**2.18**	0.585	2.08	**0.038**	11.8	0.000048	0.521	0.0826	429	**0.0013**	<0.0050	<0.0050	**0.0233**	0.405	**20.1**	<0.00050	**119**	<0.00050	**0.00588**	0.0098	0.00358	<0.0010	<0.050	**1.48**	11.9	**0.156**	0.226	**0.151**	**141**
T5	14-Aug-13	P	0.0502	15.3	1.09	<0.000010	<0.0010	**2.5**	0.736	2.01	**0.0425**	11.5	0.00007	0.505	0.0885	472	**0.00132**	<0.0050	<0.0050	**0.025**	0.455	**23**	0.00068	**139**	<0.00050	**0.00761**	0.0068	0.00401	<0.0010	<0.050	**1.81**	14.6	**0.181**	0.254	**0.171**	**180**
T5	17-Sep-13	P	0.056	17.9	1.24	<0.000010	<0.0010	**2.7**	1.21	3.34	**0.0334**	10.8	**0.000123**	0.642	0.101	490	**0.00185**	<0.0050	<0.0050	**0.0261**	0.809	**26.2**	<0.00050	**143**	<0.00050	**0.0131**	0.0083	0.00443	<0.0010	<0.050	**1.71**	17.2	**0.206**	0.283	**0.191**	**209**
T5	3-Oct-13	P	0.088	28.7	1.9	<0.000010	<0.0040	**4.25**	2.42	4.99	**0.0512**	17.6	<0.000080	0.6	0.149	790	**0.00283**	<0.020	<0.020	**0.0367**	1.32	**42**	<0.0020	**220**	<0.0010	**0.0254**	0.0044	0.00692	<0.0020	<0.10	**2.44**	27.4	**0.312**	0.415	**0.264**	**349**
S2	24-Jun-13	P	0.0212	9.03	1.22	<0.000010	<0.0010	**0.87**	0.648	2.86	**0.00272**	5.39	0.000097	0.293	0.067	176	**0.00173**	<0.0050	<0.0050	0.0124	0.17	**6.24**	<0.00050	**47**	<0.00050	**0.0113**	0.0454	0.00169	<0.0010	<0.050	**0.253**	14.9	**0.0461**	0.0979	**0.311**	**69.5**
S2	30-Jul-13	P	0.0394	16.7	2.05	<0.000010	<0.0010	**1.41**	1.35	4.97	**0.00355**	9.27	0.000029	0.395	0.106	328	**0.00298**	<0.0050	<0.0050	**0.0217**	0.294	**9.7**	<0.00050	**83.6**	<0.00050	**0.0244**	0.0207	0.00283	<0.0010	<0.050	**0.469**	24.9	**0.0882**	0.179	**0.545**	**131**
S2	14-Aug-13	P	0.0399	19.5	2.68	<0.000010	0.0011	**1.8**	1.74	5.8	**0.00342**	10	0.000044	0.374	0.125	395	**0.00363**	<0.0050	<0.0050	**0.0269**	0.396	**12.1**	<0.00050	**105**	<0.00050	**0.0337**	0.0112	0.00345	<0.0010	<0.050	**0.621**	32.1	**0.115**	0.226	**0.701**	**178**
S2	17-Sep-13	P	0.0308	13.8	2.08	<0.000010	<0.0010	**1.27**	0.951	4.11	**0.00362**	7.35	0.000069	0.395	0.0973	272	**0.0025**	<0.0050	<0.0050	**0.0198**	0.263	**8.95**	<0.00050	**74.9**	<0.00050	**0.0216**	0.0221	0.00273	<0.0010	<0.050	**0.43**	22.9	**0.0828**	0.158	**0.536**	**119**
S2	3-Oct-13	P	0.037	18.5	2.74	<0.000010	<0.0020	**1.61**	1.57	5.39	**0.00361**	10.6	<0.000040	0.38	0.119	372	**0.0031**	<0.010	<0.010	**0.026**	0.379	**12.1**	<0.0010	**95**	<0.00050	**0.0308**	0.0145	0.00342	<0.0010	<0.050	**0.555**	29.2	**0.101**	0.198	**0.683**	**161**
T4	24-Jun-13	P

Appendix B1. 2013 Surface Water Monitoring Results for QZ13-034

	Sample Date	Sample Class	Pb-D	Li-D	Mg-D	Mn-D	Hg-D	Mo-D	Ni-D	P-D	K-D	Se-D	Si-D	Ag-D	Na-D	Sr-D	S-D	Tl-D	Sn-D	Ti-D	U-D	V-D	Zn-D	Zr-D
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CCME-AL																								
CCME-AL-DM			*				0.00003	0.073	*			0.001		0.0001				0.0008			0.015		0.03	
QZ13-034 EQS																								
W2	24-Jun-13	P	<0.00020	0.0079	2.84	0.264	<0.000010	<0.0010	**0.364**	0.387	1.96	**0.00216**	3.79	0.000039	0.155	0.0353	71.1	**0.00117**	<0.0050	<0.0050	0.011	0.11	**1.89**	<0.00050
W2	24-Jun-13	QD	<0.00020	0.0079	2.97	0.27	<0.000010	<0.0010	**0.374**	0.399	2.03	**0.0023**	3.85	0.000033	0.156	0.0353	72.9	**0.00117**	<0.0050	<0.0050	0.0111	0.114	**1.95**	<0.00050
W2	30-Jul-13	P	<0.00020	0.0205	8.65	0.701	<0.000010	0.0017	**1.07**	1.43	4.96	**0.0036**	7.61	<0.000020	0.21	0.078	214	**0.00317**	<0.0050	<0.0050	**0.031**	0.358	**5.35**	<0.00050
W2	14-Aug-13	P	<0.00020	0.0298	12.3	0.931	<0.000010	0.0025	**1.56**	2.37	7.17	**0.00396**	9.29	0.000033	0.343	0.11	307	**0.00449**	<0.0050	<0.0050	**0.052**	0.583	**8.46**	<0.00050
W2	17-Sep-13	P	<0.00020	0.0192	7.41	0.613	<0.000010	0.0013	**0.934**	1.31	4.02	**0.0042**	7.48	0.000067	0.284	0.0732	180	**0.00259**	<0.0050	<0.0050	**0.0312**	0.335	**4.91**	<0.00050
W2	3-Oct-13	P	<0.00020	0.0261	9.94	0.809	<0.000010	0.0017	**1.3**	1.93	5.45	**0.00528**	8.96	0.000042	0.276	0.0934	265	**0.00339**	<0.0050	<0.0050	**0.0429**	0.485	**7.21**	<0.00050
W3	24-Jun-13	P	**0.0354**	0.0124	3.62	0.342	<0.000010	<0.0010	**0.447**	0.044	1.59	**0.00217**	4.22	**0.000119**	0.211	0.0332	85.5	**0.00107**	<0.0050	<0.0050	0.00872	0.0347	**2.82**	<0.00050
W3	30-Jul-13	P	**0.0584**	0.0263	8.67	0.83	<0.000010	<0.0010	**1.09**	0.11	3.51	**0.00387**	7.42	0.000068	0.339	0.0616	217	**0.0024**	<0.0050	<0.0050	**0.0185**	0.0739	**7.22**	<0.00050
W3	14-Aug-13	P	**0.0296**	0.0326	10.9	0.969	<0.000010	<0.0010	**1.3**	0.133	4.44	**0.00311**	7.61	**0.000117**	0.403	0.0711	267	**0.0028**	<0.0050	<0.0050	**0.0224**	0.104	**9.19**	<0.00050
W3	17-Sep-13	P	**0.063**	0.0278	8.56	0.827	<0.000010	<0.0010	**0.971**	0.125	3.33	**0.00362**	7.38	0.000093	0.355	0.0684	188	**0.00233**	<0.0050	<0.0050	**0.0183**	0.0822	**6.35**	<0.00050
W3	3-Oct-13	P	**0.0399**	0.038	11.8	1.19	<0.000010	<0.0010	**1.29**	0.177	4.8	**0.00305**	8.4	0.000088	0.404	0.0853	274	**0.00288**	<0.0050	<0.0050	**0.0214**	0.132	**8.95**	<0.00050
W3B	24-Jun-13	P	**0.0065**	0.0143	4.26	0.406	<0.000010	<0.0010	**0.579**	0.043	1.81	**0.00317**	4.4	**0.000174**	0.208	0.035	109	**0.00118**	<0.0050	<0.0050	0.0119	0.0328	**3.42**	<0.00050
W3B	30-Jul-13	P	**0.0119**	0.0423	12.4	1.14	<0.000010	<0.0010	**1.68**	0.164	4.75	**0.00589**	9.53	0.000077	0.344	0.075	333	**0.0033**	<0.0050	<0.0050	**0.0302**	0.0948	**10.7**	<0.00050
W3B	14-Aug-13	P	**0.0134**	0.0445	13.3	1.12	<0.000010	<0.0010	**1.85**	0.144	5.26	**0.00437**	9.07	**0.000165**	0.44	0.0698	335	**0.00308**	<0.0050	<0.0050	**0.0303**	0.106	**12.1**	<0.00050
W3B	17-Sep-13	P	**0.015**	0.0476	12.7	1.28	<0.000010	<0.0010	**1.69**	0.2	5.31	**0.00542**	9.85	**0.000101**	0.466	0.0819	333	**0.00308**	<0.0050	<0.0050	**0.0288**	0.137	**10.4**	<0.00050
W3B	3-Oct-13	P	**0.0186**	0.0595	16.8	1.76	<0.000010	<0.0010	**2.01**	0.26	6.84	**0.00377**	10.8	0.00009	0.428	0.093	402	**0.00395**	<0.0050	<0.0050	**0.0337**	0.189	**13.4**	<0.00050
W5	24-Jun-13	P	**0.18**	0.0629	39.5	10.7	<0.000010	<0.0010	**1.86**	0.33	7.76	0.00034	6.03	0.00007	0.429	0.288	436	**0.00363**	<0.0050	<0.0050	0.0107	0.134	**21.2**	<0.00050
W5	24-Jun-13	QD	**0.182**	0.0634	39.6	11	<0.000010	<0.0010	**1.9**	0.351	7.79	<0.00010	6.05	0.000036	0.435	0.289	451	**0.00375**	<0.0050	<0.0050	0.0107	0.14	**21**	<0.00050
W5	30-Jul-13	P	**0.169**	0.0592	41.4	11.3	<0.000010	<0.0010	**1.76**	0.283	7.11	0.00025	5.84	0.000021	0.338	0.285	454	**0.00321**	<0.0050	<0.0050	0.00871	0.108	**19.9**	<0.00050
W5	30-Jul-13	QD	**0.169**	0.0572	42.4	11.5	<0.000010	<0.0010	**1.75**	0.275	7.17	0.00028	5.67	<0.000020	0.361	0.302	449	**0.0032**	<0.0050	<0.0050	0.00866	0.112	**20.2**	<0.00050
W5	14-Aug-13	P	**0.155**	0.049	42.1	11.6	<0.000010	<0.0020	**1.62**	0.239	6.73	<0.00020	5.37	<0.000040	0.37	0.3	411	**0.00299**	<0.010	<0.010	0.0075	0.113	**22**	<0.0010
W5	14-Aug-13	QD	**0.16**	0.051	44	12	<0.000010	<0.0020	**1.7**	0.252	7.08	<0.00020	5.21	<0.000040	0.38	0.306	426	**0.00314**	<0.010	<0.010	0.00742	0.13	**22.5**	<0.0010
W5	17-Sep-13	P	**0.159**	0.048	43.8	13	<0.000010	<0.0020	**1.62**	0.205	6.48	<0.00020	5.4	<0.000040	0.39	0.315	409	**0.00304**	<0.010	<0.010	0.00732	0.085	**24.2**	<0.0010
W5	17-Sep-13	QD	**0.155**	0.051	44.7	14.2	<0.000010	<0.0020	**1.66**	0.225	6.43	<0.00020	4.94	<0.000040	0.36	0.321	432	**0.00306**	<0.010	<0.010	0.00764	0.093	**24**	<0.0010
W5	3-Oct-13	P	**0.154**	0.051	46.2	14.2	<0.000010	<0.0020	**1.63**	0.216	6.35	<0.00020	5.67	<0.000040	0.31	0.333	420	**0.00312**	<0.010	<0.010	0.00705	0.088	**26.1**	<0.0010
W5	3-Oct-13	QD	**0.153**	0.051	46.3	13.9	<0.000010	<0.0020	**1.58**	0.199	6.38	<0.00020	5.59	<0.000040	0.31	0.332	422	**0.00312**	<0.010	<0.010	0.00699	0.092	**26.6**	<0.0010
W6	24-Jun-13	P	**0.0367**	0.0143	7.06	1.19	<0.000010	<0.0010	**0.576**	0.245	2.2	**0.00237**	4.49	**0.000104**	0.231	0.0604	116	**0.00139**	<0.0050	<0.0050	0.012	0.0739	**4.83**	<0.00050
W6	30-Jul-13	P	**0.0518**	0.0292	14.4	2.61	<0.000010	<0.0010	**1.18**	0.668	4.38	**0.0032**	7.32	0.000037	0.265	0.115	255	**0.0027**	<0.0050	<0.0050	**0.0233**	0.177	**8.75**	<0.00050
W6	30-Jul-13	QD	**0.052**	0.0287	14.7	2.73	<0.000010	<0.0010	**1.18**	0.677	4.39	**0.00337**	7.61	0.000033	0.279	0.117	249	**0.00269**	<0.0050	<0.0050	**0.0234**	0.181	**9.23**	<0.00050
W6	14-Aug-13	P	**0.0513**	0.0362	19.9	3.52	<0.000010	0.0012	**1.51**	0.986	5.69	**0.00365**	8.07	0.000072	0.359	0.147	320	**0.00335**	<0.0050	<0.0050	**0.0317**	0.269	**12.6**	<0.00050
W6	14-Aug-13	QD	**0.0494**	0.0344	18.5	3.5	<0.000010	0.0011	**1.46**	0.962	5.42	**0.00333**	7.87	0.000041	0.337	0.14	305	**0.0033**	<0.0050	<0.0050	**0.0307**	0.265	**11.8**	<0.00050
W6	17-Sep-13	P	**0.0436**	0.0267	13.9	2.75	<0.000010	<0.0010	**1.05**	0.67	3.92	**0.00357**	6.99	0.000045	0.316	0.112	227	**0.00234**	<0.0050	<0.0050	**0.0237**	0.192	**9.08**	<0.00050
W6	17-Sep-13	QD	**0.044**	0.027	13.8	2.68	<0.000010	<0.0010	**1.06**	0.647	3.9	**0.00356**	6.9	0.000062	0.342	0.114	219	**0.00245**	<0.0050	<0.0050	**0.024**	0.193	**9.27**	<0.00050
W6	3-Oct-13	P	**0.0457**	0.0359	19	3.91	<0.000010	0.0011	**1.37**	1.06	5.07	**0.00412**	8.66	0.000063	0.449	0.149	298	**0.00318**	<0.0050	<0.0050	**0.0317**	0.304	**12.6**	<0.00050
W8	24-Jun-13	P	**0.0268**	0.0248	9.57	1.08	<0.000010	<0.0010	**0.995**	0.582	2.69	**0.00475**	5.88	**0.000103**	0.307	0.0638	193	**0.00158**	<0.0050	<0.0050	0.0128	0.218	**8.22**	<0.00050
W8	30-Jul-13	P	**0.0352**	0.0413	18.2	2.11	<0.000010	<0.0010	**1.8**	1.24	4.77	**0.00593**	9.15	0.000025	0.373	0.108	373	**0.00284**	<0.0050	<0.0050	**0.0214**	0.395	**13.2**	<0.00050
W8	14-Aug-13	P	**0.0326**	0.0505	22	2.6	<0.000010	<0.0010	**2.23**	1.54	5.53	**0.00688**	8.94	0.000054	0.461	0.135	419	**0.00341**	<0.0050	<0.0050	**0.0277**	0.525	**17.4**	<0.00050
W8	17-Sep-13	P	**0.0317**	0.0385	16.7	2.13	<0.000010	<0.0010	**1.7**	1.1	4.21	**0.00644**	8.61	0.000056	0.412	0.109	335	**0.00254**	<0.0050	<0.0050	**0.022**	0.393	**13.1**	<0.00050
W8	3-Oct-13	P	**0.0304**	0.0509	21	2.88	<0.000010	<0.0010	**2.06**	1.56	5.34	**0.00775**	10.5	0.000053	0.45	0.133	428	**0.00317**	<0.0050	<0.0050	**0.0253**	0.566	**17.7**	<0.00050
W8	3-Oct-13	QD	**0.0305**	0.0492	20.5	2.87	<0.000010	<0.0010	**2.11**	1.5	5.4	**0.007**	10.5	0.000057	0.424	0.133	430	**0.00336**	<0.0050	<0.0050	**0.0258**	0.535	**16.9**	<0.00050
W11	24-Jun-13	P	<0.00020	0.0108	10.2	0.292	<0.000010	<0.0010	**0.137**	<0.010	0.54	**0.00133**	2.38	<0.000020	0.187	0.086	34.9	0.000098	<0.0050	<0.0050	0.00075	<0.0050	**0.523**	<0.00050
W11	30-Jul-13	P	<0.00020	0.017	16.5	0.455	<0.000010	<0.0010	**0.229**	<0.010	0.786	**0.00179**	3.68	<0.000020	0.265	0.125	57.2	0.00016	<0.0050	<0.0050	0.00166	<0.0050	**0.883**	<0.00050
W11	14-Aug-13	P	<0.00020	0.0184	17.2	0.502	<0.000010	<0.0010	**0.243**	<0.010	0.885	**0.0016**	3.4	<0.000020	0.281	0.134	60.2	0.000162	<0.0050	<0.0050	0.0019	<0.0050	**0.967**	<0.00050
W11	17-Sep-13	P	<0.00020	0.0168	17.6	0.508	<0.000010	<0.0010	**0.226**	<0.010	0.734	**0.00194**	3.29	<0.000020	0.299	0.135	60.1	0.00014	<0.0050	<0.0050	0.00149	<0.0050	**0.86**	<0.00050
W11	3-Oct-13	P	<0.00020	0.0171	18.5	0.56	<0.000010	<0.0010	**0.256**	<0.010	0.829	**0.0021**	3.78	<0.000020	0.302	0.145	64.7	0.000194	<0.0050	<0.0050	0.00186	<0.0050	**1**	<0.00050
W12	24-Jun-13	P	0.00077	0.0119	10.7	0.318	<0.000010	<0.0010	**0.171**	<0.010	0.651	**0.00155**	2.66	<0.000020	0.196	0.087	42.2	0.000159	<0.0050	<0.0050	0.00133	<0.0050	**0.788**	<0.00050
W12	30-Jul-13	P	0.00164	0.0183	16.8	0.553	<0.000010	<0.0010	**0.323**	<0.010	1.01	**0.00201**	4.07	<0.000020	0.28	0.126	75.8	0.000312	<0.0050	<0.0050	0.00308	<0.0050	**1.64**	<0.00050
W12	14-Aug-13	P	0.0014	0.019	17.7	0.595	<0.000010	<0.0010	**0.354**	<0.010	1.13	**0.00181**	4.4	<0.000020	0.295	0.132	83.1	0.000315	<0.0050	<0.0050	0.00342	<0.0050	**1.88**	<0.00050
W12	17-Sep-13	P	0.00137	0.016	17	0.575	<0.000010	<0.0010	**0.315**	<0.010	0.953	**0.0021**	4.06	<0.000020	0.3	0.129	78.2	0.000298	<0.0050	<0.0050	0.00289	<0.0050	**1.56**	<0.00050
W12	3-Oct-13	P	0.00135	0.019	19	0.618	<0.000010	<0.0010	**0.356**	0.01	1.07	**0.00232**	4.34	<0.000020	0.319	0.141	82.7	0.000355	<0.0050	<0.0050	0.00361	<0.0050	**2.06**	<0.00050
W13	24-Jun-13	P	0.00024	0.0097	8.8	0.257	<0.000010	<0.0010	**0.14**	<0.010	0.584	**0.00127**	2.67	<0.000020	0.304	0.0766	35.6	0.00012	<0.0050	<0.0050	0.00115	<0.0050	**0.642**	<0.00050
W13	30-Jul-13	P	0.00073	0.0138	12.5	0.393	<0.000010	<0.0010	**0.239**	<0.010	0.863	**0.0015**	3.74	<0.000020	0.452	0.107	58.7	0.000193	<0.0050	<0.0050	0.00228	<0.0050	**1.14**	<0.00050
W13	14-Aug-13	P	0.00033	0.0148	13.5	0.437	<0.000010	<0.0010	**0.258**	<0.010	0.935	**0.00132**	3.73	<0.000020	0.474	0.116	58.8	0.000227	<0.0050	<0.0050	0.00265	<0.0050	**1.39**	<0.00050
W13	17-Sep-13	P	0.00032	0.0133	13.1	0.406	<0.000010	<0.0010	**0.229**	<0.010	0.809	**0.00172**	3.95	<0.000020	0.446	0.114	60.5	0.000194	<0.0050	<0.0050	0.0022	<0.0050	**1.13**	<0.00050
W13	3-Oct-13	P	0.00023	0.0146	15.1	0.47	<0.000010	<0.0010	**0.268**	<0.010	0.872	**0.00187**	4.29	<0.000020	0.478	0.124	66.1	0.000218	<0.0050	<0.0050	0.0026	<0.0050	**1.52**	<0.00050
T5	24-Jun-13	P	<0.00020	0.0256	7.08	0.508	<0.000010	<0.0010	**1.15**	0.231	1	**0.0228**	6.02	**0.000122**	0.333	0.0456	197	0.000642	<0.0050	<0.0050	0.0127	0.189	**11.8**	<0.00050
T5	30-Jul-13	P	<0.00020	0.0478	14.2	0.986	<0.000010	<0.0010	**2.25**	0.57	1.96	**0.0363**	9.88	0.000054	0.423	0.079	402	**0.00129**	<0.0050	<0.0050	**0.0224**	0.407	**20.2**	<0.00050
T5	14-Aug-13	P	<0.00020	0.0543	16.6	1.07	<0.000010	0.0102	**2.7**	0.683	2.01	**0.0421**	11	0.000073	0.532	0.0869	461	**0.00129**	<0.0050	<0.0050	**0.025**	0.457	**25.4**	0.00051
T5	17-Sep-13	P	<0.00020	0.0613	18.7	1.25	<0.000010	<0.0010	**2.86**	1.17	3.01	**0.0377**	11.6	0.000074	0.571	0.104	496	**0.00183**	<0.0050	<0.0050	**0.0254**	0.749	**26.7**	<0.00050
T5	3-Oct-13	P	<0.00040	0.093	26.8	1.84	<0.000010	<0.0020	**4.04**	2.16	4.88	**0.0484**	15.6	0.000081	0.57	0.145	760	**0.00302**	<0.010	<0.010	**0.0344**	1.28	**42.5**	<0.0010
S2	24-Jun-13	P	**0.0326**	0.0205	8.51	1.12	<0.000010	<0.0010	**0.799**	0.592	2.68	**0.00275**	5.57	0.000094	0.276	0.0621	158	**0.00164**	<0.0050	<0.0050	0.0125	0.148	**5.9**	<0.00050
S2	30-Jul-13	P	**0.0406**	0.0298	14.4	2.14	<0.000010	<0.0010	**1.43**	1.24	4.72	**0.00334**	8.35	0.00007	0.324	0.103	317	**0.00271**	<0.0050	<0.0050	**0.0203**	0.288	**10.5**	<0.00050
S2	14-Aug-13	P	**0.0398**	0.0441	20	2.88	<0.000010	0.0016	**1.92**	1.71	5.96	**0.00322**	8.93	0.000045	0.423	0.127	378	**0.00349**	<0.0050	<0.0050	**0.0273**	0.397	**13.3**	<0.00050
S2	17-Sep-13	P	**0.0379**	0.0342	14.8	2.27	<0.000010	<0.0010	**1.29**	1.14	4.02	**0.0043**	7.84	0.000066	0.378	0.102	274	**0.00247**	<0.0050	<0.0050	**0.0204**	0.283	**10**	<0.00050
S2	3-Oct-13	P	**0.0361**	0.0417	19.1	2.91	<0.000010	<0.0010	**1.62**	1.54	5.24	**0.00432**	9.34	0.000063	0.381	0.119	331	**0.00308**	<0.0050	<0.0050	**0.0245**	0.377	**13.4**	<0.00050
T4	24-Jun-13	P	**0.0369**	<0.0050	0.321	0.135	<0.000010	<0.0010	0.0222	<0.010	0.304	0.00038	1.84	0.000094	0.191	0.0081	8.8	0.000067	<0.0050	<0.0050	0.00031	<0.0050	**0.217**	<0.00050
T4	30-Jul-13	P																						
T4	14-Aug-13	P																						
T4	17-Sep-13	P																						
FB	24-Jun-13	QFB	<0.00020	<0.0050	<0.050	<0.0010	<0.000010	<0.0010	<0.0010	<0.010	<0.050	<0.00010	<0.10	<0.000020	<0.050	<0.0010	<3.0	<0.000050	<0.0050	<0.0050	<0.00010	<0.0050	<0.0050	<0.00050
FB	30-Jul-13	QFB	<0.00020	<0.0050	<0.050	<0.0010	<0.000010	<0.0010	<0.0010	<0.010	<0.050	<0.00010	<0.10	<0.000020	<0.050	<0.0010	<3.0	<0.000050	<0.0050	<0.0050	<0.00010	<0.0050	<0.0050	<0.00050
FB	14-Aug-13	QFB	<0.00020	<0.0050	<0.050	<0.0010	<0.000010	<0.0010	<0.0010	<0.010	<0.050	<0.00010	<0.10	<0.000020	<0.050	<0.0010	<3.0	<0.000050	<0.0050	<0.0050	<0.00010	<0.0050	<0.0050	<0.00050
FB	17-Sep-13	QFB	<0.00020	<0.0050	<0.050	<0.0010	<0.000010	<0.0010	<0.0010	<0.010	<0.050	<0.00010	<0.10	<0.000020	<0.050	<0.0010	<3.0	<0.000050	<0.0050	<0.0050	<0.00010	<0.0050	<0.0050	<0.00050
FB	3-Oct-13	QFB	<0.00020	<0.0050	<0.050	<0.0010	<0.000010	<0.0010	<0.0010	<0.010	<0.050	<0.00010	<0.10	<0.000020	<0.050	<0.0010	<3.0	<0.000050	<0.0050	<0.0050	<0.00010	<0.0050	<0.0050	<0.00050
TB	30-Jul-13	QTB	<0.00020	<0.0050	<0.050	<0.0010	<0.000010	<0.0010	<0.0010	<0.010	<0.050	<0.00010	<0.10	<0.000020	<0.050	<0.0010	<3.0	<0.000050	<0.0050	<0.0050	<0.00010	<0.0050	<0.0050	<0.00050
TB	17-Aug-13	QTB	<0.00020	<0.0050	<0.050	<0.0010	<0.000010	<0.0010	<0.0010	<0.010	<0.050	<0.00010	<0.10	<0.000020	<0.050	<0.0010	<3.0	<0.000050	<0.0050	<0.0050	<0.00010	<0.0050	<0.0050	<0.00050
TB	20-Sep-13	QTB	<0.00020	<0.0050	<0.050	<0.0010	<0.000010	<0.0010	<0.0010	<0.010	<0.050	<0.00010	<0.10	<0.000020	<0.050	<0.0010	<3.0	<0.000050	<0.0050	<0.0050	<0.00010	<0.0050	<0.0050	<0.00050
TB	4-Oct-13	QTB	<0.00020	<0.0050	<0.050	<0.0010	<0.000010	<0.0010	<0.0010	<0.010	<0.050	<0.00010	<0.10	<0.000020	<0.050	<0.0010	<3.0	<0.000050	<0.0050	<0.0050	<0.00010	<0.0050	<0.0050	<0.00050

Appendix B2. 2013 Groundwater Monitoring Results for QZ13-034

			Station Name	BH01-05	BH01-05	BH01-05	BH01-05	BH01-05	BH03-05	BH03-05	BH03-05	BH03-05	BH03-05	BH04-05	BH04-05	BH04-05	BH04-05	BH04-05
			Description	Upgradient well on North Waste Rock Dump	Upgradient well on North Waste Rock Dump	Upgradient well on North Waste Rock Dump	Upgradient well on North Waste Rock Dump	Upgradient well on North Waste Rock Dump	Downgradient well of South Waste Rock Dump	Downgradient well of South Waste Rock Dump	Downgradient well of South Waste Rock Dump	Downgradient well of South Waste Rock Dump	Downgradient well of South Waste Rock Dump	Downgradient well of North Waste Rock Dump	Downgradient well of North Waste Rock Dump	Downgradient well of North Waste Rock Dump	Downgradient well of North Waste Rock Dump	Downgradient well of North Waste Rock Dump
			Sample Date	24-06-2013	31-07-2013	13-08-2013	18-09-2013	03-10-2013	24-06-2013	31-07-2013	13-08-2013	18-09-2013	03-10-2013	24-06-2013	31-07-2013	13-08-2013	18-09-2013	03-10-2013
		CCME-AL-DM	QZ09-087DM															
pH (field)	pH units	6.5-9		4.44			3.99		2.59		2.46	2.66	2.79	2.67		2.64	2.9	2.93
pH (lab)	pH units	6.5-9		4.49	4.44		4.41		2.92	2.85	2.83	2.81	2.85	2.89	2.94	3.03	3.14	3.11
Specific Conductance (field)	µS/cm			15.5	103.1		25.7		807.5	1319	1439	1218	1343	1328	2294	2397	2666	2371
Specific Conductance (lab)	µS/cm			21.7	32.6		33.8		895	1240	1370	1220	1300	1490	2200	2370	2800	2380
Temperature (field)	C			4.5	3.3		3.8		2.5	6.9	10.5	5.1	3.6	14.8	4.8	9.8	2.1	1.5
Dissolved Oxygen (field)	mg/L	5.5		10.3	9.1		9.4		12.9	6.8	5.4	8.5	7.2	7	7.7	6.3	6.8	8
Dissolved Oxygen (field)	%			97	81		86		112		59	80	65		71	66	60	69
ORP (field)	mV			378.3	594.3		466.4		605.7	620.2	585.4	602.4	544.6	545.4	597.2	590.8	550.9	440.7
Groundwater Level	mbTOC				4.58	7.66	4.675	7.6		4.18	4.435	4.09	4.48	1.77	5.475	5.56	5.01	5.07
Well Depth	mbTOC				7.82	7.77	7.78	7.775		6.13	6.28	6.28	6.28		6.07	6.13	6.07	6.065
Well Purge Volume	L			14	20		20	0	15	12	11	15	11	5	5	4	8	6
Total Suspended Solids	mg/L																	
Hardness (from dissolved)	mg/L			1.52	1.63		1.26		55.2	79.2	106	81.6	102	332	886	1070	1480	1030
Alkalinity, total	mg/L			<0.50	<0.50		<0.50		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Acidity	mg/L			7.19	3.25		3.21		252	466	466	481	589	397	469	365	408	734
Acidity (pH 4.5)	mg/L			<0.50	<0.50		<0.50		136	291	294	275	310	189	220	155	121	242
Chloride	mg/L	120		1.1	<0.50		<0.50		<0.50	<0.50	<0.50	<0.50	<0.50	1.6	<0.50	0.63	<0.50	1
Fluoride	mg/L	0.12																
Sulphate	mg/L			4.16	4.08		4.42		292	454	695	496	588	638	1220	1360	1840	1470
Cyanide, total	mg/L																	
Cyanide, Weak Acid Dissociable	mg/L	0.005																
Ammonia (N)	mg/L	102		0.014	0.023		0.024		0.5	1.2	1.7	1.1	1.1	0.33	0.29	0.39	0.3	0.45
Nitrite (N)	mg/L	0.06		<0.0050	<0.0020		<0.0020		<0.0050	0.0022	0.0023	<0.0020	0.0041	<0.0050	0.011	0.0038	0.0025	0.021
Nitrate (N)	mg/L	2.935		0.141	0.15		0.176		0.205	0.171	0.203	0.197	0.233	0.164	0.152	0.223	0.186	0.13
Dissolved Organic Carbon	mg/L																	
Aluminum (Al), dissolved	mg/L	*		0.114	0.167		0.116		25.2	58.2	75.7	55.9	76.8	19.7	26.3	20.6	37.1	60
Antimony (Sb), dissolved	mg/L			0.00087	0.0009		0.001		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.0010	<0.0010	<0.0010
Arsenic (As), dissolved	mg/L	0.005	1	0.00018	0.00021		0.0002		0.00072	0.00074	0.00076	0.0008	0.0012	0.00614	0.00473	0.00248	0.00274	0.00272
Barium (Ba), dissolved	mg/L			0.225	0.266		0.287		0.0068	0.0074	0.0085	0.006	0.0067	0.0133	0.0045	0.0037	0.0033	0.0083
Beryllium (Be), dissolved	mg/L			<0.00010	<0.00010		<0.00010		0.00105	0.00218	0.00242	0.00198	0.00248	0.00115	0.0011	0.00077	0.00134	0.00179
Bismuth (Bi), dissolved	mg/L			<0.0010	<0.0010		<0.0010		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0020	<0.0020	<0.0020
Boron (B), dissolved	mg/L	1.5		<0.050	<0.050		<0.050		<0.050	<0.050	<0.050	<0.050	<0.050	<0.10	<0.050	<0.10	<0.10	<0.10
Cadmium (Cd), dissolved	mg/L	*		0.000291	0.00034		0.000246		0.0748	0.159	0.208	0.133	0.164	0.123	0.127	0.092	0.14	0.177
Calcium (Ca), dissolved	mg/L			0.422	0.439		0.303		14.1	18	23.8	18.6	22.9	59.1	128	150	210	150
Chromium (Cr), dissolved	mg/L	0.001		<0.0010	<0.0010		<0.0010		0.0174	0.0436	0.0565	0.0429	0.0521	0.0114	0.0153	0.0095	0.012	0.0311
Cobalt (Co), dissolved	mg/L			0.00067	0.00069		<0.00050		0.0443	0.0996	0.133	0.0896	0.12	0.0821	0.083	0.0547	0.0968	0.159
Copper (Cu), dissolved	mg/L	*	1.4	0.00336	0.00193		0.00297		0.338	0.637	0.787	0.629	0.794	0.423	0.36	0.235	0.258	0.32
Iron (Fe), dissolved	mg/L	0.3		0.153	0.164		0.0598		8.83	9.76	11.3	10.6	12.3	39.3	44.2	29.9	21.6	32.1
Lead (Pb), dissolved	mg/L	*	0.4	0.00053	0.00164		0.00057		0.00863	0.0224	0.0147	0.00905	0.0371	0.0106	0.0101	0.00511	0.00143	0.0404
Lithium (Li), dissolved	mg/L			<0.0050	<0.0050		<0.0050		0.0114	0.0234	0.0303	0.0233	0.0316	<0.010	0.0124	0.012	0.02	0.022
Magnesium (Mg), dissolved	mg/L			0.115	0.13		0.121		4.85	8.34	11.3	8.57	11	44.8	138	170	232	159
Manganese (Mn), dissolved	mg/L			0.0094	0.0089		0.0068		0.491	0.825	0.972	0.811	0.957	4.12	3.63	3	7.06	7.95
Mercury (Hg), dissolved	mg/L	0.000026		<0.000010	<0.000010		<0.000010		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo), dissolved	mg/L	0.073		<0.0010	<0.0010		<0.0010		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0020	<0.0020	<0.0020
Nickel (Ni), dissolved	mg/L	*	2.1	0.0042	0.0045		0.0042		0.414	0.929	1.25	0.862	1.17	0.561	0.717	0.66	1.26	1.47
Phosphorous (P), dissolved	mg/L			<0.010	<0.010		<0.010		0.014	0.02	0.017	0.023	0.03	0.218	0.292	0.167	0.14	0.074
Potassium (K), dissolved	mg/L			0.504	0.34		0.253		0.819	2.09	2.3	2.05	2.36	1.68	0.237	0.18	0.38	1.04
Selenium (Se), dissolved	mg/L	0.001		0.00456	0.00473		0.00505		0.00284	0.00621	0.00865	0.00569	0.00793	0.00953	0.0158	0.0183	0.0291	0.0286
Silicon (Si), dissolved	mg/L			2.13	2.35		2.25		4.8	7.3	8.06	7.32	8.31	5.01	5.11	3.81	5.05	11.5
Silver (Ag), dissolved	mg/L	0.0001		0.00004	<0.000020		0.000031		0.000213	0.000095	0.000187	0.000203	0.000122	0.000891	0.000224	0.000084	0.000161	0.000349
Sodium (Na), dissolved	mg/L			0.29	0.468		0.292		0.429	0.38	0.424	0.433	0.779	0.73	0.355	0.39	0.42	0.6
Strontium (Sr), dissolved	mg/L			0.0098	0.0111		0.0103		0.0702	0.0754	0.081	0.0735	0.0799	0.339	0.543	0.604	0.886	0.635
Sulphur (S), dissolved	mg/L			<3.0	4.5		<3.0		84.8	181	232	175	234	221	438	456	642	555
Thallium (Tl), dissolved	mg/L	0.0008		0.000139	0.000159		0.000197		0.000766	0.00217	0.00216	0.00205	0.00218	0.0004	0.000418	0.00049	0.00084	0.00129
Tin (Sn), dissolved	mg/L			<0.0050	<0.0050		<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.010	<0.010	<0.010
Titanium (Ti), dissolved	mg/L			<0.0050	<0.0050		<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.010	<0.010	<0.010
Uranium (U), dissolved	mg/L	0.015		<0.00010	<0.00010		<0.00010		0.00982	0.0181	0.0229	0.0188	0.0201	0.01	0.012	0.00749	0.00968	0.0112
Vanadium (V), dissolved	mg/L			<0.0050	<0.0050		<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.010	<0.010	<0.010
Zinc (Zn), dissolved	mg/L	0.03	12.6	0.203	0.223		0.218		5.16	7.24	9.06	6.68	7.78	51.8	46.8	43.9	70.5	72.7
Zirconium (Zr), dissolved	mg/L			<0.00050	<0.00050		<0.00050		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0011	0.00132	0.0012	<0.0010	<0.0010

Appendix B3. 2013 Sediment Monitoring Results for QZ13-034

		LOI	Grain Size	Moisture	Sieve-Pan	Sieve >0.053 mm	Sieve >0.106 mm	Sieve >0.15 mm	Sieve >0.25 mm	Sieve >0.425 mm	Sieve >0.85 mm	Sieve >2.00 mm	Al-T	Sb-T	As-T	Ba-T	Be-T
	Sample Date	%	N/A	%	%	%	%	%	%	%	%	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
CCME-ISQG															5.9		
CCME-PEL															17		
W11-A	15-Aug-13	34.6	FINE	95	91	1.8	1.8	1.8	1.8	1.8	<0.20	<0.20	2E+05	1.68	20.3	76.9	4.39
W11-B	15-Aug-13	35.7	FINE	95	89	5.5	1.8	1.8	1.8	<0.20	<0.20	<0.20	2E+05	1.98	22.7	71.5	3.99
W11-C	15-Aug-13	15.7	FINE	65	43	15	9.6	17	9.8	2.5	0.63	2.1	67500	5.38	48.6	339	2.24
W11-Average	15-Aug-13	28.7	FINE	85	74	7.4	4.4	6.9	4.5	1	0.3	0.8	1E+05	3.01	30.5	162	3.54
W12-A	15-Aug-13	9.4	COARSE	28	6	3.7	4.7	19	38	26	1.6	<0.20	34900	7.27	67.9	749	0.58
W12-B	15-Aug-13	11.3	COARSE	32	10	8.1	8.1	21	25	24	3.2	<0.20	41900	7.21	69.8	545	1
W12-C	15-Aug-13	9.4	COARSE	31	12	7.7	8.1	19	30	22	1.5	<0.20	31500	7.07	66.2	577	0.76
W12-Average	15-Aug-13	10.0	COARSE	30	9	6.5	7.0	20	31	24	2.1	<0.20	36100	7.18	68.0	624	0.78
W13-A	14-Aug-13	14.1	COARSE	29	5.4	1.7	0.98	5.5	35	46	5.3	<0.20	71300	5.22	39.7	562	0.6
W13-B	14-Aug-13	14.8	COARSE	24	5	1.1	0.79	7.9	41	42	2.6	<0.20	52300	4.63	38.5	606	0.58
W13-C	14-Aug-13	11.9	COARSE	29	4.3	1.6	0.91	4.6	34	50	4.7	<0.20	50700	5.96	42.4	750	0.75
W13-Average	14-Aug-13	13.6	COARSE	27	4.9	1.5	0.89	6.0	37	46	4.2	<0.20	58100	5.27	40.2	639	0.64

Appendix B3. 2013 Sediment Monitoring Results for QZ13-034

		Bi-T	Cd-T	Ca-T	Cr-T	Co-T	Cu-T	Fe-T	Pb-T	Li-T	Mg-T	Mn-T	Hg-T	Mo-T	Ni-T	P-T	K-T	Se-T	Ag-T	Na-T	Sr-T	Tl-T	Sn-T	Ti-T	U-T	V-T	Zn-T	Zr-T
	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
CCME-ISQG			**0.6**		**37.3**		**35.7**		**35**				**0.17**														**123**	
CCME-PEL			**3.5**		**90**		**197**		**91.3**				**0.486**														**315**	
W11-A	15-Aug-13	0.89	**2.52**	25400	**53**	3.26	**832**	82000	**413**	<5.0	7010	290	<0.050	25	32.3	941	485	1.43	0.936	3000	115	0.27	45.1	16.9	28.4	77.8	**409**	3.61
W11-B	15-Aug-13	0.85	**2.69**	14800	**53.9**	3.71	**785**	90000	**365**	<5.0	4090	186	<0.050	25.7	38.1	986	333	1.63	0.912	1000	71	0.312	44.2	16.6	27.2	79	**430**	3.77
W11-C	15-Aug-13	0.36	**3.58**	7890	31	13.7	**392**	63000	**170**	6.7	2250	397	0.131	22.1	88.8	1990	602	4.81	0.995	348	61.6	0.459	22	51.9	20	80.4	**464**	8.18
W11-Average	15-Aug-13	0.70	**2.93**	Fo	**46**	6.9	**670**	78333	**316**	3.9	4450	291	0.060	24.3	53.1	1306	473	2.62	0.948	1449	82.5	0.347	37.1	28.5	25.2	79.1	**434**	5.19
W12-A	15-Aug-13	0.74	**2.75**	12000	**51.5**	11.9	**546**	65500	**518**	6.6	3040	452	0.17	23.2	94.6	2840	629	5.3	0.745	510	78.6	0.477	54.2	53	8.84	172	**477**	5.57
W12-B	15-Aug-13	0.58	**3.48**	11300	**54.7**	17.5	**408**	88600	**353**	7.8	3170	666	**0.184**	23	100	2730	686	5.33	1.05	1380	76.3	0.52	37.7	45.8	12.2	212	**473**	6.1
W12-C	15-Aug-13	0.47	**3.25**	7300	**41.3**	18.3	**320**	71600	**193**	7.2	2040	694	**0.186**	22.2	94.3	2570	635	5.15	0.881	234	62.5	0.511	22.8	44.5	10.3	177	**432**	4.75
W12-Average	15-Aug-13	0.60	**3.16**	10200	**49.2**	15.9	**425**	75233	**355**	7.2	2750	604	**0.180**	22.8	96.3	2713	650	5.26	0.892	708	72.5	0.503	38.2	48	10.45	187	**461**	5.5
W13-A	14-Aug-13	0.72	**1.66**	20400	**68.3**	11	**646**	61900	**473**	13.5	6330	1150	0.075	13.7	76	1080	1390	2.17	0.321	874	96.3	0.401	72.3	130	5.69	71.1	**360**	8.94
W13-B	14-Aug-13	0.73	**1.65**	28500	**79.9**	11.6	**719**	48300	**246**	18	10200	763	0.092	15.9	92.6	1120	1920	2.39	0.4	2920	153	0.455	38.9	158	5.13	67.8	**353**	10.2
W13-C	14-Aug-13	1.1	**2.02**	14500	**75.4**	12.4	**856**	54600	**363**	17.8	5690	514	0.097	14.9	81	1140	1840	2.5	0.358	748	96.6	0.512	76	184	5.39	74	**408**	9.3
W13-Average	14-Aug-13	0.85	**1.78**	21133	**74.5**	11.7	**740**	54933	**361**	16.4	7407	809	0.088	14.8	83.2	1113	1717	2.35	0.360	1514	115.3	0.456	62.4	157	5.40	71.0	**374**	9.5

Appendix B4a. 2013 Daily Meteorological Data, Tom Valley Weather Station

Date	Rain, mm	Pressure, kPa			Wind Speed, m/s			Gust Speed, m/s			Wind Direction, ø			Solar Radiation, W/m²			Solar Radiation, W/m²2			Temp, °C [1]		
	Sum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Min	Avg	Max
1-Jan-13	0	83.74	84.51	84.85	0.56	2.16	3.71	2.23	4.98	9.65	3	68	355	0.6	3.7	25.6	0.6	3.2	21.9	-9.82	-7.86	-3.07
2-Jan-13	0	83.24	83.45	83.80	2.41	4.47	7.61	4.27	10.34	18.74	3	182	355	0.6	2.6	15.6	0.6	2.3	13.1	-10.58	-6.34	-3.15
3-Jan-13	0	83.85	84.22	84.41	1.11	2.40	3.53	2.78	4.35	6.31	20	58	355	0.6	3.2	16.9	0.6	2.7	13.1	-12.90	-11.71	-9.95
4-Jan-13	0	83.92	84.12	84.41	0.37	1.90	3.15	2.04	4.04	6.31	6	81	355	0.6	5.6	41.9	0.6	5.4	38.1	-11.11	-10.08	-9.00
5-Jan-13	0	83.44	84.10	84.54	0.37	1.55	3.15	2.6	3.96	7.61	3	100	344	0.6	2.4	14.4	0.6	2.2	13.1	-14.08	-10.68	-8.97
6-Jan-13	0	82.86	83.10	83.43	0.56	1.92	3.34	2.23	4.21	7.24	0	65	355	0.6	5.3	40.6	0.6	4.6	34.4	-10.90	-9.30	-8.56
7-Jan-13	0	82.48	82.60	82.86	0.19	1.30	2.6	1.11	2.99	5.2	1	92	355	0.6	5.1	30.6	0.6	4.6	26.9	-11.11	-10.28	-9.34
8-Jan-13	0	82.65	83.01	83.25	0.37	1.97	2.6	1.86	4.05	5.57	0	97	355	0.6	5.0	33.1	0.6	5.1	33.1	-13.13	-11.80	-10.41
9-Jan-13	0	83.30	83.85	84.44	0.56	2.05	3.15	2.04	4.35	7.79	7	71	354	0.6	7.4	64.4	0.6	6.5	55.6	-19.29	-15.55	-12.42
10-Jan-13	0	84.45	84.50	84.55	0.19	1.29	2.78	1.3	2.79	4.64	10	115	355	0.6	2.7	14.4	0.6	2.8	15.6	-25.79	-23.50	-19.89
11-Jan-13	0	84.47	84.52	84.57	0.56	1.21	2.6	1.67	3.27	5.57	3	71	177	0.6	4.0	24.4	0.6	4.7	29.4	-21.87	-18.54	-13.70
12-Jan-13	0	84.57	84.84	85.02	0.19	1.73	3.34	0.93	3.94	6.49	4	113	355	0.6	6.5	43.1	0.6	5.8	38.1	-17.51	-15.25	-13.35
13-Jan-13	0	84.03	84.47	84.82	0	1.22	3.71	0.93	3.35	6.86	4	161	355	0.6	4.4	33.1	0.6	4.3	29.4	-14.67	-10.35	-6.42
14-Jan-13	0	83.25	83.62	84.00	0	1.29	3.9	0.74	4.33	12.43	0	189	355	0.6	2.2	11.9	0.6	4.0	24.4	-8.80	-4.05	0.99
15-Jan-13	0	83.52	83.88	84.43	0	5.33	8.91	0	14.83	22.45	45	181	211	0.6	4.3	39.4	0.6	3.9	34.4	-10.27	-4.48	-1.02
16-Jan-13	0	84.10	84.63	84.88	0.37	2.44	4.82	1.67	5.65	13.92	15	64	190	0.6	4.9	33.1	0.6	4.2	26.9	-17.81	-14.97	-10.90
17-Jan-13	0	82.80	83.19	84.03	0.37	3.63	6.12	1.86	8.39	12.25	208	265	324	0.6	7.0	48.1	0.6	6.1	41.9	-17.34	-12.61	-10.79
18-Jan-13	0	83.20	84.10	84.88	0.19	2.40	6.86	1.3	5.23	11.32	6	133	313	0.6	10.3	71.9	0.6	9.0	61.9	-26.14	-21.47	-17.08
19-Jan-13	0	84.96	85.68	86.00	0.37	2.26	3.71	1.86	4.32	6.31	3	53	355	0.6	4.0	20.6	0.6	3.7	18.1	-30.55	-27.52	-24.00
20-Jan-13	0	84.65	85.27	85.85	0.19	0.77	1.67	1.11	2.36	3.53	11	120	344	0.6	8.7	68.1	0.6	7.7	59.4	-25.61	-19.56	-13.16
21-Jan-13	0	84.44	84.56	84.74	0.19	0.57	1.11	1.11	2.20	3.71	59	207	348	0.6	5.6	38.1	0.6	8.9	61.9	-15.55	-14.25	-12.60
22-Jan-13	0	84.13	84.54	84.76	0.37	1.15	2.04	1.48	4.45	9.09	0	199	345	0.6	7.1	45.6	0.6	8.7	55.6	-15.67	-14.29	-12.38
23-Jan-13	0	83.06	83.45	84.10	0.19	1.13	3.34	0.93	4.55	9.83	18	189	305	0.6	7.7	46.9	0.6	7.4	40.6	-15.79	-13.53	-10.55
24-Jan-13	0	83.05	83.16	83.29	0.19	0.91	2.78	1.3	2.86	6.49	15	157	348	0.6	7.5	66.9	0.6	11.9	105.6	-16.20	-13.08	-9.10
25-Jan-13	0	82.44	82.70	83.10	0	1.43	4.08	1.3	4.30	9.46	4	111	343	0.6	9.4	60.6	0.6	13.5	89.4	-10.79	-9.13	-6.96
26-Jan-13	0	82.47	82.64	83.03	0.37	1.18	2.97	1.48	3.70	7.61	7	190	355	0.6	7.3	43.1	0.6	11.0	60.6	-26.91	-18.93	-7.64
27-Jan-13	0	83.08	83.38	83.80	0.37	0.99	2.41	1.3	3.16	7.05	3	119	354	0.6	4.3	18.1	0.6	7.3	33.1	-34.43	-30.73	-26.97
28-Jan-13	0	83.84	84.68	85.31	0.56	1.71	2.6	2.23	3.76	5.38	8	45	343	0.6	4.1	19.4	0.6	6.5	30.6	-39.74	-38.07	-33.61
29-Jan-13	0	84.03	84.53	85.28	0.56	0.97	1.67	1.86	3.21	6.12	7	104	352	0.6	8.5	50.6	0.6	12.7	79.4	-38.51	-32.51	-28.40
30-Jan-13	0	84.20	84.37	84.45	0.37	0.93	1.67	1.48	3.02	4.45	25	151	350	0.6	11.2	51.9	0.6	15.3	71.9	-31.55	-25.09	-13.54
31-Jan-13	0	83.92	84.03	84.19	0.19	0.93	2.23	1.3	3.29	5.94	17	138	338	0.6	12.5	85.6	0.6	17.2	118.1	-16.70	-11.65	-7.61
1-Feb-13	0	83.95	84.42	84.68	1.3	2.38	4.27	2.97	4.96	8.72	0	92	355	0.6	20.6	170.6	0.6	18.3	148.1	-14.12	-11.11	-7.84
2-Feb-13	0	83.75	84.20	84.60	0	0.96	1.86	0	2.27	3.53	1	92	355	0.6	17.4	99.4	0.6	15.4	86.9	-10.02	-8.98	-7.77
3-Feb-13	0	82.82	83.26	83.73	0.19	1.46	2.23	1.11	3.59	6.31	1	139	355	0.6	14.9	95.6	0.6	15.1	93.1	-8.80	-6.17	-4.99
4-Feb-13	0	82.85	83.23	83.54	1.3	2.07	2.78	2.41	3.79	5.57	0	45	355	0.6	18.7	91.9	0.6	16.6	80.6	-8.76	-7.26	-5.70
5-Feb-13	0	83.27	83.40	83.54	0.19	1.48	2.78	1.3	2.86	4.27	0	88	355	0.6	23.1	158.1	0.6	20.2	138.1	-13.09	-10.55	-8.93
6-Feb-13	0	83.25	83.30	83.36	0.56	1.24	2.41	1.48	3.00	4.27	8	66	355	0.6	9.6	40.6	0.6	9.0	38.1	-17.81	-15.33	-12.71
7-Feb-13	0	83.23	83.32	83.42	0.56	1.69	3.15	2.04	4.31	8.16	0	55	333	0.6	23.4	124.4	0.6	20.9	111.9	-13.58	-11.31	-10.16
8-Feb-13	0	83.07	83.26	83.81	0.56	2.42	4.27	2.6	6.15	12.62	1	55	355	0.6	23.1	120.6	0.6	20.6	106.9	-10.55	-8.04	-6.77
9-Feb-13	0	83.83	84.21	84.44	0.37	1.76	3.15	1.86	4.56	7.79	0	103	345	0.6	21.4	118.1	0.6	19.3	104.4	-11.04	-8.55	-4.74
10-Feb-13	0	82.90	83.15	83.75	2.6	5.27	7.79	6.31	13.15	18.92	0	181	355	0.6	25.3	129.4	0.6	21.9	111.9	-4.44	-2.46	-1.07
11-Feb-13	0	83.20	83.29	83.44	1.48	2.68	3.9	2.97	5.90	9.28	0	126	355	0.6	26.6	196.9	0.6	23.2	170.6	Sensor failure		
12-Feb-13	0	83.31	83.44	83.80	1.3	2.26	3.15	2.6	3.75	4.45	15	32	45	0.6	18.4	98.1	0.6	16.2	86.9			
13-Feb-13	0	83.84	84.34	84.61	1.48	2.36	3.15	2.97	4.43	5.75	3	34	341	0.6	16.9	113.1	0.6	15.1	100.6			
14-Feb-13	0	83.50	84.26	84.62	0.56	1.75	4.08	1.48	4.37	9.09	7	86	350	0.6	28.6	138.1	0.6	25.1	119.4			
15-Feb-13	0	83.39	83.45	83.52	0.74	2.45	5.01	1.86	5.79	9.28	4	80	355	0.6	35.6	244.4	0.6	30.9	210.6			
16-Feb-13	0	83.45	83.86	84.22	0.19	1.42	2.78	1.11	3.00	4.45	3	70	354	0.6	27.5	116.9	0.6	27.3	118.1			
17-Feb-13	0	83.64	83.98	84.28	1.3	2.24	3.71	3.15	4.76	6.86	13	262	355	0.6	33.2	173.1	0.6	29.0	149.4			
18-Feb-13	0	83.61	83.69	83.85	0.19	1.38	2.97	1.3	2.81	5.2	21	128	355	0.6	24.6	109.4	0.6	32.9	146.9			

Appendix B4a. 2013 Daily Meteorological Data, Tom Valley Weather Station

Date	Rain, mm	Pressure, kPa			Wind Speed, m/s			Gust Speed, m/s			Wind Direction, ø			Solar Radiation, W/m²			Solar Radiation, W/m²2			Temp, °C [1]		
	Sum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Min	Avg	Max
19-Feb-13	0	83.10	83.58	83.90	0.37	0.72	2.78	1.3	2.05	3.71	8	129	337	0.6	15.2	59.4	0.6	29.7	120.6			
20-Feb-13	0	82.35	82.61	83.05	0	0.62	2.78	0	2.12	6.31	3	151	355	0.6	34.7	213.1	0.6	39.2	186.9			
21-Feb-13	0.5	82.37	82.48	82.56	0.19	1.39	4.08	1.11	4.02	8.35	1	122	350	0.6	44.6	264.4	0.6	45.7	246.9			
22-Feb-13	0.25	82.15	82.30	82.58	0.74	2.60	4.08	2.78	5.60	6.86	4	214	355	0.6	44.7	203.1	0.6	39.3	179.4			
23-Feb-13	0	82.65	82.92	83.07	0.37	1.15	3.9	1.48	3.02	6.86	3	171	355	0.6	36.0	191.9	0.6	36.3	178.1			
24-Feb-13	0	82.80	83.08	83.45	0.56	1.55	2.78	1.86	3.22	5.2	0	124	355	0.6	34.8	163.1	0.6	36.9	158.1			
25-Feb-13	0	83.48	83.89	84.26	0.74	2.31	3.9	2.04	3.78	5.75	1	25	94	0.6	54.3	293.1	0.6	48.3	255.6			
26-Feb-13	0	83.92	84.18	84.32	1.11	2.61	3.9	3.34	4.95	8.35	0	66	350	0.6	37.9	335.6	0.6	32.0	265.6			
27-Feb-13	0	83.57	83.73	83.89	0.74	1.83	4.08	2.04	4.24	7.61	1	157	355	0.6	49.2	328.1	0.6	42.0	273.1			
28-Feb-13	0	83.33	83.49	83.59	0.19	1.28	4.08	1.3	2.98	7.42	3	190	355	0.6	41.8	190.6	0.6	40.6	178.1			
1-Mar-13	0	83.34	83.76	84.14	0.74	2.27	4.64	2.23	5.30	8.91	3	118	355	0.6	45.2	219.4	0.6	39.8	193.1			
2-Mar-13	0	84.18	84.48	84.81	0.93	1.86	2.6	2.23	3.69	5.57	6	31	315	0.6	49.4	251.9	0.6	43.6	220.6			
3-Mar-13	0	84.84	85.16	85.55	0.37	2.10	3.34	1.11	3.56	4.82	6	51	192	0.6	66.8	366.9	0.6	57.5	304.4			
4-Mar-13	0	85.22	85.55	85.73	0.93	1.69	2.41	2.41	4.47	7.05	4	83	352	0.6	57.1	238.1	0.6	50.4	210.6			
5-Mar-13	0	84.40	84.74	85.17	1.3	2.43	3.34	3.15	4.34	6.12	4	127	348	0.6	57.1	288.1	0.6	50.3	253.1			
6-Mar-13	0	84.24	84.28	84.38	0.37	2.16	3.34	1.67	3.90	5.01	11	67	340	0.6	60.2	370.6	0.6	52.2	314.4			
7-Mar-13	0	84.04	84.22	84.31	0.74	1.89	3.53	1.86	3.87	5.01	7	42	299	0.6	59.2	400.6	0.6	53.4	338.1			
8-Mar-13	0	83.89	83.99	84.08	0.74	1.76	3.15	2.04	3.81	6.86	1	72	348	0.6	77.6	348.1	0.6	66.5	295.6			
9-Mar-13	0.25	84.07	84.15	84.20	0.56	2.26	3.53	2.04	4.61	7.05	1	151	355	0.6	69.1	273.1	0.6	59.3	231.9			
10-Mar-13	0.25	84.06	84.39	84.70	1.3	1.92	2.97	3.15	5.71	8.53	17	64	351	0.6	77.6	488.1	0.6	68.3	428.1			
11-Mar-13	0	84.57	84.66	84.74	0.74	2.58	6.49	2.78	5.14	11.32	0	101	355	0.6	96.9	436.9	0.6	83.1	376.9			
12-Mar-13	0	84.58	84.72	84.81	1.48	3.87	5.57	4.08	8.54	14.84	24	158	246	0.6	83.5	439.4	0.6	64.2	354.4			
13-Mar-13	0	84.22	84.42	84.80	1.48	2.86	4.27	3.9	5.77	7.98	21	181	355	0.6	84.2	446.9	0.6	68.5	361.9			
14-Mar-13	0	84.88	85.03	85.19	0.93	1.55	2.6	2.41	4.72	8.91	7	165	355	0.6	82.7	454.4	0.6	67.7	368.1			
15-Mar-13	0	84.54	84.81	84.95	0.74	1.79	2.97	2.97	5.81	10.95	4	172	355	0.6	83.6	451.9	0.6	68.7	366.9			
16-Mar-13	0	84.18	84.29	84.57	0.93	1.79	3.15	2.23	4.45	7.79	1	85	351	0.6	91.9	501.9	0.6	75.8	406.9			
17-Mar-13	0	83.93	84.20	84.32	1.48	2.53	3.34	3.53	4.34	5.38	1	54	355	0.6	87.8	471.9	0.6	72.6	383.1			
18-Mar-13	0	83.57	83.66	83.90	1.11	2.52	3.71	2.97	4.22	5.57	3	87	355	0.6	103.2	494.4	0.6	81.6	405.6			
19-Mar-13	0	83.56	83.58	83.60	0.74	2.26	3.71	2.23	3.61	4.82	3	31	66	0.6	97.8	481.9	0.6	82.9	400.6			
20-Mar-13	0	83.40	83.50	83.67	0.56	2.27	3.34	1.48	3.66	4.82	1	41	355	0.6	118.3	505.6	0.6	91.1	416.9			
21-Mar-13	0	83.69	84.23	84.83	0.74	2.64	3.71	3.34	4.04	4.64	13	57	331	0.6	128.8	505.6	0.6	105.6	418.1			
22-Mar-13	0	84.76	84.86	84.98	0.74	2.52	3.71	2.23	4.14	5.01	14	27	37	0.6	128.9	495.6	0.6	107.7	409.4			
23-Mar-13	0	84.56	84.63	84.75	0.74	1.71	2.78	1.86	3.64	4.82	1	38	352	0.6	131.0	499.4	0.6	109.1	411.9			
24-Mar-13	0	84.49	84.61	84.70	0.74	1.84	3.34	2.04	4.18	6.49	4	29	41	0.6	125.7	454.4	0.6	104.8	375.6			
25-Mar-13	0	83.60	84.03	84.45	1.11	3.43	5.38	2.78	6.84	10.02	3	226	355	0.6	119.1	476.9	0.6	100.3	393.1			
26-Mar-13	0	83.32	83.53	83.90	2.04	3.84	5.57	4.08	9.03	14.47	0	174	352	0.6	90.8	306.9	0.6	80.5	270.6			
27-Mar-13	0	83.99	84.28	84.41	1.48	2.08	3.71	2.41	4.16	10.39	4	82	352	0.6	144.0	569.4	0.6	125.4	488.1			
28-Mar-13	0	84.44	84.60	84.69	1.11	2.37	3.53	2.78	4.91	7.61	3	108	355	0.6	137.8	559.4	0.6	119.4	480.6			
29-Mar-13	0.51	84.59	84.74	84.90	0.93	2.58	3.71	3.34	4.28	5.2	3	71	355	0.6	145.2	554.4	0.6	124.4	468.1			
30-Mar-13	1.52	84.55	84.80	85.10	0	1.39	2.41	1.11	3.65	6.49	1	150	355	0.6	111.8	556.9	0.6	106.8	474.4			
31-Mar-13	0.25	84.93	85.12	85.21	1.67	2.27	3.15	2.78	4.07	5.94	10	69	355	0.6	166.0	725.6	0.6	143.3	623.1			
1-Apr-13	0	83.80	84.30	84.89	1.48	2.89	5.2	4.45	6.66	9.83	8	206	281	0.6	117.4	420.6	0.6	102.4	368.1			
2-Apr-13	0.25	83.77	84.25	84.77	0.37	3.66	6.12	1.67	7.34	11.32	32	200	355	0.6	146.6	581.9	0.6	126.5	485.6			
3-Apr-13	0	84.80	84.87	85.00	0	2.07	5.57	0	4.50	10.39	6	121	247	0.6	141.7	520.6	0.6	122.3	444.4			
4-Apr-13	0	84.49	84.89	85.11	1.3	2.36	4.64	3.34	5.73	10.76	11	126	348	0.6	160.5	601.9	0.6	137.0	499.4			
5-Apr-13	0	83.63	83.93	84.45	1.3	2.80	5.2	3.53	6.61	10.2	6	260	355	0.6	152.8	608.1	0.6	138.8	503.1			
6-Apr-13	0	83.55	83.62	83.81	0.19	2.17	4.27	1.67	5.88	11.13	6	202	340	0.6	147.5	579.4	0.6	128.4	481.9			
7-Apr-13	0.76	83.85	84.18	84.38	0.56	1.59	5.01	1.86	3.67	8.16	0	204	355	0.6	172.5	616.9	0.6	149.3	510.6			
8-Apr-13	0	83.85	84.16	84.37	2.6	4.18	6.49	4.64	7.79	11.69	0	245	355	0.6	151.1	624.4	0.6	127.9	516.9			

Appendix B4a. 2013 Daily Meteorological Data, Tom Valley Weather Station

Date	Rain, mm	Pressure, kPa			Wind Speed, m/s			Gust Speed, m/s			Wind Direction, ø			Solar Radiation, W/m²			Solar Radiation, W/m²2			Temp, °C [1]		
	Sum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Min	Avg	Max
9-Apr-13	0.5	82.00	82.70	83.79	0	4.35	7.61	0	9.37	22.26	0	321	355	0.6	116.9	400.6	0.6	104.0	353.1			
10-Apr-13	0	82.35	82.96	83.57	2.97	4.97	7.42	7.24	11.51	21.15	1	91	355	0.6	159.1	575.6	0.6	140.8	503.1			
11-Apr-13	0	83.59	83.96	84.17	1.86	3.17	5.38	3.15	7.71	12.99	1	182	355	0.6	168.7	618.1	0.6	148.2	536.9			
12-Apr-13	0	84.16	84.27	84.56	1.48	2.55	4.27	2.97	4.96	8.35	3	186	355	0.6	174.6	655.6	0.6	156.8	566.9			
13-Apr-13	1.27	84.60	84.95	85.17	0.56	1.89	4.64	1.48	4.10	8.53	6	152	355	0.6	174.9	664.4	0.6	157.1	560.6			
14-Apr-13	0	85.19	85.43	85.68	0.56	1.92	3.34	1.3	3.69	5.94	7	80	334	0.6	186.1	666.9	0.6	164.3	561.9			
15-Apr-13	0	85.69	85.79	85.89	0.93	2.29	4.64	2.23	5.84	8.35	1	244	355	0.6	165.6	576.9	0.6	143.9	493.1			
16-Apr-13	0	84.93	85.36	85.70	1.48	3.59	5.01	5.38	7.55	9.46	3	280	355	0.6	193.7	668.1	0.6	172.0	568.1			
17-Apr-13	0.25	84.45	84.58	84.86	2.04	3.52	5.2	6.12	7.87	9.65	229	282	317	0.6	175.1	536.9	0.6	155.1	475.6			
18-Apr-13	0	84.34	84.50	84.67	2.04	3.13	4.08	5.94	7.88	10.2	181	259	324	0.6	174.6	546.9	0.6	155.0	480.6			
19-Apr-13	0	84.40	84.83	85.34	2.04	4.29	7.05	5.57	10.04	14.47	32	198	351	0.6	169.1	671.9	0.6	147.7	585.6			
20-Apr-13	0.25	85.38	85.52	85.64	0.93	2.30	3.15	2.97	4.40	6.68	1	119	355	0.6	193.1	684.4	0.6	179.0	581.9			
21-Apr-13	0	85.29	85.33	85.44	1.3	2.43	3.53	3.15	4.59	6.12	8	95	355	0.6	198.4	708.1	0.6	181.2	585.6			
22-Apr-13	0	85.35	85.56	85.72	1.48	2.44	3.53	3.53	6.45	10.2	1	74	333	0.6	196.1	700.6	0.6	180.8	588.1			
23-Apr-13	0	85.00	85.57	85.81	1.48	2.26	3.15	3.34	6.64	10.2	4	106	355	0.6	217.2	718.1	0.6	198.2	601.9			
24-Apr-13	0.5	83.56	84.04	84.94	1.3	2.66	5.94	3.53	8.86	18.18	6	111	285	0.6	159.3	434.4	0.6	141.6	385.6			
25-Apr-13	0	83.50	83.56	83.61	1.48	3.19	4.64	3.9	6.73	10.76	27	155	293	0.6	204.7	751.9	0.6	192.4	655.6			
26-Apr-13	0.25	82.85	83.21	83.60	0.37	1.59	3.71	1.48	3.91	8.35	1	88	355	0.6	220.4	739.4	0.6	198.7	625.6			
27-Apr-13	0	82.85	83.27	83.66	0.74	1.93	3.34	2.6	4.58	7.42	10	131	350	0.6	230.3	725.6	0.6	211.2	618.1			
28-Apr-13	0	83.55	83.70	84.06	0.74	3.14	6.12	2.6	7.46	11.32	25	221	347	0.6	221.4	744.4	0.6	190.8	630.6			
29-Apr-13	0	84.09	84.43	84.62	0.37	2.02	3.15	1.67	3.73	5.75	6	152	355	0.6	227.9	761.9	0.6	208.8	635.6			
30-Apr-13	0	84.34	84.47	84.60	0	2.18	3.15	0	4.89	7.79	0	117	355	0.6	201.3	610.6	0.6	182.9	525.6			
1-May-13	1.26	83.82	84.15	84.34	0.19	2.00	3.71	2.04	4.99	8.72	1	175	355	0.6	205.7	750.6	0.6	186.4	661.9			
2-May-13	5.32	83.79	84.15	84.75	0	3.11	5.2	0	7.20	12.25	4	59	355	0.6	165.9	476.9	0.6	151.0	425.6			
3-May-13	0	84.78	85.02	85.19	3.53	4.75	6.12	8.35	11.24	14.1	0	194	355	0.6	150.0	494.4	0.6	132.4	434.4			
4-May-13	3.8	84.11	84.47	84.93	1.11	3.90	7.98	3.53	9.28	16.88	0	142	355	0.6	140.8	413.1	0.6	120.3	356.9			
5-May-13	0.25	84.12	84.37	84.55	1.11	3.26	6.49	4.45	8.71	16.88	1	100	355	0.6	178.2	500.6	0.6	152.8	435.6			
6-May-13	0	84.53	84.72	84.96	1.48	2.14	2.97	3.53	5.52	7.79	11	73	352	0.6	275.4	1005.6	0.6	232.9	839.4			
7-May-13	0	84.97	85.16	85.29	1.48	2.21	3.15	3.71	5.04	7.05	0	96	355	0.6	245.1	898.1	0.6	218.6	724.4			
8-May-13	0	85.26	85.30	85.37	1.11	2.23	3.34	2.78	4.58	8.35	6	150	355	0.6	227.1	764.4	0.6	207.8	626.9			
9-May-13	0	85.38	85.83	86.06	1.11	2.31	3.71	2.04	4.14	6.31	3	91	352	0.6	261.0	805.6	0.6	221.5	619.4			
10-May-13	0	85.20	85.66	86.02	0	1.89	3.71	0.19	3.47	5.38	18	68	331	0.6	265.3	770.6	0.6	219.6	605.6			
11-May-13	0	83.93	84.54	85.16	0.37	1.99	3.9	1.48	4.41	8.72	1	156	355	0.6	252.1	771.9	0.6	200.3	569.4			
12-May-13	4.55	83.30	83.43	83.87	0	1.27	2.97	0	3.23	6.86	0	113	355	0.6	159.8	516.9	0.6	120.3	378.1			
13-May-13	2.53	83.31	83.36	83.44	1.3	2.74	4.27	3.71	6.88	10.02	0	219	355	0.6	212.8	830.6	0.6	157.5	590.6			
14-May-13	2.04	83.41	83.62	83.83	0.93	3.36	5.38	2.97	8.72	14.66	0	222	355	0.6	226.0	953.1	0.6	176.8	736.9			
15-May-13	2.02	83.81	83.92	84.16	0	2.68	3.9	0	6.30	10.02	1	153	355	0.6	182.3	739.4	0.6	158.4	639.4			
16-May-13	2.03	84.17	84.24	84.35	0	1.99	4.27	0	4.54	8.53	1	170	355	0.6	225.2	851.9	0.6	199.2	731.9			
17-May-13	0	84.06	84.09	84.14	2.04	3.81	5.01	3.53	8.01	10.95	1	282	355	0.6	302.0	818.1	0.6	228.9	591.9			
18-May-13	2.03	84.06	84.14	84.39	1.48	3.08	4.82	4.27	8.01	12.8	0	271	355	0.6	228.2	933.1	0.6	164.3	648.1			
19-May-13	1.52	84.43	85.00	85.60	1.48	3.06	5.2	5.38	7.99	10.76	3	146	355	0.6	222.3	828.1	0.6	184.1	680.6			
20-May-13	0	85.66	85.91	86.10	0.93	1.78	2.97	2.97	5.23	9.28	1	124	354	0.6	218.1	601.9	0.6	183.2	504.4			
21-May-13	0	85.97	86.12	86.22	0.56	1.52	2.78	1.48	3.18	5.75	3	177	352	0.6	290.3	840.6	0.6	232.5	641.9			
22-May-13	0.5	85.04	85.49	85.94	0.93	2.20	3.53	2.23	5.46	10.39	6	175	354	0.6	168.0	506.9	0.6	136.3	400.6			
23-May-13	3.29	85.04	85.20	85.35	0	1.48	3.53	0.19	3.44	7.05	10	126	352	0.6	180.0	516.9	0.6	151.0	436.9			
24-May-13	0	85.32	85.37	85.43	0.93	2.08	2.97	1.86	4.30	7.24	0	118	355	0.6	274.5	765.6	0.6	204.6	545.6			
25-May-13	0	85.16	85.31	85.40	1.3	2.59	4.27	3.71	4.96	6.31	11	149	355	0.6	230.4	871.9	0.6	158.9	596.9			
26-May-13	0	85.04	85.14	85.20	1.67	3.12	4.27	3.9	5.17	6.49	1	38	355	0.6	246.0	785.6	0.6	175.5	526.9			
27-May-13	0	84.70	84.89	85.03	1.11	2.31	3.71	3.53	4.55	5.94	4	77	355	0.6	259.1	834.4	0.6	184.4	561.9			

Appendix B4a. 2013 Daily Meteorological Data, Tom Valley Weather Station

Date	Rain, mm	Pressure, kPa			Wind Speed, m/s			Gust Speed, m/s			Wind Direction, ø			Solar Radiation, W/m²			Solar Radiation, W/m²2			Temp, °C [1]		
	Sum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Min	Avg	Max
28-May-13	0	84.64	84.69	84.73	1.3	2.52	3.53	4.08	5.41	6.86	7	205	352	0.6	246.3	763.1	0.6	180.9	501.9			
29-May-13	0	84.69	84.76	84.84	0.93	2.91	4.45	2.78	4.73	6.86	0	87	355	0.6	271.5	815.6	0.6	176.8	511.9			
30-May-13	0	84.85	85.09	85.28	0.74	2.65	3.34	2.23	4.51	6.31	4	68	352	0.6	212.4	734.4	0.6	138.3	461.9			
31-May-13	0	85.14	85.31	85.42	2.04	3.22	4.27	3.53	4.87	6.31	1	55	352	0.6	262.0	825.6	0.6	166.4	483.1			
1-Jun-13	3.56	85.00	85.12	85.36	1.11	2.57	4.64	2.78	5.54	10.39	6	96	355	0.6	149.7	486.9	0.6	79.9	256.9			
2-Jun-13	0	85.39	85.50	85.62	1.48	2.41	3.9	3.53	5.79	9.46	1	100	355	0.6	236.0	926.9	0.6	79.8	311.9			
3-Jun-13	0	84.61	85.07	85.41	0.74	2.18	3.71	2.78	3.97	6.49	1	150	355	0.6	161.1	520.6	0.6	28.1	95.6			
4-Jun-13	0.76	84.12	84.34	84.56	2.04	3.22	4.08	4.45	7.68	11.13	0	111	355	0.6	173.5	893.1	0.6	21.1	101.9			
5-Jun-13	3.3	84.17	84.33	84.54	1.11	2.49	4.82	3.34	6.53	12.8	0	88	355	0.6	177.5	813.1	0.6	19.4	85.6			
6-Jun-13	0.75	84.45	84.60	84.72	1.11	1.73	2.97	2.78	3.74	5.38	3	96	355	0.6	164.6	961.9	0.6	16.7	93.1			
7-Jun-13	0	84.44	84.53	84.74	0.74	2.26	3.34	2.23	4.27	10.76	10	155	355	0.6	266.8	809.4	0.6	31.2	81.9			
8-Jun-13	1.78	84.84	85.07	85.34	0.56	2.37	4.82	1.86	5.10	9.65	0	173	351	0.6	187.2	731.9	0.6	19.3	76.9			
9-Jun-13	0.51	85.35	85.44	85.58	0.37	1.92	4.08	1.3	4.45	8.91	0	115	348	0.6	219.9	854.4	0.6	22.9	88.1			
10-Jun-13	1.01	85.35	85.50	85.65	0.93	2.10	4.27	3.34	5.47	8.91	7	194	351	0.6	295.7	924.4	0.6	30.9	94.4			
11-Jun-13	0	85.30	85.38	85.45	0.74	2.40	4.08	1.67	5.03	8.72	6	153	354	0.6	274.0	1018.1	0.6	31.4	104.4			
12-Jun-13	0	85.22	85.36	85.49	0.93	2.33	3.34	3.34	5.21	7.05	0	148	351	0.6	260.3	1095.6	0.6	26.1	113.1			
13-Jun-13	5.33	85.25	85.30	85.43	1.11	2.29	4.08	3.34	6.36	11.69	8	203	354	0.6	173.9	698.1	0.6	17.4	80.6			
14-Jun-13	2.53	85.40	85.64	85.87	0.56	1.92	3.53	1.86	4.52	9.28	4	125	350	0.6	180.7	889.4	0.6	18.0	90.6			
15-Jun-13	0	85.86	85.94	86.04	1.11	2.12	3.34	1.86	4.60	7.42	28	149	340	0.6	284.1	796.9	0.6	29.6	81.9			
16-Jun-13	0.25	85.12	85.62	85.86	0.74	2.71	4.08	2.23	6.12	11.5	23	138	347	0.6	141.4	528.1	0.6	15.2	56.9			
17-Jun-13	12.19	84.95	85.34	85.69	1.86	5.24	7.61	3.34	12.72	16.7	42	159	199	0.6	131.7	511.9	0.6	13.3	53.1			
18-Jun-13	0	85.70	85.79	85.85	1.67	2.88	5.38	3.34	6.88	10.76	0	149	355	0.6	167.1	878.1	0.6	17.0	86.9			
19-Jun-13	0	85.37	85.56	85.74	0.93	2.21	3.53	2.23	4.83	8.16	7	130	340	0.6	306.1	928.1	0.6	31.4	93.1			
20-Jun-13	0	85.30	85.44	85.57	1.86	2.63	3.71	3.53	5.12	7.61	1	124	345	0.6	259.5	771.9	0.6	27.4	78.1			
21-Jun-13	3.56	85.12	85.21	85.34	0.56	2.64	3.9	2.6	5.64	9.83	0	101	355	0.6	159.7	868.1	0.6	15.4	74.4			
22-Jun-13	0	84.71	84.98	85.17	1.3	2.25	2.78	2.97	4.67	6.31	0	153	355	0.6	257.7	930.6	0.6	27.2	93.1			
23-Jun-13	3.56	84.41	84.58	84.71	0.93	2.05	4.82	2.04	4.95	19.48	8	166	355	0.6	193.4	688.1	0.6	23.0	73.1			
24-Jun-13 [2]	0	84.46	84.50	84.54	1.11	2.42	3.71	1.86	4.61	8.91	21	157	343	0.6	352.9	939.4	0.6	37.8	95.6			
25-Jun-13																						
26-Jun-13																						
27-Jun-13	0	85.09	85.12	85.17	1.11	2.07	3.15	3.15	4.95	6.86	6	92	226	14.4	243.9	836.9	0.6	24.7	85.6	20.63	22.66	24.65
28-Jun-13	4.31	85.21	85.34	85.42	1.67	2.29	3.71	3.34	5.23	7.42	1	176	355	0.6	149.7	870.6	0.6	17.6	89.4	12.97	17.68	22.20
29-Jun-13	7.62	85.11	85.26	85.38	0.19	1.72	5.94	1.67	4.29	13.73	3	108	330	0.6	185.4	743.1	0.6	22.1	81.9	10.64	13.62	18.65
30-Jun-13	0	85.25	85.38	85.50	1.3	2.31	2.97	2.78	5.30	9.65	3	193	355	0.6	258.1	964.4	0.6	27.2	98.1	10.00	15.05	19.58
1-Jul-13	0.25	84.37	84.81	85.27	2.04	3.12	4.82	4.08	6.68	11.69	0	140	355	0.6	147.5	840.6	0.6	16.0	88.1	10.37	14.96	18.46
2-Jul-13	5.84	84.10	84.24	84.39	2.04	3.89	5.2	6.68	9.17	13.17	0	247	355	0.6	109.3	709.4	0.6	9.6	65.6	5.98	8.59	12.73
3-Jul-13	0	84.43	84.69	84.84	1.11	2.19	3.53	2.97	5.16	7.05	0	162	355	0.6	115.0	693.1	0.6	12.1	75.6	6.84	8.56	10.27
4-Jul-13	0.51	84.85	84.93	85.05	0.74	1.40	2.23	2.23	3.91	6.86	3	129	347	0.6	64.6	216.9	0.6	5.9	21.9	5.82	7.28	8.44
5-Jul-13	0.5	85.07	85.19	85.31	0.37	1.68	2.6	1.86	4.28	8.91	14	122	340	0.6	139.8	580.6	0.6	13.8	61.9	6.03	8.44	11.57
6-Jul-13	4.57	85.05	85.16	85.25	0	1.81	3.15	0.93	4.39	7.98	0	128	354	0.6	129.9	784.4	0.6	13.2	80.6	7.07	10.04	13.69
7-Jul-13	0	84.62	84.85	85.04	0.93	2.47	3.71	2.23	5.05	8.72	0	208	350	0.6	194.7	825.6	0.6	20.9	84.4	7.77	12.18	16.51
8-Jul-13	1.27	84.52	84.59	84.66	1.67	2.56	3.9	3.71	5.98	8.91	4	114	355	0.6	174.3	701.9	0.6	20.5	80.6	9.41	11.88	14.27
9-Jul-13	8.37	84.58	84.67	84.78	0.56	2.51	4.08	1.67	6.15	10.76	1	152	355	0.6	136.4	590.6	0.6	12.8	61.9	6.18	7.38	8.82
10-Jul-13	6.35	84.58	84.70	84.79	0.56	1.79	3.53	1.86	4.01	9.46	6	125	222	0.6	104.8	319.4	0.6	10.0	34.4	5.05	6.93	9.31
11-Jul-13	3.04	84.43	84.60	84.81	0.93	4.00	5.94	3.34	12.06	20.04	136	171	258	0.6	239.4	1100.6	0.6	24.7	115.6	5.72	8.14	9.88
12-Jul-13	0	84.85	85.00	85.30	1.3	3.45	5.01	5.94	9.39	14.47	132	181	298	0.6	200.3	861.9	0.6	21.8	95.6	1.53	3.61	6.10
13-Jul-13	0	85.34	85.52	85.62	0.74	1.85	3.15	2.04	5.08	8.72	3	227	354	0.6	273.6	756.9	0.6	28.8	76.9	-0.73	5.78	11.69
14-Jul-13	0	85.37	85.44	85.52	0.74	2.58	4.64	2.97	5.99	10.2	3	141	350	0.6	230.2	743.1	0.6	24.8	75.6	7.47	12.23	16.73

Appendix B4a. 2013 Daily Meteorological Data, Tom Valley Weather Station

Date	Rain, mm	Pressure, kPa			Wind Speed, m/s			Gust Speed, m/s			Wind Direction, ø			Solar Radiation, W/m²			Solar Radiation, W/m²2			Temp, °C [1]		
	Sum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Min	Avg	Max
15-Jul-13	0	85.46	85.51	85.61	0.74	2.84	5.2	3.34	6.36	10.39	6	122	206	0.6	269.7	866.9	0.6	29.3	88.1	11.32	14.66	19.20
16-Jul-13	0.25	85.34	85.48	85.59	0.19	1.79	3.15	1.11	4.33	9.65	1	113	336	0.6	172.1	860.6	0.6	19.8	89.4	11.52	14.11	17.32
17-Jul-13	6.1	85.10	85.30	85.42	0.74	1.87	2.97	1.86	4.45	6.68	3	137	352	0.6	161.9	629.4	0.6	19.9	71.9	10.93	14.39	17.92
18-Jul-13	7.34	85.10	85.30	85.59	0	1.77	3.9	0	4.58	8.91	1	137	275	0.6	113.2	648.1	0.6	9.8	68.1	9.63	10.90	13.04
19-Jul-13	1.02	85.18	85.41	85.60	0.37	1.77	3.34	1.86	4.38	9.28	1	107	354	0.6	169.6	695.6	0.6	17.8	71.9	8.97	11.46	14.91
20-Jul-13	6.86	84.78	84.97	85.16	0.19	1.52	2.6	1.11	3.66	6.49	7	115	355	0.6	102.2	406.9	0.6	10.2	43.1	8.52	10.20	12.53
21-Jul-13	14.73	84.66	84.85	85.23	1.48	4.26	6.49	4.82	10.45	14.47	31	152	351	0.6	81.7	221.9	0.6	6.7	21.9	8.37	9.20	9.85
22-Jul-13	0.25	85.25	85.49	85.63	1.3	2.82	5.01	3.34	6.42	10.2	20	148	184	0.6	167.1	709.4	0.6	17.9	73.1	7.95	10.98	14.82
23-Jul-13	0.51	85.55	85.62	85.69	0	1.81	3.53	1.67	4.31	9.28	3	145	350	0.6	153.7	734.4	0.6	18.8	75.6	7.57	11.63	14.94
24-Jul-13	9.65	85.18	85.45	85.62	0.74	1.77	3.53	1.67	4.31	12.06	0	129	355	0.6	205.3	795.6	0.6	22.9	84.4	10.47	14.52	19.32
25-Jul-13	6.86	85.13	85.20	85.38	0.74	2.40	4.08	2.6	5.64	8.72	1	149	355	0.6	176.0	760.6	0.6	18.8	79.4	8.54	10.91	14.24
26-Jul-13	0	85.26	85.35	85.47	0.74	1.70	2.97	2.23	4.12	7.24	4	125	341	0.6	97.0	314.4	0.6	9.7	33.1	7.47	10.73	15.18
27-Jul-13	0.25	85.50	85.63	85.78	0.56	1.81	3.34	2.04	4.67	8.72	7	116	253	0.6	148.0	699.4	0.6	15.3	73.1	8.52	11.31	14.00
28-Jul-13	0	85.68	85.78	85.84	1.11	2.49	3.34	2.97	5.27	8.35	4	117	355	0.6	185.1	809.4	0.6	20.4	86.9	9.14	12.39	15.87
29-Jul-13	0.25	85.49	85.63	85.74	1.3	2.66	5.01	3.15	6.25	15.59	11	122	355	0.6	218.2	753.1	0.6	24.3	80.6	10.57	14.27	19.87
30-Jul-13	0	85.58	85.67	85.75	1.48	2.27	3.53	2.97	5.54	9.46	1	100	275	0.6	144.5	506.9	0.6	16.1	55.6	11.95	14.82	17.77
31-Jul-13	1.27	85.46	85.67	85.81	0.56	2.05	3.34	1.48	4.21	7.24	24	146	343	0.6	129.8	784.4	0.6	19.2	81.9	11.64	15.18	19.18
1-Aug-13	8.13	85.36	85.44	85.58	0.37	1.55	2.78	1.3	4.23	9.46	7	113	354	0.6	124.8	493.1	0.6	12.1	51.9	10.35	12.54	15.13
2-Aug-13	0	85.36	85.42	85.46	0.93	1.82	2.97	2.6	4.03	5.94	3	146	341	0.6	211.1	824.4	0.6	24.7	85.6	9.71	14.44	19.39
3-Aug-13	0	85.20	85.36	85.48	1.48	2.71	3.53	3.53	5.85	9.65	6	201	355	0.6	190.6	800.6	0.6	21.2	84.4	12.61	17.20	20.96
4-Aug-13	0	85.14	85.20	85.25	2.04	2.49	2.97	3.9	5.56	10.2	0	85	355	0.6	221.1	854.4	0.6	24.2	89.4	13.31	16.82	19.27
5-Aug-13	2.54	85.18	85.22	85.35	0.37	1.61	3.15	1.86	3.60	6.68	6	192	355	0.6	86.8	311.9	0.6	8.9	33.1	11.61	14.35	16.58
6-Aug-13	1.01	85.36	85.47	85.53	0.56	1.86	4.08	1.48	4.52	9.28	24	148	319	0.6	187.6	949.4	0.6	22.2	99.4	9.71	14.29	18.65
7-Aug-13	0	85.34	85.51	85.60	1.67	2.37	3.71	3.15	5.30	6.86	3	187	355	0.6	164.1	714.4	0.6	18.3	75.6	13.21	15.99	18.87
8-Aug-13	0	85.05	85.23	85.37	1.86	2.83	4.64	2.78	5.89	9.46	0	112	355	0.6	205.8	696.9	0.6	22.8	74.4	11.57	14.05	18.25
9-Aug-13	6.85	84.99	85.03	85.11	0	1.45	4.64	0	3.76	12.25	0	149	355	0.6	79.9	293.1	0.6	7.1	28.1	8.17	10.10	11.95
10-Aug-13	0	85.12	85.26	85.40	0.56	2.06	3.15	1.86	3.67	4.82	0	114	352	0.6	191.6	655.6	0.6	21.2	69.4	9.16	13.64	18.25
11-Aug-13	0	85.44	85.55	85.61	0.93	2.24	3.34	2.04	4.15	6.31	20	125	336	0.6	208.4	649.4	0.6	22.8	68.1	12.56	17.17	21.68
12-Aug-13	0	85.49	85.60	85.71	1.11	2.40	3.71	2.6	4.50	7.05	1	93	352	0.6	189.4	725.6	0.6	21.0	75.6	14.84	18.50	22.35
13-Aug-13	10.16	85.11	85.36	85.63	1.11	1.92	3.15	2.41	4.30	10.02	3	118	352	0.6	185.0	673.1	0.6	20.1	71.9	12.34	16.91	21.44
14-Aug-13	1.27	84.77	84.92	85.11	0.19	1.94	3.34	1.3	4.28	9.65	4	141	355	0.6	172.9	786.9	0.6	19.0	84.4	13.35	15.84	20.48
15-Aug-13	3.55	84.70	84.77	84.82	0.56	1.96	3.15	1.86	4.07	6.86	17	125	354	0.6	130.9	593.1	0.6	15.9	64.4	11.20	14.09	19.48
16-Aug-13	0.51	84.41	84.55	84.71	0	2.03	3.53	0.93	4.28	7.79	7	129	345	0.6	158.8	711.9	0.6	16.9	73.1	11.27	13.62	16.44
17-Aug-13	12.45	84.09	84.24	84.41	0	1.05	2.97	1.11	2.99	6.49	1	84	355	0.6	69.2	360.6	0.6	5.3	33.1	9.24	10.60	11.57
18-Aug-13	1.77	83.70	83.84	84.08	0.56	1.74	2.6	2.23	4.01	6.12	0	120	355	0.6	100.4	328.1	0.6	10.6	35.6	7.27	9.08	11.15
19-Aug-13	6.86	83.63	83.78	84.15	0.19	1.66	2.41	1.67	3.85	7.61	4	104	355	0.6	103.1	515.6	0.6	10.0	51.9	6.10	8.06	10.64
20-Aug-13	6.34	84.19	84.47	84.67	0.37	1.79	2.6	2.23	4.41	8.35	4	150	355	0.6	70.1	343.1	0.6	6.3	35.6	6.54	7.61	10.25
21-Aug-13	8.88	84.30	84.46	84.60	1.86	2.75	3.71	3.15	6.83	9.46	0	264	355	0.6	47.1	179.4	0.6	3.1	11.9	3.62	5.16	7.92
22-Aug-13	1.51	84.21	84.24	84.31	0.93	1.75	2.78	2.6	4.39	7.61	1	165	355	0.6	102.3	486.9	0.6	11.0	61.9	1.64	3.91	6.51
23-Aug-13	2.28	83.84	84.06	84.26	0.37	1.87	2.78	1.86	4.95	10.2	0	174	355	0.6	91.5	685.6	0.6	9.0	71.9	3.67	5.58	8.30
24-Aug-13	7.09	83.77	83.94	84.36	0	1.24	2.78	0.74	3.59	6.68	4	166	345	0.6	73.5	263.1	0.6	5.4	24.4	3.04	4.70	6.28
25-Aug-13	0.75	84.39	84.55	84.62	0	0.64	1.3	1.11	2.27	3.53	162	190	216	0.6	76.3	220.6	0.6	6.6	19.4	1.83	4.27	6.43
26-Aug-13	34.04	84.40	84.48	84.59	0	1.15	3.71	0.93	3.89	9.28	0	211	355	0.6	31.4	116.9	0.6	2.0	8.1	4.22	5.96	7.44
27-Aug-13	0	84.51	84.56	84.67	0	1.52	3.9	0.74	4.07	7.98	10	148	264	0.6	141.5	716.9	0.6	15.7	76.9	2.98	5.06	8.34
28-Aug-13	0	84.68	84.72	84.78	1.86	2.44	2.97	3.53	4.89	8.35	1	131	355	0.6	152.7	596.9	0.6	18.0	63.1	2.24	6.08	9.78
29-Aug-13	0	84.72	84.76	84.81	0	1.95	2.97	0	4.11	6.68	0	60	317	0.6	108.8	680.6	0.6	11.8	73.1	4.71	8.30	12.75
30-Aug-13	0	84.81	84.84	84.91	1.3	2.52	3.53	3.34	4.93	9.65	3	161	355	0.6	104.4	624.4	0.6	13.4	71.9	6.03	9.76	13.21
31-Aug-13	5.33	84.49	84.70	84.85	1.11	2.11	3.34	2.97	4.93	9.09	1	157	355	0.6	58.4	259.4	0.6	4.7	24.4	5.87	7.53	8.42
1-Sep-13	4.56	84.29	84.41	84.60	0	1.67	3.34	0.74	4.06	6.86	1	144	322	0.6	57.9	219.4	0.6	4.1	18.1	2.40	4.28	5.80

Appendix B4a. 2013 Daily Meteorological Data, Tom Valley Weather Station

Date	Rain, mm	Pressure, kPa			Wind Speed, m/s			Gust Speed, m/s			Wind Direction, ø			Solar Radiation, W/m²			Solar Radiation, W/m²2			Temp, °C [1]		
	Sum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Min	Avg	Max
2-Sep-13	0	84.64	84.70	84.77	0.37	1.72	2.97	1.86	4.58	7.98	6	211	354	0.6	46.8	160.6	0.6	3.9	14.4	0.08	3.41	8.02
3-Sep-13	2.53	84.15	84.46	84.72	0.93	3.02	5.57	3.34	7.34	14.1	3	194	355	0.6	60.4	256.9	0.6	6.2	26.9	6.99	9.67	12.82
4-Sep-13	8.38	84.11	84.19	84.32	3.15	4.49	5.94	7.98	11.29	16.14	0	279	355	0.6	60.0	240.6	0.6	5.8	21.9	7.80	9.28	11.47
5-Sep-13	0	84.37	84.98	85.36	1.11	2.22	5.2	2.41	5.14	11.87	1	137	354	0.6	118.2	556.9	0.6	12.9	63.1	5.90	8.43	10.54
6-Sep-13	0	85.03	85.40	85.55	0.37	2.19	3.53	2.41	5.17	10.39	1	89	355	0.6	127.2	578.1	0.6	15.8	65.6	6.43	9.21	12.20
7-Sep-13	3.29	84.57	84.73	84.98	3.53	4.77	5.94	8.16	11.50	17.44	0	222	355	0.6	33.8	100.6	0.6	3.4	10.6	10.86	11.94	13.33
8-Sep-13	14.47	83.87	84.14	84.56	1.3	3.73	5.2	5.38	10.13	15.03	0	329	355	0.6	79.0	683.1	0.6	6.0	50.6	6.69	9.70	12.15
9-Sep-13	7.63	84.27	84.63	84.91	1.11	2.65	5.2	3.15	7.24	13.54	31	232	355	0.6	32.4	110.6	0.6	2.5	9.4	3.96	5.45	7.29
10-Sep-13	0	84.92	85.08	85.17	0.93	2.27	2.97	2.23	4.77	6.68	1	49	355	0.6	118.0	503.1	0.6	14.4	56.9	2.26	5.98	8.97
11-Sep-13	0.5	84.49	84.96	85.17	0	2.67	5.75	0	6.76	14.1	1	174	354	0.6	31.9	105.6	0.6	2.9	9.4	4.87	8.49	13.45
12-Sep-13	13.21	84.48	84.86	85.15	0.93	2.81	6.12	3.15	7.92	17.44	7	225	355	0.6	51.8	201.9	0.6	5.0	20.6	4.04	6.72	12.61
13-Sep-13	0	85.08	85.16	85.23	1.3	2.23	2.97	2.41	4.05	5.57	8	123	355	0.6	112.4	495.6	0.6	13.8	54.4	3.01	6.40	10.32
14-Sep-13	0	84.81	84.96	85.08	0	1.67	3.53	0	3.18	5.01	3	110	351	0.6	60.9	236.9	0.6	6.3	25.6	5.57	7.00	8.84
15-Sep-13	0	84.60	84.73	84.81	0.19	1.31	2.97	1.3	3.22	6.49	10	138	244	0.6	55.5	268.1	0.6	5.6	28.1	4.64	6.30	7.44
16-Sep-13	0	84.15	84.32	84.57	2.23	4.15	6.49	5.75	9.52	12.8	185	219	263	0.6	26.7	90.6	0.6	2.1	6.9	-0.85	1.91	6.64
17-Sep-13	0.5	84.15	84.22	84.32	0.74	2.70	4.27	2.97	6.41	10.58	7	175	355	0.6	61.4	263.1	0.6	6.8	26.9	-0.99	0.48	2.05
18-Sep-13	0	84.14	84.29	84.35	0	1.71	3.71	0	3.94	6.31	4	124	352	0.6	77.2	610.6	0.6	8.2	69.4	0.22	1.99	4.14
19-Sep-13	3.04	83.50	83.89	84.11	0	2.11	4.08	0	4.67	7.42	1	177	355	0.6	76.7	290.6	0.6	7.8	31.9	0.38	1.65	2.93
20-Sep-13	17.78	82.60	82.91	83.41	0.56	2.87	4.08	2.04	7.14	10.76	1	216	355	0.6	38.5	163.1	0.6	2.7	10.6	1.59	3.97	6.31
21-Sep-13	12.42	82.41	82.52	82.61	1.3	2.93	4.45	2.78	6.90	11.5	1	236	355	0.6	46.1	270.6	0.6	3.3	18.1	2.50	4.18	5.87
22-Sep-13	0	82.57	82.64	82.82	1.67	2.65	3.34	3.15	5.03	6.68	1	204	355	0.6	78.3	620.6	0.6	8.4	68.1	1.64	3.59	5.46
23-Sep-13	0	82.85	83.27	83.73	0.56	1.84	3.15	2.04	3.96	5.94	7	127	338	0.6	58.2	300.6	0.6	6.1	33.1	2.66	4.43	6.56
24-Sep-13	0	83.75	84.38	85.01	0.19	1.96	3.15	1.3	3.46	5.38	8	53	355	0.6	47.1	221.9	0.6	4.9	20.6	1.07	2.64	4.92
25-Sep-13	0	84.43	84.88	85.12	0	1.56	3.34	0.19	4.17	10.02	0	199	355	0.6	76.1	426.9	0.6	8.4	48.1	-0.59	2.47	5.80
26-Sep-13	1.01	83.65	84.04	84.38	0	2.60	4.64	0	6.06	10.58	1	174	355	0.6	37.6	206.9	0.6	3.9	21.9	0.52	3.31	4.82
27-Sep-13	2.29	83.05	83.32	83.61	0	0.58	2.23	0	1.44	5.38	0	122	355	0.6	64.3	294.4	0.6	26.3	168.1	-1.04	0.24	1.78
28-Sep-13	1.02	82.73	82.85	83.03	0.74	2.32	3.34	3.15	5.02	7.98	4	111	355	0.6	66.1	434.4	0.6	17.3	160.6	-1.81	0.68	2.50
29-Sep-13	0	82.75	83.03	83.33	2.23	3.57	4.82	6.12	9.84	13.54	0	55	355	0.6	47.2	176.9	0.6	5.5	20.6	0.69	1.48	2.26
30-Sep-13	0	83.35	83.75	84.15	1.86	3.26	4.82	4.64	8.64	12.25	7	167	343	0.6	56.1	218.1	0.6	6.2	23.1	0.11	0.80	1.45
1-Oct-13	0	84.20	84.45	84.72	0.74	2.07	3.15	1.86	4.44	5.75	0	180	355	0.6	45.2	321.9	0.6	5.1	36.9	-2.63	0.53	1.97
2-Oct-13	0	84.74	84.95	85.08	0.37	1.65	2.6	1.3	4.02	7.05	6	143	355	0.6	24.3	115.6	0.6	2.5	10.6	-0.65	0.26	1.04

1 Temperature and relative humdity sensor failure on 11 February 2013, and was repaired and in operation 27 June 2013.

2 Tom Meteorological station down for maintanence between 24 June 2013 and 26 June 2013.

Appendix B4b. 2010-2013 Monthly Meteorological Data, Tom Valley Weather Station

Year	Month	Rain, mm	Temp, °C			RH, %			Solar Radiation, W/m²			Solar Radiation, W/m² 2			Wind Speed, m/s			Gust Speed, m/s			Wind Direction, ø			Pressure, KPa		
		Total	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max
2010 [1]	January																									
	February																									
	March																									
	April																									
	May																									
	June	28.38	5.46	8.9	16.0	30.2	74.5	96.4	0.6	134.8	879.4	0.6	12.5	89.4	0.0	7.0	23.4	2.7	16.5	51.4	0.0	159.4	355.2	83.8	84.4	85.0
	July	30.37	4.30	11.2	19.6	30.0	62.9	91.0	0.6	155.7	906.9	0.6	16.4	94.4	0.7	7.8	18.7	3.3	19.3	58.8	0.0	155.1	355.2	83.7	84.9	85.7
	August	51.18	1.24	9.8	21.2	29.3	65.5	92.5	0.6	121.7	823.1	0.6	29.7	71.9	0.0	7.0	19.4	2.0	16.5	50.8	0.0	147.4	355.2	83.7	84.9	86.3
	September	6.32	2.82	6.5	11.4	45.7	67.8	91.2	0.6	93.6	694.4				0.0	6.6	18.7	3.3	14.5	40.1	0.0	119.9	355.2	84.3	84.8	85.6
	October																									
	November																									
	December																									
2011 [2]	January																									
	February																									
	March								0.6	118.5	573.1	0.6	101.5	495.6	0.0	2.1	5.6	0.0	2.8	8.0	0.0	137.8	355.2			
	April								0.6	160.7	816.9	0.6	147.3	699.4	0.0	2.1	8.9	0.0	2.8	13.5	0.0	120.9	355.2			
	May																									
	June	88.81							0.6	144.7	944.4	0.6	14.6	98.1	0.0	1.9	4.8	0.9	4.8	14.3	0.0	142.4	355.2	82.7	84.4	85.2
	July	100.44	6.28	8.9	14.0	49.8	77.8	99.0	0.6	138.2	906.9	0.6	14.3	94.4	0.0	1.9	6.3	0.6	4.6	13.4	0.0	145.4	355.2	83.5	84.6	85.5
	August	113.65	2.56	7.5	16.9	43.6	76.6	98.0	0.6	110.0	830.6	0.6	11.5	93.1	0.0	2.0	6.3	0.0	4.8	13.7	0.0	144.7	355.2	82.8	84.5	85.3
	September	89.05	-3.96	3.1	11.6	43.6	76.4	99.3	0.6	71.2	653.1	0.6	18.6	334.4	0.0	2.3	7.2	0.0	5.5	19.1	0.0	156.5	355.2	82.3	84.1	85.8
	October	4.28	-9.54	-3.9	0.5	40.8	83.8	97.1	0.6	39.1	385.6	0.6	35.2	318.1	0.0	2.1	5.8	0.0	5.0	17.1	0.0	123.3	355.2	82.3	83.8	84.9
	November	0	-31.19	-15.2	-2.5	48.3	81.4	96.2	0.6	11.0	153.1	0.6	11.3	138.1	0.0	2.2	9.1	0.0	5.2	21.9	0.0	114.4	355.2	81.0	83.2	85.1
	December	0	-18.61	-10.6	1.2	49.8	84.7	95.7	0.6	3.7	54.4	0.6	3.6	48.1	0.0	2.7	10.0	0.0	6.8	22.8	0.0	103.0	355.2	81.6	83.5	85.9
2012 [3]	January	0	-35.36	-17.0	-2.1	52.7	78.7	94.6	0.6	7.5	118.1	0.6	7.3	105.6	0.0	2.8	7.2	0.0	6.3	18.7	0.0	111.0	355.2	80.9	83.3	85.9
	February[1]	0	-8.73	-7.3	-4.8	69.8	82.6	91.0	0.6	24.3	315.6	0.6	22.6	263.1	0.2	2.5	10.0	1.1	5.8	26.7	0.0	116.7	355.2	81.8	84.0	86.0
	March[1]	0							0.6	94.1	691.9	0.6	83.4	588.1	0.2	1.9	5.9	1.1	4.5	13.2	0.0	118.9	355.2	81.8	83.2	84.7
	April[1]	12.93	-10.27	-2.7	2.8	38.4	68.3	96.3	0.6	170.5	873.1	0.6	147.9	751.9	0.0	2.1	4.5	0.0	4.3	8.9	0.0	130.8	355.2	83.1	84.4	85.6
	May	10.63	-5.14	1.6	9.3	43.8	66.9	95.2	0.6	231.0	1098.1	0.6	180.5	938.1	0.0	2.9	7.6	0.0	6.2	20.6	0.0	172.7	355.2	83.1	84.5	85.5
	June	39.28	1.51	9.0	20.7	26.9	64.3	96.3	0.6	199.2	1226.9	0.6	47.1	521.9	0.0	2.4	6.7	0.0	5.3	13.0	0.0	130.2	355.2	83.5	84.6	85.6
	July	105.02	-0.34	10.3	21.6	29.0	68.0	98.5	0.6	163.9	1031.9	0.6	21.1	513.1	0.0	2.1	7.1	0.0	4.9	18.0	0.0	143.5	355.2	83.8	85.0	85.7
	August	105.03	2.90	9.3	16.4	37.0	70.4	100.0	0.6	106.9	810.6	0.6	11.8	89.4	0.0	2.0	4.3	0.7	4.7	13.7	0.0	135.2	355.2	83.6	84.9	85.7
	September	60.32	-4.93	4.0	15.6	30.9	72.9	98.7	0.6	73.5	723.1	0.6	11.0	209.4	0.0	2.6	8.0	0.0	6.2	21.2	0.0	174.1	355.2	82.6	84.6	85.4
	October	5.04	-26.67	-8.4	6.9	47.4	76.9	97.8	0.6	35.4	426.9	0.6	24.5	311.9	0.0	2.0	5.9	0.0	4.9	18.4	0.0	133.0	355.2	82.4	84.7	86.2
	November	0	-28.15	-16.8	-4.0	37.1	77.5	94.9	0.6	9.4	129.4	0.6	9.5	104.4	0.0	1.8	6.7	0.0	4.5	14.7	0.0	137.6	355.2	82.6	84.1	85.6
	December	0	-30.13	-17.4	-2.9	49.7	79.4	94.5	0.6	3.1	46.9	0.6	3.4	40.6	0.0	1.7	5.4	0.0	4.3	15.6	0.0	119.9	355.2	81.6	83.5	85.1
2013 [4]	January	0	-39.74	-15.7	1.0	39.1	81.4	98.6	0.6	6.0	85.6	0.6	6.9	118.1	0.0	1.8	8.9	0.0	4.5	22.5	0.0	125.4	355.2	82.4	84.0	86.0
	February	0.75	-17.81	-9.2	-1.1	81.8	90.9	95.7	0.6	28.6	335.6	0.6	27.4	273.1	0.0	1.9	7.8	0.0	4.3	18.9	0.0	110.1	355.2	82.1	83.5	84.7
	March	2.78							0.6	96.1	725.6	0.6	81.4	623.1	0.0	2.3	6.5	1.1	4.7	14.8	0.0	94.0	355.2	83.3	84.4	85.7
	April	4.03							0.6	177.3	761.9	0.6	158.1	655.6	0.0	2.8	7.6	0.0	6.4	22.3	0.0	173.6	355.2	82.0	84.4	85.9
	May	31.14							0.6	225.3	1005.6	0.6	178.1	839.4	0.0	2.6	8.0	0.0	5.7	16.9	0.0	138.0	355.2	83.3	84.8	86.2
	June	51.02							0.6	212.5	1095.6	0.6	27.5	311.9	0.2	2.4	7.6	1.3	5.5	19.5	0.0	140.1	355.2	84.1	85.2	86.0
	July	86.04	-0.73	10.9	19.9	25.7	62.9	94.9	0.6	159.8	1100.6	0.6	17.2	115.6	0.0	2.4	6.5	0.0	5.7	20.0	0.0	142.7	355.2	84.1	85.2	85.8
	August	121.32	1.64	11.0	22.3	32.2	69.5	98.5	0.6	130.3	949.4	0.6	13.9	99.4	0.0	1.9	4.6	0.0	4.4	12.3	0.0	144.0	355.2	83.6	84.8	85.7
	September	92.63	-1.81	4.9	13.4	46.2	75.7	100.0	0.6	63.5	683.1	0.6	7.6	168.1	0.0	2.5	6.5	0.0	6.1	17.4	0.0	167.2	355.2	82.4	84.2	85.5

[1] Station installed in June 2010, station failure in September 2010

[2] Station ran intermittendly in April and was down in May. Majority of the gauges were fixed and operational on 20 June, and the temperature and humidty gauge were repaired July 26th

[3] Temperature and humidy gauge failure from February 2nd to April 2nd

[4] Temperature and humidy gauge failure from February 11th to June 27th. The June values are incomplete for ALL guages as the station was down completely for 3 days (24-27th June) for maintenance.

Cordillera Consulting

Project: MacPass/Tom
Access Consulting, Kai Woloshyn; Paul Inglis Audrey Sanfacon
Taxonomist: Sue Salter
suesalter@shaw.ca
250-494-7553

Site:	W11	W11	W11	W12	W12	W12	W13	W13	W13
Sample:	A	B	C	A	B	C	A	B	C
CC#:	CC140655	CC140656	CC140657	CC140658	CC140659	CC140660	CC140661	CC140662	CC140663
EMS:									
Richness Measures									
Species Richness	5	4	5	9	7	6	1	5	7
EPT Richness	2	1	1	1	1	2		2	3
Ephemeroptera Richness	1					1			1
Plecoptera Richness	1	1	1	1	1	1		1	1
Trichoptera Richness								1	1
Chironomidae Richness	1	1	4	4	4	2	1	3	3
Oligochaeta Richness		1			1	1			
Non-Chiro. Non-Olig. Richness									
Abundance Measures									
Corrected Abundance	7	5	15	24	45	37	5	7	10
EPT Abundance	2	1	10	8	2	7		3	3
Dominance Measures									
1st Dominant Taxon	Eukiefferiella	Chironomidae	Plecoptera	Plecoptera	Euryhapsis sp.	Metriocnemus	Chironomidae	Orthocladiinae	Chironomidae
1st Dominant Abundance	3	2	10	8	23	15	5	2	4
2nd Dominant Taxon	Plecoptera	Plecoptera	Diamesa sp.	Chaetocladius	Metriocnemus	Orthocladiinae		Hydropsyche	Orthocladiinae
2nd Dominant Abundance	1	1	2	6	15	12		2	1
3rd Dominant Taxon	Diptera	Hydrozetidae	Euryhapsis sp.	Euryhapsis sp.	Lebertia sp.	Plecoptera		Orthocladius complex	Hydropsyche sp.
3rd Dominant Abundance	1	1	1	4	2	6		1	1
% 1 Dominant Taxon	42.86%	40.00%	66.67%	33.33%	51.11%	40.54%	100.00%	28.57%	40.00%
% 2 Dominant Taxa	14.29%	20.00%	13.33%	25.00%	33.33%	32.43%		28.57%	10.00%
% 3 Dominant Taxa	14.29%	20.00%	6.67%	16.67%	4.44%	16.22%		14.29%	10.00%
Community Composition									
% Ephemeroptera	14.29%					2.70%			10.00%
% Plecoptera	14.29%	20.00%	66.67%	33.33%	4.44%	16.22%		14.29%	10.00%
% Trichoptera								28.57%	10.00%
% EPT	28.57%	20.00%	66.67%	33.33%	4.44%	18.92%		42.86%	30.00%
% Diptera	71.43%	40.00%	33.33%	58.33%	88.89%	75.68%	100.00%	57.14%	70.00%
% Oligochaeta		20.00%			2.22%	5.41%			
% Baetidae	14.29%					2.70%			
% Chironomidae	42.86%	40.00%	33.33%	50.00%	88.89%	72.97%	100.00%	57.14%	60.00%
% Odonata	142.86%								
Functional Group Composition									
% Predators		20.00%		4.17%	6.67%	2.70%			20.00%
% Shredder-Herbivores									
% Collector-Gatherers	14.29%	60.00%	26.67%	29.17%	37.78%	45.95%	100.00%	28.57%	50.00%
% Scrapers									
% MH									
% CF	14.29%			4.17%				28.57%	10.00%
% OM	42.86%			4.17%					
% PA									
% Piercer-Herbivore									
% Gatherer									
% Unclassified	28.57%	20.00%	73.33%	58.33%	55.56%	51.35%		42.86%	20.00%
Functional Group Richness									
Predators Richness		1		1	2	1			2
Shredder-Herbivores Richness									
Collector-Gatherers Richness	1	2	3	2	3	2	1	2	2
Scrapers Richness									
MH Richness									
CF Richness	1			1				1	1
OM Richness	1			1					
PA Richness									
Piercer-Herbivore Richness									
Gatherer Richness									
Unclassified	2	1	2	4	2	3		2	2
Diversity/Evenness Measures									
Shannon-Weiner H' (log 10)	0.64	0.58	0.47	0.78	0.54	0.60		0.67	0.76
Shannon-Weiner H' (log 2)	2.13	1.92	1.56	2.61	1.79	1.99		2.24	2.52
Shannon-Weiner H' (log e)	1.48	1.33	1.08	1.81	1.24	1.38		1.55	1.75
Simpson's Index (D)	0.14	0.10	0.44	0.18	0.36	0.28	1.00	0.10	0.13
Simpson's Index of Diversity (1 - D)	0.86	0.90	0.56	0.82	0.64	0.72		0.90	0.87
Simpson's Reciprocal Index (1/D)	7.00	10.00	2.28	5.63	2.75	3.56	1.00	10.50	7.50
	0.77			0.73			0.59		
Biotic Indices									
Hilsenhoff Biotic Index	5.00	5.40	1.60	2.29	0.87	0.70	6.00	2.71	3.70

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Site:	W11	W11	W11	W12	W12	W12	W13	W13	W13
Sample:	A	B	C	A	B	C	A	B	C
CC#:	CC140655	CC140656	CC140657	CC140658	CC140659	CC140660	CC140661	CC140662	CC140663
Phylum: Arthropoda	0		0		0		0		0
Subphylum: Hexapoda	0		0		0		0		0
| Class: Insecta	0		0		0		0		0
| Order: Ephemeroptera	0		0		0		0		0
| Family: Baetidae	0		0		0	1	0		0
Baetis sp.	1		0		0		0		0
| Family: Ephemerellidae	0		0		0		0		0
Ephemerella dorothea/excrucians	0		0		0		0		1
	0		0		0		0		0
| Order: Plecoptera	1	1	10	8	2	6	0	1	0
| Family: Perlodidae	0		0		0		0		0
Skwala sp.	0		0		0		0		1
	0		0		0		0		0
| Order: Trichoptera	0		0		0		0		0
| Family: Hydropsychidae	0		0		0		0		0
Hydropsyche sp.	0		0		0		0	2	1
	0		0		0		0		0
| Order: Diptera	1		0	1	0		0		0
| Family: Chironomidae	0	2	0		0		5		4
| Subfamily: Chironominae	0		0		0		0		0
| Tribe: Chironomini	0		0	1	0		0		0
| Subfamily: Diamesinae	0		0		0		0		0
| Tribe: Diamesini	0		0		0		0		0
Diamesa sp.	0		2		0		0	1	0
| Subfamily: Orthocladiinae	0		0		0	12	0	2	1
Eukiefferiella sp.	3		0	1	0		0		0
Euryhapsis sp.	0		1	4	23		0		0
Metriocnemus sp.	0		0		15	15	0		0
Orthocladius complex	0		0		1		0	1	0
Psectrocladius sp.	0		1		0		0		0
| Tribe: Orthocladiini	0		0		0		0		0
Chaetocladius sp.	0		1	6	0		0		0
| Subfamily: Tanypodinae	0		0		1		0		0
| Tribe: Pentaneurini	0		0		0		0		0
Thienemannimyia group	0		0		0		0		1
| Family: Empididae	0		0		0		0		0
Clinocera sp.	0		0		0	1	0		0
| Family: Simuliidae	0		0		0		0		1
Simulium sp.	1		0		0		0		0
| Family: Tipulidae	0		0	1	0		0		0
	0		0		0		0		0
Subphylum: Chelicerata	0		0		0		0		0
| Class: Arachnida	0		0		0		0		0
| Order: Trombidiformes	0		0	1	0		0		0
| Family: Lebertiidae	0		0		0		0		0
Lebertia sp.	0		0		2		0		0
	0		0		0		0		0
| Order: Sarcoptiformes	0		0		0		0		0
| Family: Hydrozetidae	0	1	0		0		0		0
	0		0		0		0		0
Phylum: Mollusca	0		0		0		0		0
| Class: Bivalvia	0		0		0		0		0
| Order: Veneroida	0		0		0		0		0
| Family: Pisidiidae	0		0	1	0		0		0
	0		0		0		0		0
Phylum: Annelida	0		0		0		0		0
Subphylum: Clitellata	0		0		0		0		0
| Class: Oligochaeta	0		0		0		0		0
| Order: Tubificida	0		0		0		0		0
| Family: Enchytraeidae	0		0		0		0		0
Enchytraeus	0	1	0		0		0		0
| Family: Naididae	0		0		1	2	0		0
Totals:	7	5	15	24	45	37	5	7	10
Taxa present but not included:									
Phylum: Arthropoda	0		0		0		0		0
| Class: Entognatha	0		0		0		0		0
| Order: Collembola	0		1		0		0		0
	0		0		0		0		0
Subphylum: Crustacea	0		0		0		0		0
| Class: Branchiopoda	0		0		0		0		0
| Order: Cladocera	0		0	1	0		1		0
	0		0		0		0		0
| Class: Copepoda	0		0		0		0		0
| Order: Cyclopoida	0		0		0		1		1
	0		0		0		0		0
Phylum: Nemata	0	1	2		1	1	1	2	0
Totals:	0	1	3	1	1	1	3	2	1
Totals =	**7**	**6**	**18**	**25**	**46**	**38**	**8**	**9**	**11**

APPENDIX C

LAB REPORTS

Success Through Science®

Your Project #: HBM-13-01
Your C.O.C. #: 08373433, 08373434

Attention: Kai Woloshyn
ACCESS CONSULTING GROUP
#3 Calcite
151 Industrial Road
WHITEHORSE, YT
CANADA Y1A 3C8

Report Date: 2013/07/09

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B353645
Received: 2013/06/26, 15:35

Sample Matrix: Water
Samples Received: 19

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO3)	17	N/A	2013/06/27	BBY6SOP-00037	SM-2310B
Acidity pH 4.5 & pH 8.3 (as CaCO3)	1	N/A	2013/06/28	BBY6SOP-00037	SM-2310B
Acidity pH 4.5 & pH 8.3 (as CaCO3)	1	N/A	2013/07/02	BBY6SOP-00037	SM-2310B
Alkalinity - Water	19	2013/06/28	2013/06/28	BBY6SOP-00026	SM2320B
Conductance - water	19	N/A	2013/06/28	BBY6SOP-00026	SM-2510B
Hardness Total (calculated as CaCO3)	15	N/A	2013/07/03	BBY7SOP-00002	EPA 6020A
Hardness (calculated as CaCO3)	19	N/A	2013/07/02	BBY7SOP-00002	EPA 6020A
Mercury (Dissolved) by CVAF	19	N/A	2013/07/02	BBY7SOP-00015	EPA 245.7
Mercury (Total) by CVAF	15	2013/07/02	2013/07/02	BBY7SOP-00015	EPA 245.7
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	19	N/A	2013/07/02	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (dissolved)	15	N/A	2013/06/29	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (dissolved)	4	N/A	2013/07/02	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (total)	15	2013/06/27	2013/07/03	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (total)	15	2013/06/28	2013/07/02	BBY7SOP-00002	EPA 6020A
Ammonia-N (Preserved)	18	N/A	2013/06/28	BBY6SOP-00009	SM-4500NH3G
Nitrate + Nitrite (N)	18	N/A	2013/06/27	BBY6SOP-00010	SM 4500NO3-I
Nitrate + Nitrite (N)	1	N/A	2013/06/28	BBY6SOP-00010	SM 4500NO3-I
Nitrite (N) by CFA	18	N/A	2013/06/27	BBY6SOP-00010	EPA 353.2
Nitrite (N) by CFA	1	N/A	2013/06/28	BBY6SOP-00010	EPA 353.2
Nitrogen - Nitrate (as N)	18	N/A	2013/06/28	BBY6SOP-00010	SM 4500NO3-I
Nitrogen - Nitrate (as N)	1	N/A	2013/07/02	BBY6SOP-00010	SM 4500NO3-I
Filter and HNO3 Preserve for Metals	18	N/A	2013/06/27	BBY6WI-00001	EPA 200.2
Filter and HNO3 Preserve for Metals	1	N/A	2013/07/02	BBY6WI-00001	EPA 200.2
pH Water	19	N/A	2013/06/28	BBY6SOP-00026	SM-4500H+B
Sulphate by Automated Colourimetry	11	N/A	2013/06/27	BBY6SOP-00017	SM4500-SO42- E
Sulphate by Automated Colourimetry	6	N/A	2013/06/28	BBY6SOP-00017	SM4500-SO42- E
Sulphate by Automated Colourimetry	2	N/A	2013/07/02	BBY6SOP-00017	SM4500-SO42- E
Total Suspended Solids-Low Level	1	2013/06/27	2013/06/28	BBY6SOP-00034	SM-2540 D
Total Suspended Solids-Low Level	14	2013/06/28	2013/06/29	BBY6SOP-00034	SM-2540 D

* Results relate only to the items tested.

Maxxam Job #: B353645
Report Date: 2013/07/09

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Sampler Initials: MC

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Graham Rudkin, Project Manager, Environmental
Email: GRudkin@maxxam.ca
Phone# (604) 638-5926 Ext:5926

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B353645
Report Date: 2013/07/09

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Sampler Initials: MC

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		GT3468	GT3469		GT3470		GT3471		GT3472		GT3473		
Sampling Date		2013/06/24	2013/06/24		2013/06/24		2013/06/24		2013/06/24		2013/06/24		
	UNITS	**W13**	**W12**	**QC Batch**	**W11**	**RDL**	**W8**	**QC Batch**	**W6**	**QC Batch**	**S2**	**RDL**	**QC Batch**
Misc. Inorganics													
Acidity (pH 4.5)	mg/L	<0.50	<0.50	6938333	<0.50	0.50	304	6938333	169	6938333	244	0.50	6938333
Acidity (pH 8.3)	mg/L	24.5	32.3	6938333	13.7	0.50	569	6938333	322	6938333	460	0.50	6938333
ANIONS													
Nitrite (N)	mg/L	<0.0050	<0.0050	6941776	<0.0050	0.0050	0.0135	6941776	0.0052	6941776	0.0089	0.0050	6941776
Calculated Parameters													
Filter and HNO3 Preservation	N/A	FIELD	FIELD	ONSITE	FIELD	N/A	FIELD	ONSITE	FIELD	ONSITE	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.048	0.057	6937464	0.055	0.020	0.098	6937464	0.097	6937464	0.092	0.020	6937464
Misc. Inorganics													
Alkalinity (Total as CaCO3)	mg/L	<0.50	<0.50	6944003	1.32	0.50	<0.50	6944003	<0.50	6944003	<0.50	0.50	6944003
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	6944003	<0.50	0.50	<0.50	6944003	<0.50	6944003	<0.50	0.50	6944003
Bicarbonate (HCO3)	mg/L	<0.50	<0.50	6944003	1.61	0.50	<0.50	6944003	<0.50	6944003	<0.50	0.50	6944003
Carbonate (CO3)	mg/L	<0.50	<0.50	6944003	<0.50	0.50	<0.50	6944003	<0.50	6944003	<0.50	0.50	6944003
Hydroxide (OH)	mg/L	<0.50	<0.50	6944003	<0.50	0.50	<0.50	6944003	<0.50	6944003	<0.50	0.50	6944003
Anions													
Dissolved Sulphate (SO4)	mg/L	112	139	6946311	116	0.50	543	6940875	354	6946311	448	5.0	6940875
Nutrients													
Ammonia (N)	mg/L	0.049	0.062	6941772	0.021	0.0050	0.88	6941772	0.65	6941772	0.75	0.0050	6941772
Nitrate plus Nitrite (N)	mg/L	0.048	0.057	6941769	0.055	0.020	0.112	6941769	0.102	6941769	0.101	0.020	6941769
Physical Properties													
Conductivity	uS/cm	241	285	6944013	247	1.0	1160	6944013	858	6944013	1050	1.0	6944013
pH	pH Units	4.68	4.61	6944014	5.77		2.95	6944014	3.02	6944014	2.96		6944014
Physical Properties													
Total Suspended Solids	mg/L	20.1	21.6	6941478	18.0	1.0	19.0	6941478	15.6	6941478	27.7	1.0	6941478

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: B353645
Report Date: 2013/07/09

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Sampler Initials: MC

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		GT3474	GT3475	GT3476		GT3477		GT3478		GT3479		
Sampling Date		2013/06/24	2013/06/24	2013/06/24		2013/06/24		2013/06/24		2013/06/24		
	UNITS	**T5**	**W5**	**AD**	**RDL**	**W100**	**QC Batch**	**W2**	**RDL**	**W3**	**RDL**	**QC Batch**
Misc. Inorganics												
Acidity (pH 4.5)	mg/L	328	230	241	0.50	96.7	6938333	97.8	0.50	130	0.50	6938333
Acidity (pH 8.3)	mg/L	591	1050	1090	0.50	192	6938333	196	0.50	262	0.50	6938333
ANIONS												
Nitrite (N)	mg/L	0.0103	<0.0050	<0.0050	0.0050	<0.0050	6941776	<0.0050	0.0050	<0.0050	0.0050	6941776
Calculated Parameters												
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	N/A	FIELD	ONSITE	FIELD	N/A	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.188	<0.020	<0.020	0.020	0.094	6937464	0.094	0.020	0.116	0.020	6937464
Misc. Inorganics												
Alkalinity (Total as CaCO3)	mg/L	<0.50	<0.50	<0.50	0.50	<0.50	6944003	<0.50	0.50	<0.50	0.50	6944003
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	0.50	<0.50	6944003	<0.50	0.50	<0.50	0.50	6944003
Bicarbonate (HCO3)	mg/L	<0.50	<0.50	<0.50	0.50	<0.50	6944003	<0.50	0.50	<0.50	0.50	6944003
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	0.50	<0.50	6944003	<0.50	0.50	<0.50	0.50	6944003
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	0.50	<0.50	6944003	<0.50	0.50	<0.50	0.50	6944003
Anions												
Dissolved Sulphate (SO4)	mg/L	530	1360	1340	5.0	190	6940875	176	0.50	239	5.0	6946311
Nutrients												
Ammonia (N)	mg/L	1.0	1.8	1.7	0.0050	0.38	6941772	0.34	0.0050	0.58	0.0050	6941772
Nitrate plus Nitrite (N)	mg/L	0.198	<0.020	<0.020	0.020	0.094	6941769	0.094	0.020	0.116	0.020	6941769
Physical Properties												
Conductivity	uS/cm	1120	1990	2020000	1.0	596	6944013	595	1.0	668	1.0	6944013
pH	pH Units	2.98	3.40	3.31		3.14	6944014	3.15		3.15		6944014
Physical Properties												
Total Suspended Solids	mg/L	1.1	66.3	75.4	1.0	38.2	6941478	38.9	1.0	4.4	1.0	6941478

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: B353645
Report Date: 2013/07/09

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Sampler Initials: MC

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		GT3493		GT3494			GT3495		GT3496		
Sampling Date		2013/06/24		2013/06/24			2013/06/24		2013/06/24		
	UNITS	**W3B**	**RDL**	**BH01-05**	**RDL**	**QC Batch**	**BH03-05**	**QC Batch**	**BH04-05**	**RDL**	**QC Batch**
Misc. Inorganics											
Acidity (pH 4.5)	mg/L	163	0.50	<0.50	0.50	6938333	136	6938333	189	0.50	6938333
Acidity (pH 8.3)	mg/L	316	0.50	7.19	0.50	6938333	252	6938333	397	0.50	6938333
ANIONS											
Nitrite (N)	mg/L	<0.0050	0.0050	<0.0050	0.0050	6941776	<0.0050	6941776	<0.0050	0.0050	6941776
Calculated Parameters											
Filter and HNO3 Preservation	N/A	FIELD	N/A	FIELD	N/A	ONSITE	FIELD	ONSITE	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.087	0.020	0.141	0.020	6937464	0.205	6937464	0.164	0.020	6937464
Misc. Inorganics											
Alkalinity (Total as CaCO3)	mg/L	<0.50	0.50	<0.50	0.50	6944003	<0.50	6944003	<0.50	0.50	6944003
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	0.50	6944003	<0.50	6944003	<0.50	0.50	6944003
Bicarbonate (HCO3)	mg/L	<0.50	0.50	<0.50	0.50	6944003	<0.50	6944003	<0.50	0.50	6944003
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	0.50	6944003	<0.50	6944003	<0.50	0.50	6944003
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	6944003	<0.50	6944003	<0.50	0.50	6944003
Anions											
Dissolved Sulphate (SO4)	mg/L	284	5.0	4.16	0.50	6940875	292	6946311	638	5.0	6940875
Nutrients											
Ammonia (N)	mg/L	0.76	0.0050	0.014	0.0050	6941772	0.50	6941772	0.33	0.0050	6941772
Nitrate plus Nitrite (N)	mg/L	0.087	0.020	0.141	0.020	6941769	0.205	6941769	0.164	0.020	6941769
Physical Properties											
Conductivity	uS/cm	758	1.0	21.7	1.0	6944013	895	6944013	1490	1.0	6944013
pH	pH Units	3.13		4.49		6944014	2.92	6944014	2.89		6944014
Physical Properties											
Total Suspended Solids	mg/L	2.2	1.0			6941478					

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: B353645
Report Date: 2013/07/09

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Sampler Initials: MC

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		GT3497			GT3498			GT3499		
Sampling Date		2013/06/24			2013/06/24			2013/06/24		
	UNITS	**FB**	**RDL**	**QC Batch**	**WRB-1**	**RDL**	**QC Batch**	**T4**	**RDL**	**QC Batch**
Misc. Inorganics										
Acidity (pH 4.5)	mg/L	<0.50	0.50	6946022	16100(1)	25	6938333	5.70	0.50	6941696
Acidity (pH 8.3)	mg/L	<0.50	0.50	6946022	21600(1)	25	6938333	28.2	0.50	6941696
ANIONS										
Nitrite (N)	mg/L	<0.0050	0.0050	6941776	<5.0(2)	5.0	6941776	<0.0050(3)	0.0050	6945990
Calculated Parameters										
Filter and HNO3 Preservation	N/A	FIELD	N/A	ONSITE	LAB	N/A	6938131	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	<0.020	0.020	6937464	<20	20	6937464	0.040	0.020	6937464
Misc. Inorganics										
Alkalinity (Total as CaCO3)	mg/L	0.89	0.50	6944003	<0.50	0.50	6944003	<0.50	0.50	6944003
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	6944003	<0.50	0.50	6944003	<0.50	0.50	6944003
Bicarbonate (HCO3)	mg/L	1.09	0.50	6944003	<0.50	0.50	6944003	<0.50	0.50	6944003
Carbonate (CO3)	mg/L	<0.50	0.50	6944003	<0.50	0.50	6944003	<0.50	0.50	6944003
Hydroxide (OH)	mg/L	<0.50	0.50	6944003	<0.50	0.50	6944003	<0.50	0.50	6944003
Anions										
Dissolved Sulphate (SO4)	mg/L	<0.50	0.50	6947502	24200	500	6940875	25.5	0.50	6947502
Nutrients										
Ammonia (N)	mg/L	0.014	0.0050	6941772				0.021	0.0050	6941772
Nitrate plus Nitrite (N)	mg/L	<0.020	0.020	6941769	<20(2)	20	6941769	0.040	0.020	6945980
Physical Properties										
Conductivity	uS/cm	1.0	1.0	6944013	10800	1.0	6944013	89.6	1.0	6944013
pH	pH Units	5.31		6944014	2.18		6944014	3.99		6944014
Physical Properties										
Total Suspended Solids	mg/L	<1.0	1.0	6941478				<1.0	1.0	6937875

N/A = Not Applicable
RDL = Reportable Detection Limit
(1) - RDL raised due to sample dilution.
(2) - RDL raised due to sample matrix interference.
(3) - Sample analysed past recommended hold time.

Maxxam Job #: B353645
Report Date: 2013/07/09

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Sampler Initials: MC

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		GT3468	GT3469	GT3470	GT3471	GT3472	GT3473	GT3474		GT3475		
Sampling Date		2013/06/24	2013/06/24	2013/06/24	2013/06/24	2013/06/24	2013/06/24	2013/06/24		2013/06/24		
	UNITS	**W13**	**W12**	**W11**	**W8**	**W6**	**S2**	**T5**	**RDL**	**W5**	**RDL**	**QC Batch**
Misc. Inorganics												
Dissolved Hardness (CaCO3)	mg/L	92.7	108	105	77.8	68.4	72.3	45.6	0.50	346	0.50	6937482
Elements												
Dissolved Mercury (Hg)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	<0.000010	0.000010	6945930

RDL = Reportable Detection Limit

Maxxam Job #: B353645
Report Date: 2013/07/09

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Sampler Initials: MC

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		GT3468	GT3469	GT3470	GT3471	GT3472	GT3473	GT3474		GT3475		
Sampling Date		2013/06/24	2013/06/24	2013/06/24	2013/06/24	2013/06/24	2013/06/24	2013/06/24		2013/06/24		
	UNITS	**W13**	**W12**	**W11**	**W8**	**W6**	**S2**	**T5**	**RDL**	**W5**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS												
Dissolved Aluminum (Al)	mg/L	1.66	2.40	0.514	57.7	30.7	47.0	61.8	0.0030	83.2	0.0030	6941765
Dissolved Antimony (Sb)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	<0.00050	0.00050	6941765
Dissolved Arsenic (As)	mg/L	0.00012	0.00015	0.00012	0.0105	0.00828	0.0113	0.00255	0.00010	0.0945	0.00010	6941765
Dissolved Barium (Ba)	mg/L	0.0318	0.0291	0.0290	0.0378	0.0596	0.0454	0.0178	0.0010	0.0074	0.0010	6941765
Dissolved Beryllium (Be)	mg/L	0.00021	0.00025	0.00017	0.00196	0.00137	0.00169	0.00206	0.00010	0.00655	0.00010	6941765
Dissolved Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	<0.0010	0.0010	6941765
Dissolved Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	<0.050	0.050	6941765
Dissolved Cadmium (Cd)	mg/L	0.0168	0.0228	0.0113	0.353	0.0833	0.253	0.764	0.000010	0.102 (1)	0.000020	6941765
Dissolved Chromium (Cr)	mg/L	<0.0010	<0.0010	<0.0010	0.0552	0.0275	0.0461	0.0784	0.0010	0.0521	0.0010	6941765
Dissolved Cobalt (Co)	mg/L	0.0158	0.0201	0.0162	0.116	0.0729	0.0979	0.117	0.00050	0.310	0.00050	6941765
Dissolved Copper (Cu)	mg/L	0.0297	0.0432	0.0344	0.274	0.396	0.311	0.0816	0.00020	0.376	0.00020	6941765
Dissolved Iron (Fe)	mg/L	1.74	2.59	0.635	84.6	44.3	69.5	69.2	0.0050	313	0.0050	6941765
Dissolved Lead (Pb)	mg/L	0.00024	0.00077	<0.00020	0.0268	0.0367	0.0326	<0.00020	0.00020	0.180	0.00020	6941765
Dissolved Lithium (Li)	mg/L	0.0097	0.0119	0.0108	0.0248	0.0143	0.0205	0.0256	0.0050	0.0629	0.0050	6941765
Dissolved Manganese (Mn)	mg/L	0.257	0.318	0.292	1.08	1.19	1.12	0.508	0.0010	10.7	0.0010	6941765
Dissolved Molybdenum (Mo)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	<0.0010	0.0010	6941765
Dissolved Nickel (Ni)	mg/L	0.140	0.171	0.137	0.995	0.576	0.799	1.15	0.0010	1.86	0.0010	6941765
Dissolved Selenium (Se)	mg/L	0.00127	0.00155	0.00133	0.00475	0.00237	0.00275	0.0228	0.00010	0.00034	0.00010	6941765
Dissolved Silicon (Si)	mg/L	2.67	2.66	2.38	5.88	4.49	5.57	6.02	0.10	6.03	0.10	6941765
Dissolved Silver (Ag)	mg/L	<0.000020	<0.000020	<0.000020	0.000103	0.000104	0.000094	0.000122	0.000020	0.000070	0.000020	6941765
Dissolved Strontium (Sr)	mg/L	0.0766	0.0870	0.0860	0.0638	0.0604	0.0621	0.0456	0.0010	0.288	0.0010	6941765
Dissolved Thallium (Tl)	mg/L	0.000120	0.000159	0.000098	0.00158	0.00139	0.00164	0.000642	0.000050	0.00363	0.000050	6941765
Dissolved Tin (Sn)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0050	6941765
Dissolved Titanium (Ti)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0050	6941765
Dissolved Uranium (U)	mg/L	0.00115	0.00133	0.00075	0.0128	0.0120	0.0125	0.0127	0.00010	0.0107	0.00010	6941765
Dissolved Vanadium (V)	mg/L	<0.0050	<0.0050	<0.0050	0.218	0.0739	0.148	0.189	0.0050	0.134	0.0050	6941765
Dissolved Zinc (Zn)	mg/L	0.642	0.788	0.523	8.22	4.83	5.90	11.8	0.0050	21.2	0.0050	6941765
Dissolved Zirconium (Zr)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	<0.00050	0.00050	6941765
Dissolved Calcium (Ca)	mg/L	22.6	25.6	25.0	15.4	15.7	14.9	6.58	0.050	73.6	0.050	6938014
Dissolved Magnesium (Mg)	mg/L	8.80	10.7	10.2	9.57	7.06	8.51	7.08	0.050	39.5	0.050	6938014
Dissolved Potassium (K)	mg/L	0.584	0.651	0.540	2.69	2.20	2.68	1.00	0.050	7.76	0.050	6938014
Dissolved Sodium (Na)	mg/L	0.304	0.196	0.187	0.307	0.231	0.276	0.333	0.050	0.429	0.050	6938014
Dissolved Sulphur (S)	mg/L	35.6	42.2	34.9	193	116	158	197	3.0	436	3.0	6938014

RDL = Reportable Detection Limit
(1) - RDL raised due to sample matrix interference.

Maxxam Job #: B353645
Report Date: 2013/07/09

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Sampler Initials: MC

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		GT3476		GT3477	GT3478	GT3479		GT3493		GT3494		
Sampling Date		2013/06/24		2013/06/24	2013/06/24	2013/06/24		2013/06/24		2013/06/24		
	UNITS	**AD**	**RDL**	**W100**	**W2**	**W3**	**QC Batch**	**W3B**	**QC Batch**	**BH01-05**	**RDL**	**QC Batch**
Misc. Inorganics												
Dissolved Hardness (CaCO3)	mg/L	349	0.50	33.5	33.1	35.8	6937482	40.8	6937482	1.52	0.50	6937482
Elements												
Dissolved Mercury (Hg)	mg/L	<0.000010	0.000010	<0.000010	<0.000010	<0.000010	6945930	<0.000010	6945930	<0.000010	0.000010	6945930

RDL = Reportable Detection Limit

Maxxam Job #: B353645
Report Date: 2013/07/09

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Sampler Initials: MC

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		GT3476		GT3477	GT3478	GT3479		GT3493		GT3494		
Sampling Date		2013/06/24		2013/06/24	2013/06/24	2013/06/24		2013/06/24		2013/06/24		
	UNITS	**AD**	**RDL**	**W100**	**W2**	**W3**	**QC Batch**	**W3B**	**QC Batch**	**BH01-05**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS												
Dissolved Aluminum (Al)	mg/L	83.0	0.0030	19.8	19.9	29.3	6941765	36.1	6941765	0.114	0.0030	6941765
Dissolved Antimony (Sb)	mg/L	<0.00050	0.00050	<0.00050	<0.00050	<0.00050	6941765	<0.00050	6941765	0.00087	0.00050	6941765
Dissolved Arsenic (As)	mg/L	0.0952	0.00010	0.00618	0.00605	0.00124	6941765	0.00058	6962376	0.00018	0.00010	6941765
Dissolved Barium (Ba)	mg/L	0.0075	0.0010	0.0929	0.0901	0.0387	6941765	0.0257	6941765	0.225	0.0010	6941765
Dissolved Beryllium (Be)	mg/L	0.00655	0.00010	0.00073	0.00073	0.00113	6941765	0.00138	6941765	<0.00010	0.00010	6941765
Dissolved Bismuth (Bi)	mg/L	<0.0010	0.0010	<0.0010	<0.0010	<0.0010	6941765	<0.0010	6941765	<0.0010	0.0010	6941765
Dissolved Boron (B)	mg/L	<0.050	0.050	<0.050	<0.050	<0.050	6941765	<0.050	6941765	<0.050	0.050	6941765
Dissolved Cadmium (Cd)	mg/L	0.103(1)	0.000020	0.0628	0.0627	0.0766	6941765	0.0923	6941765	0.000291	0.000010	6941765
Dissolved Chromium (Cr)	mg/L	0.0555	0.0010	0.0207	0.0202	0.0239	6941765	0.0328	6941765	<0.0010	0.0010	6941765
Dissolved Cobalt (Co)	mg/L	0.323	0.00050	0.0430	0.0422	0.0482	6941765	0.0609	6941765	0.00067	0.00050	6941765
Dissolved Copper (Cu)	mg/L	0.374	0.00020	0.384	0.384	0.312	6941765	0.459	6941765	0.00336	0.00020	6941765
Dissolved Iron (Fe)	mg/L	311	0.0050	28.2	28.4	23.5	6941765	25.2	6941765	0.153	0.0050	6941765
Dissolved Lead (Pb)	mg/L	0.182	0.00020	<0.00020	<0.00020	0.0354	6941765	0.00650	6941765	0.00053	0.00020	6941765
Dissolved Lithium (Li)	mg/L	0.0634	0.0050	0.0079	0.0079	0.0124	6941765	0.0143	6941765	<0.0050	0.0050	6941765
Dissolved Manganese (Mn)	mg/L	11.0	0.0010	0.270	0.264	0.342	6941765	0.406	6941765	0.0094	0.0010	6941765
Dissolved Molybdenum (Mo)	mg/L	<0.0010	0.0010	<0.0010	<0.0010	<0.0010	6941765	<0.0010	6941765	<0.0010	0.0010	6941765
Dissolved Nickel (Ni)	mg/L	1.90	0.0010	0.374	0.364	0.447	6941765	0.579	6941765	0.0042	0.0010	6941765
Dissolved Selenium (Se)	mg/L	<0.00010	0.00010	0.00230	0.00216	0.00217	6941765	0.00317	6941765	0.00456	0.00010	6941765
Dissolved Silicon (Si)	mg/L	6.05	0.10	3.85	3.79	4.22	6941765	4.40	6941765	2.13	0.10	6941765
Dissolved Silver (Ag)	mg/L	0.000036	0.000020	0.000033	0.000039	0.000119	6941765	0.000174	6941765	0.000040	0.000020	6941765
Dissolved Strontium (Sr)	mg/L	0.289	0.0010	0.0353	0.0353	0.0332	6941765	0.0350	6941765	0.0098	0.0010	6941765
Dissolved Thallium (Tl)	mg/L	0.00375	0.000050	0.00117	0.00117	0.00107	6941765	0.00118	6941765	0.000139	0.000050	6941765
Dissolved Tin (Sn)	mg/L	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	6941765	<0.0050	6941765	<0.0050	0.0050	6941765
Dissolved Titanium (Ti)	mg/L	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	6941765	<0.0050	6941765	<0.0050	0.0050	6941765
Dissolved Uranium (U)	mg/L	0.0107	0.00010	0.0111	0.0110	0.00872	6941765	0.0119	6941765	<0.00010	0.00010	6941765
Dissolved Vanadium (V)	mg/L	0.140	0.0050	0.114	0.110	0.0347	6941765	0.0328	6941765	<0.0050	0.0050	6941765
Dissolved Zinc (Zn)	mg/L	21.0	0.0050	1.95	1.89	2.82	6941765	3.42	6941765	0.203	0.0050	6941765
Dissolved Zirconium (Zr)	mg/L	<0.00050	0.00050	<0.00050	<0.00050	<0.00050	6941765	<0.00050	6941765	<0.00050	0.00050	6941765
Dissolved Calcium (Ca)	mg/L	74.4	0.050	8.54	8.57	8.35	6938014	9.31	6938014	0.422	0.050	6938014
Dissolved Magnesium (Mg)	mg/L	39.6	0.050	2.97	2.84	3.62	6938014	4.26	6938014	0.115	0.050	6938014
Dissolved Potassium (K)	mg/L	7.79	0.050	2.03	1.96	1.59	6938014	1.81	6938014	0.504	0.050	6938014
Dissolved Sodium (Na)	mg/L	0.435	0.050	0.156	0.155	0.211	6938014	0.208	6938014	0.290	0.050	6938014
Dissolved Sulphur (S)	mg/L	451	3.0	72.9	71.1	85.5	6938014	109	6938014	<3.0	3.0	6938014

RDL = Reportable Detection Limit
(1) - RDL raised due to sample matrix interference.

Maxxam Job #: B353645
Report Date: 2013/07/09

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Sampler Initials: MC

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		GT3495			GT3496		GT3497		GT3498		GT3499		
Sampling Date		2013/06/24			2013/06/24		2013/06/24		2013/06/24		2013/06/24		
	UNITS	**BH03-05**	**RDL**	**QC Batch**	**BH04-05**	**RDL**	**FB**	**RDL**	**WRB-1**	**RDL**	**T4**	**RDL**	**QC Batch**
Misc. Inorganics													
Dissolved Hardness (CaCO3)	mg/L	55.2	0.50	6937482	332	0.50	<0.50	0.50	1260	0.50	3.18	0.50	6937482
Elements													
Dissolved Mercury (Hg)	mg/L	<0.000010	0.000010	6945930	<0.000010	0.000010	<0.000010	0.000010	<0.000010	0.000010	<0.000010	0.000010	6945930

RDL = Reportable Detection Limit

Maxxam Job #: B353645
Report Date: 2013/07/09

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Sampler Initials: MC

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		GT3495			GT3496		GT3497		GT3498		GT3499		
Sampling Date		2013/06/24			2013/06/24		2013/06/24		2013/06/24		2013/06/24		
	UNITS	**BH03-05**	**RDL**	**QC Batch**	**BH04-05**	**RDL**	**FB**	**RDL**	**WRB-1**	**RDL**	**T4**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS													
Dissolved Aluminum (Al)	mg/L	25.2	0.0030	6941765	19.7	0.0060	<0.0030	0.0030	521	0.12	3.24	0.0030	6943957
Dissolved Antimony (Sb)	mg/L	<0.00050	0.00050	6941765	<0.0010	0.0010	<0.00050	0.00050	0.028	0.020	<0.00050	0.00050	6943957
Dissolved Arsenic (As)	mg/L	0.00072	0.00010	6941765	0.00614	0.00020	<0.00010	0.00010	14.5	0.0040	0.00023	0.00010	6943957
Dissolved Barium (Ba)	mg/L	0.0068	0.0010	6941765	0.0133	0.0020	<0.0010	0.0010	<0.040	0.040	0.0847	0.0010	6943957
Dissolved Beryllium (Be)	mg/L	0.00105	0.00010	6941765	0.00115	0.00020	<0.00010	0.00010	0.0503	0.0040	0.00019	0.00010	6943957
Dissolved Bismuth (Bi)	mg/L	<0.0010	0.0010	6941765	<0.0020	0.0020	<0.0010	0.0010	<0.040	0.040	<0.0010	0.0010	6943957
Dissolved Boron (B)	mg/L	<0.050	0.050	6941765	<0.10	0.10	<0.050	0.050	<2.0	2.0	<0.050	0.050	6943957
Dissolved Cadmium (Cd)	mg/L	0.0748	0.000010	6941765	0.123	0.000025	<0.000010	0.000010	2.32	0.00050	0.00208	0.000010	6943957
Dissolved Chromium (Cr)	mg/L	0.0174	0.0010	6941765	0.0114	0.0020	<0.0010	0.0010	2.95	0.040	<0.0010	0.0010	6943957
Dissolved Cobalt (Co)	mg/L	0.0443	0.00050	6941765	0.0821	0.0010	<0.00050	0.00050	4.60	0.020	0.00494	0.00050	6943957
Dissolved Copper (Cu)	mg/L	0.338	0.00020	6941765	0.423	0.00040	<0.00020	0.00020	188	0.0080	0.0444	0.00020	6943957
Dissolved Iron (Fe)	mg/L	8.83	0.0050	6941765	39.3	0.010	<0.0050	0.0050	7770	0.20	0.209	0.0050	6943957
Dissolved Lead (Pb)	mg/L	0.00863	0.00020	6941765	0.0106	0.00040	<0.00020	0.00020	<0.0080	0.0080	0.0369	0.00020	6943957
Dissolved Lithium (Li)	mg/L	0.0114	0.0050	6941765	<0.010	0.010	<0.0050	0.0050	<0.20	0.20	<0.0050	0.0050	6943957
Dissolved Manganese (Mn)	mg/L	0.491	0.0010	6941765	4.12	0.0020	<0.0010	0.0010	51.9	0.040	0.135	0.0010	6943957
Dissolved Molybdenum (Mo)	mg/L	<0.0010	0.0010	6941765	<0.0020	0.0020	<0.0010	0.0010	0.184	0.040	<0.0010	0.0010	6943957
Dissolved Nickel (Ni)	mg/L	0.414	0.0010	6941765	0.561	0.0020	<0.0010	0.0010	41.1	0.040	0.0222	0.0010	6943957
Dissolved Selenium (Se)	mg/L	0.00284	0.00010	6941765	0.00953	0.00020	<0.00010	0.00010	0.586	0.0040	0.00038	0.00010	6943957
Dissolved Silicon (Si)	mg/L	4.80	0.10	6941765	5.01	0.20	<0.10	0.10	11.7	4.0	1.84	0.10	6943957
Dissolved Silver (Ag)	mg/L	0.000213	0.000020	6941765	0.000891	0.000040	<0.000020	0.000020	<0.00080	0.00080	0.000094	0.000020	6943957
Dissolved Strontium (Sr)	mg/L	0.0702	0.0010	6941765	0.339	0.0020	<0.0010	0.0010	0.358	0.040	0.0081	0.0010	6943957
Dissolved Thallium (Tl)	mg/L	0.000766	0.000050	6941765	0.00040	0.00010	<0.000050	0.000050	<0.0020	0.0020	0.000067	0.000050	6943957
Dissolved Tin (Sn)	mg/L	<0.0050	0.0050	6941765	<0.010	0.010	<0.0050	0.0050	<0.20	0.20	<0.0050	0.0050	6943957
Dissolved Titanium (Ti)	mg/L	<0.0050	0.0050	6941765	<0.010	0.010	<0.0050	0.0050	<0.20	0.20	<0.0050	0.0050	6943957
Dissolved Uranium (U)	mg/L	0.00982	0.00010	6941765	0.0100	0.00020	<0.00010	0.00010	2.23	0.0040	0.00031	0.00010	6943957
Dissolved Vanadium (V)	mg/L	<0.0050	0.0050	6941765	<0.010	0.010	<0.0050	0.0050	2.53	0.20	<0.0050	0.0050	6943957
Dissolved Zinc (Zn)	mg/L	5.16	0.0050	6941765	51.8	0.010	<0.0050	0.0050	387	0.20	0.217	0.0050	6943957
Dissolved Zirconium (Zr)	mg/L	<0.00050	0.00050	6941765	0.0011	0.0010	<0.00050	0.00050	0.201	0.020	<0.00050	0.00050	6943957
Dissolved Calcium (Ca)	mg/L	14.1	0.050	6938014	59.1	0.10	<0.050	0.050	228	2.0	0.743	0.050	6938014
Dissolved Magnesium (Mg)	mg/L	4.85	0.050	6938014	44.8	0.10	<0.050	0.050	168	2.0	0.321	0.050	6938014
Dissolved Potassium (K)	mg/L	0.819	0.050	6938014	1.68	0.10	<0.050	0.050	<2.0	2.0	0.304	0.050	6938014
Dissolved Sodium (Na)	mg/L	0.429	0.050	6938014	0.73	0.10	<0.050	0.050	<2.0	2.0	0.191	0.050	6938014
Dissolved Sulphur (S)	mg/L	84.8	3.0	6938014	221	6.0	<3.0	3.0	7210	120	8.8	3.0	6938014

RDL = Reportable Detection Limit

Maxxam Job #: B353645
Report Date: 2013/07/09

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Sampler Initials: MC

CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		GT3468	GT3469	GT3470	GT3471	GT3472	GT3473	GT3474		GT3475		
Sampling Date		2013/06/24	2013/06/24	2013/06/24	2013/06/24	2013/06/24	2013/06/24	2013/06/24		2013/06/24		
	UNITS	**W13**	**W12**	**W11**	**W8**	**W6**	**S2**	**T5**	**RDL**	**W5**	**RDL**	**QC Batch**
Calculated Parameters												
Total Hardness (CaCO3)	mg/L	99.5	115	106	80.7	70.9	76.4	46.2	0.50	367	0.50	6937481
Elements												
Total Mercury (Hg)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	<0.000010	0.000010	6945959

RDL = Reportable Detection Limit

Maxxam Job #: B353645
Report Date: 2013/07/09

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Sampler Initials: MC

CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		GT3468	GT3469	GT3470	GT3471	GT3472	GT3473	GT3474		GT3475		
Sampling Date		2013/06/24	2013/06/24	2013/06/24	2013/06/24	2013/06/24	2013/06/24	2013/06/24		2013/06/24		
	UNITS	**W13**	**W12**	**W11**	**W8**	**W6**	**S2**	**T5**	**RDL**	**W5**	**RDL**	**QC Batch**
Total Metals by ICPMS												
Total Aluminum (Al)	mg/L	4.52	5.50	3.45	57.3	31.0	47.4	58.0	0.0030	78.2	0.0060	6941592
Total Antimony (Sb)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	<0.0010	0.0010	6941592
Total Arsenic (As)	mg/L	0.00110	0.00126	0.00076	0.0116	0.00956	0.0127	0.00250	0.00010	0.112	0.00020	6941592
Total Barium (Ba)	mg/L	0.0384	0.0342	0.0291	0.0430	0.0667	0.0530	0.0186	0.0010	0.0076	0.0020	6941592
Total Beryllium (Be)	mg/L	0.00026	0.00029	0.00026	0.00189	0.00139	0.00173	0.00179	0.00010	0.00610	0.00020	6941592
Total Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	<0.0020	0.0020	6941592
Total Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	<0.10	0.10	6941592
Total Cadmium (Cd)	mg/L	0.0177	0.0231	0.0110	0.380	0.0867	0.262	0.783	0.000010	0.105	0.000025	6941592
Total Chromium (Cr)	mg/L	0.0018	0.0027	<0.0010	0.0604	0.0304	0.0509	0.0816	0.0010	0.0609	0.0020	6941592
Total Cobalt (Co)	mg/L	0.0169	0.0218	0.0172	0.127	0.0811	0.109	0.124	0.00050	0.349	0.0010	6941592
Total Copper (Cu)	mg/L	0.0340	0.0525	0.0433	0.295	0.445	0.340	0.0848	0.00020	0.414	0.00040	6941592
Total Iron (Fe)	mg/L	3.87	4.92	1.70	92.8	49.0	76.0	75.0	0.0050	331	0.010	6941592
Total Lead (Pb)	mg/L	0.00084	0.00141	<0.00020	0.0293	0.0400	0.0358	<0.00020	0.00020	0.193	0.00040	6941592
Total Lithium (Li)	mg/L	0.0105	0.0121	0.0102	0.0243	0.0147	0.0212	0.0244	0.0050	0.059	0.010	6941592
Total Manganese (Mn)	mg/L	0.270	0.335	0.295	1.18	1.31	1.22	0.519	0.0010	11.5	0.0020	6941592
Total Molybdenum (Mo)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	<0.0020	0.0020	6941592
Total Nickel (Ni)	mg/L	0.147	0.184	0.143	1.08	0.636	0.870	1.20	0.0010	2.05	0.0020	6941592
Total Selenium (Se)	mg/L	0.00178	0.00165	0.00157	0.00540	0.00252	0.00272	0.0231	0.00010	<0.00020	0.00020	6941592
Total Silicon (Si)	mg/L	3.04	2.72	2.28	5.83	4.36	5.39	5.48	0.10	5.73	0.20	6941592
Total Silver (Ag)	mg/L	<0.000020	0.000027	<0.000020	0.000089	0.000091	0.000097	0.000112	0.000020	<0.000040	0.000040	6941592
Total Strontium (Sr)	mg/L	0.0895	0.0962	0.0902	0.0709	0.0661	0.0670	0.0483	0.0010	0.305	0.0020	6941592
Total Thallium (Tl)	mg/L	0.000153	0.000169	0.000096	0.00178	0.00153	0.00173	0.000646	0.000050	0.00361	0.00010	6941592
Total Tin (Sn)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.010	0.010	6941592
Total Titanium (Ti)	mg/L	<0.0050	0.0062	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.010	0.010	6941592
Total Uranium (U)	mg/L	0.00152	0.00198	0.00153	0.0134	0.0122	0.0124	0.0124	0.00010	0.0104	0.00020	6941592
Total Vanadium (V)	mg/L	0.0061	0.0096	<0.0050	0.244	0.0941	0.170	0.197	0.0050	0.347	0.010	6941592
Total Zinc (Zn)	mg/L	0.626	0.811	0.511	8.36	5.08	6.24	11.4	0.0050	22.9	0.010	6941592
Total Zirconium (Zr)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	<0.0010	0.0010	6941592
Total Calcium (Ca)	mg/L	23.9	26.4	24.8	16.0	16.3	15.7	6.68	0.050	75.5	0.10	6937751
Total Magnesium (Mg)	mg/L	9.68	11.8	10.7	9.91	7.34	9.03	7.16	0.050	43.3	0.10	6937751
Total Potassium (K)	mg/L	0.598	0.654	0.540	2.80	2.30	2.86	1.00	0.050	8.01	0.10	6937751
Total Sodium (Na)	mg/L	0.267	0.188	0.172	0.301	0.239	0.293	0.335	0.050	0.48	0.10	6937751
Total Sulphur (S)	mg/L	38.2	44.5	34.4	208	126	176	204	3.0	476	6.0	6937751

RDL = Reportable Detection Limit

Maxxam Job #: B353645
Report Date: 2013/07/09

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Sampler Initials: MC

CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		GT3476		GT3477	GT3478	GT3479	GT3493		GT3497		GT3499		
Sampling Date		2013/06/24		2013/06/24	2013/06/24	2013/06/24	2013/06/24		2013/06/24		2013/06/24		
	UNITS	**AD**	**RDL**	**W100**	**W2**	**W3**	**W3B**	**QC Batch**	**FB**	**QC Batch**	**T4**	**RDL**	**QC Batch**
Calculated Parameters													
Total Hardness (CaCO3)	mg/L	369	0.50	35.4	33.3	35.9	41.3	6937481	<0.50	6937481	3.09	0.50	6937481
Elements													
Total Mercury (Hg)	mg/L	<0.000010	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	6945959	<0.000010	6945959	<0.000010	0.000010	6945959

RDL = Reportable Detection Limit

Maxxam Job #: B353645
Report Date: 2013/07/09

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Sampler Initials: MC

CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		GT3476		GT3477	GT3478	GT3479	GT3493		GT3497		GT3499		
Sampling Date		2013/06/24		2013/06/24	2013/06/24	2013/06/24	2013/06/24		2013/06/24		2013/06/24		
	UNITS	**AD**	**RDL**	**W100**	**W2**	**W3**	**W3B**	**QC Batch**	**FB**	**QC Batch**	**T4**	**RDL**	**QC Batch**
Total Metals by ICPMS													
Total Aluminum (Al)	mg/L	80.1	0.0060	19.7	19.3	27.9	35.0	6941592	0.0120	6952720	3.44	0.0030	6941592
Total Antimony (Sb)	mg/L	<0.0010	0.0010	<0.00050	<0.00050	<0.00050	<0.00050	6941592	<0.00050	6941592	<0.00050	0.00050	6941592
Total Arsenic (As)	mg/L	0.114	0.00020	0.00663	0.00631	0.00151	0.00054	6941592	<0.00010	6941592	0.00014	0.00010	6941592
Total Barium (Ba)	mg/L	0.0078	0.0020	0.120	0.113	0.0477	0.0317	6941592	<0.0010	6941592	0.0932	0.0010	6941592
Total Beryllium (Be)	mg/L	0.00595	0.00020	0.00071	0.00065	0.00098	0.00121	6941592	<0.00010	6941592	0.00022	0.00010	6941592
Total Bismuth (Bi)	mg/L	<0.0020	0.0020	<0.0010	<0.0010	<0.0010	<0.0010	6941592	<0.0010	6941592	<0.0010	0.0010	6941592
Total Boron (B)	mg/L	<0.10	0.10	<0.050	<0.050	<0.050	<0.050	6941592	<0.050	6941592	<0.050	0.050	6941592
Total Cadmium (Cd)	mg/L	0.108	0.000025	0.0667	0.0646	0.0787	0.0920	6941592	<0.000010	6952720	0.00223	0.000010	6941592
Total Chromium (Cr)	mg/L	0.0618	0.0020	0.0225	0.0219	0.0261	0.0345	6941592	<0.0010	6941592	<0.0010	0.0010	6941592
Total Cobalt (Co)	mg/L	0.355	0.0010	0.0475	0.0455	0.0521	0.0656	6941592	<0.00050	6941592	0.00541	0.00050	6941592
Total Copper (Cu)	mg/L	0.416	0.00040	0.411	0.398	0.334	0.504	6941592	<0.00020	6952720	0.0491	0.00020	6941592
Total Iron (Fe)	mg/L	341	0.010	32.2	30.7	25.1	26.9	6941592	<0.0050	6952720	0.227	0.0050	6941592
Total Lead (Pb)	mg/L	0.204	0.00040	<0.00020	<0.00020	0.0374	0.00540	6941592	<0.00020	6941592	0.0407	0.00020	6941592
Total Lithium (Li)	mg/L	0.063	0.010	0.0076	0.0073	0.0117	0.0145	6941592	<0.0050	6941592	<0.0050	0.0050	6941592
Total Manganese (Mn)	mg/L	11.7	0.0020	0.284	0.277	0.366	0.418	6941592	0.0015	6941592	0.152	0.0010	6941592
Total Molybdenum (Mo)	mg/L	<0.0020	0.0020	<0.0010	<0.0010	<0.0010	<0.0010	6941592	<0.0010	6941592	<0.0010	0.0010	6941592
Total Nickel (Ni)	mg/L	2.10	0.0020	0.407	0.393	0.472	0.613	6941592	0.0020	6941592	0.0243	0.0010	6941592
Total Selenium (Se)	mg/L	<0.00020	0.00020	0.00252	0.00229	0.00269	0.00328	6941592	<0.00010	6941592	0.00035	0.00010	6941592
Total Silicon (Si)	mg/L	5.84	0.20	3.67	3.46	3.87	4.19	6941592	<0.10	6941592	1.97	0.10	6941592
Total Silver (Ag)	mg/L	<0.000040	0.000040	0.000055	0.000041	0.000151	0.000165	6941592	<0.000020	6941592	0.000040	0.000020	6941592
Total Strontium (Sr)	mg/L	0.316	0.0020	0.0373	0.0362	0.0357	0.0369	6941592	<0.0010	6941592	0.0079	0.0010	6941592
Total Thallium (Tl)	mg/L	0.00400	0.00010	0.00122	0.00124	0.00116	0.00120	6941592	<0.000050	6941592	0.000051	0.000050	6941592
Total Tin (Sn)	mg/L	<0.010	0.010	<0.0050	<0.0050	<0.0050	<0.0050	6941592	<0.0050	6941592	<0.0050	0.0050	6941592
Total Titanium (Ti)	mg/L	<0.010	0.010	<0.0050	<0.0050	<0.0050	<0.0050	6941592	<0.0050	6941592	<0.0050	0.0050	6941592
Total Uranium (U)	mg/L	0.0108	0.00020	0.0110	0.0105	0.00870	0.0118	6941592	<0.00010	6941592	0.00036	0.00010	6941592
Total Vanadium (V)	mg/L	0.349	0.010	0.125	0.122	0.0409	0.0310	6941592	<0.0050	6941592	<0.0050	0.0050	6941592
Total Zinc (Zn)	mg/L	22.8	0.010	1.90	1.85	2.81	3.45	6941592	<0.0050	6952720	0.215	0.0050	6941592
Total Zirconium (Zr)	mg/L	<0.0010	0.0010	<0.00050	<0.00050	<0.00050	<0.00050	6941592	<0.00050	6941592	<0.00050	0.00050	6941592
Total Calcium (Ca)	mg/L	77.1	0.10	9.07	8.44	8.38	9.52	6937751	<0.050	6937751	0.669	0.050	6937751
Total Magnesium (Mg)	mg/L	43.0	0.10	3.10	2.95	3.64	4.25	6937751	<0.050	6937751	0.344	0.050	6937751
Total Potassium (K)	mg/L	8.14	0.10	2.07	2.00	1.58	1.73	6937751	<0.050	6937751	0.318	0.050	6937751
Total Sodium (Na)	mg/L	0.48	0.10	0.169	0.174	0.192	0.194	6937751	<0.050	6937751	0.181	0.050	6937751
Total Sulphur (S)	mg/L	472	6.0	74.6	71.8	89.8	112	6937751	<3.0	6937751	9.1	3.0	6937751

RDL = Reportable Detection Limit

Maxxam Job #: B353645
Report Date: 2013/07/09

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Sampler Initials: MC

Package 1	5.3°C
Package 2	5.7°C

Each temperature is the average of up to three cooler temperatures taken at receipt

General Comments

Sample GT3468-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GT3469-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GT3470-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GT3471-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GT3472-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GT3473-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GT3474-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GT3475-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GT3476-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GT3477-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GT3478-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GT3479-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

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Sample GT3493-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GT3494-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GT3495-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GT3496-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GT3497-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GT3498-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GT3499-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GT3493, Elements by CRC ICPMS (dissolved): Test repeated.

CCME DISSOLVED METALS IN WATER (WATER) Comments

Sample GT3496-03 Elements by CRC ICPMS (dissolved): Detection limits raised due to matrix interference.

Sample GT3498-01 Elements by CRC ICPMS (dissolved): Detection limits raised due to matrix interference.

CCME TOTAL METALS IN WATER (WATER) Comments

Sample GT3475-03 Elements by CRC ICPMS (total): Detection limits raised due to matrix interference.

Sample GT3476-03 Elements by CRC ICPMS (total): Detection limits raised due to matrix interference.

Sample GT3497, Elements by CRC ICPMS (total): Test repeated.

Maxxam Job #: B353645
Report Date: 2013/07/09

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Sampler Initials: MC

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6937875	Total Suspended Solids	2013/06/28			100	80 - 120	<1.0	mg/L		
6938333	Acidity (pH 8.3)	2013/06/27			102	80 - 120	<0.50	mg/L	0.3	20
6938333	Acidity (pH 4.5)	2013/06/27					<0.50	mg/L	0.9	20
6940875	Dissolved Sulphate (SO4)	2013/06/27	NC	80 - 120	97	80 - 120	0.70, RDL=0.50	mg/L	NC	20
6941478	Total Suspended Solids	2013/06/29			97	80 - 120	<1.0	mg/L		
6941592	Total Aluminum (Al)	2013/07/02	101	80 - 120	110	80 - 120	0.0044, RDL=0.0030	mg/L	NC	20
6941592	Total Antimony (Sb)	2013/07/02	NC	80 - 120	107	80 - 120	<0.00050	mg/L	NC	20
6941592	Total Arsenic (As)	2013/07/02	100	80 - 120	106	80 - 120	<0.00010	mg/L	NC	20
6941592	Total Barium (Ba)	2013/07/02	NC	80 - 120	103	80 - 120	<0.0010	mg/L	NC	20
6941592	Total Beryllium (Be)	2013/07/02	106	80 - 120	95	80 - 120	<0.00010	mg/L	NC	20
6941592	Total Bismuth (Bi)	2013/07/02	75(1)	80 - 120	102	80 - 120	<0.0010	mg/L	NC	20
6941592	Total Cadmium (Cd)	2013/07/02	98	80 - 120	104	80 - 120	<0.000010	mg/L	NC	20
6941592	Total Chromium (Cr)	2013/07/02	95	80 - 120	103	80 - 120	<0.0010	mg/L	NC	20
6941592	Total Cobalt (Co)	2013/07/02	100	80 - 120	105	80 - 120	<0.00050	mg/L	NC	20
6941592	Total Copper (Cu)	2013/07/02	NC	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20
6941592	Total Iron (Fe)	2013/07/02	108	80 - 120	109	80 - 120	<0.0050	mg/L	NC	20
6941592	Total Lead (Pb)	2013/07/02	95	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
6941592	Total Lithium (Li)	2013/07/02	NC	80 - 120	106	80 - 120	<0.0050	mg/L	NC	20
6941592	Total Manganese (Mn)	2013/07/02	112	80 - 120	106	80 - 120	<0.0010	mg/L	NC	20
6941592	Total Molybdenum (Mo)	2013/07/02	NC	80 - 120	106	80 - 120	<0.0010	mg/L	NC	20
6941592	Total Nickel (Ni)	2013/07/02	95	80 - 120	103	80 - 120	<0.0010	mg/L	NC	20
6941592	Total Selenium (Se)	2013/07/02	114	80 - 120	105	80 - 120	0.00011, RDL=0.00010	mg/L	NC	20
6941592	Total Silver (Ag)	2013/07/02	89	80 - 120	102	80 - 120	<0.000020	mg/L	NC	20
6941592	Total Strontium (Sr)	2013/07/02	NC	80 - 120	106	80 - 120	<0.0010	mg/L	1.8	20
6941592	Total Thallium (Tl)	2013/07/02	86	80 - 120	106	80 - 120	<0.000050	mg/L	NC	20
6941592	Total Tin (Sn)	2013/07/02	90	80 - 120	102	80 - 120	<0.0050	mg/L	NC	20
6941592	Total Titanium (Ti)	2013/07/02	72(1)	80 - 120	102	80 - 120	<0.0050	mg/L	NC	20
6941592	Total Uranium (U)	2013/07/02	97	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
6941592	Total Vanadium (V)	2013/07/02	102	80 - 120	104	80 - 120	<0.0050	mg/L	NC	20
6941592	Total Zinc (Zn)	2013/07/02	NC	80 - 120	98	80 - 120	<0.0050	mg/L	NC	20
6941592	Total Boron (B)	2013/07/02					<0.050	mg/L	2.2	20
6941592	Total Silicon (Si)	2013/07/02					<0.10	mg/L	NC	20
6941592	Total Zirconium (Zr)	2013/07/02					<0.00050	mg/L	NC	20
6941696	Acidity (pH 8.3)	2013/06/28			97	80 - 120	<0.50	mg/L	NC	20
6941696	Acidity (pH 4.5)	2013/06/28					<0.50	mg/L	NC	20
6941765	Dissolved Aluminum (Al)	2013/06/29	NC	80 - 120	102	80 - 120	<0.0030	mg/L	0.2	20
6941765	Dissolved Antimony (Sb)	2013/06/29	NC	80 - 120	103	80 - 120	<0.00050	mg/L	NC	20
6941765	Dissolved Arsenic (As)	2013/06/29	97	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
6941765	Dissolved Barium (Ba)	2013/06/29	NC	80 - 120	102	80 - 120	<0.0010	mg/L	0.9	20
6941765	Dissolved Beryllium (Be)	2013/06/29	103	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20

Maxxam Job #: B353645
Report Date: 2013/07/09

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Sampler Initials: MC

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6941765	Dissolved Bismuth (Bi)	2013/06/29	98	80 - 120	99	80 - 120	<0.0010	mg/L	NC	20
6941765	Dissolved Cadmium (Cd)	2013/06/29	100	80 - 120	96	80 - 120	<0.000010	mg/L	2.7	20
6941765	Dissolved Chromium (Cr)	2013/06/29	100	80 - 120	103	80 - 120	<0.0010	mg/L	NC	20
6941765	Dissolved Cobalt (Co)	2013/06/29	99	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
6941765	Dissolved Copper (Cu)	2013/06/29	97	80 - 120	101	80 - 120	<0.00020	mg/L	0.9	20
6941765	Dissolved Iron (Fe)	2013/06/29	NC	80 - 120	112	80 - 120	<0.0050	mg/L	2.9	20
6941765	Dissolved Lead (Pb)	2013/06/29	97	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
6941765	Dissolved Lithium (Li)	2013/06/29	98	80 - 120	100	80 - 120	<0.0050	mg/L	NC	20
6941765	Dissolved Manganese (Mn)	2013/06/29	NC	80 - 120	103	80 - 120	<0.0010	mg/L	0.6	20
6941765	Dissolved Molybdenum (Mo)	2013/06/29	99	80 - 120	100	80 - 120	<0.0010	mg/L	NC	20
6941765	Dissolved Nickel (Ni)	2013/06/29	98	80 - 120	102	80 - 120	<0.0010	mg/L	NC	20
6941765	Dissolved Selenium (Se)	2013/06/29	99	80 - 120	108	80 - 120	<0.00010	mg/L	6.4	20
6941765	Dissolved Silver (Ag)	2013/06/29	105	80 - 120	97	80 - 120	<0.000020	mg/L	NC	20
6941765	Dissolved Strontium (Sr)	2013/06/29	NC	80 - 120	103	80 - 120	<0.0010	mg/L	2.6	20
6941765	Dissolved Thallium (Tl)	2013/06/29	102	80 - 120	101	80 - 120	<0.000050	mg/L	NC	20
6941765	Dissolved Tin (Sn)	2013/06/29	NC	80 - 120	100	80 - 120	<0.0050	mg/L	NC	20
6941765	Dissolved Titanium (Ti)	2013/06/29	115	80 - 120	108	80 - 120	<0.0050	mg/L	NC	20
6941765	Dissolved Uranium (U)	2013/06/29	102	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
6941765	Dissolved Vanadium (V)	2013/06/29	106	80 - 120	101	80 - 120	<0.0050	mg/L	NC	20
6941765	Dissolved Zinc (Zn)	2013/06/29	NC	80 - 120	101	80 - 120	<0.0050	mg/L	0.8	20
6941765	Dissolved Boron (B)	2013/06/29					<0.050	mg/L	NC	20
6941765	Dissolved Silicon (Si)	2013/06/29					<0.10	mg/L	3.2	20
6941765	Dissolved Zirconium (Zr)	2013/06/29					<0.00050	mg/L	NC	20
6941769	Nitrate plus Nitrite (N)	2013/06/27	105	80 - 120	105	80 - 120	<0.020	mg/L	1.0	25
6941772	Ammonia (N)	2013/06/28	96	80 - 120	101	80 - 120	<0.0050	mg/L	0.9	20
6941776	Nitrite (N)	2013/06/27	97	80 - 120	98	80 - 120	<0.0050	mg/L	NC	20
6943957	Dissolved Aluminum (Al)	2013/07/02	116	80 - 120	101	80 - 120	<0.0030	mg/L	NC	20
6943957	Dissolved Antimony (Sb)	2013/07/02	NC	80 - 120	102	80 - 120	<0.00050	mg/L	0.9	20
6943957	Dissolved Arsenic (As)	2013/07/02	NC	80 - 120	100	80 - 120	<0.00010	mg/L	1	20
6943957	Dissolved Barium (Ba)	2013/07/02	NC	80 - 120	98	80 - 120	<0.0010	mg/L	0.5	20
6943957	Dissolved Beryllium (Be)	2013/07/02	99	80 - 120	93	80 - 120	<0.00010	mg/L	NC	20
6943957	Dissolved Bismuth (Bi)	2013/07/02	93	80 - 120	96	80 - 120	<0.0010	mg/L	NC	20
6943957	Dissolved Cadmium (Cd)	2013/07/02	98	80 - 120	98	80 - 120	<0.000010	mg/L	NC	20
6943957	Dissolved Chromium (Cr)	2013/07/02	NC	80 - 120	99	80 - 120	<0.0010	mg/L	1.8	20
6943957	Dissolved Cobalt (Co)	2013/07/02	96	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
6943957	Dissolved Copper (Cu)	2013/07/02	91	80 - 120	98	80 - 120	<0.00020	mg/L	2.1	20
6943957	Dissolved Iron (Fe)	2013/07/02	105	80 - 120	106	80 - 120	<0.0050	mg/L	NC	20
6943957	Dissolved Lead (Pb)	2013/07/02	92	80 - 120	94	80 - 120	<0.00020	mg/L	NC	20
6943957	Dissolved Lithium (Li)	2013/07/02	NC	80 - 120	98	80 - 120	<0.0050	mg/L	NC	20
6943957	Dissolved Manganese (Mn)	2013/07/02	NC	80 - 120	98	80 - 120	<0.0010	mg/L	1.2	20

Maxxam Job #: B353645
Report Date: 2013/07/09

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Sampler Initials: MC

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6943957	Dissolved Molybdenum (Mo)	2013/07/02	NC	80 - 120	97	80 - 120	<0.0010	mg/L	0.9	20
6943957	Dissolved Nickel (Ni)	2013/07/02	NC	80 - 120	101	80 - 120	<0.0010	mg/L	2.4	20
6943957	Dissolved Selenium (Se)	2013/07/02	99	80 - 120	105	80 - 120	<0.00010	mg/L	14.0	20
6943957	Dissolved Silver (Ag)	2013/07/02	101	80 - 120	94	80 - 120	<0.000020	mg/L	NC	20
6943957	Dissolved Strontium (Sr)	2013/07/02	NC	80 - 120	100	80 - 120	<0.0010	mg/L	1.0	20
6943957	Dissolved Thallium (Tl)	2013/07/02	98	80 - 120	100	80 - 120	<0.000050	mg/L	NC	20
6943957	Dissolved Tin (Sn)	2013/07/02	104	80 - 120	98	80 - 120	<0.0050	mg/L	NC	20
6943957	Dissolved Titanium (Ti)	2013/07/02	109	80 - 120	101	80 - 120	<0.0050	mg/L	NC	20
6943957	Dissolved Uranium (U)	2013/07/02	95	80 - 120	93	80 - 120	<0.00010	mg/L	3.6	20
6943957	Dissolved Vanadium (V)	2013/07/02	NC	80 - 120	100	80 - 120	<0.0050	mg/L	NC	20
6943957	Dissolved Zinc (Zn)	2013/07/02	102	80 - 120	105	80 - 120	<0.0050	mg/L	NC	20
6943957	Dissolved Boron (B)	2013/07/02					<0.050	mg/L	NC	20
6943957	Dissolved Silicon (Si)	2013/07/02					<0.10	mg/L	2.9	20
6943957	Dissolved Zirconium (Zr)	2013/07/02					<0.00050	mg/L	NC	20
6944003	Alkalinity (Total as CaCO3)	2013/06/28	NC	80 - 120	99	80 - 120	<0.50	mg/L	0	20
6944003	Alkalinity (PP as CaCO3)	2013/06/28					<0.50	mg/L	NC	20
6944003	Bicarbonate (HCO3)	2013/06/28					<0.50	mg/L	0	20
6944003	Carbonate (CO3)	2013/06/28					<0.50	mg/L	NC	20
6944003	Hydroxide (OH)	2013/06/28					<0.50	mg/L	NC	20
6944013	Conductivity	2013/06/28			97	80 - 120	<1.0	uS/cm	0.4	20
6945930	Dissolved Mercury (Hg)	2013/07/02	91	80 - 120	110	80 - 120	<0.000010	mg/L	NC	20
6945959	Total Mercury (Hg)	2013/07/02	86	80 - 120	103	80 - 120	<0.000010	mg/L	NC	20
6945980	Nitrate plus Nitrite (N)	2013/06/28	98	80 - 120	103	80 - 120	<0.020	mg/L	NC	25
6945990	Nitrite (N)	2013/06/28	91	80 - 120	97	80 - 120	<0.0050	mg/L	NC	20
6946022	Acidity (pH 8.3)	2013/07/02			99	80 - 120	<0.50	mg/L	NC	20
6946022	Acidity (pH 4.5)	2013/07/02					<0.50	mg/L	NC	20
6946311	Dissolved Sulphate (SO4)	2013/06/28	NC	80 - 120	92	80 - 120	<0.50	mg/L	0.8	20
6947502	Dissolved Sulphate (SO4)	2013/07/02			98	80 - 120	<0.50	mg/L		
6952720	Total Aluminum (Al)	2013/07/04	NC	80 - 120	108	80 - 120	0.0059, RDL=0.0030	mg/L		
6952720	Total Cadmium (Cd)	2013/07/04	101	80 - 120	101	80 - 120	<0.000010	mg/L		
6952720	Total Copper (Cu)	2013/07/04	96	80 - 120	101	80 - 120	<0.00020	mg/L		
6952720	Total Iron (Fe)	2013/07/04	NC	80 - 120	103	80 - 120	<0.0050	mg/L		

Maxxam Job #: B353645
Report Date: 2013/07/09

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Sampler Initials: MC

QUALITY ASSURANCE REPORT

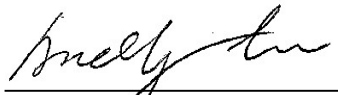
			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6952720	Total Zinc (Zn)	2013/07/04	NC	80 - 120	104	80 - 120	<0.0050	mg/L		
6962376	Dissolved Arsenic (As)	2013/07/09	101	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20

N/A = Not Applicable
RDL = Reportable Detection Limit
RPD = Relative Percent Difference
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) - Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Validation Signature Page

Maxxam Job #: B353645

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Andy Lu, Data Validation Coordinator

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics Inc
8577 Commerce Court
Burnaby, BC V5A 4N5
www.maxxamanalytics.com
Phone: (604) 444-4808
Fax.: (604) 444-4511
Toll-Free: 1-800-440-4808

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

08373433

LAB USE ONLY
MAXXAM JOB #: B353645

ANALYSIS REQUEST

LAB USE ONLY
COC #:

COMPANY NAME:	Access Consulting Group
CLIENT PROJECT NO.:	HBM-13-01
COMPANY ADDRESS:	#3 Calcite Business Center 151 Industrial Rd. Whitehorse, YT Y1A 2V3
TEL.:	867-668-6463
E-MAIL:	kwoloshyn@accessconsulting.ca
FAX:	867-667-6680
SAMPLER NAME (PRINT):	Matt Corriveau
PROJECT MANAGER:	Kai Woloshyn
LABORATORY CONTACT:	Graham Rudkin

	FIELD SAMPLE ID	MAXXAM LAB # (LAB USE ONLY)	MATRIX: GROUNDWATER	SURFACE WATER	DRINKING WATER	SOIL	OTHER	SAMPLING: DATE DD/MM/YY	TIME	# CONTAINERS	General Chemistry (pH, Conductivity, alkalanity	acidity, sulfate, nitrate, nitrite)	Dissolved metals -CCME	Total metals -CCME	Total Nutrients - ammonia	TSS
1	W13	GT3468		X				24/06/13		5	X	X	X	X	X	X
2	W12	GT3469		X				24/06/13		5	X	X	X	X	X	X
3	W11	GT3470		X				24/06/13		5	X	X	X	X	X	X
4	W8	GT3471		X				24/06/13		5	X	X	X	X	X	X
5	W6	GT3472		X				24/06/13		5	X	X	X	X	X	X
6	S2	GT3473		X				24/06/13		5	X	X	X	X	X	X
7	T5	GT3474		X				24/06/13		5	X	X	X	X	X	X
8	W5	GT3475		X				24/06/13		5	X	X	X	X	X	X
9	AD	GT3476		X				24/06/13		5	X	X	X	X	X	X
10	W100	GT3477		X				24/06/13		5	X	X	X	X	X	X
11	W2	GT3478		X				24/06/13		5	X	X	X	X	X	X
12	W3	GT3479		X				24/06/13		5	X	X	X	X	X	X

B353645

TAT (Turnaround Time)
LESS THAN 5 DAY TAT MUST HAVE PRIOR APPROVAL
* Some exceptions apply - please contact laboratory

STANDARD	5 BUSINESS DAYS	X
RUSH	3 BUSINESS DAYS	
RUSH	2 BUSINESS DAYS	
URGENT	1 BUSINESS DAY	

OTHER BUSINESS DAYS

PO NUMBER OR QUOTE NUMBER: 14711

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE:

X CCME
CSR
AB TIER 1
OTHER

LAB USE ONLY
ARRIVAL TEMPERATURE °C: 5,6,5/5,6,6 6,7,5
DUE DATE:
LOG IN CHECK:

ACCOUNTING CONTACT:

SPECIAL REPORTING OR BILLING INSTRUCTIONS: B11-096-DL

JARS USED:

RELINQUISHED BY SAMPLER: Matt Corriveau	DATE: DD/MM/YY 25/06/13	TIME: 10:00	RECEIVED BY: Air North Cargo
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY:
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY LABORATORY: Laurel Berthier 2013/06/26 15:35

CUSTODY RECORD

COCFORM - BC - 20070822

Maxxam Analytics Inc

8577 Commerce Court
Burnaby, BC V5A 4N5
www.maxxamanalytics.com

Phone: (604) 444-4808
Fax.: (604) 444-4511
Toll-Free: 1-800-440-4808

CHAIN-OF CUSTODY RECORD AND ANALYSIS REQUEST

08373434

LAB USE ONLY
MAXXAM JOB #

ANALYSIS REQUEST

LAB USE ONLY
COC #

COMPANY NAME:	Access Consulting Group
CLIENT PROJECT NO.:	HBM-13-01
COMPANY ADDRESS:	#3 Calcite Business Center 151 Industrial Rd. Whitehorse, YT Y1A 2V3
TEL.:	867-668-6463
E-MAIL:	kwoloshyn@accessconsulting.ca
FAX:	867-667-6680
SAMPLER NAME (PRINT):	Matt Corriveau
PROJECT MANAGER:	Kai Woloshyn
LABORATORY CONTACT:	Graham Rudkin

	FIELD SAMPLE ID	MAXXAM LAB # (LAB USE ONLY)	MATRIX: GROUNDWATER	SURFACE WATER	DRINKING WATER	SOIL	OTHER	SAMPLING: DATE DD/MM/YY	TIME	# CONTAINERS	General Chemistry (pH, conductivity, alkalinity,	acidity, sulphate, nitrate, nitrite)	Dissolved metals -CCME	Total metals -ccme	Total nutrients - Ammonia	TSS
1	W3B	GT3493		x				24/06/13		5	x	x	x	x	x	x
2	BH01-05	GT3494	x					24/06/13		3	x	x	x		x	
3	BH03-05	GT3495	x					24/06/13		3	x	x	x		x	
4	BH04-05	GT3496	x					24/06/13		3	x	x	x		x	
5	FB	GT3497		x				24/06/13		5	x	x	x	x	x	x
6	WRB-1	GT3498		x				24/06/13		2	x	x	x			
7		GT3499														
8																
9																
10																
11																
12																

B353645

TAT (Turnaround Time)
LESS THAN 5 DAY TAT MUST HAVE PRIOR APPROVAL
* Some exceptions apply - please contact laboratory

STANDARD	5 BUSINESS DAYS	X
RUSH	3 BUSINESS DAYS	
RUSH	2 BUSINESS DAYS	
URGENT	1 BUSINESS DAY	

OTHER BUSINESS DAYS

PO NUMBER OR QUOTE NUMBER: 14711

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE:

ACCOUNTING CONTACT:

SPECIAL REPORTING OR BILLING INSTRUCTIONS: B11-096-DL

X	CCME
	CSR
	AB TIER 1
	OTHER

JARS USED:

LAB USE ONLY
ARRIVAL TEMPERATURE °C: 5,6,5/5,6,6 6,7,5
DUE DATE:
LOG IN CHECK:

RELINQUISHED BY SAMPLER: Matt Corriveau	DATE: DD/MM/YY 25/06/13	TIME: 10:00	RECEIVED BY: Air North Cargo
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY:
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY LABORATORY: Laurel Berthier 2013/06/26 15:35

CUSTODY RECORD

COCFORM - BC - 20070822

Maxxam

Success Through Science®

Your P.O. #: 14711
Your Project #: HBM-13-01
Your C.O.C. #: 08375365, 08375364

Attention: Kai Woloshyn
ACCESS CONSULTING GROUP
#3 Calcite
151 Industrial Road
WHITEHORSE, YT
CANADA Y1A 3C8

Report Date: 2013/08/12

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B367467
Received: 2013/08/03, 14:00

Sample Matrix: Water
Samples Received: 21

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO3)	19	N/A	2013/08/06	BBY6SOP-00037	SM-2310B
Alkalinity - Water	18	2013/08/06	2013/08/06	BBY6SOP-00026	SM2320B
Chloride by Automated Colourimetry	19	N/A	2013/08/07	BBY6SOP-00011	SM-4500-Cl-
Conductance - water	18	N/A	2013/08/06	BBY6SOP-00026	SM-2510B
Conductance - water	1	N/A	2013/08/08	BBY6SOP-00026	SM-2510B
Fluoride - Mining Clients	1	N/A	2013/08/07	BBY6SOP-00038	SM - 4500 F C
Hardness Total (calculated as CaCO3)	14	N/A	2013/08/07	BBY7SOP-00002	EPA 6020A
Hardness Total (calculated as CaCO3)	3	N/A	2013/08/09	BBY7SOP-00002	EPA 6020A
Hardness (calculated as CaCO3)	15	N/A	2013/08/07	BBY7SOP-00002	EPA 6020A
Hardness (calculated as CaCO3)	3	N/A	2013/08/08	BBY7SOP-00002	EPA 6020A
Hardness (calculated as CaCO3)	1	N/A	2013/08/09	BBY7SOP-00002	EPA 6020A
Mercury (Dissolved) by CVAF	15	N/A	2013/08/07	BBY7SOP-00015	EPA 245.7
Mercury (Dissolved) by CVAF	4	N/A	2013/08/08	BBY7SOP-00015	EPA 245.7
Mercury (Total) by CVAF	15	2013/08/07	2013/08/07	BBY7SOP-00015	EPA 245.7
Mercury (Total) by CVAF	2	2013/08/09	2013/08/09	BBY7SOP-00015	EPA 245.7
Ion Balance	15	N/A	2013/08/08	Calc	
Ion Balance	3	N/A	2013/08/09	Calc	
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	15	N/A	2013/08/07	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	3	N/A	2013/08/08	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	1	N/A	2013/08/09	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (dissolved)	15	N/A	2013/08/07	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (dissolved)	3	N/A	2013/08/08	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (dissolved)	1	N/A	2013/08/09	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (total)	14	2013/08/03	2013/08/07	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (total)	1	2013/08/03	2013/08/09	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (total)	2	2013/08/06	2013/08/09	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (total)	15	2013/08/06	2013/08/06	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (total)	2	2013/08/07	2013/08/08	BBY7SOP-00002	EPA 6020A
Ammonia-N (Unpreserved)	1	N/A	2013/08/06	BBY6SOP-00009	SM-4500NH3G
Ammonia-N (Preserved)	17	N/A	2013/08/06	BBY6SOP-00009	SM-4500NH3G
Nitrate+Nitrite (N) (low level)	18	N/A	2013/08/07	BBY6SOP-00010	EPA 353.2
Nitrate+Nitrite (N) (low level)	1	N/A	2013/08/09	BBY6SOP-00010	EPA 353.2
Nitrite (N) (low level)	18	N/A	2013/08/07	BBY6SOP-00010	SM 4500NO3-I
Nitrite (N) (low level)	1	N/A	2013/08/09	BBY6SOP-00010	SM 4500NO3-I
Nitrogen - Nitrate (as N)	18	N/A	2013/08/07	BBY6SOP-00010	SM 4500NO3-I
Nitrogen - Nitrate (as N)	1	N/A	2013/08/09	BBY6SOP-00010	SM 4500NO3-I
Filter and HNO3 Preserve for Metals	18	N/A	2013/08/03	BBY6WI-00001	EPA 200.2
Filter and HNO3 Preserve for Metals	1	N/A	2013/08/08	BBY6WI-00001	EPA 200.2
pH Water	19	N/A	2013/08/06	BBY6SOP-00026	SM-4500H+B
Sulphate by Automated Colourimetry	14	N/A	2013/08/07	BBY6SOP-00017	SM4500-SO42- E
Sulphate by Automated Colourimetry	5	N/A	2013/08/08	BBY6SOP-00017	SM4500-SO42- E
Total Suspended Solids-Low Level	15	2013/08/06	2013/08/07	BBY6SOP-00034	SM-2540 D

Maxxam Job #: B367467
Report Date: 2013/08/12

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: LEI

* Results relate only to the items tested.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Graham Rudkin, Project Manager, Environmental
Email: GRudkin@maxxam.ca
Phone# (604) 638-5926 Ext:5926

==========

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Maxxam Job #: B367467
Report Date: 2013/08/12

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: LEI

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		HC3195		HC3196		HC3197		HC3198	HC3199	HC3200	HC3201		
Sampling Date		2013/07/30 10:15		2013/07/30 13:20		2013/07/30 14:40		2013/07/30 15:30	2013/07/30 17:45	2013/07/30 16:50	2013/07/30 16:50		
	UNITS	**W13**	**RDL**	**W12**	**RDL**	**W11**	**RDL**	**W8**	**W6**	**S2**	**T5**	**RDL**	**QC Batch**
Misc. Inorganics													
Acidity (pH 4.5)	mg/L	<0.50	0.50	3.98	0.50	<0.50	0.50	622	385	512	766	0.50	7049228
Acidity (pH 8.3)	mg/L	44.6	0.50	68.0	0.50	12.7	0.50	941	629	798	1150	0.50	7049228
Calculated Parameters													
Filter and HNO3 Preservation	N/A	FIELD	N/A	FIELD	N/A	FIELD	N/A	FIELD	FIELD	FIELD	FIELD	N/A	ONSITE
Ion Balance	N/A	0.96	0.010	0.92	0.010	0.98	0.010	1.1	1.1	1.1	1.1	0.010	7047610
Nitrate (N)	mg/L	0.0391	0.0020	0.0499	0.0020	0.0500	0.0020	0.0742	0.0821	0.0728	0.165	0.0020	7047334
Misc. Inorganics													
Alkalinity (Total as CaCO3)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	0.50	7050539
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	0.50	7050539
Bicarbonate (HCO3)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	0.50	7050539
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	0.50	7050539
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	0.50	7050539
Anions													
Dissolved Sulphate (SO4)	mg/L	170	0.50	231	5.0	168	0.50	959	689	852	1010	5.0	7057368
Dissolved Chloride (Cl)	mg/L	0.79	0.50	<0.50	0.50	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	0.50	7057329
Nutrients													
Ammonia (N)	mg/L	0.093	0.0050	0.11	0.0050	0.033	0.0050	2.1	1.2	2.1	2.7	0.0050	7052097
Nitrate plus Nitrite (N)	mg/L	0.0391(1)	0.0020	0.0499(1)	0.0020	0.0500(1)	0.0020	0.113(1)	0.108(1)	0.107(1)	0.211(1)	0.0020	7057582
Nitrite (N)	mg/L	<0.0020(1)	0.0020	<0.0020(1)	0.0020	<0.0020(1)	0.0020	0.0387(1)	0.0261(1)	0.0346(1)	0.0467(1)	0.0020	7057593
Physical Properties													
Conductivity	uS/cm	353	1.0	452	1.0	363	1.0	1720	1420	1570	1770	1.0	7050552
pH	pH Units	4.43		4.18		5.09		2.79	2.85	2.82	2.80		7050567
Physical Properties													
Total Suspended Solids	mg/L	18.9	1.0	25.4	1.0	26.0	1.0	19.8	12.1	26.5	<1.0	1.0	7049273

N/A = Not Applicable
RDL = Reportable Detection Limit
(1) - Sample arrived to laboratory past recommended hold time.

Maxxam Job #: B367467
Report Date: 2013/08/12

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: LEI

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		HC3202	HC3203		HC3204	HC3205		HC3206		
Sampling Date		2013/07/30 18:15	2013/07/30 18:15		2013/07/30 17:45	2013/07/30 19:45		2013/07/30 19:25		
	UNITS	**W5**	**AD**	**QC Batch**	**W100**	**W2**	**QC Batch**	**W3**	**RDL**	**QC Batch**
Misc. Inorganics										
Acidity (pH 4.5)	mg/L	262	266	7049228	391	346	7049228	370	0.50	7049228
Acidity (pH 8.3)	mg/L	990	958	7049228	635	557	7049228	590	0.50	7049228
Calculated Parameters										
Filter and HNO3 Preservation	N/A	FIELD	FIELD	ONSITE	FIELD	FIELD	ONSITE	FIELD	N/A	ONSITE
Ion Balance	N/A	1.0	1.0	7047610	0.91	1.1	7047610	1.0	0.010	7047610
Nitrate (N)	mg/L	0.0022	<0.0020	7047334	0.0830	0.0901	7047334	0.0927	0.0020	7047334
Misc. Inorganics										
Alkalinity (Total as CaCO3)	mg/L	<0.50	<0.50	7050539	<0.50	<0.50	7050539	<0.50	0.50	7050539
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	7050539	<0.50	<0.50	7050539	<0.50	0.50	7050539
Bicarbonate (HCO3)	mg/L	<0.50	<0.50	7050539	<0.50	<0.50	7050539	<0.50	0.50	7050539
Carbonate (CO3)	mg/L	<0.50	<0.50	7050539	<0.50	<0.50	7050539	<0.50	0.50	7050539
Hydroxide (OH)	mg/L	<0.50	<0.50	7050539	<0.50	<0.50	7050539	<0.50	0.50	7050539
Anions										
Dissolved Sulphate (SO4)	mg/L	1300	1290	7057368	824	579	7061653	584	5.0	7057368
Dissolved Chloride (Cl)	mg/L	<0.50	<0.50	7057329	<0.50	<0.50	7057329	1.0	0.50	7057329
Nutrients										
Ammonia (N)	mg/L	3.8	1.2	7052097	1.5	1.4	7052097	1.5	0.0050	7052097
Nitrate plus Nitrite (N)	mg/L	0.0075(1)	0.0054(1)	7057582	0.111(1)	0.110(1)	7057582	0.108(1)	0.0020	7057582
Nitrite (N)	mg/L	0.0053(1)	0.0084(1)	7057593	0.0282(1)	0.0200(1)	7057593	0.0152(1)	0.0020	7057593
Physical Properties										
Conductivity	uS/cm	1970	2000	7050552	1420	1270	7050552	1240	1.0	7050552
pH	pH Units	3.29	3.18	7050567	2.85	2.87	7050567	2.91		7050567
Physical Properties										
Total Suspended Solids	mg/L	81.7	75.0	7049273	14.9	34.5	7049273	1.2	1.0	7049273

N/A = Not Applicable
RDL = Reportable Detection Limit
(1) - Sample arrived to laboratory past recommended hold time.

Maxxam Job #: B367467
Report Date: 2013/08/12

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: LEI

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		HC3249			HC3250		HC3251		
Sampling Date		2013/07/30 20:00			2013/07/30 20:00		2013/07/30		
	UNITS	**W3B**	**RDL**	**QC Batch**	**W101**	**QC Batch**	**TRIP BLANK**	**RDL**	**QC Batch**
Misc. Inorganics									
Acidity (pH 4.5)	mg/L	588	0.50	7049228	<0.50	7049228	<0.50	0.50	7049228
Acidity (pH 8.3)	mg/L	901	0.50	7049228	<0.50	7049228	<0.50	0.50	7049228
Calculated Parameters									
Filter and HNO3 Preservation	N/A	FIELD	N/A	ONSITE	FIELD	ONSITE	LAB	N/A	7058674
Ion Balance	N/A	1.1	0.010	7047610	NC	7047610	NC	0.010	7047610
Nitrate (N)	mg/L	0.0713	0.0020	7047334	<0.0020	7047334	<0.0020	0.0020	7047334
Misc. Inorganics									
Alkalinity (Total as CaCO3)	mg/L	<0.50	0.50	7050539	<0.50	7050539	<0.50	0.50	7050539
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	7050539	<0.50	7050539	<0.50	0.50	7050539
Bicarbonate (HCO3)	mg/L	<0.50	0.50	7050539	<0.50	7050539	<0.50	0.50	7050539
Carbonate (CO3)	mg/L	<0.50	0.50	7050539	<0.50	7050539	<0.50	0.50	7050539
Hydroxide (OH)	mg/L	<0.50	0.50	7050539	<0.50	7050539	<0.50	0.50	7050539
Anions									
Dissolved Sulphate (SO4)	mg/L	864	5.0	7057368	<0.50	7061653	<0.50	0.50	7061653
Dissolved Chloride (Cl)	mg/L	0.67	0.50	7057329	<0.50	7057329	<0.50	0.50	7057329
Nutrients									
Ammonia (N)	mg/L	2.3	0.0050	7052097	0.015	7052097	0.0195(1)	0.0050	7052094
Nitrate plus Nitrite (N)	mg/L	0.0951(1)	0.0020	7057582	<0.0020(1)	7057582	<0.0020(1)	0.0020	7057582
Nitrite (N)	mg/L	0.0238(1)	0.0020	7057593	<0.0020(1)	7057593	<0.0020(1)	0.0020	7057593
Physical Properties									
Conductivity	uS/cm	1550	1.0	7050552	2.2	7050552	1.3	1.0	7059918
pH	pH Units	2.90		7050567	5.09	7050567	4.82		7050567
Physical Properties									
Total Suspended Solids	mg/L	1.2	1.0	7049273	<1.0	7049273	<1.0	1.0	7049273

N/A = Not Applicable
NC = Non-calculable
RDL = Reportable Detection Limit
(1) - Sample arrived to laboratory past recommended hold time.

Maxxam Job #: B367467
Report Date: 2013/08/12

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: LEI

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		HC3253			HC3254	HC3255			HC3258		
Sampling Date		2013/07/31 08:40			2013/07/31 09:35	2013/07/31 10:00			2013/08/01 20:20		
	UNITS	**BH01-05**	**RDL**	**QC Batch**	**BH03-05**	**BH04-05**	**RDL**	**QC Batch**	**ARD ADIT OLD**	**RDL**	**QC Batch**
Misc. Inorganics											
Acidity (pH 4.5)	mg/L	<0.50	0.50	7049228	291	220	0.50	7049228	11800(1)	10	7049228
Acidity (pH 8.3)	mg/L	3.25	0.50	7049228	466	469	0.50	7049228	14900(1)	10	7049228
Fluoride (F)	mg/L								<0.010	0.010	7054259
Calculated Parameters											
Filter and HNO3 Preservation	N/A	FIELD	N/A	ONSITE	FIELD	FIELD	N/A	ONSITE	FIELD	N/A	ONSITE
Ion Balance	N/A	1.4	0.010	7047610	1.1	0.98	0.010	7047610			
Nitrate (N)	mg/L	0.150	0.0020	7047334	0.171	0.152	0.0020	7047334	<0.20	0.20	7058787
Misc. Inorganics											
Alkalinity (Total as CaCO3)	mg/L	<0.50	0.50	7050539	<0.50	<0.50	0.50	7050539			
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	7050539	<0.50	<0.50	0.50	7050539			
Bicarbonate (HCO3)	mg/L	<0.50	0.50	7050539	<0.50	<0.50	0.50	7050539			
Carbonate (CO3)	mg/L	<0.50	0.50	7050539	<0.50	<0.50	0.50	7050539			
Hydroxide (OH)	mg/L	<0.50	0.50	7050539	<0.50	<0.50	0.50	7050539			
Anions											
Dissolved Sulphate (SO4)	mg/L	4.08	0.50	7061653	454	1220	5.0	7057368	6440	50	7057368
Dissolved Chloride (Cl)	mg/L	<0.50	0.50	7057329	<0.50	<0.50	0.50	7057329	76(2)	50	7057329
Nutrients											
Ammonia (N)	mg/L	0.023	0.0050	7052097	1.2	0.29	0.0050	7052097			
Nitrate plus Nitrite (N)	mg/L	0.150(3)	0.0020	7057582	0.174(3)	0.163(3)	0.0020	7057582	0.61(4)	0.20	7066136
Nitrite (N)	mg/L	<0.0020(3)	0.0020	7057593	0.0022(5)	0.0110(3)	0.0020	7057593	0.82(4)	0.20	7066148
Physical Properties											
Conductivity	uS/cm	32.6	1.0	7050552	1240	2200	1.0	7050552	7840	1.0	7050552
pH	pH Units	4.44		7050567	2.85	2.94		7050567	2.14		7050567

N/A = Not Applicable
RDL = Reportable Detection Limit
(1) - RDL raised due to sample dilution.
(2) - RDL raised due to sample matrix interference.
(3) - Sample analysed past recommended hold time.
(4) - RDL raised due to sample matrix interference. Sample analysed past recommended hold time.
(5) - Matrix spike exceeds acceptance limits due to matrix interference. Re-analysis yields similar results. Sample analysed past recommended hold time.

Maxxam Job #: B367467
Report Date: 2013/08/12

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: LEI

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HC3195	HC3196	HC3197		HC3198	HC3199		HC3200		
Sampling Date		2013/07/30 10:15	2013/07/30 13:20	2013/07/30 14:40		2013/07/30 15:30	2013/07/30 17:45		2013/07/30 16:50		
	UNITS	**W13**	**W12**	**W11**	**QC Batch**	**W8**	**W6**	**QC Batch**	**S2**	**RDL**	**QC Batch**
Misc. Inorganics											
Dissolved Hardness (CaCO3)	mg/L	122	157	160	7047219	140	130	7047219	122	0.50	7047219
Elements											
Dissolved Mercury (Hg)	mg/L	<0.000010	<0.000010	<0.000010	7057864	<0.000010	<0.000010	7054211	<0.000010	0.000010	7054211
Dissolved Metals by ICPMS											
Dissolved Aluminum (Al)	mg/L	6.85	7.76	1.19	7051950	103	64.9	7051950	83.6	0.0030	7054039
Dissolved Antimony (Sb)	mg/L	<0.00050	<0.00050	<0.00050	7051950	<0.00050	<0.00050	7051950	<0.00050	0.00050	7054039
Dissolved Arsenic (As)	mg/L	0.00025	0.00038	0.00013	7051950	0.0222	0.0219	7051950	0.0244	0.00010	7054039
Dissolved Barium (Ba)	mg/L	0.0356	0.0320	0.0335	7051950	0.0182	0.0254	7051950	0.0207	0.0010	7054039
Dissolved Beryllium (Be)	mg/L	0.00041	0.00047	0.00026	7051950	0.00318	0.00262	7051950	0.00283	0.00010	7054039
Dissolved Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	7051950	<0.0010	<0.0010	7051950	<0.0010	0.0010	7054039
Dissolved Boron (B)	mg/L	<0.050	<0.050	<0.050	7051950	<0.050	<0.050	7051950	<0.050	0.050	7054039
Dissolved Cadmium (Cd)	mg/L	0.0376	0.0573	0.0222	7051950	0.632	0.166	7051950	0.469	0.000010	7054039
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0035	<0.0010	7051950	0.102	0.0597	7051950	0.0882	0.0010	7054039
Dissolved Cobalt (Co)	mg/L	0.0265	0.0374	0.0269	7051950	0.210	0.149	7051950	0.179	0.00050	7054039
Dissolved Copper (Cu)	mg/L	0.0457	0.0735	0.0503	7051950	0.472	0.794	7051950	0.545	0.00020	7054039
Dissolved Iron (Fe)	mg/L	2.06	6.73	0.263	7051950	157	95.9	7051950	131	0.0050	7054039
Dissolved Lead (Pb)	mg/L	0.00073	0.00164	<0.00020	7051950	0.0352	0.0518	7051950	0.0406	0.00020	7054039
Dissolved Lithium (Li)	mg/L	0.0138	0.0183	0.0170	7051950	0.0413	0.0292	7051950	0.0298	0.0050	7054039
Dissolved Manganese (Mn)	mg/L	0.393	0.553	0.455	7051950	2.11	2.61	7051950	2.14	0.0010	7054039
Dissolved Molybdenum (Mo)	mg/L	<0.0010	<0.0010	<0.0010	7051950	<0.0010	<0.0010	7051950	<0.0010	0.0010	7054039
Dissolved Nickel (Ni)	mg/L	0.239	0.323	0.229	7051950	1.80	1.18	7051950	1.43	0.0010	7054039
Dissolved Phosphorus (P)	mg/L	<0.010	<0.010	<0.010	7051950	1.24	0.668	7051950	1.24	0.010	7054039
Dissolved Selenium (Se)	mg/L	0.00150	0.00201	0.00179	7051950	0.00593	0.00320	7051950	0.00334	0.00010	7054039
Dissolved Silicon (Si)	mg/L	3.74	4.07	3.68	7051950	9.15	7.32	7051950	8.35	0.10	7054039
Dissolved Silver (Ag)	mg/L	<0.000020	<0.000020	<0.000020	7051950	0.000025	0.000037	7051950	0.000070	0.000020	7054039
Dissolved Strontium (Sr)	mg/L	0.107	0.126	0.125	7051950	0.108	0.115	7051950	0.103	0.0010	7054039
Dissolved Thallium (Tl)	mg/L	0.000193	0.000312	0.000160	7051950	0.00284	0.00270	7051950	0.00271	0.000050	7054039
Dissolved Tin (Sn)	mg/L	<0.0050	<0.0050	<0.0050	7051950	<0.0050	<0.0050	7051950	<0.0050	0.0050	7054039
Dissolved Titanium (Ti)	mg/L	<0.0050	<0.0050	<0.0050	7051950	<0.0050	<0.0050	7051950	<0.0050	0.0050	7054039
Dissolved Uranium (U)	mg/L	0.00228	0.00308	0.00166	7051950	0.0214	0.0233	7051950	0.0203	0.00010	7054039
Dissolved Vanadium (V)	mg/L	<0.0050	<0.0050	<0.0050	7051950	0.395	0.177	7051950	0.288	0.0050	7054039
Dissolved Zinc (Zn)	mg/L	1.14	1.64	0.883	7051950	13.2	8.75	7051950	10.5	0.0050	7054039
Dissolved Zirconium (Zr)	mg/L	<0.00050	<0.00050	<0.00050	7051950	<0.00050	<0.00050	7051950	<0.00050	0.00050	7054039
Dissolved Calcium (Ca)	mg/L	28.2	35.3	36.9	7047403	26.1	28.2	7047403	24.9	0.050	7047403

RDL = Reportable Detection Limit

Maxxam Job #: B367467
Report Date: 2013/08/12

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: LEI

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HC3195	HC3196	HC3197		HC3198	HC3199		HC3200		
Sampling Date		2013/07/30 10:15	2013/07/30 13:20	2013/07/30 14:40		2013/07/30 15:30	2013/07/30 17:45		2013/07/30 16:50		
	UNITS	**W13**	**W12**	**W11**	**QC Batch**	**W8**	**W6**	**QC Batch**	**S2**	**RDL**	**QC Batch**
Dissolved Magnesium (Mg)	mg/L	12.5	16.8	16.5	7047403	18.2	14.4	7047403	14.4	0.050	7047403
Dissolved Potassium (K)	mg/L	0.863	1.01	0.786	7047403	4.77	4.38	7047403	4.72	0.050	7047403
Dissolved Sodium (Na)	mg/L	0.452	0.280	0.265	7047403	0.373	0.265	7047403	0.324	0.050	7047403
Dissolved Sulphur (S)	mg/L	58.7	75.8	57.2	7047403	373	255	7047403	317	3.0	7047403

RDL = Reportable Detection Limit

Maxxam Job #: B367467
Report Date: 2013/08/12

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: LEI

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HC3201	HC3202	HC3203	HC3204	HC3205	HC3206	HC3249	HC3250		
Sampling Date		2013/07/30 16:50	2013/07/30 18:15	2013/07/30 18:15	2013/07/30 17:45	2013/07/30 19:45	2013/07/30 19:25	2013/07/30 20:00	2013/07/30 20:00		
	UNITS	**T5**	**W5**	**AD**	**W100**	**W2**	**W3**	**W3B**	**W101**	**RDL**	**QC Batch**
Misc. Inorganics											
Dissolved Hardness (CaCO3)	mg/L	88.1	360	361	134	84.3	81.1	118	<0.50	0.50	7047219
Elements											
Dissolved Mercury (Hg)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	7054211
Dissolved Metals by ICPMS											
Dissolved Aluminum (Al)	mg/L	119	72.9	71.4	65.7	59.8	66.1	107	0.0256(1)	0.0030	7051950
Dissolved Antimony (Sb)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7051950
Dissolved Arsenic (As)	mg/L	0.00588	0.0955	0.0961	0.0226	0.0197	0.00201	0.00173	<0.00010	0.00010	7051950
Dissolved Barium (Ba)	mg/L	0.0098	0.0073	0.0073	0.0259	0.0390	0.0234	0.0062	<0.0010	0.0010	7051950
Dissolved Beryllium (Be)	mg/L	0.00358	0.00583	0.00582	0.00263	0.00197	0.00225	0.00376	<0.00010	0.00010	7051950
Dissolved Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7051950
Dissolved Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7051950
Dissolved Cadmium (Cd)	mg/L	1.48	0.0928	0.0927	0.169	0.180	0.191	0.300	<0.000010	0.000010	7051950
Dissolved Chromium (Cr)	mg/L	0.156	0.0440	0.0442	0.0622	0.0716	0.0605	0.0964	<0.0010	0.0010	7051950
Dissolved Cobalt (Co)	mg/L	0.226	0.307	0.308	0.150	0.121	0.119	0.179	<0.00050	0.00050	7051950
Dissolved Copper (Cu)	mg/L	0.151	0.326	0.331	0.793	1.12	0.624	1.03	<0.00020	0.00020	7051950
Dissolved Iron (Fe)	mg/L	141	306	306	102	84.9	52.3	77.4	<0.0050	0.0050	7051950
Dissolved Lead (Pb)	mg/L	<0.00020	0.169	0.169	0.0520	<0.00020	0.0584	0.0119	<0.00020	0.00020	7051950
Dissolved Lithium (Li)	mg/L	0.0478	0.0592	0.0572	0.0287	0.0205	0.0263	0.0423	<0.0050	0.0050	7051950
Dissolved Manganese (Mn)	mg/L	0.986	11.3	11.5	2.73	0.701	0.830	1.14	<0.0010	0.0010	7051950
Dissolved Molybdenum (Mo)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0017	<0.0010	<0.0010	<0.0010	0.0010	7051950
Dissolved Nickel (Ni)	mg/L	2.25	1.76	1.75	1.18	1.07	1.09	1.68	<0.0010	0.0010	7051950
Dissolved Phosphorus (P)	mg/L	0.570	0.283	0.275	0.677	1.43	0.110	0.164	<0.010	0.010	7051950
Dissolved Selenium (Se)	mg/L	0.0363	0.00025	0.00028	0.00337	0.00360	0.00387	0.00589	<0.00010	0.00010	7051950
Dissolved Silicon (Si)	mg/L	9.88	5.84	5.67	7.61	7.61	7.42	9.53	<0.10	0.10	7051950
Dissolved Silver (Ag)	mg/L	0.000054	0.000021	<0.000020	0.000033	<0.000020	0.000068	0.000077	<0.000020	0.000020	7051950
Dissolved Strontium (Sr)	mg/L	0.0790	0.285	0.302	0.117	0.0780	0.0616	0.0750	<0.0010	0.0010	7051950
Dissolved Thallium (Tl)	mg/L	0.00129	0.00321	0.00320	0.00269	0.00317	0.00240	0.00330	<0.000050	0.000050	7051950
Dissolved Tin (Sn)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7051950
Dissolved Titanium (Ti)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7051950
Dissolved Uranium (U)	mg/L	0.0224	0.00871	0.00866	0.0234	0.0310	0.0185	0.0302	<0.00010	0.00010	7051950
Dissolved Vanadium (V)	mg/L	0.407	0.108	0.112	0.181	0.358	0.0739	0.0948	<0.0050	0.0050	7051950
Dissolved Zinc (Zn)	mg/L	20.2	19.9	20.2	9.23	5.35	7.22	10.7	<0.0050	0.0050	7051950
Dissolved Zirconium (Zr)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7051950

RDL = Reportable Detection Limit
(1) - Dissolved greater than total. Reanalysis yields similar results.

Maxxam Job #: B367467
Report Date: 2013/08/12

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: LEI

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HC3201	HC3202	HC3203	HC3204	HC3205	HC3206	HC3249	HC3250		
Sampling Date		2013/07/30 16:50	2013/07/30 18:15	2013/07/30 18:15	2013/07/30 17:45	2013/07/30 19:45	2013/07/30 19:25	2013/07/30 20:00	2013/07/30 20:00		
	UNITS	**T5**	**W5**	**AD**	**W100**	**W2**	**W3**	**W3B**	**W101**	**RDL**	**QC Batch**
Dissolved Calcium (Ca)	mg/L	11.9	75.7	74.5	29.3	19.5	18.2	26.7	<0.050	0.050	7047403
Dissolved Magnesium (Mg)	mg/L	14.2	41.4	42.4	14.7	8.65	8.67	12.4	<0.050	0.050	7047403
Dissolved Potassium (K)	mg/L	1.96	7.11	7.17	4.39	4.96	3.51	4.75	<0.050	0.050	7047403
Dissolved Sodium (Na)	mg/L	0.423	0.338	0.361	0.279	0.210	0.339	0.344	<0.050	0.050	7047403
Dissolved Sulphur (S)	mg/L	402	454	449	249	214	217	333	<3.0	3.0	7047403

RDL = Reportable Detection Limit

Maxxam Job #: B367467
Report Date: 2013/08/12

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: LEI

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HC3251		HC3253		HC3254	HC3255		HC3258		
Sampling Date		2013/07/30		2013/07/31 08:40		2013/07/31 09:35	2013/07/31 10:00		2013/08/01 20:20		
	UNITS	**TRIP BLANK**	**QC Batch**	**BH01-05**	**QC Batch**	**BH03-05**	**BH04-05**	**QC Batch**	**ARD ADIT OLD**	**RDL**	**QC Batch**
Misc. Inorganics											
Dissolved Hardness (CaCO3)	mg/L	<0.50	7047219	1.63	7047219	79.2	886	7047219	636	0.50	7047219
Elements											
Dissolved Mercury (Hg)	mg/L	<0.000010	7054211	<0.000010	7057864	<0.000010	<0.000010	7054211	<0.000010	0.000010	7054211
Dissolved Metals by ICPMS											
Dissolved Aluminum (Al)	mg/L	<0.0030	7054039	0.167	7063040	58.2	26.3	7051950	255	0.0030	7054039
Dissolved Antimony (Sb)	mg/L	<0.00050	7054039	0.00090	7063040	<0.00050	<0.00050	7051950	0.0242	0.00050	7054039
Dissolved Arsenic (As)	mg/L	<0.00010	7054039	0.00021	7063040	0.00074	0.00473	7051950	10.4	0.00010	7054039
Dissolved Barium (Ba)	mg/L	<0.0010	7054039	0.266	7063040	0.0074	0.0045	7051950	0.0120	0.0010	7054039
Dissolved Beryllium (Be)	mg/L	<0.00010	7054039	<0.00010	7063040	0.00218	0.00110	7051950	0.0307	0.00010	7054039
Dissolved Bismuth (Bi)	mg/L	<0.0010	7054039	<0.0010	7063040	<0.0010	<0.0010	7051950	<0.0010	0.0010	7054039
Dissolved Boron (B)	mg/L	<0.050	7054039	<0.050	7063040	<0.050	<0.050	7051950	<0.050	0.050	7054039
Dissolved Cadmium (Cd)	mg/L	<0.000010	7054039	0.000340	7063040	0.159	0.127	7051950	0.905	0.000010	7054039
Dissolved Chromium (Cr)	mg/L	<0.0010	7054039	<0.0010	7063040	0.0436	0.0153	7051950	1.74	0.0010	7054039
Dissolved Cobalt (Co)	mg/L	<0.00050	7054039	0.00069	7063040	0.0996	0.0830	7051950	3.12	0.00050	7054039
Dissolved Copper (Cu)	mg/L	<0.00020	7054039	0.00193	7063040	0.637	0.360	7051950	128	0.00020	7054039
Dissolved Iron (Fe)	mg/L	<0.0050	7054039	0.164	7063040	9.76	44.2	7051950	5230	0.0050	7054039
Dissolved Lead (Pb)	mg/L	<0.00020	7054039	0.00164	7063040	0.0224	0.0101	7051950	0.00742	0.00020	7054039
Dissolved Lithium (Li)	mg/L	<0.0050	7054039	<0.0050	7063040	0.0234	0.0124	7051950	0.0224	0.0050	7054039
Dissolved Manganese (Mn)	mg/L	<0.0010	7054039	0.0089	7063040	0.825	3.63	7051950	33.8	0.0010	7054039
Dissolved Molybdenum (Mo)	mg/L	<0.0010	7054039	<0.0010	7063040	<0.0010	<0.0010	7051950	0.247	0.0010	7054039
Dissolved Nickel (Ni)	mg/L	<0.0010	7054039	0.0045	7063040	0.929	0.717	7051950	32.5	0.0010	7054039
Dissolved Phosphorus (P)	mg/L	<0.010	7054039	<0.010	7063040	0.020	0.292	7051950	64.4	0.010	7054039
Dissolved Selenium (Se)	mg/L	<0.00010	7054039	0.00473	7063040	0.00621	0.0158	7051950	0.326	0.00010	7054039
Dissolved Silicon (Si)	mg/L	<0.10	7054039	2.35	7063040	7.30	5.11	7051950	10.6	0.10	7054039
Dissolved Silver (Ag)	mg/L	<0.000020	7054039	<0.000020	7063040	0.000095	0.000224(1)	7051950	0.000167	0.000020	7054039
Dissolved Strontium (Sr)	mg/L	<0.0010	7054039	0.0111	7063040	0.0754	0.543	7051950	0.254	0.0010	7054039
Dissolved Thallium (Tl)	mg/L	<0.000050	7054039	0.000159	7063040	0.00217	0.000418	7051950	0.00362	0.000050	7054039
Dissolved Tin (Sn)	mg/L	<0.0050	7054039	<0.0050	7063040	<0.0050	<0.0050	7051950	0.0087	0.0050	7054039
Dissolved Titanium (Ti)	mg/L	<0.0050	7054039	<0.0050	7063040	<0.0050	<0.0050	7051950	0.178	0.0050	7054039
Dissolved Uranium (U)	mg/L	<0.00010	7054039	<0.00010	7063040	0.0181	0.0120	7051950	1.36	0.00010	7054039
Dissolved Vanadium (V)	mg/L	<0.0050	7054039	<0.0050	7063040	<0.0050	<0.0050	7051950	1.33	0.0050	7054039
Dissolved Zinc (Zn)	mg/L	<0.0050	7054039	0.223	7063040	7.24	46.8	7051950	146	0.0050	7054039
Dissolved Zirconium (Zr)	mg/L	<0.00050	7054039	<0.00050	7063040	<0.00050	0.00132	7051950	0.173	0.00050	7054039

RDL = Reportable Detection Limit
(1) - Matrix Spike outside acceptance criteria (10% of analytes failure allowed)

Maxxam Job #: B367467
Report Date: 2013/08/12

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: LEI

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HC3251		HC3253		HC3254	HC3255		HC3258		
Sampling Date		2013/07/30		2013/07/31 08:40		2013/07/31 09:35	2013/07/31 10:00		2013/08/01 20:20		
	UNITS	**TRIP BLANK**	**QC Batch**	**BH01-05**	**QC Batch**	**BH03-05**	**BH04-05**	**QC Batch**	**ARD ADIT OLD**	**RDL**	**QC Batch**
Dissolved Calcium (Ca)	mg/L	<0.050	7047403	0.439	7047403	18.0	128	7047403	95.1	0.050	7047403
Dissolved Magnesium (Mg)	mg/L	<0.050	7047403	0.130	7047403	8.34	138	7047403	96.8	0.050	7047403
Dissolved Potassium (K)	mg/L	<0.050	7047403	0.340	7047403	2.09	0.237	7047403	<0.050	0.050	7047403
Dissolved Sodium (Na)	mg/L	<0.050	7047403	0.468	7047403	0.380	0.355	7047403	0.943	0.050	7047403
Dissolved Sulphur (S)	mg/L	<3.0	7047403	4.5	7047403	181	438	7047403	4570	3.0	7047403

RDL = Reportable Detection Limit

Maxxam Job #: B367467
Report Date: 2013/08/12

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: LEI

CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		HC3195	HC3196	HC3197	HC3198	HC3199	HC3200	HC3201	HC3202		
Sampling Date		2013/07/30 10:15	2013/07/30 13:20	2013/07/30 14:40	2013/07/30 15:30	2013/07/30 17:45	2013/07/30 16:50	2013/07/30 16:50	2013/07/30 18:15		
	UNITS	**W13**	**W12**	**W11**	**W8**	**W6**	**S2**	**T5**	**W5**	**RDL**	**QC Batch**
Calculated Parameters											
Total Hardness (CaCO3)	mg/L	141	175	179	147	142	135	93.5	385	0.50	7047218
Elements											
Total Mercury (Hg)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	7053056
Total Metals by ICPMS											
Total Aluminum (Al)	mg/L	9.07	12.5	6.32	106	68.2	87.6	122	74.1	0.0030	7049839
Total Antimony (Sb)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00054	0.00050	7049839
Total Arsenic (As)	mg/L	0.00190	0.00201	0.00075	0.0243	0.0253	0.0266	0.00602	0.113	0.00010	7049839
Total Barium (Ba)	mg/L	0.0393	0.0331	0.0359	0.0185	0.0272	0.0246	0.0103	0.0075	0.0010	7049839
Total Beryllium (Be)	mg/L	0.00050	0.00054	0.00044	0.00335	0.00280	0.00305	0.00357	0.00600	0.00010	7049839
Total Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7049839
Total Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7049839
Total Cadmium (Cd)	mg/L	0.0390	0.0578	0.0234	0.649	0.175	0.473	1.52	0.0962	0.000010	7049839
Total Chromium (Cr)	mg/L	0.0041	0.0081	0.0018	0.100	0.0609	0.0850	0.150	0.0466	0.0010	7049839
Total Cobalt (Co)	mg/L	0.0269	0.0371	0.0280	0.205	0.146	0.172	0.216	0.301	0.00050	7049839
Total Copper (Cu)	mg/L	0.0484	0.0764	0.0573	0.463	0.782	0.520	0.145	0.323	0.00020	7049839
Total Iron (Fe)	mg/L	7.23	12.5	2.78	169	105	132	152	322	0.0050	7049839
Total Lead (Pb)	mg/L	0.00113	0.00207	<0.00020	0.0372	0.0547	0.0429	<0.00020	0.186	0.00020	7049839
Total Lithium (Li)	mg/L	0.0153	0.0186	0.0182	0.0463	0.0305	0.0394	0.0523	0.0602	0.0050	7049839
Total Manganese (Mn)	mg/L	0.410	0.547	0.496	2.11	2.69	2.05	0.973	11.8	0.0010	7049839
Total Molybdenum (Mo)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	<0.0010	<0.0010	<0.0010	0.0010	7049839
Total Nickel (Ni)	mg/L	0.243	0.315	0.236	1.78	1.15	1.41	2.18	1.72	0.0010	7049839
Total Phosphorus (P)	mg/L	0.068	0.100	0.027	1.33	0.739	1.35	0.585	0.380	0.010	7049839
Total Selenium (Se)	mg/L	0.00148	0.00214	0.00181	0.00644	0.00329	0.00355	0.0380	0.00031	0.00010	7049839
Total Silicon (Si)	mg/L	4.61	4.80	4.38	10.4	8.34	9.27	11.8	6.48	0.10	7049839
Total Silver (Ag)	mg/L	<0.000020	<0.000020	<0.000020	0.000031	0.000036	0.000029	0.000048	0.000020	0.000020	7049839
Total Strontium (Sr)	mg/L	0.120	0.139	0.145	0.116	0.124	0.106	0.0826	0.312	0.0010	7049839
Total Thallium (Tl)	mg/L	0.000234	0.000352	0.000191	0.00304	0.00286	0.00298	0.00130	0.00327	0.000050	7049839
Total Tin (Sn)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7049839
Total Titanium (Ti)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7049839
Total Uranium (U)	mg/L	0.00269	0.00364	0.00272	0.0235	0.0255	0.0217	0.0233	0.00940	0.00010	7049839
Total Vanadium (V)	mg/L	0.0142	0.0247	<0.0050	0.425	0.206	0.294	0.405	0.283	0.0050	7049839
Total Zinc (Zn)	mg/L	1.18	1.59	0.897	13.1	9.02	9.70	20.1	19.7	0.0050	7049839
Total Zirconium (Zr)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7049839
Total Calcium (Ca)	mg/L	33.0	40.0	40.9	28.8	31.2	26.6	13.6	80.4	0.050	7047526

RDL = Reportable Detection Limit

Maxxam Job #: B367467
Report Date: 2013/08/12

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: LEI

CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		HC3195	HC3196	HC3197	HC3198	HC3199	HC3200	HC3201	HC3202		
Sampling Date		2013/07/30 10:15	2013/07/30 13:20	2013/07/30 14:40	2013/07/30 15:30	2013/07/30 17:45	2013/07/30 16:50	2013/07/30 16:50	2013/07/30 18:15		
	UNITS	**W13**	**W12**	**W11**	**W8**	**W6**	**S2**	**T5**	**W5**	**RDL**	**QC Batch**
Total Magnesium (Mg)	mg/L	14.2	18.4	18.8	18.3	15.6	16.7	14.5	44.8	0.050	7047526
Total Potassium (K)	mg/L	0.969	1.08	0.889	5.05	4.85	4.97	2.08	7.81	0.050	7047526
Total Sodium (Na)	mg/L	0.545	0.360	0.373	0.467	0.370	0.395	0.521	0.443	0.050	7047526
Total Sulphur (S)	mg/L	61.9	80.6	63.7	391	273	328	429	486	3.0	7047526

RDL = Reportable Detection Limit

Maxxam Job #: B367467
Report Date: 2013/08/12

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: LEI

CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		HC3203	HC3204	HC3205	HC3206	HC3249	HC3250		
Sampling Date		2013/07/30 18:15	2013/07/30 17:45	2013/07/30 19:45	2013/07/30 19:25	2013/07/30 20:00	2013/07/30 20:00		
	UNITS	**AD**	**W100**	**W2**	**W3**	**W3B**	**W101**	**RDL**	**QC Batch**
Calculated Parameters									
Total Hardness (CaCO3)	mg/L	388	152	91.4	89.2	120	2.16	0.50	7047218
Elements									
Total Mercury (Hg)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	7053056
Total Metals by ICPMS									
Total Aluminum (Al)	mg/L	74.6	67.0	61.3	72.0	107	0.0061	0.0030	7049839
Total Antimony (Sb)	mg/L	0.00056	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7049839
Total Arsenic (As)	mg/L	0.113	0.0250	0.0208	0.00204	0.00176	<0.00010	0.00010	7049839
Total Barium (Ba)	mg/L	0.0078	0.0272	0.0412	0.0247	0.0067	<0.0010	0.0010	7049839
Total Beryllium (Be)	mg/L	0.00595	0.00276	0.00199	0.00258	0.00386	<0.00010	0.00010	7049839
Total Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7049839
Total Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7049839
Total Cadmium (Cd)	mg/L	0.0969	0.175	0.182	0.204	0.301	<0.000010	0.000010	7049839
Total Chromium (Cr)	mg/L	0.0464	0.0611	0.0712	0.0618	0.0960	<0.0010	0.0010	7049839
Total Cobalt (Co)	mg/L	0.303	0.147	0.119	0.119	0.176	<0.00050	0.00050	7049839
Total Copper (Cu)	mg/L	0.325	0.774	1.07	0.627	1.06	<0.00020	0.00020	7049839
Total Iron (Fe)	mg/L	329	124	91.9	56.2	78.5	0.0243	0.0050	7049839
Total Lead (Pb)	mg/L	0.187	0.0533	0.0104	0.0619	0.0115	<0.00020	0.00020	7049839
Total Lithium (Li)	mg/L	0.0597	0.0304	0.0221	0.0292	0.0457	<0.0050	0.0050	7049839
Total Manganese (Mn)	mg/L	11.9	2.71	0.713	0.872	1.14	<0.0010	0.0010	7049839
Total Molybdenum (Mo)	mg/L	<0.0010	<0.0010	0.0016	<0.0010	<0.0010	<0.0010	0.0010	7049839
Total Nickel (Ni)	mg/L	1.72	1.17	1.05	1.09	1.64	<0.0010	0.0010	7049839
Total Phosphorus (P)	mg/L	0.374	0.738	1.55	0.123	0.161	<0.010	0.010	7049839
Total Selenium (Se)	mg/L	0.00037	0.00382	0.00389	0.00384	0.00618	<0.00010	0.00010	7049839
Total Silicon (Si)	mg/L	6.54	9.85	8.88	8.41	10.3	<0.10	0.10	7049839
Total Silver (Ag)	mg/L	<0.000020	0.000032	<0.000020	0.000069	0.000110	<0.000020	0.000020	7049839
Total Strontium (Sr)	mg/L	0.316	0.119	0.0803	0.0669	0.0773	<0.0010	0.0010	7049839
Total Thallium (Tl)	mg/L	0.00340	0.00280	0.00330	0.00252	0.00317	0.000054	0.000050	7049839
Total Tin (Sn)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7049839
Total Titanium (Ti)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7049839
Total Uranium (U)	mg/L	0.00947	0.0250	0.0336	0.0204	0.0300	<0.00010	0.00010	7049839
Total Vanadium (V)	mg/L	0.284	0.208	0.370	0.0795	0.0969	<0.0050	0.0050	7049839
Total Zinc (Zn)	mg/L	19.5	9.07	5.30	7.35	10.8	0.0303	0.0050	7049839
Total Zirconium (Zr)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7049839
Total Calcium (Ca)	mg/L	81.3	36.3	21.6	20.0	27.0	0.866	0.050	7047526

RDL = Reportable Detection Limit

Maxxam Job #: B367467
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Your P.O. #: 14711
Sampler Initials: LEI

CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		HC3203	HC3204	HC3205	HC3206	HC3249	HC3250		
Sampling Date		2013/07/30 18:15	2013/07/30 17:45	2013/07/30 19:45	2013/07/30 19:25	2013/07/30 20:00	2013/07/30 20:00		
	UNITS	**AD**	**W100**	**W2**	**W3**	**W3B**	**W101**	**RDL**	**QC Batch**
Total Magnesium (Mg)	mg/L	44.8	14.9	9.08	9.54	12.7	<0.050	0.050	7047526
Total Potassium (K)	mg/L	7.78	4.78	5.25	3.81	5.05	<0.050	0.050	7047526
Total Sodium (Na)	mg/L	0.463	0.364	0.303	0.424	0.416	0.101	0.050	7047526
Total Sulphur (S)	mg/L	483	269	224	240	344	<3.0	3.0	7047526

RDL = Reportable Detection Limit

Maxxam Job #: B367467
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ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: LEI

CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		HC3251			HC3256	HC3257		
Sampling Date		2013/07/30			2013/07/31 22:20	2013/07/31 22:20		
	UNITS	**TRIP BLANK**	**RDL**	**QC Batch**	**W5 SETTLIING@24 HRS-A**	**W5 SETTLIING@24 HRS-B**	**RDL**	**QC Batch**
Calculated Parameters								
Total Hardness (CaCO3)	mg/L	<0.50	0.50	7058140	386	399	0.50	7048816
Elements								
Total Mercury (Hg)	mg/L	<0.000010	0.000010	7053056	<0.000010	<0.000010	0.000010	7062378
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	<0.0030	0.0030	7049839	75.0	76.6	0.0060	7054231
Total Antimony (Sb)	mg/L	<0.00050	0.00050	7049839	<0.0010	<0.0010	0.0010	7054231
Total Arsenic (As)	mg/L	<0.00010	0.00010	7049839	0.0780	0.0875	0.00020	7054231
Total Barium (Ba)	mg/L	<0.0010	0.0010	7049839	0.0078	0.0077	0.0020	7054231
Total Beryllium (Be)	mg/L	<0.00010	0.00010	7049839	0.00620	0.00649	0.00020	7054231
Total Bismuth (Bi)	mg/L	<0.0010	0.0010	7049839	<0.0020	<0.0020	0.0020	7054231
Total Boron (B)	mg/L	<0.050	0.050	7049839	<0.10	<0.10	0.10	7054231
Total Cadmium (Cd)	mg/L	<0.000010	0.000010	7049839	0.0969	0.0975	0.000020	7054231
Total Chromium (Cr)	mg/L	<0.0010	0.0010	7049839	0.0325	0.0355	0.0020	7054231
Total Cobalt (Co)	mg/L	<0.00050	0.00050	7049839	0.326	0.317	0.0010	7054231
Total Copper (Cu)	mg/L	<0.00020	0.00020	7049839	0.344	0.335	0.00040	7054231
Total Iron (Fe)	mg/L	<0.0050	0.0050	7049839	304	307	0.010	7054231
Total Lead (Pb)	mg/L	<0.00020	0.00020	7049839	0.175	0.185	0.00040	7054231
Total Lithium (Li)	mg/L	<0.0050	0.0050	7049839	0.065	0.073	0.010	7054231
Total Manganese (Mn)	mg/L	<0.0010	0.0010	7049839	13.0	12.2	0.0020	7054231
Total Molybdenum (Mo)	mg/L	<0.0010	0.0010	7049839	<0.0020	<0.0020	0.0020	7054231
Total Nickel (Ni)	mg/L	<0.0010	0.0010	7049839	1.85	1.79	0.0020	7054231
Total Phosphorus (P)	mg/L	<0.010	0.010	7049839	0.189	0.211	0.020	7054231
Total Selenium (Se)	mg/L	<0.00010	0.00010	7049839	0.00028	0.00027	0.00020	7054231
Total Silicon (Si)	mg/L	<0.10	0.10	7049839	6.55	6.64	0.20	7054231
Total Silver (Ag)	mg/L	<0.000020	0.000020	7049839	<0.000040	<0.000040	0.000040	7054231
Total Strontium (Sr)	mg/L	<0.0010	0.0010	7049839	0.320	0.330	0.0020	7054231
Total Thallium (Tl)	mg/L	<0.000050	0.000050	7049839	0.00329	0.00347	0.00010	7054231
Total Tin (Sn)	mg/L	<0.0050	0.0050	7049839	<0.010	<0.010	0.010	7054231
Total Titanium (Ti)	mg/L	<0.0050	0.0050	7049839	<0.010	<0.010	0.010	7054231
Total Uranium (U)	mg/L	<0.00010	0.00010	7049839	0.00897	0.00953	0.00020	7054231
Total Vanadium (V)	mg/L	<0.0050	0.0050	7049839	0.127	0.143	0.010	7054231
Total Zinc (Zn)	mg/L	<0.0050	0.0050	7049839	22.2	22.1	0.010	7054231
Total Zirconium (Zr)	mg/L	<0.00050	0.00050	7049839	<0.0010	<0.0010	0.0010	7054231
Total Calcium (Ca)	mg/L	<0.050	0.050	7058561	80.8	84.8	0.10	7048817

RDL = Reportable Detection Limit

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Your P.O. #: 14711
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CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		HC3251			HC3256	HC3257		
Sampling Date		2013/07/30			2013/07/31 22:20	2013/07/31 22:20		
	UNITS	**TRIP BLANK**	**RDL**	**QC Batch**	**W5 SETTLIING@24 HRS-A**	**W5 SETTLIING@24 HRS-B**	**RDL**	**QC Batch**
Total Magnesium (Mg)	mg/L	<0.050	0.050	7058561	44.8	45.4	0.10	7048817
Total Potassium (K)	mg/L	<0.050	0.050	7058561	7.63	7.72	0.10	7048817
Total Sodium (Na)	mg/L	<0.050	0.050	7058561	0.37	0.52	0.10	7048817
Total Sulphur (S)	mg/L	<3.0	3.0	7058561	493	474	6.0	7048817

RDL = Reportable Detection Limit

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Package 1	8.7°C
Package 2	7.3°C
Package 3	7.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

General Comments

Sample HC3195-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HC3196-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HC3197-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HC3198-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HC3199-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HC3200-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HC3201-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HC3202-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HC3203-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HC3204-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HC3205-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HC3206-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory

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pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HC3249-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HC3250-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time. Ion Balance: NC = Not Calculable due to low ion sum [< 3 meq/L].

Sample HC3251-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time. Ion Balance: NC = Not Calculable due to low ion sum [< 3 meq/L].

Sample HC3253-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HC3254-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HC3255-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HC3258-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

CCME TOTAL METALS IN WATER (WATER) Comments

Sample HC3256-01 Elements by CRC ICPMS (total): Detection limits raised due to matrix interference.

Sample HC3257-01 Elements by CRC ICPMS (total): Detection limits raised due to matrix interference.

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QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7049228	Acidity (pH 8.3)	2013/08/06			104	80 - 120	<0.50	mg/L	2.9	20
7049228	Acidity (pH 4.5)	2013/08/06					<0.50	mg/L	NC	20
7049273	Total Suspended Solids	2013/08/07			98	80 - 120	<1.0	mg/L		
7049839	Total Aluminum (Al)	2013/08/06	NC	80 - 120	114	80 - 120	<0.0030	mg/L	5.0	20
7049839	Total Antimony (Sb)	2013/08/06	122(1)	80 - 120	110	80 - 120	<0.00050	mg/L	NC	20
7049839	Total Arsenic (As)	2013/08/06	111	80 - 120	106	80 - 120	<0.00010	mg/L	4.3	20
7049839	Total Barium (Ba)	2013/08/06	NC	80 - 120	110	80 - 120	<0.0010	mg/L	1.2	20
7049839	Total Beryllium (Be)	2013/08/06	103	80 - 120	103	80 - 120	<0.00010	mg/L	NC	20
7049839	Total Bismuth (Bi)	2013/08/06	103	80 - 120	104	80 - 120	<0.0010	mg/L	NC	20
7049839	Total Cadmium (Cd)	2013/08/06	NC	80 - 120	106	80 - 120	<0.000010	mg/L	2.5	20
7049839	Total Chromium (Cr)	2013/08/06	97	80 - 120	101	80 - 120	<0.0010	mg/L	NC	20
7049839	Total Cobalt (Co)	2013/08/06	NC	80 - 120	99	80 - 120	<0.00050	mg/L	2.1	20
7049839	Total Copper (Cu)	2013/08/06	NC	80 - 120	98	80 - 120	<0.00020	mg/L	2.3	20
7049839	Total Iron (Fe)	2013/08/06	NC	80 - 120	111	80 - 120	<0.0050	mg/L	7.3	20
7049839	Total Lead (Pb)	2013/08/06	NC	80 - 120	104	80 - 120	<0.00020	mg/L	1.7	20
7049839	Total Lithium (Li)	2013/08/06	NC	80 - 120	107	80 - 120	<0.0050	mg/L	NC	20
7049839	Total Manganese (Mn)	2013/08/06	NC	80 - 120	102	80 - 120	0.0020, RDL=0.0010	mg/L	4.2	20
7049839	Total Molybdenum (Mo)	2013/08/06	121(1)	80 - 120	105	80 - 120	<0.0010	mg/L	NC	20
7049839	Total Nickel (Ni)	2013/08/06	NC	80 - 120	99	80 - 120	<0.0010	mg/L	1.7	20
7049839	Total Selenium (Se)	2013/08/06	111	80 - 120	112	80 - 120	<0.00010	mg/L	NC	20
7049839	Total Silver (Ag)	2013/08/06	46(1)	80 - 120	108	80 - 120	<0.000020	mg/L	NC	20
7049839	Total Strontium (Sr)	2013/08/06	NC	80 - 120	106	80 - 120	<0.0010	mg/L	7.3	20
7049839	Total Thallium (Tl)	2013/08/06	NC	80 - 120	108	80 - 120	<0.000050	mg/L	0.5	20
7049839	Total Tin (Sn)	2013/08/06	103	80 - 120	110	80 - 120	<0.0050	mg/L	NC	20
7049839	Total Titanium (Ti)	2013/08/06	NC	80 - 120	102	80 - 120	<0.0050	mg/L	NC	20
7049839	Total Uranium (U)	2013/08/06	NC	80 - 120	105	80 - 120	<0.00010	mg/L	0.02	20
7049839	Total Vanadium (V)	2013/08/06	101	80 - 120	101	80 - 120	<0.0050	mg/L	NC	20
7049839	Total Zinc (Zn)	2013/08/06	NC	80 - 120	103	80 - 120	<0.0050	mg/L	1.2	20
7049839	Total Boron (B)	2013/08/06					<0.050	mg/L	NC	20
7049839	Total Phosphorus (P)	2013/08/06					<0.010	mg/L		
7049839	Total Silicon (Si)	2013/08/06					<0.10	mg/L	6.4	20
7049839	Total Zirconium (Zr)	2013/08/06					<0.00050	mg/L	NC	20
7050539	Alkalinity (Total as CaCO3)	2013/08/06	NC	80 - 120	100	80 - 120	0.57, RDL=0.50	mg/L	NC	20
7050539	Alkalinity (PP as CaCO3)	2013/08/06					<0.50	mg/L	NC	20
7050539	Bicarbonate (HCO3)	2013/08/06					0.70, RDL=0.50	mg/L	NC	20
7050539	Carbonate (CO3)	2013/08/06					<0.50	mg/L	NC	20
7050539	Hydroxide (OH)	2013/08/06					<0.50	mg/L	NC	20
7050552	Conductivity	2013/08/06			100	80 - 120	<1.0	uS/cm	0.3	20
7051950	Dissolved Aluminum (Al)	2013/08/07	NC	80 - 120	106	80 - 120	<0.0030	mg/L	0.5	20

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QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7051950	Dissolved Antimony (Sb)	2013/08/07	100	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
7051950	Dissolved Arsenic (As)	2013/08/07	96	80 - 120	100	80 - 120	<0.00010	mg/L	1.5	20
7051950	Dissolved Barium (Ba)	2013/08/07	92	80 - 120	104	80 - 120	<0.0010	mg/L	NC	20
7051950	Dissolved Beryllium (Be)	2013/08/07	94	80 - 120	96	80 - 120	<0.00010	mg/L	3.3	20
7051950	Dissolved Bismuth (Bi)	2013/08/07	90	80 - 120	97	80 - 120	<0.0010	mg/L	NC	20
7051950	Dissolved Cadmium (Cd)	2013/08/07	NC	80 - 120	101	80 - 120	<0.000010	mg/L	0.5	20
7051950	Dissolved Chromium (Cr)	2013/08/07	NC	80 - 120	103	80 - 120	<0.0010	mg/L	3.6	20
7051950	Dissolved Cobalt (Co)	2013/08/07	NC	80 - 120	101	80 - 120	<0.00050	mg/L	2.0	20
7051950	Dissolved Copper (Cu)	2013/08/07	NC	80 - 120	99	80 - 120	<0.00020	mg/L	1	20
7051950	Dissolved Iron (Fe)	2013/08/07	NC	80 - 120	104	80 - 120	<0.0050	mg/L	8.3	20
7051950	Dissolved Lead (Pb)	2013/08/07	NC	80 - 120	98	80 - 120	<0.00020	mg/L	1.5	20
7051950	Dissolved Lithium (Li)	2013/08/07	NC	80 - 120	98	80 - 120	<0.0050	mg/L	NC	20
7051950	Dissolved Manganese (Mn)	2013/08/07	NC	80 - 120	101	80 - 120	<0.0010	mg/L	2.7	20
7051950	Dissolved Molybdenum (Mo)	2013/08/07	102	80 - 120	103	80 - 120	<0.0010	mg/L	NC	20
7051950	Dissolved Nickel (Ni)	2013/08/07	NC	80 - 120	102	80 - 120	<0.0010	mg/L	1.5	20
7051950	Dissolved Selenium (Se)	2013/08/07	NC	80 - 120	107	80 - 120	<0.00010	mg/L	8.1	20
7051950	Dissolved Silver (Ag)	2013/08/07	71(1)	80 - 120	97	80 - 120	<0.000020	mg/L	6.9	20
7051950	Dissolved Strontium (Sr)	2013/08/07	NC	80 - 120	101	80 - 120	<0.0010	mg/L	2.5	20
7051950	Dissolved Thallium (Tl)	2013/08/07	90	80 - 120	99	80 - 120	<0.000050	mg/L	7.7	20
7051950	Dissolved Tin (Sn)	2013/08/07	96	80 - 120	112	80 - 120	<0.0050	mg/L	NC	20
7051950	Dissolved Titanium (Ti)	2013/08/07	98	80 - 120	104	80 - 120	<0.0050	mg/L	NC	20
7051950	Dissolved Uranium (U)	2013/08/07	NC	80 - 120	95	80 - 120	<0.00010	mg/L	1.5	20
7051950	Dissolved Vanadium (V)	2013/08/07	100	80 - 120	102	80 - 120	<0.0050	mg/L	NC	20
7051950	Dissolved Zinc (Zn)	2013/08/07	NC	80 - 120	101	80 - 120	<0.0050	mg/L	0.9	20
7051950	Dissolved Boron (B)	2013/08/07					<0.050	mg/L	NC	20
7051950	Dissolved Phosphorus (P)	2013/08/07					<0.010	mg/L	1.0	20
7051950	Dissolved Silicon (Si)	2013/08/07					<0.10	mg/L	8.0	20
7051950	Dissolved Zirconium (Zr)	2013/08/07					<0.00050	mg/L	NC	20
7052094	Ammonia (N)	2013/08/06	NC	80 - 120	100	80 - 120	0.0065, RDL=0.0050	mg/L	3.1	20
7052097	Ammonia (N)	2013/08/06	101	80 - 120	99	80 - 120	<0.0050	mg/L	1.2	20
7053056	Total Mercury (Hg)	2013/08/07	107	80 - 120	111	80 - 120	<0.000010	mg/L	NC	20
7054039	Dissolved Aluminum (Al)	2013/08/08	NC	80 - 120	105	80 - 120	<0.0030	mg/L	3.1	20
7054039	Dissolved Antimony (Sb)	2013/08/08	103	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
7054039	Dissolved Arsenic (As)	2013/08/08	99	80 - 120	98	80 - 120	<0.00010	mg/L	1.2	20
7054039	Dissolved Barium (Ba)	2013/08/08	NC	80 - 120	101	80 - 120	<0.0010	mg/L	2.7	20
7054039	Dissolved Beryllium (Be)	2013/08/08	93	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
7054039	Dissolved Bismuth (Bi)	2013/08/08	97	80 - 120	99	80 - 120	<0.0010	mg/L	NC	20
7054039	Dissolved Cadmium (Cd)	2013/08/08	100	80 - 120	100	80 - 120	<0.000010	mg/L	3.1	20
7054039	Dissolved Chromium (Cr)	2013/08/08	103	80 - 120	99	80 - 120	<0.0010	mg/L	NC	20

Maxxam Job #: B367467
Report Date: 2013/08/12

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: LEI

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7054039	Dissolved Cobalt (Co)	2013/08/08	NC	80 - 120	100	80 - 120	<0.00050	mg/L	3.6	20
7054039	Dissolved Copper (Cu)	2013/08/08	97	80 - 120	96	80 - 120	<0.00020	mg/L	2.9	20
7054039	Dissolved Iron (Fe)	2013/08/08	124(1)	80 - 120	124(1, 2)	80 - 120	<0.0050	mg/L	NC	20
7054039	Dissolved Lead (Pb)	2013/08/08	96	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
7054039	Dissolved Lithium (Li)	2013/08/08	74(1)	80 - 120	91	80 - 120	<0.0050	mg/L	NC	20
7054039	Dissolved Manganese (Mn)	2013/08/08	NC	80 - 120	97	80 - 120	<0.0010	mg/L	3.2	20
7054039	Dissolved Molybdenum (Mo)	2013/08/08	92	80 - 120	98	80 - 120	<0.0010	mg/L	NC	20
7054039	Dissolved Nickel (Ni)	2013/08/08	NC	80 - 120	99	80 - 120	<0.0010	mg/L	2.3	20
7054039	Dissolved Selenium (Se)	2013/08/08	103	80 - 120	106	80 - 120	<0.00010	mg/L	1.2	20
7054039	Dissolved Silver (Ag)	2013/08/08	98	80 - 120	87	80 - 120	<0.000020	mg/L	NC	20
7054039	Dissolved Strontium (Sr)	2013/08/08	NC	80 - 120	100	80 - 120	<0.0010	mg/L	1.8	20
7054039	Dissolved Thallium (Tl)	2013/08/08	97	80 - 120	100	80 - 120	<0.000050	mg/L	NC	20
7054039	Dissolved Tin (Sn)	2013/08/08	101	80 - 120	99	80 - 120	<0.0050	mg/L	NC	20
7054039	Dissolved Titanium (Ti)	2013/08/08	95	80 - 120	95	80 - 120	<0.0050	mg/L	NC	20
7054039	Dissolved Uranium (U)	2013/08/08	99	80 - 120	98	80 - 120	<0.00010	mg/L	1.5	20
7054039	Dissolved Vanadium (V)	2013/08/08	106	80 - 120	100	80 - 120	<0.0050	mg/L	NC	20
7054039	Dissolved Zinc (Zn)	2013/08/08	NC	80 - 120	105	80 - 120	<0.0050	mg/L	NC	20
7054039	Dissolved Boron (B)	2013/08/08					<0.050	mg/L	NC	20
7054039	Dissolved Phosphorus (P)	2013/08/08					<0.010	mg/L		
7054039	Dissolved Silicon (Si)	2013/08/08					<0.10	mg/L	2.2	20
7054039	Dissolved Zirconium (Zr)	2013/08/08					<0.00050	mg/L	NC	20
7054211	Dissolved Mercury (Hg)	2013/08/07	100	80 - 120	106	80 - 120	<0.000010	mg/L	NC	20
7054231	Total Aluminum (Al)	2013/08/08	108	80 - 120	110	80 - 120	0.0033, RDL=0.0030	mg/L		
7054231	Total Antimony (Sb)	2013/08/08	96	80 - 120	96	80 - 120	<0.00050	mg/L		
7054231	Total Arsenic (As)	2013/08/08	99	80 - 120	103	80 - 120	<0.00010	mg/L		
7054231	Total Barium (Ba)	2013/08/08	96	80 - 120	101	80 - 120	<0.0010	mg/L		
7054231	Total Beryllium (Be)	2013/08/08	101	80 - 120	101	80 - 120	<0.00010	mg/L		
7054231	Total Bismuth (Bi)	2013/08/08	98	80 - 120	105	80 - 120	<0.0010	mg/L		
7054231	Total Cadmium (Cd)	2013/08/08	98	80 - 120	99	80 - 120	<0.000010	mg/L		
7054231	Total Chromium (Cr)	2013/08/08	99	80 - 120	105	80 - 120	<0.0010	mg/L		
7054231	Total Cobalt (Co)	2013/08/08	99	80 - 120	103	80 - 120	<0.00050	mg/L		
7054231	Total Copper (Cu)	2013/08/08	96	80 - 120	100	80 - 120	<0.00020	mg/L		
7054231	Total Iron (Fe)	2013/08/08	NC	80 - 120	111	80 - 120	<0.0050	mg/L		
7054231	Total Lead (Pb)	2013/08/08	103	80 - 120	103	80 - 120	<0.00020	mg/L		
7054231	Total Lithium (Li)	2013/08/08	115	80 - 120	114	80 - 120	<0.0050	mg/L		
7054231	Total Manganese (Mn)	2013/08/08	97	80 - 120	105	80 - 120	<0.0010	mg/L		
7054231	Total Molybdenum (Mo)	2013/08/08	114	80 - 120	108	80 - 120	<0.0010	mg/L		
7054231	Total Nickel (Ni)	2013/08/08	103	80 - 120	100	80 - 120	<0.0010	mg/L		
7054231	Total Selenium (Se)	2013/08/08	107	80 - 120	110	80 - 120	<0.00010	mg/L		

Maxxam Job #: B367467
Report Date: 2013/08/12

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: LEI

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7054231	Total Silver (Ag)	2013/08/08	90	80 - 120	96	80 - 120	<0.000020	mg/L		
7054231	Total Strontium (Sr)	2013/08/08	NC	80 - 120	107	80 - 120	<0.0010	mg/L		
7054231	Total Thallium (Tl)	2013/08/08	108	80 - 120	107	80 - 120	<0.000050	mg/L		
7054231	Total Tin (Sn)	2013/08/08	105	80 - 120	99	80 - 120	<0.0050	mg/L		
7054231	Total Titanium (Ti)	2013/08/08	98	80 - 120	93	80 - 120	<0.0050	mg/L		
7054231	Total Uranium (U)	2013/08/08	105	80 - 120	103	80 - 120	<0.00010	mg/L		
7054231	Total Vanadium (V)	2013/08/08	98	80 - 120	103	80 - 120	<0.0050	mg/L		
7054231	Total Zinc (Zn)	2013/08/08	99	80 - 120	97	80 - 120	<0.0050	mg/L		
7054231	Total Boron (B)	2013/08/08					<0.050	mg/L		
7054231	Total Phosphorus (P)	2013/08/08					<0.010	mg/L		
7054231	Total Silicon (Si)	2013/08/08					<0.10	mg/L		
7054231	Total Zirconium (Zr)	2013/08/08					<0.00050	mg/L		
7054259	Fluoride (F)	2013/08/07	NC	80 - 120	102	80 - 120	<0.010	mg/L	0	20
7057329	Dissolved Chloride (Cl)	2013/08/07	102	80 - 120	106	80 - 120	<0.50	mg/L	NC	20
7057368	Dissolved Sulphate (SO4)	2013/08/07	97	80 - 120	97	80 - 120	<0.50	mg/L	0.04	20
7057582	Nitrate plus Nitrite (N)	2013/08/07	99	80 - 120	104	80 - 120	<0.0020	mg/L	3.1	25
7057593	Nitrite (N)	2013/08/07	61 (1)	80 - 120	91	80 - 120	<0.0020	mg/L	0.4	25
7057864	Dissolved Mercury (Hg)	2013/08/08	104	80 - 120	106	80 - 120	<0.000010	mg/L	NC	20
7059918	Conductivity	2013/08/09			98	80 - 120	<1.0	uS/cm	0.07	20
7061653	Dissolved Sulphate (SO4)	2013/08/08	95	80 - 120	92	80 - 120	0.61, RDL=0.50	mg/L	NC	20
7062378	Total Mercury (Hg)	2013/08/09	112	80 - 120	108	80 - 120	<0.000010	mg/L	NC	20
7063040	Dissolved Aluminum (Al)	2013/08/09			103	80 - 120	<0.0030	mg/L		
7063040	Dissolved Antimony (Sb)	2013/08/09			100	80 - 120	<0.00050	mg/L		
7063040	Dissolved Arsenic (As)	2013/08/09			105	80 - 120	<0.00010	mg/L		
7063040	Dissolved Barium (Ba)	2013/08/09			101	80 - 120	<0.0010	mg/L		
7063040	Dissolved Beryllium (Be)	2013/08/09			97	80 - 120	<0.00010	mg/L		
7063040	Dissolved Bismuth (Bi)	2013/08/09			97	80 - 120	<0.0010	mg/L		
7063040	Dissolved Cadmium (Cd)	2013/08/09			100	80 - 120	<0.000010	mg/L		
7063040	Dissolved Chromium (Cr)	2013/08/09			102	80 - 120	<0.0010	mg/L		
7063040	Dissolved Cobalt (Co)	2013/08/09			100	80 - 120	<0.00050	mg/L		
7063040	Dissolved Copper (Cu)	2013/08/09			97	80 - 120	<0.00020	mg/L		
7063040	Dissolved Iron (Fe)	2013/08/09			96	80 - 120	<0.0050	mg/L		
7063040	Dissolved Lead (Pb)	2013/08/09			100	80 - 120	<0.00020	mg/L		
7063040	Dissolved Lithium (Li)	2013/08/09			102	80 - 120	<0.0050	mg/L		
7063040	Dissolved Manganese (Mn)	2013/08/09			101	80 - 120	<0.0010	mg/L		
7063040	Dissolved Molybdenum (Mo)	2013/08/09			90	80 - 120	<0.0010	mg/L		
7063040	Dissolved Nickel (Ni)	2013/08/09			101	80 - 120	<0.0010	mg/L		
7063040	Dissolved Selenium (Se)	2013/08/09			104	80 - 120	<0.00010	mg/L		
7063040	Dissolved Silver (Ag)	2013/08/09			85	80 - 120	<0.000020	mg/L		

Maxxam Job #: B367467
Report Date: 2013/08/12

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: LEI

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7063040	Dissolved Strontium (Sr)	2013/08/09			101	80 - 120	<0.0010	mg/L		
7063040	Dissolved Thallium (Tl)	2013/08/09			97	80 - 120	<0.000050	mg/L		
7063040	Dissolved Tin (Sn)	2013/08/09			101	80 - 120	<0.0050	mg/L		
7063040	Dissolved Titanium (Ti)	2013/08/09			95	80 - 120	<0.0050	mg/L		
7063040	Dissolved Uranium (U)	2013/08/09			101	80 - 120	<0.00010	mg/L		
7063040	Dissolved Vanadium (V)	2013/08/09			94	80 - 120	<0.0050	mg/L		
7063040	Dissolved Zinc (Zn)	2013/08/09			104	80 - 120	<0.0050	mg/L		
7063040	Dissolved Boron (B)	2013/08/09					<0.050	mg/L		
7063040	Dissolved Phosphorus (P)	2013/08/09					<0.010	mg/L		
7063040	Dissolved Silicon (Si)	2013/08/09					<0.10	mg/L		
7063040	Dissolved Zirconium (Zr)	2013/08/09					<0.00050	mg/L		
7066136	Nitrate plus Nitrite (N)	2013/08/09	104	80 - 120	99	80 - 120	<0.0020	mg/L	NC	25
7066148	Nitrite (N)	2013/08/09	101	80 - 120	104	80 - 120	<0.0020	mg/L	NC	25

N/A = Not Applicable
RDL = Reportable Detection Limit
RPD = Relative Percent Difference
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) - Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.
(2) - Blank Spike outside acceptance criteria (10% of analytes failure allowed)

Validation Signature Page

Maxxam Job #: B367467

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Data Validation Coordinator

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics Inc
8577 Commerce Court
Burnaby, BC V5A 4N5
www.maxxamanalytics.com
Phone: (604) 444-4808
Fax.: (604) 444-4511
Toll-Free: 1-800-440-4808

08375365

CHAIN-OF CUSTODY RECORD AND ANALYSIS REQUEST

B367467

LAB USE ONLY — MAXXAM JOB #

ANALYSIS REQUEST

LAB USE ONLY — COC #

LAB USE ONLY

COMPANY NAME:	Access Consulting Group
CLIENT PROJECT NO.:	HBM-13-01
COMPANY ADDRESS:	#3 Calcite Business Center 151 Industrial Rd. Whitehorse, YT Y1A 2V3
TEL.:	867-668-6463
E-MAIL:	kwoloshyn@accessconsulting.ca, lfougere@accessconsulting.ca
FAX:	867-667-6680
SAMPLER NAME (PRINT):	Leia and Holly
PROJECT MANAGER:	Kai Woloshyn
LABORATORY CONTACT:	Graham Rudkin

B367467

	FIELD SAMPLE ID	MAXXAM LAB # (LAB USE ONLY)	MATRIX: GROUNDWATER	SURFACE WATER	DRINKING WATER	SOIL	OTHER	SAMPLING: DATE (DD/MM/YY)	TIME	# CONTAINERS	General Chemistry (pH, Conductivity, alkalan	acidity, sulfate, nitrate, nitrite, chloride)	Dissolved metals -CCME	Total metals -CCME	Total Nutrients - ammonia	TSS
1	W13	HC3195		X				7/30/2013	10:15	5	X	X	X	X	X	X
2	W12	HC3196		X				7/30/2013	13:20	5	X	X	X	X	X	X
3	W11	HC3197		X				7/30/2013	14:40	5	X	X	X	X	X	X
4	W8	HC3198		X				7/30/2013	15:30	5	X	X	X	X	X	X
5	W6	HC3199		X				7/30/2013	17:45	5	X	X	X	X	X	X
6	S2	HC3200		X				7/30/2013	16:50	5	X	X	X	X	X	X
7	T5	HC3201		X				7/30/2013	16:50	5	X	X	X	X	X	X
8	W5	HC3202		X				7/30/2013	18:15	5	X	X	X	X	X	X
9	AD	HC3203		X				7/30/2013	18:15	5	X	X	X	X	X	X
10	W100	HC3204		X				7/30/2013	17:45	5	X	X	X	X	X	X
11	W2	HC3205		X				7/30/2013	19:45	5	X	X	X	X	X	X
12	W3	HC3206		X				7/30/2013	19:25	5	X	X	X	X	X	X

TAT (Turnaround Time)
LESS THAN 5 DAY TAT MUST HAVE PRIOR APPROVAL
* Some exceptions apply - please contact laboratory

STANDARD	5 BUSINESS DAYS	X
RUSH	3 BUSINESS DAYS	
RUSH	2 BUSINESS DAYS	
URGENT	1 BUSINESS DAY	

OTHER BUSINESS DAYS

PO NUMBER OR QUOTE NUMBER: 14711

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE:

ACCOUNTING CONTACT:

SPECIAL REPORTING OR BILLING INSTRUCTIONS: B11-096-DL

X	CCME
	CSR
	AB TIER 1
	OTHER

JARS USED:

LAB USE ONLY — ARRIVAL TEMPERATURE °C: 9,9,8 / 6,8,8 / 6,6,10 | DUE DATE: | LOG IN CHECK:

RELINQUISHED BY SAMPLER: Leia	DATE: DD/MM/YY 02/08/2013	TIME:	RECEIVED BY: Air North Cargo
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY: Pacheco ROCHELLE PACHECO
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY LABORATORY:

CUSTODY RECORD

CDCFORM - BC - 20070822

2013/08/03 CS: N/A 14:00

Maxxam Analytics Inc

8577 Commerce Court
Burnaby, BC V5A 4N5
www.maxxamanalytics.com

Phone: (604) 444-4808
Fax.: (604) 444-4511
Toll-Free: 1-800-440-4808

08375364

CHAIN-OF CUSTODY RECORD AND ANALYSIS REQUEST

B367467

LAB USE ONLY — MAXXAM JOB #

ANALYSIS REQUEST

LAB USE ONLY — COC #

COMPANY NAME:	Access Consulting Group
CLIENT PROJECT NO.:	HBM-13-01
COMPANY ADDRESS:	#3 Calcite Business Center 151 Industrial Rd. Whitehorse, YT Y1A 2V3
TEL.:	867-668-6463
E-MAIL:	kwoloshyn@accessconsulting.ca, lfougere@accessconsulting.ca
FAX:	867-667-6680
SAMPLER NAME (PRINT):	Leia and Holly
PROJECT MANAGER:	Kai Woloshyn
LABORATORY CONTACT:	Graham Rudkin

	FIELD SAMPLE ID	MAXXAM LAB # (LAB USE ONLY)	MATRIX: GROUNDWATER	SURFACE WATER	DRINKING WATER	SOIL	OTHER	SAMPLING: DATE DD/MM/YY	TIME	# CONTAINERS	General Chemistry (pH, conductivity, alkalinity	acidity, sulphate, nitrate, nitrite, chloride)	Dissolved metals -CCME	Total metals -ccme	Total nutrients - Ammonia	TSS	pH, conductivity	acidity	anions (sulphate, nitrate, nitrite, chloride, flou	dissolved metals (CCME)	
1	W3B	HC 3249		x				7/30/2013	20:00	5	x	x	x	x	x	X					
2	W101	HC 3250		x				7/30/2013	20:00	5	x	x	x	x	x	X					
3	Trip Blank	HC 3251		x				7/30/2013		5	x	x	x	x	x	X					
4	JB	HC 3252		x				7/30/2013	12:20	5	x	x	x	x	x	X					
5	BH01-05	HC 3253	x					7/31/2013	8:40	3	x	x	x		x						
6	BH03-05	HC 3254	x					7/31/2013	9:35	3	x	x	x		x						
7	BH04-05	HC 3255	x					7/31/2013	10:00	3	x	x	x		x						
8	W5 settling @ 24 hrs - A	HC 3256		x				7/31/2013	22:20	1			x								
9	W5 settling @ 24 hrs - B	HC 3257		x				7/31/2013	22:20	1			x								
10	RPE	#																			
11	ARD adit OLD	HC 3258					x	8/1/2013	20:20	2							x	x	x	x	
12																					

Please hold this sample.

TAT (Turnaround Time)
LESS THAN 5 DAY TAT MUST HAVE PRIOR APPROVAL
* Some exceptions apply - please contact laboratory

STANDARD	5 BUSINESS DAYS	X
RUSH	3 BUSINESS DAYS	
RUSH	2 BUSINESS DAYS	
URGENT	1 BUSINESS DAY	

OTHER BUSINESS DAYS _____

PO NUMBER OR QUOTE NUMBER: 14711

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE:

X CCME
CSR
AB TIER 1
OTHER

ACCOUNTING CONTACT:

SPECIAL REPORTING OR BILLING INSTRUCTIONS: B11-096-DL

JARS USED:

LAB USE ONLY
ARRIVAL TEMPERATURE °C: 9,9,8 / 6,8,8 / 6,6,10
DUE DATE:
LOG IN CHECK:

RELINQUISHED BY SAMPLER: Leia — DATE: DD/MM/YY 02/08/2013 — TIME:

RECEIVED BY:

RELINQUISHED BY: — DATE: DD/MM/YY

RECEIVED BY: Rachea Rochelle Pacheco

RELINQUISHED BY: — DATE: DD/MM/YY

RECEIVED BY LABORATORY:

CUSTODY RECORD

2013/08/03 CS: N/A 14:00

COCFORM - BC - 20070822

B367467

Success Through Science®

Your Project #: HBM-13-01
Your C.O.C. #: 08376620, 08376621

Attention: Kai Woloshyn
ACCESS CONSULTING GROUP
#3 Calcite
151 Industrial Road
WHITEHORSE, YT
CANADA Y1A 3C8

Report Date: 2013/08/30
This report supersedes all previous reports with the same Maxxam job number

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B372642
Received: 2013/08/17, 09:30

Sample Matrix: Water
Samples Received: 17

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO3)	17	N/A	2013/08/19	BBY6SOP-00037	SM-2310B
Alkalinity - Water	17	2013/08/19	2013/08/20	BBY6SOP-00026	SM2320B
Chloride by Automated Colourimetry	17	N/A	2013/08/19	BBY6SOP-00011	SM-4500-Cl-
Conductance - water	17	N/A	2013/08/20	BBY6SOP-00026	SM-2510B
Hardness Total (calculated as CaCO3)	13	N/A	2013/08/20	BBY7SOP-00002	EPA 6020A
Hardness Total (calculated as CaCO3)	2	N/A	2013/08/21	BBY7SOP-00002	EPA 6020A
Hardness (calculated as CaCO3)	17	N/A	2013/08/20	BBY7SOP-00002	EPA 6020A
Mercury (Dissolved) by CVAF	9	N/A	2013/08/19	BBY7SOP-00015	EPA 245.7
Mercury (Dissolved) by CVAF	8	N/A	2013/08/22	BBY7SOP-00015	EPA 245.7
Mercury (Total) by CVAF	15	2013/08/21	2013/08/21	BBY7SOP-00015	EPA 245.7
Ion Balance	17	N/A	2013/08/21	Calc	
Sum of cations, anions	17	N/A	2013/08/20	Calc	
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	17	N/A	2013/08/20	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (dissolved)	17	N/A	2013/08/19	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (total)	13	2013/08/17	2013/08/20	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (total)	2	2013/08/17	2013/08/21	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (total)	13	2013/08/19	2013/08/20	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (total)	2	2013/08/20	2013/08/20	BBY7SOP-00002	EPA 6020A
Ammonia-N (Unpreserved)	1	N/A	2013/08/19	BBY6SOP-00009	SM-4500NH3G
Ammonia-N (Preserved)	16	N/A	2013/08/20	BBY6SOP-00009	SM-4500NH3G
Nitrate+Nitrite (N) (low level)	16	N/A	2013/08/17	BBY6SOP-00010	EPA 353.2
Nitrate+Nitrite (N) (low level)	1	N/A	2013/08/23	BBY6SOP-00010	EPA 353.2
Nitrite (N) (low level)	9	N/A	2013/08/17	BBY6SOP-00010	SM 4500NO3-I
Nitrite (N) (low level)	8	N/A	2013/08/23	BBY6SOP-00010	SM 4500NO3-I
Nitrogen - Nitrate (as N)	17	N/A	2013/08/20	BBY6SOP-00010	SM 4500NO3-I
Filter and HNO3 Preserve for Metals	17	N/A	2013/08/17	BBY6WI-00001	EPA 200.2
pH Water	17	N/A	2013/08/20	BBY6SOP-00026	SM-4500H+B
Sulphate by Automated Colourimetry	11	N/A	2013/08/19	BBY6SOP-00017	SM4500-SO42- E
Sulphate by Automated Colourimetry	5	N/A	2013/08/20	BBY6SOP-00017	SM4500-SO42- E
Sulphate by Automated Colourimetry	1	N/A	2013/08/26	BBY6SOP-00017	SM4500-SO42- E
Total Suspended Solids-Low Level	15	2013/08/20	2013/08/20	BBY6SOP-00034	SM-2540 D

* Results relate only to the items tested.

Maxxam Job #: B372642
Report Date: 2013/08/30

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Graham Rudkin, Project Manager, Environmental
Email: GRudkin@maxxam.ca
Phone# (604) 638-5926 Ext:5926

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B372642
Report Date: 2013/08/30

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		HF6472		HF6473		HF6474			HF6475		
Sampling Date		2013/08/14 13:30		2013/08/14 17:40		2013/08/14 18:20			2013/08/14 08:30		
	UNITS	**W13**	**RDL**	**W12**	**RDL**	**W11**	**RDL**	**QC Batch**	**W8**	**RDL**	**QC Batch**
Misc. Inorganics											
Acidity (pH 4.5)	mg/L	4.95	0.50	9.24	0.50	<0.50	0.50	7091075	716	0.50	7091075
Acidity (pH 8.3)	mg/L	57.1	0.50	81.9	0.50	10.5	0.50	7091075	1180	0.50	7091075
Calculated Parameters											
Anion Sum	meq/L	3.7	N/A	4.8	N/A	3.6	N/A	7088831	25	N/A	7088831
Cation Sum	meq/L	3.8	N/A	5.0	N/A	3.6	N/A	7088831	27	N/A	7088831
Filter and HNO3 Preservation	N/A	FIELD	N/A	FIELD	N/A	FIELD	N/A	ONSITE	FIELD	N/A	ONSITE
Ion Balance	N/A	1.0	0.010	1.0	0.010	1.0	0.010	7088830	1.1	0.010	7088830
Nitrate (N)	mg/L	0.0528	0.0020	0.0542	0.0020	0.0557	0.0020	7088832	0.0613	0.0020	7088832
Misc. Inorganics											
Alkalinity (Total as CaCO3)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	7091272	<0.50	0.50	7091272
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	7091272	<0.50	0.50	7091272
Bicarbonate (HCO3)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	7091272	<0.50	0.50	7091272
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	7091272	<0.50	0.50	7091272
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	7091272	<0.50	0.50	7091272
Anions											
Dissolved Sulphate (SO4)	mg/L	179	0.50	230	5.0	171	0.50	7097670	1190	5.0	7093660
Dissolved Chloride (Cl)	mg/L	<0.50	0.50	<0.50	0.50	0.53	0.50	7093585	1.8	0.50	7093585
Nutrients											
Ammonia (N)	mg/L	0.096	0.0050	0.14	0.0050	0.34	0.0050	7095142	2.4	0.0050	7095142
Nitrate plus Nitrite (N)	mg/L	0.0528	0.0020	0.0542	0.0020	0.0557	0.0020	7088852	0.0919	0.0020	7088852
Nitrite (N)	mg/L	<0.0020	0.0020	<0.0020	0.0020	<0.0020	0.0020	7088853	0.0306	0.0020	7111886
Physical Properties											
Conductivity	uS/cm	385	1.0	488	1.0	391	1.0	7091368	1990	1.0	7091368
pH	pH Units	4.36		4.11		4.90		7091369	2.77		7091369
Physical Properties											
Total Suspended Solids	mg/L	19.9	1.0	30.6	1.0	27.3	1.0	7094391	24.3	1.0	7094391

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: B372642
Report Date: 2013/08/30

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		HF6476	HF6477	HF6478		HF6479	HF6480		
Sampling Date		2013/08/14 10:00	2013/08/14 09:30	2013/08/14 09:00		2013/08/14 11:50	2013/08/14 11:50		
	UNITS	**W6**	**S2**	**T5**	**QC Batch**	**W5**	**AD**	**RDL**	**QC Batch**
Misc. Inorganics									
Acidity (pH 4.5)	mg/L	411	587	827	7091075	174	188	0.50	7091075
Acidity (pH 8.3)	mg/L	834	989	1370	7091075	979	956	0.50	7091075
Calculated Parameters									
Anion Sum	meq/L	19	22	26	7088831	27	28	N/A	7088831
Cation Sum	meq/L	20	24	27	7088831	27	28	N/A	7088831
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	ONSITE	FIELD	FIELD	N/A	ONSITE
Ion Balance	N/A	1.0	1.1	1.0	7088830	1.0	1.0	0.010	7088830
Nitrate (N)	mg/L	0.0826	0.0737	0.150	7088832	0.0021	0.0041	0.0020	7088832
Misc. Inorganics									
Alkalinity (Total as CaCO3)	mg/L	<0.50	<0.50	<0.50	7091272	<0.50	<0.50	0.50	7091272
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	7091272	<0.50	<0.50	0.50	7091272
Bicarbonate (HCO3)	mg/L	<0.50	<0.50	<0.50	7091272	<0.50	<0.50	0.50	7091272
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	7091272	<0.50	<0.50	0.50	7091272
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	7091272	<0.50	<0.50	0.50	7091272
Anions									
Dissolved Sulphate (SO4)	mg/L	931	1080	1240	7093660	1300	1330	5.0	7093660
Dissolved Chloride (Cl)	mg/L	2.7	1.6	0.77	7093585	<0.50	<0.50	0.50	7093585
Nutrients									
Ammonia (N)	mg/L	1.4	1.8	2.0	7095142	1.7	1.5	0.0050	7095142
Nitrate plus Nitrite (N)	mg/L	0.102	0.0940	0.193	7088852	0.0041	0.0069	0.0020	7088852
Nitrite (N)	mg/L	0.0190	0.0203	0.0431	7111886	0.0020	0.0028	0.0020	7088853
Physical Properties									
Conductivity	uS/cm	1680	1830	1930	7091368	1980	1990	1.0	7091368
pH	pH Units	2.81	2.80	2.78	7091369	3.17	3.15		7091369
Physical Properties									
Total Suspended Solids	mg/L	42.7	28.7	<1.0	7094391	95.4	94.3	1.0	7094391

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: B372642
Report Date: 2013/08/30

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		HF6481		HF6482			HF6483		HF6496		
Sampling Date		2013/08/14 11:10		2013/08/14 10:40			2013/08/14 11:10		2013/08/14 11:35		
	UNITS	**W100**	**QC Batch**	**W2**	**RDL**	**QC Batch**	**W3**	**RDL**	**W3B**	**RDL**	**QC Batch**
Misc. Inorganics											
Acidity (pH 4.5)	mg/L	462	7091075	475	0.50	7091075	439	0.50	593	0.50	7091075
Acidity (pH 8.3)	mg/L	850	7091075	837	0.50	7091075	675	0.50	910	0.50	7091075
Calculated Parameters											
Anion Sum	meq/L	19	7088831	17	N/A	7088831	15	N/A	19	N/A	7088831
Cation Sum	meq/L	19	7088831	19	N/A	7088831	16	N/A	20	N/A	7088831
Filter and HNO3 Preservation	N/A	FIELD	ONSITE	FIELD	N/A	ONSITE	FIELD	N/A	FIELD	N/A	ONSITE
Ion Balance	N/A	1.0	7088830	1.1	0.010	7088830	1.0	0.010	1.0	0.010	7088830
Nitrate (N)	mg/L	0.0807	7088832	0.0752	0.0020	7088832	0.158	0.020	0.0693	0.0020	7088832
Misc. Inorganics											
Alkalinity (Total as CaCO3)	mg/L	<0.50	7091272	<0.50	0.50	7091272	<0.50	0.50	<0.50	0.50	7091272
Alkalinity (PP as CaCO3)	mg/L	<0.50	7091272	<0.50	0.50	7091272	<0.50	0.50	<0.50	0.50	7091272
Bicarbonate (HCO3)	mg/L	<0.50	7091272	<0.50	0.50	7091272	<0.50	0.50	<0.50	0.50	7091272
Carbonate (CO3)	mg/L	<0.50	7091272	<0.50	0.50	7091272	<0.50	0.50	<0.50	0.50	7091272
Hydroxide (OH)	mg/L	<0.50	7091272	<0.50	0.50	7091272	<0.50	0.50	<0.50	0.50	7091272
Anions											
Dissolved Sulphate (SO4)	mg/L	894	7093660	830	5.0	7097670	720	5.0	924	5.0	7093660
Dissolved Chloride (Cl)	mg/L	1.8	7093585	2.1	0.50	7093585	<0.50	0.50	<0.50	0.50	7093585
Nutrients											
Ammonia (N)	mg/L	1.6	7095142	1.7	0.0050	7095142	1.9	0.0050	2.5	0.0050	7095142
Nitrate plus Nitrite (N)	mg/L	0.100	7088852	0.0923	0.0020	7111876	0.169(1)	0.020	0.0849	0.0020	7088852
Nitrite (N)	mg/L	0.0194	7111886	0.0171	0.0020	7111886	0.0107	0.0020	0.0156	0.0020	7111886
Physical Properties											
Conductivity	uS/cm	1710	7091368	1620	1.0	7091368	1430	1.0	1630	1.0	7091368
pH	pH Units	2.78	7091369	2.80		7091369	2.85		2.86		7091369
Physical Properties											
Total Suspended Solids	mg/L	46.6	7094391	63.6	1.0	7094391	4.3	1.0	1.1	1.0	7094391

N/A = Not Applicable
RDL = Reportable Detection Limit
(1) - RDL raised due to sample matrix interference.

Maxxam Job #: B372642
Report Date: 2013/08/30

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		HF6497			HF6498	HF6499			HF6500		
Sampling Date		2013/08/14 11:10			2013/08/13 12:30	2013/08/13 21:45			2013/08/17		
	UNITS	**W101**	**RDL**	**QC Batch**	**BH03-05**	**BH04-05**	**RDL**	**QC Batch**	**TRIP BLANK**	**RDL**	**QC Batch**
Misc. Inorganics											
Acidity (pH 4.5)	mg/L	<0.50	0.50	7091075	294	155	0.50	7091075	<0.50	0.50	7091075
Acidity (pH 8.3)	mg/L	<0.50	0.50	7091075	466	365	0.50	7091075	<0.50	0.50	7091075
Calculated Parameters											
Anion Sum	meq/L	0.042	N/A	7088831	14	28	N/A	7088831	0.0000	N/A	7088831
Cation Sum	meq/L	0.0062	N/A	7088831	13	27	N/A	7088831	0.0087	N/A	7088831
Filter and HNO3 Preservation	N/A	FIELD	N/A	ONSITE	FIELD	FIELD	N/A	ONSITE	FIELD	N/A	ONSITE
Ion Balance	N/A	0.15(1)	0.010	7088830	0.89	0.96	0.010	7088830	NC(2)	0.010	7088830
Nitrate (N)	mg/L	<0.0020	0.0020	7088832	0.203	0.223	0.0020	7088832	<0.0020	0.0020	7088832
Misc. Inorganics											
Alkalinity (Total as CaCO3)	mg/L	0.96	0.50	7091272	<0.50	<0.50	0.50	7091272	<0.50	0.50	7091272
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	7091272	<0.50	<0.50	0.50	7091272	<0.50	0.50	7091272
Bicarbonate (HCO3)	mg/L	1.17	0.50	7091272	<0.50	<0.50	0.50	7091272	<0.50	0.50	7091272
Carbonate (CO3)	mg/L	<0.50	0.50	7091272	<0.50	<0.50	0.50	7091272	<0.50	0.50	7091272
Hydroxide (OH)	mg/L	<0.50	0.50	7091272	<0.50	<0.50	0.50	7091272	<0.50	0.50	7091272
Anions											
Dissolved Sulphate (SO4)	mg/L	1.08	0.50	7097670	695	1360	5.0	7093660	<0.50	0.50	7116773
Dissolved Chloride (Cl)	mg/L	<0.50	0.50	7093585	<0.50	0.63	0.50	7093585	<0.50	0.50	7093585
Nutrients											
Ammonia (N)	mg/L	0.034	0.0050	7095142	1.7	0.39	0.0050	7095142	0.0078(3)	0.0050	7091169
Nitrate plus Nitrite (N)	mg/L	<0.0020	0.0020	7088852	0.205(4)	0.227(4)	0.0020	7088852	<0.0020	0.0020	7088852
Nitrite (N)	mg/L	<0.0020	0.0020	7088853	0.0023(4)	0.0038(4)	0.0020	7088853	<0.0020	0.0020	7088853
Physical Properties											
Conductivity	uS/cm	1.6	1.0	7091368	1370	2370	1.0	7091368	1.1	1.0	7091368
pH	pH Units	5.44		7091369	2.83	3.03		7091369	5.09		7091369
Physical Properties											
Total Suspended Solids	mg/L	<1.0	1.0	7094391					<1.0	1.0	7094391

N/A = Not Applicable
NC = Non-calculable
RDL = Reportable Detection Limit
(1) - Ion balance out of optimal range due to high measurement uncertainty at this level (Ion Sum < 3 meq/L for both cations and anions).
(2) - Anion-Cation balance cannot be calculated as the anion sum is less than detection limits necessitating a division by zero
(3) - Sample preserved to extend hold time.
(4) - Sample arrived to laboratory past recommended hold time.

Maxxam Job #: B372642
Report Date: 2013/08/30

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HF6472	HF6473	HF6474	HF6475	HF6476	HF6477		HF6478		
Sampling Date		2013/08/14 13:30	2013/08/14 17:40	2013/08/14 18:20	2013/08/14 08:30	2013/08/14 10:00	2013/08/14 09:30		2013/08/14 09:00		
	UNITS	**W13**	**W12**	**W11**	**W8**	**W6**	**S2**	**QC Batch**	**T5**	**RDL**	**QC Batch**
Misc. Inorganics											
Dissolved Hardness (CaCO3)	mg/L	134	177	166	167	172	162	7088518	105	0.50	7088518
Elements											
Dissolved Mercury (Hg)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	7090413	<0.000010	0.000010	7090413

RDL = Reportable Detection Limit

Maxxam Job #: B372642
Report Date: 2013/08/30

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HF6472	HF6473	HF6474	HF6475	HF6476	HF6477		HF6478		
Sampling Date		2013/08/14 13:30	2013/08/14 17:40	2013/08/14 18:20	2013/08/14 08:30	2013/08/14 10:00	2013/08/14 09:30		2013/08/14 09:00		
	UNITS	**W13**	**W12**	**W11**	**W8**	**W6**	**S2**	**QC Batch**	**T5**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS											
Dissolved Aluminum (Al)	mg/L	7.89	8.52	1.36	123	80.1	105	7090643	139	0.0030	7090643
Dissolved Antimony (Sb)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	7090643	<0.00050	0.00050	7090643
Dissolved Arsenic (As)	mg/L	0.00021	0.00055	0.00016	0.0281	0.0318	0.0337	7090643	0.00761	0.00010	7090643
Dissolved Barium (Ba)	mg/L	0.0358	0.0314	0.0335	0.0100	0.0133	0.0112	7090643	0.0068	0.0010	7090643
Dissolved Beryllium (Be)	mg/L	0.00043	0.00048	0.00027	0.00371	0.00343	0.00345	7090643	0.00401	0.00010	7090643
Dissolved Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	7090643	<0.0010	0.0010	7090643
Dissolved Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	7090643	<0.050	0.050	7090643
Dissolved Cadmium (Cd)	mg/L	0.0421	0.0638	0.0240	0.819	0.216	0.621	7090643	1.81	0.000010	7090643
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0042	<0.0010	0.125	0.0828	0.115	7090643	0.181	0.0010	7090643
Dissolved Cobalt (Co)	mg/L	0.0284	0.0404	0.0287	0.243	0.189	0.226	7090643	0.254	0.00050	7090643
Dissolved Copper (Cu)	mg/L	0.0494	0.0773	0.0517	0.556	1.10	0.701	7090643	0.171	0.00020	7090643
Dissolved Iron (Fe)	mg/L	1.74	7.98	0.174	199	145	178	7090643	180	0.0050	7090643
Dissolved Lead (Pb)	mg/L	0.00033	0.00140	<0.00020	0.0326	0.0513	0.0398	7090643	<0.00020	0.00020	7090643
Dissolved Lithium (Li)	mg/L	0.0148	0.0190	0.0184	0.0505	0.0362	0.0441	7090643	0.0543	0.0050	7090643
Dissolved Manganese (Mn)	mg/L	0.437	0.595	0.502	2.60	3.52	2.88	7090643	1.07	0.0010	7090643
Dissolved Molybdenum (Mo)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	0.0016	7090643	0.0102(1)	0.0010	7111816
Dissolved Nickel (Ni)	mg/L	0.258	0.354	0.243	2.23	1.51	1.92	7090643	2.70	0.0010	7090643
Dissolved Phosphorus (P)	mg/L	<0.010	<0.010	<0.010	1.54	0.986	1.71	7090643	0.683	0.010	7090643
Dissolved Selenium (Se)	mg/L	0.00132	0.00181	0.00160	0.00688	0.00365	0.00322	7090643	0.0421	0.00010	7090643
Dissolved Silicon (Si)	mg/L	3.73	4.40	3.40	8.94	8.07	8.93	7090643	11.0	0.10	7090643
Dissolved Silver (Ag)	mg/L	<0.000020	<0.000020	<0.000020	0.000054	0.000072	0.000045	7090643	0.000073	0.000020	7090643
Dissolved Strontium (Sr)	mg/L	0.116	0.132	0.134	0.135	0.147	0.127	7090643	0.0869	0.0010	7090643
Dissolved Thallium (Tl)	mg/L	0.000227	0.000315	0.000162	0.00341	0.00335	0.00349	7090643	0.00129	0.000050	7090643
Dissolved Tin (Sn)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	7090643	<0.0050	0.0050	7090643
Dissolved Titanium (Ti)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	7090643	<0.0050	0.0050	7090643
Dissolved Uranium (U)	mg/L	0.00265	0.00342	0.00190	0.0277	0.0317	0.0273	7090643	0.0250	0.00010	7090643
Dissolved Vanadium (V)	mg/L	<0.0050	<0.0050	<0.0050	0.525	0.269	0.397	7090643	0.457	0.0050	7090643
Dissolved Zinc (Zn)	mg/L	1.39	1.88	0.967	17.4	12.6	13.3	7090643	25.4	0.0050	7090643
Dissolved Zirconium (Zr)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	7090643	0.00051	0.00050	7090643
Dissolved Calcium (Ca)	mg/L	31.4	41.9	38.3	30.7	36.2	32.1	7088519	14.6	0.050	7088519
Dissolved Magnesium (Mg)	mg/L	13.5	17.7	17.2	22.0	19.9	20.0	7088519	16.6	0.050	7088519
Dissolved Potassium (K)	mg/L	0.935	1.13	0.885	5.53	5.69	5.96	7088519	2.01	0.050	7088519
Dissolved Sodium (Na)	mg/L	0.474	0.295	0.281	0.461	0.359	0.423	7088519	0.532	0.050	7088519
Dissolved Sulphur (S)	mg/L	58.8	83.1	60.2	419	320	378	7088519	461	3.0	7088519

RDL = Reportable Detection Limit
(1) - Dissolved greater than total. Reanalysis yields similar results.

Maxxam Job #: B372642
Report Date: 2013/08/30

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HF6479	HF6480			HF6481	HF6482	HF6483	HF6496		
Sampling Date		2013/08/14 11:50	2013/08/14 11:50			2013/08/14 11:10	2013/08/14 10:40	2013/08/14 11:10	2013/08/14 11:35		
	UNITS	**W5**	**AD**	**RDL**	**QC Batch**	**W100**	**W2**	**W3**	**W3B**	**RDL**	**QC Batch**
Misc. Inorganics											
Dissolved Hardness (CaCO3)	mg/L	363	377	0.50	7088518	166	115	104	128	0.50	7088518
Elements											
Dissolved Mercury (Hg)	mg/L	<0.000010	<0.000010	0.000010	7090413	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	7102879

RDL = Reportable Detection Limit

Maxxam Job #: B372642
Report Date: 2013/08/30

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HF6479	HF6480			HF6481	HF6482	HF6483	HF6496		
Sampling Date		2013/08/14 11:50	2013/08/14 11:50			2013/08/14 11:10	2013/08/14 10:40	2013/08/14 11:10	2013/08/14 11:35		
	UNITS	**W5**	**AD**	**RDL**	**QC Batch**	**W100**	**W2**	**W3**	**W3B**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS											
Dissolved Aluminum (Al)	mg/L	61.4	64.8	0.0060	7090643	77.6	86.0	81.7	109	0.0030	7090643
Dissolved Antimony (Sb)	mg/L	<0.0010	<0.0010	0.0010	7090643	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7090643
Dissolved Arsenic (As)	mg/L	0.0932	0.0971	0.00020	7090643	0.0312	0.0309	0.00236	0.00176	0.00010	7090643
Dissolved Barium (Ba)	mg/L	0.0071	0.0075	0.0020	7090643	0.0126	0.0185	0.0154	0.0059	0.0010	7090643
Dissolved Beryllium (Be)	mg/L	0.00510	0.00554	0.00020	7090643	0.00321	0.00277	0.00280	0.00378	0.00010	7090643
Dissolved Bismuth (Bi)	mg/L	<0.0020	<0.0020	0.0020	7090643	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7090643
Dissolved Boron (B)	mg/L	<0.10	<0.10	0.10	7090643	<0.050	<0.050	<0.050	<0.050	0.050	7090643
Dissolved Cadmium (Cd)	mg/L	0.0910	0.0927	0.000020	7090643	0.212	0.263	0.253	0.344	0.000010	7090643
Dissolved Chromium (Cr)	mg/L	0.0387	0.0400	0.0020	7090643	0.0810	0.118	0.0758	0.101	0.0010	7090643
Dissolved Cobalt (Co)	mg/L	0.281	0.297	0.0010	7090643	0.183	0.173	0.145	0.188	0.00050	7090643
Dissolved Copper (Cu)	mg/L	0.289	0.303	0.00040	7090643	1.02	1.72	0.710	1.06	0.00020	7090643
Dissolved Iron (Fe)	mg/L	304	309	0.010	7090643	139	141	70.7	80.0	0.0050	7090643
Dissolved Lead (Pb)	mg/L	0.155	0.160	0.00040	7090643	0.0494	<0.00020	0.0296	0.0134	0.00020	7090643
Dissolved Lithium (Li)	mg/L	0.049	0.051	0.010	7090643	0.0344	0.0298	0.0326	0.0445	0.0050	7090643
Dissolved Manganese (Mn)	mg/L	11.6	12.0	0.0020	7090643	3.50	0.931	0.969	1.12	0.0010	7090643
Dissolved Molybdenum (Mo)	mg/L	<0.0020	<0.0020	0.0020	7090643	0.0011	0.0025	<0.0010	<0.0010	0.0010	7090643
Dissolved Nickel (Ni)	mg/L	1.62	1.70	0.0020	7090643	1.46	1.56	1.30	1.85	0.0010	7090643
Dissolved Phosphorus (P)	mg/L	0.239	0.252	0.020	7090643	0.962	2.37	0.133	0.144	0.010	7090643
Dissolved Selenium (Se)	mg/L	<0.00020	<0.00020	0.00020	7090643	0.00333	0.00396	0.00311	0.00437	0.00010	7090643
Dissolved Silicon (Si)	mg/L	5.37	5.21	0.20	7090643	7.87	9.29	7.61	9.07	0.10	7090643
Dissolved Silver (Ag)	mg/L	<0.000040	<0.000040	0.000040	7090643	0.000041	0.000033	0.000117 (1)	0.000165 (1)	0.000020	7090643
Dissolved Strontium (Sr)	mg/L	0.300	0.306	0.0020	7090643	0.140	0.110	0.0711	0.0698	0.0010	7090643
Dissolved Thallium (Tl)	mg/L	0.00299	0.00314	0.00010	7090643	0.00330	0.00449	0.00280	0.00308	0.000050	7090643
Dissolved Tin (Sn)	mg/L	<0.010	<0.010	0.010	7090643	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7090643
Dissolved Titanium (Ti)	mg/L	<0.010	<0.010	0.010	7090643	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7090643
Dissolved Uranium (U)	mg/L	0.00750	0.00742	0.00020	7090643	0.0307	0.0520	0.0224	0.0303	0.00010	7090643
Dissolved Vanadium (V)	mg/L	0.113	0.130	0.010	7090643	0.265	0.583	0.104	0.106	0.0050	7090643
Dissolved Zinc (Zn)	mg/L	22.0	22.5	0.010	7090643	11.8	8.46	9.19	12.1	0.0050	7090643
Dissolved Zirconium (Zr)	mg/L	<0.0010	<0.0010	0.0010	7090643	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7090643
Dissolved Calcium (Ca)	mg/L	75.9	78.3	0.10	7088519	35.9	25.7	23.8	29.1	0.050	7088519
Dissolved Magnesium (Mg)	mg/L	42.1	44.0	0.10	7088519	18.5	12.3	10.9	13.3	0.050	7088519
Dissolved Potassium (K)	mg/L	6.73	7.08	0.10	7088519	5.42	7.17	4.44	5.26	0.050	7088519
Dissolved Sodium (Na)	mg/L	0.37	0.38	0.10	7088519	0.337	0.343	0.403	0.440	0.050	7088519
Dissolved Sulphur (S)	mg/L	411	426	6.0	7088519	305	307	267	335	3.0	7088519

RDL = Reportable Detection Limit
(1) - Dissolved greater than total. Reanalysis yields similar results.

Maxxam Job #: B372642
Report Date: 2013/08/30

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HF6497	HF6498		HF6499		HF6500		
Sampling Date		2013/08/14 11:10	2013/08/13 12:30		2013/08/13 21:45		2013/08/17		
	UNITS	**W101**	**BH03-05**	**RDL**	**BH04-05**	**RDL**	**TRIP BLANK**	**RDL**	**QC Batch**
Misc. Inorganics									
Dissolved Hardness (CaCO3)	mg/L	<0.50	106	0.50	1070	0.50	<0.50	0.50	7088518
Elements									
Dissolved Mercury (Hg)	mg/L	<0.000010	<0.000010	0.000010	<0.000010	0.000010	<0.000010	0.000010	7102879

RDL = Reportable Detection Limit

Maxxam Job #: B372642
Report Date: 2013/08/30

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HF6497	HF6498		HF6499		HF6500		
Sampling Date		2013/08/14 11:10	2013/08/13 12:30		2013/08/13 21:45		2013/08/17		
	UNITS	**W101**	**BH03-05**	**RDL**	**BH04-05**	**RDL**	**TRIP BLANK**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS									
Dissolved Aluminum (Al)	mg/L	<0.0030	75.7	0.0030	20.6	0.0060	<0.0030	0.0030	7090643
Dissolved Antimony (Sb)	mg/L	<0.00050	<0.00050	0.00050	<0.0010	0.0010	<0.00050	0.00050	7090643
Dissolved Arsenic (As)	mg/L	<0.00010	0.00076	0.00010	0.00248	0.00020	<0.00010	0.00010	7090643
Dissolved Barium (Ba)	mg/L	<0.0010	0.0085	0.0010	0.0037	0.0020	<0.0010	0.0010	7090643
Dissolved Beryllium (Be)	mg/L	<0.00010	0.00242	0.00010	0.00077	0.00020	<0.00010	0.00010	7090643
Dissolved Bismuth (Bi)	mg/L	<0.0010	<0.0010	0.0010	<0.0020	0.0020	<0.0010	0.0010	7090643
Dissolved Boron (B)	mg/L	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	7090643
Dissolved Cadmium (Cd)	mg/L	<0.000010	0.208	0.000010	0.0920	0.000020	<0.000010	0.000010	7090643
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0565	0.0010	0.0095	0.0020	<0.0010	0.0010	7090643
Dissolved Cobalt (Co)	mg/L	<0.00050	0.133	0.00050	0.0547	0.0010	<0.00050	0.00050	7090643
Dissolved Copper (Cu)	mg/L	<0.00020	0.787	0.00020	0.235	0.00040	<0.00020	0.00020	7090643
Dissolved Iron (Fe)	mg/L	0.0051	11.3	0.0050	29.9	0.010	<0.0050	0.0050	7090643
Dissolved Lead (Pb)	mg/L	<0.00020	0.0147	0.00020	0.00511	0.00040	<0.00020	0.00020	7090643
Dissolved Lithium (Li)	mg/L	<0.0050	0.0303	0.0050	0.012	0.010	<0.0050	0.0050	7090643
Dissolved Manganese (Mn)	mg/L	<0.0010	0.972	0.0010	3.00	0.0020	<0.0010	0.0010	7090643
Dissolved Molybdenum (Mo)	mg/L	<0.0010	<0.0010	0.0010	<0.0020	0.0020	<0.0010	0.0010	7090643
Dissolved Nickel (Ni)	mg/L	<0.0010	1.25	0.0010	0.660	0.0020	<0.0010	0.0010	7090643
Dissolved Phosphorus (P)	mg/L	<0.010	0.017	0.010	0.167	0.020	<0.010	0.010	7090643
Dissolved Selenium (Se)	mg/L	<0.00010	0.00865	0.00010	0.0183	0.00020	<0.00010	0.00010	7090643
Dissolved Silicon (Si)	mg/L	<0.10	8.06	0.10	3.81	0.20	<0.10	0.10	7090643
Dissolved Silver (Ag)	mg/L	<0.000020	0.000187	0.000020	0.000084	0.000040	<0.000020	0.000020	7090643
Dissolved Strontium (Sr)	mg/L	<0.0010	0.0810	0.0010	0.604	0.0020	<0.0010	0.0010	7090643
Dissolved Thallium (Tl)	mg/L	<0.000050	0.00216	0.000050	0.00049	0.00010	<0.000050	0.000050	7090643
Dissolved Tin (Sn)	mg/L	<0.0050	<0.0050	0.0050	<0.010	0.010	<0.0050	0.0050	7090643
Dissolved Titanium (Ti)	mg/L	<0.0050	<0.0050	0.0050	<0.010	0.010	<0.0050	0.0050	7090643
Dissolved Uranium (U)	mg/L	<0.00010	0.0229	0.00010	0.00749	0.00020	<0.00010	0.00010	7090643
Dissolved Vanadium (V)	mg/L	<0.0050	<0.0050	0.0050	<0.010	0.010	<0.0050	0.0050	7090643
Dissolved Zinc (Zn)	mg/L	<0.0050	9.06	0.0050	43.9	0.010	<0.0050	0.0050	7090643
Dissolved Zirconium (Zr)	mg/L	<0.00050	<0.00050	0.00050	0.0012	0.0010	<0.00050	0.00050	7090643
Dissolved Calcium (Ca)	mg/L	<0.050	23.8	0.050	150	0.10	<0.050	0.050	7088519
Dissolved Magnesium (Mg)	mg/L	<0.050	11.3	0.050	170	0.10	<0.050	0.050	7088519
Dissolved Potassium (K)	mg/L	<0.050	2.30	0.050	0.18	0.10	<0.050	0.050	7088519
Dissolved Sodium (Na)	mg/L	<0.050	0.424	0.050	0.39	0.10	<0.050	0.050	7088519
Dissolved Sulphur (S)	mg/L	<3.0	232	3.0	456	6.0	<3.0	3.0	7088519

RDL = Reportable Detection Limit

Maxxam Job #: B372642
Report Date: 2013/08/30

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		HF6472	HF6473		HF6474	HF6475		HF6476	HF6477	HF6478		
Sampling Date		2013/08/14 13:30	2013/08/14 17:40		2013/08/14 18:20	2013/08/14 08:30		2013/08/14 10:00	2013/08/14 09:30	2013/08/14 09:00		
	UNITS	**W13**	**W12**	**QC Batch**	**W11**	**W8**	**QC Batch**	**W6**	**S2**	**T5**	**RDL**	**QC Batch**
Calculated Parameters												
Total Hardness (CaCO3)	mg/L	134	168	7088712	187	182	7088712	174	162	97.6	0.50	7088712
Elements												
Total Mercury (Hg)	mg/L	<0.000010	<0.000010	7099210	<0.000010	<0.000010	7099210	<0.000010	<0.000010	<0.000010	0.000010	7099210

RDL = Reportable Detection Limit

Maxxam Job #: B372642
Report Date: 2013/08/30

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		HF6472	HF6473		HF6474	HF6475		HF6476	HF6477	HF6478		
Sampling Date		2013/08/14 13:30	2013/08/14 17:40		2013/08/14 18:20	2013/08/14 08:30		2013/08/14 10:00	2013/08/14 09:30	2013/08/14 09:00		
	UNITS	**W13**	**W12**	**QC Batch**	**W11**	**W8**	**QC Batch**	**W6**	**S2**	**T5**	**RDL**	**QC Batch**
Total Metals by ICPMS												
Total Aluminum (Al)	mg/L	9.35	13.0	7093128	6.87	134	7094756	83.5	105	138	0.0030	7093128
Total Antimony (Sb)	mg/L	<0.00050	<0.00050	7093128	<0.00050	<0.00050	7094756	<0.00050	<0.00050	<0.00050	0.00050	7093128
Total Arsenic (As)	mg/L	0.00183	0.00205	7093128	0.00078	0.0328	7094756	0.0334	0.0332	0.00743	0.00010	7093128
Total Barium (Ba)	mg/L	0.0359	0.0327	7093128	0.0379	0.0104	7094756	0.0136	0.0113	0.0069	0.0010	7093128
Total Beryllium (Be)	mg/L	0.00043	0.00064	7093128	0.00044	0.00404	7094756	0.00345	0.00348	0.00426	0.00010	7093128
Total Bismuth (Bi)	mg/L	<0.0010	<0.0010	7093128	<0.0010	<0.0010	7094756	<0.0010	<0.0010	<0.0010	0.0010	7093128
Total Boron (B)	mg/L	<0.050	<0.050	7093128	<0.050	<0.050	7094756	<0.050	<0.050	<0.050	0.050	7093128
Total Cadmium (Cd)	mg/L	0.0411	0.0642	7093128	0.0261	0.834	7094756	0.217	0.607	1.77	0.000010	7093128
Total Chromium (Cr)	mg/L	0.0042	0.0080	7093128	0.0021	0.141	7094756	0.0868	0.110	0.176	0.0010	7093128
Total Cobalt (Co)	mg/L	0.0283	0.0391	7093128	0.0315	0.276	7094756	0.190	0.218	0.250	0.00050	7093128
Total Copper (Cu)	mg/L	0.0478	0.0768	7093128	0.0635	0.600	7094756	0.986	0.643	0.163	0.00020	7093128
Total Iron (Fe)	mg/L	7.06	13.5	7093128	3.39	223	7094756	145	177	171	0.0050	7093128
Total Lead (Pb)	mg/L	0.00088	0.00183	7093128	<0.00020	0.0330	7094756	0.0538	0.0410	<0.00020	0.00020	7093128
Total Lithium (Li)	mg/L	0.0140	0.0183	7093128	0.0196	0.0560	7094756	0.0341	0.0399	0.0502	0.0050	7093128
Total Manganese (Mn)	mg/L	0.412	0.566	7093128	0.538	3.13	7094756	3.49	2.68	1.09	0.0010	7093128
Total Molybdenum (Mo)	mg/L	<0.0010	<0.0010	7093128	<0.0010	<0.0010	7094756	0.0093	0.0011	<0.0010	0.0010	7093128
Total Nickel (Ni)	mg/L	0.252	0.338	7093128	0.270	2.57	7094756	1.55	1.80	2.50	0.0010	7093128
Total Phosphorus (P)	mg/L	0.065	0.117	7093128	0.034	1.78	7094756	1.04	1.74	0.736	0.010	7093128
Total Selenium (Se)	mg/L	0.00137	0.00189	7093128	0.00166	0.00761	7094756	0.00334	0.00342	0.0425	0.00010	7093128
Total Silicon (Si)	mg/L	4.39	4.49	7093128	4.60	11.1	7094756	9.41	10.0	11.5	0.10	7093128
Total Silver (Ag)	mg/L	<0.000020	<0.000020	7093128	0.000025	0.000048	7094756	0.000044	0.000044	0.000070	0.000020	7093128
Total Strontium (Sr)	mg/L	0.113	0.134	7093128	0.156	0.144	7094756	0.141	0.125	0.0885	0.0010	7093128
Total Thallium (Tl)	mg/L	0.000228	0.000359	7093128	0.000226	0.00384	7094756	0.00350	0.00363	0.00132	0.000050	7093128
Total Tin (Sn)	mg/L	<0.0050	<0.0050	7093128	<0.0050	<0.0050	7094756	<0.0050	<0.0050	<0.0050	0.0050	7093128
Total Titanium (Ti)	mg/L	<0.0050	<0.0050	7093128	<0.0050	<0.0050	7094756	<0.0050	<0.0050	<0.0050	0.0050	7093128
Total Uranium (U)	mg/L	0.00267	0.00395	7093128	0.00283	0.0273	7094756	0.0322	0.0269	0.0250	0.00010	7093128
Total Vanadium (V)	mg/L	0.0157	0.0273	7093128	<0.0050	0.596	7094756	0.299	0.396	0.455	0.0050	7093128
Total Zinc (Zn)	mg/L	1.24	1.74	7093128	1.00	18.7	7094756	12.1	12.1	23.0	0.0050	7093128
Total Zirconium (Zr)	mg/L	<0.00050	<0.00050	7093128	<0.00050	<0.00050	7094756	<0.00050	<0.00050	0.00068	0.00050	7093128
Total Calcium (Ca)	mg/L	31.8	38.3	7088813	43.0	34.5	7088813	38.9	32.5	13.9	0.050	7088813
Total Magnesium (Mg)	mg/L	13.3	17.7	7088813	19.4	23.4	7088813	18.7	19.5	15.3	0.050	7088813
Total Potassium (K)	mg/L	0.948	1.10	7088813	0.892	5.75	7088813	5.59	5.80	2.01	0.050	7088813
Total Sodium (Na)	mg/L	0.440	0.286	7088813	0.291	0.441	7088813	0.334	0.374	0.505	0.050	7088813
Total Sulphur (S)	mg/L	65.4	84.6	7088813	66.8	496	7088813	329	395	472	3.0	7088813

RDL = Reportable Detection Limit

Maxxam Job #: B372642
Report Date: 2013/08/30

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		HF6479	HF6480		HF6481	HF6482	HF6483	HF6496	HF6497	HF6500		
Sampling Date		2013/08/14 11:50	2013/08/14 11:50		2013/08/14 11:10	2013/08/14 10:40	2013/08/14 11:10	2013/08/14 11:35	2013/08/14 11:10	2013/08/17		
	UNITS	**W5**	**AD**	**RDL**	**W100**	**W2**	**W3**	**W3B**	**W101**	**TRIP BLANK**	**RDL**	**QC Batch**
Calculated Parameters												
Total Hardness (CaCO3)	mg/L	366	370	0.50	178	116	98.1	123	<0.50	<0.50	0.50	7088712
Elements												
Total Mercury (Hg)	mg/L	<0.000010	<0.000010	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	7099210

RDL = Reportable Detection Limit

Maxxam Job #: B372642
Report Date: 2013/08/30

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		HF6479	HF6480		HF6481	HF6482	HF6483	HF6496	HF6497	HF6500		
Sampling Date		2013/08/14 11:50	2013/08/14 11:50		2013/08/14 11:10	2013/08/14 10:40	2013/08/14 11:10	2013/08/14 11:35	2013/08/14 11:10	2013/08/17		
	UNITS	**W5**	**AD**	**RDL**	**W100**	**W2**	**W3**	**W3B**	**W101**	**TRIP BLANK**	**RDL**	**QC Batch**
Total Metals by ICPMS												
Total Aluminum (Al)	mg/L	65.7	67.1	0.0060	84.1	93.0	81.5	113	<0.0030	<0.0030	0.0030	7093128
Total Antimony (Sb)	mg/L	<0.0010	<0.0010	0.0010	<0.00050	0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7093128
Total Arsenic (As)	mg/L	0.0988	0.101	0.00020	0.0333	0.0312	0.00232	0.00184	<0.00010	<0.00010	0.00010	7093128
Total Barium (Ba)	mg/L	0.0077	0.0073	0.0020	0.0136	0.0186	0.0158	0.0061	<0.0010	<0.0010	0.0010	7093128
Total Beryllium (Be)	mg/L	0.00554	0.00588	0.00020	0.00349	0.00300	0.00287	0.00389	<0.00010	<0.00010	0.00010	7093128
Total Bismuth (Bi)	mg/L	<0.0020	<0.0020	0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7093128
Total Boron (B)	mg/L	<0.10	<0.10	0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7093128
Total Cadmium (Cd)	mg/L	0.0924	0.0935	0.000020	0.217	0.269	0.251	0.344	<0.000010	<0.000010	0.000010	7093128
Total Chromium (Cr)	mg/L	0.0418	0.0429	0.0020	0.0833	0.116	0.0740	0.103	<0.0010	<0.0010	0.0010	7093128
Total Cobalt (Co)	mg/L	0.286	0.295	0.0010	0.194	0.173	0.141	0.190	<0.00050	<0.00050	0.00050	7093128
Total Copper (Cu)	mg/L	0.288	0.297	0.00040	1.01	1.60	0.675	1.00	<0.00020	<0.00020	0.00020	7093128
Total Iron (Fe)	mg/L	310	311	0.010	147	144	65.3	80.5	<0.0050	<0.0050	0.0050	7093128
Total Lead (Pb)	mg/L	0.178	0.180	0.00040	0.0535	<0.00020	0.0314	0.0143	<0.00020	<0.00020	0.00020	7093128
Total Lithium (Li)	mg/L	0.045	0.047	0.010	0.0337	0.0275	0.0290	0.0380	<0.0050	<0.0050	0.0050	7093128
Total Manganese (Mn)	mg/L	11.6	11.8	0.0020	3.51	0.930	0.940	1.14	<0.0010	<0.0010	0.0010	7093128
Total Molybdenum (Mo)	mg/L	<0.0020	<0.0020	0.0020	0.0011	0.0027	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7093128
Total Nickel (Ni)	mg/L	1.63	1.69	0.0020	1.54	1.57	1.30	1.75	<0.0010	<0.0010	0.0010	7093128
Total Phosphorus (P)	mg/L	0.292	0.320	0.020	1.04	2.39	0.131	0.142	<0.010	<0.010	0.010	7093128
Total Selenium (Se)	mg/L	<0.00020	<0.00020	0.00020	0.00314	0.00411	0.00308	0.00436	<0.00010	<0.00010	0.00010	7093128
Total Silicon (Si)	mg/L	5.78	5.80	0.20	9.10	10.4	8.20	9.88	<0.10	<0.10	0.10	7093128
Total Silver (Ag)	mg/L	<0.000040	<0.000040	0.000040	0.000043	0.000023	0.000080	0.000126	<0.000020	<0.000020	0.000020	7093128
Total Strontium (Sr)	mg/L	0.311	0.304	0.0020	0.146	0.108	0.0676	0.0708	<0.0010	<0.0010	0.0010	7093128
Total Thallium (Tl)	mg/L	0.00304	0.00318	0.00010	0.00345	0.00468	0.00278	0.00318	<0.000050	<0.000050	0.000050	7093128
Total Tin (Sn)	mg/L	<0.010	<0.010	0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7093128
Total Titanium (Ti)	mg/L	<0.010	<0.010	0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7093128
Total Uranium (U)	mg/L	0.00818	0.00817	0.00020	0.0321	0.0524	0.0229	0.0311	<0.00010	<0.00010	0.00010	7093128
Total Vanadium (V)	mg/L	0.253	0.254	0.010	0.304	0.560	0.109	0.113	<0.0050	<0.0050	0.0050	7093128
Total Zinc (Zn)	mg/L	20.2	21.0	0.010	11.7	7.70	8.64	11.8	<0.0050	<0.0050	0.0050	7093128
Total Zirconium (Zr)	mg/L	<0.0010	<0.0010	0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7093128
Total Calcium (Ca)	mg/L	75.7	78.1	0.10	38.6	27.1	22.6	28.3	<0.050	<0.050	0.050	7088813
Total Magnesium (Mg)	mg/L	42.9	42.5	0.10	19.9	11.8	10.1	12.8	<0.050	<0.050	0.050	7088813
Total Potassium (K)	mg/L	6.85	6.90	0.10	5.73	6.91	4.35	5.26	<0.050	<0.050	0.050	7088813
Total Sodium (Na)	mg/L	0.38	0.48	0.10	0.373	0.326	0.395	0.399	<0.050	<0.050	0.050	7088813
Total Sulphur (S)	mg/L	437	446	6.0	334	299	268	343	<3.0	<3.0	3.0	7088813

RDL = Reportable Detection Limit

Package 1	4.7°C
Package 2	4.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

General Comments

Revised Report (2013/08/30): Due to client request, sample W6 was investigated and an error in data entry for Acidity result was discovered. This report contains the corrected Acidity results for W6. Results for Ion Sum (Cation and Anion) have also been included (GRR).

Sample HF6472-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HF6473-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HF6474-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HF6475-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HF6476-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HF6477-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HF6478-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HF6479-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HF6480-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HF6481-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HF6482-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HF6483-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HF6496-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HF6497-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time. Ion Balance: NC = Not Calculable due to low ion sum [< 3 meq/L].

Sample HF6498-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HF6499-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HF6500-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time. Ion Balance: NC = Not Calculable due to low ion sum [< 3 meq/L]. Ion Balance: NC = Not Calculable due to low ion sum [< 0.4 meq/L].

Sample HF6478, Elements by CRC ICPMS (dissolved): Test repeated.

CCME DISSOLVED METALS IN WATER (WATER) Comments

Sample HF6479-04 Elements by CRC ICPMS (dissolved): Detection limits raised due to matrix interference.

Sample HF6480-04 Elements by CRC ICPMS (dissolved): Detection limits raised due to matrix interference.

Sample HF6499-02 Elements by CRC ICPMS (dissolved): Detection limits raised due to matrix interference.

CCME TOTAL METALS IN WATER (WATER) Comments

Sample HF6479-03 Elements by CRC ICPMS (total): RDL raised due to sample matrix interference.

Sample HF6480-03 Elements by CRC ICPMS (total): RDL raised due to sample matrix interference.

Maxxam Job #: B372642
Report Date: 2013/08/30

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7088852	Nitrate plus Nitrite (N)	2013/08/17	104	80 - 120	102	80 - 120	<0.0020	mg/L	NC	25
7088853	Nitrite (N)	2013/08/17			100	80 - 120	<0.0020	mg/L	NC	25
7090413	Dissolved Mercury (Hg)	2013/08/19	102	80 - 120	91	80 - 120	<0.000010	mg/L	NC	20
7090643	Dissolved Aluminum (Al)	2013/08/20	99	80 - 120	97	80 - 120	<0.0030	mg/L	NC	20
7090643	Dissolved Antimony (Sb)	2013/08/20	106	80 - 120	96	80 - 120	<0.00050	mg/L	NC	20
7090643	Dissolved Arsenic (As)	2013/08/20	107	80 - 120	97	80 - 120	<0.00010	mg/L	2.1	20
7090643	Dissolved Barium (Ba)	2013/08/20	NC	80 - 120	95	80 - 120	<0.0010	mg/L	5.5	20
7090643	Dissolved Beryllium (Be)	2013/08/20	92	80 - 120	90	80 - 120	<0.00010	mg/L	NC	20
7090643	Dissolved Bismuth (Bi)	2013/08/20	105	80 - 120	97	80 - 120	<0.0010	mg/L	NC	20
7090643	Dissolved Cadmium (Cd)	2013/08/20	112	80 - 120	98	80 - 120	<0.000010	mg/L	12.7	20
7090643	Dissolved Chromium (Cr)	2013/08/20	110	80 - 120	96	80 - 120	<0.0010	mg/L	NC	20
7090643	Dissolved Cobalt (Co)	2013/08/20	102	80 - 120	94	80 - 120	<0.00050	mg/L	NC	20
7090643	Dissolved Copper (Cu)	2013/08/20	99	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
7090643	Dissolved Iron (Fe)	2013/08/20	104	80 - 120	102	80 - 120	<0.0050	mg/L	NC	20
7090643	Dissolved Lead (Pb)	2013/08/20	101	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
7090643	Dissolved Lithium (Li)	2013/08/20	96	80 - 120	94	80 - 120	<0.0050	mg/L	NC	20
7090643	Dissolved Manganese (Mn)	2013/08/20	109	80 - 120	94	80 - 120	<0.0010	mg/L	NC	20
7090643	Dissolved Molybdenum (Mo)	2013/08/20	NC	80 - 120	100	80 - 120	<0.0010	mg/L	NC	20
7090643	Dissolved Nickel (Ni)	2013/08/20	101	80 - 120	96	80 - 120	<0.0010	mg/L	NC	20
7090643	Dissolved Selenium (Se)	2013/08/20	105	80 - 120	102	80 - 120	<0.00010	mg/L	5.3	20
7090643	Dissolved Silver (Ag)	2013/08/20	107	80 - 120	84	80 - 120	<0.000020	mg/L	NC	20
7090643	Dissolved Strontium (Sr)	2013/08/20	NC	80 - 120	99	80 - 120	<0.0010	mg/L	3.1	20
7090643	Dissolved Thallium (Tl)	2013/08/20	109	80 - 120	104	80 - 120	<0.000050	mg/L	NC	20
7090643	Dissolved Tin (Sn)	2013/08/20	101	80 - 120	95	80 - 120	<0.0050	mg/L	NC	20
7090643	Dissolved Titanium (Ti)	2013/08/20	100	80 - 120	95	80 - 120	<0.0050	mg/L	NC	20
7090643	Dissolved Uranium (U)	2013/08/20	116	80 - 120	103	80 - 120	<0.00010	mg/L	1.3	20
7090643	Dissolved Vanadium (V)	2013/08/20	113	80 - 120	98	80 - 120	<0.0050	mg/L	NC	20
7090643	Dissolved Zinc (Zn)	2013/08/20	NC	80 - 120	100	80 - 120	<0.0050	mg/L	NC	20
7090643	Dissolved Boron (B)	2013/08/20					<0.050	mg/L	NC	20
7090643	Dissolved Phosphorus (P)	2013/08/19					<0.010	mg/L		
7090643	Dissolved Silicon (Si)	2013/08/20					<0.10	mg/L	16.1	20
7090643	Dissolved Zirconium (Zr)	2013/08/20					<0.00050	mg/L	NC	20
7091075	Acidity (pH 8.3)	2013/08/19			106	80 - 120	<0.50	mg/L	6.7	20
7091075	Acidity (pH 4.5)	2013/08/19					<0.50	mg/L	4.9	20
7091169	Ammonia (N)	2013/08/19	97	80 - 120	98	80 - 120	0.0051, RDL=0.0050	mg/L	NC	20
7091272	Alkalinity (Total as CaCO3)	2013/08/19	82	80 - 120	98	80 - 120	<0.50	mg/L	0.7	20
7091272	Alkalinity (PP as CaCO3)	2013/08/19					<0.50	mg/L	NC	20
7091272	Bicarbonate (HCO3)	2013/08/19					<0.50	mg/L	0.7	20
7091272	Carbonate (CO3)	2013/08/19					<0.50	mg/L	NC	20
7091272	Hydroxide (OH)	2013/08/19					<0.50	mg/L	NC	20

Maxxam Job #: B372642
Report Date: 2013/08/30

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7091368	Conductivity	2013/08/19			100	80 - 120	<1.0	uS/cm	1	20
7093128	Total Aluminum (Al)	2013/08/20	104	80 - 120	110	80 - 120	<0.0030	mg/L	NC	20
7093128	Total Antimony (Sb)	2013/08/20	104	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
7093128	Total Arsenic (As)	2013/08/20	102	80 - 120	103	80 - 120	<0.00010	mg/L	NC	20
7093128	Total Barium (Ba)	2013/08/20	100	80 - 120	105	80 - 120	<0.0010	mg/L	NC	20
7093128	Total Beryllium (Be)	2013/08/20	98	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
7093128	Total Bismuth (Bi)	2013/08/20	99	80 - 120	103	80 - 120	<0.0010	mg/L	NC	20
7093128	Total Cadmium (Cd)	2013/08/20	101	80 - 120	101	80 - 120	<0.000010	mg/L	NC	20
7093128	Total Chromium (Cr)	2013/08/20	98	80 - 120	99	80 - 120	<0.0010	mg/L	NC	20
7093128	Total Cobalt (Co)	2013/08/20	96	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
7093128	Total Copper (Cu)	2013/08/20	NC	80 - 120	99	80 - 120	<0.00020	mg/L	1.0	20
7093128	Total Iron (Fe)	2013/08/20	101	80 - 120	107	80 - 120	<0.0050	mg/L	NC	20
7093128	Total Lead (Pb)	2013/08/20	101	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
7093128	Total Lithium (Li)	2013/08/20	90	80 - 120	97	80 - 120	<0.0050	mg/L	NC	20
7093128	Total Manganese (Mn)	2013/08/20	98	80 - 120	100	80 - 120	<0.0010	mg/L	NC	20
7093128	Total Molybdenum (Mo)	2013/08/20	103	80 - 120	104	80 - 120	<0.0010	mg/L	NC	20
7093128	Total Nickel (Ni)	2013/08/20	95	80 - 120	102	80 - 120	<0.0010	mg/L	NC	20
7093128	Total Selenium (Se)	2013/08/20	100	80 - 120	106	80 - 120	<0.00010	mg/L	NC	20
7093128	Total Silver (Ag)	2013/08/20	93	80 - 120	86	80 - 120	<0.000020	mg/L	NC	20
7093128	Total Strontium (Sr)	2013/08/20	NC	80 - 120	103	80 - 120	<0.0010	mg/L	3.9	20
7093128	Total Thallium (Tl)	2013/08/20	99	80 - 120	103	80 - 120	<0.000050	mg/L	NC	20
7093128	Total Tin (Sn)	2013/08/20	103	80 - 120	102	80 - 120	<0.0050	mg/L	NC	20
7093128	Total Titanium (Ti)	2013/08/20	95	80 - 120	94	80 - 120	<0.0050	mg/L	NC	20
7093128	Total Uranium (U)	2013/08/20	101	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
7093128	Total Vanadium (V)	2013/08/20	97	80 - 120	99	80 - 120	<0.0050	mg/L	NC	20
7093128	Total Zinc (Zn)	2013/08/20	NC	80 - 120	102	80 - 120	<0.0050	mg/L	NC	20
7093128	Total Boron (B)	2013/08/20					<0.050	mg/L	NC	20
7093128	Total Phosphorus (P)	2013/08/20					<0.010	mg/L		
7093128	Total Silicon (Si)	2013/08/20					<0.10	mg/L	4.8	20
7093128	Total Zirconium (Zr)	2013/08/20					<0.00050	mg/L	NC	20
7093585	Dissolved Chloride (Cl)	2013/08/19	NC	80 - 120	99	80 - 120	<0.50	mg/L	NC	20
7093660	Dissolved Sulphate (SO4)	2013/08/19	NC	80 - 120	96	80 - 120	<0.50	mg/L	0.6	20
7094391	Total Suspended Solids	2013/08/14			100	80 - 120	<1.0	mg/L		
7094756	Total Aluminum (Al)	2013/08/20	107	80 - 120	109	80 - 120	<0.0030	mg/L		
7094756	Total Antimony (Sb)	2013/08/20	102	80 - 120	106	80 - 120	<0.00050	mg/L		
7094756	Total Arsenic (As)	2013/08/20	116	80 - 120	108	80 - 120	<0.00010	mg/L		
7094756	Total Barium (Ba)	2013/08/20	NC	80 - 120	113	80 - 120	<0.0010	mg/L		
7094756	Total Beryllium (Be)	2013/08/20	96	80 - 120	102	80 - 120	<0.00010	mg/L		
7094756	Total Bismuth (Bi)	2013/08/20	97	80 - 120	109	80 - 120	<0.0010	mg/L		
7094756	Total Cadmium (Cd)	2013/08/20	94	80 - 120	110	80 - 120	<0.000010	mg/L		

Maxxam Job #: B372642
Report Date: 2013/08/30

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

QUALITY ASSURANCE REPORT

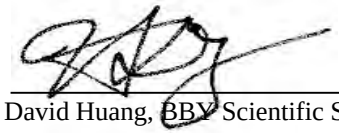
			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7094756	Total Chromium (Cr)	2013/08/20	95	80 - 120	109	80 - 120	<0.0010	mg/L		
7094756	Total Cobalt (Co)	2013/08/20	92	80 - 120	108	80 - 120	<0.00050	mg/L		
7094756	Total Copper (Cu)	2013/08/20	91	80 - 120	101	80 - 120	<0.00020	mg/L		
7094756	Total Iron (Fe)	2013/08/20	NC	80 - 120	120	80 - 120	<0.0050	mg/L	3.6	20
7094756	Total Lead (Pb)	2013/08/20	91	80 - 120	101	80 - 120	<0.00020	mg/L		
7094756	Total Lithium (Li)	2013/08/20	NC	80 - 120	107	80 - 120	<0.0050	mg/L		
7094756	Total Manganese (Mn)	2013/08/20	NC	80 - 120	108	80 - 120	<0.0010	mg/L		
7094756	Total Molybdenum (Mo)	2013/08/20	86	80 - 120	105	80 - 120	<0.0010	mg/L		
7094756	Total Nickel (Ni)	2013/08/20	89	80 - 120	106	80 - 120	<0.0010	mg/L		
7094756	Total Selenium (Se)	2013/08/20	102	80 - 120	109	80 - 120	<0.00010	mg/L		
7094756	Total Silver (Ag)	2013/08/20	91	80 - 120	99	80 - 120	0.000034, RDL=0.000020	mg/L		
7094756	Total Strontium (Sr)	2013/08/20	NC	80 - 120	105	80 - 120	<0.0010	mg/L		
7094756	Total Thallium (Tl)	2013/08/20	99	80 - 120	107	80 - 120	<0.000050	mg/L		
7094756	Total Tin (Sn)	2013/08/20	109	80 - 120	103	80 - 120	<0.0050	mg/L		
7094756	Total Titanium (Ti)	2013/08/20	99	80 - 120	109	80 - 120	<0.0050	mg/L		
7094756	Total Uranium (U)	2013/08/20	100	80 - 120	108	80 - 120	<0.00010	mg/L		
7094756	Total Vanadium (V)	2013/08/20	99	80 - 120	110	80 - 120	<0.0050	mg/L		
7094756	Total Zinc (Zn)	2013/08/20	86	80 - 120	111	80 - 120	<0.0050	mg/L		
7094756	Total Boron (B)	2013/08/20					<0.050	mg/L		
7094756	Total Phosphorus (P)	2013/08/20					<0.010	mg/L		
7094756	Total Silicon (Si)	2013/08/20					<0.10	mg/L		
7094756	Total Zirconium (Zr)	2013/08/20					<0.00050	mg/L		
7095142	Ammonia (N)	2013/08/20	NC	80 - 120	100	80 - 120	<0.0050	mg/L	5.8	20
7097670	Dissolved Sulphate (SO4)	2013/08/20	NC	80 - 120	98	80 - 120	<0.50	mg/L	4.0	20
7099210	Total Mercury (Hg)	2013/08/21	102	80 - 120	102	80 - 120	<0.000010	mg/L	NC	20
7102879	Dissolved Mercury (Hg)	2013/08/22	99	80 - 120	103	80 - 120	<0.000010	mg/L	NC	20
7111816	Dissolved Molybdenum (Mo)	2013/08/24			101	80 - 120	<0.0010	mg/L		
7116773	Dissolved Sulphate (SO4)	2013/08/26			101	80 - 120	<0.50	mg/L		

N/A = Not Applicable
RDL = Reportable Detection Limit
RPD = Relative Percent Difference
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Validation Signature Page

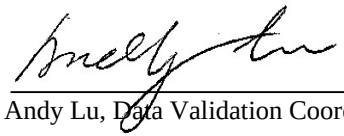
Maxxam Job #: B372642

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



David Huang, BBY Scientific Specialist

Rob Reinert, Data Validation Coordinator



Andy Lu, Data Validation Coordinator

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics Inc
8577 Commerce Court
Burnaby, BC V5A 4N5
www.maxxamanalytics.com
Phone: (604) 444-4808
Fax.: (604) 444-4511
Toll-Free: 1-800-440-4808

CHAIN-OF CUSTODY RECORD AND ANALYSIS REQUEST

LAB USE ONLY
MAXXAM JOB #: B372642

ANALYSIS REQU

08376620

COMPANY NAME: Access Consulting Group

CLIENT PROJECT NO.: HBM-13-01

COMPANY ADDRESS: #3 Calcite Business Center, 151 Industrial Rd, Whitehorse, YT, Y1A 2V3

TEL.: 867-668-6463

E-MAIL: kwoloshyn@accessconsulting.ca, lfougere@accessconsulting.ca, hgoulding@accessconsulting.ca,nichole@accessc

FAX: 867-667-6680

SAMPLER NAME (PRINT): Holly Goulding

PROJECT MANAGER: Kai Woloshyn

LABORATORY CONTACT: Graham Rudkin

	FIELD SAMPLE ID	MAXXAM LAB # (LAB USE ONLY)	MATRIX: GROUNDWATER	SURFACE WATER	DRINKING WATER	SOIL	OTHER	SAMPLING: DATE DD/MM/YY	TIME	# CONTAINERS	General Chemistry (pH, Conductivity, alkalanity	acidity, sulfate, nitrate, nitrite, chloride)	Dissolved metals -CCME	Total metals -CCME	Total Nutrients - ammonia	TSS
1	W13	HF6472		X				14-08-2013	13:30	5	X	X	X	X	X	X
2	W12	HF6473		X				14-08-2013	17:40	5	X	X	X	X	X	X
3	W11	HF6474		X				14-08-2013	18:20	5	X	X	X	X	X	X
4	W8	HF6475		X				14-08-2013	8:30	5	X	X	X	X	X	X
5	W6	HF6476		X				14-08-2013	10:00	5	X	X	X	X	X	X
6	S2	HF6477		X				14-08-2013	9:30	5	X	X	X	X	X	X
7	T5	HF6478		X				14-08-2013	9:00	5	X	X	X	X	X	X
8	W5	HF6479		X				14-08-2013	11:50	5	X	X	X	X	X	X
9	AD	HF6480		X				14-08-2013	11:50	5	X	X	X	X	X	X
10	W100	HF6481		X				14-08-2013	11:10	5	X	X	X	X	X	X
11	W2	HF6482		X				14-08-2013	10:40	5	X	X	X	X	X	X
12	W3	HF6483		X				14-08-2013	11:10	5	X	X	X	X	X	X

B372642

TAT (Turnaround Time)
LESS THAN 5 DAY TAT MUST HAVE PRIOR APPROVAL
* Some exceptions apply - please contact laboratory

STANDARD	5 BUSINESS DAYS	X
RUSH	3 BUSINESS DAYS	
RUSH	2 BUSINESS DAYS	
URGENT	1 BUSINESS DAY	

OTHER BUSINESS DAYS

PO NUMBER OR QUOTE NUMBER: 14711

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE:

ACCOUNTING CONTACT: Graham Rudkin

SPECIAL REPORTING OR BILLING INSTRUCTIONS: B11-096-DL

RELINQUISHED BY SAMPLER: Holly Goulding
DATE: DD/MM/YY 16-08-2013
TIME: 14:30
RECEIVED BY: Air North Cargo

RELINQUISHED BY:
DATE: DD/MM/YY
TIME:
RECEIVED BY:

RELINQUISHED BY:
DATE: DD/MM/YY
TIME:
RECEIVED BY LABORATORY: Yolanda Liu 2013/08/17 09:30 CS: NA

X CCME
CSR
AB TIER 1
OTHER

JARS USED:

LAB USE ONLY
ARRIVAL TEMPERATURE °C: 4.5.5.1 3.4.6
DUE DATE:
LOG IN CHECK:

CUSTODY RECORD

Maxxam Analytics Inc
8577 Commerce Court
Burnaby, BC V5A 4N5
www.maxxamanalytics.com
Phone: (604) 444-4808
Fax.: (604) 444-4511
Toll-Free: 1-800-440-4808

CHAIN-OF CUSTODY RECORD AND ANALYSIS REQUEST

LAB USE ONLY
MAXXAM JOB #: B372642

ANALYSIS RI

08376621

COMPANY NAME:	Access Consulting Group
CLIENT PROJECT NO.:	HBM-13-01
COMPANY ADDRESS:	#3 Calcite Business Center 151 Industrial Rd. Whitehorse, YT Y1A 2V3
TEL.:	867-668-6463
E-MAIL:	kwoloshyn@accessconsulting.ca, lfougere@accessconsulting.ca hgoulding@accessconsulting.ca,nichole@accessc
FAX:	867-667-6680
SAMPLER NAME (PRINT):	Holly Goulding
PROJECT MANAGER:	Kai Woloshyn
LABORATORY CONTACT:	Graham Rudkin

	FIELD SAMPLE ID	MAXXAM LAB # (LAB USE ONLY)	MATRIX: GROUNDWATER	SURFACE WATER	DRINKING WATER	SOIL	OTHER	SAMPLING: DATE DD/MM/YY	TIME	# CONTAINERS	General Chemistry (pH, conductivity, alkalnity,	acidity, sulphate, nitrate, nitrite, chloride)	Dissolved metals -CCME	Total metals -ccme	Total nutrients - Ammonia	TSS
1	W3B	HF6496		x				14-08-2013	11:35	5	x	x	x	x	x	X
2	W101	HF6497		x				14-08-2013	11:10	5	x	x	x	x	x	X
3	BH03-05	HF6498	x					13-08-2013	12:30	3	x	x	x		x	
4	BH04-05	HF6499	x					13-08-2013	21:45	3	x	x	x		x	
5	TRIP BLANK	HF6500		x						5	x	x	x	x	x	x
6																
7																
8																
9																
10																
11																
12																

B372642

TAT (Turnaround Time)
LESS THAN 5 DAY TAT MUST HAVE PRIOR APPROVAL
* Some exceptions apply - please contact laboratory

STANDARD	5 BUSINESS DAYS	x
RUSH	3 BUSINESS DAYS	
RUSH	2 BUSINESS DAYS	
URGENT	1 BUSINESS DAY	

OTHER BUSINESS DAYS

PO NUMBER OR QUOTE NUMBER: 14711

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE:

ACCOUNTING CONTACT: Graham Rudkin

SPECIAL REPORTING OR BILLING INSTRUCTIONS: B11-096-DL

RELINQUISHED BY SAMPLER: Holly Goulding
DATE: DD/MM/YY 16-08-2013
TIME: 14:30

RELINQUISHED BY:
DATE: DD/MM/YY
TIME:

RELINQUISHED BY:
DATE: DD/MM/YY
TIME:

x CCME
CSR
AB TIER 1
OTHER

JARS USED:

LAB USE ONLY
ARRIVAL TEMPERATURE °C: 4.5, 5 / 3.4.6
DUE DATE:
LOG IN CHECK:

RECEIVED BY:

RECEIVED BY:

RECEIVED BY LABORATORY: Yolanda Lin 2013/08/17 09:30 CS-NA

CUSTODY RECORD

Your P.O. #: 14711
Your Project #: HBM-13-1
Your C.O.C. #: 08376622

Attention: Kai Woloshyn
ACCESS CONSULTING GROUP
#3 Calcite
151 Industrial Road
WHITEHORSE, YT
CANADA Y1A 3C8

Report Date: 2013/09/10

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B373035
Received: 2013/08/17, 09:30

Sample Matrix: Soil
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Elements by ICPMS (total)	9	2013/09/09	2013/09/09	BBY7SOP-00004	BCMOE-SALM
Loss on Ignition, Org. & Inorg. Residue (2)	9	N/A	2013/09/10	BBY6SOP-00040	Carter SSMA 44.3
Moisture (1)	9	N/A	2013/08/21	AB SOP-00002	CCME PHC-CWS
Particle Size by Sieve (Special) (1,3)	4	2013/08/28	2013/08/28	AB SOP-00022	SSMA 55.4
Particle Size by Sieve (Special) (1,3)	1	2013/08/29	2013/08/29	AB SOP-00022	SSMA 55.4
Particle Size by Sieve (Special) (1,3)	4	2013/08/30	2013/08/30	AB SOP-00022	SSMA 55.4
Particle Size by Sieve (Grain Size) (1)	9	N/A	2013/08/30	AB SOP-00022	SSMA 55.4

* Results relate only to the items tested.

(1) This test was performed by Maxxam Calgary Environmental
(2) Loss on Ignition was reported on a dry weight basis.
(3) Result indicates % of sample retained on the sieve.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Graham Rudkin, Project Manager, Environmental
Email: GRudkin@maxxam.ca
Phone# (604) 638-5926 Ext:5926

==========

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Total cover pages: 1

Maxxam Job #: B373035
Report Date: 2013/09/10

ACCESS CONSULTING GROUP
Client Project #: HBM-13-1

Your P.O. #: 14711
Sampler Initials: HG

RESULTS OF CHEMICAL ANALYSES OF SOIL

Maxxam ID		HG0454	HG0455	HG0456	HG0457	HG0458	HG0459	HG0460	HG0461	HG0462		
Sampling Date		2013/08/14 15:00	2013/08/14 15:00	2013/08/14 15:00	2013/08/15 09:00	2013/08/15 09:00	2013/08/15 09:00	2013/08/15 10:00	2013/08/15 10:00	2013/08/15 10:00		
	UNITS	**W13-A**	**W13-B**	**W13-C**	**W12-A**	**W12-B**	**W12-C**	**W11-A**	**W11-B**	**W11-C**	**RDL**	**QC Batch**
Physical Properties												
Grain Size	N/A	COARSE	COARSE	COARSE	COARSE	COARSE	COARSE	FINE	FINE	FINE	N/A	7093650
Loss on Ignition	%	14.1	14.8	11.9	9.4	11.3	9.4	34.6	35.7	15.7	1.0	7156676
Sieve - #10 (>2.00mm)	%	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	2.1	0.20	7119081
Sieve - #20 (>0.85mm)	%	5.3	2.6	4.7	1.6	3.2	1.5	<0.20	<0.20	0.63	0.20	7119081
Sieve - #40 (>0.425mm)	%	46	42	50	26	24	22	1.8	<0.20	2.5	0.20	7119081
Sieve - #60 (>0.25 mm)	%	35	41	34	38	25	30	1.8	1.8	9.8	0.20	7119081
Sieve - #100(>0.15mm)	%	5.5	7.9	4.6	19	21	19	1.8	1.8	17	0.20	7119081
Sieve - #140 (>0.106mm)	%	0.98	0.79	0.91	4.7	8.1	8.1	1.8	1.8	9.6	0.20	7119081
Sieve - #270 (>0.053mm)	%	1.7	1.1	1.6	3.7	8.1	7.7	1.8	5.5	15	0.20	7119081
Sieve - Pan	%	5.4	5.0	4.3	6.0	10	12	91	89	43	0.20	7119081
Moisture	%	29	24	29	28	32	31	95	95	65	0.30	7102320

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: B373035
Report Date: 2013/09/10

ACCESS CONSULTING GROUP
Client Project #: HBM-13-1

Your P.O. #: 14711
Sampler Initials: HG

CSR/CCME METALS IN SOIL (SOIL)

Maxxam ID		HG0454	HG0455	HG0456	HG0457	HG0458	HG0459	HG0460	HG0461	HG0462		
Sampling Date		2013/08/14 15:00	2013/08/14 15:00	2013/08/14 15:00	2013/08/15 09:00	2013/08/15 09:00	2013/08/15 09:00	2013/08/15 10:00	2013/08/15 10:00	2013/08/15 10:00		
	UNITS	**W13-A**	**W13-B**	**W13-C**	**W12-A**	**W12-B**	**W12-C**	**W11-A**	**W11-B**	**W11-C**	**RDL**	**QC Batch**
Total Metals by ICPMS												
Total Aluminum (Al)	mg/kg	71300	52300	50700	34900	41900	31500	170000	165000	67500	100	7153748
Total Antimony (Sb)	mg/kg	5.22	4.63	5.96	7.27	7.21	7.07	1.68	1.98	5.38	0.10	7153748
Total Arsenic (As)	mg/kg	39.7	38.5	42.4	67.9	69.8	66.2	20.3	22.7	48.6	0.50	7153748
Total Barium (Ba)	mg/kg	562	606	750	749	545	577	76.9	71.5	339	0.10	7153748
Total Beryllium (Be)	mg/kg	0.60	0.58	0.75	0.58	1.00	0.76	4.39	3.99	2.24	0.40	7153748
Total Bismuth (Bi)	mg/kg	0.72	0.73	1.10	0.74	0.58	0.47	0.89	0.85	0.36	0.10	7153748
Total Cadmium (Cd)	mg/kg	1.66	1.65	2.02	2.75	3.48	3.25	2.52	2.69	3.58	0.050	7153748
Total Calcium (Ca)	mg/kg	20400	28500	14500	12000	11300	7300	25400	14800	7890	100	7153748
Total Chromium (Cr)	mg/kg	68.3	79.9	75.4	51.5	54.7	41.3	53.0	53.9	31.0	1.0	7153748
Total Cobalt (Co)	mg/kg	11.0	11.6	12.4	11.9	17.5	18.3	3.26	3.71	13.7	0.30	7153748
Total Copper (Cu)	mg/kg	646	719	856	546	408	320	832	785	392	0.50	7153748
Total Iron (Fe)	mg/kg	61900	48300	54600	65500	88600	71600	82000	90000	63000	100	7153748
Total Lead (Pb)	mg/kg	473	246	363	518	353	193	413	365	170	0.10	7153748
Total Lithium (Li)	mg/kg	13.5	18.0	17.8	6.6	7.8	7.2	<5.0	<5.0	6.7	5.0	7153748
Total Magnesium (Mg)	mg/kg	6330	10200	5690	3040	3170	2040	7010	4090	2250	100	7153748
Total Manganese (Mn)	mg/kg	1150	763	514	452	666	694	290	186	397	0.20	7153748
Total Mercury (Hg)	mg/kg	0.075	0.092	0.097	0.170	0.184	0.186	<0.050	<0.050	0.131	0.050	7153748
Total Molybdenum (Mo)	mg/kg	13.7	15.9	14.9	23.2	23.0	22.2	25.0	25.7	22.1	0.10	7153748
Total Nickel (Ni)	mg/kg	76.0	92.6	81.0	94.6	100	94.3	32.3	38.1	88.8	0.80	7153748
Total Phosphorus (P)	mg/kg	1080	1120	1140	2840	2730	2570	941	986	1990	10	7153748
Total Potassium (K)	mg/kg	1390	1920	1840	629	686	635	485	333	602	100	7153748
Total Selenium (Se)	mg/kg	2.17	2.39	2.50	5.30	5.33	5.15	1.43	1.63	4.81	0.50	7153748
Total Silver (Ag)	mg/kg	0.321	0.400	0.358	0.745	1.05	0.881	0.936	0.912	0.995	0.050	7153748
Total Sodium (Na)	mg/kg	874	2920	748	510	1380	234	3000	1000	348	100	7153748
Total Strontium (Sr)	mg/kg	96.3	153	96.6	78.6	76.3	62.5	115	71.0	61.6	0.10	7153748
Total Thallium (Tl)	mg/kg	0.401	0.455	0.512	0.477	0.520	0.511	0.270	0.312	0.459	0.050	7153748
Total Tin (Sn)	mg/kg	72.3	38.9	76.0	54.2	37.7	22.8	45.1	44.2	22.0	0.10	7153748
Total Titanium (Ti)	mg/kg	130	158	184	53.0	45.8	44.5	16.9	16.6	51.9	1.0	7153748
Total Uranium (U)	mg/kg	5.69	5.13	5.39	8.84	12.2	10.3	28.4	27.2	20.0	0.050	7153748
Total Vanadium (V)	mg/kg	71.1	67.8	74.0	172	212	177	77.8	79.0	80.4	2.0	7153748
Total Zinc (Zn)	mg/kg	360	353	408	477	473	432	409	430	464	1.0	7153748
Total Zirconium (Zr)	mg/kg	8.94	10.2	9.30	5.57	6.10	4.75	3.61	3.77	8.18	0.50	7153748

RDL = Reportable Detection Limit

Maxxam Job #: B373035
Report Date: 2013/09/10

ACCESS CONSULTING GROUP
Client Project #: HBM-13-1

Your P.O. #: 14711
Sampler Initials: HG

Package 1	4.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

General Comments

ICPMS Metals and loss on ignition (LOI) analyses were peformed on the fraction of sample passing through a 100 mesh sieve. Insufficient sieved material was available to determine sediment pH.

LOI was determined at a temperature of 600°C.

Maxxam Job #: B373035
Report Date: 2013/09/10

ACCESS CONSULTING GROUP
Client Project #: HBM-13-1

Your P.O. #: 14711
Sampler Initials: HG

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7102320	Moisture	2013/08/21					<0.30	%	2.1	20		
7119081	Sieve - Pan	2013/08/30							7.6	35	100	94 - 106
7119081	Sieve - #10 (>2.00mm)	2013/08/30							21.3	35		
7119081	Sieve - #20 (>0.85mm)	2013/08/30							13.6	35		
7119081	Sieve - #40 (>0.425mm)	2013/08/30							19.1	35		
7119081	Sieve - #100(>0.15mm)	2013/08/30							11.2	35		
7153748	Total Antimony (Sb)	2013/09/09	NC	75 - 125	94	75 - 125	<0.10	mg/kg	3.3	30	102	70 - 130
7153748	Total Arsenic (As)	2013/09/09	NC	75 - 125	95	75 - 125	<0.50	mg/kg	0.3	30	103	70 - 130
7153748	Total Barium (Ba)	2013/09/09	NC	75 - 125	88	75 - 125	<0.10	mg/kg	4.1	35	107	70 - 130
7153748	Total Beryllium (Be)	2013/09/09	92	75 - 125	113	75 - 125	<0.40	mg/kg	6.3	30		
7153748	Total Cadmium (Cd)	2013/09/09	104	75 - 125	96	75 - 125	<0.050	mg/kg	0.3	30	111	70 - 130
7153748	Total Chromium (Cr)	2013/09/09	NC	75 - 125	95	75 - 125	<1.0	mg/kg	5.2	30	107	70 - 130
7153748	Total Cobalt (Co)	2013/09/09	95	75 - 125	93	75 - 125	<0.30	mg/kg	5.1	30	101	70 - 130
7153748	Total Copper (Cu)	2013/09/09	NC	75 - 125	99	75 - 125	<0.50	mg/kg	3.1	30	94	70 - 130
7153748	Total Lead (Pb)	2013/09/09	NC	75 - 125	98	75 - 125	<0.10	mg/kg	4.1	35	96	70 - 130
7153748	Total Lithium (Li)	2013/09/09	95	75 - 125	98	75 - 125	<5.0	mg/kg	NC	30		
7153748	Total Manganese (Mn)	2013/09/09	NC	75 - 125	95	75 - 125	<0.20	mg/kg	4.6	30	103	70 - 130
7153748	Total Mercury (Hg)	2013/09/09	100	75 - 125	98	75 - 125	<0.050	mg/kg	NC	35	89	70 - 130
7153748	Total Molybdenum (Mo)	2013/09/09	NC	75 - 125	97	75 - 125	<0.10	mg/kg	4.1	35	109	70 - 130
7153748	Total Nickel (Ni)	2013/09/09	NC	75 - 125	98	75 - 125	<0.80	mg/kg	5.1	30	96	70 - 130
7153748	Total Selenium (Se)	2013/09/09	106	75 - 125	103	75 - 125	<0.50	mg/kg	1.1	30		
7153748	Total Silver (Ag)	2013/09/09	100	75 - 125	96	75 - 125	<0.050	mg/kg	1.5	35		
7153748	Total Strontium (Sr)	2013/09/09	NC	75 - 125	96	75 - 125	<0.10	mg/kg	3.1	35	101	70 - 130
7153748	Total Thallium (Tl)	2013/09/09	96	75 - 125	96	75 - 125	<0.050	mg/kg	7.6	30	102	70 - 130
7153748	Total Tin (Sn)	2013/09/09	NC	75 - 125	91	75 - 125	<0.10	mg/kg	5.0	35		
7153748	Total Titanium (Ti)	2013/09/09	NC	75 - 125	93	75 - 125	<1.0	mg/kg	1.5	35	115	70 - 130
7153748	Total Uranium (U)	2013/09/09	94	75 - 125	88	75 - 125	<0.050	mg/kg	5.8	30	107	70 - 130
7153748	Total Vanadium (V)	2013/09/09	NC	75 - 125	95	75 - 125	<2.0	mg/kg	6.6	30	110	70 - 130
7153748	Total Zinc (Zn)	2013/09/09	NC	75 - 125	102	75 - 125	<1.0	mg/kg	1.9	30	94	70 - 130
7153748	Total Aluminum (Al)	2013/09/09					<100	mg/kg	6.6	35	110	70 - 130
7153748	Total Calcium (Ca)	2013/09/09					<100	mg/kg	6.8	30	99	70 - 130
7153748	Total Iron (Fe)	2013/09/09					<100	mg/kg	5.0	30	98	70 - 130
7153748	Total Magnesium (Mg)	2013/09/09					<100	mg/kg	7.3	30	93	70 - 130
7153748	Total Phosphorus (P)	2013/09/09					<10	mg/kg	2.7	30	93	70 - 130
7153748	Total Bismuth (Bi)	2013/09/09					<0.10	mg/kg	NC	30		
7153748	Total Potassium (K)	2013/09/09					<100	mg/kg	9.4	35		
7153748	Total Sodium (Na)	2013/09/09					<100	mg/kg	NC	35		

Maxxam Job #: B373035
Report Date: 2013/09/10

ACCESS CONSULTING GROUP
Client Project #: HBM-13-1

Your P.O. #: 14711
Sampler Initials: HG

QUALITY ASSURANCE REPORT

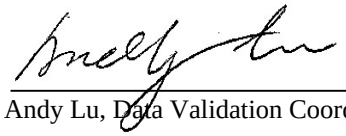
			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7153748	Total Zirconium (Zr)	2013/09/09					<0.50	mg/kg	10.2	30		
7156676	Loss on Ignition	2013/09/10					<1.0	%	0	35		

N/A = Not Applicable
RPD = Relative Percent Difference
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

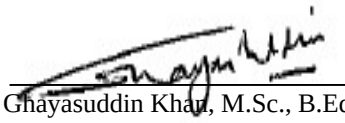
Validation Signature Page

Maxxam Job #: B373035

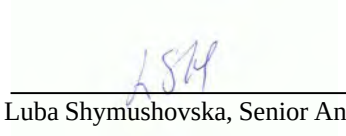
The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Andy Lu, Data Validation Coordinator



Ghayasuddin Khan, M.Sc., B.Ed., P.Chem, Scientific Specialist



Luba Shymushovska, Senior Analyst, Organic Department

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Maxxam Analytics Inc
8577 Commerce Court
Burnaby, BC V5A 4N5
www.maxxamanalytics.com
Phone: (604) 444-4808
Fax.: (604) 444-4511
Toll-Free: 1-800-440-4808

CHAIN-OF CUSTODY RECORD AND ANALYSIS REQUEST

LAB USE ONLY
MAXXAM JOB #: B373035

ANALYSIS REC

08376622

COMPANY NAME:	Access Consulting Group
CLIENT PROJECT NO.:	HBM-13-01
COMPANY ADDRESS:	#3 Calcite Business Center 151 Industrial Rd. Whitehorse, YT Y1A 2V3
TEL.:	867-668-6463
E-MAIL:	kwoloshyn@accessconsulting.ca, lfougere@accessconsulting.ca hgoulding@accessconsulting.ca,nichole@accessc
FAX:	867-667-6680
SAMPLER NAME (PRINT):	Holly Goulding
PROJECT MANAGER:	Kai Woloshyn
LABORATORY CONTACT:	Graham Rudkin

	FIELD SAMPLE ID	MAXXAM LAB # (LAB USE ONLY)	MATRIX: GROUNDWATER	SURFACE WATER	DRINKING WATER	SOIL	OTHER	SAMPLING: DATE (DD/MM/YY)	TIME	# CONTAINERS	Grain size (mesh 20, 40, 60, 100, 140, and 270	CCME metals passing through 100 mesh	LOI @ 600 C passing through 100 mesh
1	W13-A HG0454					x		14-08-2013	15:00	1	x	x	x
2	W13-B HG0455					x		14-08-2013	15:00	1	x	x	x
3	W13-C HG0456					x		14-08-2013	15:00	1	x	x	x
4	W12-A HG0457					x		15-08-2013	9:00	1	x	x	x
5	W12-B HG0458					x		15-08-2013	9:00	1	x	x	x
6	W12-C HG0459					x		15-08-2013	9:00	1	x	x	x
7	W11-A HG0460					x		15-08-2013	10:00	1	x	x	x
8	W11-B HG0461					x		15-08-2013	10:00	1	x	x	x
9	W11-C HG0462					x		15-08-2013	10:00	1	x	x	x
10													
11													
12													

B373035

TAT (Turnaround Time)
LESS THAN 5 DAY TAT MUST HAVE PRIOR APPROVAL
* Some exceptions apply - please contact laboratory

STANDARD	5 BUSINESS DAYS	x
RUSH	3 BUSINESS DAYS	
RUSH	2 BUSINESS DAYS	
URGENT	1 BUSINESS DAY	

OTHER BUSINESS DAYS: ____

PO NUMBER OR QUOTE NUMBER: 14711

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE:

ACCOUNTING CONTACT: Graham Rudkin

SPECIAL REPORTING OR BILLING INSTRUCTIONS: B11-096-DL; will send water licence detailing sediment analysis

x	CCME
	CSR
	AB TIER 1
	OTHER

JARS USED:

LAB USE ONLY

ARRIVAL TEMPERATURE °C:	DUE DATE:	LOG IN CHECK:
4.5,5/ 3,4,6		

	DATE: DD/MM/YY	TIME:	RECEIVED BY:
RELINQUISHED BY SAMPLER: Holly Goulding	16-08-2014	14:30	
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY:
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY LABORATORY: Yolanda Liu — 2013/08/17 09:30 CS: NA

CUSTODY RECORD

Maxxam

Success Through Science®

Your P.O. #: 14711
Your Project #: HBM-13-01
Your C.O.C. #: 08378782, 08378783

Attention: Kai Woloshyn
ACCESS CONSULTING GROUP
#3 Calcite
151 Industrial Road
WHITEHORSE, YT
CANADA Y1A 3C8

Report Date: 2013/10/02

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B385661
Received: 2013/09/20, 09:30

Sample Matrix: Water
Samples Received: 24

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO3)	24	N/A	2013/09/20	BBY6SOP-00037	SM-2310B
Alkalinity - Water	23	2013/09/21	2013/09/21	BBY6SOP-00026	SM2320B
Alkalinity - Water	1	2013/09/28	2013/09/28	BBY6SOP-00026	SM2320B
Chloride by Automated Colourimetry	18	N/A	2013/09/20	BBY6SOP-00011	SM-4500-Cl-
Chloride by Automated Colourimetry	6	N/A	2013/09/23	BBY6SOP-00011	SM-4500-Cl-
Conductance - water	23	N/A	2013/09/21	BBY6SOP-00026	SM-2510B
Conductance - water	1	N/A	2013/09/27	BBY6SOP-00026	SM-2510B
Hardness Total (calculated as CaCO3)	1	N/A	2013/09/23	BBY7SOP-00002	EPA 6020A
Hardness Total (calculated as CaCO3)	14	N/A	2013/09/24	BBY7SOP-00002	EPA 6020A
Hardness (calculated as CaCO3)	10	N/A	2013/09/24	BBY7SOP-00002	EPA 6020A
Hardness (calculated as CaCO3)	14	N/A	2013/09/25	BBY7SOP-00002	EPA 6020A
Mercury (Dissolved) by CVAF	15	N/A	2013/09/24	BBY7SOP-00015	EPA 245.7
Mercury (Dissolved) by CVAF	9	N/A	2013/09/25	BBY7SOP-00015	EPA 245.7
Mercury (Total) by CVAF	15	2013/09/23	2013/09/23	BBY7SOP-00015	EPA 245.7
Ion Balance	10	N/A	2013/09/24	Calc	
Ion Balance	14	N/A	2013/09/25	Calc	
Sum of cations, anions	19	N/A	2013/09/24	Calc	
Sum of cations, anions	5	N/A	2013/09/25	Calc	
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	10	N/A	2013/09/24	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	14	N/A	2013/09/25	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (dissolved)	10	N/A	2013/09/23	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (dissolved)	14	N/A	2013/09/24	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (total)	1	2013/09/20	2013/09/23	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (total)	14	2013/09/20	2013/09/24	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (total)	15	2013/09/23	2013/09/23	BBY7SOP-00002	EPA 6020A
Ammonia-N (Unpreserved)	1	N/A	2013/09/23	BBY6SOP-00009	SM-4500NH3G
Ammonia-N (Preserved)	17	N/A	2013/09/23	BBY6SOP-00009	SM-4500NH3G
Nitrate+Nitrite (N) (low level)	23	N/A	2013/09/21	BBY6SOP-00010	EPA 353.2
Nitrate+Nitrite (N) (low level)	1	N/A	2013/09/28	BBY6SOP-00010	EPA 353.2
Nitrite (N) (low level)	24	N/A	2013/09/21	BBY6SOP-00010	SM 4500NO3-I
Nitrogen - Nitrate (as N)	23	N/A	2013/09/24	BBY6SOP-00010	SM 4500NO3-I
Nitrogen - Nitrate (as N)	1	N/A	2013/09/30	BBY6SOP-00010	SM 4500NO3-I
Filter and HNO3 Preserve for Metals	24	N/A	2013/09/20	BBY6WI-00001	EPA 200.2
pH Water	23	N/A	2013/09/21	BBY6SOP-00026	SM-4500H+B
pH Water	1	N/A	2013/09/27	BBY6SOP-00026	SM-4500H+B
Sulphate by Automated Colourimetry	14	N/A	2013/09/20	BBY6SOP-00017	SM4500-SO42- E
Sulphate by Automated Colourimetry	9	N/A	2013/09/23	BBY6SOP-00017	SM4500-SO42- E
Sulphate by Automated Colourimetry	1	N/A	2013/09/30	BBY6SOP-00017	SM4500-SO42- E
Total Suspended Solids-Low Level	15	2013/09/21	2013/09/24	BBY6SOP-00034	SM-2540 D

* Results relate only to the items tested.

Maxxam Job #: B385661
Report Date: 2013/10/02

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: HG

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Graham Rudkin, Project Manager, Environmental
Email: GRudkin@maxxam.ca
Phone# (604) 638-5926 Ext:5926

==========

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Total cover pages: 2

Maxxam

Success Through Science®

Maxxam Job #: B385661
Report Date: 2013/10/02

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: HG

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		HO6573		HO6574		HO6575			HO6576		HO6577		
Sampling Date		2013/09/17 10:05		2013/09/17 12:50		2013/09/17 14:15			2013/09/17 15:35		2013/09/17 17:25		
	UNITS	**W13**	**RDL**	**W12**	**RDL**	**W11**	**RDL**	**QC Batch**	**W8**	**QC Batch**	**W6**	**RDL**	**QC Batch**
Misc. Inorganics													
Acidity (pH 4.5)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	7182191	401	7182191	264	0.50	7182191
Acidity (pH 8.3)	mg/L	47.1	0.50	76.3	0.50	17.3	0.50	7182191	842	7182191	609	0.50	7182191
Calculated Parameters													
Anion Sum	meq/L	3.7	N/A	4.8	N/A	3.8	N/A	7182932	19	7182932	14	N/A	7182932
Cation Sum	meq/L	3.5	N/A	4.5	N/A	3.6	N/A	7182932	20	7182932	14	N/A	7182932
Filter and HNO3 Preservation	N/A	FIELD	N/A	FIELD	N/A	FIELD	N/A	ONSITE	FIELD	ONSITE	FIELD	N/A	ONSITE
Ion Balance	N/A	0.95	0.010	0.94	0.010	0.96	0.010	7182931	1.0	7182931	1.0	0.010	7182931
Nitrate (N)	mg/L	0.0611	0.0020	0.0696	0.0020	0.0659	0.0020	7181790	0.078	7181790	0.106	0.020	7181790
Misc. Inorganics													
Alkalinity (Total as CaCO3)	mg/L	<0.50	0.50	<0.50	0.50	0.54	0.50	7184050	<0.50	7184050	<0.50	0.50	7184050
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	7184050	<0.50	7184050	<0.50	0.50	7184050
Bicarbonate (HCO3)	mg/L	<0.50	0.50	<0.50	0.50	0.66	0.50	7184050	<0.50	7184050	<0.50	0.50	7184050
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	7184050	<0.50	7184050	<0.50	0.50	7184050
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	7184050	<0.50	7184050	<0.50	0.50	7184050
Anions													
Dissolved Sulphate (SO4)	mg/L	176	0.50	230	5.0	180	0.50	7187017	926	7183465	649	5.0	7187017
Dissolved Chloride (Cl)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	7186992	2.3	7183427	<0.50	0.50	7186992
Nutrients													
Ammonia (N)	mg/L	0.069	0.0050	0.096	0.0050	0.035	0.0050	7186672	1.3	7186672	0.89	0.0050	7186672
Nitrate plus Nitrite (N)	mg/L	0.0611(1)	0.0020	0.0696(1)	0.0020	0.0659(1)	0.0020	7184458	0.130(2)	7184458	0.145(2)	0.020	7184458
Nitrite (N)	mg/L	<0.0020(1)	0.0020	<0.0020(1)	0.0020	<0.0020(1)	0.0020	7184459	0.051(2)	7184459	0.039(2)	0.020	7184459
Physical Properties													
Conductivity	uS/cm	357	1.0	446	1.0	371	1.0	7184059	1570	7184059	1200	1.0	7184059
pH	pH Units	4.53		4.41		5.36		7184060	2.92	7184060	3.08		7184060
Physical Properties													
Total Suspended Solids	mg/L	24.0	1.0	26.8(3)	2.0	27.6	1.0	7183963	24.6	7183963	8.6	1.0	7183963

N/A = Not Applicable
RDL = Reportable Detection Limit
(1) - Sample analysed past recommended hold time.
(2) - RDL raised due to sample matrix interference. Sample analysed past recommended hold time.
(3) - RDL raised due to sample matrix interference.

Maxxam Job #: B385661
Report Date: 2013/10/02

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: HG

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		HO6578		HO6579		HO6580	HO6581		HO6582		HO6583		
Sampling Date		2013/09/17 16:55		2013/09/17 16:25		2013/09/17 17:50	2013/09/17 17:50		2013/09/17 17:25		2013/09/17 19:00		
	UNITS	**S2**	**RDL**	**T5**	**QC Batch**	**W5**	**AD**	**RDL**	**W100**	**RDL**	**W2**	**RDL**	**QC Batch**
Misc. Inorganics													
Acidity (pH 4.5)	mg/L	376	0.50	867	7182191	94.3	82.2	0.50	261	0.50	227	0.50	7182191
Acidity (pH 8.3)	mg/L	776	0.50	1490	7182191	844	841	0.50	590	0.50	526	0.50	7182191
Calculated Parameters													
Anion Sum	meq/L	17	N/A	31	7182932	26	26	N/A	14	N/A	11	N/A	7182932
Cation Sum	meq/L	16	N/A	28	7182932	26	26	N/A	14	N/A	12	N/A	7182932
Filter and HNO3 Preservation	N/A	FIELD	N/A	FIELD	ONSITE	FIELD	FIELD	N/A	FIELD	N/A	FIELD	N/A	ONSITE
Ion Balance	N/A	0.99	0.010	0.92	7182931	1.0	0.99	0.010	1.0	0.010	1.0	0.010	7182931
Nitrate (N)	mg/L	0.100	0.020	0.155	7181790	0.0045	0.0061	0.0020	0.144	0.020	0.110	0.020	7181790
Misc. Inorganics													
Alkalinity (Total as CaCO3)	mg/L	<0.50	0.50	<0.50	7184050	<0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	7184050
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	7184050	<0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	7184050
Bicarbonate (HCO3)	mg/L	<0.50	0.50	<0.50	7184050	<0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	7184050
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	7184050	<0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	7184050
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	7184050	<0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	7184050
Anions													
Dissolved Sulphate (SO4)	mg/L	802	5.0	1480	7187017	1260	1240	5.0	651	5.0	531	5.0	7183465
Dissolved Chloride (Cl)	mg/L	<0.50	0.50	0.50	7186992	0.72	<0.50	0.50	1.2	0.50	0.67	0.50	7183427
Nutrients													
Ammonia (N)	mg/L	1.2	0.0050	2.2	7186672	1.6	1.3	0.0050	1.3	0.0050	0.92	0.0050	7186672
Nitrate plus Nitrite (N)	mg/L	0.144(1)	0.020	0.197	7184458	0.0045(2)	0.0061(2)	0.0020	0.144(1)	0.020	0.137(2)	0.0020	7184458
Nitrite (N)	mg/L	0.044(1)	0.020	0.0416	7184459	<0.0020(2)	<0.0020(2)	0.0020	<0.020(3)	0.020	0.026(1)	0.020	7184459
Physical Properties													
Conductivity	uS/cm	1350	1.0	1970	7184059	1770	1780	1.0	1240	1.0	1040	1.0	7184059
pH	pH Units	3.04		2.87	7184060	3.87	3.90		3.03		3.12		7184060
Physical Properties													
Total Suspended Solids	mg/L	16.0(3)	2.0	<1.0	7183963	25.1	27.7	1.0	10.0	1.0	9.6	1.0	7183963

N/A = Not Applicable
RDL = Reportable Detection Limit
(1) - RDL raised due to sample matrix interference. Sample analysed past recommended hold time.
(2) - Sample analysed past recommended hold time.
(3) - RDL raised due to sample matrix interference.

Maxxam Job #: B385661
Report Date: 2013/10/02

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: HG

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		HO6584	HO6606		HO6607		HO6608	HO6609			HO6610		
Sampling Date		2013/09/17 19:20	2013/09/17 20:20		2013/09/17 20:20		2013/09/18 09:15	2013/09/18 08:15			2013/09/18 08:40		
	UNITS	**W3**	**W3B**	**RDL**	**W101**	**RDL**	**BH03-05**	**BH04-05**	**RDL**	**QC Batch**	**BH01-05**	**RDL**	**QC Batch**
Misc. Inorganics													
Acidity (pH 4.5)	mg/L	245	496	0.50	<0.50	0.50	275	121	0.50	7182191	<0.50	0.50	7182191
Acidity (pH 8.3)	mg/L	486	859	0.50	<0.50	0.50	481	408	0.50	7182191	3.21	0.50	7182191
Calculated Parameters													
Anion Sum	meq/L	11	20	N/A	0.031	N/A	10	38	N/A	7182932	0.10	N/A	7182932
Cation Sum	meq/L	11	19	N/A	0.020	N/A	10	38	N/A	7182932	0.11	N/A	7182932
Filter and HNO3 Preservation	N/A	FIELD	FIELD	N/A	FIELD	N/A	FIELD	FIELD	N/A	ONSITE	FIELD	N/A	ONSITE
Ion Balance	N/A	1.0	0.98	0.010	0.65(1)	0.010	0.98	0.98	0.010	7182931	1.0	0.010	7182931
Nitrate (N)	mg/L	0.114	0.028	0.020	<0.0020	0.0020	0.197	0.186	0.0020	7181790	0.176	0.0020	7181790
Misc. Inorganics													
Alkalinity (Total as CaCO3)	mg/L	<0.50	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	7184050	<0.50	0.50	7184050
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	7184050	<0.50	0.50	7184050
Bicarbonate (HCO3)	mg/L	<0.50	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	7184050	<0.50	0.50	7184050
Carbonate (CO3)	mg/L	<0.50	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	7184050	<0.50	0.50	7184050
Hydroxide (OH)	mg/L	<0.50	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	7184050	<0.50	0.50	7184050
Anions													
Dissolved Sulphate (SO4)	mg/L	530	942	5.0	1.46	0.50	496	1840	5.0	7183465	4.42	0.50	7187172
Dissolved Chloride (Cl)	mg/L	0.68	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	7183427	<0.50	0.50	7183427
Nutrients													
Ammonia (N)	mg/L	1.4	2.4	0.0050	0.013	0.0050	1.1	0.30	0.0050	7186672	0.024	0.0050	7186672
Nitrate plus Nitrite (N)	mg/L	0.114(2)	0.0737(2)	0.0020	<0.0020(2)	0.0020	0.197	0.188	0.0020	7184458	0.176	0.0020	7184458
Nitrite (N)	mg/L	<0.020(3)	0.046(3)	0.020	<0.0020(2)	0.0020	<0.0020	0.0025	0.0020	7184459	<0.0020	0.0020	7184459
Physical Properties													
Conductivity	uS/cm	1120	1510	1.0	6.1	1.0	1220	2800	1.0	7184059	33.8	1.0	7184059
pH	pH Units	2.97	2.93		4.74		2.81	3.14		7184060	4.41		7184060
Physical Properties													
Total Suspended Solids	mg/L	1.5	<1.0	1.0	<1.0	1.0				7183963			

N/A = Not Applicable
RDL = Reportable Detection Limit
(1) - Ion balance out of optimal range due to high measurement uncertainty at this level (Ion Sum < 0.4 meq/L for both cations and anions).
(2) - Sample analysed past recommended hold time.
(3) - RDL raised due to sample matrix interference. Sample analysed past recommended hold time.

Maxxam Job #: B385661
Report Date: 2013/10/02

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: HG

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		HO6611			HO6612			HO6613		
Sampling Date		2013/09/18 08:35			2013/09/18 08:25			2013/09/18 09:40		
	UNITS	**BIN A**	**RDL**	**QC Batch**	**BIN B**	**RDL**	**QC Batch**	**BIN C**	**RDL**	**QC Batch**
Misc. Inorganics										
Acidity (pH 4.5)	mg/L	2350(1)	5.0	7182191	3960(1)	5.0	7182191	542	0.50	7182191
Acidity (pH 8.3)	mg/L	3670(1)	5.0	7182191	7860(1)	5.0	7182191	1090	0.50	7182191
Calculated Parameters										
Anion Sum	meq/L	77	N/A	7182932	160	N/A	7182932	21	N/A	7182932
Cation Sum	meq/L	65	N/A	7182932	120	N/A	7182932	21	N/A	7182932
Filter and HNO3 Preservation	N/A	FIELD	N/A	ONSITE	FIELD	N/A	ONSITE	FIELD	N/A	ONSITE
Ion Balance	N/A	0.85	0.010	7182931	0.80(2)	0.010	7182931	0.99	0.010	7182931
Nitrate (N)	mg/L	0.39	0.20	7181790	0.51	0.20	7190381	0.025	0.020	7181790
Misc. Inorganics										
Alkalinity (Total as CaCO3)	mg/L	<0.50	0.50	7184050	<0.50	0.50	7184050	<0.50	0.50	7184050
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	7184050	<0.50	0.50	7184050	<0.50	0.50	7184050
Bicarbonate (HCO3)	mg/L	<0.50	0.50	7184050	<0.50	0.50	7184050	<0.50	0.50	7184050
Carbonate (CO3)	mg/L	<0.50	0.50	7184050	<0.50	0.50	7184050	<0.50	0.50	7184050
Hydroxide (OH)	mg/L	<0.50	0.50	7184050	<0.50	0.50	7184050	<0.50	0.50	7184050
Anions										
Dissolved Sulphate (SO4)	mg/L	3680	50	7187172	7450	50	7199597	1020	5.0	7183465
Dissolved Chloride (Cl)	mg/L	<0.50	0.50	7183427	<0.50	0.50	7183427	<0.50	0.50	7183427
Nutrients										
Nitrate plus Nitrite (N)	mg/L	0.394(3)	0.020	7184458	1.34(4)	0.20	7197540	0.048(3)	0.020	7184458
Nitrite (N)	mg/L	<0.20(3)	0.20	7184459	0.83(3)	0.20	7184459	0.023(3)	0.020	7184459
Physical Properties										
Conductivity	uS/cm	5300	1.0	7184059	9250	1.0	7184059	2440	1.0	7184059
pH	pH Units	2.27		7184060	2.06		7184060	2.47		7184060

N/A = Not Applicable
RDL = Reportable Detection Limit
(1) - RDL raised due to sample dilution.
(2) - Anion - Cation balance exceeds normal acceptance limits, major ions reanalyzed, possible matrix interference
(3) - RDL raised due to sample matrix interference.
(4) - RDL raised due to sample matrix interference. Sample was originally analysed within hold time. Data quality required investigation. Re-analysis was completed past recommended hold time.

Maxxam Job #: B385661
Report Date: 2013/10/02

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: HG

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		HO6614		HO6615	HO6616			HO6617		
Sampling Date		2013/09/18 09:50		2013/09/18 09:05	2013/09/18 09:10			2013/09/20 09:30		
	UNITS	**BIN D**	**RDL**	**BIN E**	**BIN F**	**RDL**	**QC Batch**	**TRIP BLANK**	**RDL**	**QC Batch**
Misc. Inorganics										
Acidity (pH 4.5)	mg/L	985(1)	2.5	<0.50	19.7	0.50	7182191	<0.50	0.50	7182191
Acidity (pH 8.3)	mg/L	1660(1)	2.5	94.5	189	0.50	7182191	<0.50	0.50	7182191
Calculated Parameters										
Anion Sum	meq/L	36	N/A	39	9.3	N/A	7182932	0.0000	N/A	7182932
Cation Sum	meq/L	34	N/A	40	9.1	N/A	7182932	0.011	N/A	7182932
Filter and HNO3 Preservation	N/A	FIELD	N/A	FIELD	FIELD	N/A	ONSITE	FIELD	N/A	ONSITE
Ion Balance	N/A	0.95	0.010	1.0	0.97	0.010	7182931	NC(2)	0.010	7182931
Nitrate (N)	mg/L	0.048	0.020	<0.0020	0.0079	0.0020	7181790	<0.0020	0.0020	7181790
Misc. Inorganics										
Alkalinity (Total as CaCO3)	mg/L	<0.50	0.50	<0.50	<0.50	0.50	7184050	<0.50	0.50	7195577
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	<0.50	0.50	7184050	<0.50	0.50	7195577
Bicarbonate (HCO3)	mg/L	<0.50	0.50	<0.50	<0.50	0.50	7184050	<0.50	0.50	7195577
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	<0.50	0.50	7184050	<0.50	0.50	7195577
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	<0.50	0.50	7184050	<0.50	0.50	7195577
Anions										
Dissolved Sulphate (SO4)	mg/L	1730	5.0	1860	449	5.0	7183465	<0.50	0.50	7187172
Dissolved Chloride (Cl)	mg/L	0.80	0.50	<0.50	<0.50	0.50	7183427	<0.50	0.50	7183427
Nutrients										
Ammonia (N)	mg/L							<0.0050	0.0050	7186671
Nitrate plus Nitrite (N)	mg/L	0.0746	0.0020	<0.0020	0.0079	0.0020	7184458	<0.0020	0.0020	7184458
Nitrite (N)	mg/L	0.026(3)	0.020	<0.0020	<0.0020	0.0020	7184459	<0.0020	0.0020	7184459
Physical Properties										
Conductivity	uS/cm	3930	1.0	2760	848	1.0	7184059	1.2	1.0	7195593
pH	pH Units	2.28		4.77	3.82		7184060	4.95		7195594
Physical Properties										
Total Suspended Solids	mg/L							<1.0	1.0	7183963

N/A = Not Applicable
NC = Non-calculable
RDL = Reportable Detection Limit
(1) - RDL raised due to sample dilution.
(2) - Ion balance out of optimal range due to high measurement uncertainty at this level (Ion Sum < 0.4 meq/L for both cations and anions).
(3) - RDL raised due to sample matrix interference.

Maxxam Job #: B385661
Report Date: 2013/10/02

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: HG

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HO6573		HO6574		HO6575		HO6576	HO6577	HO6578		
Sampling Date		2013/09/17 10:05		2013/09/17 12:50		2013/09/17 14:15		2013/09/17 15:35	2013/09/17 17:25	2013/09/17 16:55		
	UNITS	**W13**	**QC Batch**	**W12**	**QC Batch**	**W11**	**QC Batch**	**W8**	**W6**	**S2**	**RDL**	**QC Batch**
Misc. Inorganics												
Dissolved Hardness (CaCO3)	mg/L	135	7181439	166	7181439	169	7181439	130	128	118	0.50	7181439
Elements												
Dissolved Mercury (Hg)	mg/L	<0.000010	7189791	<0.000010	7190487	<0.000010	7188444	<0.000010	<0.000010	<0.000010	0.000010	7188444
Dissolved Metals by ICPMS												
Dissolved Aluminum (Al)	mg/L	5.00	7185781	6.89	7185781	1.24	7185753	89.3	55.2	74.9	0.0030	7185753
Dissolved Antimony (Sb)	mg/L	<0.00050	7185781	<0.00050	7185781	<0.00050	7185753	<0.00050	<0.00050	<0.00050	0.00050	7185753
Dissolved Arsenic (As)	mg/L	0.00034	7185781	0.00051	7185781	0.00017	7185753	0.0206	0.0208	0.0216	0.00010	7185753
Dissolved Barium (Ba)	mg/L	0.0386	7185781	0.0315	7185781	0.0336	7185753	0.0193	0.0280	0.0221	0.0010	7185753
Dissolved Beryllium (Be)	mg/L	0.00035	7185781	0.00039	7185781	0.00023	7185753	0.00286	0.00248	0.00273	0.00010	7185753
Dissolved Bismuth (Bi)	mg/L	<0.0010	7185781	<0.0010	7185781	<0.0010	7185753	<0.0010	<0.0010	<0.0010	0.0010	7185753
Dissolved Boron (B)	mg/L	<0.050	7185781	<0.050	7185781	<0.050	7185753	<0.050	<0.050	<0.050	0.050	7185753
Dissolved Cadmium (Cd)	mg/L	0.0341	7185781	0.0518	7185781	0.0210	7185753	0.569	0.148	0.430	0.000010	7185753
Dissolved Chromium (Cr)	mg/L	<0.0010	7185781	0.0030	7185781	<0.0010	7185753	0.0946	0.0589	0.0828	0.0010	7185753
Dissolved Cobalt (Co)	mg/L	0.0264	7185781	0.0371	7185781	0.0283	7185753	0.192	0.132	0.158	0.00050	7185753
Dissolved Copper (Cu)	mg/L	0.0514	7185781	0.0802	7185781	0.0546	7185753	0.491	0.819	0.536	0.00020	7185753
Dissolved Iron (Fe)	mg/L	3.24	7185781	6.86	7185781	0.515	7185753	148	96.9	119	0.0050	7185753
Dissolved Lead (Pb)	mg/L	0.00032	7185781	0.00137	7185781	<0.00020	7185753	0.0317	0.0436	0.0379	0.00020	7185753
Dissolved Lithium (Li)	mg/L	0.0133	7185781	0.0160	7185781	0.0168	7185753	0.0385	0.0267	0.0342	0.0050	7185753
Dissolved Manganese (Mn)	mg/L	0.406	7185781	0.575	7185781	0.508	7185753	2.13	2.75	2.27	0.0010	7185753
Dissolved Molybdenum (Mo)	mg/L	<0.0010	7185781	<0.0010	7185781	<0.0010	7185753	<0.0010	<0.0010	<0.0010	0.0010	7185753
Dissolved Nickel (Ni)	mg/L	0.229	7185781	0.315	7185781	0.226	7185753	1.70	1.05	1.29	0.0010	7185753
Dissolved Phosphorus (P)	mg/L	<0.010	7185781	<0.010	7185781	<0.010	7185753	1.10	0.670	1.14	0.010	7185753
Dissolved Selenium (Se)	mg/L	0.00172	7191652	0.00210	7185781	0.00194	7185753	0.00644	0.00357	0.00430	0.00010	7185753
Dissolved Silicon (Si)	mg/L	3.95	7185781	4.06	7185781	3.29	7185753	8.61	6.99	7.84	0.10	7185753
Dissolved Silver (Ag)	mg/L	<0.000020	7185781	<0.000020	7185781	<0.000020	7185753	0.000056	0.000045	0.000066	0.000020	7202045
Dissolved Strontium (Sr)	mg/L	0.114	7185781	0.129	7185781	0.135	7185753	0.109	0.112	0.102	0.0010	7185753
Dissolved Thallium (Tl)	mg/L	0.000194	7185781	0.000298	7185781	0.000140	7185753	0.00254	0.00234	0.00247	0.000050	7185753
Dissolved Tin (Sn)	mg/L	<0.0050	7185781	<0.0050	7185781	<0.0050	7185753	<0.0050	<0.0050	<0.0050	0.0050	7185753
Dissolved Titanium (Ti)	mg/L	<0.0050	7185781	<0.0050	7185781	<0.0050	7185753	<0.0050	<0.0050	<0.0050	0.0050	7185753
Dissolved Uranium (U)	mg/L	0.00220	7185781	0.00289	7185781	0.00149	7185753	0.0220	0.0237	0.0204	0.00010	7185753
Dissolved Vanadium (V)	mg/L	<0.0050	7185781	<0.0050	7185781	<0.0050	7185753	0.393	0.192	0.283	0.0050	7185753
Dissolved Zinc (Zn)	mg/L	1.13	7185781	1.56	7185781	0.860	7185753	13.1	9.08	10.0	0.0050	7185753
Dissolved Zirconium (Zr)	mg/L	<0.00050	7185781	<0.00050	7185781	<0.00050	7185753	<0.00050	<0.00050	<0.00050	0.00050	7185753
Dissolved Calcium (Ca)	mg/L	32.6	7181440	38.4	7181440	38.7	7181440	24.6	28.5	22.9	0.050	7181440

RDL = Reportable Detection Limit

Maxxam Job #: B385661
Report Date: 2013/10/02

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: HG

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HO6573		HO6574		HO6575		HO6576	HO6577	HO6578		
Sampling Date		2013/09/17 10:05		2013/09/17 12:50		2013/09/17 14:15		2013/09/17 15:35	2013/09/17 17:25	2013/09/17 16:55		
	UNITS	**W13**	**QC Batch**	**W12**	**QC Batch**	**W11**	**QC Batch**	**W8**	**W6**	**S2**	**RDL**	**QC Batch**
Dissolved Magnesium (Mg)	mg/L	13.1	7181440	17.0	7181440	17.6	7181440	16.7	13.9	14.8	0.050	7181440
Dissolved Potassium (K)	mg/L	0.809	7181440	0.953	7181440	0.734	7181440	4.21	3.92	4.02	0.050	7181440
Dissolved Sodium (Na)	mg/L	0.446	7181440	0.300	7181440	0.299	7181440	0.412	0.316	0.378	0.050	7181440
Dissolved Sulphur (S)	mg/L	60.5	7181440	78.2	7181440	60.1	7181440	335	227	274	3.0	7181440

RDL = Reportable Detection Limit

Maxxam Job #: B385661
Report Date: 2013/10/02

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: HG

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HO6579			HO6580		HO6581		HO6582	HO6583	HO6584		
Sampling Date		2013/09/17 16:25			2013/09/17 17:50		2013/09/17 17:50		2013/09/17 17:25	2013/09/17 19:00	2013/09/17 19:20		
	UNITS	**T5**	**RDL**	**QC Batch**	**W5**	**QC Batch**	**AD**	**RDL**	**W100**	**W2**	**W3**	**RDL**	**QC Batch**
Misc. Inorganics													
Dissolved Hardness (CaCO3)	mg/L	120	0.50	7181439	368	7181439	369	0.50	124	76.2	79.2	0.50	7181439
Elements													
Dissolved Mercury (Hg)	mg/L	<0.000010	0.000010	7188444	<0.000010	7190487	<0.000010	0.000010	<0.000010	<0.000010	<0.000010	0.000010	7188444
Dissolved Metals by ICPMS													
Dissolved Aluminum (Al)	mg/L	143	0.0030	7185753	57.9	7185781	53.7	0.0060	56.5	54.3	59.7	0.0030	7185753
Dissolved Antimony (Sb)	mg/L	<0.00050	0.00050	7185753	<0.0010	7185781	<0.0010	0.0010	<0.00050	<0.00050	<0.00050	0.00050	7185753
Dissolved Arsenic (As)	mg/L	0.0131	0.00010	7185753	0.0910	7185781	0.0943	0.00020	0.0207	0.0161	0.00206	0.00010	7185753
Dissolved Barium (Ba)	mg/L	0.0083	0.0010	7185753	0.0078	7185781	0.0078	0.0020	0.0277	0.0420	0.0237	0.0010	7185753
Dissolved Beryllium (Be)	mg/L	0.00443	0.00010	7185753	0.00534	7185781	0.00575	0.00020	0.00258	0.00175	0.00242	0.00010	7185753
Dissolved Bismuth (Bi)	mg/L	<0.0010	0.0010	7185753	<0.0020	7185781	<0.0020	0.0020	<0.0010	<0.0010	<0.0010	0.0010	7185753
Dissolved Boron (B)	mg/L	<0.050	0.050	7185753	<0.10	7185781	<0.10	0.10	<0.050	<0.050	<0.050	0.050	7185753
Dissolved Cadmium (Cd)	mg/L	1.71	0.000010	7185753	0.0938	7185781	0.0934	0.000020	0.144	0.145	0.164	0.000010	7185753
Dissolved Chromium (Cr)	mg/L	0.206	0.0010	7185753	0.0333	7185781	0.0348	0.0020	0.0582	0.0693	0.0557	0.0010	7185753
Dissolved Cobalt (Co)	mg/L	0.283	0.00050	7185753	0.297	7185781	0.306	0.0010	0.131	0.103	0.101	0.00050	7185753
Dissolved Copper (Cu)	mg/L	0.191	0.00020	7185753	0.288	7185781	0.286	0.00040	0.829	1.08	0.688	0.00020	7185753
Dissolved Iron (Fe)	mg/L	209	0.0050	7185753	296	7185781	296	0.010	96.8	80.4	48.7	0.0050	7185753
Dissolved Lead (Pb)	mg/L	<0.00020	0.00020	7185753	0.159	7185781	0.155	0.00040	0.0440	<0.00020	0.0630	0.00020	7185753
Dissolved Lithium (Li)	mg/L	0.0613	0.0050	7185753	0.048	7185781	0.051	0.010	0.0270	0.0192	0.0278	0.0050	7185753
Dissolved Manganese (Mn)	mg/L	1.25	0.0010	7185753	13.0	7185781	14.2	0.0020	2.68	0.613	0.827	0.0010	7185753
Dissolved Molybdenum (Mo)	mg/L	<0.0010	0.0010	7185753	<0.0020	7185781	<0.0020	0.0020	<0.0010	0.0013	<0.0010	0.0010	7185753
Dissolved Nickel (Ni)	mg/L	2.86	0.0010	7185753	1.62	7185781	1.66	0.0020	1.06	0.934	0.971	0.0010	7185753
Dissolved Phosphorus (P)	mg/L	1.17	0.010	7185753	0.205	7185781	0.225	0.020	0.647	1.31	0.125	0.010	7185753
Dissolved Selenium (Se)	mg/L	0.0377	0.00010	7185753	<0.00020	7185781	<0.00020	0.00020	0.00356	0.00420	0.00362	0.00010	7185753
Dissolved Silicon (Si)	mg/L	11.6	0.10	7185753	5.40	7185781	4.94	0.20	6.90	7.48	7.38	0.10	7185753
Dissolved Silver (Ag)	mg/L	0.000074	0.000020	7185753	<0.000040	7185781	<0.000040	0.000040	0.000062	0.000067	0.000093	0.000020	7185753
Dissolved Strontium (Sr)	mg/L	0.104	0.0010	7185753	0.315	7185781	0.321	0.0020	0.114	0.0732	0.0684	0.0010	7185753
Dissolved Thallium (Tl)	mg/L	0.00183	0.000050	7185753	0.00304	7185781	0.00306	0.00010	0.00245	0.00259	0.00233	0.000050	7185753
Dissolved Tin (Sn)	mg/L	<0.0050	0.0050	7185753	<0.010	7185781	<0.010	0.010	<0.0050	<0.0050	<0.0050	0.0050	7185753
Dissolved Titanium (Ti)	mg/L	<0.0050	0.0050	7185753	<0.010	7185781	<0.010	0.010	<0.0050	<0.0050	<0.0050	0.0050	7185753
Dissolved Uranium (U)	mg/L	0.0254	0.00010	7185753	0.00732	7185781	0.00764	0.00020	0.0240	0.0312	0.0183	0.00010	7185753
Dissolved Vanadium (V)	mg/L	0.749	0.0050	7185753	0.085	7185781	0.093	0.010	0.193	0.335	0.0822	0.0050	7185753
Dissolved Zinc (Zn)	mg/L	26.7	0.0050	7185753	24.2	7185781	24.0	0.010	9.27	4.91	6.35	0.0050	7185753
Dissolved Zirconium (Zr)	mg/L	<0.00050	0.00050	7185753	<0.0010	7185781	<0.0010	0.0010	<0.00050	<0.00050	<0.00050	0.00050	7185753
Dissolved Calcium (Ca)	mg/L	17.2	0.050	7181440	75.3	7181440	74.0	0.10	26.9	18.3	17.6	0.050	7181440

RDL = Reportable Detection Limit

Maxxam Job #: B385661
Report Date: 2013/10/02

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: HG

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HO6579			HO6580		HO6581		HO6582	HO6583	HO6584		
Sampling Date		2013/09/17 16:25			2013/09/17 17:50		2013/09/17 17:50		2013/09/17 17:25	2013/09/17 19:00	2013/09/17 19:20		
	UNITS	**T5**	**RDL**	**QC Batch**	**W5**	**QC Batch**	**AD**	**RDL**	**W100**	**W2**	**W3**	**RDL**	**QC Batch**
Dissolved Magnesium (Mg)	mg/L	18.7	0.050	7181440	43.8	7181440	44.7	0.10	13.8	7.41	8.56	0.050	7181440
Dissolved Potassium (K)	mg/L	3.01	0.050	7181440	6.48	7181440	6.43	0.10	3.90	4.02	3.33	0.050	7181440
Dissolved Sodium (Na)	mg/L	0.571	0.050	7181440	0.39	7181440	0.36	0.10	0.342	0.284	0.355	0.050	7181440
Dissolved Sulphur (S)	mg/L	496	3.0	7181440	409	7181440	432	6.0	219	180	188	3.0	7181440

RDL = Reportable Detection Limit

Maxxam Job #: B385661
Report Date: 2013/10/02

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: HG

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HO6606	HO6607		HO6608		HO6609		HO6610		HO6611		
Sampling Date		2013/09/17 20:20	2013/09/17 20:20		2013/09/18 09:15		2013/09/18 08:15		2013/09/18 08:40		2013/09/18 08:35		
	UNITS	**W3B**	**W101**	**QC Batch**	**BH03-05**	**RDL**	**BH04-05**	**RDL**	**BH01-05**	**RDL**	**BIN A**	**RDL**	**QC Batch**
Misc. Inorganics													
Dissolved Hardness (CaCO3)	mg/L	117	<0.50	7181439	81.6	0.50	1480	0.50	1.26	0.50	342	0.50	7181439
Elements													
Dissolved Mercury (Hg)	mg/L	<0.000010	<0.000010	7189791	<0.000010	0.000010	<0.000010	0.000010	<0.000010	0.000010	<0.000010	0.000010	7188444
Dissolved Metals by ICPMS													
Dissolved Aluminum (Al)	mg/L	110	0.0035	7185781	55.9	0.0030	37.1	0.0060	0.116	0.0030	44.0	0.030	7185753
Dissolved Antimony (Sb)	mg/L	<0.00050	<0.00050	7185781	<0.00050	0.00050	<0.0010	0.0010	0.00100	0.00050	0.0233	0.0050	7185753
Dissolved Arsenic (As)	mg/L	0.00233	<0.00010	7185781	0.00080	0.00010	0.00274	0.00020	0.00020	0.00010	2.33	0.0010	7185753
Dissolved Barium (Ba)	mg/L	0.0040	<0.0010	7185781	0.0060	0.0010	0.0033	0.0020	0.287	0.0010	0.010	0.010	7185753
Dissolved Beryllium (Be)	mg/L	0.00396	<0.00010	7185781	0.00198	0.00010	0.00134	0.00020	<0.00010	0.00010	0.0049	0.0010	7185753
Dissolved Bismuth (Bi)	mg/L	<0.0010	<0.0010	7185781	<0.0010	0.0010	<0.0020	0.0020	<0.0010	0.0010	<0.010	0.010	7185753
Dissolved Boron (B)	mg/L	<0.050	<0.050	7185781	<0.050	0.050	<0.10	0.10	<0.050	0.050	<0.50	0.50	7185753
Dissolved Cadmium (Cd)	mg/L	0.287	0.000010	7185781	0.133	0.000010	0.140	0.000020	0.000246	0.000010	0.0453	0.00010	7185753
Dissolved Chromium (Cr)	mg/L	0.102	<0.0010	7185781	0.0429	0.0010	0.0120	0.0020	<0.0010	0.0010	0.332	0.010	7185753
Dissolved Cobalt (Co)	mg/L	0.181	<0.00050	7185781	0.0896	0.00050	0.0968	0.0010	<0.00050	0.00050	0.892	0.0050	7185753
Dissolved Copper (Cu)	mg/L	1.19	0.00022	7185781	0.629	0.00020	0.258	0.00040	0.00297	0.00020	86.9	0.0020	7185753
Dissolved Iron (Fe)	mg/L	75.3	0.0084	7185781	10.6	0.0050	21.6	0.010	0.0598	0.0050	1320	0.050	7185753
Dissolved Lead (Pb)	mg/L	0.0150	<0.00020	7185781	0.00905	0.00020	0.00143	0.00040	0.00057	0.00020	0.110	0.0020	7185753
Dissolved Lithium (Li)	mg/L	0.0476	<0.0050	7185781	0.0233	0.0050	0.020	0.010	<0.0050	0.0050	<0.050	0.050	7185753
Dissolved Manganese (Mn)	mg/L	1.28	<0.0010	7185781	0.811	0.0010	7.06	0.0020	0.0068	0.0010	13.0	0.010	7185753
Dissolved Molybdenum (Mo)	mg/L	<0.0010	<0.0010	7185781	<0.0010	0.0010	<0.0020	0.0020	<0.0010	0.0010	0.105	0.010	7185753
Dissolved Nickel (Ni)	mg/L	1.69	<0.0010	7185781	0.862	0.0010	1.26	0.0020	0.0042	0.0010	11.7	0.010	7185753
Dissolved Phosphorus (P)	mg/L	0.200	<0.010	7185781	0.023	0.010	0.140	0.020	<0.010	0.010	6.50	0.10	7185753
Dissolved Selenium (Se)	mg/L	0.00542	<0.00010	7185781	0.00569	0.00010	0.0291	0.00020	0.00505	0.00010	0.0570	0.0010	7185753
Dissolved Silicon (Si)	mg/L	9.85	<0.10	7185781	7.32	0.10	5.05	0.20	2.25	0.10	2.9	1.0	7185753
Dissolved Silver (Ag)	mg/L	0.000101	<0.000020	7185781	0.000203	0.000020	0.000161	0.000040	0.000031	0.000020	<0.00020	0.00020	7185753
Dissolved Strontium (Sr)	mg/L	0.0819	<0.0010	7185781	0.0735	0.0010	0.886	0.0020	0.0103	0.0010	0.209	0.010	7185753
Dissolved Thallium (Tl)	mg/L	0.00308	<0.000050	7185781	0.00205	0.000050	0.00084	0.00010	0.000197	0.000050	0.0119	0.00050	7185753
Dissolved Tin (Sn)	mg/L	<0.0050	<0.0050	7185781	<0.0050	0.0050	<0.010	0.010	<0.0050	0.0050	<0.050	0.050	7185753
Dissolved Titanium (Ti)	mg/L	<0.0050	<0.0050	7185781	<0.0050	0.0050	<0.010	0.010	<0.0050	0.0050	0.169	0.050	7185753
Dissolved Uranium (U)	mg/L	0.0288	<0.00010	7185781	0.0188	0.00010	0.00968	0.00020	<0.00010	0.00010	0.213	0.0010	7185753
Dissolved Vanadium (V)	mg/L	0.137	<0.0050	7185781	<0.0050	0.0050	<0.010	0.010	<0.0050	0.0050	0.447	0.050	7185753
Dissolved Zinc (Zn)	mg/L	10.4	<0.0050	7185781	6.68	0.0050	70.5	0.010	0.218	0.0050	11.6	0.050	7185753
Dissolved Zirconium (Zr)	mg/L	<0.00050	<0.00050	7185781	<0.00050	0.00050	<0.0010	0.0010	<0.00050	0.00050	0.0084	0.0050	7185753
Dissolved Calcium (Ca)	mg/L	26.0	<0.050	7181440	18.6	0.050	210	0.10	0.303	0.050	70.9	0.50	7181440

RDL = Reportable Detection Limit

Maxxam Job #: B385661
Report Date: 2013/10/02

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: HG

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HO6606	HO6607		HO6608		HO6609		HO6610		HO6611		
Sampling Date		2013/09/17 20:20	2013/09/17 20:20		2013/09/18 09:15		2013/09/18 08:15		2013/09/18 08:40		2013/09/18 08:35		
	UNITS	**W3B**	**W101**	**QC Batch**	**BH03-05**	**RDL**	**BH04-05**	**RDL**	**BH01-05**	**RDL**	**BIN A**	**RDL**	**QC Batch**
Dissolved Magnesium (Mg)	mg/L	12.7	<0.050	7181440	8.57	0.050	232	0.10	0.121	0.050	40.0	0.50	7181440
Dissolved Potassium (K)	mg/L	5.31	<0.050	7181440	2.05	0.050	0.38	0.10	0.253	0.050	<0.50	0.50	7181440
Dissolved Sodium (Na)	mg/L	0.466	<0.050	7181440	0.433	0.050	0.42	0.10	0.292	0.050	1.02	0.50	7181440
Dissolved Sulphur (S)	mg/L	333	<3.0	7181440	175	3.0	642	6.0	<3.0	3.0	1260	30	7181440

RDL = Reportable Detection Limit

Maxxam Job #: B385661
Report Date: 2013/10/02

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: HG

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HO6612			HO6613			HO6614		
Sampling Date		2013/09/18 08:25			2013/09/18 09:40			2013/09/18 09:50		
	UNITS	**BIN B**	**RDL**	**QC Batch**	**BIN C**	**RDL**	**QC Batch**	**BIN D**	**RDL**	**QC Batch**
Misc. Inorganics										
Dissolved Hardness (CaCO3)	mg/L	344	0.50	7181439	46.2	0.50	7181439	82.2	0.50	7181439
Elements										
Dissolved Mercury (Hg)	mg/L	<0.000010	0.000010	7189791	<0.000010	0.000010	7190487	<0.000010	0.000010	7188444
Dissolved Metals by ICPMS										
Dissolved Aluminum (Al)	mg/L	98.0	0.030	7185781	9.53	0.0060	7185781	18.9	0.012	7185753
Dissolved Antimony (Sb)	mg/L	0.0364	0.0050	7185781	0.0066	0.0010	7185781	0.0071	0.0020	7185753
Dissolved Arsenic (As)	mg/L	6.54	0.0010	7185781	0.448	0.00020	7185781	0.915	0.00040	7185753
Dissolved Barium (Ba)	mg/L	0.014	0.010	7185781	0.0107	0.0020	7185781	0.0148	0.0040	7185753
Dissolved Beryllium (Be)	mg/L	0.0108	0.0010	7185781	0.00213	0.00020	7185781	0.00391	0.00040	7185753
Dissolved Bismuth (Bi)	mg/L	<0.010	0.010	7185781	<0.0020	0.0020	7185781	<0.0040	0.0040	7185753
Dissolved Boron (B)	mg/L	<0.50	0.50	7185781	<0.10	0.10	7185781	<0.20	0.20	7185753
Dissolved Cadmium (Cd)	mg/L	0.236	0.00010	7185781	0.0918	0.000020	7185781	0.0855	0.000040	7185753
Dissolved Chromium (Cr)	mg/L	0.851	0.010	7185781	0.0492	0.0020	7185781	0.116	0.0040	7185753
Dissolved Cobalt (Co)	mg/L	1.66	0.0050	7185781	0.182	0.0010	7185781	0.333	0.0020	7185753
Dissolved Copper (Cu)	mg/L	107	0.0020	7185781	0.777	0.00040	7185781	1.41	0.00080	7185753
Dissolved Iron (Fe)	mg/L	2660	0.050	7185781	432	0.010	7185781	696	0.020	7185753
Dissolved Lead (Pb)	mg/L	0.122	0.0020	7185781	0.0892	0.00040	7185781	0.0219	0.00080	7185753
Dissolved Lithium (Li)	mg/L	<0.050	0.050	7185781	<0.010	0.010	7185781	<0.020	0.020	7185753
Dissolved Manganese (Mn)	mg/L	20.0	0.010	7185781	0.451	0.0020	7185781	1.21	0.0040	7185753
Dissolved Molybdenum (Mo)	mg/L	0.255	0.010	7185781	0.0280	0.0020	7185781	0.0392	0.0040	7185753
Dissolved Nickel (Ni)	mg/L	20.0	0.010	7185781	1.56	0.0020	7185781	2.78	0.0040	7185753
Dissolved Phosphorus (P)	mg/L	21.8	0.10	7185781	6.52	0.020	7185781	16.1	0.040	7185753
Dissolved Selenium (Se)	mg/L	0.103	0.0010	7185781	0.0141	0.00020	7185781	0.0212	0.00040	7185753
Dissolved Silicon (Si)	mg/L	4.0	1.0	7185781	2.39	0.20	7185781	2.51	0.40	7185753
Dissolved Silver (Ag)	mg/L	0.00040	0.00020	7185781	<0.000040	0.000040	7185781	<0.000080	0.000080	7185753
Dissolved Strontium (Sr)	mg/L	0.235	0.010	7185781	0.111	0.0020	7185781	0.226	0.0040	7185753
Dissolved Thallium (Tl)	mg/L	0.0184	0.00050	7185781	0.00207	0.00010	7185781	0.00272	0.00020	7185753
Dissolved Tin (Sn)	mg/L	<0.050	0.050	7185781	<0.010	0.010	7185781	<0.020	0.020	7185753
Dissolved Titanium (Ti)	mg/L	0.307	0.050	7185781	<0.010	0.010	7185781	<0.020	0.020	7185753
Dissolved Uranium (U)	mg/L	0.571	0.0010	7185781	0.0313	0.00020	7185781	0.109	0.00040	7185753
Dissolved Vanadium (V)	mg/L	1.04	0.050	7185781	0.091	0.010	7185781	0.214	0.020	7185753
Dissolved Zinc (Zn)	mg/L	40.2	0.050	7185781	9.81	0.010	7185781	8.43	0.020	7185753
Dissolved Zirconium (Zr)	mg/L	0.166	0.0050	7185781	0.0011	0.0010	7185781	<0.0020	0.0020	7185753
Dissolved Calcium (Ca)	mg/L	57.8	0.50	7181440	16.3	0.10	7181440	24.2	0.20	7181440

RDL = Reportable Detection Limit

Maxxam Job #: B385661
Report Date: 2013/10/02

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: HG

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HO6612			HO6613			HO6614		
Sampling Date		2013/09/18 08:25			2013/09/18 09:40			2013/09/18 09:50		
	UNITS	**BIN B**	**RDL**	**QC Batch**	**BIN C**	**RDL**	**QC Batch**	**BIN D**	**RDL**	**QC Batch**
Dissolved Magnesium (Mg)	mg/L	48.5	0.50	7181440	1.33	0.10	7181440	5.27	0.20	7181440
Dissolved Potassium (K)	mg/L	0.91	0.50	7181440	0.49	0.10	7181440	0.74	0.20	7181440
Dissolved Sodium (Na)	mg/L	1.48	0.50	7181440	<0.10	0.10	7181440	<0.20	0.20	7181440
Dissolved Sulphur (S)	mg/L	2340	30	7181440	343	6.0	7181440	609	12	7181440

RDL = Reportable Detection Limit

Maxxam Job #: B385661
Report Date: 2013/10/02

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: HG

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HO6615		HO6616			HO6617		
Sampling Date		2013/09/18 09:05		2013/09/18 09:10			2013/09/20 09:30		
	UNITS	**BIN E**	**QC Batch**	**BIN F**	**RDL**	**QC Batch**	**TRIP BLANK**	**RDL**	**QC Batch**
Misc. Inorganics									
Dissolved Hardness (CaCO3)	mg/L	1890	7181439	283	0.50	7181439	<0.50	0.50	7181439
Elements									
Dissolved Mercury (Hg)	mg/L	<0.000010	7189791	<0.000010	0.000010	7188444	<0.000010	0.000010	7190487
Dissolved Metals by ICPMS									
Dissolved Aluminum (Al)	mg/L	1.20	7185781	9.61	0.012	7185781	<0.0030	0.0030	7185781
Dissolved Antimony (Sb)	mg/L	<0.0020	7185781	<0.0020	0.0020	7185781	<0.00050	0.00050	7185781
Dissolved Arsenic (As)	mg/L	0.00061	7185781	0.00044	0.00040	7185781	<0.00010	0.00010	7185781
Dissolved Barium (Ba)	mg/L	0.0123	7185781	0.0161	0.0040	7185781	<0.0010	0.0010	7185781
Dissolved Beryllium (Be)	mg/L	<0.00040	7185781	0.00051	0.00040	7185781	<0.00010	0.00010	7185781
Dissolved Bismuth (Bi)	mg/L	<0.0040	7185781	<0.0040	0.0040	7185781	<0.0010	0.0010	7185781
Dissolved Boron (B)	mg/L	<0.20	7185781	<0.20	0.20	7185781	<0.050	0.050	7185781
Dissolved Cadmium (Cd)	mg/L	0.272	7185781	0.0852	0.000040	7185781	<0.000010	0.000010	7185781
Dissolved Chromium (Cr)	mg/L	<0.0040	7185781	<0.0040	0.0040	7185781	<0.0010	0.0010	7185781
Dissolved Cobalt (Co)	mg/L	0.0485	7185781	0.108	0.0020	7185781	<0.00050	0.00050	7185781
Dissolved Copper (Cu)	mg/L	0.0451	7185781	0.532	0.00080	7185781	<0.00020	0.00020	7185781
Dissolved Iron (Fe)	mg/L	0.386	7185781	0.674	0.020	7185781	<0.0050	0.0050	7185781
Dissolved Lead (Pb)	mg/L	0.0547	7185781	0.259	0.00080	7185781	<0.00020	0.00020	7185781
Dissolved Lithium (Li)	mg/L	<0.020	7185781	<0.020	0.020	7185781	<0.0050	0.0050	7185781
Dissolved Manganese (Mn)	mg/L	2.33	7185781	11.4	0.0040	7185781	<0.0010	0.0010	7185781
Dissolved Molybdenum (Mo)	mg/L	<0.0040	7185781	<0.0040	0.0040	7185781	<0.0010	0.0010	7185781
Dissolved Nickel (Ni)	mg/L	0.568	7185781	0.834	0.0040	7185781	<0.0010	0.0010	7185781
Dissolved Phosphorus (P)	mg/L	<0.040	7185781	<0.040	0.040	7185781	<0.010	0.010	7185781
Dissolved Selenium (Se)	mg/L	0.0243	7185781	0.00751	0.00040	7185781	<0.00010	0.00010	7185781
Dissolved Silicon (Si)	mg/L	5.10	7185781	28.3	0.40	7185781	<0.10	0.10	7185781
Dissolved Silver (Ag)	mg/L	<0.000080	7185781	<0.000080	0.000080	7185781	<0.000020	0.000020	7185781
Dissolved Strontium (Sr)	mg/L	1.46	7185781	0.263	0.0040	7185781	<0.0010	0.0010	7185781
Dissolved Thallium (Tl)	mg/L	0.00231	7185781	0.00155	0.00020	7185781	<0.000050	0.000050	7185781
Dissolved Tin (Sn)	mg/L	<0.020	7185781	<0.020	0.020	7185781	<0.0050	0.0050	7185781
Dissolved Titanium (Ti)	mg/L	<0.020	7185781	<0.020	0.020	7185781	<0.0050	0.0050	7185781
Dissolved Uranium (U)	mg/L	0.00069	7185781	0.00160	0.00040	7185781	<0.00010	0.00010	7185781
Dissolved Vanadium (V)	mg/L	<0.020	7185781	<0.020	0.020	7185781	<0.0050	0.0050	7185781
Dissolved Zinc (Zn)	mg/L	47.1	7185781	56.3	0.020	7185781	<0.0050	0.0050	7185781
Dissolved Zirconium (Zr)	mg/L	<0.0020	7185781	<0.0020	0.0020	7185781	<0.00050	0.00050	7185781
Dissolved Calcium (Ca)	mg/L	504	7181440	64.8	0.20	7181440	<0.050	0.050	7181440

RDL = Reportable Detection Limit

Maxxam Job #: B385661
Report Date: 2013/10/02

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: HG

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HO6615		HO6616			HO6617		
Sampling Date		2013/09/18 09:05		2013/09/18 09:10			2013/09/20 09:30		
	UNITS	**BIN E**	**QC Batch**	**BIN F**	**RDL**	**QC Batch**	**TRIP BLANK**	**RDL**	**QC Batch**
Dissolved Magnesium (Mg)	mg/L	154	7181440	29.5	0.20	7181440	<0.050	0.050	7181440
Dissolved Potassium (K)	mg/L	0.51	7181440	0.52	0.20	7181440	<0.050	0.050	7181440
Dissolved Sodium (Na)	mg/L	0.30	7181440	0.33	0.20	7181440	<0.050	0.050	7181440
Dissolved Sulphur (S)	mg/L	648	7181440	161	12	7181440	<3.0	3.0	7181440

RDL = Reportable Detection Limit

Maxxam Job #: B385661
Report Date: 2013/10/02

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: HG

CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		HO6573	HO6574	HO6575	HO6576	HO6577	HO6578	HO6579	HO6580		
Sampling Date		2013/09/17 10:05	2013/09/17 12:50	2013/09/17 14:15	2013/09/17 15:35	2013/09/17 17:25	2013/09/17 16:55	2013/09/17 16:25	2013/09/17 17:50		
	UNITS	**W13**	**W12**	**W11**	**W8**	**W6**	**S2**	**T5**	**W5**	**RDL**	**QC Batch**
Calculated Parameters											
Total Hardness (CaCO3)	mg/L	138	168	170	131	128	116	119	347	0.50	7181260
Elements											
Total Mercury (Hg)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	7186122
Total Metals by ICPMS											
Total Aluminum (Al)	mg/L	7.77(1)	11.6(1)	6.22(1)	87.3(1)	53.4(1)	70.4(1)	142(1)	49.6(1)	0.010	7185752
Total Antimony (Sb)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00062	0.00050	7185752
Total Arsenic (As)	mg/L	0.00129	0.00156	0.00067	0.0201	0.0220	0.0214	0.0136	0.0952	0.00010	7185752
Total Barium (Ba)	mg/L	0.0375	0.0323	0.0334	0.0183	0.0265	0.0204	0.0078	0.0072	0.0010	7185752
Total Beryllium (Be)	mg/L	0.00039	0.00056	0.00040	0.00287	0.00229	0.00236	0.00419	0.00480	0.00010	7185752
Total Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7185752
Total Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7185752
Total Cadmium (Cd)	mg/L	0.0321	0.0498	0.0205	0.535	0.138	0.393	1.57	0.0853	0.000010	7185752
Total Chromium (Cr)	mg/L	0.0043	0.0071	0.0020	0.0944	0.0614	0.0753	0.211	0.0350	0.0010	7185752
Total Cobalt (Co)	mg/L	0.0255	0.0358	0.0281	0.182	0.136	0.154	0.274	0.281	0.00050	7185752
Total Copper (Cu)	mg/L	0.0544	0.0856	0.0634	0.473	0.816	0.524	0.183	0.267	0.00020	7185752
Total Iron (Fe)	mg/L	7.49	11.9	2.99	155	103	118	226	289	0.0050	7185752
Total Lead (Pb)	mg/L	0.00112	0.00187	<0.00020	0.0316	0.0452	0.0370	0.00040	0.161	0.00020	7185752
Total Lithium (Li)	mg/L	0.0130	0.0170	0.0157	0.0378	0.0254	0.0308	0.0560	0.0466	0.0050	7185752
Total Manganese (Mn)	mg/L	0.404	0.548	0.486	2.07	2.80	2.08	1.24	12.5	0.0010	7185752
Total Molybdenum (Mo)	mg/L	<0.0010	<0.0010	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7185752
Total Nickel (Ni)	mg/L	0.225	0.308	0.225	1.63	1.06	1.27	2.70	1.53	0.0010	7185752
Total Phosphorus (P)	mg/L	0.056	0.085	0.034	1.04	0.648	0.951	1.21	0.257	0.010	7185752
Total Selenium (Se)	mg/L	0.00144	0.00197	0.00171	0.00576	0.00361	0.00362	0.0334	0.00015	0.00010	7185752
Total Silicon (Si)	mg/L	3.63	3.88	3.42	8.83	7.07	7.35	10.8	4.69	0.10	7185752
Total Silver (Ag)	mg/L	0.000027	0.000024	0.000024	0.000074	0.000066	0.000069	0.000123	0.000034	0.000020	7185752
Total Strontium (Sr)	mg/L	0.115	0.134	0.136	0.106	0.111	0.0973	0.101	0.295	0.0010	7185752
Total Thallium (Tl)	mg/L	0.000218	0.000300	0.000161	0.00263	0.00255	0.00250	0.00185	0.00287	0.000050	7185752
Total Tin (Sn)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7185752
Total Titanium (Ti)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7185752
Total Uranium (U)	mg/L	0.00261	0.00366	0.00259	0.0206	0.0236	0.0198	0.0261	0.00767	0.00010	7185752
Total Vanadium (V)	mg/L	0.0155	0.0273	<0.0050	0.406	0.215	0.263	0.809	0.215	0.0050	7185752
Total Zinc (Zn)	mg/L	1.06	1.51	0.815	12.2	8.51	8.95	26.2	21.9	0.0050	7185752
Total Zirconium (Zr)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7185752

RDL = Reportable Detection Limit
(1) - RDL raised due to cross contamination.

Maxxam Job #: B385661
Report Date: 2013/10/02

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: HG

CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		HO6573	HO6574	HO6575	HO6576	HO6577	HO6578	HO6579	HO6580		
Sampling Date		2013/09/17 10:05	2013/09/17 12:50	2013/09/17 14:15	2013/09/17 15:35	2013/09/17 17:25	2013/09/17 16:55	2013/09/17 16:25	2013/09/17 17:50		
	UNITS	**W13**	**W12**	**W11**	**W8**	**W6**	**S2**	**T5**	**W5**	**RDL**	**QC Batch**
Total Calcium (Ca)	mg/L	32.6	38.1	39.1	26.3	28.8	23.7	18.0	71.6	0.050	7181261
Total Magnesium (Mg)	mg/L	13.8	17.7	17.7	15.9	13.7	13.8	17.9	40.8	0.050	7181261
Total Potassium (K)	mg/L	0.823	0.949	0.764	4.20	3.99	4.11	3.34	6.04	0.050	7181261
Total Sodium (Na)	mg/L	0.469	0.322	0.322	0.420	0.366	0.395	0.642	0.367	0.050	7181261
Total Sulphur (S)	mg/L	58.9	74.7	59.9	316	229	272	490	381	3.0	7181261

RDL = Reportable Detection Limit

Maxxam Job #: B385661
Report Date: 2013/10/02

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: HG

CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		HO6581		HO6582	HO6583	HO6584	HO6606	HO6607	HO6617		
Sampling Date		2013/09/17 17:50		2013/09/17 17:25	2013/09/17 19:00	2013/09/17 19:20	2013/09/17 20:20	2013/09/17 20:20	2013/09/20 09:30		
	UNITS	**AD**	**RDL**	**W100**	**W2**	**W3**	**W3B**	**W101**	**TRIP BLANK**	**RDL**	**QC Batch**
Calculated Parameters											
Total Hardness (CaCO3)	mg/L	373	0.50	132	70.4	80.2	123	<0.50	<0.50	0.50	7181260
Elements											
Total Mercury (Hg)	mg/L	<0.000010	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	7186122
Total Metals by ICPMS											
Total Aluminum (Al)	mg/L	55.1(1)	0.020	55.7(1)	47.7(1)	57.7(1)	99.6(1)	0.013(1)	<0.010(1)	0.010	7185752
Total Antimony (Sb)	mg/L	<0.0010	0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7185752
Total Arsenic (As)	mg/L	0.0979	0.00020	0.0216	0.0156	0.00187	0.00223	<0.00010	<0.00010	0.00010	7185752
Total Barium (Ba)	mg/L	0.0070	0.0020	0.0271	0.0372	0.0235	0.0039	<0.0010	<0.0010	0.0010	7185752
Total Beryllium (Be)	mg/L	0.00525	0.00020	0.00239	0.00149	0.00217	0.00359	<0.00010	<0.00010	0.00010	7185752
Total Bismuth (Bi)	mg/L	<0.0020	0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7185752
Total Boron (B)	mg/L	<0.10	0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7185752
Total Cadmium (Cd)	mg/L	0.0919	0.000020	0.143	0.129	0.157	0.272	0.000014	<0.000010	0.000010	7185752
Total Chromium (Cr)	mg/L	0.0349	0.0020	0.0617	0.0643	0.0582	0.105	<0.0010	<0.0010	0.0010	7185752
Total Cobalt (Co)	mg/L	0.279	0.0010	0.133	0.0938	0.107	0.184	<0.00050	<0.00050	0.00050	7185752
Total Copper (Cu)	mg/L	0.283	0.00040	0.840	0.986	0.677	1.25	0.00084	<0.00020	0.00020	7185752
Total Iron (Fe)	mg/L	307	0.010	104	76.1	50.2	85.7	0.561	<0.0050	0.0050	7185752
Total Lead (Pb)	mg/L	0.169	0.00040	0.0459	<0.00020	0.0642	0.0148	<0.00020	<0.00020	0.00020	7185752
Total Lithium (Li)	mg/L	0.049	0.010	0.0259	0.0168	0.0251	0.0439	<0.0050	<0.0050	0.0050	7185752
Total Manganese (Mn)	mg/L	12.9	0.0020	2.76	0.571	0.878	1.37	0.0010	<0.0010	0.0010	7185752
Total Molybdenum (Mo)	mg/L	<0.0020	0.0020	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7185752
Total Nickel (Ni)	mg/L	1.53	0.0020	1.06	0.849	0.983	1.73	<0.0010	<0.0010	0.0010	7185752
Total Phosphorus (P)	mg/L	0.266	0.020	0.627	1.17	0.121	0.193	<0.010	<0.010	0.010	7185752
Total Selenium (Se)	mg/L	<0.00020	0.00020	0.00354	0.00386	0.00368	0.00606	<0.00010	<0.00010	0.00010	7185752
Total Silicon (Si)	mg/L	4.77	0.20	7.27	6.56	6.92	9.16	<0.10	<0.10	0.10	7185752
Total Silver (Ag)	mg/L	<0.000040	0.000040	0.000074	0.000022	0.000089	0.000108	0.000024	<0.000020	0.000020	7185752
Total Strontium (Sr)	mg/L	0.313	0.0020	0.114	0.0664	0.0661	0.0808	<0.0010	<0.0010	0.0010	7185752
Total Thallium (Tl)	mg/L	0.00304	0.00010	0.00248	0.00252	0.00224	0.00338	<0.000050	<0.000050	0.000050	7185752
Total Tin (Sn)	mg/L	<0.010	0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7185752
Total Titanium (Ti)	mg/L	<0.010	0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7185752
Total Uranium (U)	mg/L	0.00795	0.00020	0.0241	0.0286	0.0179	0.0310	<0.00010	<0.00010	0.00010	7185752
Total Vanadium (V)	mg/L	0.223	0.010	0.216	0.307	0.0833	0.143	<0.0050	<0.0050	0.0050	7185752
Total Zinc (Zn)	mg/L	25.0	0.010	8.94	4.24	5.99	10.2	<0.0050	<0.0050	0.0050	7185752
Total Zirconium (Zr)	mg/L	<0.0010	0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7185752

RDL = Reportable Detection Limit
(1) - RDL raised due to cross contamination.

Maxxam Job #: B385661
Report Date: 2013/10/02

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: HG

CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		HO6581		HO6582	HO6583	HO6584	HO6606	HO6607	HO6617		
Sampling Date		2013/09/17 17:50		2013/09/17 17:25	2013/09/17 19:00	2013/09/17 19:20	2013/09/17 20:20	2013/09/17 20:20	2013/09/20 09:30		
	UNITS	**AD**	**RDL**	**W100**	**W2**	**W3**	**W3B**	**W101**	**TRIP BLANK**	**RDL**	**QC Batch**
Total Calcium (Ca)	mg/L	76.2	0.10	29.7	16.9	18.6	28.1	<0.050	<0.050	0.050	7181261
Total Magnesium (Mg)	mg/L	44.4	0.10	14.1	6.84	8.22	12.8	<0.050	<0.050	0.050	7181261
Total Potassium (K)	mg/L	6.26	0.10	4.01	3.74	3.55	5.48	<0.050	<0.050	0.050	7181261
Total Sodium (Na)	mg/L	0.44	0.10	0.382	0.290	0.417	0.485	<0.050	<0.050	0.050	7181261
Total Sulphur (S)	mg/L	376	6.0	222	169	198	325	<3.0	<3.0	3.0	7181261

RDL = Reportable Detection Limit

Maxxam Job #: B385661
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ACCESS CONSULTING GROUP
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Package 1	6.0°C
Package 2	6.0°C
Package 3	4.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

General Comments

Sample HO6573-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HO6574-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HO6575-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HO6576-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HO6577-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HO6578-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HO6579-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HO6580-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HO6581-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HO6582-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HO6583-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HO6584-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory

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pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HO6606-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HO6607-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HO6608-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HO6609-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HO6610-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HO6611-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HO6612-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HO6613-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HO6614-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HO6615-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HO6616-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HO6617-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time. Ion Balance: NC = Not Calculable due to low ion sum [< 0.4 meq/L].

Sample HO6573, Elements by CRC ICPMS (dissolved): Test repeated.
Sample HO6576, Elements by CRC ICPMS (dissolved): Test repeated.
Sample HO6577, Elements by CRC ICPMS (dissolved): Test repeated.

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Sample HO6578, Elements by CRC ICPMS (dissolved): Test repeated.

CCME DISSOLVED METALS IN WATER (WATER) Comments

Sample HO6580-04 Elements by CRC ICPMS (dissolved): RDL raised due to sample matrix interference.

Sample HO6581-04 Elements by CRC ICPMS (dissolved): Detection limits raised due to matrix interference.

Sample HO6609-02 Elements by CRC ICPMS (dissolved): Detection limits raised due to matrix interference.

Sample HO6611-02 Elements by CRC ICPMS (dissolved): Detection limits raised due to matrix interference.

Sample HO6612-02 Elements by CRC ICPMS (dissolved): RDL raised due to sample matrix interference.

Sample HO6613-02 Elements by CRC ICPMS (dissolved): RDL raised due to sample matrix interference.

Sample HO6614-02 Elements by CRC ICPMS (dissolved): Detection limits raised due to matrix interference.

Sample HO6615-02 Elements by CRC ICPMS (dissolved): RDL raised due to sample matrix interference.

Sample HO6616-02 Elements by CRC ICPMS (dissolved): RDL raised due to sample matrix interference.

CCME TOTAL METALS IN WATER (WATER) Comments

Sample HO6581-03 Elements by CRC ICPMS (total): Detection limits raised due to matrix interference.

Sample HO6583-03 Elements by CRC ICPMS (total): Sodium confirmed by analysis of Raw aliquot

Maxxam Job #: B385661
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Sampler Initials: HG

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7182191	Acidity (pH 8.3)	2013/09/20			107	80 - 120	<0.50	mg/L	8.1	20
7182191	Acidity (pH 4.5)	2013/09/20					<0.50	mg/L	NC	20
7183427	Dissolved Chloride (Cl)	2013/09/20	NC	80 - 120	100	80 - 120	0.69, RDL=0.50	mg/L	NC	20
7183465	Dissolved Sulphate (SO4)	2013/09/20	NC	80 - 120	100	80 - 120	0.75, RDL=0.50	mg/L	1.7	20
7183963	Total Suspended Solids	2013/09/24			96	80 - 120	<1.0	mg/L		
7184050	Alkalinity (Total as CaCO3)	2013/09/21	NC	80 - 120	102	80 - 120	<0.50	mg/L	NC	20
7184050	Alkalinity (PP as CaCO3)	2013/09/21					<0.50	mg/L	NC	20
7184050	Bicarbonate (HCO3)	2013/09/21					<0.50	mg/L	NC	20
7184050	Carbonate (CO3)	2013/09/21					<0.50	mg/L	NC	20
7184050	Hydroxide (OH)	2013/09/21					<0.50	mg/L	NC	20
7184059	Conductivity	2013/09/21			98	80 - 120	1.1, RDL=1.0	uS/cm	0.4	20
7184458	Nitrate plus Nitrite (N)	2013/09/21	NC	80 - 120	104	80 - 120	<0.0020	mg/L	1.4	25
7184459	Nitrite (N)	2013/09/21	101	80 - 120	103	80 - 120	<0.0020	mg/L	NC	25
7185752	Total Aluminum (Al)	2013/09/23	NC	80 - 120	108	80 - 120	0.011, RDL=0.010 (1)	mg/L	8.5 (2)	20
7185752	Total Antimony (Sb)	2013/09/23	104	80 - 120	105	80 - 120	<0.00050	mg/L	NC	20
7185752	Total Arsenic (As)	2013/09/23	NC	80 - 120	108	80 - 120	0.00011, RDL=0.00010	mg/L	7.9	20
7185752	Total Barium (Ba)	2013/09/23	NC	80 - 120	98	80 - 120	<0.0010	mg/L	3.7	20
7185752	Total Beryllium (Be)	2013/09/23	101	80 - 120	97	80 - 120	<0.00010	mg/L	16.8	20
7185752	Total Bismuth (Bi)	2013/09/23	103	80 - 120	92	80 - 120	<0.0010	mg/L	NC	20
7185752	Total Cadmium (Cd)	2013/09/23	NC	80 - 120	97	80 - 120	0.000010, RDL=0.000010	mg/L	8.0	20
7185752	Total Chromium (Cr)	2013/09/23	NC	80 - 120	98	80 - 120	<0.0010	mg/L	5.2	20
7185752	Total Cobalt (Co)	2013/09/23	NC	80 - 120	99	80 - 120	<0.00050	mg/L	9.3	20
7185752	Total Copper (Cu)	2013/09/23	NC	80 - 120	97	80 - 120	<0.00020	mg/L	5.0	20
7185752	Total Iron (Fe)	2013/09/23	NC	80 - 120	126 (3, 4)	80 - 120	<0.0050	mg/L	4.8	20
7185752	Total Lead (Pb)	2013/09/23	100	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
7185752	Total Lithium (Li)	2013/09/23	NC	80 - 120	97	80 - 120	<0.0050	mg/L	NC	20
7185752	Total Manganese (Mn)	2013/09/23	NC	80 - 120	102	80 - 120	<0.0010	mg/L	5.8	20
7185752	Total Molybdenum (Mo)	2013/09/23	NC	80 - 120	100	80 - 120	<0.0010	mg/L	NC	20
7185752	Total Nickel (Ni)	2013/09/23	NC	80 - 120	98	80 - 120	<0.0010	mg/L	7.9	20
7185752	Total Selenium (Se)	2013/09/23	111	80 - 120	105	80 - 120	<0.00010	mg/L	12.7	20
7185752	Total Silver (Ag)	2013/09/23	91	80 - 120	106	80 - 120	<0.000020	mg/L	NC	20
7185752	Total Strontium (Sr)	2013/09/23	NC	80 - 120	98	80 - 120	<0.0010	mg/L	7.4	20
7185752	Total Thallium (Tl)	2013/09/23	NC	80 - 120	105	80 - 120	<0.000050	mg/L	2.1	20
7185752	Total Tin (Sn)	2013/09/23	100	80 - 120	100	80 - 120	<0.0050	mg/L	NC	20
7185752	Total Titanium (Ti)	2013/09/23	86	80 - 120	99	80 - 120	<0.0050	mg/L	NC	20
7185752	Total Uranium (U)	2013/09/23	NC	80 - 120	97	80 - 120	<0.00010	mg/L	4.8	20
7185752	Total Vanadium (V)	2013/09/23	NC	80 - 120	99	80 - 120	<0.0050	mg/L	2.9	20
7185752	Total Zinc (Zn)	2013/09/23	NC	80 - 120	105	80 - 120	<0.0050	mg/L	8.8	20
7185752	Total Boron (B)	2013/09/23					<0.050	mg/L	NC	20

Maxxam Job #: B385661
Report Date: 2013/10/02

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: HG

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7185752	Total Phosphorus (P)	2013/09/23					<0.010	mg/L	5.7	20
7185752	Total Silicon (Si)	2013/09/23					<0.10	mg/L	6.6	20
7185752	Total Zirconium (Zr)	2013/09/23					<0.00050	mg/L	NC	20
7185753	Dissolved Aluminum (Al)	2013/09/24	NC	80 - 120	107	80 - 120	<0.0030	mg/L	0.2	20
7185753	Dissolved Antimony (Sb)	2013/09/24	104	80 - 120	104	80 - 120	<0.00050	mg/L	NC	20
7185753	Dissolved Arsenic (As)	2013/09/24	104	80 - 120	105	80 - 120	<0.00010	mg/L	NC	20
7185753	Dissolved Barium (Ba)	2013/09/24	NC	80 - 120	104	80 - 120	<0.0010	mg/L	0.4	20
7185753	Dissolved Beryllium (Be)	2013/09/24	104	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
7185753	Dissolved Bismuth (Bi)	2013/09/24	100	80 - 120	85	80 - 120	<0.0010	mg/L	NC	20
7185753	Dissolved Cadmium (Cd)	2013/09/24	NC	80 - 120	103	80 - 120	<0.000010	mg/L	1.3	20
7185753	Dissolved Chromium (Cr)	2013/09/24	102	80 - 120	105	80 - 120	<0.0010	mg/L	NC	20
7185753	Dissolved Cobalt (Co)	2013/09/24	NC	80 - 120	102	80 - 120	<0.00050	mg/L	0.4	20
7185753	Dissolved Copper (Cu)	2013/09/24	NC	80 - 120	105	80 - 120	<0.00020	mg/L	4.2	20
7185753	Dissolved Iron (Fe)	2013/09/24	NC	80 - 120	109	80 - 120	<0.0050	mg/L	0.01	20
7185753	Dissolved Lead (Pb)	2013/09/24	98	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
7185753	Dissolved Lithium (Li)	2013/09/24	NC	80 - 120	98	80 - 120	<0.0050	mg/L	NC	20
7185753	Dissolved Manganese (Mn)	2013/09/24	NC	80 - 120	102	80 - 120	<0.0010	mg/L	0.9	20
7185753	Dissolved Molybdenum (Mo)	2013/09/24	102	80 - 120	102	80 - 120	<0.0010	mg/L	NC	20
7185753	Dissolved Nickel (Ni)	2013/09/24	NC	80 - 120	107	80 - 120	<0.0010	mg/L	3.2	20
7185753	Dissolved Selenium (Se)	2013/09/24	107	80 - 120	105	80 - 120	<0.00010	mg/L	3.3	20
7185753	Dissolved Silver (Ag)	2013/09/24	102	80 - 120	92	80 - 120	<0.000020	mg/L	NC	20
7185753	Dissolved Strontium (Sr)	2013/09/24	NC	80 - 120	102	80 - 120	<0.0010	mg/L	0.7	20
7185753	Dissolved Thallium (Tl)	2013/09/24	106	80 - 120	108	80 - 120	<0.000050	mg/L	NC	20
7185753	Dissolved Tin (Sn)	2013/09/24	102	80 - 120	99	80 - 120	<0.0050	mg/L	NC	20
7185753	Dissolved Titanium (Ti)	2013/09/24	107	80 - 120	111	80 - 120	<0.0050	mg/L	NC	20
7185753	Dissolved Uranium (U)	2013/09/24	102	80 - 120	100	80 - 120	<0.00010	mg/L	1.7	20
7185753	Dissolved Vanadium (V)	2013/09/24	103	80 - 120	109	80 - 120	<0.0050	mg/L	NC	20
7185753	Dissolved Zinc (Zn)	2013/09/24	NC	80 - 120	108	80 - 120	<0.0050	mg/L	0.9	20
7185753	Dissolved Boron (B)	2013/09/24					<0.050	mg/L	NC	20
7185753	Dissolved Phosphorus (P)	2013/09/24					<0.010	mg/L	NC	20
7185753	Dissolved Silicon (Si)	2013/09/24					<0.10	mg/L	3.4	20
7185753	Dissolved Zirconium (Zr)	2013/09/24					<0.00050	mg/L	NC	20
7185781	Dissolved Aluminum (Al)	2013/09/23	104	80 - 120	109	80 - 120	<0.0030	mg/L	NC	20
7185781	Dissolved Antimony (Sb)	2013/09/23	103	80 - 120	105	80 - 120	<0.00050	mg/L	NC	20
7185781	Dissolved Arsenic (As)	2013/09/23	101	80 - 120	105	80 - 120	<0.00010	mg/L	NC	20
7185781	Dissolved Barium (Ba)	2013/09/23	96	80 - 120	102	80 - 120	<0.0010	mg/L	NC	20
7185781	Dissolved Beryllium (Be)	2013/09/23	95	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
7185781	Dissolved Bismuth (Bi)	2013/09/23	98	80 - 120	104	80 - 120	<0.0010	mg/L	NC	20
7185781	Dissolved Cadmium (Cd)	2013/09/23	101	80 - 120	102	80 - 120	<0.000010	mg/L	NC	20

Maxxam Job #: B385661
Report Date: 2013/10/02

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: HG

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7185781	Dissolved Chromium (Cr)	2013/09/23	99	80 - 120	108	80 - 120	<0.0010	mg/L	NC	20
7185781	Dissolved Cobalt (Co)	2013/09/23	98	80 - 120	106	80 - 120	<0.00050	mg/L	NC	20
7185781	Dissolved Copper (Cu)	2013/09/23	97	80 - 120	105	80 - 120	<0.00020	mg/L	NC	20
7185781	Dissolved Iron (Fe)	2013/09/23	103	80 - 120	107	80 - 120	<0.0050	mg/L	NC	20
7185781	Dissolved Lead (Pb)	2013/09/23	98	80 - 120	103	80 - 120	<0.00020	mg/L	NC	20
7185781	Dissolved Lithium (Li)	2013/09/23	88	80 - 120	97	80 - 120	<0.0050	mg/L	NC	20
7185781	Dissolved Manganese (Mn)	2013/09/23	101	80 - 120	108	80 - 120	<0.0010	mg/L	NC	20
7185781	Dissolved Molybdenum (Mo)	2013/09/23	97	80 - 120	105	80 - 120	<0.0010	mg/L	NC	20
7185781	Dissolved Nickel (Ni)	2013/09/23	99	80 - 120	106	80 - 120	<0.0010	mg/L	NC	20
7185781	Dissolved Selenium (Se)	2013/09/23	103	80 - 120	109	80 - 120	<0.00010	mg/L	NC	20
7185781	Dissolved Silver (Ag)	2013/09/23	97	80 - 120	105	80 - 120	<0.000020	mg/L	NC	20
7185781	Dissolved Strontium (Sr)	2013/09/23	97	80 - 120	102	80 - 120	<0.0010	mg/L	NC	20
7185781	Dissolved Thallium (Tl)	2013/09/23	96	80 - 120	105	80 - 120	<0.000050	mg/L	NC	20
7185781	Dissolved Tin (Sn)	2013/09/23	99	80 - 120	103	80 - 120	<0.0050	mg/L	NC	20
7185781	Dissolved Titanium (Ti)	2013/09/23	109	80 - 120	93	80 - 120	<0.0050	mg/L	NC	20
7185781	Dissolved Uranium (U)	2013/09/23	93	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
7185781	Dissolved Vanadium (V)	2013/09/23	98	80 - 120	106	80 - 120	<0.0050	mg/L	NC	20
7185781	Dissolved Zinc (Zn)	2013/09/23	107	80 - 120	106	80 - 120	<0.0050	mg/L	NC	20
7185781	Dissolved Boron (B)	2013/09/23					<0.050	mg/L	NC	20
7185781	Dissolved Phosphorus (P)	2013/09/23					<0.010	mg/L	NC	20
7185781	Dissolved Silicon (Si)	2013/09/23					<0.10	mg/L	NC	20
7185781	Dissolved Zirconium (Zr)	2013/09/23					<0.00050	mg/L	NC	20
7186122	Total Mercury (Hg)	2013/09/23	115	80 - 120	110	80 - 120	<0.000010	mg/L	NC	20
7186671	Ammonia (N)	2013/09/23	92	80 - 120	97	80 - 120	<0.0050	mg/L	NC	20
7186672	Ammonia (N)	2013/09/23	100	80 - 120	98	80 - 120	<0.0050	mg/L	2.7	20
7186992	Dissolved Chloride (Cl)	2013/09/23			101	80 - 120	<0.50	mg/L	NC	20
7187017	Dissolved Sulphate (SO4)	2013/09/23			102	80 - 120	<0.50	mg/L	0.3	20
7187172	Dissolved Sulphate (SO4)	2013/09/23			102	80 - 120	<0.50	mg/L	0.3	20
7188444	Dissolved Mercury (Hg)	2013/09/24	114	80 - 120	110	80 - 120	<0.000010	mg/L	NC	20
7189791	Dissolved Mercury (Hg)	2013/09/25	97	80 - 120	109	80 - 120	<0.000010	mg/L	NC	20
7190487	Dissolved Mercury (Hg)	2013/09/25	88	80 - 120	93	80 - 120	<0.000010	mg/L	NC	20
7191652	Dissolved Selenium (Se)	2013/09/25			104	80 - 120	<0.00010	mg/L		
7195577	Alkalinity (Total as CaCO3)	2013/09/27	NC	80 - 120	93	80 - 120	<0.50	mg/L	0.4	20
7195577	Alkalinity (PP as CaCO3)	2013/09/27					<0.50	mg/L	NC	20
7195577	Bicarbonate (HCO3)	2013/09/27					<0.50	mg/L	0.4	20
7195577	Carbonate (CO3)	2013/09/27					<0.50	mg/L	NC	20
7195577	Hydroxide (OH)	2013/09/27					<0.50	mg/L	NC	20
7195593	Conductivity	2013/09/28			98	80 - 120	1.2, RDL=1.0	uS/cm	0	20
7197540	Nitrate plus Nitrite (N)	2013/09/28	102	80 - 120	107	80 - 120	<0.0020	mg/L	NC	25

Maxxam Job #: B385661
Report Date: 2013/10/02

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Your P.O. #: 14711
Sampler Initials: HG

QUALITY ASSURANCE REPORT

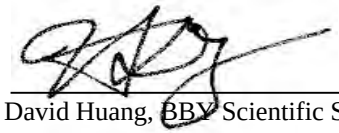
			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7199597	Dissolved Sulphate (SO4)	2013/09/30	90	80 - 120	95	80 - 120	<0.50	mg/L	0.4	20
7202045	Dissolved Silver (Ag)	2013/10/02			98	80 - 120	<0.000020	mg/L		

N/A = Not Applicable
RDL = Reportable Detection Limit
RPD = Relative Percent Difference
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) - Blank outside acceptance criteria due to cross contamination.
(2) - RDL raised due to cross contamination.
(3) - Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.
(4) - Blank Spike outside acceptance criteria (10% of analytes failure allowed).

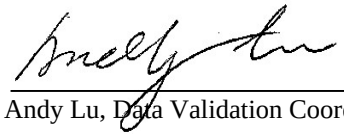
Validation Signature Page

Maxxam Job #: B385661

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



David Huang, BBY Scientific Specialist



Andy Lu, Data Validation Coordinator

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics Inc
8577 Commerce Court
Burnaby, BC V5A 4N5
www.maxxamanalytics.com
Phone: (604) 444-4808
Fax: (604) 444-4511
Toll-Free: 1-800-440-4808

CHAIN-OF CUSTODY RECORD AND ANALYSIS REQUEST

LAB USE ONLY
MAXXAM JOB #: B385661

ANALYSIS REQU

08378782

COMPANY NAME:	Access Consulting Group
CLIENT PROJECT NO.:	HBM-13-01
COMPANY ADDRESS:	#3 Calcite Business Center 151 Industrial Rd. Whitehorse, YT Y1A 2V3
TEL.:	867-668-6463
E-MAIL:	kwoloshyn@accessconsulting.ca, lfougere@accessconsulting.ca, hgoulding@accessconsulting.ca,nichole@accessc
FAX:	867-667-6680
SAMPLER NAME (PRINT):	Holly Goulding
PROJECT MANAGER:	Kai Woloshyn
LABORATORY CONTACT:	Graham Rudkin

	FIELD SAMPLE ID	MAXXAM LAB # (LAB USE ONLY)	MATRIX: GROUNDWATER	SURFACE WATER	DRINKING WATER	SOIL	OTHER	SAMPLING: DATE DD/MM/YY	TIME	# CONTAINERS	General Chemistry (pH, Conductivity, alkalanity	acidity, sulfate, nitrate, nitrite, chloride)	Dissolved metals -CCME	Total metals -CCME	Total Nutrients - ammonia	TSS
✓ 1	W13	H06573	X					17/09/13	10:05	5	X	X	X	X	X	X
✓ 2	W12	H06574	X					19/09/13	12:50	5	X	X	X	X	X	X
✓ 3	W11	H06575	X					17/09/13	14:15	5	X	X	X	X	X	X
✓ 4	W8	H06576	X					17/09/13	15:35	5	X	X	X	X	X	X
✓ 5	W6	H06577	X					17/09/13	17:25	5	X	X	X	X	X	X
✓ 6	S2	H06578	X					17/09/13	16:55	5	X	X	X	X	X	X
✓ 7	T5	H06579	X					17/09/13	16:25	5	X	X	X	X	X	X
✓ 8	W5	H06580	X					19/09/13	17:50	5	X	X	X	X	X	X
✓ 9	AD	H06581	X					17/09/13	17:50	5	X	X	X	X	X	X
✓ 10	W100	H06582	X					17/09/13	17:25	5	X	X	X	X	X	X
✓ 11	W2	H06583	X					17/09/13	19:00	5	X	X	X	X	X	X
✓ 12	W3	H06584	X					17/09/13	19:20	5	X	X	X	X	X	X

B385661

TAT (Turnaround Time)
LESS THAN 5 DAY TAT MUST HAVE PRIOR APPROVAL
* Some exceptions apply - please contact laboratory

STANDARD	5 BUSINESS DAYS	X
RUSH	3 BUSINESS DAYS	
RUSH	2 BUSINESS DAYS	
URGENT	1 BUSINESS DAY	

OTHER BUSINESS DAYS

CUSTODY RECORD

PO NUMBER OR QUOTE NUMBER: 14711

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE:

ACCOUNTING CONTACT:

SPECIAL REPORTING OR BILLING INSTRUCTIONS: B11-096-DL

X	CCME
	CSR
	AB TIER 1
	OTHER

JARS USED:

LAB USE ONLY
ARRIVAL TEMPERATURE °C: 3,6,9 4,6,8,4,4,5
DUE DATE:
LOG IN CHECK:

	DATE: DD/MM/YY	TIME:	
RELINQUISHED BY SAMPLER: Holly Goulding	19/09/13	10:00	RECEIVED BY: Air North Cargo
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY:
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY LABORATORY: RYANYEN 2013/09/20 09:30

COCFORM - BC - 25070822 CS:NJA

Maxxam Analytics Inc
8577 Commerce Court
Burnaby, BC V5A 4N5
www.maxxamanalytics.com
Phone: (604) 444-4808
Fax.: (604) 444-4511
Toll-Free: 1-800-440-4808

CHAIN-OF CUSTODY RECORD AND ANALYSIS REQUEST

LAB USE ONLY
MAXXAM JOB #

ANALYSIS REQU

08378783

COMPANY NAME:	CLIENT PROJECT NO.:
Access Consulting Group	HBM-13-01

COMPANY ADDRESS:
#3 Calcite Business Center
151 Industrial Rd.
Whitehorse, YT
Y1A 2V3

TEL.: 867-668-6463
E-MAIL: kwoloshyn@accessconsulting.ca, flougere@accessconsulting.ca
hgoulding@accessconsulting.ca,nichole@accesso
FAX: 867-667-6680

SAMPLER NAME (PRINT):	PROJECT MANAGER:	LABORATORY CONTACT:
Holly Goulding	Kai Woloshyn	Graham Rudkin

		FIELD SAMPLE ID	MAXXAM LAB # (LAB USE ONLY)	MATRIX: GROUNDWATER	SURFACE WATER	DRINKING WATER	SOIL	OTHER	SAMPLING: DATE DD/MM/YY	TIME	# CONTAINERS	General Chemistry (pH, conductivity, alkalinity,	acidity, sulphate, nitrate, nitrite, chloride)	Dissolved metals -CCME	Total metals -ccme	Total nutrients - Ammonia	TSS
✓	1	W3B	H06606		x				17/09/13	20:20	5	x	x	x	x	x	X
✓	2	W101	H06607		x				17/09/13	20:20	5	x	x	x	x	x	X
✓	3	BH03-05	H06608	x					18/09/13	9:15	3	x	x	x		x	
✓	4	BH04-05	H06609	x					18/09/13	8:15	3	x	x	x		x	
✓	5	BH01-05	H06610	x					18/09/13	8:40	3	x	x	x		x	
✓	6	BIN A	H06611		x				18/09/13	8:35	2	x	x	x			
✓	7	BIN B	H06612		x				18/09/13	8:25	2	x	x	x			
✓	8	BIN C	H06613		x				18/09/13	9:40	2	x	x	x			
✓	9	BIN D	H06614		x				18/09/13	9:50	2	x	x	x			
✓	10	BIN E	H06615		x				18/09/13	9:05	2	x	x	x			
✓	11	BIN F	H06616		x				18/09/13	9:10	2	x	x	x			
✓	12	TRIP BLANK	H06617		x						5	x	x	x	x	x	x

B385661

TAT (Turnaround Time)
LESS THAN 5 DAY TAT MUST HAVE PRIOR APPROVAL
* Some exceptions apply - please contact laboratory

STANDARD	5 BUSINESS DAYS	X
RUSH	3 BUSINESS DAYS	
RUSH	2 BUSINESS DAYS	
URGENT	1 BUSINESS DAY	

OTHER BUSINESS DAYS

PO NUMBER OR QUOTE NUMBER: 14711

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE:

X	CCME
	CSR
	AB TIER 1
	OTHER

JARS USED:

LAB USE ONLY
ARRIVAL TEMPERATURE °C: 3,6,9 4,6,8 4,4,5
DUE DATE:
LOG IN CHECK:

ACCOUNTING CONTACT:

SPECIAL REPORTING OR BILLING INSTRUCTIONS: B11-096-DL

	DATE: DD/MM/YY	TIME:	
RELINQUISHED BY SAMPLER: Holly Goulding	19/09/13	10:00	RECEIVED BY:
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY:
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY LABORATORY: RYAN YEN 2013/09/20 09:30

CUSTODY RECORD

COCFORM - BC - 20070602

CS'N/A

Maxxam

Success Through Science®

Your Project #: HBM-13-01
Your C.O.C. #: 08379884, 08379885

Attention: Kai Woloshyn
ACCESS CONSULTING GROUP
#3 Calcite
151 Industrial Road
WHITEHORSE, YT
CANADA Y1A 3C8

Report Date: 2013/10/11

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B391352
Received: 2013/10/04, 13:35

Sample Matrix: Water
Samples Received: 21

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO3)	21	N/A	2013/10/07	BBY6SOP-00037	SM-2310B
Alkalinity - Water	21	2013/10/07	2013/10/08	BBY6SOP-00026	SM2320B
Chloride by Automated Colourimetry	21	N/A	2013/10/05	BBY6SOP-00011	SM-4500-Cl-
Conductance - water	20	N/A	2013/10/08	BBY6SOP-00026	SM-2510B
Conductance - water	1	N/A	2013/10/09	BBY6SOP-00026	SM-2510B
Hardness Total (calculated as CaCO3)	15	N/A	2013/10/09	BBY7SOP-00002	EPA 6020A
Hardness (calculated as CaCO3)	1	N/A	2013/10/08	BBY7SOP-00002	EPA 6020A
Hardness (calculated as CaCO3)	20	N/A	2013/10/09	BBY7SOP-00002	EPA 6020A
Mercury (Dissolved) by CVAF	21	N/A	2013/10/09	BBY7SOP-00015	EPA 245.7
Mercury (Total) by CVAF	15	2013/10/09	2013/10/09	BBY7SOP-00015	EPA 245.7
Ion Balance	18	N/A	2013/10/09	Calc	
Ion Balance	3	N/A	2013/10/10	Calc	
Sum of cations, anions	19	N/A	2013/10/09	Calc	
Sum of cations, anions	2	N/A	2013/10/10	Calc	
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	1	N/A	2013/10/08	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	19	N/A	2013/10/09	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	1	N/A	2013/10/10	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (dissolved)	21	N/A	2013/10/08	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (total)	15	2013/10/04	2013/10/09	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (total)	15	2013/10/09	2013/10/09	BBY7SOP-00002	EPA 6020A
Ammonia-N (Unpreserved)	1	N/A	2013/10/07	BBY6SOP-00009	SM-4500NH3G
Ammonia-N (Preserved)	16	N/A	2013/10/07	BBY6SOP-00009	SM-4500NH3G
Nitrate+Nitrite (N) (low level)	20	N/A	2013/10/05	BBY6SOP-00010	EPA 353.2
Nitrate+Nitrite (N) (low level)	1	N/A	2013/10/08	BBY6SOP-00010	EPA 353.2
Nitrite (N) (low level)	20	N/A	2013/10/05	BBY6SOP-00010	SM 4500NO3-I
Nitrite (N) (low level)	1	N/A	2013/10/08	BBY6SOP-00010	SM 4500NO3-I
Nitrogen - Nitrate (as N)	21	N/A	2013/10/07	BBY6SOP-00010	SM 4500NO3-I
Filter and HNO3 Preserve for Metals	20	N/A	2013/10/04	BBY6WI-00001	EPA 200.2
Filter and HNO3 Preserve for Metals	1	N/A	2013/10/07	BBY6WI-00001	EPA 200.2
pH Water	21	N/A	2013/10/08	BBY6SOP-00026	SM-4500H+B
Sulphate by Automated Colourimetry	16	N/A	2013/10/05	BBY6SOP-00017	SM4500-SO42- E
Sulphate by Automated Colourimetry	4	N/A	2013/10/07	BBY6SOP-00017	SM4500-SO42- E
Sulphate by Automated Colourimetry	1	N/A	2013/10/08	BBY6SOP-00017	SM4500-SO42- E
Total Suspended Solids-Low Level	15	2013/10/08	2013/10/09	BBY6SOP-00034	SM-2540 D

* Results relate only to the items tested.

Maxxam Job #: B391352
Report Date: 2013/10/11

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Ken Pomeroy, Project Manager
Email: KPomeroy@maxxam.ca
Phone# (604) 638-5020

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B391352
Report Date: 2013/10/11

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		HS5604			HS5605		HS5606		HS5607	HS5608	HS5609		
Sampling Date		2013/10/03 10:05			2013/10/03 11:25		2013/10/03 12:15		2013/10/03 13:00	2013/10/03 13:59	2013/10/03 13:46		
	UNITS	**W13**	**RDL**	**QC Batch**	**W12**	**RDL**	**W11**	**RDL**	**W8**	**W6**	**S2**	**RDL**	**QC Batch**
Misc. Inorganics													
Acidity (pH 4.5)	mg/L	<0.50	0.50	7212114	<0.50	0.50	<0.50	0.50	537	315	410	0.50	7212114
Acidity (pH 8.3)	mg/L	49.7	0.50	7212114	77.5	0.50	15.1	0.50	1080	784	875	0.50	7212114
Calculated Parameters													
Anion Sum	meq/L	4.0	N/A	7209354	5.3	N/A	3.8	N/A	23	17	20	N/A	7209354
Cation Sum	meq/L	4.2	N/A	7209354	5.2	N/A	3.9	N/A	26	19	21	N/A	7209354
Filter and HNO3 Preservation	N/A	FIELD	N/A	ONSITE	FIELD	N/A	FIELD	N/A	FIELD	FIELD	FIELD	N/A	ONSITE
Ion Balance	N/A	1.0	0.010	7208235	0.97	0.010	1.1	0.010	1.1	1.1	1.1	0.010	7208235
Nitrate (N)	mg/L	0.037	0.020	7207402	0.065	0.020	0.052	0.020	0.040	0.118	0.048	0.020	7207402
Misc. Inorganics													
Alkalinity (Total as CaCO3)	mg/L	<0.50	0.50	7212800	<0.50	0.50	0.84	0.50	<0.50	<0.50	<0.50	0.50	7212800
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	7212800	<0.50	0.50	<0.50	0.50	<0.50	<0.50	<0.50	0.50	7212800
Bicarbonate (HCO3)	mg/L	<0.50	0.50	7212800	<0.50	0.50	1.03	0.50	<0.50	<0.50	<0.50	0.50	7212800
Carbonate (CO3)	mg/L	<0.50	0.50	7212800	<0.50	0.50	<0.50	0.50	<0.50	<0.50	<0.50	0.50	7212800
Hydroxide (OH)	mg/L	<0.50	0.50	7212800	<0.50	0.50	<0.50	0.50	<0.50	<0.50	<0.50	0.50	7212800
Anions													
Dissolved Sulphate (SO4)	mg/L	193	0.50	7213392	255	5.0	178	0.50	1110	837	945	5.0	7210096
Dissolved Chloride (Cl)	mg/L	0.51	0.50	7210095	0.55	0.50	0.61	0.50	1.1	0.55	<0.50	0.50	7210095
Nutrients													
Ammonia (N)	mg/L	0.14	0.0050	7213373	0.20	0.0050	0.050	0.0050	2.0	1.6	1.7	0.0050	7213373
Nitrate plus Nitrite (N)	mg/L	0.037(1)	0.020	7210103	0.065(1)	0.020	0.052(1)	0.020	0.097(1)	0.118(1)	0.083(1)	0.020	7210103
Nitrite (N)	mg/L	<0.020(1)	0.020	7210104	<0.020(1)	0.020	<0.020(1)	0.020	0.057(1)	<0.020(1)	0.035(1)	0.020	7210104
Physical Properties													
Conductivity	uS/cm	400	1.0	7212813	483	1.0	388	1.0	1850	1510	1620	1.0	7212813
pH	pH Units	4.32		7212812	4.26		5.53		2.84	2.96	2.92		7212812
Physical Properties													
Total Suspended Solids	mg/L	25.7	1.0	7214106	35.8	1.0	31.7	1.0	82.3	56.6	61.3	1.0	7214106

N/A = Not Applicable
RDL = Reportable Detection Limit
(1) - RDL raised due to sample matrix interference.

Maxxam Job #: B391352
Report Date: 2013/10/11

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		HS5610		HS5611	HS5612	HS5613	HS5614	HS5615	HS5621		
Sampling Date		2013/10/03 13:39		2013/10/03 15:10	2013/10/03	2013/10/03	2013/10/03 14:16	2013/10/03 14:27	2013/10/03 14:45		
	UNITS	**T5**	**RDL**	**W5**	**AD**	**W100**	**W2**	**W3**	**W3B**	**RDL**	**QC Batch**
Misc. Inorganics											
Acidity (pH 4.5)	mg/L	1090(1)	2.5	97.8	108	540	351	417	629	0.50	7212114
Acidity (pH 8.3)	mg/L	1940(1)	2.5	905	888	1090	775	728	1090	0.50	7212114
Calculated Parameters											
Anion Sum	meq/L	40	N/A	25	25	24	16	15	21	N/A	7209354
Cation Sum	meq/L	44	N/A	27	26	26	16	16	23	N/A	7209354
Filter and HNO3 Preservation	N/A	FIELD	N/A	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	N/A	ONSITE
Ion Balance	N/A	1.1	0.010	1.1	1.1	1.1	1.0	1.1	1.1	0.010	7208235
Nitrate (N)	mg/L	0.058	0.020	<0.020	<0.020	0.037	0.111	0.040	<0.020	0.020	7207402
Misc. Inorganics											
Alkalinity (Total as CaCO3)	mg/L	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7212800
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7212800
Bicarbonate (HCO3)	mg/L	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7212800
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7212800
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7212800
Anions											
Dissolved Sulphate (SO4)	mg/L	1900	5.0	1220	1190	1140	744	709	1020	5.0	7210096
Dissolved Chloride (Cl)	mg/L	<0.50	0.50	<0.50	<0.50	0.99	0.81	1.1	<0.50	0.50	7210095
Nutrients											
Ammonia (N)	mg/L	3.4	0.0050	1.6	1.6	1.6	1.5	1.8	2.8	0.0050	7213373
Nitrate plus Nitrite (N)	mg/L	0.154(2)	0.020	<0.020(2)	<0.020(2)	0.087(2)	0.111(2)	0.094(2)	0.025(2)	0.020	7210103
Nitrite (N)	mg/L	0.096(3)	0.020	<0.020(2)	<0.020(2)	0.050(2)	<0.020(2)	0.055(2)	0.049(2)	0.020	7210104
Physical Properties											
Conductivity	uS/cm	2570	1.0	1770	1780	1850	1330	1360	1740	1.0	7212813
pH	pH Units	2.81		3.61	3.64	2.84	3.01	2.88	2.85		7212812
Physical Properties											
Total Suspended Solids	mg/L	48.8	1.0	98.3	103	68.3	46.0	22.3	14.1	1.0	7214106

N/A = Not Applicable
RDL = Reportable Detection Limit
(1) - RDL raised due to sample dilution.
(2) - RDL raised due to sample matrix interference.
(3) - RDL raised due to sample matrix interference. Matrix spike exceeds acceptance limits due to matrix interference. Re-analysis yields similar results.

Maxxam Job #: B391352
Report Date: 2013/10/11

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		HS5622			HS5623			HS5624			HS5625		
Sampling Date		2013/10/03			2013/10/03 16:15			2013/10/03 16:40			2013/10/03 15:40		
	UNITS	**W101**	**RDL**	**QC Batch**	**BH03-05**	**RDL**	**QC Batch**	**BH04-05**	**RDL**	**QC Batch**	**BIN A**	**RDL**	**QC Batch**
Misc. Inorganics													
Acidity (pH 4.5)	mg/L	<0.50	0.50	7212114	310	0.50	7212114	242	0.50	7212114	2210(1)	2.5	7212114
Acidity (pH 8.3)	mg/L	0.75	0.50	7212114	589	0.50	7212114	734	0.50	7212114	3740(1)	2.5	7212114
Calculated Parameters													
Anion Sum	meq/L	0.0000	N/A	7209354	12	N/A	7209354	31	N/A	7209354	60	N/A	7209354
Cation Sum	meq/L	0.027	N/A	7209354	13	N/A	7209354	32	N/A	7209354	52	N/A	7209354
Filter and HNO3 Preservation	N/A	FIELD	N/A	ONSITE	FIELD	N/A	ONSITE	LAB	N/A	7212091	FIELD	N/A	ONSITE
Ion Balance	N/A	NC(2)	0.010	7208235	1.1	0.010	7208235	1.0	0.010	7208235	0.87	0.010	7208235
Nitrate (N)	mg/L	<0.0020	0.0020	7207402	0.233	0.0020	7207402	0.130	0.020	7207402	<0.020	0.020	7207402
Misc. Inorganics													
Alkalinity (Total as CaCO3)	mg/L	<0.50	0.50	7212800	<0.50	0.50	7212800	<0.50	0.50	7212800	<0.50	0.50	7212800
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	7212800	<0.50	0.50	7212800	<0.50	0.50	7212800	<0.50	0.50	7212800
Bicarbonate (HCO3)	mg/L	<0.50	0.50	7212800	<0.50	0.50	7212800	<0.50	0.50	7212800	<0.50	0.50	7212800
Carbonate (CO3)	mg/L	<0.50	0.50	7212800	<0.50	0.50	7212800	<0.50	0.50	7212800	<0.50	0.50	7212800
Hydroxide (OH)	mg/L	<0.50	0.50	7212800	<0.50	0.50	7212800	<0.50	0.50	7212800	<0.50	0.50	7212800
Anions													
Dissolved Sulphate (SO4)	mg/L	<0.50	0.50	7213392	588	5.0	7210096	1470	5.0	7210096	2890	50	7213392
Dissolved Chloride (Cl)	mg/L	<0.50	0.50	7210095	<0.50	0.50	7210095	1.0	0.50	7210095	0.87	0.50	7210095
Nutrients													
Ammonia (N)	mg/L	0.011	0.0050	7213373	1.1	0.0050	7213373	0.45	0.0050	7213373			
Nitrate plus Nitrite (N)	mg/L	<0.0020	0.0020	7210103	0.237	0.0020	7210103	0.151(3)	0.020	7210103	0.277(3)	0.020	7210103
Nitrite (N)	mg/L	<0.0020	0.0020	7210104	0.0041	0.0020	7210104	0.021(3)	0.020	7210104	0.324(3)	0.020	7210104
Physical Properties													
Conductivity	uS/cm	11.6	1.0	7212813	1300	1.0	7212813	2380	1.0	7212813	4200	1.0	7212813
pH	pH Units	4.59		7212812	2.85		7212812	3.11		7212812	2.35		7212812
Physical Properties													
Total Suspended Solids	mg/L	<1.0	1.0	7214106									

N/A = Not Applicable
NC = Non-calculable
RDL = Reportable Detection Limit
(1) - RDL raised due to sample dilution.
(2) - Anion-Cation balance cannot be calculated as the anion sum is less than detection limits necessitating a division by zero
(3) - RDL raised due to sample matrix interference.

Maxxam Job #: B391352
Report Date: 2013/10/11

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		HS5626			HS5627	HS5628			HS5629		
Sampling Date		2013/10/03 15:50			2013/10/03 16:38	2013/10/03 16:46			2013/10/04 13:35		
	UNITS	**BIN B**	**RDL**	**QC Batch**	**BIN E**	**BIN F**	**RDL**	**QC Batch**	**TRIP BLANK**	**RDL**	**QC Batch**
Misc. Inorganics											
Acidity (pH 4.5)	mg/L	3040(1)	5.0	7212114	<0.50	5.80	0.50	7212114	<0.50	0.50	7212114
Acidity (pH 8.3)	mg/L	4720(1)	5.0	7212114	70.3	215	0.50	7212114	<0.50	0.50	7212114
Calculated Parameters											
Anion Sum	meq/L	76	N/A	7209354	31	8.9	N/A	7209354	0.036	N/A	7209354
Cation Sum	meq/L	63	N/A	7209354	31	9.4	N/A	7209354	0.017	N/A	7209354
Filter and HNO3 Preservation	N/A	FIELD	N/A	ONSITE	FIELD	FIELD	N/A	ONSITE	FIELD	N/A	ONSITE
Ion Balance	N/A	0.84	0.010	7208235	0.99	1.1	0.010	7208235	NC(2)	0.010	7208235
Nitrate (N)	mg/L	<0.20	0.20	7207402	<0.0020	0.0032	0.0020	7207402	<0.0020	0.0020	7207402
Misc. Inorganics											
Alkalinity (Total as CaCO3)	mg/L	<0.50	0.50	7212800	<0.50	<0.50	0.50	7212800	<0.50	0.50	7212800
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	7212800	<0.50	<0.50	0.50	7212800	<0.50	0.50	7212800
Bicarbonate (HCO3)	mg/L	<0.50	0.50	7212800	<0.50	<0.50	0.50	7212800	<0.50	0.50	7212800
Carbonate (CO3)	mg/L	<0.50	0.50	7212800	<0.50	<0.50	0.50	7212800	<0.50	0.50	7212800
Hydroxide (OH)	mg/L	<0.50	0.50	7212800	<0.50	<0.50	0.50	7212800	<0.50	0.50	7212800
Anions											
Dissolved Sulphate (SO4)	mg/L	3620	50	7213392	1480	428	5.0	7210096	<0.50	0.50	7215880
Dissolved Chloride (Cl)	mg/L	0.94	0.50	7210095	<0.50	<0.50	0.50	7210095	<0.50	0.50	7210095
Nutrients											
Ammonia (N)	mg/L								<0.0050	0.0050	7213377
Nitrate plus Nitrite (N)	mg/L	0.40(3)	0.20	7215958	<0.0020	0.0032	0.0020	7210103	<0.0020	0.0020	7210103
Nitrite (N)	mg/L	0.21(3)	0.20	7215968	<0.0020	<0.0020	0.0020	7210104	<0.0020	0.0020	7210104
Physical Properties											
Conductivity	uS/cm	4260	1.0	7212813	2220	790	1.0	7212813	1.4	1.0	7216299
pH	pH Units	2.37		7212812	4.83	4.05		7212812	4.76		7212812
Physical Properties											
Total Suspended Solids	mg/L								<1.0	1.0	7214106

N/A = Not Applicable
NC = Non-calculable
RDL = Reportable Detection Limit
(1) - RDL raised due to sample dilution.
(2) - Anion-Cation balance cannot be calculated as the anion sum is less than detection limits necessitating a division by zero
(3) - RDL raised due to sample matrix interference. Sample was originally analysed within hold time. Data quality required investigation. Re-analysis was completed past recommended hold time.

Maxxam Job #: B391352
Report Date: 2013/10/11

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HS5604	HS5605	HS5606	HS5607		HS5608		HS5609		
Sampling Date		2013/10/03 10:05	2013/10/03 11:25	2013/10/03 12:15	2013/10/03 13:00		2013/10/03 13:59		2013/10/03 13:46		
	UNITS	**W13**	**W12**	**W11**	**W8**	**QC Batch**	**W6**	**QC Batch**	**S2**	**RDL**	**QC Batch**
Misc. Inorganics											
Dissolved Hardness (CaCO3)	mg/L	152	181	182	166	7208392	171	7208392	151	0.50	7208392
Elements											
Dissolved Mercury (Hg)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	7216113	<0.000010	7216113	<0.000010	0.000010	7216113

RDL = Reportable Detection Limit

Maxxam Job #: B391352
Report Date: 2013/10/11

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HS5604	HS5605	HS5606	HS5607		HS5608		HS5609		
Sampling Date		2013/10/03 10:05	2013/10/03 11:25	2013/10/03 12:15	2013/10/03 13:00		2013/10/03 13:59		2013/10/03 13:46		
	UNITS	**W13**	**W12**	**W11**	**W8**	**QC Batch**	**W6**	**QC Batch**	**S2**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS											
Dissolved Aluminum (Al)	mg/L	7.59	9.13	1.73	116	7213412	76.2	7213412	95.0	0.0030	7213412
Dissolved Antimony (Sb)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	7213412	<0.00050	7213412	<0.00050	0.00050	7213412
Dissolved Arsenic (As)	mg/L	0.00038	0.00079	0.00024	0.0285	7213412	0.0322	7213412	0.0308	0.00010	7213412
Dissolved Barium (Ba)	mg/L	0.0401	0.0328	0.0363	0.0124	7213412	0.0169	7213412	0.0145	0.0010	7213412
Dissolved Beryllium (Be)	mg/L	0.00044	0.00052	0.00026	0.00368	7213412	0.00339	7213412	0.00342	0.00010	7213412
Dissolved Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	7213412	<0.0010	7213412	<0.0010	0.0010	7213412
Dissolved Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	7213412	<0.050	7213412	<0.050	0.050	7213412
Dissolved Cadmium (Cd)	mg/L	0.0435	0.0671	0.0259	0.772	7213412	0.193	7213412	0.555	0.000010	7213412
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0040	<0.0010	0.127	7213412	0.0818	7213412	0.101	0.0010	7213412
Dissolved Cobalt (Co)	mg/L	0.0303	0.0418	0.0317	0.242	7213412	0.179	7213412	0.198	0.00050	7213412
Dissolved Copper (Cu)	mg/L	0.0562	0.0892	0.0600	0.590	7213412	1.11	7213412	0.683	0.00020	7213412
Dissolved Iron (Fe)	mg/L	4.28	9.86	0.473	208	7213412	145	7213412	161	0.0050	7213412
Dissolved Lead (Pb)	mg/L	0.00023	0.00135	<0.00020	0.0304	7213412	0.0457	7213412	0.0361	0.00020	7213412
Dissolved Lithium (Li)	mg/L	0.0146	0.0190	0.0171	0.0509	7213412	0.0359	7213412	0.0417	0.0050	7213412
Dissolved Manganese (Mn)	mg/L	0.470	0.618	0.560	2.88	7213412	3.91	7213412	2.91	0.0010	7213412
Dissolved Molybdenum (Mo)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	7213412	0.0011	7213412	<0.0010	0.0010	7213412
Dissolved Nickel (Ni)	mg/L	0.268	0.356	0.256	2.06	7213412	1.37	7213412	1.62	0.0010	7213412
Dissolved Phosphorus (P)	mg/L	<0.010	0.010	<0.010	1.56	7213412	1.06	7213412	1.54	0.010	7213412
Dissolved Selenium (Se)	mg/L	0.00187	0.00232	0.00210	0.00775	7213412	0.00412	7213412	0.00432	0.00010	7213412
Dissolved Silicon (Si)	mg/L	4.29	4.34	3.78	10.5	7213412	8.66	7213412	9.34	0.10	7213412
Dissolved Silver (Ag)	mg/L	<0.000020	<0.000020	<0.000020	0.000053	7213412	0.000063	7213412	0.000063	0.000020	7213412
Dissolved Strontium (Sr)	mg/L	0.124	0.141	0.145	0.133	7213412	0.149	7213412	0.119	0.0010	7213412
Dissolved Thallium (Tl)	mg/L	0.000218	0.000355	0.000194	0.00317	7213412	0.00318	7213412	0.00308	0.000050	7213412
Dissolved Tin (Sn)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	7213412	<0.0050	7213412	<0.0050	0.0050	7213412
Dissolved Titanium (Ti)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	7213412	<0.0050	7213412	<0.0050	0.0050	7213412
Dissolved Uranium (U)	mg/L	0.00260	0.00361	0.00186	0.0253	7213412	0.0317	7213412	0.0245	0.00010	7213412
Dissolved Vanadium (V)	mg/L	<0.0050	<0.0050	<0.0050	0.566	7213412	0.304	7213412	0.377	0.0050	7213412
Dissolved Zinc (Zn)	mg/L	1.52	2.06	1.00	17.7	7213412	12.6	7213412	13.4	0.0050	7213412
Dissolved Zirconium (Zr)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	7213412	<0.00050	7213412	<0.00050	0.00050	7213412
Dissolved Calcium (Ca)	mg/L	35.9	41.2	42.5	31.7	7209355	37.1	7219592	29.2	0.050	7209355
Dissolved Magnesium (Mg)	mg/L	15.1	19.0	18.5	21.0	7209355	19.0	7219592	19.1	0.050	7209355
Dissolved Potassium (K)	mg/L	0.872	1.07	0.829	5.34	7209355	5.07	7219592	5.24	0.050	7209355
Dissolved Sodium (Na)	mg/L	0.478	0.319	0.302	0.450	7209355	0.449(1)	7219592	0.381	0.050	7209355
Dissolved Sulphur (S)	mg/L	66.1	82.7	64.7	428	7209355	298	7219592	331	3.0	7209355

RDL = Reportable Detection Limit
(1) - Dissolved greater than total. Reanalysis yields similar results.

Maxxam Job #: B391352
Report Date: 2013/10/11

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HS5610	HS5611	HS5612		HS5613	HS5614	HS5615	HS5621	HS5622		
Sampling Date		2013/10/03 13:39	2013/10/03 15:10	2013/10/03		2013/10/03	2013/10/03 14:16	2013/10/03 14:27	2013/10/03 14:45	2013/10/03		
	UNITS	**T5**	**W5**	**AD**	**RDL**	**W100**	**W2**	**W3**	**W3B**	**W101**	**RDL**	**QC Batch**
Misc. Inorganics												
Dissolved Hardness (CaCO3)	mg/L	179	389	385	0.50	162	97.0	111	155	<0.50	0.50	7208392
Elements												
Dissolved Mercury (Hg)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	7216113

RDL = Reportable Detection Limit

Maxxam Job #: B391352
Report Date: 2013/10/11

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HS5610	HS5611	HS5612		HS5613	HS5614	HS5615	HS5621	HS5622		
Sampling Date		2013/10/03 13:39	2013/10/03 15:10	2013/10/03		2013/10/03	2013/10/03 14:16	2013/10/03 14:27	2013/10/03 14:45	2013/10/03		
	UNITS	**T5**	**W5**	**AD**	**RDL**	**W100**	**W2**	**W3**	**W3B**	**W101**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS												
Dissolved Aluminum (Al)	mg/L	220	54.1	51.8	0.0060	118	76.7	82.5	124	<0.0030	0.0030	7213412
Dissolved Antimony (Sb)	mg/L	<0.0010	<0.0010	<0.0010	0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7213412
Dissolved Arsenic (As)	mg/L	0.0254	0.0989	0.0963	0.00020	0.0294	0.0250	0.00276	0.00304	<0.00010	0.00010	7213412
Dissolved Barium (Ba)	mg/L	0.0044	0.0081	0.0078	0.0020	0.0123	0.0230	0.0200	0.0034	<0.0010	0.0010	7213412
Dissolved Beryllium (Be)	mg/L	0.00692	0.00540	0.00579	0.00020	0.00378	0.00245	0.00313	0.00479	<0.00010	0.00010	7213412
Dissolved Bismuth (Bi)	mg/L	<0.0020	<0.0020	<0.0020	0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7213412
Dissolved Boron (B)	mg/L	<0.10	<0.10	<0.10	0.10	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7213412
Dissolved Cadmium (Cd)	mg/L	2.44	0.0961	0.0967	0.000020	0.747	0.214	0.243	0.372	0.000014	0.000010	7213412
Dissolved Chromium (Cr)	mg/L	0.312	0.0312	0.0304	0.0020	0.121	0.102	0.0780	0.126	<0.0010	0.0010	7213412
Dissolved Cobalt (Co)	mg/L	0.415	0.304	0.295	0.0010	0.253	0.147	0.149	0.224	<0.00050	0.00050	7213412
Dissolved Copper (Cu)	mg/L	0.264	0.253	0.252	0.00040	0.578	1.55	0.813	1.34	0.00022	0.00020	7213412
Dissolved Iron (Fe)	mg/L	349	307	306	0.010	198	116	74.1	108	<0.0050	0.0050	7213412
Dissolved Lead (Pb)	mg/L	<0.00040	0.154	0.153	0.00040	0.0305	<0.00020	0.0399	0.0186	<0.00020	0.00020	7213412
Dissolved Lithium (Li)	mg/L	0.093	0.051	0.051	0.010	0.0492	0.0261	0.0380	0.0595	<0.0050	0.0050	7213412
Dissolved Manganese (Mn)	mg/L	1.84	14.2	13.9	0.0020	2.87	0.809	1.19	1.76	<0.0010	0.0010	7213412
Dissolved Molybdenum (Mo)	mg/L	<0.0020	<0.0020	<0.0020	0.0020	<0.0010	0.0017	<0.0010	<0.0010	<0.0010	0.0010	7213412
Dissolved Nickel (Ni)	mg/L	4.04	1.63	1.58	0.0020	2.11	1.30	1.29	2.01	<0.0010	0.0010	7213412
Dissolved Phosphorus (P)	mg/L	2.16	0.216	0.199	0.020	1.50	1.93	0.177	0.260	<0.010	0.010	7213412
Dissolved Selenium (Se)	mg/L	0.0484	<0.00020	<0.00020	0.00020	0.00700	0.00528	0.00305	0.00377	<0.00010	0.00010	7213412
Dissolved Silicon (Si)	mg/L	15.6	5.67	5.59	0.20	10.5	8.96	8.40	10.8	<0.10	0.10	7213412
Dissolved Silver (Ag)	mg/L	0.000081	<0.000040	<0.000040	0.000040	0.000057	0.000042	0.000088	0.000090	<0.000020	0.000020	7213412
Dissolved Strontium (Sr)	mg/L	0.145	0.333	0.332	0.0020	0.133	0.0934	0.0853	0.0930	<0.0010	0.0010	7213412
Dissolved Thallium (Tl)	mg/L	0.00302	0.00312	0.00312	0.00010	0.00336	0.00339	0.00288	0.00395	<0.000050	0.000050	7213412
Dissolved Tin (Sn)	mg/L	<0.010	<0.010	<0.010	0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7213412
Dissolved Titanium (Ti)	mg/L	<0.010	<0.010	<0.010	0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7213412
Dissolved Uranium (U)	mg/L	0.0344	0.00705	0.00699	0.00020	0.0258	0.0429	0.0214	0.0337	<0.00010	0.00010	7213412
Dissolved Vanadium (V)	mg/L	1.28	0.088	0.092	0.010	0.535	0.485	0.132	0.189	<0.0050	0.0050	7213412
Dissolved Zinc (Zn)	mg/L	42.5	26.1	26.6	0.010	16.9	7.21	8.95	13.4	<0.0050	0.0050	7213412
Dissolved Zirconium (Zr)	mg/L	<0.0010	<0.0010	<0.0010	0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7213412
Dissolved Calcium (Ca)	mg/L	27.4	79.6	77.8	0.10	31.2	22.4	24.8	34.2	<0.050	0.050	7209355
Dissolved Magnesium (Mg)	mg/L	26.8	46.2	46.3	0.10	20.5	9.94	11.8	16.8	<0.050	0.050	7209355
Dissolved Potassium (K)	mg/L	4.88	6.35	6.38	0.10	5.40	5.45	4.80	6.84	<0.050	0.050	7209355
Dissolved Sodium (Na)	mg/L	0.57	0.31	0.31	0.10	0.424	0.276	0.404	0.428	<0.050	0.050	7209355
Dissolved Sulphur (S)	mg/L	760	420	422	6.0	430	265	274	402	<3.0	3.0	7209355

RDL = Reportable Detection Limit

Maxxam Job #: B391352
Report Date: 2013/10/11

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HS5623			HS5624			HS5625	HS5626		
Sampling Date		2013/10/03 16:15			2013/10/03 16:40			2013/10/03 15:40	2013/10/03 15:50		
	UNITS	**BH03-05**	**RDL**	**QC Batch**	**BH04-05**	**RDL**	**QC Batch**	**BIN A**	**BIN B**	**RDL**	**QC Batch**
Misc. Inorganics											
Dissolved Hardness (CaCO3)	mg/L	102	0.50	7208392	1030	0.50	7208392	232	213	0.50	7208392
Elements											
Dissolved Mercury (Hg)	mg/L	<0.000010	0.000010	7216113	<0.000010	0.000010	7216883	<0.000010	<0.000010	0.000010	7216113

RDL = Reportable Detection Limit

Maxxam Job #: B391352
Report Date: 2013/10/11

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HS5623			HS5624			HS5625	HS5626		
Sampling Date		2013/10/03 16:15			2013/10/03 16:40			2013/10/03 15:40	2013/10/03 15:50		
	UNITS	**BH03-05**	**RDL**	**QC Batch**	**BH04-05**	**RDL**	**QC Batch**	**BIN A**	**BIN B**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS											
Dissolved Aluminum (Al)	mg/L	76.8	0.0030	7213412	60.0	0.0060	7213692	35.1	51.8	0.012	7213412
Dissolved Antimony (Sb)	mg/L	<0.00050	0.00050	7213412	<0.0010	0.0010	7213692	0.0190	0.0175	0.0020	7213412
Dissolved Arsenic (As)	mg/L	0.00120	0.00010	7213412	0.00272	0.00020	7213692	1.92	2.71	0.00040	7213412
Dissolved Barium (Ba)	mg/L	0.0067	0.0010	7213412	0.0083	0.0020	7213692	0.0069	0.0079	0.0040	7213412
Dissolved Beryllium (Be)	mg/L	0.00248	0.00010	7213412	0.00179	0.00020	7213692	0.00452	0.00771	0.00040	7213412
Dissolved Bismuth (Bi)	mg/L	<0.0010	0.0010	7213412	<0.0020	0.0020	7213692	<0.0040	<0.0040	0.0040	7213412
Dissolved Boron (B)	mg/L	<0.050	0.050	7213412	<0.10	0.10	7213692	<0.20	<0.20	0.20	7213412
Dissolved Cadmium (Cd)	mg/L	0.164	0.000010	7213412	0.177	0.000020	7213692	0.0349	0.123	0.000040	7213412
Dissolved Chromium (Cr)	mg/L	0.0521	0.0010	7213412	0.0311	0.0020	7213692	0.270	0.408	0.0040	7213412
Dissolved Cobalt (Co)	mg/L	0.120	0.00050	7213412	0.159	0.0010	7213692	0.692	0.810	0.0020	7213412
Dissolved Copper (Cu)	mg/L	0.794	0.00020	7213412	0.320	0.00040	7213692	55.5	51.4	0.00080	7213412
Dissolved Iron (Fe)	mg/L	12.3	0.0050	7213412	32.1	0.010	7213692	1080	1330	0.020	7213412
Dissolved Lead (Pb)	mg/L	0.0371	0.00020	7213412	0.0404	0.00040	7213692	0.0990	0.0598	0.00080	7213412
Dissolved Lithium (Li)	mg/L	0.0316	0.0050	7213412	0.022	0.010	7213692	<0.020	<0.020	0.020	7213412
Dissolved Manganese (Mn)	mg/L	0.957	0.0010	7213412	7.95	0.0020	7213692	10.7	12.1	0.0040	7213412
Dissolved Molybdenum (Mo)	mg/L	<0.0010	0.0010	7213412	<0.0020	0.0020	7213692	0.0951	0.115	0.0040	7213412
Dissolved Nickel (Ni)	mg/L	1.17	0.0010	7213412	1.47	0.0020	7213692	8.99	10.3	0.0040	7213412
Dissolved Phosphorus (P)	mg/L	0.030	0.010	7213412	0.074	0.020	7213692	5.24	9.74	0.040	7213412
Dissolved Selenium (Se)	mg/L	0.00793	0.00010	7213412	0.0286	0.00020	7213692	0.0582	0.0592	0.00040	7213412
Dissolved Silicon (Si)	mg/L	8.31	0.10	7213412	11.5	0.20	7213692	3.31	3.15	0.40	7213412
Dissolved Silver (Ag)	mg/L	0.000122	0.000020	7213412	0.000349	0.000040	7213692	<0.000080	<0.000080	0.000080	7213412
Dissolved Strontium (Sr)	mg/L	0.0799	0.0010	7213412	0.635	0.0020	7213692	0.162	0.182	0.0040	7213412
Dissolved Thallium (Tl)	mg/L	0.00218	0.000050	7213412	0.00129	0.00010	7213692	0.00875	0.00928	0.00020	7213412
Dissolved Tin (Sn)	mg/L	<0.0050	0.0050	7213412	<0.010	0.010	7213692	<0.020	<0.020	0.020	7213412
Dissolved Titanium (Ti)	mg/L	<0.0050	0.0050	7213412	<0.010	0.010	7213692	0.104	0.100	0.020	7213412
Dissolved Uranium (U)	mg/L	0.0201	0.00010	7213412	0.0112	0.00020	7213692	0.173	0.331	0.00040	7213412
Dissolved Vanadium (V)	mg/L	<0.0050	0.0050	7213412	<0.010	0.010	7213692	0.325	0.475	0.020	7213412
Dissolved Zinc (Zn)	mg/L	7.78	0.0050	7213412	72.7	0.010	7213692	9.48	19.6	0.020	7213412
Dissolved Zirconium (Zr)	mg/L	<0.00050	0.00050	7213412	<0.0010	0.0010	7213692	0.0072	0.0161	0.0020	7213412
Dissolved Calcium (Ca)	mg/L	22.9	0.050	7209355	150	0.10	7209355	42.0	33.2	0.20	7209355
Dissolved Magnesium (Mg)	mg/L	11.0	0.050	7209355	159	0.10	7209355	30.8	31.5	0.20	7209355
Dissolved Potassium (K)	mg/L	2.36	0.050	7209355	1.04	0.10	7209355	0.38	0.55	0.20	7209355
Dissolved Sodium (Na)	mg/L	0.779	0.050	7209355	0.60	0.10	7209355	0.58	0.77	0.20	7209355
Dissolved Sulphur (S)	mg/L	234	3.0	7209355	555	6.0	7209355	973	1140	12	7209355

RDL = Reportable Detection Limit

Maxxam Job #: B391352
Report Date: 2013/10/11

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HS5627			HS5628			HS5629		
Sampling Date		2013/10/03 16:38			2013/10/03 16:46			2013/10/04 13:35		
	UNITS	**BIN E**	**RDL**	**QC Batch**	**BIN F**	**RDL**	**QC Batch**	**TRIP BLANK**	**RDL**	**QC Batch**
Misc. Inorganics										
Dissolved Hardness (CaCO3)	mg/L	1480	0.50	7208392	277	0.50	7209352	<0.50	0.50	7209352
Elements										
Dissolved Mercury (Hg)	mg/L	<0.000010	0.000010	7216113	<0.000010	0.000010	7216113	<0.000010	0.000010	7216883

RDL = Reportable Detection Limit

Maxxam Job #: B391352
Report Date: 2013/10/11

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

CCME DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HS5627			HS5628			HS5629		
Sampling Date		2013/10/03 16:38			2013/10/03 16:46			2013/10/04 13:35		
	UNITS	**BIN E**	**RDL**	**QC Batch**	**BIN F**	**RDL**	**QC Batch**	**TRIP BLANK**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS										
Dissolved Aluminum (Al)	mg/L	0.790	0.0030	7213412	14.3	0.0060	7213412	<0.0030	0.0030	7213412
Dissolved Antimony (Sb)	mg/L	<0.00050	0.00050	7213412	<0.0010	0.0010	7213412	<0.00050	0.00050	7213412
Dissolved Arsenic (As)	mg/L	0.00028	0.00010	7213412	0.00026	0.00020	7213412	<0.00010	0.00010	7213412
Dissolved Barium (Ba)	mg/L	0.0112	0.0010	7213412	0.0130	0.0020	7213412	<0.0010	0.0010	7213412
Dissolved Beryllium (Be)	mg/L	<0.00010	0.00010	7213412	0.00059	0.00020	7213412	<0.00010	0.00010	7213412
Dissolved Bismuth (Bi)	mg/L	<0.0010	0.0010	7213412	<0.0020	0.0020	7213412	<0.0010	0.0010	7213412
Dissolved Boron (B)	mg/L	<0.050	0.050	7213412	<0.10	0.10	7213412	<0.050	0.050	7213412
Dissolved Cadmium (Cd)	mg/L	0.186	0.000010	7213412	0.0875	0.000020	7213412	<0.000010	0.000010	7213412
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0010	7213412	<0.0020	0.0020	7213412	<0.0010	0.0010	7213412
Dissolved Cobalt (Co)	mg/L	0.0157	0.00050	7213412	0.0918	0.0010	7213412	<0.00050	0.00050	7213412
Dissolved Copper (Cu)	mg/L	0.0255	0.00020	7213412	0.588	0.00040	7213412	<0.00020	0.00020	7213412
Dissolved Iron (Fe)	mg/L	0.0611	0.0050	7213412	0.424	0.010	7213412	<0.0050	0.0050	7213412
Dissolved Lead (Pb)	mg/L	0.0238	0.00020	7213412	0.195	0.00040	7213412	<0.00020	0.00020	7213412
Dissolved Lithium (Li)	mg/L	<0.0050	0.0050	7213412	<0.010	0.010	7213412	<0.0050	0.0050	7213412
Dissolved Manganese (Mn)	mg/L	0.625	0.0010	7213412	9.52	0.0020	7213412	<0.0010	0.0010	7213412
Dissolved Molybdenum (Mo)	mg/L	<0.0010	0.0010	7213412	<0.0020	0.0020	7213412	<0.0010	0.0010	7213412
Dissolved Nickel (Ni)	mg/L	0.312	0.0010	7213412	0.736	0.0020	7213412	<0.0010	0.0010	7213412
Dissolved Phosphorus (P)	mg/L	<0.010	0.010	7213412	<0.020	0.020	7213412	<0.010	0.010	7213412
Dissolved Selenium (Se)	mg/L	0.0199	0.00010	7213412	0.00715	0.00020	7213412	<0.00010	0.00010	7213412
Dissolved Silicon (Si)	mg/L	4.73	0.10	7213412	29.9	0.20	7213412	<0.10	0.10	7213412
Dissolved Silver (Ag)	mg/L	0.000062	0.000020	7213412	0.000053	0.000040	7213412	<0.000020	0.000020	7213412
Dissolved Strontium (Sr)	mg/L	1.38	0.0010	7213412	0.290	0.0020	7213412	<0.0010	0.0010	7213412
Dissolved Thallium (Tl)	mg/L	0.00177	0.000050	7213412	0.00121	0.00010	7213412	<0.000050	0.000050	7213412
Dissolved Tin (Sn)	mg/L	<0.0050	0.0050	7213412	<0.010	0.010	7213412	<0.0050	0.0050	7213412
Dissolved Titanium (Ti)	mg/L	<0.0050	0.0050	7213412	<0.010	0.010	7213412	<0.0050	0.0050	7213412
Dissolved Uranium (U)	mg/L	0.00037	0.00010	7213412	0.00150	0.00020	7213412	<0.00010	0.00010	7213412
Dissolved Vanadium (V)	mg/L	<0.0050	0.0050	7213412	<0.010	0.010	7213412	<0.0050	0.0050	7213412
Dissolved Zinc (Zn)	mg/L	27.8	0.0050	7213412	59.6	0.010	7213412	<0.0050	0.0050	7213412
Dissolved Zirconium (Zr)	mg/L	<0.00050	0.00050	7213412	<0.0010	0.0010	7213412	<0.00050	0.00050	7213412
Dissolved Calcium (Ca)	mg/L	449	0.050	7209355	66.0	0.10	7209355	<0.050	0.050	7209355
Dissolved Magnesium (Mg)	mg/L	87.5	0.050	7209355	27.2	0.10	7209355	<0.050	0.050	7209355
Dissolved Potassium (K)	mg/L	0.450	0.050	7209355	0.45	0.10	7209355	<0.050	0.050	7209355
Dissolved Sodium (Na)	mg/L	0.195	0.050	7209355	0.15	0.10	7209355	<0.050	0.050	7209355
Dissolved Sulphur (S)	mg/L	517	3.0	7209355	145	6.0	7209355	<3.0	3.0	7209355

RDL = Reportable Detection Limit

Maxxam Job #: B391352
Report Date: 2013/10/11

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		HS5604	HS5605	HS5606		HS5607	HS5608	HS5609		HS5610		
Sampling Date		2013/10/03 10:05	2013/10/03 11:25	2013/10/03 12:15		2013/10/03 13:00	2013/10/03 13:59	2013/10/03 13:46		2013/10/03 13:39		
	UNITS	**W13**	**W12**	**W11**	**RDL**	**W8**	**W6**	**S2**	**RDL**	**T5**	**RDL**	**QC Batch**
Calculated Parameters												
Total Hardness (CaCO3)	mg/L	164	192	186	0.50	170	176	155	0.50	193	0.50	7208974
Elements												
Total Mercury (Hg)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	<0.000010	<0.000010	<0.000010	0.000010	<0.000010	0.000010	7216163

RDL = Reportable Detection Limit

Maxxam Job #: B391352
Report Date: 2013/10/11

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		HS5604	HS5605	HS5606		HS5607	HS5608	HS5609		HS5610		
Sampling Date		2013/10/03 10:05	2013/10/03 11:25	2013/10/03 12:15		2013/10/03 13:00	2013/10/03 13:59	2013/10/03 13:46		2013/10/03 13:39		
	UNITS	**W13**	**W12**	**W11**	**RDL**	**W8**	**W6**	**S2**	**RDL**	**T5**	**RDL**	**QC Batch**
Total Metals by ICPMS												
Total Aluminum (Al)	mg/L	10.5	13.8	7.50	0.0030	118	76.3	93.6	0.0060	230	0.012	7216471
Total Antimony (Sb)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	<0.0010	<0.0010	<0.0010	0.0010	<0.0020	0.0020	7216471
Total Arsenic (As)	mg/L	0.00155	0.00238	0.00084	0.00010	0.0295	0.0338	0.0318	0.00020	0.0264	0.00040	7216471
Total Barium (Ba)	mg/L	0.0424	0.0334	0.0361	0.0010	0.0130	0.0179	0.0151	0.0020	0.0042	0.0040	7216471
Total Beryllium (Be)	mg/L	0.00047	0.00066	0.00042	0.00010	0.00370	0.00333	0.00344	0.00020	0.00673	0.00040	7216471
Total Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	0.0010	<0.0020	<0.0020	<0.0020	0.0020	<0.0040	0.0040	7216471
Total Boron (B)	mg/L	<0.050	<0.050	<0.050	0.050	<0.10	<0.10	<0.10	0.10	<0.20	0.20	7216471
Total Cadmium (Cd)	mg/L	0.0443	0.0652	0.0255	0.000010	0.767	0.194	0.546	0.000020	2.52	0.000040	7216471
Total Chromium (Cr)	mg/L	0.0054	0.0091	0.0023	0.0010	0.122	0.0806	0.100	0.0020	0.320	0.0040	7216471
Total Cobalt (Co)	mg/L	0.0314	0.0439	0.0308	0.00050	0.248	0.179	0.197	0.0010	0.429	0.0020	7216471
Total Copper (Cu)	mg/L	0.0610	0.0944	0.0670	0.00020	0.601	1.07	0.668	0.00040	0.269	0.00080	7216471
Total Iron (Fe)	mg/L	10.3	16.1	3.79	0.0050	200	146	165	0.010	361	0.020	7216471
Total Lead (Pb)	mg/L	0.00108	0.00194	<0.00020	0.00020	0.0332	0.0497	0.0391	0.00040	<0.00080	0.00080	7216471
Total Lithium (Li)	mg/L	0.0142	0.0168	0.0149	0.0050	0.043	0.033	0.037	0.010	0.088	0.020	7216471
Total Manganese (Mn)	mg/L	0.474	0.634	0.520	0.0010	2.76	3.76	2.74	0.0020	1.90	0.0040	7216471
Total Molybdenum (Mo)	mg/L	<0.0010	<0.0010	0.0011	0.0010	<0.0020	<0.0020	<0.0020	0.0020	<0.0040	0.0040	7216471
Total Nickel (Ni)	mg/L	0.284	0.373	0.258	0.0010	2.15	1.40	1.61	0.0020	4.25	0.0040	7216471
Total Phosphorus (P)	mg/L	0.080	0.133	0.038	0.010	1.67	1.09	1.57	0.020	2.42	0.040	7216471
Total Selenium (Se)	mg/L	0.00188	0.00237	0.00188	0.00010	0.00739	0.00393	0.00361	0.00020	0.0512	0.00040	7216471
Total Silicon (Si)	mg/L	5.09	5.02	4.42	0.10	10.8	9.27	10.6	0.20	17.6	0.40	7216471
Total Silver (Ag)	mg/L	<0.000020	<0.000020	<0.000020	0.000020	<0.000040	<0.000040	<0.000040	0.000040	<0.000080	0.000080	7216471
Total Strontium (Sr)	mg/L	0.133	0.145	0.152	0.0010	0.131	0.143	0.119	0.0020	0.149	0.0040	7216471
Total Thallium (Tl)	mg/L	0.000252	0.000354	0.000187	0.000050	0.00315	0.00328	0.00310	0.00010	0.00283	0.00020	7216471
Total Tin (Sn)	mg/L	<0.0050	<0.0050	<0.0050	0.0050	<0.010	<0.010	<0.010	0.010	<0.020	0.020	7216471
Total Titanium (Ti)	mg/L	<0.0050	<0.0050	<0.0050	0.0050	<0.010	<0.010	<0.010	0.010	<0.020	0.020	7216471
Total Uranium (U)	mg/L	0.00305	0.00419	0.00303	0.00010	0.0267	0.0330	0.0260	0.00020	0.0367	0.00040	7216471
Total Vanadium (V)	mg/L	0.0208	0.0357	<0.0050	0.0050	0.570	0.320	0.379	0.010	1.32	0.020	7216471
Total Zinc (Zn)	mg/L	1.42	1.94	0.977	0.0050	17.2	12.0	12.1	0.010	42.0	0.020	7216471
Total Zirconium (Zr)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	<0.0010	<0.0010	<0.0010	0.0010	<0.0020	0.0020	7216471
Total Calcium (Ca)	mg/L	38.7	43.2	42.6	0.050	31.8	38.5	31.5	0.10	29.9	0.20	7207026
Total Magnesium (Mg)	mg/L	16.4	20.5	19.2	0.050	22.0	19.4	18.5	0.10	28.7	0.20	7207026
Total Potassium (K)	mg/L	0.914	1.10	0.849	0.050	5.66	5.29	5.39	0.10	4.99	0.20	7207026
Total Sodium (Na)	mg/L	0.511	0.321	0.364	0.050	0.44	0.31	0.38	0.10	0.60	0.20	7207026
Total Sulphur (S)	mg/L	74.3	85.2	68.2	3.0	451	327	372	6.0	790	12	7207026

RDL = Reportable Detection Limit

Maxxam Job #: B391352
Report Date: 2013/10/11

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		HS5611	HS5612	HS5613		HS5614	HS5615	HS5621	HS5622	HS5629		
Sampling Date		2013/10/03 15:10	2013/10/03	2013/10/03		2013/10/03 14:16	2013/10/03 14:27	2013/10/03 14:45	2013/10/03	2013/10/04 13:35		
	UNITS	**W5**	**AD**	**W100**	**RDL**	**W2**	**W3**	**W3B**	**W101**	**TRIP BLANK**	**RDL**	**QC Batch**
Calculated Parameters												
Total Hardness (CaCO3)	mg/L	417	403	170	0.50	102	115	162	<0.50	<0.50	0.50	7208974
Elements												
Total Mercury (Hg)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	7216163

RDL = Reportable Detection Limit

Maxxam Job #: B391352
Report Date: 2013/10/11

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		HS5611	HS5612	HS5613		HS5614	HS5615	HS5621	HS5622	HS5629		
Sampling Date		2013/10/03 15:10	2013/10/03	2013/10/03		2013/10/03 14:16	2013/10/03 14:27	2013/10/03 14:45	2013/10/03	2013/10/04 13:35		
	UNITS	**W5**	**AD**	**W100**	**RDL**	**W2**	**W3**	**W3B**	**W101**	**TRIP BLANK**	**RDL**	**QC Batch**
Total Metals by ICPMS												
Total Aluminum (Al)	mg/L	56.2	53.9	119	0.0060	76.7	80.3	123	0.0346	<0.0030	0.0030	7216471
Total Antimony (Sb)	mg/L	<0.0010	<0.0010	<0.0010	0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7216471
Total Arsenic (As)	mg/L	0.105	0.101	0.0285	0.00020	0.0248	0.00252	0.00299	<0.00010	<0.00010	0.00010	7216471
Total Barium (Ba)	mg/L	0.0084	0.0088	0.0125	0.0020	0.0240	0.0187	0.0039	<0.0010	<0.0010	0.0010	7216471
Total Beryllium (Be)	mg/L	0.00563	0.00548	0.00394	0.00020	0.00240	0.00313	0.00471	<0.00010	<0.00010	0.00010	7216471
Total Bismuth (Bi)	mg/L	<0.0020	<0.0020	<0.0020	0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7216471
Total Boron (B)	mg/L	<0.10	<0.10	<0.10	0.10	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7216471
Total Cadmium (Cd)	mg/L	0.0979	0.0943	0.747	0.000020	0.211	0.236	0.375	0.000120	<0.000010	0.000010	7216471
Total Chromium (Cr)	mg/L	0.0337	0.0342	0.118	0.0020	0.101	0.0754	0.117	<0.0010	<0.0010	0.0010	7216471
Total Cobalt (Co)	mg/L	0.301	0.295	0.239	0.0010	0.146	0.144	0.222	<0.00050	<0.00050	0.00050	7216471
Total Copper (Cu)	mg/L	0.254	0.248	0.574	0.00040	1.54	0.779	1.33	0.00071	<0.00020	0.00020	7216471
Total Iron (Fe)	mg/L	327	314	208	0.010	124	76.3	110	0.0727	<0.0050(1)	0.0050	7216471
Total Lead (Pb)	mg/L	0.178	0.172	0.0322	0.00040	<0.00020	0.0428	0.0203	<0.00020	<0.00020	0.00020	7216471
Total Lithium (Li)	mg/L	0.046	0.044	0.047	0.010	0.0221	0.0331	0.0518	<0.0050	<0.0050	0.0050	7216471
Total Manganese (Mn)	mg/L	14.0	13.5	2.69	0.0020	0.811	1.18	1.63	0.0013	<0.0010	0.0010	7216471
Total Molybdenum (Mo)	mg/L	<0.0020	<0.0020	<0.0020	0.0020	0.0022	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7216471
Total Nickel (Ni)	mg/L	1.63	1.59	2.07	0.0020	1.32	1.28	1.98	0.0011	<0.0010	0.0010	7216471
Total Phosphorus (P)	mg/L	0.270	0.267	1.58	0.020	1.98	0.179	0.269	<0.010	<0.010	0.010	7216471
Total Selenium (Se)	mg/L	0.00020	<0.00020	0.00697	0.00020	0.00505	0.00309	0.00427	<0.00010	<0.00010	0.00010	7216471
Total Silicon (Si)	mg/L	6.36	6.06	11.3	0.20	10.2	9.46	11.5	<0.10	<0.10	0.10	7216471
Total Silver (Ag)	mg/L	<0.000040	<0.000040	<0.000040	0.000040	<0.000020	0.000046	0.000074	<0.000020	<0.000020	0.000020	7216471
Total Strontium (Sr)	mg/L	0.336	0.338	0.128	0.0020	0.0927	0.0869	0.0969	<0.0010	<0.0010	0.0010	7216471
Total Thallium (Tl)	mg/L	0.00322	0.00299	0.00315	0.00010	0.00352	0.00292	0.00394	<0.000050	<0.000050	0.000050	7216471
Total Tin (Sn)	mg/L	<0.010	<0.010	<0.010	0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7216471
Total Titanium (Ti)	mg/L	<0.010	<0.010	<0.010	0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7216471
Total Uranium (U)	mg/L	0.00776	0.00744	0.0262	0.00020	0.0464	0.0230	0.0366	<0.00010	<0.00010	0.00010	7216471
Total Vanadium (V)	mg/L	0.214	0.211	0.549	0.010	0.478	0.128	0.180	<0.0050	<0.0050	0.0050	7216471
Total Zinc (Zn)	mg/L	25.4	24.4	16.6	0.010	6.55	8.07	12.9	0.0053	<0.0050	0.0050	7216471
Total Zirconium (Zr)	mg/L	<0.0010	<0.0010	<0.0010	0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7216471
Total Calcium (Ca)	mg/L	87.0	82.7	32.6	0.10	24.5	26.5	37.0	0.106	<0.050	0.050	7207026
Total Magnesium (Mg)	mg/L	48.4	47.7	21.5	0.10	10.0	11.7	16.9	<0.050	<0.050	0.050	7207026
Total Potassium (K)	mg/L	6.65	6.46	5.35	0.10	5.74	4.75	7.03	<0.050	<0.050	0.050	7207026
Total Sodium (Na)	mg/L	0.35	0.40	0.47	0.10	0.271	0.388	0.416	<0.050	<0.050	0.050	7207026
Total Sulphur (S)	mg/L	435	444	426	6.0	269	288	416	<3.0	<3.0	3.0	7207026

RDL = Reportable Detection Limit
(1) - Matrix Spike for (Iron) exceeds acceptance criteria. 10% of analytes failure in multi-element scan is allowed.

Package 1	2.7°C
Package 2	2.3°C
Package 3	2.7°C

Each temperature is the average of up to three cooler temperatures taken at receipt

General Comments

Sample HS5604-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HS5605-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HS5606-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

SQC trend rule failure for Alkalinity, Batch [7212800]. EWMA greater than 1.5 SD below the mean

Sample HS5607-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HS5608-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HS5609-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HS5610-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HS5611-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HS5612-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HS5613-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HS5614-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HS5615-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HS5621-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HS5622-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time. Ion Balance: NC = Not Calculable due to low ion sum [< 0.4 meq/L].

Sample HS5623-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HS5624-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HS5625-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HS5626-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HS5627-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HS5628-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HS5629-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time. Ion Balance: NC = Not Calculable due to low ion sum [< 0.4 meq/L].

CCME DISSOLVED METALS IN WATER (WATER) Comments

Sample HS5610-04 Elements by CRC ICPMS (dissolved): Detection limits raised due to matrix interference.

Sample HS5611-04 Elements by CRC ICPMS (dissolved): Detection limits raised due to matrix interference.

Sample HS5612-04 Elements by CRC ICPMS (dissolved): Detection limits raised due to matrix interference.

Sample HS5624-01 Elements by CRC ICPMS (dissolved): RDL raised due to sample matrix interference.

Sample HS5625-02 Elements by CRC ICPMS (dissolved): Detection limits raised due to matrix interference.

Sample HS5626-02 Elements by CRC ICPMS (dissolved): Detection limits raised due to matrix interference.

Sample HS5628-02 Elements by CRC ICPMS (dissolved): Detection limits raised due to matrix interference.

CCME TOTAL METALS IN WATER (WATER) Comments

Sample HS5607-03 Elements by CRC ICPMS (total): RDL raised due to sample matrix interference.

Sample HS5608-03 Elements by CRC ICPMS (total): RDL raised due to sample matrix interference.

Sample HS5609-03 Elements by CRC ICPMS (total): RDL raised due to sample matrix interference.

Sample HS5610-03 Elements by CRC ICPMS (total): RDL raised due to sample matrix interference.

Sample HS5611-03 Elements by CRC ICPMS (total): RDL raised due to sample matrix interference.

Sample HS5612-03 Elements by CRC ICPMS (total): RDL raised due to sample matrix interference.

Sample HS5613-03 Elements by CRC ICPMS (total): RDL raised due to sample matrix interference.

Maxxam Job #: B391352
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ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7210095	Dissolved Chloride (Cl)	2013/10/05	99	80 - 120	102	80 - 120	<0.50	mg/L	NC	20
7210096	Dissolved Sulphate (SO4)	2013/10/05	100	80 - 120	98	80 - 120	<0.50	mg/L	5.4	20
7210103	Nitrate plus Nitrite (N)	2013/10/05	96	80 - 120	105	80 - 120	<0.0020	mg/L	1.4(1)	25
7210104	Nitrite (N)	2013/10/05	NC	80 - 120	103	80 - 120	<0.0020	mg/L	NC	25
7212114	Acidity (pH 8.3)	2013/10/07			105	80 - 120	<0.50	mg/L	2.4	20
7212114	Acidity (pH 4.5)	2013/10/07					<0.50	mg/L	1.7	20
7212800	Alkalinity (Total as CaCO3)	2013/10/08	NC	80 - 120	99	80 - 120	<0.50	mg/L	NC	20
7212800	Alkalinity (PP as CaCO3)	2013/10/08					<0.50	mg/L	NC	20
7212800	Bicarbonate (HCO3)	2013/10/08					<0.50	mg/L	NC	20
7212800	Carbonate (CO3)	2013/10/08					<0.50	mg/L	NC	20
7212800	Hydroxide (OH)	2013/10/08					<0.50	mg/L	NC	20
7212813	Conductivity	2013/10/08			98	80 - 120	1.0, RDL=1.0	uS/cm	0.4	20
7213373	Ammonia (N)	2013/10/07	117	80 - 120	98	80 - 120	<0.0050	mg/L	NC	20
7213377	Ammonia (N)	2013/10/07	109	80 - 120	95	80 - 120	<0.0050	mg/L	NC	20
7213392	Dissolved Sulphate (SO4)	2013/10/07	NC	80 - 120	100	80 - 120	<0.50	mg/L	5.4	20
7213412	Dissolved Aluminum (Al)	2013/10/08	NC	80 - 120	109	80 - 120	<0.0030	mg/L	2.1	20
7213412	Dissolved Antimony (Sb)	2013/10/08	111	80 - 120	108	80 - 120	<0.00050	mg/L	NC	20
7213412	Dissolved Arsenic (As)	2013/10/08	109	80 - 120	104	80 - 120	<0.00010	mg/L	NC	20
7213412	Dissolved Barium (Ba)	2013/10/08	NC	80 - 120	101	80 - 120	<0.0010	mg/L	1.3	20
7213412	Dissolved Beryllium (Be)	2013/10/08	107	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
7213412	Dissolved Bismuth (Bi)	2013/10/08	102	80 - 120	97	80 - 120	<0.0010	mg/L	NC	20
7213412	Dissolved Cadmium (Cd)	2013/10/08	NC	80 - 120	104	80 - 120	<0.000010	mg/L	2.3	20
7213412	Dissolved Chromium (Cr)	2013/10/08	106	80 - 120	103	80 - 120	<0.0010	mg/L	NC	20
7213412	Dissolved Cobalt (Co)	2013/10/08	NC	80 - 120	103	80 - 120	<0.00050	mg/L	3.5	20
7213412	Dissolved Copper (Cu)	2013/10/08	NC	80 - 120	103	80 - 120	<0.00020	mg/L	1.3	20
7213412	Dissolved Iron (Fe)	2013/10/08	NC	80 - 120	111	80 - 120	<0.0050	mg/L	1.6	20
7213412	Dissolved Lead (Pb)	2013/10/08	98	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
7213412	Dissolved Lithium (Li)	2013/10/08	NC	80 - 120	103	80 - 120	<0.0050	mg/L	NC	20
7213412	Dissolved Manganese (Mn)	2013/10/08	NC	80 - 120	105	80 - 120	<0.0010	mg/L	5.3	20
7213412	Dissolved Molybdenum (Mo)	2013/10/08	104	80 - 120	114	80 - 120	<0.0010	mg/L	NC	20
7213412	Dissolved Nickel (Ni)	2013/10/08	NC	80 - 120	106	80 - 120	<0.0010	mg/L	2.4	20
7213412	Dissolved Selenium (Se)	2013/10/08	107	80 - 120	106	80 - 120	<0.00010	mg/L	8.2	20
7213412	Dissolved Silver (Ag)	2013/10/08	108	80 - 120	93	80 - 120	<0.000020	mg/L	NC	20
7213412	Dissolved Strontium (Sr)	2013/10/08	NC	80 - 120	103	80 - 120	<0.0010	mg/L	3.1	20
7213412	Dissolved Thallium (Tl)	2013/10/08	105	80 - 120	109	80 - 120	<0.000050	mg/L	NC	20
7213412	Dissolved Tin (Sn)	2013/10/08	111	80 - 120	102	80 - 120	<0.0050	mg/L	NC	20
7213412	Dissolved Titanium (Ti)	2013/10/08	110	80 - 120	104	80 - 120	<0.0050	mg/L	NC	20
7213412	Dissolved Uranium (U)	2013/10/08	102	80 - 120	100	80 - 120	<0.00010	mg/L	6.1	20
7213412	Dissolved Vanadium (V)	2013/10/08	106	80 - 120	104	80 - 120	<0.0050	mg/L	NC	20
7213412	Dissolved Zinc (Zn)	2013/10/08	NC	80 - 120	108	80 - 120	<0.0050	mg/L	2.6	20

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ACCESS CONSULTING GROUP
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QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7213412	Dissolved Boron (B)	2013/10/08					<0.050	mg/L	NC	20
7213412	Dissolved Phosphorus (P)	2013/10/08					<0.010	mg/L	NC	20
7213412	Dissolved Silicon (Si)	2013/10/08					<0.10	mg/L	0.2	20
7213412	Dissolved Zirconium (Zr)	2013/10/08					<0.00050	mg/L	NC	20
7213692	Dissolved Aluminum (Al)	2013/10/08	NC	80 - 120	103	80 - 120	<0.0030	mg/L	0.2	20
7213692	Dissolved Antimony (Sb)	2013/10/08	105	80 - 120	97	80 - 120	<0.00050	mg/L	NC	20
7213692	Dissolved Arsenic (As)	2013/10/08	105	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
7213692	Dissolved Barium (Ba)	2013/10/08	NC	80 - 120	99	80 - 120	<0.0010	mg/L	2.1	20
7213692	Dissolved Beryllium (Be)	2013/10/08	103	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
7213692	Dissolved Bismuth (Bi)	2013/10/08	98	80 - 120	96	80 - 120	<0.0010	mg/L	NC	20
7213692	Dissolved Cadmium (Cd)	2013/10/08	102	80 - 120	99	80 - 120	<0.000010	mg/L	4.1	20
7213692	Dissolved Chromium (Cr)	2013/10/08	105	80 - 120	108	80 - 120	<0.0010	mg/L	NC	20
7213692	Dissolved Cobalt (Co)	2013/10/08	103	80 - 120	108	80 - 120	<0.00050	mg/L	NC	20
7213692	Dissolved Copper (Cu)	2013/10/08	NC	80 - 120	107	80 - 120	<0.00020	mg/L	0.4	20
7213692	Dissolved Iron (Fe)	2013/10/08	NC	80 - 120	104	80 - 120	<0.0050	mg/L	6.1	20
7213692	Dissolved Lead (Pb)	2013/10/08	98	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
7213692	Dissolved Lithium (Li)	2013/10/08	94	80 - 120	96	80 - 120	<0.0050	mg/L	NC	20
7213692	Dissolved Manganese (Mn)	2013/10/08	NC	80 - 120	109	80 - 120	<0.0010	mg/L	2.5	20
7213692	Dissolved Molybdenum (Mo)	2013/10/08	98	80 - 120	98	80 - 120	<0.0010	mg/L	NC	20
7213692	Dissolved Nickel (Ni)	2013/10/08	102	80 - 120	109	80 - 120	<0.0010	mg/L	NC	20
7213692	Dissolved Selenium (Se)	2013/10/08	107	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
7213692	Dissolved Silver (Ag)	2013/10/08	101	80 - 120	99	80 - 120	<0.000020	mg/L	NC	20
7213692	Dissolved Strontium (Sr)	2013/10/08	NC	80 - 120	97	80 - 120	<0.0010	mg/L	1.2	20
7213692	Dissolved Thallium (Tl)	2013/10/08	98	80 - 120	99	80 - 120	<0.000050	mg/L	NC	20
7213692	Dissolved Tin (Sn)	2013/10/08	99	80 - 120	98	80 - 120	<0.0050	mg/L	NC	20
7213692	Dissolved Titanium (Ti)	2013/10/08	110	80 - 120	100	80 - 120	<0.0050	mg/L	NC	20
7213692	Dissolved Uranium (U)	2013/10/08	99	80 - 120	95	80 - 120	<0.00010	mg/L	NC	20
7213692	Dissolved Vanadium (V)	2013/10/08	106	80 - 120	106	80 - 120	<0.0050	mg/L	NC	20
7213692	Dissolved Zinc (Zn)	2013/10/08	NC	80 - 120	107	80 - 120	<0.0050	mg/L	2.1	20
7213692	Dissolved Boron (B)	2013/10/08					<0.050	mg/L	NC	20
7213692	Dissolved Phosphorus (P)	2013/10/08					<0.010	mg/L		
7213692	Dissolved Silicon (Si)	2013/10/08					<0.10	mg/L	1.9	20
7213692	Dissolved Zirconium (Zr)	2013/10/08					<0.00050	mg/L	NC	20
7214106	Total Suspended Solids	2013/10/09			106	80 - 120	<1.0	mg/L		
7215880	Dissolved Sulphate (SO4)	2013/10/08	NC	80 - 120	101	80 - 120	<0.50	mg/L	1.1	20
7215958	Nitrate plus Nitrite (N)	2013/10/08	106	80 - 120	108	80 - 120	<0.0020	mg/L	NC	25
7215968	Nitrite (N)	2013/10/08	108	80 - 120	109	80 - 120	<0.0020	mg/L	NC	25
7216113	Dissolved Mercury (Hg)	2013/10/09	95	80 - 120	98	80 - 120	<0.000010	mg/L	NC	20
7216163	Total Mercury (Hg)	2013/10/09	94	80 - 120	97	80 - 120	<0.000010	mg/L	NC	20
7216299	Conductivity	2013/10/09			97	80 - 120	1.0, RDL=1.0	uS/cm	0.7	20

Maxxam Job #: B391352
Report Date: 2013/10/11

ACCESS CONSULTING GROUP
Client Project #: HBM-13-01

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7216471	Total Aluminum (Al)	2013/10/09	104	80 - 120	105	80 - 120	<0.0030	mg/L	NC	20
7216471	Total Antimony (Sb)	2013/10/09	109	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
7216471	Total Arsenic (As)	2013/10/09	109	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
7216471	Total Barium (Ba)	2013/10/09	103	80 - 120	100	80 - 120	<0.0010	mg/L	NC	20
7216471	Total Beryllium (Be)	2013/10/09	107	80 - 120	96	80 - 120	<0.00010	mg/L	NC	20
7216471	Total Bismuth (Bi)	2013/10/09	98	80 - 120	103	80 - 120	<0.0010	mg/L	NC	20
7216471	Total Cadmium (Cd)	2013/10/09	101	80 - 120	97	80 - 120	<0.000010	mg/L	NC	20
7216471	Total Chromium (Cr)	2013/10/09	103	80 - 120	104	80 - 120	<0.0010	mg/L	NC	20
7216471	Total Cobalt (Co)	2013/10/09	102	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
7216471	Total Copper (Cu)	2013/10/09	99	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
7216471	Total Iron (Fe)	2013/10/09	132(2)	80 - 120	108	80 - 120	<0.0050	mg/L	NC	20
7216471	Total Lead (Pb)	2013/10/09	101	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20
7216471	Total Lithium (Li)	2013/10/09	100	80 - 120	92	80 - 120	<0.0050	mg/L	NC	20
7216471	Total Manganese (Mn)	2013/10/09	107	80 - 120	105	80 - 120	<0.0010	mg/L	NC	20
7216471	Total Molybdenum (Mo)	2013/10/09	106	80 - 120	102	80 - 120	<0.0010	mg/L	NC	20
7216471	Total Nickel (Ni)	2013/10/09	102	80 - 120	101	80 - 120	<0.0010	mg/L	NC	20
7216471	Total Selenium (Se)	2013/10/09	109	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
7216471	Total Silver (Ag)	2013/10/09	93	80 - 120	106	80 - 120	<0.000020	mg/L	NC	20
7216471	Total Strontium (Sr)	2013/10/09	98	80 - 120	105	80 - 120	<0.0010	mg/L	NC	20
7216471	Total Thallium (Tl)	2013/10/09	102	80 - 120	103	80 - 120	<0.000050	mg/L	NC	20
7216471	Total Tin (Sn)	2013/10/09	98	80 - 120	102	80 - 120	<0.0050	mg/L	NC	20
7216471	Total Titanium (Ti)	2013/10/09	117	80 - 120	101	80 - 120	<0.0050	mg/L	NC	20
7216471	Total Uranium (U)	2013/10/09	99	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
7216471	Total Vanadium (V)	2013/10/09	106	80 - 120	103	80 - 120	<0.0050	mg/L	NC	20
7216471	Total Zinc (Zn)	2013/10/09	96	80 - 120	92	80 - 120	<0.0050	mg/L	NC	20
7216471	Total Boron (B)	2013/10/09					<0.050	mg/L	NC	20
7216471	Total Phosphorus (P)	2013/10/09					<0.010	mg/L	NC	20
7216471	Total Silicon (Si)	2013/10/09					<0.10	mg/L	NC	20

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QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7216471	Total Zirconium (Zr)	2013/10/09					<0.00050	mg/L	NC	20
7216883	Dissolved Mercury (Hg)	2013/10/09	90	80 - 120	93	80 - 120	<0.000010	mg/L	NC	20

N/A = Not Applicable
RDL = Reportable Detection Limit
RPD = Relative Percent Difference
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) - RDL raised due to sample matrix interference.
(2) - Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Validation Signature Page

Maxxam Job #: B391352

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Rob Reinert, Data Validation Coordinator

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics Inc
8577 Commerce Court
Burnaby, BC V5A 4N5
www.maxxamanalytics.com
Phone: (604) 444-4808
Fax.: (604) 444-4511
Toll-Free: 1-800-440-4808

CHAIN-OF CUSTODY RECORD AND ANALYSIS REQUEST

08379884

LAB USE ONLY
MAXXAM JOB #: B391352.

ANALYSIS REQUEST

LAB USE ONLY
COC #:

COMPANY NAME:	Access Consulting Group
CLIENT PROJECT NO.:	HBM-13-01
COMPANY ADDRESS:	#3 Calcite Business Center 151 Industrial Rd. Whitehorse, YT Y1A 2V3
TEL:	867-668-6463
E-MAIL:	kwoloshyn@accessconsulting.ca, tfougere@accessconsulting.ca, hgoulding@accessconsulting.ca,nichole@accessc
FAX:	867-667-6680
SAMPLER NAME (PRINT):	Holly Goulding
PROJECT MANAGER:	Kai Woloshyn
LABORATORY CONTACT:	~~Graham Rudkin~~ Ken Pomeroy

LAB USE ONLY

B391352

	FIELD SAMPLE ID	MAXXAM LAB # (LAB USE ONLY)	MATRIX: GROUNDWATER	SURFACE WATER	DRINKING WATER	SOIL	OTHER	SAMPLING: DATE (DD/MM/YY)	TIME	# CONTAINERS	General Chemistry (pH, Conductivity, alkalanity	acidity, sulfate, nitrate, nitrite, chloride)	Dissolved metals -CCME	Total metals -CCME	Total Nutrients - ammonia	TSS
1	W13	HS5604		X				03-10-2013	10:05	5	X	X	X	X	X	X
2	W12	HS5605		X				03-10-2013	11:25	5	X	X	X	X	X	X
3	W11	HS5606		X				03-10-2013	12:15	5	X	X	X	X	X	X
4	W8	HS5607		X				03-10-2013	13:00	5	X	X	X	X	X	X
5	W6	HS5608		X				03-10-2013	13:59	5	X	X	X	X	X	X
6	S2	HS5609		X				03-10-2013	13:46	5	X	X	X	X	X	X
7	T5	HS5610		X				03-10-2013	13:39	5	X	X	X	X	X	X
8	W5	HS5611		X				03-10-2013	15:10	5	X	X	X	X	X	X
9	AD	HS5612		X				03-10-2013		5	X	X	X	X	X	X
10	W100	HS5613		X				03-10-2013		5	X	X	X	X	X	X
11	W2	HS5614		X				03-10-2013	14:16	5	X	X	X	X	X	X
12	W3	HS5615		X				03-10-2013	14:27	5	X	X	X	X	X	X

TAT (Turnaround Time)
LESS THAN 5 DAY TAT MUST HAVE PRIOR APPROVAL
* Some exceptions apply - please contact laboratory

STANDARD	5 BUSINESS DAYS	X
RUSH	3 BUSINESS DAYS	
RUSH	2 BUSINESS DAYS	
URGENT	1 BUSINESS DAY	

OTHER BUSINESS DAYS

PO NUMBER OR QUOTE NUMBER: 14711

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE:

ACCOUNTING CONTACT:

SPECIAL REPORTING OR BILLING INSTRUCTIONS: B11-096-DL

X	CCME
	CSR
	AB TIER 1
	OTHER

JARS USED:

LAB USE ONLY
ARRIVAL TEMPERATURE °C: 3,3,2/3,3,1 2,3,3
DUE DATE:
LOG IN CHECK:

RELINQUISHED BY SAMPLER:	Holly Goulding	DATE: DD/MM/YY 04-10-2013	TIME: 6:00
RECEIVED BY:	Air North Cargo		
RELINQUISHED BY:		DATE: DD/MM/YY	TIME:
RECEIVED BY:			
RELINQUISHED BY:		DATE: DD/MM/YY	TIME:
RECEIVED BY LABORATORY:	Laurel Berthier 2013/10/04 13:35		

CUSTODY RECORD

Maxxam Analytics Inc

8577 Commerce Court
Burnaby, BC V5A 4N5
www.maxxamanalytics.com

Phone: (604) 444-4808
Fax.: (604) 444-4511
Toll-Free: 1-800-440-4808

CHAIN-OF CUSTODY RECORD AND ANALYSIS REQUEST

08379885

LAB USE ONLY
MAXXAM JOB #: B391352

ANALYSIS REQUEST

LAB USE ONLY
COC #:

LAB USE ONLY

COMPANY NAME:	Access Consulting Group
CLIENT PROJECT NO.:	HBM-13-01
COMPANY ADDRESS:	#3 Calcite Business Center 151 Industrial Rd. Whitehorse, YT Y1A 2V3
TEL.:	867-668-6463
E-MAIL:	kwoloshyn@accessconsulting.ca, tfougere@accessconsulting.ca hgoulding@accessconsulting.ca,nichole@accessc
FAX:	867-667-6680
SAMPLER NAME (PRINT):	Holly Goulding
PROJECT MANAGER:	Kai Woloshyn
LABORATORY CONTACT:	~~Graham Rudkin~~ Ken Pomeroy

B391352

	FIELD SAMPLE ID	MAXXAM LAB # (LAB USE ONLY)	MATRIX: GROUNDWATER	SURFACE WATER	DRINKING WATER	SOIL	OTHER	SAMPLING: DATE DD/MM/YY	TIME	# CONTAINERS	General Chemistry (pH, conductivity, alkalinity,	acidity, sulphate, nitrate, nitrite, chloride)	Dissolved metals -CCME	Total metals -ccme	Total nutrients - Ammonia	TSS
1	W3B	HS5621		x				03-10-2013	14:45	5	x	x	x	x	x	X
2	W101	HS5622		x				03-10-2013		5	x	x	x	x	x	X
3	BH03-05	HS5623	x					03-10-2013	16:15	3	x	x	x		x	
4	BH04-05	HS5624	x					03-10-2013	16:40	3	x	x	x		x	
5	Bin A	HS5625		x				03-10-2013	15:40	2	x	x	x			
6	Bin B	HS5626		x				03-10-2013	15:50	2	x	x	x			
7	Bin E	HS5627		x				03-10-2013	16:38	2	x	x	x			
8	Bin F	HS5628		x				03-10-2013	16:46	2	x	x	x			
9	Trip Blank	HS5629		x						5	x	x	x	x	x	x
10																
11																
12																

TAT (Turnaround Time)
LESS THAN 5 DAY TAT MUST HAVE PRIOR APPROVAL
* Some exceptions apply - please contact laboratory

STANDARD	5 BUSINESS DAYS	X
RUSH	3 BUSINESS DAYS	
RUSH	2 BUSINESS DAYS	
URGENT	1 BUSINESS DAY	

OTHER BUSINESS DAYS

PO NUMBER OR QUOTE NUMBER: 14711

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE:

X CCME
CSR
AB TIER 1
OTHER

LAB USE ONLY
ARRIVAL TEMPERATURE °C: 3,3,2/3,3,1 2,3,3
DUE DATE:
LOG IN CHECK:

ACCOUNTING CONTACT:

SPECIAL REPORTING OR BILLING INSTRUCTIONS: B11-096-DL

JARS USED:

RELINQUINSHED BY SAMPLER: Holly Goulding	DATE: DD/MM/YY 04-10-2013	TIME: 6:00	RECEIVED BY:
RELINQUINSHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY:
RELINQUINSHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY LABORATORY: Laurel Berthier 2013/10/04 13:35

CUSTODY RECORD

APPENDIX D

INSPECTION REPORT

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

HUDSON BAY MINING AND SMELTING CO., LIMITED

TOM MINE, MACMILLAN PASS, YUKON

AUGUST 13, 2013 SITE VISIT AND INSPECTION

FINAL

PROJECT NO:	0077-010-04	DISTRIBUTION:	
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LIMITATIONS

BGC Engineering Inc. (BGC) prepared this document for the account of Hudson Bay Mining and Smelting Co., Limited. The material in it reflects the judgment of BGC staff in light of the information available to BGC at the time of document preparation. Any use which a third party makes of this document or any reliance on decisions to be based on it is the responsibility of such third parties. BGC accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this document.

As a mutual protection to our client, the public, and ourselves, all documents and drawings are submitted for the confidential information of our client for a specific project. Authorization for any use and/or publication of this document or any data, statements, conclusions or abstracts from or regarding our documents and drawings, through any form of print or electronic media, including without limitation, posting or reproduction of same on any website, is reserved pending BGC's written approval. If this document is issued in an electronic format, an original paper copy is on file at BGC and that copy is the primary reference with precedence over any electronic copy of the document, or any extracts from our documents published by others.

1.0 INTRODUCTION

The Tom Mine property, owned by Hudson Bay Mining and Smelting Co., Limited (HBMS) is located in the Macmillan Pass area of Yukon, centered on approximately Longitude 130°9' West and Latitude 63°10' North, approximately 400 km northeast of Whitehorse.

In 2009 and 2010, HBMS carried out surface and underground reclamation work to reduce acid rock drainage (ARD) and metal leaching (ML) associated with development activities from previous advanced exploration work. This work was carried out by Ampex Mining Limited of Whitehorse, the prime contractor, under the supervision of Mr. Jan (Swede) Martensson. The major components of reclamation work completed by HBMS included the following:

- Surface Reclamation:
    - Construction of a High Density Polyethylene (HDPE) lined containment pond within the waste rock dump next to the adit to hold the iron hydroxide sludge removed from the adit to gain access.
    - Excavation, regrading, and subgrade compaction/preparation of the surface of the waste rock dump prior to installation of the liner.
    - Installation of a 60 mil HDPE liner and protective riprap cover composed of locally borrowed colluvial material over the top of waste rock dump to prevent direct infiltration of precipitation, meltwater and runoff from the adjacent slopes into the waste rock.
    - Construction of a lined discharge channel and spillway from the adit.
    - Removal of the ore stockpile and encapsulating it in the sludge pond beneath the HDPE lined cover.
    - Grouting of two old exploration boreholes that were discharging artesian groundwater to the surface.
- Underground Reclamation:
    - Rehabilitation of adit portal and re-installation of a security grill to prevent access.
    - Removal of old wire and piping. The wire was recycled offsite. The piping was stored underground in the adit downstream of the plug.
    - Removal of accumulated iron hydroxide sludge from the floor of the adit from a point just upstream of the plug location to the portal.
    - Construction of a small sludge retention cofferdam upstream of the plug.
    - Excavation of the 2 m by 2 m bypass raises around the plug to a height of 20 m above the top of the plug.
    - Construction of a 9 m long by 4.5 m wide and 4.5 m high concrete gravity plug, including erecting formwork in the adit and pouring the plug in one continuous mass concrete pour.

- Grouting of the concrete-rock interface and the bedrock surrounding the plug.
- Commissioning of the concrete adit plug by sealing the bypass pipe through the plug with an inflatable packer and backfilling the pipe entirely with grout. The water behind the plug began to flood the underground workings on August 28, 2010. Flow over the bypass raise started on September 13, 2010 and discharge resumed from the adit.

This report summarizes observations made during the August 13, 2013 site visit and inspection of the Tom property. Authorization for this work was provided by Mr. Stephen West, P. Eng., Superintendent Environmental Control of HBMS under Service Requisition (SR) #35205, based on a proposal prepared by BGC Engineering Inc. (BGC) on August 9, 2013.

Appendix A contains selected site photographs from the inspection that are referred to in the report. Appendix B contains a series of photos of the plug taken since commissioning in August 2010 to compare conditions.

2.0 TERMS OF REFERENCE

This inspection was carried out to satisfy the requirements of Water Licence QZ12-042 and the commitments made to Yukon Environmental and Socio-Economic Assessment Board (YESAB) and the Yukon Water Board (YWB). The inspection and monitoring requirements were provided by HBMS in the Tom Valley Final Adaptive Management Plan (AMP), prepared by AECOM Canada Ltd. (AECOM) for HBMS (AECOM, 2010).

In 2013, additional work was required to mitigate damage that occurred to the spillway liner over the winter of 2012-13. The report includes preliminary recommendations for both short-term repair of the liner and for a long-term solution.

3.0 SCOPE OF WORK

The purpose of the site visit was to conduct a general inspection of the Tom property and to assess the condition of the water retention plug in the Tom adit. As part of this, BGC conducted a visual geotechnical inspection of the waste rock dump covers, the slopes adjacent to the adit portal checking for signs of instability and seepage and assessed the performance and integrity of the plug in accordance with the protocols provided in the AMP.

During the winter of 2012-13, a portion of the 60 mil HDPE liner along the spillway was torn away. The damage was discovered by Access on June 24, 2013 during the June monitoring trip. A temporary repair was subsequently made by Ampex Mining on August 20, 2013 to stitch the torn section of HDPE liner. Prior to the August 13, 2013 site inspection visit by BGC, some preliminary inquiries were made by BGC and Ampex with a supplier of lining products to assess options for a more robust design. During the site inspection, the condition of the spillway channel was further reviewed and preliminary design concepts are presented in this report. Detailed design and mitigation work on the spillway is expected to be carried out in 2014, as subsequent phases of work.

4.0 SCHEDULE AND ITINERARY

General logistical arrangements for the inspection trip were made by Mr. Kai Woloshyn, Environmental Manager with Access Consulting Group (Access) of Whitehorse, Yukon. Timing of the trip was based on the availability of the participants, which included the following individuals:

- Mr. Stephen West, P. Eng., Superintendent, Environmental Control, HBMS.
- Mr. Jay Cooper, Assistant Superintendent, Environmental Control, HBMS.
- Mr. Kai Woloshyn, Environmental Manager, Access.
- Mr. Jan (Swede) Martensson, Ampex Mining Limited.
- Mr. Sevn Bohnet, Senior Natural Resources Officer, Mining, Yukon Energy Mines and Resources.
- Mr. Holger Hartmaier, P. Eng. Senior Geotechnical Engineer BGC.

The site inspection was carried out on August 13, 2013. Stephen West did not participate in the site visit. The following is a summary of the general itinerary of the inspection trip:

- Tuesday, August 13, 8:45 AM, participants meet at Alkan Air hangar in Whitehorse.
- Approximately 9:00-10:30 AM, charter flight with Alkan Air from Whitehorse to Macmillan Pass airstrip.
- Alkan held at the airstrip while the site inspection took place. Ground transportation from the airstrip to the Tom Mine site was provided by Access staff.
- The site inspection took place between 10:30 AM and 1:30 PM.
- Approximately 1:30- 3:00 PM, return flight back to Whitehorse.

5.0 SITE INSPECTION OBSERVATIONS

5.1. General

The site inspection included the main areas where remediation and reclamation work was carried out in 2009 and 2010, which included the underground and surface components of the project.

The underground component of the inspection provided an assessment of:

- The condition and stability of the portal and adit downstream of the plug.
- The integrity of the HDPE liner in the adit.
- The downstream face of the plug for seepage and cracking or deterioration of the concrete.
- The location of any seepage points in the rock mass downstream of the plug.
- The condition of the by-pass raise was visually inspected from the main drift only. It was not planned to enter the bypass raise during this inspection.
- The berm retaining the ponded water downstream of the concrete plug.

During the underground inspection, a hand held multi-gas air quality monitor was used to continuously check air quality.

The surface component of the inspection consisted of a reconnaissance visual inspection of the following areas outside the adit:

- The natural slopes in the vicinity of the adit above the waste rock dump were checked for signs of seepage or springs that may have developed since the plug was commissioned.
- The old exploratory drill hole adjacent to and slightly above the adit that was sealed by grouting was checked to see that the grout seal was still intact.
- New exploration drill holes completed by HBMS in 2012 along the valley of Sekie Creek #2 were checked.
- The damage to the HDPE liner in the adit discharge spillway was observed and assessed.
- The waste rock cover and slopes were checked for seepage and stability.
- Water level data from the piezometers and flow data from the adit was collected by Access.

Weather at the Tom Mine site during the inspection was clear and dry with a steady temperature of about 28^{o}C. The mountain slopes within the Tom valley were free of snow cover. The following sections provide details of the observations noted in each area.

5.2. Inspection of Underground Components

5.2.1. Direction Convention

For the underground components the terms “left” and “right” are based on the observer inside the tunnel facing downstream (i.e. towards the portal, in the direction of drainage flow from the adit).

5.2.2. Adit Portal Area

Small sloughs of overburden material continue to periodically ravel from the unsupported overburden slope above the portal canopy. However, nothing of significance was noted. The wooden timbers which were installed by Ampex during the tunnel reclamation work are in excellent condition. However, further inside the portal area, the original steel sets are in a deteriorated condition, as noted in previous inspections. The I-beam flanges supporting the horizontal wooden timbers in the roof of the portal canopy structure are deeply corroded, resulting in loss of thickness as well as width. The 2012 inspection report recommended remediation of the portal area. It is understood that HBMS has authorized Ampex to carry out this work, which will be completed in 2013.

5.2.3. HDPE Adit Liner

The HDPE liner in the immediate portal area, upstream of the grillage, was covered by 10 to 15 cm of accumulated iron hydroxide sludge. The sludge is precipitated from the acidic water draining from the adit. At the time of the inspection, the liner was in contact with the base of the floor of the adit, indicating that any water seeping under the liner is being fully drained away. In 2012, water was trapped below the liner at the portal by a small slide at the portal that blocked drainage. Removal of the slide material allowed the accumulated water trapped under the HDPE liner to drain away. The small amount of water seeping under the HDPE liner ultimately drains into the waste rock pile in front of adit. The adit liner is connected to the HDPE liner capping the waste rock dump, thus conveying the adit drainage over top of the waste rock.

The thickness of iron hydroxide sludge coating the wetted perimeter of the HDPE liner has increased in the floor of the adit between the portal and the bypass raise compared to previous observations. The rusty-coloured sludge forms a stable crust up to 10 cm in thickness under normal tunnel water flow, but becomes easily dislodged when disturbed by walking on the liner. Small quantities of water were observed dripping from the crown of the adit and were noted to be similar to conditions experienced prior to plug commissioning.

Qualitatively, overall seepage into the adit appears reduced compared to previous inspections, in terms of drips from the crown and wall. Seepage points are associated with reddish oxide coatings on the black argillite bedrock exposed in the tunnel. These areas are typically moist, but show no visible flowing water. It is speculated that the iron hydroxide coating building up along the points of seepage may be helping to impede or mask the flow.

Minor rockfall was noted along the adit floor between the portal and the bypass raise. The closely jointed rockmass in the crown of the tunnel continues to ravel due to minor seepage and seasonal freeze-thaw effects. Loose rock was scaled during the plug construction period, however since then, no ongoing scaling and stabilization work has been carried out.

5.2.4. Concrete Plug and Adjacent Adit Area

The concrete in the plug face was in good condition and there was no sign of any leakage from the grout holes. As part of the annual inspection procedure, photos of the plug are taken to compare with photos from previous inspections to check for any noticeable changes in seepage patterns and staining. Based on comparisons between photos taken in previous years, and those taken during the current inspection, there has been no significant change to the extent of superficial iron staining associated with seepage waters flowing over the downstream concrete face of the plug noted in previous inspections (See Appendix B). Some of the rusty staining present on the plug face originally occurred during the grouting of the holes and is not necessarily indicative of post-commissioning leakage through the grout holes. The presence of white precipitate on the plug face appears to be caused by the low pH groundwater seepage flowing down the plug face reacting with the relict grout that spilled from the grout holes during grouting. It does not appear that leaching of the grout is taking place, however this should continue to be monitored by checking for seepage coming from the grout holes. At the present time, there is no concern with respect to the integrity of the grouted holes in the face of the plug.

The face of the concrete is stained with iron oxide due to minor seepage from the rock mass around the periphery of the plug concrete-rock interface. It is important to note that seepage from the rock mass in the crown area of the plug periphery developed soon after the plug was constructed, but before the underground workings upstream of the plug were flooded. This indicates that, at least the initial component of the seepage seen downstream of the plug was groundwater draining towards the adit that was unrelated to the flooding of the underground workings.

Since commissioning of the plug 3-years ago, a steady-state seepage condition has likely now become established through the rock mass surrounding the plug. The traces of fractures where seepage enters the tunnel are now highlighted by rusty staining. Seepage quantity is in the form of occasional drips.

Evidence of seepage around the plug that was directly relatable to the initial flooding of the underground workings was noted in the adit sidewalls downstream of the plug face on both sides of the adit at several locations:

- On the right side of the adit, near the floor, seepage was noted from two locations on either side of a small pile of shotcrete/ adit muck located about 1 m downstream of the plug. These seeps were first noted shortly after commissioning of the plug, but flow rates have now declined to a minor trickle. The seepage zone is stained rusty

red to black by iron oxides. During the 2013 inspection, this area was covered by ponded water, so it was not possible to directly observe seepage.

- On the right side of the adit, approximately 2.5 m downstream of the plug and about 1 m above the floor of the adit seepage has reduced from a trickle in 2012 to wet, oozing flow in 2013. This zone is associated with a localized point within a clay-filled shear zone approximately 1-2 cm wide. The seepage is stained rusty coloured.
- On the left side of the adit, about 2 m downstream of the plug and about 1.3 m above the floor of the adit, minor seepage is coming from the exposure of the same clay seam seen on the right side of the adit. The clay seam dips at about 70^{o} in a downstream (i.e. west) direction and strikes normal to the adit axis. Seepage is associated with rusty staining.

In all cases, seepage was clear and continues to show a year-to-year decreasing trend in terms of flowrate since commissioning.

The seepage from the rock mass downstream of the plug is collected behind a small (approximately 0.75 m high) waste rock berm that supports the upstream end of the HDPE liner at the point where the bypass raise discharges into the adit. The berm was constructed using adit muck composed of silt, sand and gravel-sized rock fragments, which may contain sulphides and would be considered potentially acid generating rock. Over the past 3 years, precipitation of iron hydroxide sludge on the side of the berm facing the plug has occurred. As a result, it is speculated that the overall permeability of the berm has been reduced. If this is the case, the amount of water draining under the HDPE liner in the adit would also be reduced

The water within this area is drained through a 100 mm diameter HDPE pipe. This pipe was installed by AECOM after the plug was commissioned. This pipe penetrates through the HDPE liner near the invert of the adit and decants the ponded seepage water into the lined channel downstream to the portal. Initial flowrates from the drainage pipe shortly after installation were of the order of 0.4 l/s. At the time of the 2013 inspection, the pipe was noted to be partially obstructed by iron hydroxide sludge. The sludge was cleaned out and some of the ponded water in front of the plug was drained to a new level. At the time of the inspection, flowrate was estimated at 0.2 l/s, which was not a stabilized flowrate due to plugging of the pipe. Stabilized flow readings were subsequently taken on August 14, 2013 by Access staff. Table 1 summarizes pipe discharge flow readings taken by Access staff before, during and after the August 13, 2013 site inspection.

Table 1. Flowrates from Pipe Draining Ponded Water in Front of Plug (from Access, 2013).

Date	Pipe Discharge (l/s)
June 24, 2013	0.24
July 31, 2013	0.21
August 13, 2013 (day of inspection)	0.2 l/s (visually estimated as pipe was unplugged).
August 14, 2013	0.18
September 17, 2013	0.25

This flowrate approximates the visually estimated cumulative flowrate from the seepage points described above, indicating that seepage through the waste rock berm under the HDPE liner is not a significant issue. The volume of seepage is well below the 0.8 l/s threshold set as a trigger level in the AMP. The 2013 flowrates are lower than the initial flowrates measured after plug commissioning of about 0.4 l/s.

In general flowrates were similar to those measured in 2012.

At the moment there is no immediate concern regarding the configuration of the drainage pipe and berm although it is possible that minor water quantities may seep through the waste rock berm and flow under the HDPE liner. Future monitoring by Access should identify any seepage issues.

5.2.5. Bypass Raise

Visual inspection of the bypass raise is not carried out due to continued flow of water from the flooded underground workings upstream of the plug and lack of ventilation. The estimated flow down the bypass raise was about 9.1 l/s at the time of the inspection. Table 2 summarizes the adit discharge flowrates measured by Access staff prior to, during and after the August 13, 2013 site inspection.

Table 2. Adit Discharge Flowrates (from Access, 2013).

Date	Adit Discharge (l/s)
June 24, 2013	8.60
July 31, 2013	8.08
August 14, 2013 (day after inspection)	9.13
September 17, 2013	14.59
October 3, 2013	12.94

The vibrating wire piezometer installed behind the plug measured a water level of about 24 m above the invert of the plug (equivalent to about elevation 1466 m above sea level). This is equivalent to the sill level at the top of the bypass raise. This level has remained essentially constant since commissioning according to the data-logger information.

In general, flowrates from June to August are less than those noted in 2012, which averaged around 11 l/s, but flows in September were above average, potentially due to heavy rain.

There was no indication of any erosion or instability in the bypass raise. No rock or shotcrete fragments that would be indicative of erosion or instability were noted in the adit invert adjacent to the bypass raise discharge.

The HDPE liner in the transition between the bypass raise and the tunnel invert is becoming coated with a hardened black crust, possibly composed of manganese oxides.

5.3. Inspection of Surface Components

5.3.1. Waste Rock Dump Cover

The north and south waste rock dumps were covered with an HDPE liner and protected with a layer of locally borrowed materials comprising a silty, sandy gravel colluvium. This material compacts to form a relatively low permeability surface that tends to prevent infiltration of precipitation and runoff. No disturbance to the cover materials or liner were noted.

Along the outer perimeter of the cover, at the crest of the waste dump slope, minor exposure of the HDPE liner was noted. The exposed waste rock slopes beyond the crest were stable and showed no sign of instability, sloughing or seepage. Minor gully erosion within the protective cover material was noted near the crest of the waste rock dump adjacent to the discharge channel and spillway.

As part of the ongoing geochemical assessment work, Access has set up a field kinetic test site on the waste rock dump cover near the portal. The material being tested in the two drums is a bulk sample of the waste rock.

5.3.2. Discharge Channel and Spillway

The discharge channel is lined with HDPE, which is integral with the adjacent waste rock covers. Over the winter of 2012-2013, a portion of the HDPE liner along the right-hand side of the spillway was damaged and torn from the portion covering the top of the waste rock pile. This portion of liner was temporarily repaired by Ampex on 20, 2013, by stitching the torn section with nylon rope. During the August 13, 2013 inspection, this repaired section was noted to again be torn away through the stitched area. In addition, a section of the liner covering the waste rock dump slope on the left side of the spillway was torn along the crest of the slope. Both areas were likely damaged by high winds getting under the liner due to poor anchorage.

Prior to the 2013 site inspection, BGC, Ampex and HBMS initiated a review of options for improving the design of the spillway to mitigate these problems and provide a more robust installation. Several options were discussed, including use of gabion mattresses and shotcrete in conjunction with an HDPE liner. Appendix C provides further details on this concept based on discussions with Layfield and Presto Geosystems.

This and other potential options will be reviewed and a final design will be developed as part of the next phase of work. In the meantime, Ampex has been authorized by HBMS to undertake work prior to the end of September 2013 to repair the spillway for the 2013-2014 winter/spring period. The permanent spillway channel re-construction will be completed during the summer of 2014.

5.3.3. Waste Rock Dump Toe Area

There was no sign of any seepage discharge from the base of the waste rock dumps. The dump slopes appear stable.

The valley of Sekie Creek #2 was free of snow at the time of inspection. A high-water “mud line” was noted on the alluvial terrace just above creek level indicating that either high water or a blocked channel existed during the 2013 freshet in Sekie Creek #2.

5.3.4. Natural Slopes Adjacent to Portal Area

A walkover inspection of the slopes above the north and south waste rock dump adjacent to the adit portal indicated no sign of any instability or points of seepage. The point on the slope above the top of the bypass raise was flagged by the surveyors in 2010 for use as a reference point during the inspection. There was no sign of any instability or seepage in the vicinity of the marked area, or in the slopes below, where seepage could be expected.

5.3.5. Old Exploration Boreholes

Abandoned exploration Borehole FS-1, located adjacent and slightly above the portal was excavated and grouted in 2010 as part of the remediation program. The sides of the pit excavated around the collar of this hole have slumped in and covered the collar of the hole. There was no casing left in the hole when it was grouted. The hole was filled with grout to the bedrock surface exposed in the trench. No seepage was noted within the pit or adjacent slope.

The other abandoned historical exploratory holes located along the Sekie Creek #2 valley, adjacent to the drill road were not visually inspected by BGC during this visit. Instead, the inspection was directed to the new exploration drillholes completed by HBMS during the summer of 2011. None of these holes have been grouted. The casings have been capped, however groundwater continues to either seep up around the outside of the casing or leak from the capped casing. As part of the 2013 site mitigation work being carried out by Ampex, these holes will be sealed by grouting.

6.0 SUMMARY AND RECOMMENDATIONS

The current condition of the adit portal canopy indicates that a long term replacement structure will be necessary if access to the portal is to be maintained. The need for ongoing access for inspection and monitoring should be assessed in accordance with the AMP (AECOM, 2010).

The rehabilitation work carried out on the existing timber and steel set structure during construction of the plug and bypass is still adequate over the short term, but ongoing deterioration indicates that this will not be a long term solution. BGC recommends that HBMS initiate a review to develop options for stabilizing the overburden slope around the portal and replacing the steel sets and timber support structure with a new canopy. The portal area around the new canopy should be backfilled up to the grade of the adjacent slopes. Berms may be considered on the slope above the canopy to divert surface runoff and prevent erosion.

The adit between the portal and the plug requires a regular program of scaling and an upgrading of the rockbolt support system. The original rockbolts and chainlink mesh have corroded away due to the acidic mine water seeping from the surrounding rock mass. To maintain safe access for plug inspection and monitoring purposes, HBMS should rehabilitate the adit in conjunction with the portal canopy reconstruction.

The recently drilled exploration drillholes should be sealed by pumping full with grout to prevent discharge of groundwater into the adjacent receiving waters.

The following areas require monitoring during each site visit:

- The annual geotechnical monitoring of the plug integrity should continue in 2014. This would be the fourth annual inspection of the plug since commissioning. Subsequent inspection visits after 2014 need to be determined in accordance with the AMP (AECOM, 2010.)
- Check the HDPE liner in the vicinity of the portal for ponding water under the liner. The recommendation to reconstruct the portal canopy should also address ways to improve handling drainage from the tunnel downstream of the plug.
- Seepage under the HDPE liner at the downstream end of the spillway should be checked for signs of erosion or increasing flows. Undertake further inspection to find source of water and repair as necessary.
- The seepage rate from the area of ponded water 10 m downstream of the concrete plug formed by the waste rock berm.
- Historical and recent exploration boreholes for signs of seepage.

BGC understands that Access will be conducting regular ongoing monitoring and sampling at the site.

7.0 CLOSURE

We trust the above satisfies your requirements at this time. Should you have any questions or comments, please do not hesitate to contact us.

Yours sincerely,

BGC ENGINEERING INC.
per:

ISSUED AS DIGITAL DOCUMENT.
SIGNED HARDCOPY ON FILE WITH
BGC ENGINEERING INC.

Holger Hartmaier, M. Eng., P. Eng.
Senior Geotechnical Engineer

Reviewed by:

ISSUED AS DIGITAL DOCUMENT.
SIGNED HARDCOPY ON FILE WITH
BGC ENGINEERING INC.

Iain Bruce, Ph.D., P. Eng.
Chief Technical Officer

HH/IB/cs

REFERENCES

AECOM Canada Ltd., (2010), Tom Valley Final Adaptive Management Plan, prepared for Hudson Bay Mining and Smelting Co., Ltd. by AECOM Canada Ltd., BGC Engineering Inc., and Gomm Environmental Engineering Consulting, November 2010.

APPENDIX A
SELECTED PHOTOGRAPHS

APPENDIX A

HUDSON BAY MINING AND SMELTING CO., LTD.

TOM MINE

2013 ANNUAL INSPECTIONS
SELECTED PHOTOGRAPHS

Hudson Bay Mining and Smelting Co. Ltd.

2013 Annual Inspection

Tom Mine

August 2013

Portal and Adjacent Slopes

Note: References to “right” or “left” side are used with respect to the adit based on observer facing downstream (in direction of flow out of adit).

Photo 1 (P8130039)—Portal entrance, wooden support timbers in canopy appear in good shape. Minor soughing of overburden is ongoing around portal cut.

Photo 2 (P8130040)—Slope adjacent to right side of portal, with toe at surface of waste rock

Photo 3 (P8130047) - Slope adjacent to left side of portal, with toe at surface of waste rock dump.

Photo 4 (P8130055) - General view of slope above waste rock dump adjacent to left side of portal.

Photo 5 (P8130056) - General view of slope above portal.

Photo 6 (P8130057) - General view of slope above right side of portal.

Adit Support

Photo 7—Condition of steel sets and timbers from inside the portal canopy. Note that deflection of steel beam was caused by bulldozer pushing portal backfill over canopy during previous decommissioning by HBMS in the 1980s.

Photo 8—Condition of steel set and timbers at back end of portal canopy.

Photo 9—Rockfall inside adit past canopy.

Plug Area

Photo 10—Drainage from 100mm diameter PVC pipe in berm retaining water ponding in front of plug.

Photo 11—General view of plug face. See Appendix B for comparison with previous photos. No significant changes noted from 2012 inspection.

Photo 12—Right side of plug area. Iron oxide stains show seepage zones through bedrock downstream of plug.

Photo 13—Condition of right side of plug bedrock in sidewall and crown.

Photo 14—Close-up view of lower portion of right side wall downstream plug.

Photo 15—Lower portion of right side wall further downstream of Photo 14, within ponded area impounded by berm.

Photo 16—Plug face and crown area.

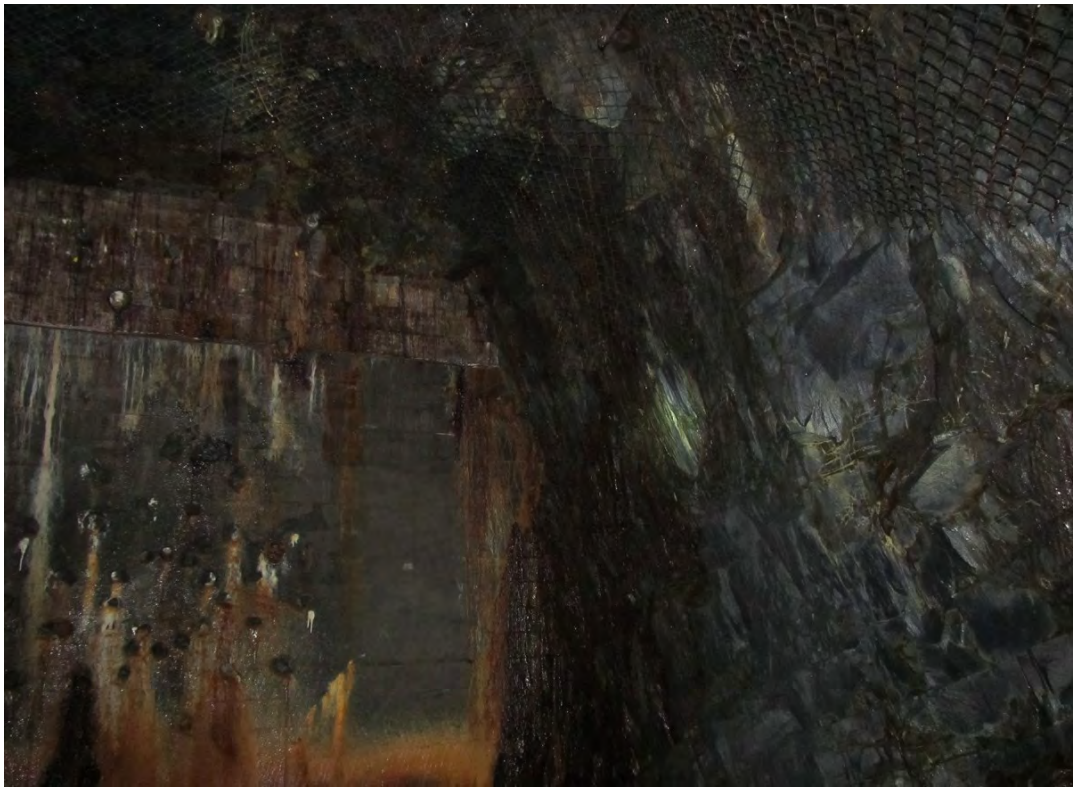


Photo 17—Upper left side of plug face area.

Photo 18—Left side wall of adit adjacent to plug face.

Photo 19—Close-up view of lower portion of left side wall adjacent to plug.

Photo 20—Lower portion of left side wall further downstream of Photo 19, within ponded area

Photo 21—Close-up of grout holes on downstream face of plug.

Waste Rock Dump

Photo 22—Discharge channel flow across surface of waste rock dump towards spillway. The red sludge laying along the sides of the channel was previously excavated by hand from the channel to improve flow.

Photo 23—View looking north across top of waste rock dump. A Field kinetic test was set up by Access staff to assess acid rock drainage and metal leaching of waste rock samples under field conditions.

Photo 24—Samples of waste rock in field kinetic cells—primarily black argillite, which contains abundant pyrite mineralization

Photo 25—Close-up of set up of field kinetic test on waste rock dump surface, adjacent to portal

Photo 26—Crest of waste rock dump, looking down on access road in area formerly occupied by ore stockpile. Equipment is from 2011 drilling program carried out by HBMS Exploration.

Photo 27—Waste rock dump slope south of discharge channel. Another field kinetic test is being set up by Access staff.

Discharge Channel and Spillway

Photo 28—Discharge channel flowing across surface of waste rock dump. Iron hydroxide sludge on side of channel was recently removed by hand excavation by Access staff to Improve flow.

Photo 29—View of discharge channel looking downstream towards crest of waste rock dump and start of spillway section.

Photo 30—Discharge channel at crest of waste rock dump-top of spillway section. Note minor erosion gullies are forming along edge of protective cover on HDPE liner.

Photo 31—General view of spillway section, looking upstream from toe of waste rock dump along access road.

Photo 32—General view of crest area of spillway looking upstream. Note liner covering waste rock dump on right side of photo was lifted away by wind action due to lack of anchorage. Liner in channel base has slipped and buckled due to sliding on top of old liner left in place below.

Photo 33—Close up view of spillway channel profile at crest area, with buckles and torn HDPE liner.

Photo 34—View looking down spillway from crest. Section of torn HDPE liner is on right side of channel near top.

Photo 35—Right side of spillway near crest. Torn section of liner is located near lower right side of photo. Note wind-blown liner on waste rock dump slope on opposite side of spillway.

Photo 36—Left side of spillway near crest. Torn section of liner is visible in left-centre of photograph where several yellow nylon rope ties are visible.

Photo 37—Spillway channel right side, partway down slope showing area where HDPE liner was torn. Attempts to repair torn section with yellow nylon rope were unsuccessful. Located on transition of spillway channel from waste rock dump slope to berm.

Photo 38—Spillway channel left side, partway down slope. Torn area of liner is visible on right side of photo.

Photo 39—Spillway channel right side, within bermed section. Note buckled HDPE liner, likely due to sliding on old liner left underneath.

Photo 40—View of spillway left side. HDPE covering waste rock dump slope appears to have been lifted by wind action and torn along crest from liner capping waste rock dump surface.

Photo 41—Close up view of torn liner section along right side of spillway channel. Position of buckled liner section shown in photo 39 can be seen downstream of torn section. Note exposed geotextile liner visible under torn section. It is likely that upper HDPE liner slipped on combination of old HDPE liner and geotextile lower liner causing increased tension and eventual tearing in the upper liner.

Photo 42—Close up view of torn liner section. Tear goes through liner material, not along a seamed section.

Photo 43—Close up view of torn liner section showing geotextile liner underneath.

Photo 44—Evidence of damage or weakness in HDPE liner seams.

Photo 45—Evidence of tearing adjacent to seamed section. Location is within buckled section of spillway about halfway down slope.

Photo 46—Hand in shadow points to hole in liner on left side of spillway in lower section.

Adjacent Areas and Features

Photo 47—View of Seki Creek #2 at point where discharge from spillway crosses access road.

Photo 48—General view looking north across surface of waste rock dump and along profile of slope above adit. Note water line from exploration drilling and some timbers left on site.

Photo 49—Seepage around recent boreholes located above access road along Seki Creek valley.

Photo 50—Iron oxide stained talus in area of historic boreholes located upslope of recent boreholes located further downslope (pictured in Photo 49).

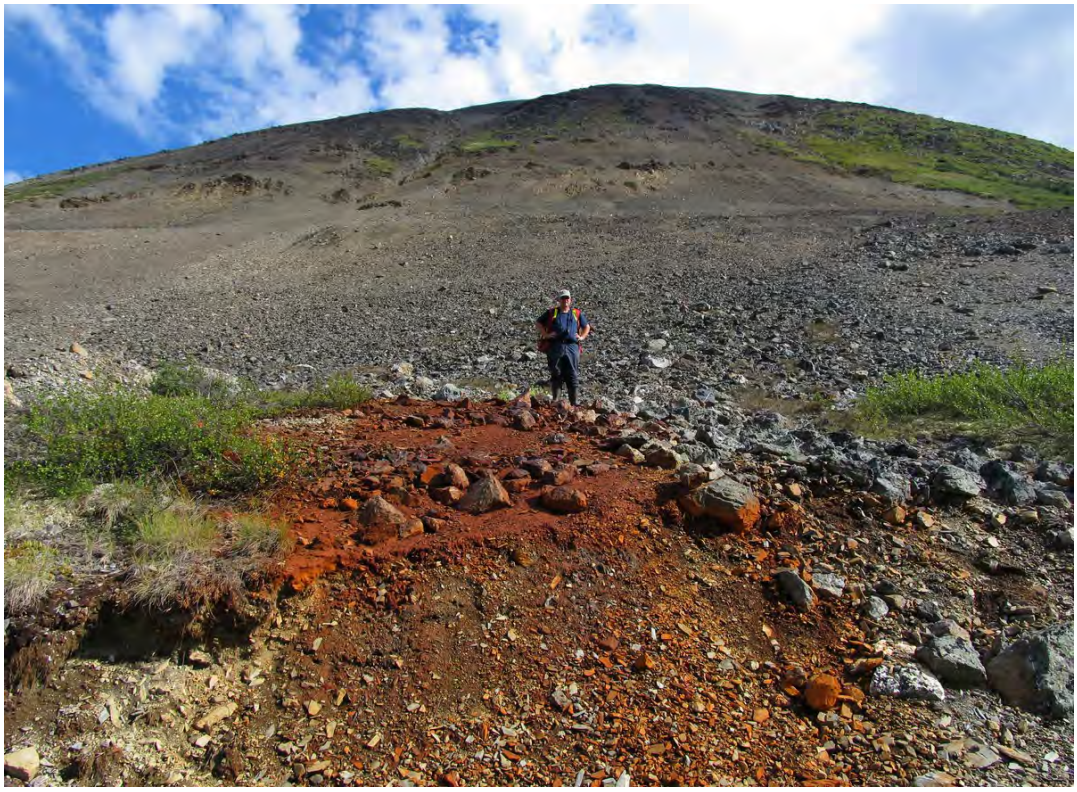


Photo 51—View of historic stained area shown in Photo 50, looking upslope.

Photo 52—Two recent boreholes located on side of access road going up Sekie Creek valley, located downslope of holes in Photo 49. Seepage is leaking around casing caps and possibly around surface casing as well.

Photo 53—Rusty staining due to seepage discharge at toe of talus slope on bedrock along Sekie Creek. This area is downslope of historic and recent drill holes.

Photo 54—Camp area-core boxes from recent exploration program and miscellaneous construction materials, which includes plywood, lumber, a seacan (not shown) and remnant roll of HDPE liner (not shown).

Photo 55—Camp buildings on site from exploration drilling program.

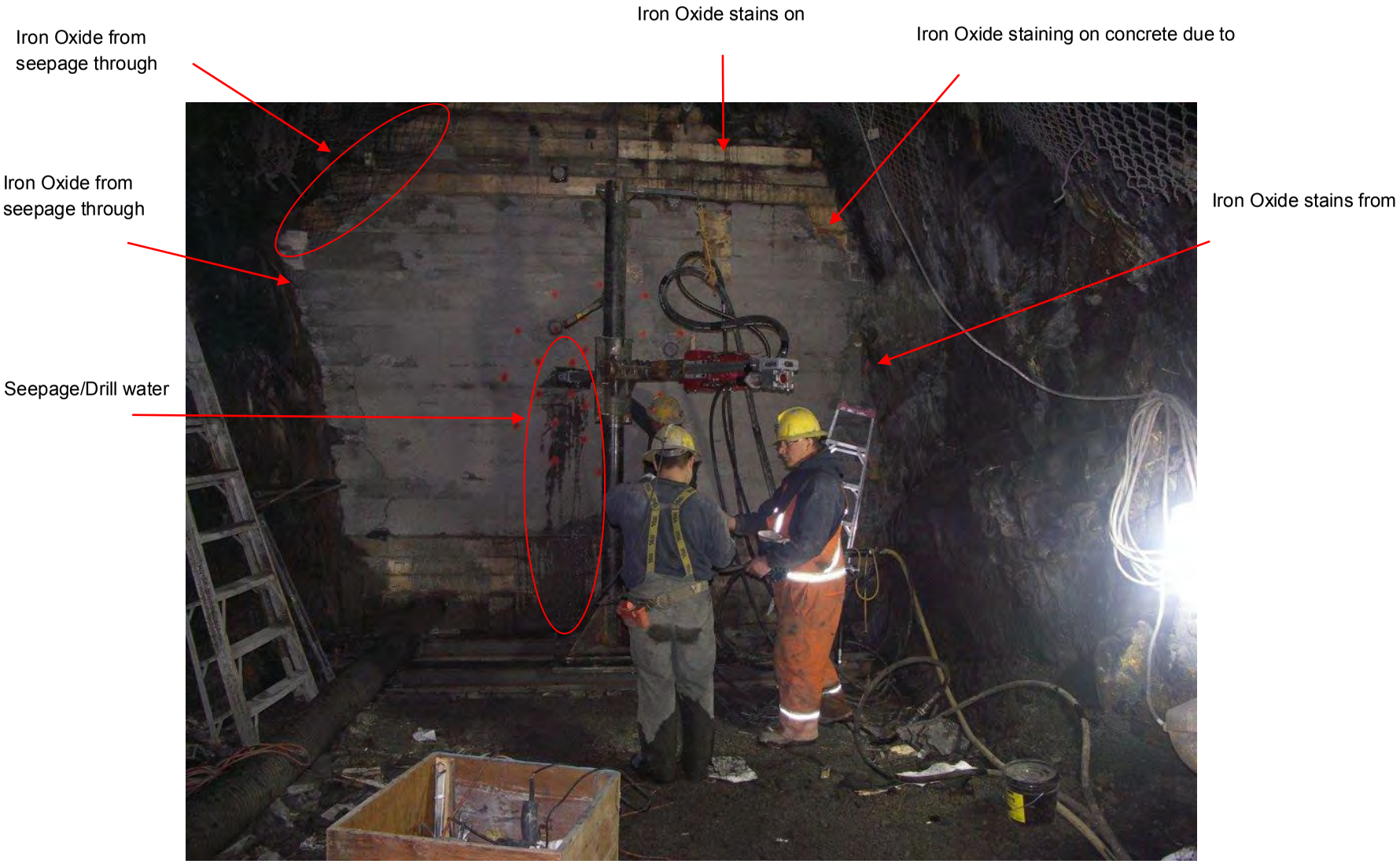
APPENDIX B
PLUG PHOTOGRAPHS FOR COMPARISON

Hudson Bay Mining and Smelting Co., Limited

Appendix B

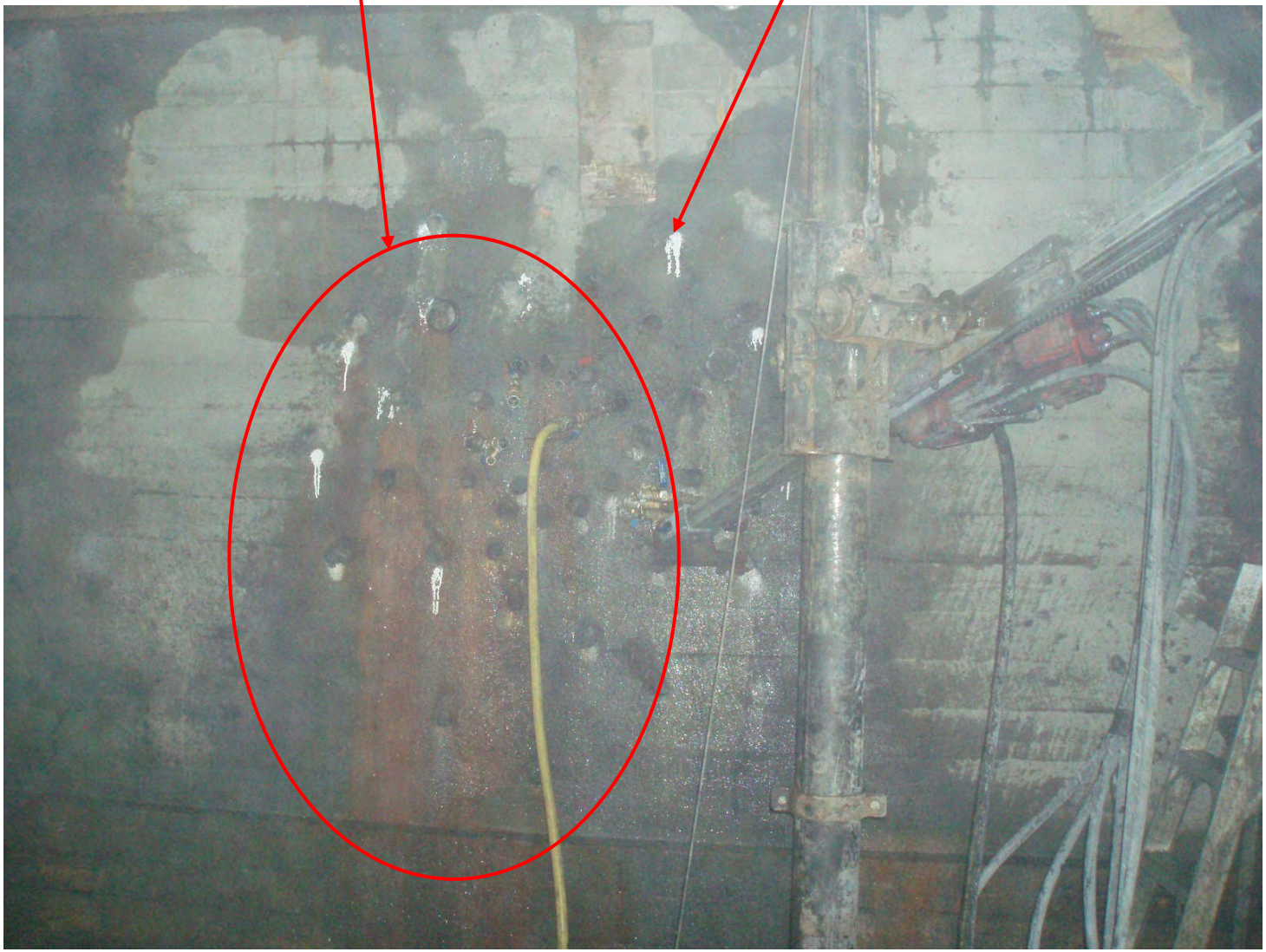
Selected Plug Photos

August 2010 to
August 2013



August 15, 2010
Starting to drill grout holes—all water being diverted through bypass pipe in lower left. Iron oxide stains on rock around perimeter of plug indicates baseline seepage into tunnel prior to commissioning

August 24, 2010
Note Seepage around perimeter of plug. Iron Oxide stained groundwater coming from bore-holes that have penetrated into rock during drilling of grout holes



August 27, 2010

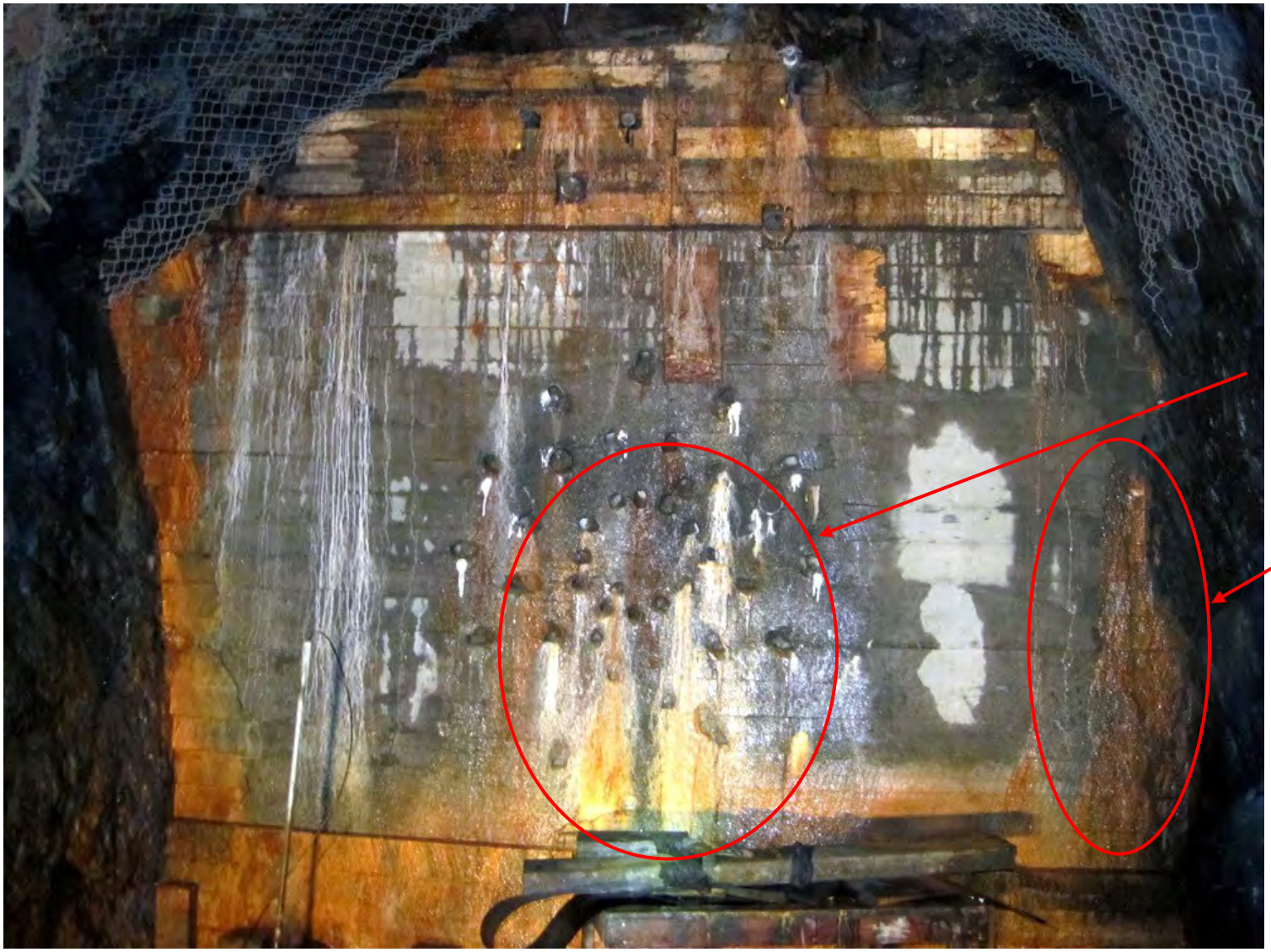
Plug was commissioned August 28, 2010. Note Iron Oxide stained concrete due to groundwater from grout holes during drilling. This is baseline condition of plug prior to commissioning

Seepage from rock

Stains from groundwater seepage from grout holes

Seepage from rock

September 9, 2010
Water level behind plug about 10m above invert level (5.5m above crown). Basically no change in seepage locations from those noted in previous photos



September 20, 2010 (1of 2)

One week after full head was reached. In general, seepage is continuing through rock mass around perimeter of plug. Iron oxide staining is building up on plug face due to perimeter seepage through rock. On right side of photo, new zone of seepage has emerged from bedrock at plug perimeter

September 20, 2010 (2 of 2)
Full head reached on September 13, 2010

June 20, 2011 (1 of 3)
South side of plug

June 20, 2011 (2 of 3)
Full view of plug
Note rusty stains show where seepage points in rock are located

June 20, 2011 (3 of 3)
North side of Plug

Photo 040—August 22, 2012 (Photo 1 of 8): General view of downstream face of concrete plug. Concrete is in good condition, no signs of concrete deterioration or leakage from cracks of grout holes. See main report for comparison with 2011 inspection conditions.

Photo 027—August 22, 2012 (Photo 2 of 8): Close up of lower right side of plug face.

Photo 026—August 22, 2012 (Photo 3 of 8): Close up of middle section of right side of plug face.

Photo 025—August 22, 2012 (Photo 4of 8): Close up of crown area on right side of plug face.

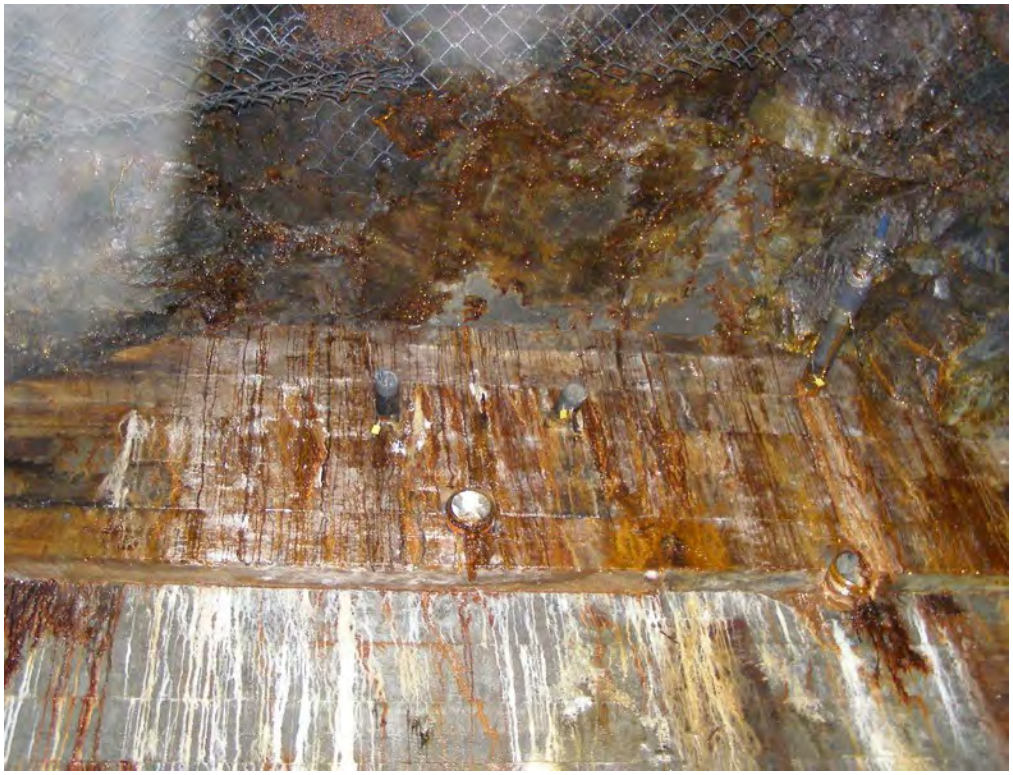


Photo 025—August 22, 2012 (Photo 5 of 8): Close up of crown area on right side of plug

Photo 030—August 22, 2012 (Photo 6 of 8): Close up of crown area on left side of plug.

Photo 031—August 22, 2012 (Photo 7 of 8): Close up of middle section of left side of plug.

Photo 032—August 22, 2012 (Photo 8 of 8): Close up of lower section of left side of plug.

Photo 33—August 13, 2013: Plug Face

APPENDIX C
SPILLWAY CHANNEL REHABILITATION OPTION

C1.0 Introduction

During the winter of 2012-2013, the HDPE liner installed along the spillway channel was torn, likely due to wind damage as a result of poor anchorage along the edges. A temporary repair has been carried out to allow the spillway to function over the winter of 2013-2014. As part of the 2013 inspection, BGC was requested by HBMS to explore options for re-constructing the spillway with a more robust liner system. Various concepts were discussed between HBMS, Access, Ampex and BGC. The overall consensus arising from these discussions was to construct some type of rock/gravel or concrete filled gabion or mattress system on top of the HDPE liner. Discussions were initiated between BGC and Layfield, the original supplier of the existing HDPE liner to assess options. The concept of using Geoweb® was recommended by Layfield and discussions were initiated by BGC with Presto Geosystems (Presto), the manufacturers of Geoweb®.

This Appendix presents a summary of the Geoweb® concept developed by Presto, based on discussions with BGC. It is included with the 2013 annual inspection report to provide regulatory authorities with an opportunity to review the proposed spillway channel mitigation concept and respond with any questions or concerns that should be addressed in the final design and construction scheduled for 2014.

C2.0 Description of Geoweb® System

The Presto Geoweb® system is a HDPE geocell cellular confinement system developed for use in soil stabilization and channel protection. Each Geoweb® panel consists of a network of interconnected cells. Panels are available in various dimensions and various cell sizes and depths are available depending on the details of the application. In conventional applications, the Geoweb® panel is underlain by a non-woven geotextile. The panel is vertically anchored into the ground using a Geoweb® proprietary anchor system. In this case, the anchors punch through the geotextile into the underlying substrate. Additional and/or alternative support can be provided through the cell walls by using horizontal steel tendons. This option would be necessary where the substrate is composed of rockfill, or if a geomembrane liner is required under the Geoweb®, both of which is the case at the Tom Mine spillway.

The main advantage of the Geoweb® system is that the geocells can be filled with a variety of materials depending on the application. Infill materials can be sand, gravel, crushed rock, concrete or shotcrete, providing various levels of erosion and scour protection, as well as channel hydraulic properties.

C3.0 Design Considerations

C3.1 Channel Bed Slope and Side Slope

Currently, the existing HDPE liner along the spillway channel is anchored in an anchor trench along each side of the spillway. At the crest of the waste rock dump, the HDPE liner that covers the surface of the waste rock dump overlaps the HDPE liner in the spillway channel.

Based on the as-built survey of the spillway channel, the existing bed slope varies from less than 10^o near the crest to about 18^o near the base of the slope.

From an overall geotechnical stability perspective, the geometric layout of the channel is governed by the sliding resistance of HDPE on geotextile. Available data from suppliers and the literature indicate that smooth HDPE on geotextile has an angle of shearing resistance of about 15 degrees. Textured HDPE on geotextile has an angle of shearing resistance of about 25^o.

The current spillway liner is smooth HDPE. Based on these estimates of friction angle, it can be seen that the smooth HDPE on geotextile would be close to the theoretical friction angle in the lower part of the spillway. This may be a contributing factor that leads to liner buckling and possibly to the liner damage experienced in 2012-2013. For this reason, it is recommended to replace the smooth HDPE liner in the spillway with a textured HDPE liner.

The HDPE liner in the spillway must be textured on both sides, as geotextile is used as an interface between the base of the liner and the waste rock substrate, and between the liner and the Geoweb®. Assuming a factor of safety of 1.5 for static sliding resistance, the overall bedslope of the spillway should be less than 16.5^o (about 3.4H:1V slope). The same criterion applies to the channel side slope.

It is recommended that a new profile survey be carried out of the spillway channel to identify those sections where slope modifications are required.

It is important to note that the Geoweb® panels cannot be supported by vertical anchors, as is the case in the conventional application. The vertical anchors resist not only sliding forces but uplift and hydraulic tractive forces as well. In the recommended concept, the overall bed slope and side slope would address static sliding stability. Horizontal tendons will be required to carry all other loads, including uplift, hydraulic loads and possibly dynamic (i.e. seismic, vehicular and foot traffic) loads. Uplift is not expected to be a problem, due to the free draining nature of the waste rock. The tendons will be threaded horizontally (i.e. parallel to the channel base and sides) through the cells and anchored in the lateral anchor trenches parallel to the spillway and at the top of the spillway.

C3.2 Channel Dimensions

Standard Geoweb® panel dimensions range from 2.3 to 2.8 m wide. The minimum and maximum length of panel depends on the cell dimensions. The concept developed by Presto is based on what was assumed to be the existing site conditions. The overall spillway slope was 4.33H: 1V and the channel section was 1 m wide by 0.5 m deep with assumed 1H :1V side slopes.

Due to the relatively low and steady flows from the adit, assumed to be in the range of 10-20 l/s, the overall average depth of flow in the existing spillway channel is only a few centimetres. Therefore, the hydraulic capacity of a nominal 1 m wide by 0.5 m deep channel cross-section would be more than sufficient to handle the range of flows expected from the

adit. One unknown is the range of overland flow contributed from the surface of the waste rock dump that drains towards the spillway. A rapid snowmelt or a rain on snow event is likely to exceed the range of adit flows experienced to date. This is one design factor that needs to be verified in the final design stage.

The final channel cross-section should be optimized in the final design.

C3.3 Cell Infill Material

The estimated volume required to fill the Geoweb® cells is about 28 m^3, based on 25 panels having dimensions of 6 m long by 2.45 m wide and a cell depth of 75 mm.

The options for cell infill material are limited at the site. The options for material included the following:

- Concrete or shotcrete
- The pit run colluvial material available on site that was used as protective cover material for the HDPE liner on top of the waste rock dump.
- Pit run material from a borrow source used for maintenance of the North Canol Road.
- Processing and crushing of gravel or rockfill from either of the above sources or another source.
- A combination of granular infill base with a protective layer of shotcrete/concrete.

Based on discussions with Ampex, the following paragraphs summarize the rationale that was used to select the most economical and practical option.

From a design perspective, concrete and shotcrete infill would both provide excellent channel protection and hydraulic properties, as the surface can be finished to a fairly smooth profile. The other advantage with these materials is that the stainless steel anchor cables would be embedded within the concrete or shotcrete, providing a layer of corrosion protection.

The use of concrete would require a supply of locally processed aggregate and the mobilization and demobilization of a transit mixer and pumper to produce and deliver the concrete to the spillway. Shotcrete is a viable alternative to concrete, but requires shipping pre-mixed bags of shotcrete to site which is expensive. In addition, the cost of mobilization and demobilization of the shotcrete equipment and crew is a significant cost burden.

Given that an excavator and loader will be on site to undertake the re-grading work around the spillway and support the Geoweb® installation, the lowest cost option would involve using locally-supplied granular material, thus eliminating any costly freight, mobilization and demobilization charges associated with the concrete and shotcrete alternatives.

A source of processed, crushed gravel is locally available along the North Canol Road that can be delivered to the site in several dump truck loads. This option is considered the most economical as it avoids having to mobilize and demobilize a processing plant to the site to use local materials.

The option of placing granular material into the cells and protecting it with an overlay of shotcrete or concrete would reduce the amounts (and associated materials and transportation costs) of each of the infill materials required, however, the mobilization/demobilization cost would still be a significant cost factor compared to the crushed gravel option.

The disadvantage of this option is lack of additional corrosion protection for the stainless steel tendons used to anchor the Geoweb® panels.

C4.0 Geoweb® Concept Details

Figures C1 and C2 present the Geoweb® concept for the Tom Mine spillway developed by Presto. The drawings reflect the use of concrete as cell infill, which was based on the initial design concept provided to Presto. The details of the installation however are common to any choice of infill material, and are presented here only to illustrate the concept.

Figure C1 shows the channel cross-section. The sketch does not include a geotextile under the textured HDPE, however Layfield recommends that a 16 oz non-woven (NW on drawing) geotextile be used at the base of the textured HDPE as well.

Several items related to construction are noted on the drawing:

- If concrete is used, the drop of infill (concrete) should be less than 1 m to avoid distortion to the cells. If shotcrete is used, care will be required to avoid distorting the cells with the shotcrete blasts delivered from the nozzle.
- Diversion of the water from the channel will be required while re-construction of the spillway channel takes place.
- No additional pore pressure relief is necessary, as the waste rock is assumed to be free draining.

Figure C2 shows the longitudinal profile of the spillway. A PVC deadman anchor placed in an anchor trench at 90 degrees to the channel orientation is recommended to support the tendons running through the Geoweb® panels. The PVC deadman was selected due to the presence of acidic water in the adit discharge. The anchor tendons normally supplied by Presto are not stainless steel. However, for this application, use of stainless steel tendons is recommended and can be obtained through Presto.

The tie-in detail to the existing HDPE is not shown on Figure C2. It is assumed that the anchor trench located at the top of the spillway would be overlapped by the existing HDPE. The existing HDPE would then be sandwiched above the Geoweb downstream of the anchor trench under a layer of protective rockfill. That way, the existing HDPE liner is not perforated by the anchor tendons that slope into the anchor trench.

Additional installation details are provided in Attachment C1, which is the “Geoweb® Channel Protection System Installation Guideline”. This document provides further details on product dimensions, installation methods and tools for reference.

C5.0 Recommendations

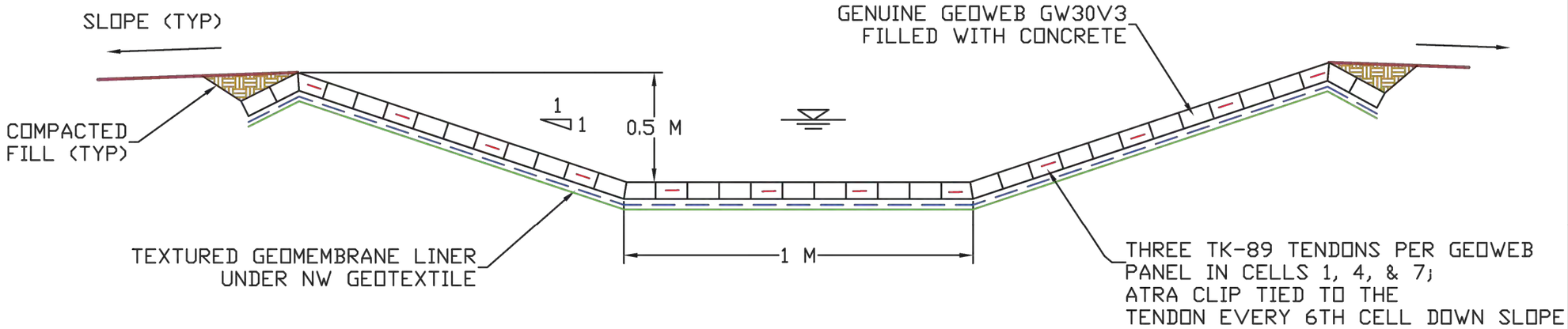
The next phase of work would involve preparing a detailed design and cost estimate for the proposed channel re-construction. The following additional information should be obtained by HBMS to support this work:

- Carry out another ground survey of the existing discharge channel and spillway to confirm the overall profile so that the bed slope can be recontoured as required to satisfy sliding stability criteria. Sufficient cross sections are required (say every 5 m) to define the existing side slopes so that channel dimensions and anchor trench locations can be determined.
- Confirm limits of catchment area drained by spillway channel and determine peak discharge requirements for channel so that channel dimensions can be determined.

Attachments:

Figures:

- Figure C1- Typical Channel Cross-Section.
- Figure C2- Spillway Channel Longitudinal Profile
- Attachment C1- Geoweb® Channel Protection System Installation Guideline, by Presto Geosystems



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2. Limit the drop of infill to less than 1 meter to prevent distortion to the cells.
3. Installation shall take place when there is little or no water in channel.
4. The panels shall be connected with Atra keys at each interleaf and end to end connection.
5. Provide hydrostatic relief as necessary to prevent pore pressure build up under Geoweb..

PRESTO® PRODUCTS CO.
670 NORTH PERKINS STREET
APPLETON, WI 54914
920-738-1342
WWW.PRESTOGEO.COM

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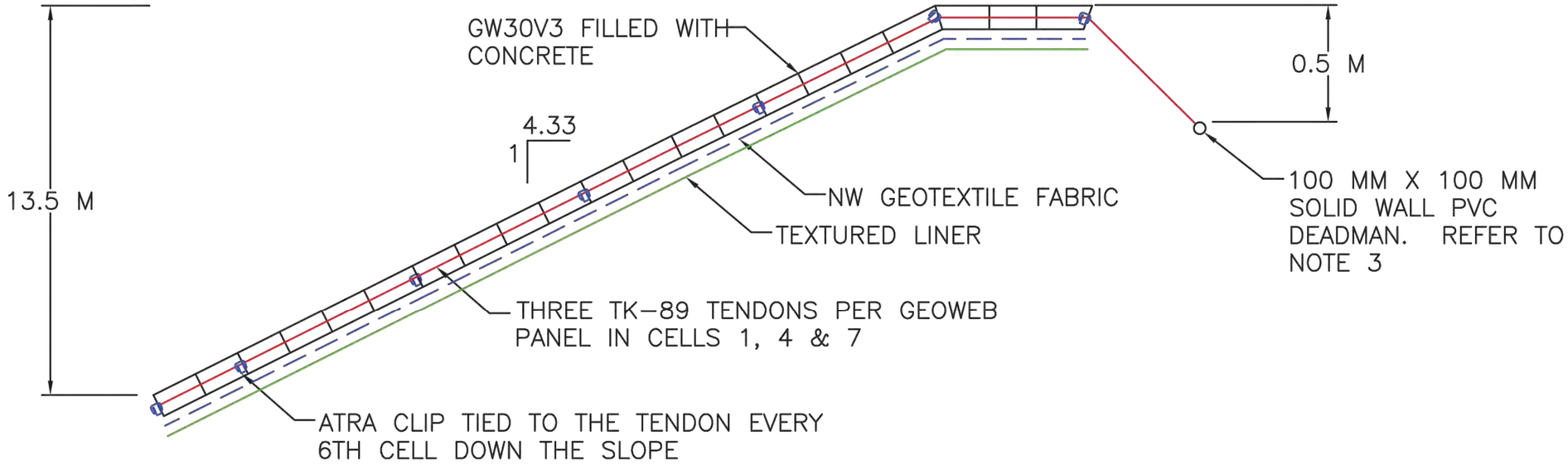

SPILLWAY PROFILE

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2. Limit the drop of infill material to 1 meter to prevent panel distortion.
3. Earth anchors may be used in place of deadman anchor. Coordinate with Engineer.
4. The Geoweb panels shall be connected with Atra keys at each interleaf and end to end connection.
5. Provide hydraulic relief as necessary to prevent pore pressure build up under Geoweb.

GEOSYSTEMS

PRESTO® PRODUCTS CO.
670 NORTH PERKINS STREET
APPLETON, WI 54914
920–738–1342
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TITLE: PRESTO GEOSYSTEMS - PROPOSED SPILLWAY PROTECTION - LONGITUDINAL SECTION

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