

Appendix A4-3

Aquatic Effects Monitoring Program – Targeted Study: Dike Construction Monitoring 2009, Meadowbank Gold Project, March 2010

Final

**Aquatic Effects Monitoring Program – Targeted Study:
Dike Construction Monitoring 2009**

Meadowbank Gold Project

Prepared for:

Agnico-Eagle Mines Ltd.

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Baker Lake, NU

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March 2010



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PROFESSIONAL LIABILITY STATEMENT

This report has been prepared by Azimuth Consulting Group Inc. (Azimuth), for the use of Agnico-Eagle Mines Ltd. (AEM), who has been party to the development of the scope of work for this project and understands its limitations. The extent to which previous investigations were relied on is detailed in the report.

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ACRONYMS

AEM – Agnico-Eagle Mines Ltd.
AEMP – Aquatic Effects Management Program
BGE – Bay-Goose east station series
BGW – Bay-Goose west station series
CCME – Canadian Council of Ministers of the Environment
DOC – Dissolved oxygen content
DQO – Data Quality Objective
EAS – Effects Assessment Study
ED – East Dike
GPS – Global Positioning System
HVV – High value habitat
MDL – Method Detection Limit
MMM – Maximum monthly mean
NTU – Nephelometric Turbidity Units
QA/QC – Quality Assurance / Quality Control
RPD – Relative Percent Difference
SOP – Standard Operating Procedure
SP – Second Portage Lake
STM – Short-term mean
TE – Tehek Lake
TKN – Total Kjeldahl nitrogen
TPE – Third Portage Lake east station series
TPN – Third Portage Lake north station series
TOC – Total oxygen content
TSS – Total suspended solids
UTM – Universal Transverse Mercator



EXECUTIVE SUMMARY

Azimuth Consulting Group Inc. (Azimuth) conducted water quality monitoring during dike construction activities at the Meadowbank Gold Project on behalf of Agnico-Eagle Mines Ltd. (AEM) in 2009. As per requirements of the Nunavut Water Board A License (2AM-MEA0815) for the project, monitoring followed the framework presented in the *Water Quality Monitoring and Management Plan for Dike Construction and Dewatering at the Meadowbank Mine* (AEM, 2009a). AEM completed the northern section of the Bay-Goose Dike during the open water season of 2009. This report documents the results of the receiving environment water quality monitoring.

Monitoring Overview

As per the framework, monitoring focused primarily on total suspended solids (TSS). However, measured TSS measurements are time intensive and were not possible to conduct on site in 2009. Rather, as was done in 2008, an empirical relationship between TSS and turbidity was used so that turbidity, which is easily measured using handheld equipment, could be used to obtain real-time estimates of TSS. Routine monitoring was conducted daily at a specific network of sampling stations (Routine Stations), as well as at 5 stations situated near high-value habitat (HVH Stations). TSS trigger values, developed in the monitoring plan (AEM, 2009a) were as follows:

- *Routine Stations* - 50 mg/L for 24-hr average and 15 mg/L for 30-day average.
- *High-Value Habitat Stations* – same as the routine stations, except after September 1, when 25 mg/L for 24-hr average and 6 mg/L 30-day average are in effect.

In addition to monitoring turbidity at routine and high-value habitat stations in the near vicinity of dike construction, broad surveys, extending to Second Portage Lake, Tehek Lake, and the east and north basins of Third Portage Lake, were carried out every one to two weeks. Focused turbidity surveys were conducted to monitor TSS plume characteristics and to test turbidity curtain effectiveness. Water quality sampling was also conducted at key stations in Third and Second Portage Lakes approximately every week to monitor other parameters (e.g., nutrients, total and dissolved metals).

Bay-Goose Dike Construction Monitoring Results

Monitoring was started 11 days prior to dike construction, on 16 July 2009, and ended 7 October 2009, due to freezing conditions in the east basin. As stipulated in the monitoring plan (AEM, 2009a), Bay-Goose dike construction monitoring focused primarily on TSS, but also included periodic sampling for a range of other parameters (e.g., nutrients and metals). Key results were as follows:



-
- Baseline (i.e., background) TSS concentrations typically ranged from 0.2 to 0.6 mg/L and were as high as 2 mg/L.
 - Turbidity barriers functioned quite well during the first several weeks of monitoring. TSS concentrations were slightly elevated during the first two weeks of monitoring at select stations, but then dissipated into the water column on August 11 due to wind-driven vertical mixing (resulting in lower overall TSS concentrations throughout the water column). Neither the 24-hr average (STM; 50 mg/L) nor the 30-day average (MMM; 15 mg/L) trigger values for TSS concentrations were exceeded at any station.
 - A more intensive TSS plume began to form in deeper basins (>16 m) east of the work area (e.g., BGE-3) between August 13 and 17, but was again dissipated throughout the water column by a SE wind event on August 18. Both the STM and MMM were exceeded at one or more stations during this period.
 - Relatively calm conditions over the next two weeks favoured the reformation of the east TSS plume in deep areas (>16 m), presumably due to the continued introduction of new material from between or under turbidity barrier panels (e.g., near BGE-2) and the lack of wind-driven mixing. TSS concentrations also started to rise on the west side of the work zone, particularly in the deep area at BGW-2. Focused plume tracking showed that the east TSS laden plume was largely contained within the bathymetric depression between BGE-2 through BGE-5 at depths >16 m. Both the STM and MMM were exceeded at these depths at several stations during this period.
 - A severe wind storm (i.e., > 100 km/hr gusts) lasting from August 31 through September 2 vertically mobilized and mixed the high TSS water in the deep depressions into the water column resulting in uniformly elevated TSS throughout the east basin of Third Portage Lake. The silt curtains were also heavily damaged and allowed high TSS water to escape, exacerbating conditions.
 - The water column stayed fairly well mixed for the remainder of the monitoring period, with TSS concentrations gradually diminishing over time. Despite repairing the turbidity barriers, TSS gradients did not reform across the barriers, likely due to much lower sediment inputs from dike construction activities in September. TSS triggers for high-value habitat areas changed as of September 1 (STM to 25 mg/L; MMM to 6 mg/L); TSS trigger values for other areas (i.e., not high-value habitat) remained the same. The 30-day average TSS concentrations exceeded the MMMs at nearly all stations for most of September; concentrations at routine stations fell below the MMM by early October, while the monthly average concentrations at high-value habitat stations still exceeded the MMM at all stations. Notwithstanding, 24-hr maximum TSS concentrations at all stations



were approximately 6 mg/L (or less) and decreasing by the end of the monitoring program on October 7.

- As a complement to routine daily turbidity monitoring, broad surveys were conducted every one to two weeks to characterize conditions in one or more of the following areas: north and east (southern area) basins of Third Portage Lake, Second Portage Lake and Tehek Lake. TSS concentrations were:
 - Always < 1.2 mg/L and usually < 0.5 in the north basin of Third Portage Lake (i.e., background).
 - Always < 7.2 mg/L for the southern portion of the east basin of Third Portage Lake.
 - Always < 5 mg/L and usually < 2 mg/L in most of Second Portage Lake.
 - Always < 1 mg/L and usually < 0.5 mg/L in Tehek Lake near the outlet of Second Portage Lake.
- Weekly water quality (i.e., chemistry and physical parameters) monitoring was conducted to characterize conditions in the receiving environment. To that end, samples were often collected to target a range of conditions (e.g., upper water column or the centre of a TSS plume). TSS concentrations provide the best indicator of “exposure levels” related to construction; TSS concentrations ranged from < 1 mg/L to over 350 mg/L in the depression. For nutrients, total phosphorus was the only parameter to exceed CCME guidelines (using the guideline for ultra-oligotrophic lakes); in general, it was higher in samples with elevated TSS concentrations. Several total metal parameters also exceeded CCME guidelines in samples with high TSS concentrations. However, they almost never exceeded CCME guidelines in the dissolved form, which is considered a better indicator of potential effects. These results suggest that the metals are primarily associated with introduced particulates.
- Due to the unexpected extent and magnitude of the elevated TSS concentrations in the east basin of Third Portage Lake, a TSS Effects Assessment Study (EAS) was conducted in September 2009 to evaluate the ecological significance of the situation. Results of this study are reported elsewhere (Azimuth, 2010).

1. INTRODUCTION

Azimuth Consulting Group Inc. (Azimuth) conducted environmental monitoring of in-water dike construction activities at the Meadowbank Gold Project on behalf of Agnico-Eagle Mines Ltd. (AEM) in 2009. As per the requirements of the Nunavut Water Board A License (2AM-MEA0815) for the project, monitoring followed the framework presented in the *Water Quality Monitoring and Management Plan for Dike Construction and Dewatering at the Meadowbank Mine* (AEM, 2009a).

This report covers turbidity and water quality monitoring for the Bay-Goose Dike. A general overview of the site related to dike construction in 2009 is presented in **Figure 1-1**. The figure includes some of the naming conventions used in this report and shows local hydrology among the lakes.

While water quality monitoring included numerous parameters (e.g., nutrients and metals measured weekly). Management actions under the plan were driven primarily by total suspended solids (TSS) and turbidity (primarily used as a surrogate for TSS). The TSS/turbidity focus allowed for direct monitoring of the key potential stressor in “real time”, providing AEM with timely information to support decision making. This approach relied on predicting TSS concentrations from field turbidity measurements.

The plan (AEM, 2009a) presented a decision framework for suspended sediment monitoring during dike construction (**Figure 1-2**), which relied on the following trigger values (see AEM, 2009a for more details):

- *Short Term Maximum (STM)* – For durations up to and including 24 hours, a TSS threshold of 25 mg/L was applied in areas with spawning habitat and at times when eggs or larvae would be expected to be present (i.e., this threshold of 25 mg/L was applied to monitoring stations that are located closest to the high value shoal areas¹, starting 1 September 2009). In all other areas and at times when eggs/larvae are not present, a TSS threshold of 50 mg/L was used.
- *Maximum Monthly Mean (MMM)* – For long-term exposure (i.e., greater than one day and less than a month), a monthly mean TSS threshold of 6 mg/L was applied in areas with spawning habitat and at times when eggs or larvae would be expected to be present (i.e., this threshold of 6 mg/L was applied to monitoring stations targeting the high value shoal areas, starting 1 September 2009). In all other areas and at times when eggs/larvae were not present, we used a TSS threshold of 15 mg/L as a maximum monthly mean.

¹ Five high value shoal areas were identified in close proximity to the construction area; these areas were subject to a higher level of protection (i.e., lower trigger values for TSS) than other areas during the fall spawning season.



The 2009 monitoring plan also specified the locations of routine monitoring stations, situated approximately 50 m from the turbidity barriers enclosing the Bay-Goose Dike construction zone (**Figure 1-3**) and sampled daily. Station types were as follows:

- The west (BGW) series targeted the west turbidity barriers.
- The east (BGE) series covered the east turbidity barriers.
- The high value habitat (BG-HVH) series targeted the 5 closest high value shoal areas.

HVH stations were not located directly over the high value shoal habitat, but adjacent to it on the side closest to dike construction. The primary reason for this was to avoid any disruption of the valuable area whatsoever. This also provided information of the potential future conditions at high value habitat; thereby providing an early warning should conditions deteriorate. Two of the HVH stations were located in areas that were deeper than the shoal habitat itself. High value habitat is considered to be present between 2 and 6 m deep and low value habitat is found primarily in water deeper than 8 m (Azimuth, 2006). To address this, BG-HVH stations reported data to a depth of 8 m deep (i.e., 8 m chosen to be conservative and allow for some vertical movement of the plume between the monitoring location and the actual high-value habitat), while duplicate stations (BGH) at the same locations as the HVH stations were created, but considered the depth profile to the maximum depth reported (as much as 16 m).

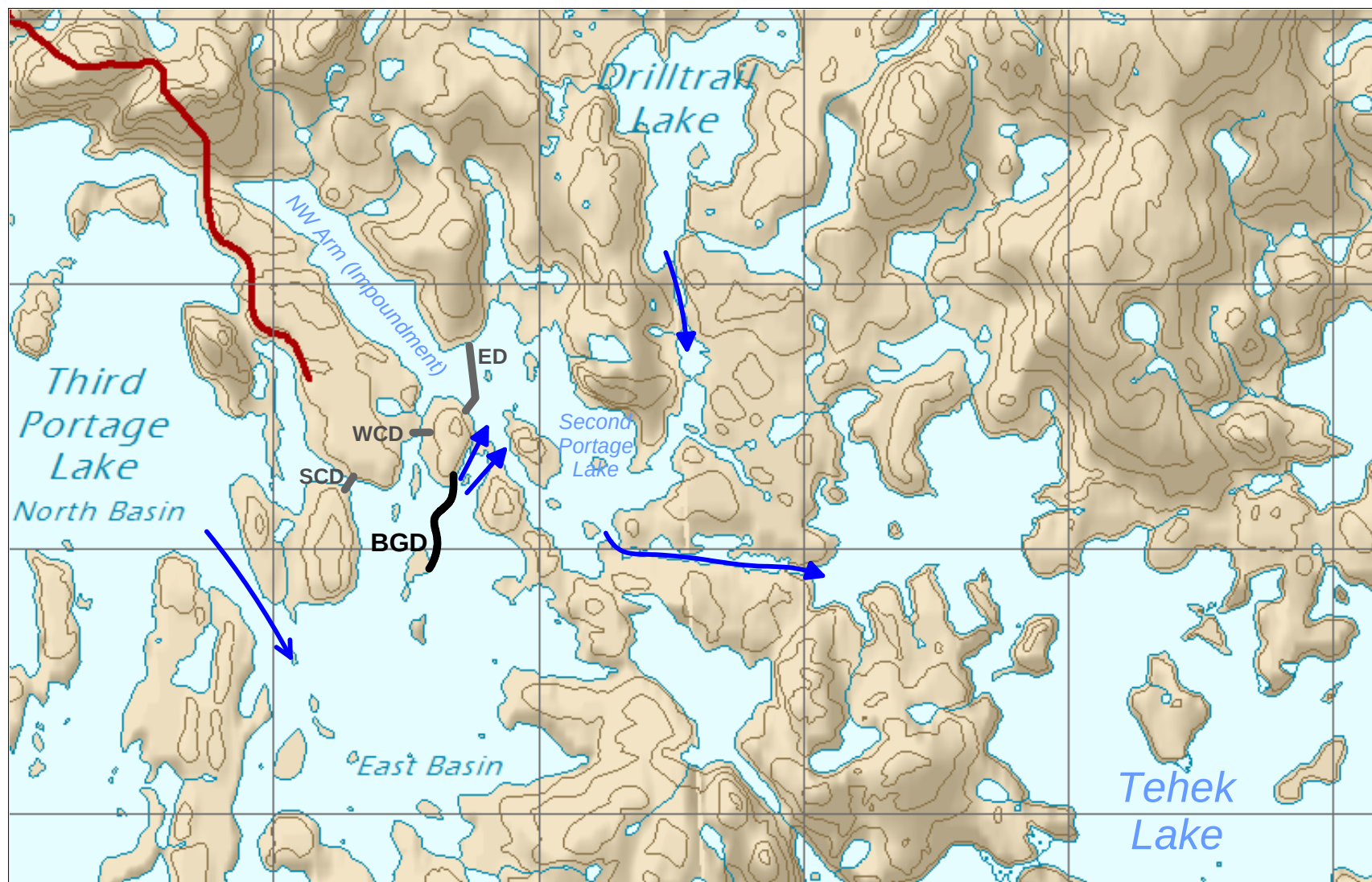
To achieve an understanding of the TSS characteristics in the areas extending beyond the immediate vicinity of dike construction, broad TSS monitoring was conducted every one to two weeks at fixed locations throughout the east and north basins of Third Portage Lake, Second Portage Lake and Tehek Lake (**Figure 1-4**). Examining these extended areas allowed for a better understanding of TSS dynamics (e.g., plume extent, migration and mixing over time).

In addition, as a complement to the routine, focused turbidity surveys were also conducted periodically to better understand specific situations such as major plume events or turbidity curtain issues. Survey locations for this activity were selected each event to optimize information collection (i.e., they were not fixed). These surveys were primarily focused inside the east basin of Third Portage Lake.

Due to the widespread suspended sediment plume that prevailed in the latter part of August and early September, targeted studies were also initiated to assess potential the ecological effects of the elevated TSS; these are discussed in detail in a separate report (Azimuth, 2010).

This report presents the results of the monitoring component of the plan (see **Figure 1-2**).





Legend

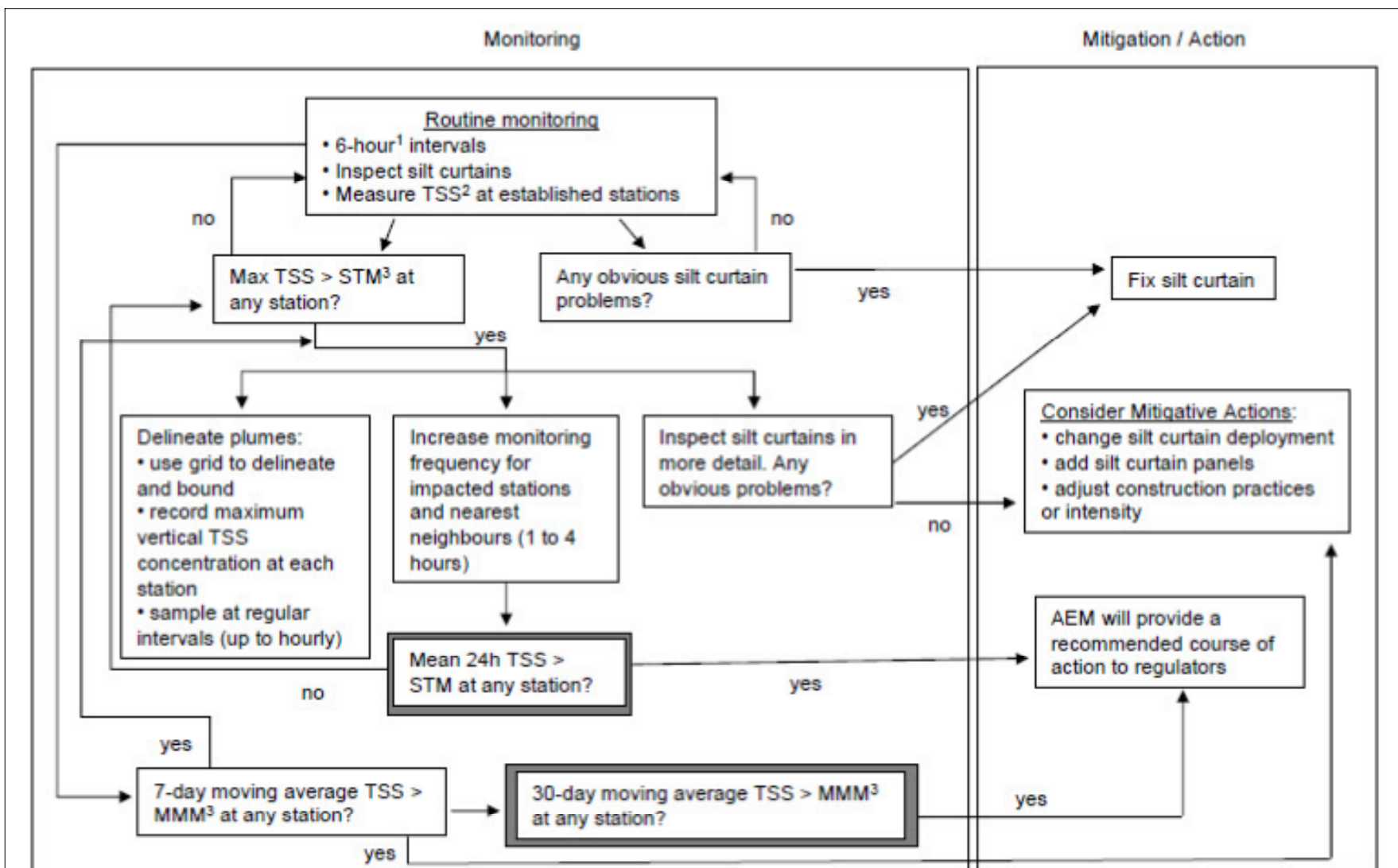
BGD = Bay Goose Dike
 ED = East Dike
 WCD = Western Channel Dike
 SCD = South Camp Dike
 Blue arrows indicate direction of water flow.



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MEADOWBANK GOLD PROJECT
 BAY-GOOSE DIKE CONSTRUCTION MONITORING 2009
 OVERVIEW OF DIKE CONSTRUCTION MONITORING AREA

FIGURE 1-1



Notes

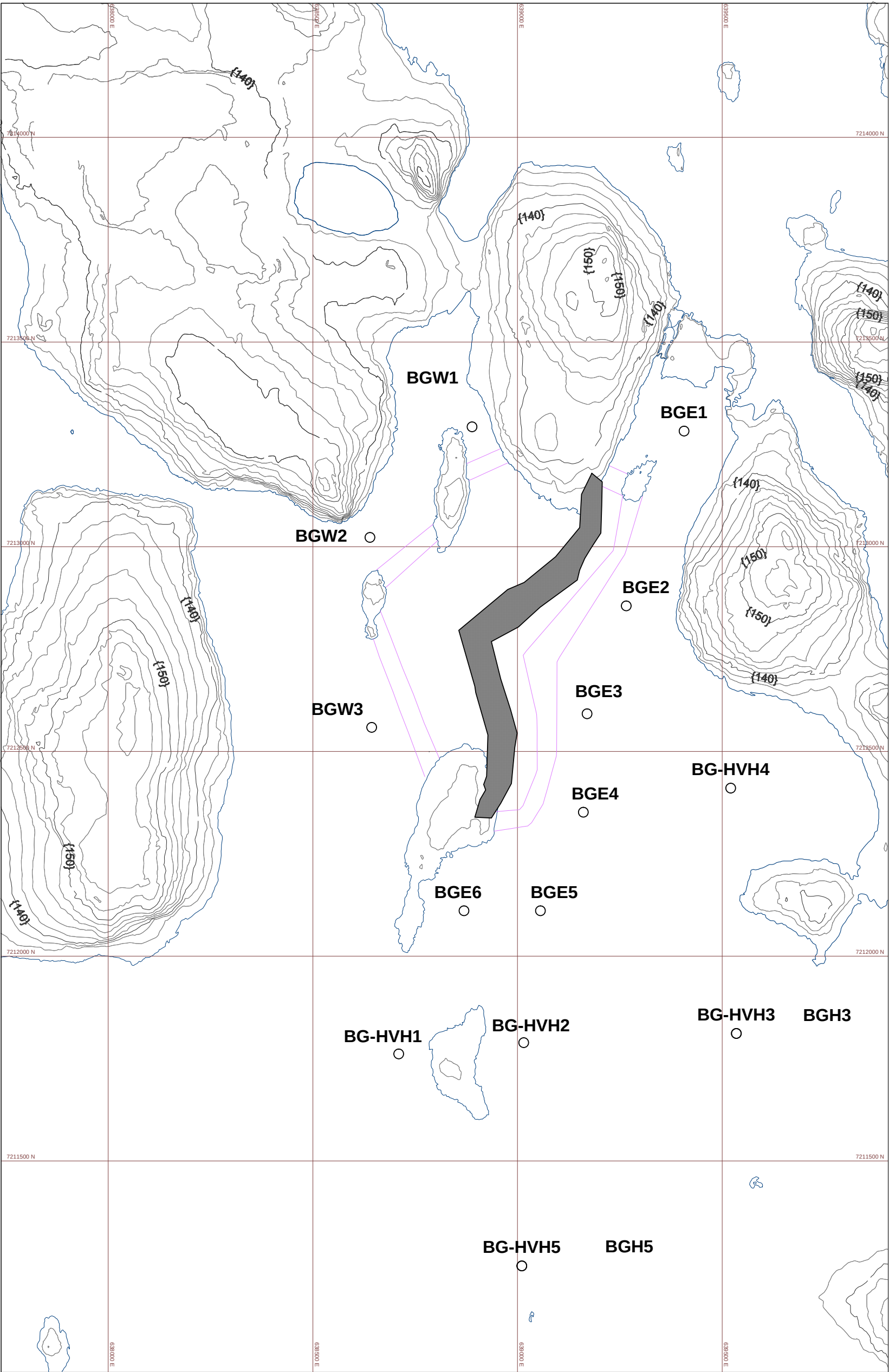
During daylight hours and/or weather/logistics permitting. 2. TSS will be measured using turbidity as a surrogate 3. STM = short term maximum concentration of TSS. MMM = maximum monthly mean TSS concentration.



Azimuth Consulting Group Inc.

MEADOWBANK GOLD PROJECT
BAY-GOOSE DIKE CONSTRUCTION MONITORING 2009
DECISION FRAMEWORK FOR TSS MONITORING
DURING DIKE CONSTRUCTION

FIGURE 1-2



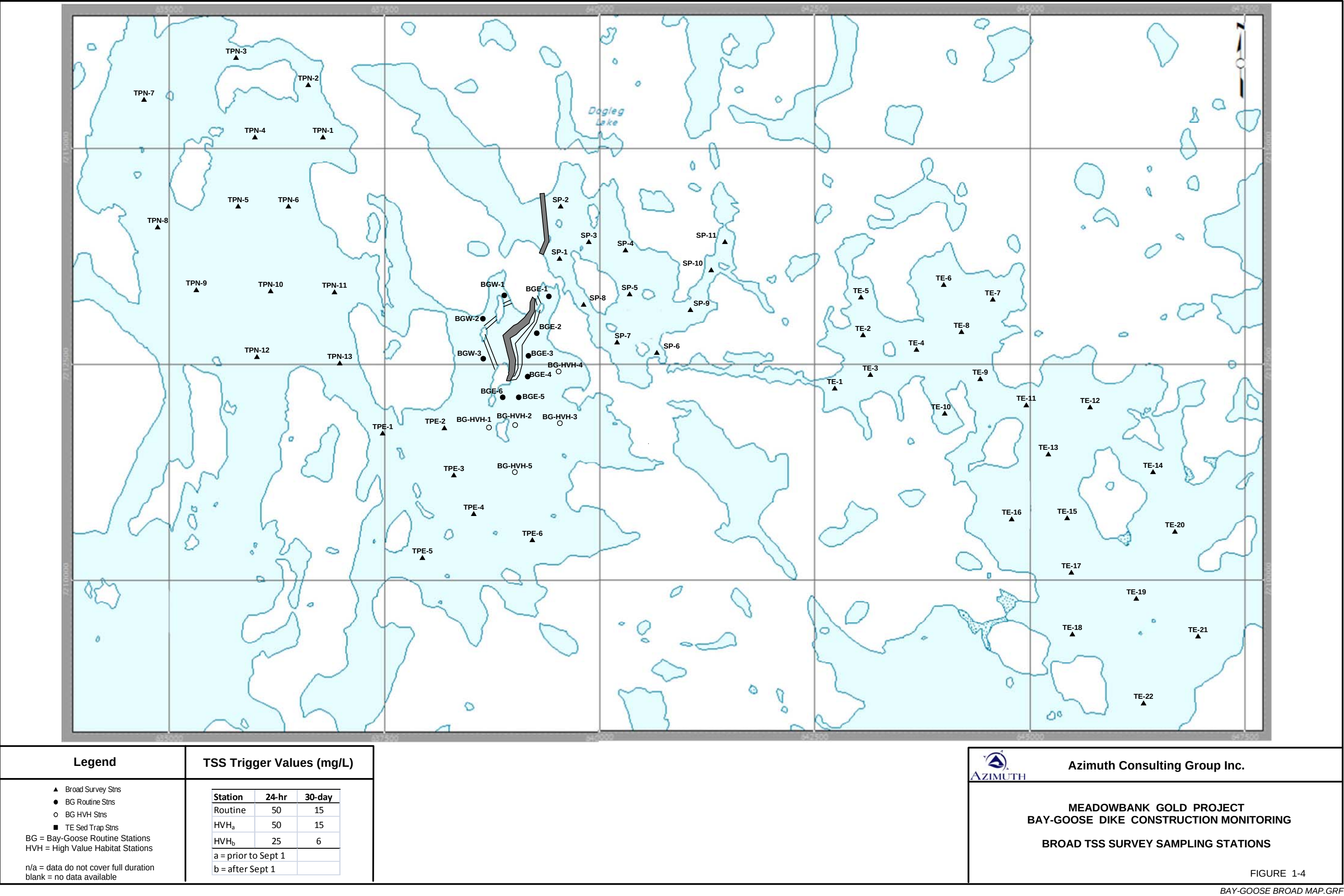
Legend	TSS Trigger Values (mg/L)																		
BG = Bay-Goose Routine Stations HVH = High Value Habitat Stations (BGH3 and BGH5 are at the same locations as the HVH stations, but cover full depth profile (i.e., >8m))	<table><tr><th>Station</th><th>24-hr</th><th>30-day</th></tr><tr><td>Routine</td><td>50</td><td>15</td></tr><tr><td>HVH_a</td><td>50</td><td>15</td></tr><tr><td>HVH_b</td><td>25</td><td>6</td></tr><tr><td colspan="2">a = prior to Sept 1</td><td></td></tr><tr><td colspan="2">b = after Sept 1</td><td></td></tr></table>	Station	24-hr	30-day	Routine	50	15	HVH _a	50	15	HVH _b	25	6	a = prior to Sept 1			b = after Sept 1		
Station	24-hr	30-day																	
Routine	50	15																	
HVH _a	50	15																	
HVH _b	25	6																	
a = prior to Sept 1																			
b = after Sept 1																			



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MEADOWBANK GOLD PROJECT
BAY-GOOSE DIKE CONSTRUCTION MONITORING 2009
BAY-GOOSE DIKE CONSTRUCTION ZONE, TURBIDITYBARRIERS
AND ROUTINE MONITORING STATION LOCATIONS

FIGURE 1-3



2. METHODS

2.1. Field Turbidity Measurements

Turbidity sampling was conducted in the field using McVan's Analite NEP160-3-05R portable turbidity meter/logger with a high sensitivity NEP260 90° probe. Probe cable lengths were 20 and 25 m to allow full water column profiling. The unit has a range (0 to 3000 NTU) easily covering expected environment conditions and is highly precise (resolution varies with sub-range as follows: <0.1 to 20 NTU [0.02 NTU], <1 to 200 NTU [0.1 NTU], <10 to 2,000 NTU [1 NTU]) and accurate (repeatability = 2%). This probe measures turbidity following the ISO 7027 method. Probes were calibrated routinely throughout the program.

2.2. Turbidity-TSS Relationships

An empirical relationship between TSS and turbidity was developed so that turbidity, which is easily measured using handheld equipment, could be used to obtain real-time estimates of TSS. The general form of this relationship was as follows:

$$\text{Log (Turbidity)} = \text{Intercept} + (\text{Slope} \times \text{Log [TSS]})$$

where turbidity is measured in NTUs and TSS in mg/L.

As indicated in the approved monitoring plan (AEM, 2009a) and recommended by DFO (DFO, 2000), this specific TSS-turbidity relationship was developed using paired data collected across a range of TSS concentrations (Azimuth, 2009). The resulting linear regression was as follows:

$$\text{Log}_{10} (\text{NTU}) = 0.273 + (1.19 \times \text{Log}_{10} (\text{TSS})), [n=125 \text{ r-squared} = 0.79, p<0.001]$$

This relationship was used throughout the 2009 monitoring season. Additional data collected in 2009 was used to update the relationship for the 2010 season; details are provided in **Section 2.8**.

2.3. Routine Turbidity Monitoring

As outlined in the plan (AEM, 2009a), routine turbidity monitoring targeted five monitoring events per day (weather/logistics permitting; not all stations necessarily monitored). Anchored floats were deployed at each routine monitoring station to facilitate daily monitoring. GPS coordinates and approximate depths for all stations are presented in **Table 2-1**; stations were situated approximately 50 m east (BGE) and west (BGW) of the turbidity barriers (**Figure 1-3**). Additionally, high-value habitat was routinely monitored (BG-HVH and BGH).



-
- A single monitoring event for a station occurred as follows. The boat would be navigated to a particular station, and depending on wind conditions would remain stationary relative to the station marker (buoy) by shifting the motor in- and out of gear. The boat was not anchored to avoid disturbing bottom sediments during windy conditions that might cause anchor drag. After noting the time and depth (measured with a hand-held Hawk Eye® Digital Sonar or a Lowrance® HD10 fishfinder & GPS chartplotter), turbidity measurements were recorded at the surface and at each meter through the water column, stopping approximately 0.5 to 1 meter off the bottom (i.e., to avoid inadvertent sediment re-suspension). The maximum turbidity value for each profile was also noted as it was the only value used for subsequent calculations.

Data from each monitoring event were reviewed (i.e., to identify any dramatic changes) then entered into an Excel database. The following estimates were calculated daily to provide AEM with up-to-date information on the status of suspended sediments in the Third Portage Lake receiving environment:

- **Daily Maximum TSS Concentration** – the highest daily turbidity values were used to estimate the maximum TSS concentration for each station. This provided a snapshot of worst case conditions for a particular day.
- **Moving 24-hr Average TSS Concentration** – turbidity values were time-weighted to estimate the mean TSS concentration for each station over the previous 24 hours. This was compared to the *Short-Term Maximum* (STM) trigger value.
- **Moving 7-day Average TSS Concentration** – turbidity values were time-weighted to estimate the mean TSS concentration for each station over the previous 7 days. This was compared to the *Maximum Monthly Mean* (MMM) trigger value.²
- **Moving 30 day Average TSS Concentration** – turbidity values were time-weighted to estimate the mean TSS concentration for each station over the previous 30 days.

2.4. Broad Turbidity Monitoring

Broad surveys were conducted in the north (TPN) and east (TPE) basins of Third Portage Lake, Second Portage Lake (SP) and Tehek Lake (TE), in an effort to characterize the

² The underlying data used to derive the *Maximum Monthly Mean* trigger value included exposure durations ranging from 24 hrs to a month. Seven days was considered a reasonable time frame over which to derive a mean exposure level to compare to this trigger value. More details on the trigger value derivation process are provided in the plan (AEM, 2010).



far-field TSS characteristics throughout Bay-Goose Dike construction (**Figure 1-4**). GPS coordinates for all stations are presented in **Table 2-2**. These surveys were conducted roughly every one to two weeks over the course of dike construction starting in late July and ending in late September. TSS concentrations were estimated from turbidity monitoring measurements using the same procedure as routine monitoring.

2.5. Focused Surveys

Discussed in **Section 1**, based on the results of routine monitoring, focused surveys were conducted to track the extent and magnitude of sediment plumes when elevated TSS concentrations were observed as well as to monitor the effectiveness of the turbidity curtains. Monitoring stations were selected on a case-by-case basis to provide adequate coverage of the event. The monitoring process for each station was similar to routine monitoring. Survey frequency was dictated by the rate at which event-related conditions changed over time, which was typically slow unless major winds occurred.

2.6. Water Quality Monitoring

Water quality sampling for a range of parameters³ was conducted approximately every week between late July and mid September, primarily at various routine and turbidity monitoring stations in Third Portage Lake; samples were also collected in Second Portage Lake. This approach provides a more complete view of water chemistry (conventional, nutrients, metals) varied over a larger spatial scale, and its relation to TSS concentrations. Water quality data were also collected as part of the Bay-Goose Dike TSS Effects Assessment Studies (EAS) program. These water quality data are included in this report for two reasons:

- The areas sampled for water quality in both programs overlapped. Samples were collected in a similar manner, so the data sets for each program are comparable.
- Dike Construction Monitoring water quality data was collected in July, August, and beginning of September, while TSS EAS water quality data was collected in mid- and late September. Including the TSS EAS data set allows for a more

³ Water quality sampling parameters included (a) physical parameters - hardness, pH, total dissolved solids, total suspended solids, (b) Anions and nutrients - ammonia, alkalinity – bicarbonate, alkalinity – carbonate, alkalinity – hydroxide, alkalinity – total, chloride, silicate, sulfate, nitrate, nitrite, total Kjeldahl nitrogen, ortho phosphate, total phosphorus; (c) Organic parameters: chlorophyll a, dissolved organic carbon, total organic carbon; (d) Total and dissolved metals.

comprehensive understanding of water quality from the start to finish of Bay-Goose Dike construction.

Water samples were collected in the upper water column (2-4 m), unless otherwise stated, on the following dates and stations:

- *July 22* – Samples were collected at HVH-1 through HVH-5, and BGW-3. These occurred before dike construction began, on July 27, and provided baseline values for HVH and routine monitoring.
- *July 31* – Samples were collected at HVH-4, BGW-1, BGW-2, BGE-1 and BGE-2 to characterize typical water quality at stations nearest the dike during early stages of construction. Broad survey stations SP-6 and SP-8, located in Second Portage Lake closest to dike construction, were also sampled to determine water quality in the downstream receiving environment.
- *August 8* – Samples were collected at HVH-2, HVH-4, BGW-2, BGE-1, BGE-3 (at depth) and BGE-5, again to characterize typical water quality at stations nearest the dike during early stages of construction. Of the broad survey stations, SP-8 was sampled.
- *August 16/17* – Samples were collected at HVH-2, HVH-4, BGW-3, BGE-1, BGE-3 and BGE-5 to characterize water quality nearest the dike as construction progressed. SP-8 was also sampled.
- *August 21/22* – HVH and routine stations HVH-4, BGW-3, BGE-1 and SP-8 were sampled. Station BGE-2 was sampled at depth as routine TSS monitoring had revealed the formation of a deep plume southeast of the Bay-Goose Dike's east turbidity barriers.
- *August 29* – The HVH and routine stations HVH-4, BGW-2, BGW-3, BGE-1, BGE-2 and BGE-3 were sampled, as were broad stations SP-6 and SP-8. Samples at depth were collected at stations BGW-2, BGE-2 and BGE-3, where deep plumes were present.
- *September 4* – A high wind event (August 31 to September 2) caused vertical mixing of deep TSS plumes and severely damaged the turbidity barriers. Samples were collected at HVH-5, BGW-2, BGE-2 and BGE-5, as well as at broad survey stations TPE-6 (located in the east basin of Third Portage Lake), SP-6 and SP-8.
- *September 11* – Samples were again collected at HVH-5, BGW-2, BGE-3, and BGE-5 as well as SP-1, SP-6 and SP-8 of the broad survey stations. This was the final water quality/chemistry sampling event as part of the Bay-Goose Dike construction monitoring program (i.e., due to the start of the Bay-Goose TSS EAS).



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- *September 18* – As part of the Bay-Goose Dike TSS EAS program, near field stations east (EAS-BGE-1) and west (EAS-BGW-1) of the dike construction zone, as well as a far-field station in Second Portage Lake (EAS-SPC-1) were sampled. Reference stations were also sampled in the south basin of Third Portage Lake (EAS-TPS-1) and in the drill trail arm of Second Portage Lake (EAS-DT-1).
 - *September 24 & 26* – Samples were collected as part of the Bay-Goose Dike TSS EAS program at the same stations sampled on September 18.

All samples were acquired by pumping lake water through a weighted flexible (food-grade silicone) tubing and a diaphragm pump connected to a 12 volt battery. Water was collected from discrete depths, usually 3 m. Occasionally, deep (10 – 18 m) water collections occurred in an effort to characterize water quality characteristics of TSS plumes. Procedures for collecting the water samples are outlined in detail in the Standard Operating Procedure (SOP) for Water and Phytoplankton Sampling (AEM, 2009b).

ALS Environmental (Vancouver, BC) provided all of the sampling containers and appropriate preservatives for the water and filter samples. All samples were stored in the dark and kept on ice immediately following collection and during transport to the laboratory. A completed chain-of-custody form accompanied the samples during transport.

Water samples were analyzed for conventional parameters (hardness, conductivity, pH, turbidity, and total dissolved and suspended solids), anions (alkalinity, bromide, chloride, fluoride, silicate and sulfate), nutrients (ammonia, nitrate, nitrite, total Kjeldahl nitrogen (TKN), orthophosphate and total phosphate), organic parameters (chlorophyll- α , dissolved and total organic carbon) and total and dissolved metals.

All of the measured water chemistry concentrations were tabulated, reviewed for quality assurance/ quality control (QA/QC) purposes, then screened against the federal Canadian Council of Ministers of the Environment (CCME, 2007) water quality guidelines for the protection of aquatic life (where available for specific parameters). These guidelines are intended to provide a conservative level of protection to freshwater aquatic life from anthropogenic contaminants or other physical changes (suspended solids, temperature).

2.7. QA/QC

The objective of QA/QC is to assure that the chemical and biological data collected are representative of the material or populations being sampled, are of known quality, are properly documented, and are scientifically defensible. Data quality was assured throughout the collection and analysis of samples using specified standardized procedures, by the employment of laboratories that have been certified for all applicable methods, and by staffing the program with experienced technicians.



ALS Environmental is an analytical laboratory accredited by the Canadian Association of Environmental Analytical Laboratories. This accreditation ensures that laboratories achieve and demonstrate the highest levels of technical and management excellence for their services. Laboratory QA/QC procedures performed on the water and sediment samples met all of the laboratory's internal data quality objectives for precision and completeness defined for this project.

Laboratory QA/QC – Data Quality Objectives (DQOs) are numerically definable measures of analytical precision and completeness. Analytical precision is a measurement of the variability associated with duplicate analyses of the same sample in the laboratory. Completeness for this study is defined as the percentage of valid analytical results. Results that were made uncertain due to missed hold times, improper calibration, contamination of analytical blanks, or poor calibration verification results were deemed invalid.

Duplicate results were assessed using the relative percent difference (RPD) between measurements. The equation used to calculate a RPD is:

$$RPD = \frac{(A - B)}{((A + B)/2)} \times 100$$

where: A = analytical result; B = duplicate result.

The laboratory DQOs for this project were:

- Analytical Precision = 25% RPD for concentrations that exceed 10x the method detection limit (MDL).
- Completeness = 95% valid data obtained.

RPD values may be either positive or negative, and ideally should provide a mix of the two, clustered around zero. Consistently positive or negative values may indicate a bias. Large variations in RPD values are often observed between duplicate samples when the concentrations of analytes are very low and approaching the detection limit. The reason for this is apparent if one considers duplicate samples with concentrations of an analyte of 0.0005 and 0.0007 mg/L. In absolute terms, the concentration difference between the two is only 0.0002 mg/L, a small amount; however, the RPD value is 33.3%. This may sometimes lead to a belief that the level of precision is less than it actually is. RPDs are not calculated for cases where one of the samples (i.e., either A or B above) is below detection and the other is not.

Field QA/QC: Turbidity Monitoring – Field QA included consistently adhering to the monitoring program and using properly maintained and calibrated instruments.

Field QA/QC: Water Sampling – Throughout water sampling field QA standards, as documented (AEM, 2009b), were maintained. This included thoroughly flushing the



flexible tubing and pump to prevent cross-contamination between stations and rinsing the sample containers with site water prior to sample collection.

Field duplicates, equipment blanks and trip blanks were collected at a subset of stations. The field duplicates were used to assess sampling variability and sample homogeneity; a RPD of 50% for concentrations that exceed 10x the MDL is considered acceptable. Trip blanks and equipment blanks were used to assess whether any trip-related or equipment-related cross contamination may have occurred.

2.8. Turbidity-TSS Relationship: Modifications Using 2009 Data

Field measurements of turbidity were used as a surrogate for TSS during dike construction monitoring and dewatering monitoring. Prior to 2009, a limited data set was available which was used to develop a single relationship that was applied to dike construction monitoring and to dewatering (of untreated water⁴) monitoring. Intensive sampling during 2009 has now provided a data set that could support development of a more precise relationship for dike construction monitoring and dewatering monitoring – the relationships should be distinct in theory because conditions during dewatering are fundamentally different from conditions during dike construction.

Details regarding the selection of data sets and statistical methods are provided in **Appendix A**.

⁴ All discussions herein regarding dewatering refer to untreated water and are not applicable to monitoring of treated water.



Table 2-1. Coordinates (UTM, 14W, NAD 83) and depths for Bay-Goose Dike construction routine TSS monitoring stations.

Station	UTM		Water Depth ¹ (m)
	Easting	Northing	
BG West			
BGW-1	638890	7213292	4
BGW-2	638641	7213022	10
BGW-3	638645	7212558	6
BG East			
BGE-6	638870	7212110	4
BGE-5	639057	7212110	22
BGE-4	639162	7212351	16
BGE-3	639171	7212591	22
BGE-2	639267	7212855	14
BGE-1	639408	7213281	6
BG-HVH and BG-H			
BG-HVH1	638711	7211761	2
BG-HVH2, BG-H2 ²	639016	7211788	6
BG-HVH3	639535	7211811	16
BG-HVH4	639521	7212410	6
BG-HVH5, BG-H5 ²	639012	7211243	12

¹ Water depth reported is based on the TSS monitoring depth.

² Station results analysed to full water depth as "BG-H", but only to 6 m depth as "BG-HVH".

Table 2-2. Coordinates (UTM, 14W, NAD 83) for Bay-Goose Dike construction broad TSS monitoring stations.

Station	UTM	
	Easting	Northing
<i>Third Portage Lake - North Basin</i>		
TPN-1	636783	7215130
TPN-2	636612	7215737
TPN-3	635773	7216052
TPN-4	635992	7215130
TPN-5	635797	7214329
TPN-6	636381	7214329
TPN-7	634703	7215567
TPN-8	634860	7214087
TPN-9	635311	7213359
TPN-10	636174	7213346
TPN-11	636916	7213334
TPN-12	636016	7212582
TPN-13	636977	7212509
<i>Third Portage Lake - East Basin</i>		
TPE-1	637476	7211696
TPE-2	638194	7211757
TPE-3	638303	7211211
TPE-4	638534	7210762
TPE-5	637938	7210252
TPE-6	639216	7210459
<i>Second Portage Lake¹</i>		
SP-1	639532	7213723
SP-2	639544	7214329
SP-3	639872	7213917
SP-4	640298	7213820
SP-5	640347	7213310
SP-6	640663	7212630
SP-7	640200	7212752
SP-8	639812	7213189
SP-9	641052	7213128
SP-10	641295	7213589
SP-11	641454	7213917
<i>Tehek Lake</i>		
TE-1	642731	7212218
TE-2	643059	7212836
TE-3	643144	7212376
TE-4	643680	7212667
TE-5	643035	7213274
TE-6	643996	7213419
TE-7	644567	7213249
TE-8	644203	7212873
TE-9	644422	7212327
TE-10	644008	7211926
TE-11	644957	7212023
TE-12	645699	7211999
TE-13	645213	7211454
TE-14	646428	7211248
TE-15	645432	7210714
TE-16	644786	7210701
TE-17	645480	7210082
TE-18	645492	7209366
TE-19	646235	7209779
TE-20	646684	7210556
TE-21	646952	7209342
TE-22	646319	7208565

¹ Water quality samples were also collected at Second Portage Lake stations.

3. RESULTS

3.1. Routine Turbidity Monitoring

Pre-construction turbidity monitoring started 11 days prior to Bay-Goose Dike construction started on 16 July 2009, to characterize baseline conditions. Construction-related monitoring started on 27 July, and ended 7 October, just days prior to freeze-up of Third Portage Lake. A series of photos is provided to document the progression of conditions throughout the construction period (**Photos 3-1 through 3-9**). Monitoring results for each station are shown graphically for each station (**Figure 3-1** [BGW], **3-2** [BGE], **3-3** [HVH and H]; see the text box for guidance in interpreting the plots). Tabularized results are provided in **Appendix B**.

Interpretation Guide to TSS Profile Time Series (Figure 3-1 to 3-3)

- ◆ These plots represent the progression of TSS concentrations at specific monitoring stations throughout the monitoring period.
- ◆ The x axis is reported as “construction days”, with “0” equal to the construction start date (27 July, 2009).
- ◆ Daily monitoring results for the entire depth profile (i.e., the results for each depth sampled) were compiled for the entire monitoring period. Contouring software (Surfer 8, Golden Software®) was then used to “map” the results. Minor adjustments were made to eliminate anomalous contouring results.
- ◆ The plots show where (i.e., at what depth) and when elevated TSS concentration were found, and how conditions changed over time.
- ◆ Moving Average (24-hr and 30-day) results based on maximum TSS values (i.e., the highest TSS values measured in a profile) are shown for comparison.
- ◆ The BGE-3 plot (**Figure 3-2c**) is annotated to explain the causes of key changes and how the results affected the moving average results.

Key results were as follows:

- **General** – Field turbidity measurements⁵ taken in Third Portage Lake (prior to construction) and in other project lakes suggest background concentrations

⁵ Apart from TSS measurements taken to establish the TSS-turbidity relationship or as part of the water quality sampling, all TSS concentrations reported herein are estimates made from direct monitoring of turbidity (see **Section 2.2** for details)



typically of approximately 0.3 to 1 NTU, which, using the final site-specific TSS-turbidity relationship (**Section 2.2**), would equate to approximately 0.2 to 0.6 mg/L TSS. Higher values are possible, such as the 2 mg/L measured in Drilltrail Arm of Second Portage Lake (station SP-11, see **Figure 3-4**).

- **W Stations** – TSS concentrations showed a remarkably similar pattern among BGW stations (**Figure 3-1 a to c**): increasing during the first week of construction, stabilizing for the next two to three weeks, and then increasing again, remaining high for at least a week, followed by a final long, steady decline. By the end of monitoring, in early October, TSS concentrations were not at background, however given more time TSS would likely have reached this level, given the steady nature of the decrease. This will have been achieved during winter under ice-cover. The highest TSS concentrations were recorded in late August and early September and were primarily localized at station BGW-2 at depths > 6 m. This initiated a series of focused surveys (see **Section 3.3**). Both the Short Term Maximum (STM; 24-hr average trigger of 50 mg/L TSS) and the Maximum Monthly Mean (MMM; 7-day average trigger of 15 mg/L TSS) were exceeded at station BGW-2, for a total of 5 (August 28 – September 5) and 29 days (August 30 – September 29), respectively (**Figure 3-1b**). Station BGW-3 also exceeded the MMM trigger (16 days, September 12-27), though never by more than 2 mg/L, and the STM trigger was never exceeded (**Figure 3-1c**). BGW-1 did not exceed either the MMM or STM triggers (**Figure 3-1a**).
- **E Stations** – Of the 6 BGE stations, two were relatively shallow in depth (< 8 m, BGE-1 and 6, **Figures 3-2a and f**) when compared to the other 4 east stations (> 14 m, BGE-2 through BGE-5, **Figures 3-2b through e**). The results for all the BGE stations were fairly similar when considering only the upper water column (i.e., the upper 8 m or so). TSS concentrations were generally below 5 mg/L for the first three weeks of construction, then increased to 5-15 mg/L for most of the remainder of monitoring (except for early September when TSS concentrations in the upper water column generally remained low). The two shallower stations (BGE-1 and BGE-6) never exceeded the STM or MMM trigger values. Results for deeper stations (BGE-2 through BGE-5) were affected by the formation of deep plumes (starting in early August and intensifying by mid to late August) caused by high TSS water escaping from beneath the curtains. Wind events on August 18 and August 31 to September 2, the latter being particularly strong (e.g., 70 (gusting to 100) km/hr winds that severely damaged the silt curtains; see **Photo 3-8, 3-9**), vertically and horizontally mixed the water column over much of the east basin. These four deep BGE stations exceeded both MMM and STM trigger values, generally by mid to late August. The MMM trigger value was exceeded for a mean 36.3 days (range: 27 - 46 days), while the STM trigger value

was exceeded for a mean 4.8 days (range: 3 - 10 days). All stations were once again below trigger values for STM by September 4, and for MMM by October 2. TSS concentrations continued to decline at all BGE stations till monitoring completion on October 7, but not yet returned to background levels by the end of monitoring.

- **HVH and H Stations** – TSS concentration patterns were fairly similar among BG-HVH (**Figure 3-3 a, b, c, e & f**) and BG-H stations (**Figure 3-3 d & g**), increasing gradually over construction, then declining quite gradually (e.g., with most stations still above 5 mg/L in early October). The STM trigger value⁶ was exceeded only once, at station BGH-3 (0-16 m depth profile, **Figure 3-3d**), where elevated TSS concentrations were found at depth. The MMM trigger was exceeded at all BG-HVH and BG-H stations for a mean 31 days (range: 27 - 34 days), with the exception of BGH-5 which never exceeded the trigger value for MMM.

3.2. Broad Turbidity Monitoring

Broad turbidity monitoring was conducted approximately every week or two in the east (TPE) and north (TPN) basins of Third Portage Lake, Second Portage Lake (SP) and Tehek Lake (TE). Monitoring started on July 24, three days prior to the start of dike construction (i.e., to characterize baseline conditions prior to construction), and continued until September 28. Broad turbidity monitoring results for 2009 are plotted in **Figures 3-4 through 3-9** and conditions on September 3, immediately after a major wind event, are shown in **Photos 3-10 through 3-12**.

Key results were as follows:

- North Basin of Third Portage Lake (TPN) – TSS concentrations were low (generally < 1 mg/L) throughout the entire monitoring period.
- East Basin of Third Portage Lake (TPE) – While TSS concentrations increased substantially at the routine monitoring stations, increases were considerably less at the broad turbidity survey stations; TSS in the southern portion of the basin started at approximately 0.2 mg/L and increased to 7 mg/L at most stations. The highest concentration measured at the outlet to Second Portage Lake (BGE-1) was 16.2 mg/L on August 20.
- Second Portage Lake (SP) – TSS concentrations at stations closest to the inflow from Third Portage Lake started to increase slightly very soon after construction.

⁶ Trigger values changed (more stringent) at HVH sites on September 1, to reflect the time when eggs or larvae would be expected to be present.

However, despite the presence of TSS plumes in mid to late August, TSS concentrations never exceeded 5 mg/L in SP. The highest TSS concentration measured at the outlet to Tehek Lake (SP-6) was 1.6 mg/L on September 9.

- Tehek Lake (TE) – TSS concentrations increased slightly in Tehek Lake relative to baseline conditions, never exceeding 1 mg/L.

3.3. Focused Turbidity Surveys

Focused surveys were first initiated to explore the extent of deep TSS plumes identified in the deep basin of the eastern portion of the east basin in the second half of August. Focused surveys were also conducted to determine the effectiveness of the turbidity curtains.

Routine monitoring identified a deep TSS plume in the east basin of Third Portage Lake in the area of stations BGE-2 through BGE-5 (see **Section 3.1**). Target surveys were initiated on August 23 to characterize the extent and magnitude of the east plume and to check that the turbidity barriers were functioning as intended. A period of very calm weather during late August (after the August 18 wind storm) facilitated the intensification and growth of the plume (i.e., due to lack of vertical mixing and continued sediment inputs). These surveys revealed a steadily increasing TSS plume forming in the deep depression of the basin. This period ended on August 31, when strong winds gusting over 100 km/hr for a 3 day period resulted in the complete vertical mixing of the deep plume into the entire water column. Focused monitoring of the east basin continued until September 20 2009. Monitoring results for these areas over time are shown in **Figures 3-10 to 3-17** (see textbox for interpretation guidance).

Interpretation of Focused Survey Maps

- Values shown adjacent “+” symbols represent routine survey results; values without symbols are focused survey locations; all concentrations are mg/L.
- The shaded area represents the zones deeper than 16 m. The deep plume was tracked throughout this zone to document its extent and magnitude.
- Maps should be viewed in colour; main turbidity barriers are purple and the secondary barrier installed across the outlet is red.
- Similar to routine and broad monitoring, depth profiles were conducted at each location; the maximum TSS concentrations are reported for each location.

Key insights from focused surveys of the east plume and surrounding area are as follows:



-
- **August 23-25** – Construction of the Bay-Goose Dike progressed from north to south. Within the first week of construction, TSS concentrations at BGE-2 through BGE-5 increased (as high as 37 mg/L), but then subsided and remained only slightly elevated over background for the next few weeks (**Photos 3-4 and 3-5**). However, by August 21 TSS concentrations had once again increased, this time more dramatically and were focused in the deep depressions, a similar phenomenon as was observed in Second Portage Lake during East Dike construction. This observation led to focused surveys between August 23 and 25 (**Figure 3-10**). Depth profiles (**Figure 3-2 b through e**) showed that the most elevated TSS concentrations were limited to deep water (>16 m), with the upper water column generally much lower. The deep basin zone south of the BGE stations was surveyed extensively, with TSS decreasing (note that TSS concentrations in the southern portion of the >16 m basin were much lower than the northern section). Also areas outside the deep basin generally had low TSS concentrations. Elevated TSS concentrations (>150 mg/L) found adjacent to the turbidity barriers suggest the possible source area for the plume material. Limited sampling west of dike construction indicated that TSS remained low in this area at this time.
 - **August 27** – As construction progressed south, so did the elevated TSS concentration. TSS remained high at sampling locations very close to the east side of dike construction and TSS in the southern portion of the east deep basin increased, though were generally not exceeding routine average short term trigger value (**Figure 3-11**). TSS also started to increase on the western side of dike construction.
 - **August 28** – TSS concentrations were increasing in the southern portion of the deep basin. High concentrations close to the turbidity barriers near BGE-2 suggest this area was the likely source. TSS concentrations in the bathymetric depression at BGW-2 continued to increase; testing near the turbidity barriers did not identify a likely source area.
 - **August 30** – TSS concentrations in the east deep basin continued to increase, but remained constrained by local bathymetry (**Figure 3-13**). TSS concentrations in the small basin near BGW-2 continued to intensify.
 - **August 31** – Conditions in both (i.e., east and west) plumes continued to intensify. This survey focused on the outside of the west turbidity barriers to identify where the TSS was coming from. TSS values collected closest to the west barriers were marginally elevated near BGW-2 but were somewhat higher near BGW-3.

-
- **September 5** – This event was conducted to document conditions in the east basin after the wind storm (**Photos 3-8 through 3-12**) that broke down and vertically mixed the deep sediment plumes. The results showed large decreases in TSS concentrations and much lower vertical gradients, which indicated that vertical mixing had occurred throughout the east basin.
 - **September 19** – In advance of potentially removing the turbidity barriers, this survey focused on quantifying TSS concentrations inside and outside of the turbidity barriers. All TSS concentrations were below 11 mg/L and there was no gradient across the barrier. This suggests that dike construction was no longer a source of TSS.
 - **September 20** – The final focused survey of Bay-Goose Dike construction monitoring was conducted to confirm the results obtained the previous day. TSS concentrations throughout the survey area remained low (all <11 mg/L). There was no gradient between the barriers.

3.4. Water Quality Monitoring

3.4.1. Quality Assurance/Quality Control

QA/QC procedures consisted of a combination of careful field collection and sample handling, the collection of field duplicate samples and the analysis of laboratory replicates and standard reference materials. As stated in **Section 2.6**, in addition to the weekly water quality monitoring conducted for the Bay-Goose Dike construction monitoring, the final two weeks of data were collected as part of the Bay-Goose TSS EAS monitoring program. QA/QC results for both Bay-Goose Dike construction monitoring and TSS EAS monitoring are presented in **Table 3-1** and discussed below.

Duplicate water samples were collected from a random station during each of the sampling events (seven events, BG Dike construction monitoring; two events, TSS EAS monitoring). Field duplicate results for BG Dike construction monitoring were generally consistent with the original samples. The only RPDs to exceed DQOs and have values >10 times the MDL were for chlorophyll-a, which exceeded for three of the seven samples. Similarly, field duplicates collected for TSS EAS monitoring showed a high level of consistency with the original samples, with one sample (EAS-DT-2, September 18) having two parameters (TKN and ammonia) exceeding the DQO (i.e., RPD < 50%) but none of the values were >10 times the MDL.

Laboratory duplicate analyses were performed on randomly chosen samples; the results are shown in **Table 3-1**. In one case, for BG Dike construction monitoring, the DQO for manganese for the laboratory duplicate exceeded 25%; however, the concentration of

manganese was below the detection limit (MDL) in both the original sample and the laboratory duplicate. There were no exceedances in laboratory duplicates for EAS monitoring.

The results for travel and equipment blanks are shown in **Table 3-1**. Nearly all parameters tested were below detection limit, with the following exceptions:

- **Travel Blanks** – TSS (August 8), TKN (July 22; August 8), and total organic carbon (TOC)(July 31).
- **Equipment Blanks** – Dike Construction Monitoring: turbidity (August 29; September 9), ammonia (August 22), TKN (July 23), dissolved inorganic carbon (DOC)(August 8; September 11), and TOC (August 22). EAS monitoring: turbidity (September 19) and ammonia (September 19).

Technically, no parameter measured in a travel blank should exceed detection. This was discussed with the laboratory and the reason for this exceedance could not be identified. However, given that the travel blank samples were never opened at the site, the results suggest an issue with the laboratory (this is exemplified by TSS and TOC). Equipment blanks also should not contain any measured parameters; the significance of the measured values is discussed below:

- **Total TKN** – the measured concentration on July 22 was 0.063 mg/L. The sampling date coincides with the travel blank results, which may be due to some TKN in the laboratory-supplied rinse water. Given that the measured value occurred prior to dike construction, these results will not affect any interpretation of the monitoring results.
- **DOC/TOC** – measured values were marginally above detection limits (August 8, August 22, September 11). However, receiving environment samples were usually within two to four times higher, suggesting a possible influence on the data. Consequently, monitoring results for DOC (August 8 and September 11) and TOC (August 22) are flagged and should be viewed with some caution. This should not affect overall interpretation of the data.
- **Turbidity** – these measured values for Dike Construction Monitoring (August 29, September 4) and EAS monitoring (September 19) are very low relative to actual sample results and will not affect data interpretation.
- **Ammonia** – the measured values (August 22, September 19) are well below CCME guidelines (see **Table 3-2**), so the equipment blank results, while not meeting the DQO, would not affect interpretation of monitoring data.

3.4.2. Water Quality

Water quality monitoring stations for each sampling event are shown in **Figure 2-1**; monitoring results for all ten weekly events are shown in **Table 3-2** and are discussed below by major parameter group (ALS laboratory reports can be found in **Appendix C**):

- *Physical Tests* – TSS concentrations have been discussed in previous sections at length, so the general patterns won't be addressed in this section. The results will be used below as a means of quantifying construction-related influence on particular samples.
- *Anions and Nutrients* – Ammonia and nitrate were both well below CCME guidelines in all samples. Other nitrogen-related compounds, nitrite and TKN, were also relatively low (no CCME guidelines), but were higher in samples with the highest TSS concentrations. Orthophosphate concentrations were generally below MDL; there was no consistent pattern in detected values with TSS concentrations. Total phosphorus was the only parameter to exceed CCME guidelines (using the guideline for ultra-oligotrophic lakes); in general, total phosphorus was higher in samples with elevated TSS concentrations.
- *Organic Carbon* – Dissolved and total results were very similar, without a clear pattern of TOC being higher. This suggests that there is some variability in the parameter and that virtually all organic carbon is present in the dissolved form. There was no clear pattern in DOC or TOC concentrations in relation to TSS.
- *Chlorophyll a* – There was no clear pattern in chlorophyll-a concentrations in relation to TSS.
- *Total and Dissolved Metals* – For total metals, one or more samples exceeded CCME guidelines for aluminum, arsenic, cadmium, chromium, copper, iron, lead, nickel, selenium, silver, and zinc. Of these, most (e.g., arsenic, cadmium, copper, lead [except for BGE-3 on August 8], nickel, selenium, silver, and zinc) were only associated with extremely high TSS concentrations that would have only prevailed in isolated portions of the east basin. However, despite the elevated TSS concentrations and associated metals, dissolved metals only exceeded CCME guidelines for three occasions: lead was marginally above twice and aluminum was above one (due to low pH of 6.49 measured in this sample).

The pattern observed for metals (i.e., high total metals and very low dissolved metals) indicates that the observed metals were largely bound to suspended particulates (e.g., TSS). This pattern was consistent even in the most turbid water sampled, with laboratory-measured TSS at 378 mg/L. This was also consistent with results of last year's monitoring of East Dike construction (Azimuth, 2009). Dissolved metals are considered a much better indicator of potential effects to aquatic life in the water column. The water

quality results suggest that direct toxic effects to aquatic life, even in the highly turbid water, are unlikely.

While direct effects of sediment-bound metals in the water column to aquatic life may be unlikely, settlement of this material remains a concern due to physical smothering and potential toxicity. The potential effects (both chemical and physical) of settled sediments are discussed further in the TSS Effects Assessment Study report (Azimuth, 2010).

3.5. Turbidity-TSS Relationship: Modifications Using 2009 Data

Detailed results and discussion are provided in **Appendix A**. The revised TSS-turbidity relationships are shown below.

Dike Construction Monitoring – The new proposed TSS-turbidity relationship for dike construction monitoring in 2010 is:

$$\log_{10}(\text{turbidity}) = 0.622 + (0.956 * \log_{10}(\text{TSS})),$$

where TSS is measured in the lab in mg/L and turbidity is measured in NTUs in the field using an Analite NEP 160 meter⁷.

This relationship is based on data from focused TSS samples collected during construction of the Bay-Goose dike in 2009, as well as other relevant data collected in 2009 in Second and Third Portage Lakes (sampling associated with the AEMP, the Effects Assessment for the Bay-Goose dike construction, and weekly dike construction water quality). The 2008 data associated with the East Dike were not included because (a) the 2009 data set was very large and covered a range of conditions, and could therefore support derivation of a rigorous relationship without additional data; (b) there was some *a priori* expectation of differences between the two data sets because the nature of construction material used and the placement methods may have changed slightly in 2009; and (c) statistical analysis confirmed a slight, but statistically significant, difference between the 2008 and 2009 data sets.

Dewatering Monitoring (untreated water only; see underlined cautionary note below) –

The new proposed TSS-turbidity relationship for dewatering monitoring is:

$$\log_{10}(\text{turbidity}) = 0.53276 + (0.99276 * \log_{10}(\text{TSS})),$$

where TSS is measured in the lab in mg/L and turbidity is measured in NTUs in the field using an Analite NEP 160 meter.

⁷ Different turbidity probes often differ systematically in their NTU readings. Results from other meters could only be used with the reported TSS-turbidity relationships if they are first converted to Analite NEP 160 equivalence (i.e., by deriving the relationship between observed NTU values for both meter types).

This is based on data from 2009 dewatering of the impounded arm of Second Portage Lake, as well as all of the data related to dike construction from 2008 and 2009. The dewatering data alone are insufficient because (a) they cover only a very limited range of turbidity and TSS values, and cannot be easily extrapolated to higher values; and (b) the data were collected during a narrow time window and their applicability to dewatering conditions in general is unknown. In future it may be possible to exclude the dike construction monitoring data and use only dewatering data, if additional dewatering data are collected across a higher range of turbidity values and at different times of year. This relationship is inappropriate for use on treated water; potential application of this relationship should be reviewed in advance to ensure consistency with the assumptions used in its derivation.



Table 3-1. QA/QC data for 2009 water parameters, Dike Construction Monitoring, 2009.

Dike Construction Monitoring																																		
MDLs	DC-WQ-SP8	DC-WQ-DUP	RPD	DC-WQ-BGE3	DC-WQ-DUP	RPD	DC-WQ-HVH4	DC-WQ-DUP	RPD	Field Duplicate			DC-WQ-SP8	DC-WQ-DUP	RPD	DC-WQ-HVH5	DC-WQ-DUP	RPD	DC-WQ-BGW2	DC-WQ-DUP	RPD	Laboratory Duplicate												
	31-Jul-09	31-Jul-09	(%)	8-Aug-09	8-Aug-09	(%)	16-Aug-09	16-Aug-09	(%)	DC-WQ-BGE1	DC-WQ-DUP	RPD	29-Aug-09	29-Aug-09	(%)	4-Sep-09	4-Sep-09	(%)	11-Sep-09	11-Sep-09	(%)	Original	Duplicate	RPD	Original	Duplicate	RPD	Original	Duplicate	RPD				
CONVENTIONAL PARAMETERS																																		
Physical Tests																																		
Conductivity (µS/cm)	2.0	20.0	19.6	2	15.1	14.7	3	15.1	14.9	1	16.7	16.6	1	16.7	16.5	1	16.7	15.9	5	16.8	16.5	2	-	-	-	14.3	14.3	0	-	-	-	15.7	15.4	2
Hardness (mg/L)	1.1	7.9	8.0	-1	5.5	5.5	0	5.9	5.8	2	6.5	6.4	2	7.7	7.0	10	6.2	6.3	-2	6.1	6.1	0	-	-	-	-	-	-	-	-	-	-	-	
pH	0.10	6.98	6.99	0	6.93	7.01	-1	6.94	6.97	0	6.91	6.95	-1	7.16	7.01	2	7.11	7.05	1	6.82	6.94	-2	7.01	6.96	1	-	-	-	7.05	7.01	1	-	-	-
Total Suspended Solids (mg/L)	1.0	<1.0	<1.0	0	3.4	2.2	43	1.7	1.5	13	3.9	5.7	-38	3.9	3.3	17	6.1	9.3	-42	5.1	4.9	4	-	-	-	-	-	-	-	-	-	-	-	
Total Dissolved Solids (mg/L)	10	13	14	-7	10	14	-33	<10	<10	0	NA	<10	18	NA	13	10	26	15	0	-	-	13	-	-	-	-	-	-	-	-	-	-	-	
Turbidity (NTU)	0.10	1.07	0.65	49	4.22	2.93	36	3.93	3.79	4	28.0	29.6	-6	5.16	6.22	-19	19.7	23.0	-15	13.2	12.2	8	-	-	-	8.54	8.61	-1	-	-	-	5.80	5.77	1
Anions & Nutrients (mg/L)																																		
Alkalinity - Bicarbonate (as CaCO3)	2.0	6.3	6.6	-5	4.6	4.5	2	4.7	4.5	4	4.4	4.4	0	5.6	4.6	20	4.5	4.5	0	4.4	4.6	-4	-	-	-	-	-	-	-	-	-	-	-	
Alkalinity - Carbonate (as CaCO3)	2.0	<2.0	<2.0	0	<2.0	<2.0	0	<2.0	<2.0	0	<2.0	<2.0	0	<2.0	<2.0	0	<2.0	<2.0	0	<2.0	<2.0	0	-	-	-	-	-	-	-	-	-	-	-	
Alkalinity - Hydroxide (as CaCO3)	2.0	<2.0	<2.0	0	<2.0	<2.0	0	<2.0	<2.0	0	<2.0	<2.0	0	<2.0	<2.0	0	<2.0	<2.0	0	<2.0	<2.0	0	-	-	-	-	-	-	-	-	-	-	-	
Alkalinity - Total (as CaCO3)	2.0	6.3	6.6	-5	4.6	4.5	2	4.7	4.5	4	4.4	4.4	0	5.6	4.6	20	4.5	4.5	0	4.4	4.6	-4	-	-	-	-	-	-	-	-	-	-	-	
Ammonia (as N)	0.020	0.035	0.023	41	<0.020	<0.020	0	<0.020	<0.020	0	0.026	0.021	21	0.032	0.022	37	0.022	<0.020	NA	<0.020	<0.020	0	<0.0050	<0.0050	0	0.062	0.068	-9	<0.020	<0.020	0	<0.020	<0.020	0
Bromide	0.050	<0.050	<0.050	0	<0.050	<0.050	0	<0.050	<0.050	0	<0.050	<0.050	0	<0.050	<0.050	0	<0.050	<0.050	0	<0.050	<0.050	0	-	-	-	<0.050	<0.050	0	-	-	-	<0.050	<0.050	0
Chloride	0.50	<0.50	<0.50	0	<0.50	<0.50	0	0.52	0.53	-2	<0.50	<0.50	0	<0.50	<0.50	0	<0.50	<0.50	0	<0.50	<0.50	NA	-	-	-	<0.50	<0.50	0	-	-	-	<0.50	<0.50	0
Fluoride	0.020	0.070	0.070	0	0.045	0.046	-2	0.066	0.064	3	0.046	0.046	0	0.065	0.064	2	0.067	0.067	0	0.066	0.066	0	-	-	-	<0.020	<0.020	0	-	-	-	<0.020	<0.020	0
Nitrate (as N)	0.0050	<0.0050	<0.0050	0	0.0119	0.0104	13	0.0055	0.0061	-10	0.0113	0.0142	46	0.0112	0.0101	10	0.0113	0.0119	-5	0.0081	0.0091	-12	-	-	-	<0.0050	<0.0050	0	-	-	-	<0.0050	<0.0050	0
Nitrite (as N)	0.0010	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	-	-	-	<0.0010	<0.0010	0	-	-	-	<0.0010	<0.0010	0
Total Kjeldahl Nitrogen	0.050	0.084	0.087	-4	0.118	0.117	1	0.093	0.126	-30	0.074	0.10	-30	0.098	0.10	-6	0.13	0.086	40	0.326	0.114	96	0.126	0.146	-15	-	-	-	0.118	0.108	9	-	-	-
Ortho Phosphate (as P)	0.0010	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	-	-	-	-	-	-	<0.0010	<0.0010	0	-	-	-
Total Phosphate (as P)	0.0020	<0.0020	<0.0020	0	<0.0020	<0.0020	0	<0.0020	<0.0020	0	0.0047	0.0056	-17	0.0029	0.0026	11	0.010	0.0069	37	0.0034	0.0039	-14	-	-	-	-	-	-	<0.0020	<0.0020	0	<0.0020	<0.0020	0
Silicate (as SiO2)	1.0	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0	-	-	-	<1.0	<1.0	0	-	-	-	<1.0	<1.0	0
Sulfate (SO4)	0.50	1.89	1.88	1	1.18	1.16	2	1.53	1.55	-1	1.30	1.22	6	1.58	1.49	6	1.45	1.45	0	1.51	1.49	1	-	-	-	<0.50	<0.50	0	-	-	-	<0.50	<0.50	0
ORGANIC / INORGANIC CARBON																																		
Dissolved Organic Carbon (mg/L)	0.50	1.31	1.42	-8	2.03	2.24	-10	1.09	1.15	-5	1.14	1.20	-5	1.28	1.31	-2	1.35	1.15	16	1.31	1.42	-8	1.27	1.26	1	1.42	1.41	1	<0.50	<0.50	0	<0.50	<0.50	0
Total Organic Carbon (mg/L)	0.50	1.42	1.41	1	1.23	1.27	-3	1.18	1.27	-7	1.23	1.15	7	1.32	1.32	0	1.21	1.27	-5	1.27	1.18	7	1.32	1.26	5	1.41	1.41	0	-	-	-	<0.50	<0.50	0
PLANT PIGMENTS																																		
Chlorophyll a (µg/L)	0.010	0.381	0.537	-34	0.290	0.528	-58	0.159	0.466	-98	0.330	0.208	45	0.434	0.397	9	0.548	1.76	-105	0.474	0.484	-2	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL METALS (mg/L)																																		
Aluminum	0.0050	0.0166	0.0170	-2	0.0774	0.0778	-1	0.0879	0.0732	18	0.660	0.734	-11	0.295	0.290	2	0.931	0.810	14	0.567	0.498	13	0.0102	0.01	2	0.148	0.146	1	-	-	-	-	-	-
Antimony	0.00050	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	-	-	-	-	-	-
Arsenic	0.00050	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	0.00081	0.00085	-5	<0.00050	<0.00050	0	0.00084	0.00084	0	0.00056	0.00053	6	<0.00050	<0.00050	0	<0.00050	<0.00050	0	-	-	-	-	-	-
Barium	0.020	<0.020	<0.020	0	<0.020	<0.020	0	<0.020	<0.020	0	<0.020	<0.020	0	<0.020	<0.020	0	<0.020	<0.020	0	<0.020	<0.020	0	-	-	-	<0.020	<0.020	0	-	-	-	<0.020	<0.020	0
Beryllium	0.0010	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	-	-	-	<0.0010	<0.0010	0
Boron	0.10	<0.10	<0.10	0	<0.10	<0.10	0	<0.10	<0.10	0	<0.10	<0.10	0	<0.10	<0.10	0	<0.10	<0.10	0	<0.10	<0.10	0	<0.10	<0.10	0	<0.10	<0.10	0	-	-	-	<0.10	<0.10	0
Cadmium	0.000017	<0.000017	<0.000017	0	<0.000017	<0.000017	0	<0.000017	<0.000017	0	<0.000017	<0.000017	0	<0.000017	<0.000017	0	<0.000017	<0.000017	0	<0.000017	<0.000017	0	<0.000017	<0.000010	0	<0.000017	<0.000010	0	-	-	-	<0.000017	<0.000010	0
Calcium	0.10	2.01	2.04	-1	1.30	1.30	0	1.23	1.19	3	1.41	1.47	-4	1.52	1.51	1	1.44	1.47	-2	1.42	1.41	1	1.24	1.24	0	1.36	1.38	-1	-	-	-	<1.36	<1.38	0
Chromium	0.0010	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	0.0032	0.0038	-17	0.0023	0.0013	0	0.0038	0.0032	0	0.0022	0.0019	15	<											

Table 3-1. QA/QC data for 2009 water parameters, Dike Construction Monitoring, 2009.

Dike Construction Monitoring																												
MDLs	Laboratory Duplicate												Travel Blanks								Equipment Blanks							
	Original 22-Aug-09	Duplicate	RPD (%)	Original 29-Aug-09	Duplicate	RPD (%)	Original 4-Sep-09	Duplicate	RPD (%)	Original 11-Sep-09	Duplicate	RPD (%)	Travel Blk 1 22-Jul-09	Travel Blk 2 31-Jul-09	Travel Blk 3 8-Aug-09	Travel Blk 4 16-Aug-09	Travel Blk 5 22-Aug-09	Travel Blk 6 29-Aug-09	Travel Blk 7 4-Sep-09	Travel Blk 8 11-Sep-09	DC-WQ-BG-EB 23-Jul-09	Eqmt Blks 8-Aug-09	Eqmt Blks 16-Aug-09	DC-WQ-EB 22-Aug-09	DC-WQ-EB 29-Aug-09	DC-WQ-EB 4-Sep-09	DC-WQ-EB 11-Sep-09	
CONVENTIONAL PARAMETERS																												
Physical Tests																												
Conductivity (µS/cm)	2.0	-	-	-	-	-	15.9	16.1	-1	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Hardness (mg/L)	1.1	-	-	-	-	-	-	-	-	-	-	-	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
pH	0.10	-	-	-	-	-	-	-	-	-	-	-	5.60	5.61	5.7	5.62	5.57	-	5.71	5.75	5.60	5.77	5.73	5.83	5.85	5.83	5.88	5.68
Total Suspended Solids (mg/L)	0.50	-	-	-	-	-	-	-	-	-	-	-	<1.0	<1.0	0.14	<1.0	<1.0	-	<1.0	<1.0	<1.0	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids (mg/L)	10	10	11	-10	-	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	-	<10	<10	<10	-	<10	<10	<10	<10	<10	<10
Turbidity (NTU)	0.10	3.01	3.07	-2	6.22	6.52	-5	0.21	0.21	0	22.8	23.0	-1	-	-	-	<0.10	<0.10	-	<0.10	<0.10	-	<0.10	<0.10	0.12	0.21	<0.10	<0.10
Anions & Nutrients (mg/L)																												
Alkalinity - Bicarbonate (as CaCO3)	2.0	-	-	-	-	-	-	-	-	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity - Carbonate (as CaCO3)	2.0	-	-	-	-	-	-	-	-	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity - Hydroxide (as CaCO3)	2.0	-	-	-	-	-	-	-	-	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity - Total (as CaCO3)	2.0	4.4	4.2	5	-	-	-	-	-	7.0	7.1	-1	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Ammonia (as N)	0.020	<0.020	<0.020	0	0.149	0.149	0	0.020	0.022	-10	-	-	<0.0050	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.0050	<0.020	<0.020	0.022	<0.020	<0.020	<0.020	<0.020
Bromide	0.050	<0.050	<0.050	0	-	-	-	<0.050	<0.050	0	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride	0.50	<0.50	<0.50	0	-	-	-	<0.50	<0.50	0	-	-	<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	<0.50	<0.50
Fluoride	0.020	0.067	0.066	2	-	-	-	<0.020	<0.020	0	-	-	<0.020	<0.020	<0.020	<0.020	<0.020	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrate (as N)	0.0050	0.0926	0.0929	0	-	-	-	<0.0050	<0.0050	0	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	0.0010	0.0028	0.0027	4	-	-	-	<0.0010	<0.0010	0	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	0.050	0.100	0.101	-1	0.118	0.104	13	0.129	0.107	19	-	-	0.124	<0.050	0.152	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ortho Phosphate (as P)	0.0010	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Phosphate (as P)	0.0020	-	-	-	-	-	-	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silicate (as SiO2)	1.0	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Sulfate (SO4)	0.50	1.64	1.62	1	-	-	-	<0.50	<0.50	0	-	-	<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	<0.50	<0.50
ORGANIC / INORGANIC CARBON																												
Dissolved Organic Carbon (mg/L)	0.50	<0.50	<0.50	0	1.27	1.26	1	1.35	1.35	0	0.60	0.60	0	<0.50	<0.50	<0.50	<0.50	-	<0.50	-	<0.50	0.73	<0.50	<0.50	<0.50	<0.50	<0.50	0.60
Total Organic Carbon (mg/L)	0.50	0.59	0.60	-2	1.23	1.28	-4	1.21	1.17	3	<0.50	<0.50	0	<0.50	2.61	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.59	<0.50	<0.50	<0.50	<0.50	<0.50
PLANT PIGMENTS																												
Chlorophyll a (µg/L)	0.010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL METALS (mg/L)																												
Aluminum	0.0050	0.734	0.700	5	-	-	-	-	-	0.567	0.504	12	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Antimony	0.00050	<0.00050	<0.00050	0	-	-	-	<0.00050	<0.00050	0	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Arsenic	0.00050	0.00085	0.00083	2	-	-	-	-	-	0.00056	0.00050	11	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Barium	0.020	<0.020	<0.020	0	-	-	-	<0.020	<0.020	0	-	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Beryllium	0.0010	<0.0010	<0.0010	0	-	-	-	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Boron	0.10	<0.10	<0.10	0	-	-	-	<0.10	<0.10	0	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Cadmium	0.000017	<0.000017	<0.000010	-	-	-	-	<0.000017	<0.000010	-	<0.000017	<0.000017	-	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017
Calcium	0.10	1.47	1.47	0	-	-	-	1.42	1.40	1	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chromium	0.0010	0.0038	0.0034	11	-	-	-	0.0022	0.0019	15	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cobalt	0.00030	0.00044	0.00043	2	-	-	-	-	-	0.00031	<0.00030	NA	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Copper	0.0010	0.0015	0.0015	0	-	-	-	0.0011	0.0012	-9	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Iron	0.030	0.920	0.854	7	-	-	-	0.674	0.636	6	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	0.00050	<0.00050	<0.00050	0	-	-	-	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050						

Table 3-1. QA/QC data for 2009 water parameters, Dike Construction Monitoring, 2009.

EAS																							
MDLs	Field Duplicate												Laboratory Duplicate				Travel Blanks		Equipment Blanks				
	EAS-DT-1	Field Dup-1	RPD	EAS-SPC-1	Field Dup-2	RPD	EAS-DT-1	Field Dup-1	RPD	EAS-SPC-1	Field Dup-2	RPD	Original	Duplicate	RPD	Original	Duplicate	RPD	1	2	EAS-EQ-1	EAS-EQ-1	
	18-Sep-09	19-Sep-09	(%)	19-Sep-09	19-Sep-09	(%)	24-Sep-09	24-Sep-09	(%)	26-Sep-09	26-Sep-09	(%)	Mid Sept.	Duplicate	(%)	Late Sept.	Duplicate	(%)	19-Sep-09	26-Sep-09	19-Sep-09	26-Sep-09	
CONVENTIONAL PARAMETERS																							
Physical Tests																							
Conductivity (µS/cm)	2.0	27.1	27.0	0.37	-	-	-	27.0	26.8	0.74	-	-	-	<2.0	<2.0	0	-	-	-	<2.0	<2.0	<2.0	<2.0
Hardness (mg/L)	1.1	11.2	11.2	0	-	-	-	11.3	11.3	0	-	-	-	-	-	-	-	-	-	<1.1	<1.1	<1.1	<1.1
pH	0.10	6.95	6.83	1.74	-	-	-	7.67	7.20	6.32	-	-	-	5.71	5.64	1.23	-	-	-	5.70	5.63	5.71	5.70
Total Suspended Solids (mg/L)	1.0	<1.0	<1.0	0	-	-	-	<1.0	<1.0	0	-	-	-	-	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids (mg/L)	10	12	12	0	-	-	-	12	14	-15	-	-	-	12	<10	NA	-	-	-	<10	<10	<10	<10
Turbidity (NTU)	0.10	0.42	0.46	-9.1	-	-	-	0.49	0.52	-5.9	-	-	-	0.14	0.16	-13	<0.10	<0.10	0	<0.10	<0.10	0.14	<0.10
Anions & Nutrients (mg/L)																							
Alkalinity - Bicarbonate (as CaCO ₃)	2.0	8.9	8.7	2.3	-	-	-	8.5	8.6	-1.2	-	-	-	-	-	-	-	-	-	<2.0	<2.0	<2.0	<2.0
Alkalinity - Carbonate (as CaCO ₃)	2.0	<2.0	<2.0	0	-	-	-	<2.0	<2.0	0	-	-	-	-	-	-	-	-	-	<2.0	<2.0	<2.0	<2.0
Alkalinity - Hydroxide (as CaCO ₃)	2.0	<2.0	<2.0	0	-	-	-	<2.0	<2.0	0	-	-	-	-	-	-	-	-	-	<2.0	<2.0	<2.0	<2.0
Alkalinity - Total (as CaCO ₃)	2.0	8.9	8.7	2.3	-	-	-	8.5	8.6	-1.2	-	-	-	-	-	-	-	-	-	<2.0	<2.0	<2.0	<2.0
Ammonia (as N)	0.020	0.10	0.049	72	-	-	-	<0.020	<0.020	0	-	-	-	0.066	0.066	0	-	-	-	<0.020	<0.020	0.047	<0.020
Bromide	0.050	<0.050	<0.050	0	-	-	-	<0.050	<0.050	0	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050
Chloride	0.50	0.52	0.50	3.9	-	-	-	0.73	<0.50	NA	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50
Fluoride	0.020	0.050	0.053	-5.8	-	-	-	0.038	0.037	2.7	-	-	-	-	-	-	-	-	-	<0.020	<0.020	<0.020	<0.020
Nitrate (as N)	0.0050	<0.0050	<0.0050	0	-	-	-	<0.0050	<0.0050	0	-	-	-	-	-	-	-	-	-	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	0.0010	<0.0010	<0.0010	0	-	-	-	<0.0010	<0.0010	0	-	-	-	-	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	0.050	0.16	0.082	66	-	-	-	0.118	0.124	-4.96	-	-	-	0.163	0.145	11.7	-	-	-	<0.050	<0.050	<0.050	<0.050
Ortho Phosphate (as P)	0.0010	<0.0010	<0.0010	0	-	-	-	<0.0010	<0.0010	0	-	-	-	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	<0.0010	<0.0010
Total Phosphate (as P)	0.0020	<0.0020	0.0022	NA	-	-	-	<0.0020	0.0024	NA	-	-	-	-	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020
Silicate (as SiO ₂)	1.0	<1.0	<1.0	0	-	-	-	<1.0	<1.0	0	-	-	-	-	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0
Sulfate (SO ₄)	0.50	2.67	2.67	0	-	-	-	2.4	2.4	0	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50
ORGANIC / INORGANIC CARBON																							
Dissolved Organic Carbon (mg/L)	0.50	1.64	1.73	-5.34	-	-	-	1.73	1.75	-1.15	-	-	-	<0.50	<0.50	0	<0.50	<0.50	0	-	<0.50	<0.50	<0.50
Total Organic Carbon (mg/L)	0.50	1.68	1.70	-1.18	-	-	-	1.80	1.78	1.12	-	-	-	<0.50	<0.50	0	-	-	-	<0.50	<0.50	<0.50	<0.50
PLANT PIGMENTS																							
Chlorophyll a (µg/L)	0.010	0.331	0.334	-0.90	0.448	0.466	-3.94	0.666	0.639	4.14	0.996	0.929	6.96	-	-	-	-	-	-	-	-	-	-
TOTAL METALS (mg/L)																							
Aluminum	0.0050	0.0097	0.011	-16	-	-	-	0.0166	0.0219	-27.5	-	-	-	-	-	-	0.0166	0.0155	6.85	<0.0050	<0.0050	<0.0050	<0.0050
Antimony	0.00050	<0.00050	<0.00050	0	-	-	-	<0.00050	<0.00050	0	-	-	-	-	-	-	<0.00050	<0.00050	0	<0.00050	<0.00050	<0.00050	<0.00050
Arsenic	0.00050	<0.00050	<0.00050	0	-	-	-	<0.00050	<0.00050	0	-	-	-	-	-	-	<0.00050	<0.00050	0	<0.00050	<0.00050	<0.00050	<0.00050
Barium	0.020	<0.020	<0.020	0	-	-	-	<0.020	<0.020	0	-	-	-	-	-	-	<0.020	<0.020	0	<0.020	<0.020	<0.020	<0.020
Beryllium	0.0010	<0.0010	<0.0010	0	-	-	-	<0.0010	<0.0010	0	-	-	-	-	-	-	<0.0010	<0.0010	0	<0.0010	<0.0010	<0.0010	<0.0010
Boron	0.10	<0.10	<0.10	0	-	-	-	<0.10	<0.10	0	-	-	-	-	-	-	<0.10	<0.10	0	<0.10	<0.10	<0.10	<0.10
Cadmium	0.000017	<0.000017	<0.000017	0	-	-	-	<0.000017	<0.000017	0	-	-	-	-	-	-	<0.000017	<0.000017	-	<0.000017	<0.000017	<0.000017	<0.000017
Calcium	0.10	2.97	2.98	-0.34	-	-	-	2.96	2.95	0.34	-	-	-	-	-	-	2.96	2.95	0.34	<0.10	<0.10	<0.10	<0.10
Chromium	0.0010	<0.0010	<0.0010	0	-	-	-	<0.0010	<0.0010	0	-	-	-	-	-	-	<0.0010	<0.0010	0	<0.0010	<0.0010	<0.0010	<0.0010
Cobalt	0.00030	<0.00030	<0.00030	0	-	-	-	<0.00030	<0.00030	0	-	-	-	-	-	-	<0.00030	<0.00030	0	<0.00030	<0.00030	<0.00030	<0.00030
Copper	0.0010	<0.0010	<0.0010	0	-	-	-	<0.0010	0.0011	NA	-	-	-	-	-	-	<0.0010	<0.0010	0	<0.0010	<0.0010	<0.0010	<0.0010
Iron	0.030	<0.030	<0.030	0	-	-	-	<0.030	<0.030	0	-	-	-	-	-	-	<0.030	<0.030	0	<0.030	<0.030	<0.030	<0.030
Lead	0.00050	<0.00050	<0.00050	0	-	-	-	<0.00050	<0.00050	0	-	-	-	-	-	-	<0.00050	<0.00050	0	<0.00050	<0.00050	<0.00050	<0.00050
Lithium	0.0050	<0.0050	<0.0050	0	-	-	-	<0.0050	<0.0050	0	-	-	-	-	-	-	<0.0050	<0.0050	0	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium	0.10	0.92	0.93	-1.1	-	-	-	0.94	0.95	-1.1	-	-	-	-	-	-	0.94	0.93	1.1	<0.10	<0.10	<0.10	<0.10
Manganese	0.00030	0.00081	0.00086	-6.0	-	-	-	0.000920	0.00115	-22.2	-	-	-	-	-	-	0.00092	0.00086	6.7	<0.00030	<0.00030	<0.00030	<0.00030
Mercury	0.000020	<0.000020	<0.000020	0	-	-	-	<0.000020	<0.000020	0	-	-	-	<0.000020	<0.000020	0	-	-	-	<0.000020	<0.000020	<0.000020	<0.000020
Molybdenum	0.0010	<0.0010	<0.0010	0	-	-	-	<0.0010	<0.0010	0	-	-	-	-	-	-	<0.0010	<0.0010	0	<0.0010	<0.0010	<0.0010	<0.0010
Nickel	0.0010	<0.0010	<0.0010	0	-	-	-	<0.0010	<0.0010	0	-	-	-	-	-	-	<0.0010	<0.0010	0	<0.0010	<0.0010	<0.0010	<0.0010
Potassium	2.0	<2.0	<2.0	0	-	-	-	<2.0	<2.0	0	-	-	-	-	-	-	<2.0	<2.0	0	<2.0	<2.0	<2.0	<2.0
Selenium	0.0010	<0.0010	<0.0010	0	-	-	-	<0.0010	<0.0010	0	-	-	-	-	-	-	<0.0010	<0.0010	0	<0.0010	<0.0010	<0.0010	<0.0010
Silver	0.000020	<0.000020	<0.000020	0	-	-	-	<0.000020	<0.000020	0	-	-	-	-	-	-	<0.000020	<0.000020	0	<0.000020	<0.000020	<0.000020	<0.000020
Sodium	2.0	<2.0	<2.0	0	-	-	-	<2.0	<2.0	0	-	-	-	-	-	-	<2.0	<2.0	0	<2.0	<2.0	<2.0	<2.0
Thallium	0.00020	<0.00020	<0.00020	0	-	-	-	<0.00020	<0.00020	0	-	-	-	-	-	-	<0.00020	<0.00020	0	<0.00020	<0.00020	<0.00020	<0.00020
Tin	0.00050	<0.00050	<0.00050	0	-	-	-	<0.00050	<0.00050	0	-	-	-	-	-	-	<0.00050	<0.00050	0	<0.00050	<0.00050	<0.00050	<0.00050
Titanium	0.010	<0.010	<0.010	0	-	-	-	<0.010	<0.010	0	-	-	-	-	-	-	<0.010	<0.010	0	<0.010	<0.010	<0.010	<0.010
Uranium	0.00020	<0.00020	<0.00020	0	-	-	-	<0.00020	<0.00020	0	-	-	-	-	-	-	<0.00020	<0.00020	0	<0.00020	<0.00020	<0.00020	<0.00020
Vanadium	0.0010	<0.0010	<0.0010	0	-	-	-	<0.0010	<0.0010	0	-	-	-	-	-	-	<0.0010	<0.0010	0	<0.0010	<0.0010	<0.0010	<0.0010
Zinc	0.0050	<0.0050	<0.0050	0	-	-	-	<0.0050	<0.0050	0	-	-	-	-	-	-	<0						

Table 3-2. Conventional water chemistry and total and dissolved metals (mg/L), Dike Construction Monitoring, 2009.

[illegible]

Notes:

NG = no guideline.

¹CCME (Canadian Council of Ministers of the Environment)

³Aluminum guideline is all dependent.

⁴Chromium guideline is for Cr VI.

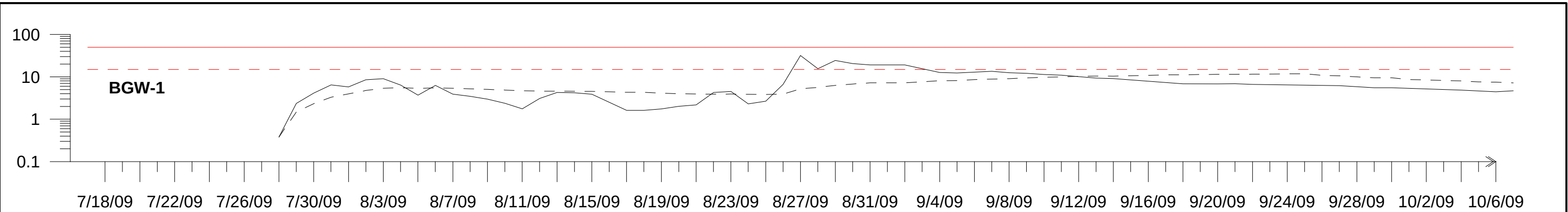
⁵Guidelines have not yet been made for "Dissolved Metals," thus were screened against CCME guidelines for "Total Metals."

*Cadmium, copper, lead and nickel guidelines are hardness dependent.

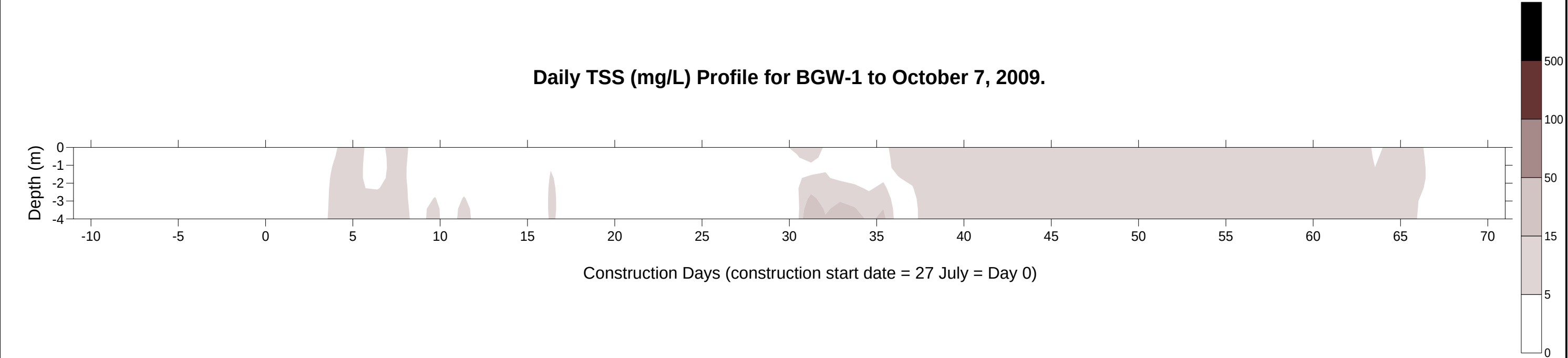
Shaded concentrations exceed the CCME guideline

Table 3-2. Conventional water chemistry and total and dissolved metals (mg/L), Dike Construction Monitoring, 2009.

Lake & Basin		Second Portage Lake												EAS Monitoring									
Station ID		DC-WQ-SP6	DC-WQ-SP8	DC-WQ-SP8	DC-WQ-SP8	DC-WQ-SP8	DC-WQ-SP8	DC-WQ-SP6	DC-WQ-SP8	DC-WQ-SP6	DC-WQ-SP8	DC-WQ-SP6	DC-WQ-SP8	EAS-BGW-1	EAS-BGW-1	EAS-BGE-1	EAS-BGE-1	EAS-TPS-1	EAS-TPS-1	EAS-SPC-1	EAS-SPC-1	EAS-DT-1	EAS-DT-1
Depth (m)	CCME (2007)	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Date	Guideline ²	31-Jul-09	31-Jul-09	8-Aug-09	17-Aug-09	21-Aug-09	29-Aug-09	29-Aug-09	4-Sep-09	4-Sep-09	11-Sep-09	11-Sep-09	11-Sep-09	18-Sep-09	24-Sep-09	18-Sep-09	26-Sep-09	17-Sep-09	27-Sep-09	19-Sep-09	26-Sep-09	18-Sep-09	24-Sep-09
CONVENTIONAL PARAMETERS																							
Physical Tests																							
Conductivity (µS/cm)	NG	21.8	20.0	21.3	21.6	21.2	21.3	16.7	21.6	21.5	22.9	22.8	22.3	16.9	17.0	16.8	16.7	14.9	15.1	23.1	23.0	27.1	27.0
Hardness (mg/L)	NG	8.8	7.9	8.6	9.1	8.9	8.9	7.7	9.0	9.2	9.4	9.3	9.1	6.00	6.40	6.10	6.30	4.90	5.30	9.20	9.40	11.2	11.3
pH	6.5 - 9.0	6.91	6.98	6.92	6.77	7.04	6.67	7.16	6.49	6.74	7.31	7.30	7.29	7.00	6.97	6.91	6.92	6.88	6.92	6.77	7.41	6.95	7.67
Total Suspended Solids (mg/L)	NG	<1.0	<1.0	<1.0	<1.0	1.5	1.3	3.9	1.5	<1.0	1.9	1.3	2.9	5.8	9.1	8.6	7.9	1.0	<1.0	1.8	1.3	<1.0	<1.0
Total Dissolved Solids (mg/L)	NG	20	13	17	12	14	19	<10	<10	17	17	20	16	10	10	<10	<10	15	<10	11	<10	12	12
Turbidity (NTU)	NG	1.04	1.07	0.69	1.69	4.99	1.89	5.16	5.03	2.49	1.95	3.09	4.27	9.47	11.2	12.5	16.3	0.30	0.53	2.06	2.70	0.42	0.49
Anions & Nutrients (mg/L)																							
Alkalinity - Bicarbonate (as CaCO ₃)	NG	6.8	6.3	7.2	6.7	6.4	6.6	5.6	6.6	6.6	7.0	7.1	6.9	4.9	4.5	4.4	5.1	3.7	4.2	6.9	7.6	8.9	8.5
Alkalinity - Carbonate (as CaCO ₃)	NG	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity - Hydroxide (as CaCO ₃)	NG	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity - Total (as CaCO ₃)	NG	6.8	6.3	7.2	6.7	6.4	6.6	5.6	6.6	6.6	7.0	7.1	6.9	4.9	4.5	4.4	5.1	3.7	4.2	6.9	7.6	8.9	8.5
Ammonia (as N) ³	0.274 - 81.6	<0.020	0.035	<0.020	<0.020	0.125	<0.020	0.032	0.022	<0.020	0.027	<0.020	0.025	0.066	<0.020	0.092	<0.020	0.094	0.024	0.020	<0.020	0.104	<0.020
Bromide	NG	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride	NG	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.51	0.51	0.52	0.5	<0.50	0.58	<0.50	0.55	<0.50	0.59	<0.50	0.52	0.73
Fluoride	NG	0.069	0.070	0.041	0.033	0.042	0.060	0.065	0.061	0.060	0.060	0.061	0.062	0.062	0.047	0.067	0.046	0.055	0.04	0.056	0.042	0.05	0.038
Nitrate (as N)	2.9	<0.050	<0.050	<0.050	<0.050	0.0083	<0.050	0.011	<0.050	<0.050	<0.050	<0.050	<0.050	0.011	0.010	0.014	0.013	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Nitrite (as N)	0.06	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Total Kjeldahl Nitrogen	NG	0.087	0.084	0.13	0.12	0.079	0.12	0.098	0.11	0.089	0.16	0.13	0.14	0.080	0.095	0.083	0.10	0.13	0.070	0.089	0.13	0.16	0.12
Ortho Phosphate (as P)	NG	<0.0010	<0.0010	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Phosphate (as P)	0.004	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	<0.0020	0.0029	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0039	0.0064	0.0058	0.0071	<0.0020	<0.0020	0.0020	0.0030	<0.0020	<0.0020
Silicate (as SiO ₂)	NG	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Sulfate (SO ₄)	NG	2.09	1.89	1.78	1.89	1.84	2.06	1.58	2.05	2.10	2.17	2.18	2.12	1.45	1.27	1.51	1.22	1.44	1.14	2.19	1.91	2.67	2.4
ORGANIC / INORGANIC CARBON																							
Dissolved Organic Carbon (mg/L)	NG	1.45	1.31	1.74	1.56	1.48	1.44	1.28	1.44	1.45	1.5	1.52	1.39	1.16	1.30	1.08	1.12	1.22	4.45	1.54	1.60	1.64	1.73
Total Organic Carbon (mg/L)	NG	1.50	1.42	1.63	1.61	1.56	1.51	1.32	1.44	1.43	1.52	1.43	1.45	1.06	1.08	1.11	1.17	1.21	1.31	1.47	1.47	1.68	1.80
PLANT PIGMENTS																							
Chlorophyll a - standardized (µg/L)	NG	0.516	0.381	0.396	0.355	0.418	0.391	0.434	0.747	0.488	0.448	0.462	0.536	0.308	0.715	0.268	0.697	0.159	0.728	0.448	0.996	0.331	0.666
TOTAL METALS (mg/L)																							
Aluminum ¹	0.005 - 0.100	0.0155	0.0166	0.0214	0.0359	0.134	0.0933	0.295	0.140	0.0834	0.0924	0.101	0.0781	0.41	0.27	0.51	0.63	0.008	0.015	0.071	0.098	0.010	0.017
Antimony	NG	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Arsenic	0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00054	<0.00050	0.00061	0.00066	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Barium	NG	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Beryllium	NG	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Boron	NG	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Cadmium*	0.0000026 - 0.0000050	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017
Calcium	NG	2.27	2.01	2.30	2.15	2.11	2.30	1.52	2.33	2.23	2.36	2.35	2.19	1.42	1.56	1.44	1.49	1.17	1.20	2.41	2.42	2.97	2.96
Chromium ⁴	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0017	0.0013	0.0021	0.0028	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cobalt	NG	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	0.00032	0.00035	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Copper*	0.002 - 0.004	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	<0.0010	0.0013	0.0013	0.0013	0.0013	<0.0010	<0.0010	<0.0010	<0.0010
Iron	0.300	<0.030	<0.030	<0.030	0.0470	0.176	0.101	0.369	0.181	0.106	0.121	0.128	0.101	0.54	0.46	0.66	0.78	<0.030	0.031	0.087	0.12	<0.030	<0.030
Lead*	0.001 - 0.007	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Lithium	NG	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Magnesium	NG	0.76	0.71	0.74	0.75	0.77	0.80	0.74	0.85	0.80	0.83	0.83	0.78	0.76	0.77	0.79	0.87	0.53	0.57	0.82	0.86	0.92	0.94
Manganese	NG	0.00126	0.0013	0.00126	0.00156	0.00340	0.00231	0.00655	0.00323	0.00285	0.00269	0.00277	0.00250	0.0094	0.0074	0.012	0.013	0.00070	0.0011	0.0021	0.0028	0.0081	0.0092
Mercury	0.0000026	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0													



Daily TSS (mg/L) Profile for BGW-1 to October 7, 2009.

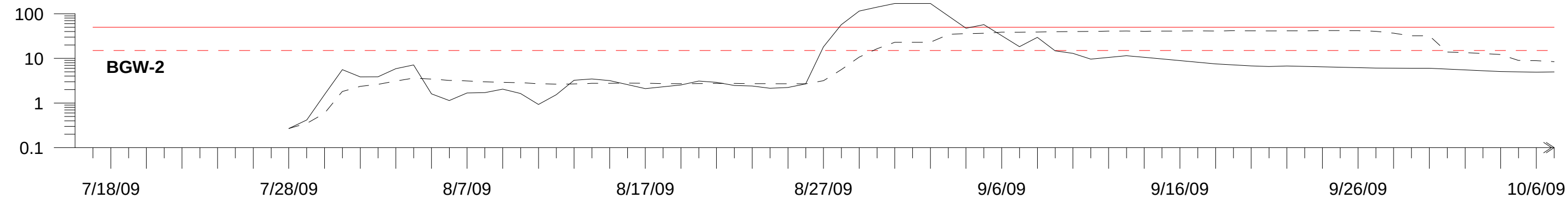


Legend	TSS Trigger Values (mg/L)		
— 24-hr Trigger	Station	24-hr Ave	30-d Ave
- - - 30-d Trigger	BGW/BGE	50	15
— 24-hr Ave TSS	BGH _a	50	15
- - - 30-d Ave TSS	BGH _b	25	6
	a = prior to Sept 1		
	b = after Sept 1		

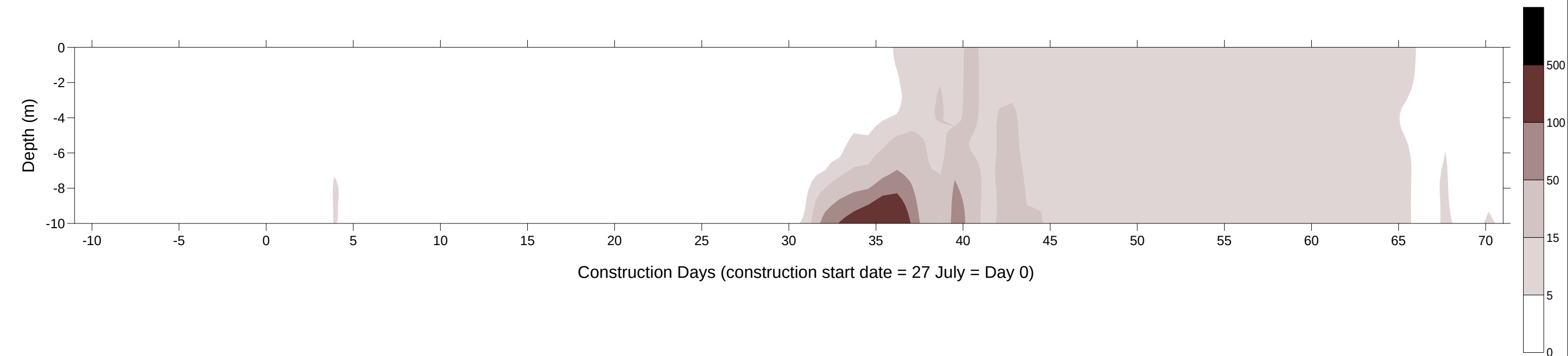

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MEADOWBANK GOLD PROJECT
BAY-GOOSE DIKE CONSTRUCTION
TSS TIME SERIES PROFILING RESULTS FOR BGW-1

FIGURE 3-1a



Daily TSS (mg/L) Profiling for BGW-2 to October 7, 2009.

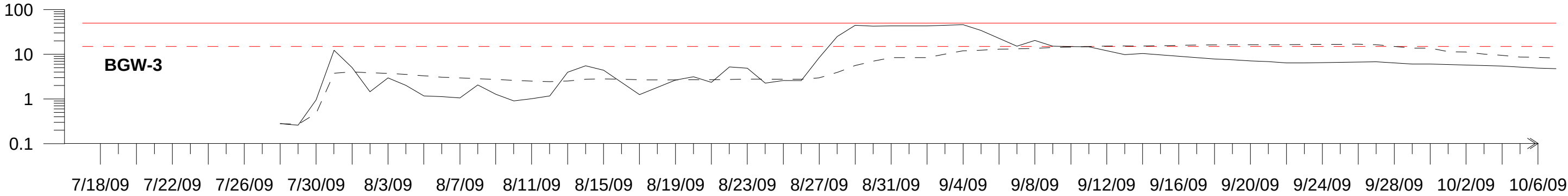


Legend	TSS Trigger Values (mg/L)		
— 24-hr Trigger	Station	24-hr Ave	30-d Ave
- - - 30-d Trigger	BGW/BGE	50	15
— 24-hr Ave TSS	BGH _a	50	15
- - - 30-d Ave TSS	BGH _b	25	6
	a = prior to Sept 1		
	b = after Sept 1		

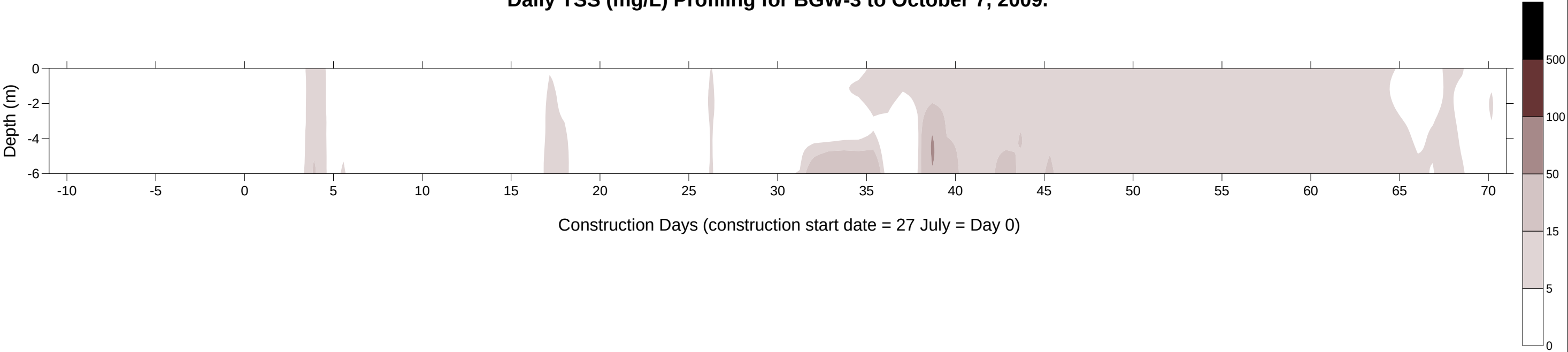

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MEADOWBANK GOLD PROJECT
BAY-GOOSE DIKE CONSTRUCTION
TSS TIME SERIES PROFILING RESULTS FOR BGW-2

FIGURE 3-1b



Daily TSS (mg/L) Profiling for BGW-3 to October 7, 2009.



Legend	TSS Trigger Values (mg/L)		
24-hr Trigger	Station	24-hr Ave	30-d Ave
30-d Trigger	BGW/BGE	50	15
24-hr Ave TSS	BGH _a	50	15
30-d Ave TSS	BGH _b	25	6
	a = prior to Sept 1		
	b = after Sept 1		

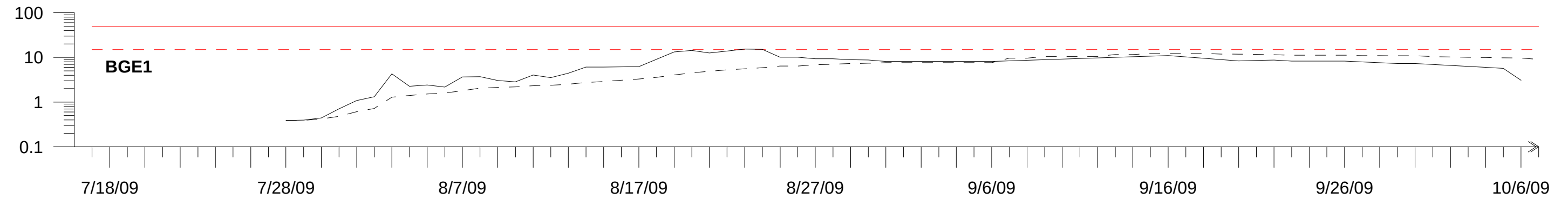


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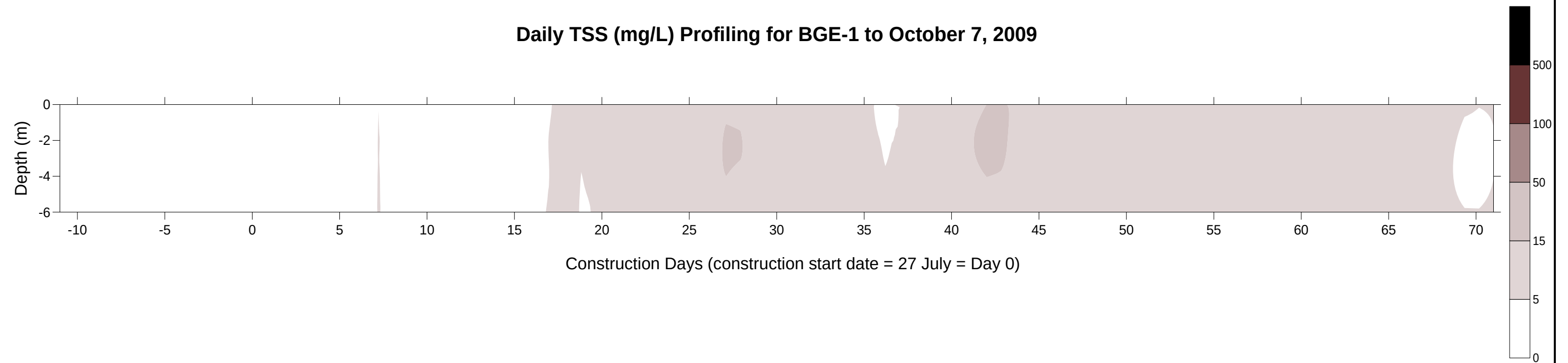
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BAY-GOOSE DIKE CONSTRUCTION

TSS TIME SERIES PROFILING RESULTS FOR BGW-3

FIGURE 3-1c

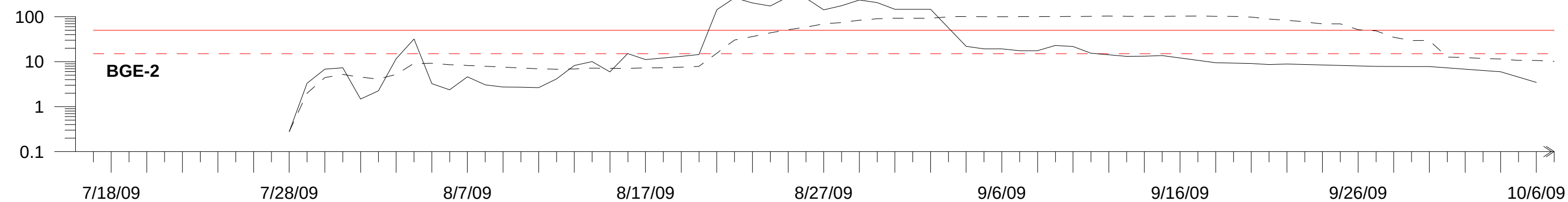


Daily TSS (mg/L) Profiling for BGE-1 to October 7, 2009

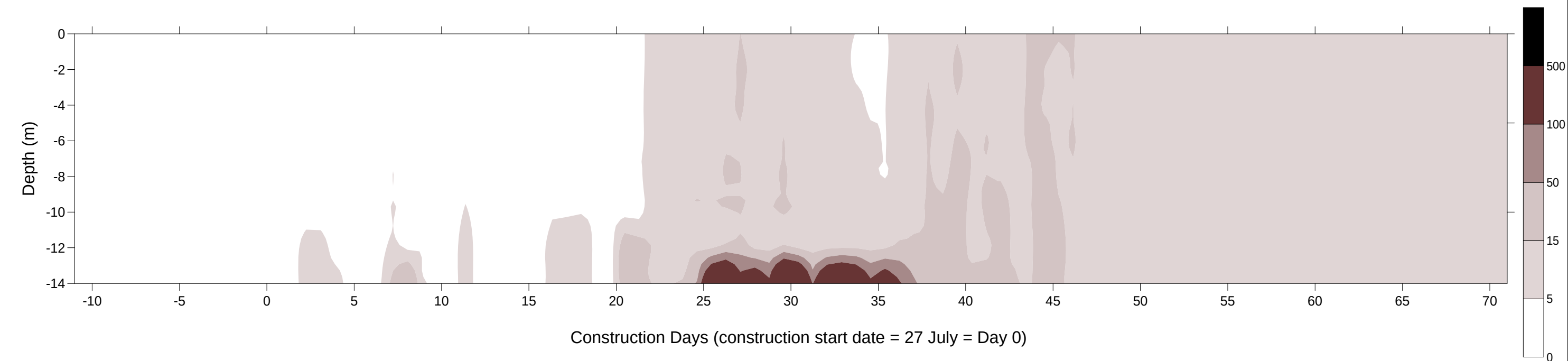


Legend	TSS Trigger Values (mg/L)		
—— 24-hr Trigger	Station	24-hr Ave	30-d Ave
- - - - 30-d Trigger	BGW/BGE	50	15
—— 24-hr Ave TSS	BGH _a	50	15
- - - - 30-d Ave TSS	BGH _b	25	6
	a = prior to Sept 1		
	b = after Sept 1		

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	TSS TIME SERIES PROFILING RESULTS FOR BGE-1
FIGURE 3-2a	



Daily TSS (mg/L) Profiling for BGE-2 to October 7, 2009.



Legend	TSS Trigger Values (mg/L)		
— 24-hr Trigger	Station	24-hr Ave	30-d Ave
- - - 30-d Trigger	BGW/BGE	50	15
— 24-hr Ave TSS	BGH _a	50	15
- - - 30-d Ave TSS	BGH _b	25	6
	a = prior to Sept 1		
	b = after Sept 1		

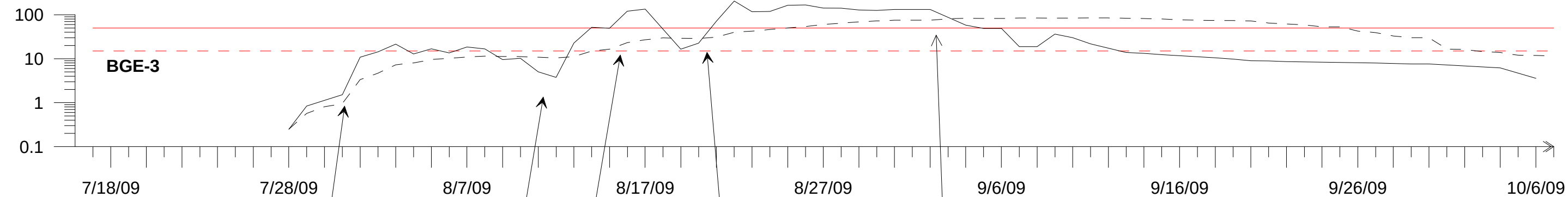


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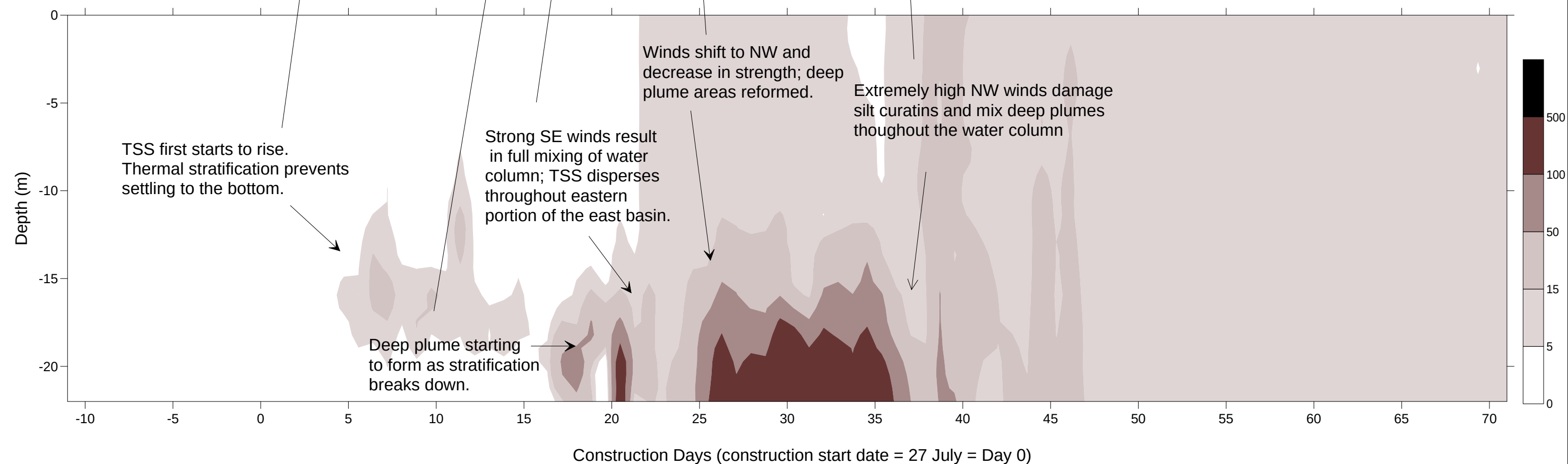
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BAY-GOOSE DIKE CONSTRUCTION

TSS TIME SERIES PROFILING RESULTS FOR BGE-2

FIGURE 3-2b

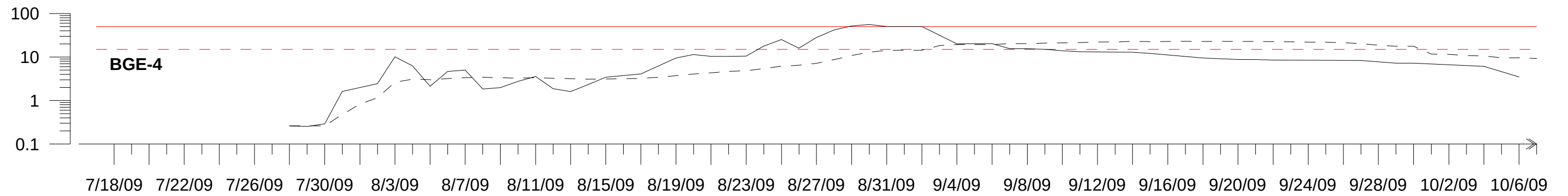


Daily TSS (mg/L) Profiling for BGE-3 to October 7, 2009

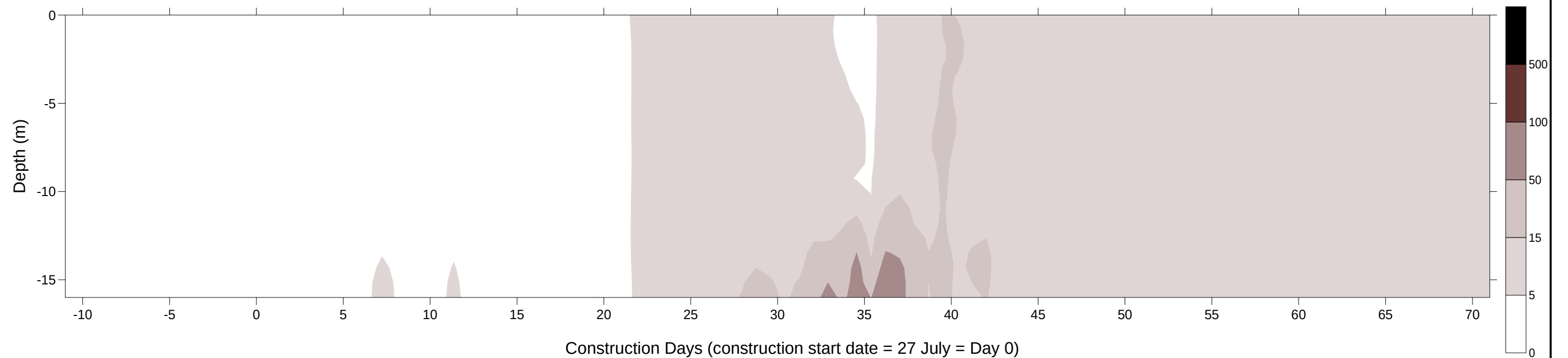


Legend	TSS Trigger Values (mg/L)		
— 24-hr Trigger	Station	24-hr Ave	30-d Ave
- - - 30-d Trigger	BGW/BGE	50	15
— 24-hr Ave TSS	BGH _a	50	15
- - - 30-d Ave TSS	BGH _b	25	6
	a = prior to Sept 1		
	b = after Sept 1		

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	TSS TIME SERIES PROFILING RESULTS FOR BGE-3
	FIGURE 3-2c

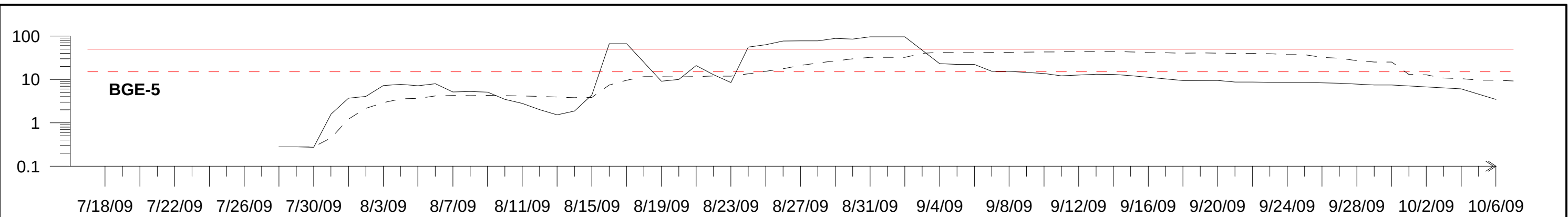


Daily TSS (mg/L) Profiling for BGE-4 to October 7, 2009.

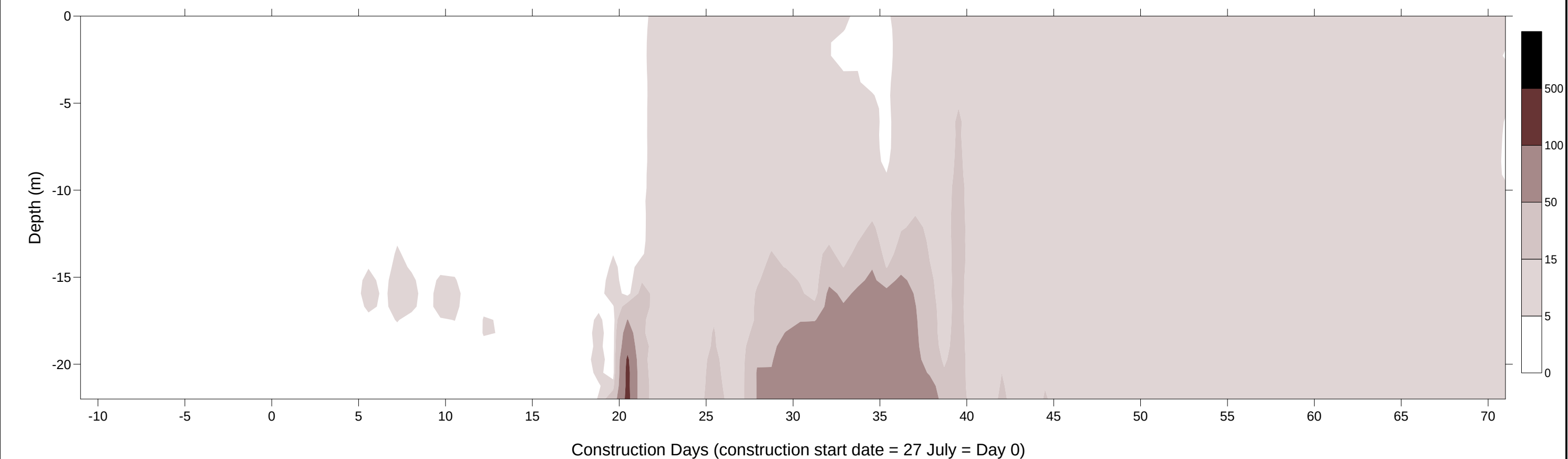


Legend	TSS Trigger Values (mg/L)		
— 24-hr Trigger	Station	24-hr Ave	30-d Ave
- - - 30-d Trigger	BGW/BGE	50	15
— 24-hr Ave TSS	BGH _a	50	15
- - - 30-d Ave TSS	BGH _b	25	6
	a = prior to Sept 1		
	b = after Sept 1		

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	TSS TIME SERIES PROFILING RESULTS FOR BGE-4
FIGURE 3-2d	



Daily TSS (mg/L) Profiling for BGE-5 to October 7, 2009



Legend	TSS Trigger Values (mg/L)		
— 24-hr Trigger	Station	24-hr Ave	30-d Ave
- - - 30-d Trigger	BGW/BGE	50	15
— 24-hr Ave TSS	BGH _a	50	15
- - - 30-d Ave TSS	BGH _b	25	6
	a = prior to Sept 1		
	b = after Sept 1		



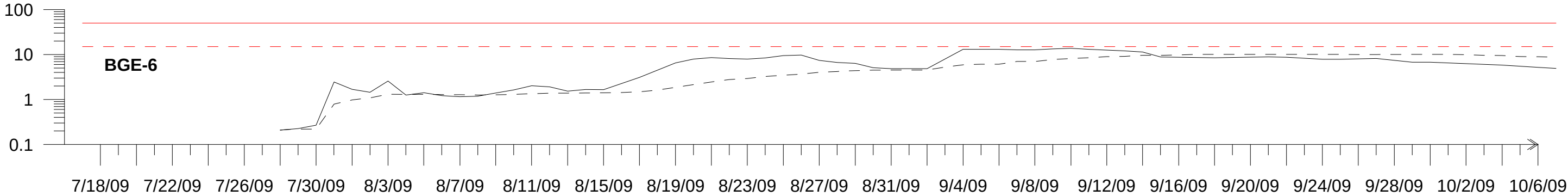
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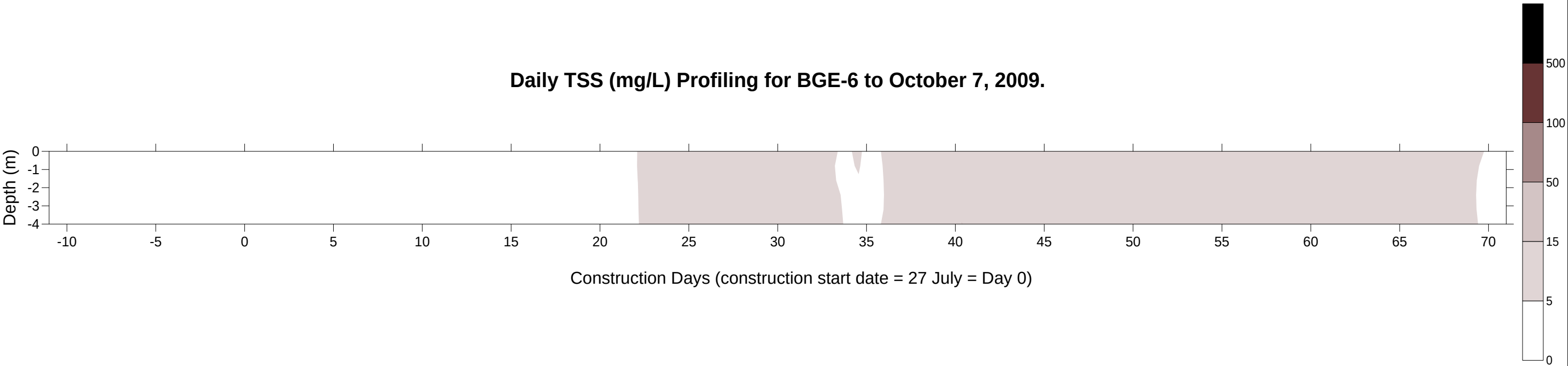
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TSS TIME SERIES PROFILING RESULTS FOR BGE-5

FIGURE 3-2e



Daily TSS (mg/L) Profiling for BGE-6 to October 7, 2009.



Legend	TSS Trigger Values (mg/L)		
— 24-hr Trigger	Station	24-hr Ave	30-d Ave
- - - 30-d Trigger	BGW/BGE	50	15
— 24-hr Ave TSS	BGH _a	50	15
- - - 30-d Ave TSS	BGH _b	25	6
	a = prior to Sept 1		
	b = after Sept 1		

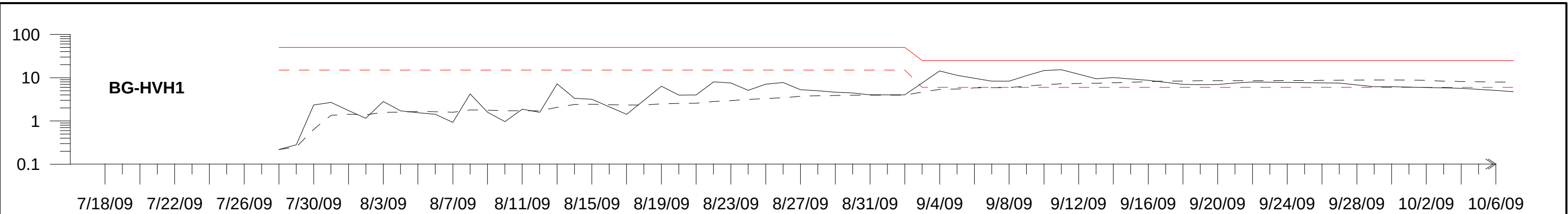


Azimuth Consulting Group Inc.

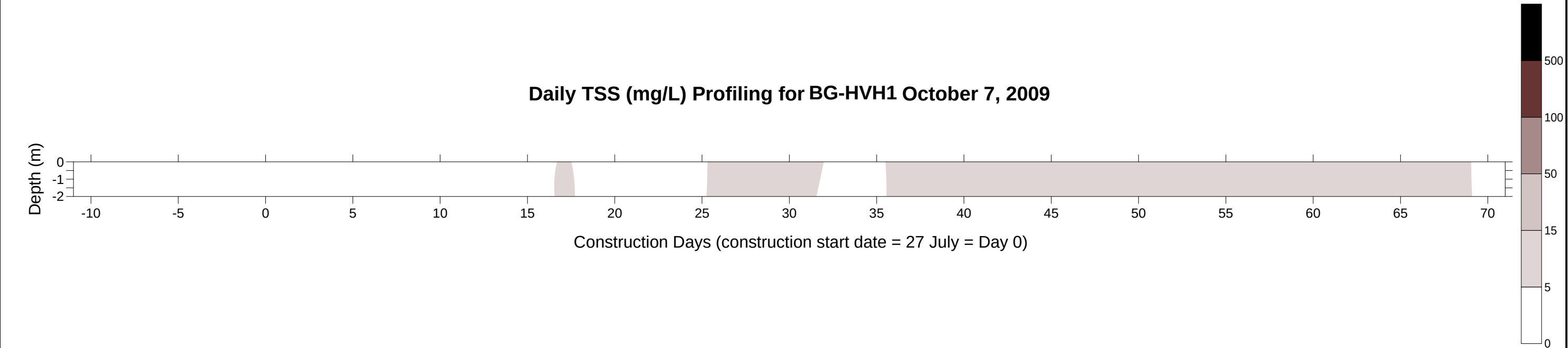
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BAY-GOOSE DIKE CONSTRUCTION

TSS TIME SERIES PROFILING RESULTS FOR BGE-6

FIGURE 3-2f



Daily TSS (mg/L) Profiling for BG-HVH1 October 7, 2009

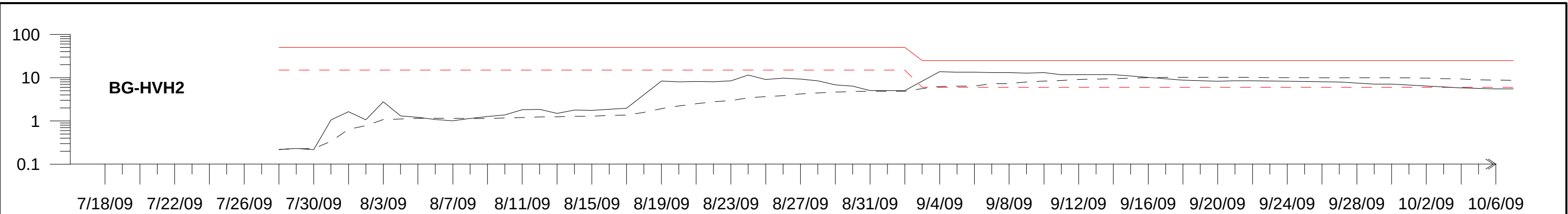


Legend	TSS Trigger Values (mg/L)		
— 24-hr Trigger	Station	24-hr Ave	30-d Ave
- - - 30-d Trigger	BGW/BGE	50	15
— 24-hr Ave TSS	BGH _a	50	15
- - - 30-d Ave TSS	BGH _b	25	6
	a = prior to Sept 1		
	b = after Sept 1		

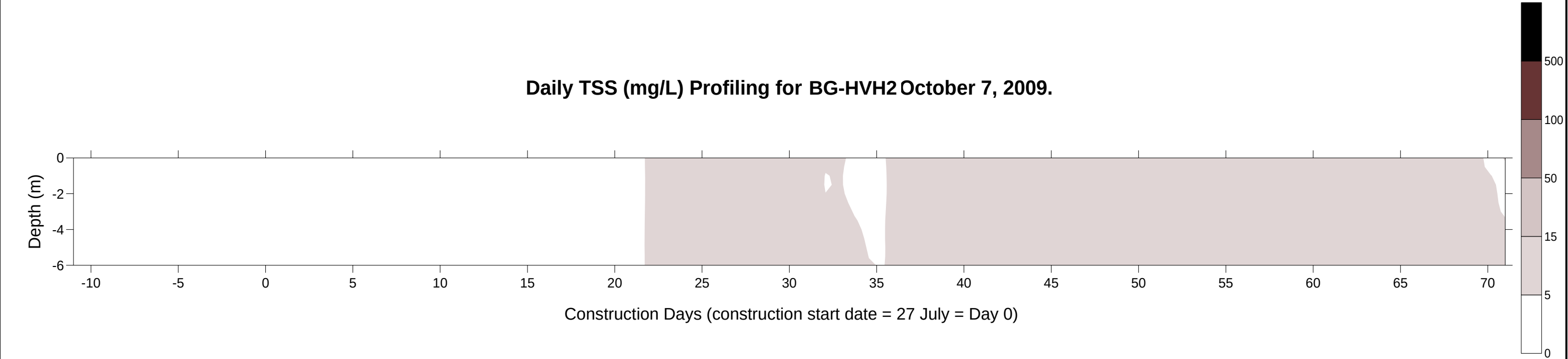

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MEADOWBANK GOLD PROJECT
BAY-GOOSE DIKE CONSTRUCTION
TSS TIME SERIES PROFILING RESULTS FOR BG-HVH1

FIGURE 3-3a



Daily TSS (mg/L) Profiling for BG-HVH2 October 7, 2009.

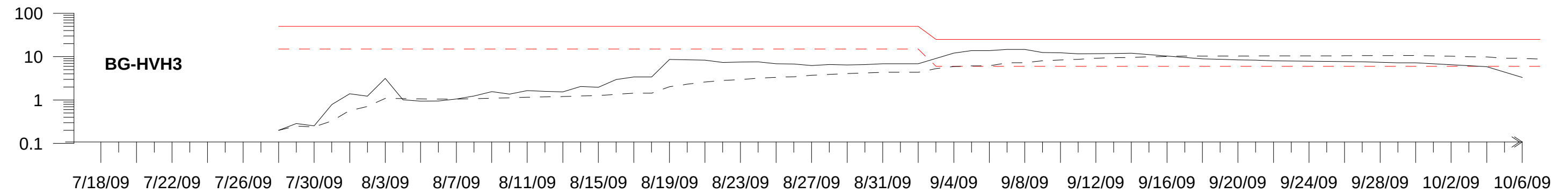


Legend	TSS Trigger Values (mg/L)		
— 24-hr Trigger	Station	24-hr Ave	30-d Ave
- - - 30-d Trigger	BGW/BGE	50	15
— 24-hr Ave TSS	BGH _a	50	15
- - - 30-d Ave TSS	BGH _b	25	6
	a = prior to Sept 1		
	b = after Sept 1		

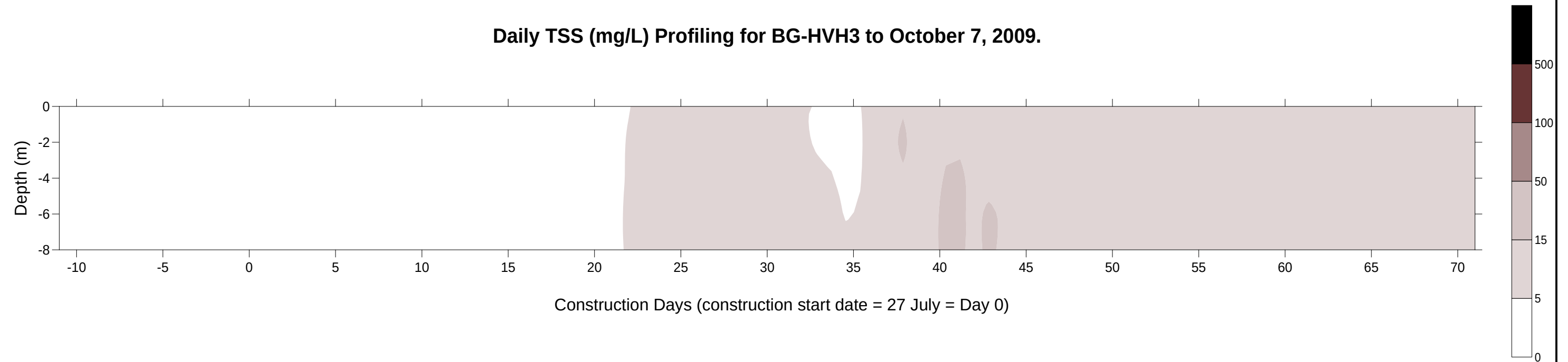

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MEADOWBANK GOLD PROJECT
BAY-GOOSE DIKE CONSTRUCTION
TSS TIME SERIES PROFILING RESULTS FOR BG-HVH2

FIGURE 3-3b

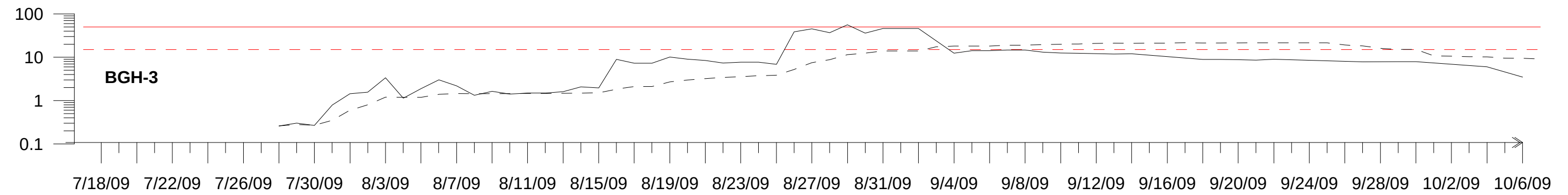


Daily TSS (mg/L) Profiling for BG-HVH3 to October 7, 2009.

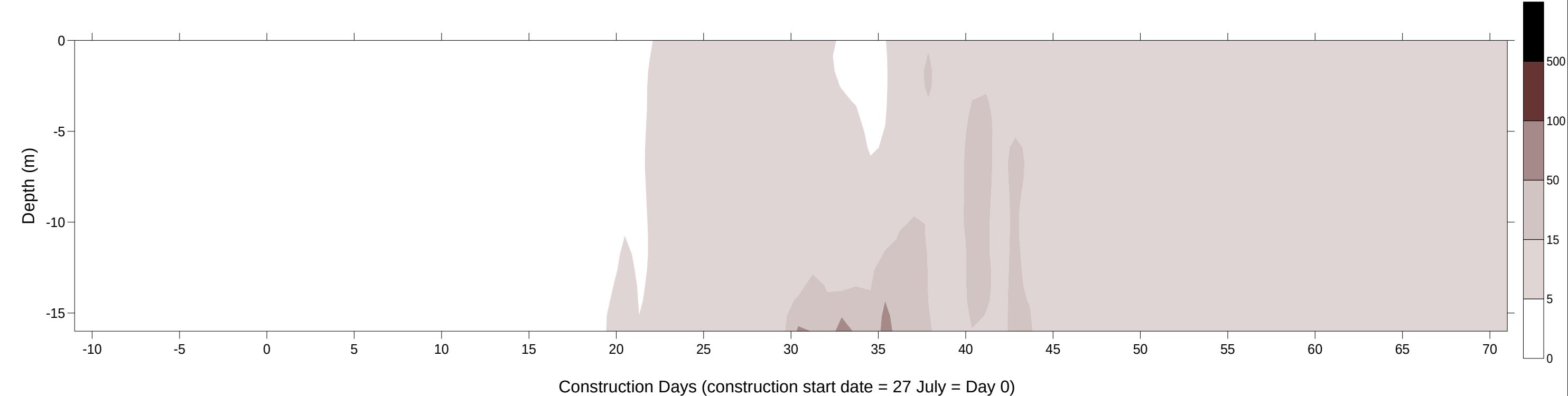


Legend	TSS Trigger Values (mg/L)		
— 24-hr Trigger	Station	24-hr Ave	30-d Ave
- - - 30-d Trigger	BGW/BGE	50	15
— 24-hr Ave TSS	BGH _a	50	15
- - - 30-d Ave TSS	BGH _b	25	6
	a = prior to Sept 1		
	b = after Sept 1		

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	MEADOWBANK GOLD PROJECT BAY-GOOSE DIKE CONSTRUCTION
	TSS TIME SERIES PROFILING RESULTS FOR BG-HVH3
FIGURE 3-3c	



Daily TSS (mg/L) Profiling for BGH-3 to October 7, 2009.



Legend	TSS Trigger Values (mg/L)		
— 24-hr Trigger	Station	24-hr Ave	30-d Ave
- - - 30-d Trigger	BGW/BGE	50	15
— 24-hr Ave TSS	BGH _a	50	15
- - - 30-d Ave TSS	BGH _b	25	6
	a = prior to Sept 1		
	b = after Sept 1		

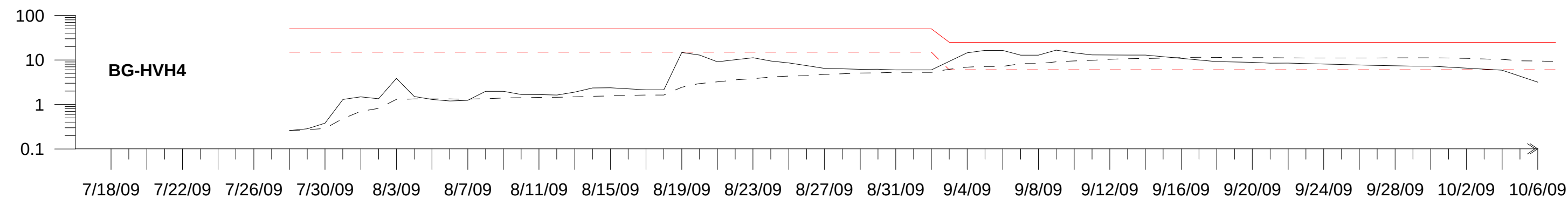


Azimuth Consulting Group Inc.

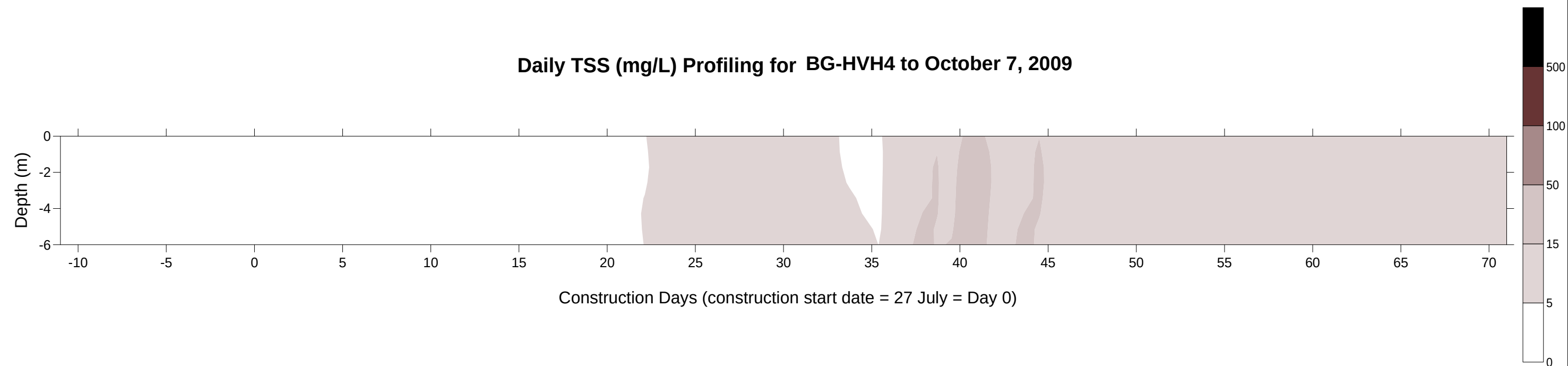
MEADOWBANK GOLD PROJECT
BAY-GOOSE DIKE CONSTRUCTION

TSS TIME SERIES PROFILING RESULTS FOR BGH-3

FIGURE 3-3d



Daily TSS (mg/L) Profiling for BG-HVH4 to October 7, 2009

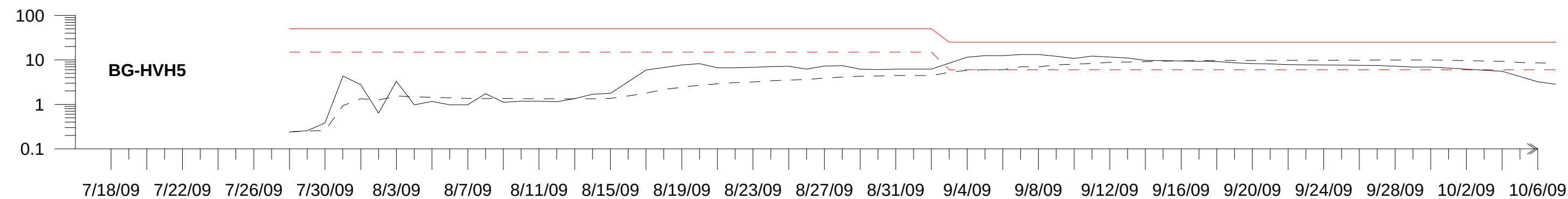


Legend	TSS Trigger Values (mg/L)		
— 24-hr Trigger	Station	24-hr Ave	30-d Ave
- - - 30-d Trigger	BGW/BGE	50	15
— 24-hr Ave TSS	BGH _a	50	15
- - - 30-d Ave TSS	BGH _b	25	6
	a = prior to Sept 1		
	b = after Sept 1		

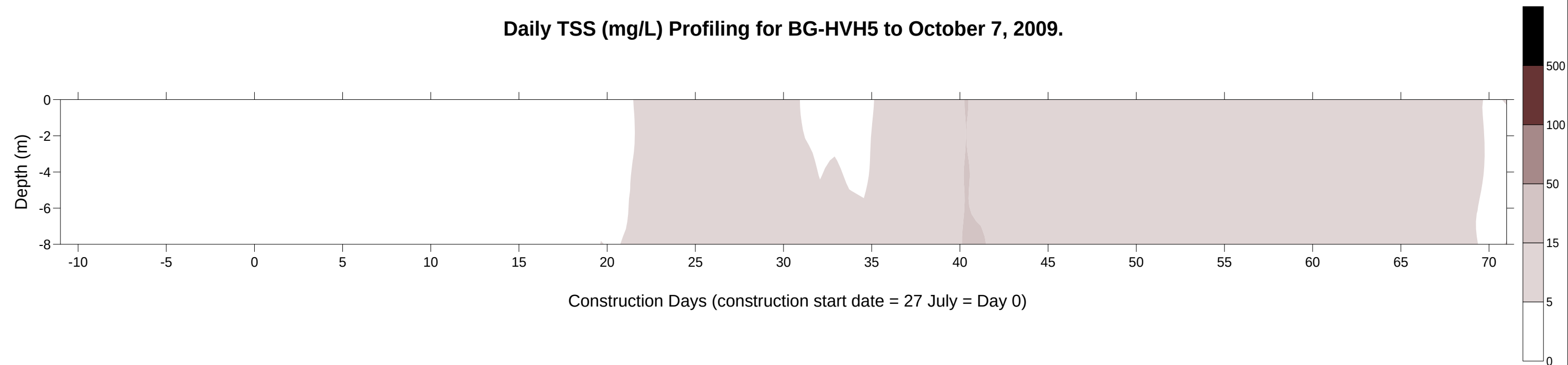

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MEADOWBANK GOLD PROJECT
BAY-GOOSE DIKE CONSTRUCTION
TSS TIME SERIES PROFILING RESULTS FOR BG-HVH4

FIGURE 3-3e

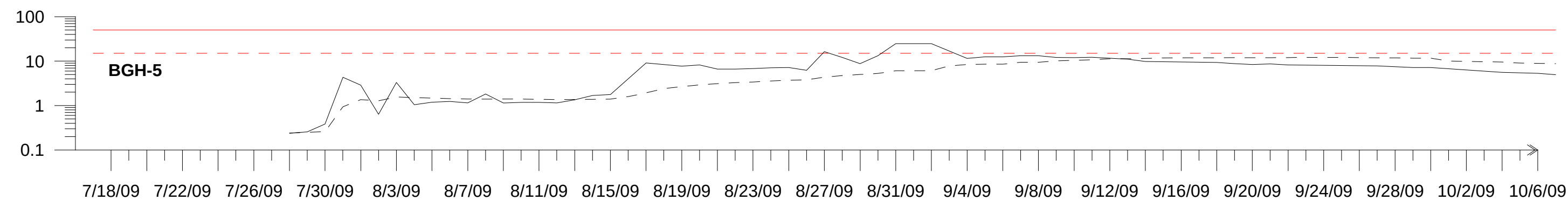


Daily TSS (mg/L) Profiling for BG-HVH5 to October 7, 2009.

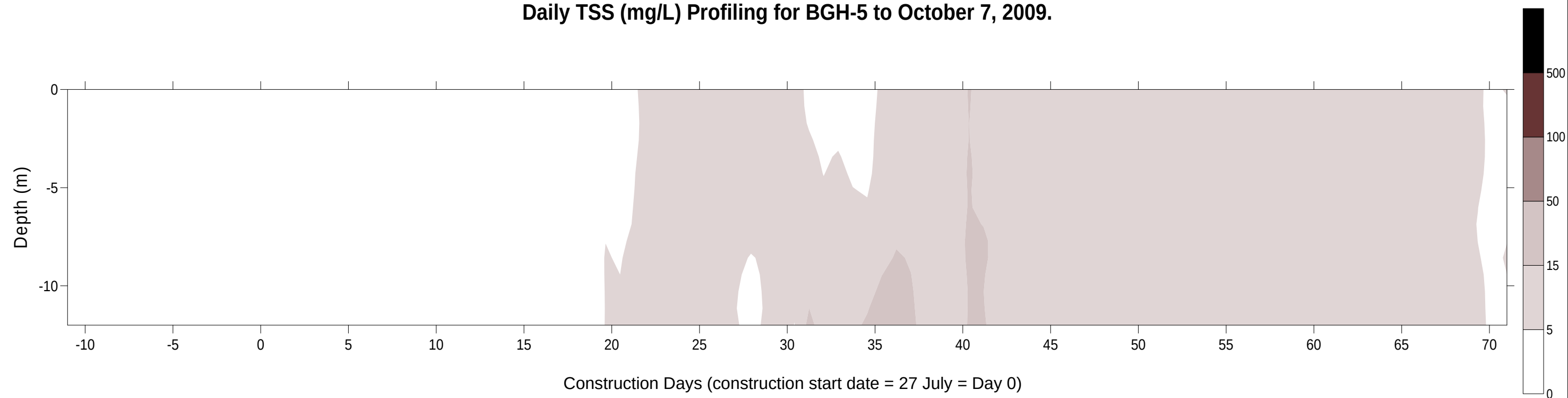


Legend	TSS Trigger Values (mg/L)		
— 24-hr Trigger	Station	24-hr Ave	30-d Ave
- - - 30-d Trigger	BGW/BGE	50	15
— 24-hr Ave TSS	BGH _a	50	15
- - - 30-d Ave TSS	BGH _b	25	6
	a = prior to Sept 1		
	b = after Sept 1		

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	MEADOWBANK GOLD PROJECT BAY-GOOSE DIKE CONSTRUCTION	
	TSS TIME SERIES PROFILING RESULTS FOR BG-HVH5	
FIGURE 3-3f		

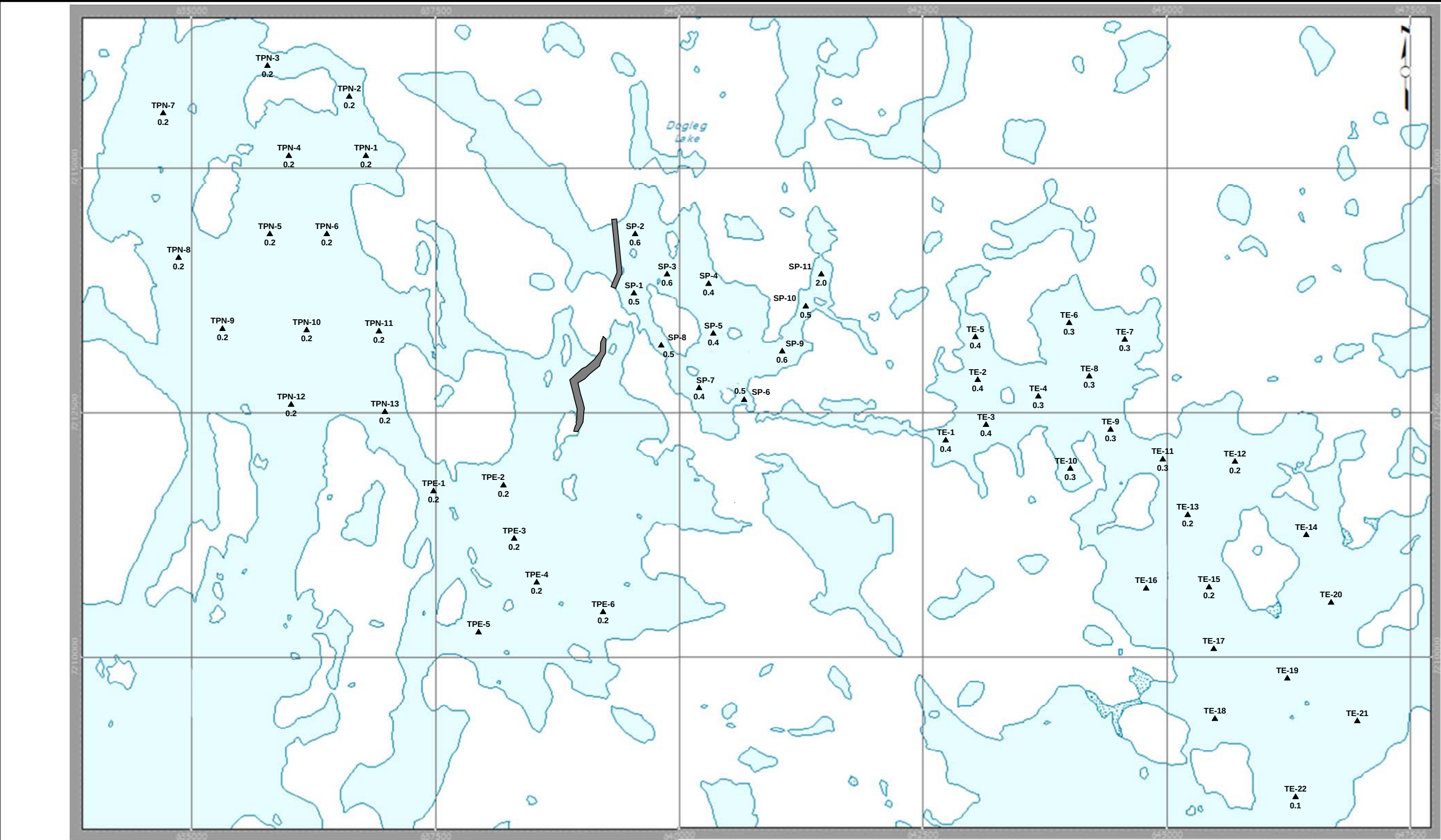


Daily TSS (mg/L) Profiling for BGH-5 to October 7, 2009.



Legend	TSS Trigger Values (mg/L)		
— 24-hr Trigger	Station	24-hr Ave	30-d Ave
- - - 30-d Trigger	BGW/BGE	50	15
— 24-hr Ave TSS	BGH _a	50	15
- - - 30-d Ave TSS	BGH _b	25	6
	a = prior to Sept 1		
	b = after Sept 1		

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	MEADOWBANK GOLD PROJECT BAY-GOOSE DIKE CONSTRUCTION
	TSS TIME SERIES PROFILING RESULTS FOR BGH-5
FIGURE 3-3g	



Legend

- ▲ Broad Survey Stns
- BG Routine Stns
- BG HVH Stns
- TE Sed Trap Stns

BG = Bay-Goose Routine Stations
HVH = High Value Habitat Stations

n/a = data do not cover full duration
blank = no data available

TSS Trigger Values (mg/L)

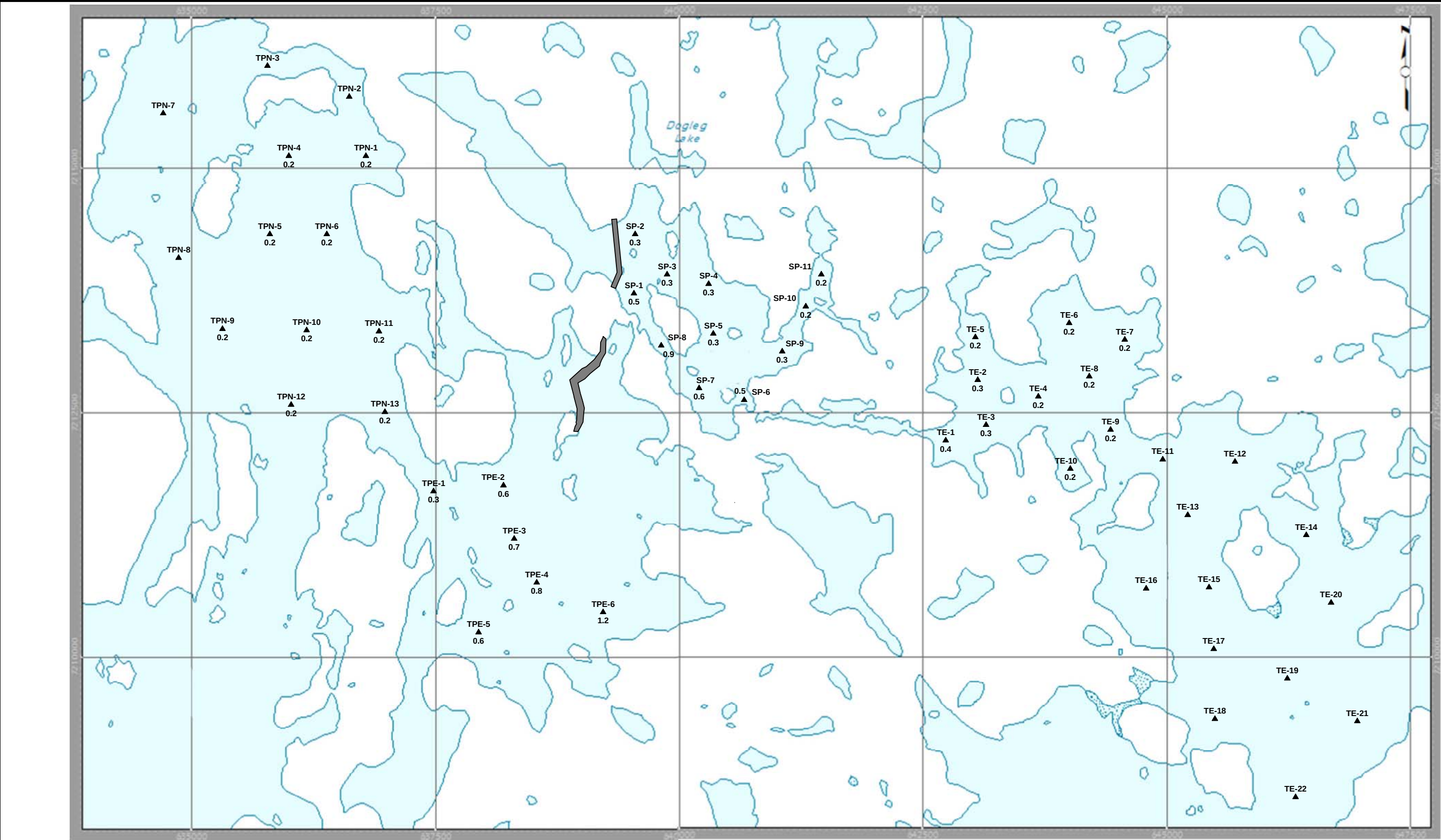
Station	24-hr	30-day
Routine	50	15
HVH _a	50	15
HVH _b	25	6
a = prior to Sept 1		
b = after Sept 1		

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MEADOWBANK GOLD PROJECT
BAY-GOOSE DIKE CONSTRUCTION MONITORING

BROAD SURVEY
MAXIMUM TSS ESTIMATES (mg/L) for JULY 25 & 29, 2009.

FIGURE 3-4



Legend	TSS Trigger Values (mg/L)																		
▲ Broad Survey Stns ● BG Routine Stns ○ BG HVH Stns ■ TE Sed Trap Stns BG = Bay-Goose Routine Stations HVH = High Value Habitat Stations n/a = data do not cover full duration blank = no data available	<table><tr><th>Station</th><th>24-hr</th><th>30-day</th></tr><tr><td>Routine</td><td>50</td><td>15</td></tr><tr><td>HVH_a</td><td>50</td><td>15</td></tr><tr><td>HVH_b</td><td>25</td><td>6</td></tr><tr><td>a = prior to Sept 1</td><td></td><td></td></tr><tr><td>b = after Sept 1</td><td></td><td></td></tr></table>	Station	24-hr	30-day	Routine	50	15	HVH _a	50	15	HVH _b	25	6	a = prior to Sept 1			b = after Sept 1		
Station	24-hr	30-day																	
Routine	50	15																	
HVH _a	50	15																	
HVH _b	25	6																	
a = prior to Sept 1																			
b = after Sept 1																			



Azimuth Consulting Group Inc.

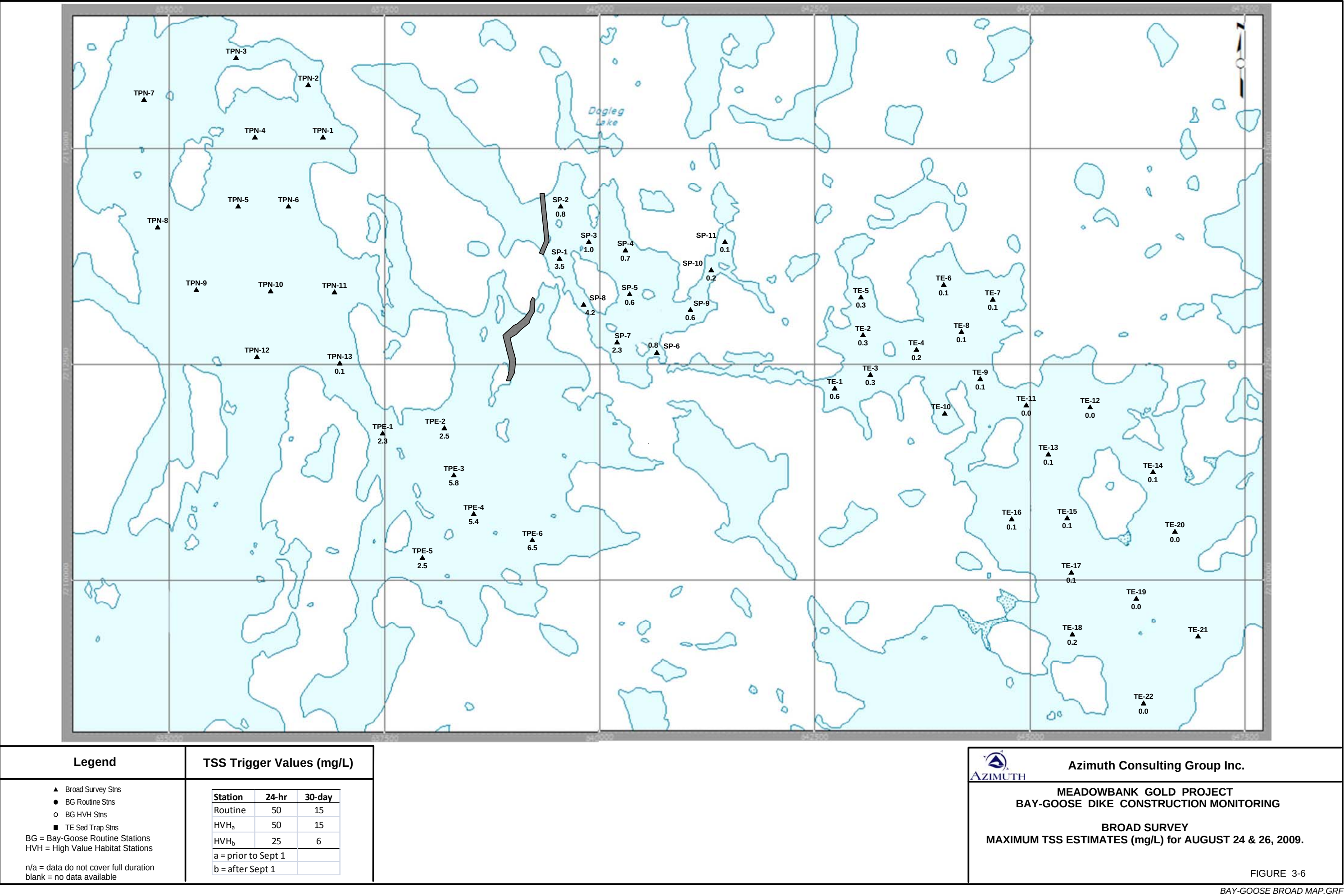
MEADOWBANK GOLD PROJECT

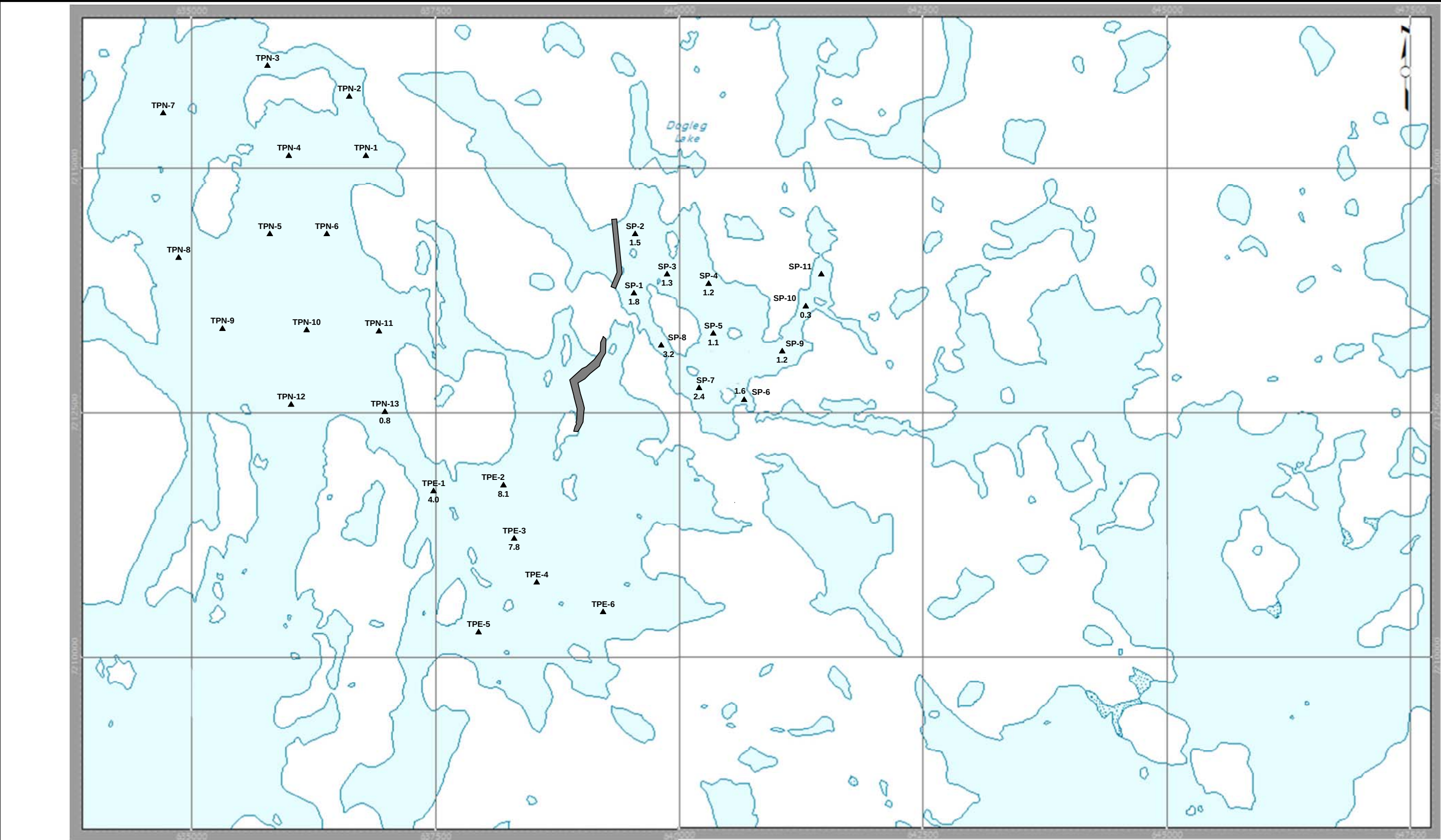
BAY-GOOSE DIKE CONSTRUCTION MONITORING

BROAD SURVEY

MAXIMUM TSS ESTIMATES (mg/L) for AUGUST 9 & 11, 2009.

FIGURE 3-5





Legend	TSS Trigger Values (mg/L)																		
▲ Broad Survey Stns ● BG Routine Stns ○ BG HVH Stns ■ TE Sed Trap Stns BG = Bay-Goose Routine Stations HVH = High Value Habitat Stations n/a = data do not cover full duration blank = no data available	<table><tr><th>Station</th><th>24-hr</th><th>30-day</th></tr><tr><td>Routine</td><td>50</td><td>15</td></tr><tr><td>HVH_a</td><td>50</td><td>15</td></tr><tr><td>HVH_b</td><td>25</td><td>6</td></tr><tr><td colspan="2">a = prior to Sept 1</td><td></td></tr><tr><td colspan="2">b = after Sept 1</td><td></td></tr></table>	Station	24-hr	30-day	Routine	50	15	HVH _a	50	15	HVH _b	25	6	a = prior to Sept 1			b = after Sept 1		
Station	24-hr	30-day																	
Routine	50	15																	
HVH _a	50	15																	
HVH _b	25	6																	
a = prior to Sept 1																			
b = after Sept 1																			

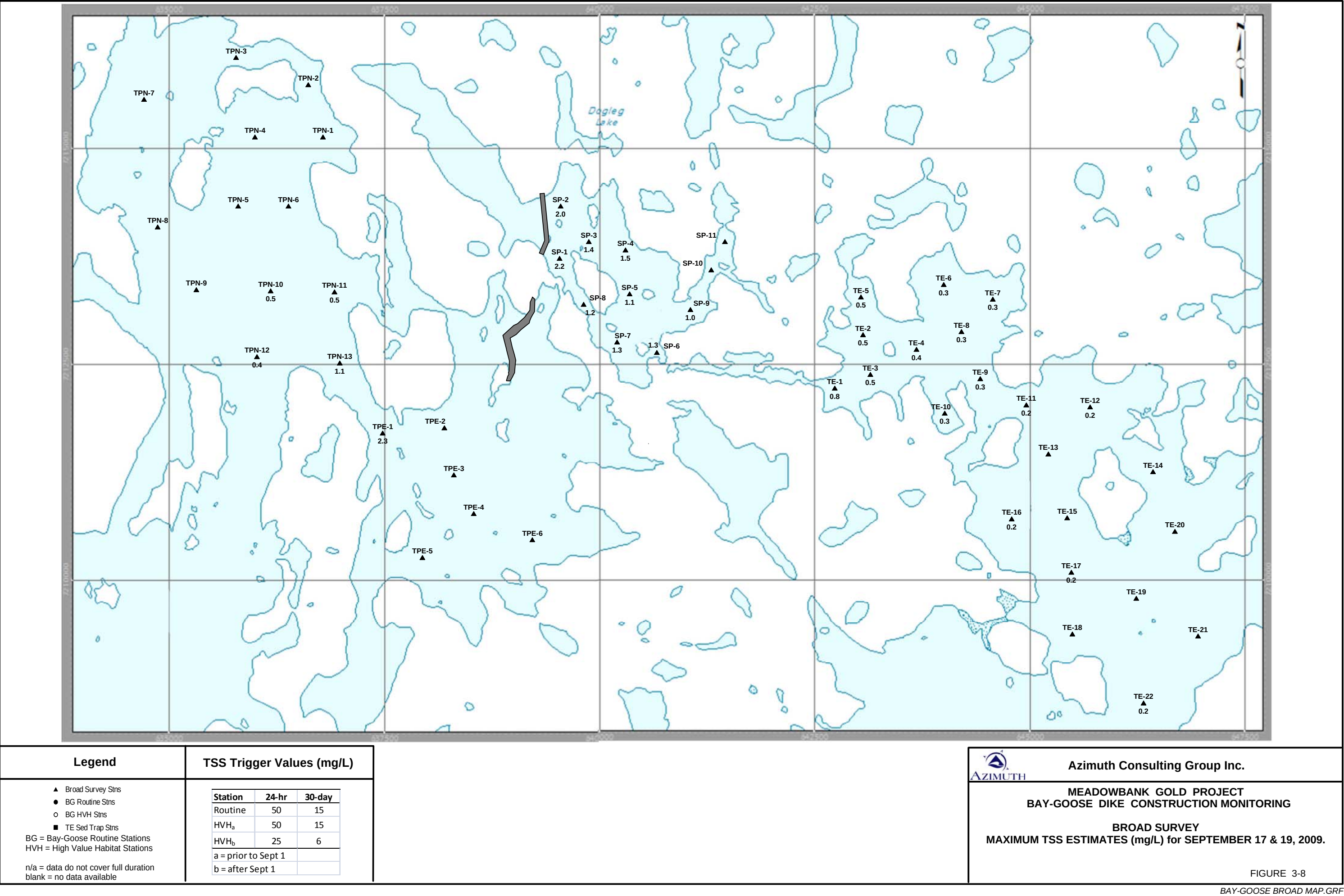


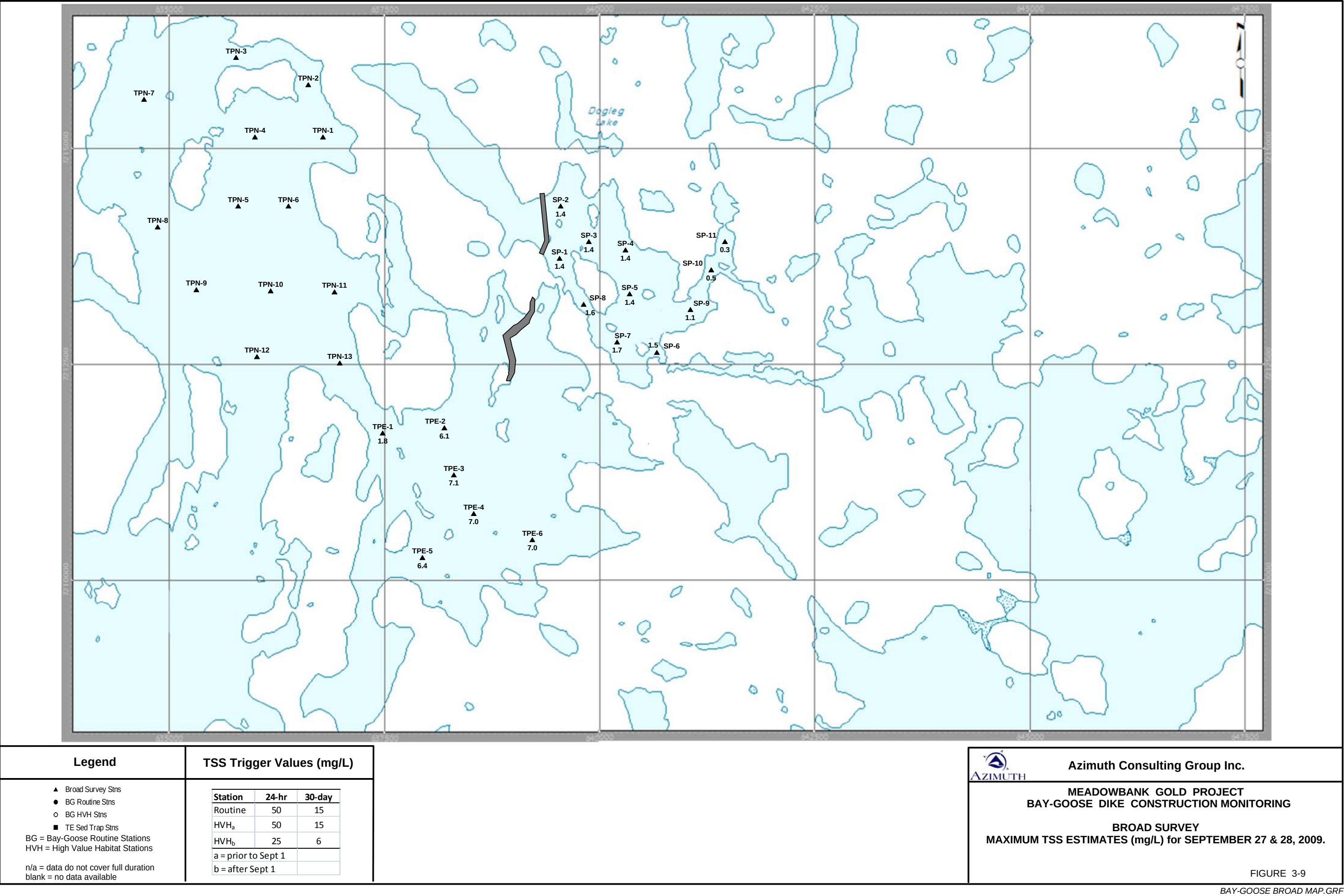
Azimuth Consulting Group Inc.

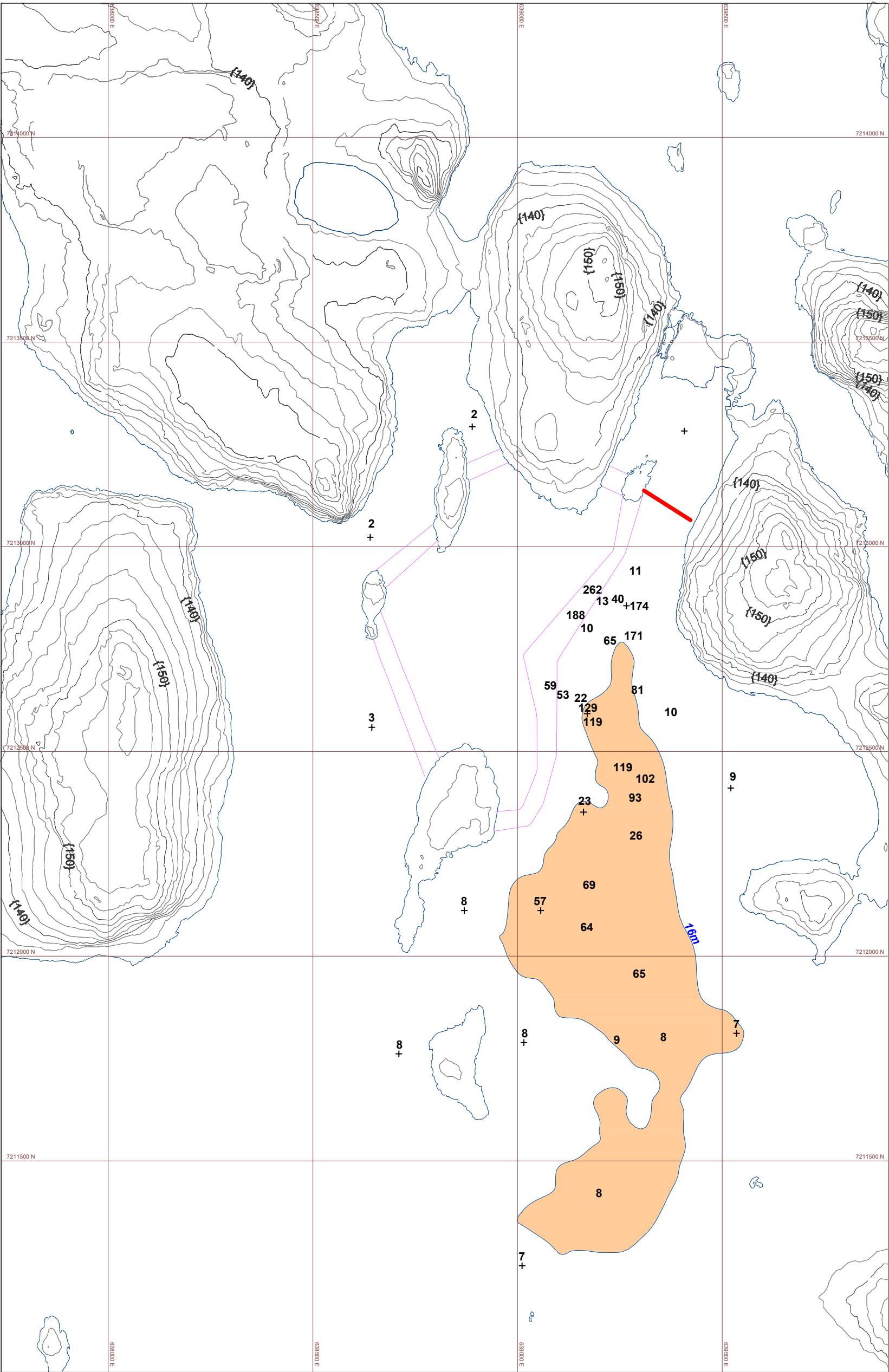
MEADOWBANK GOLD PROJECT
BAY-GOOSE DIKE CONSTRUCTION MONITORING

BROAD SURVEY
MAXIMUM TSS ESTIMATES (mg/L) for SEPTEMBER 9 & 11, 2009.

FIGURE 3-7





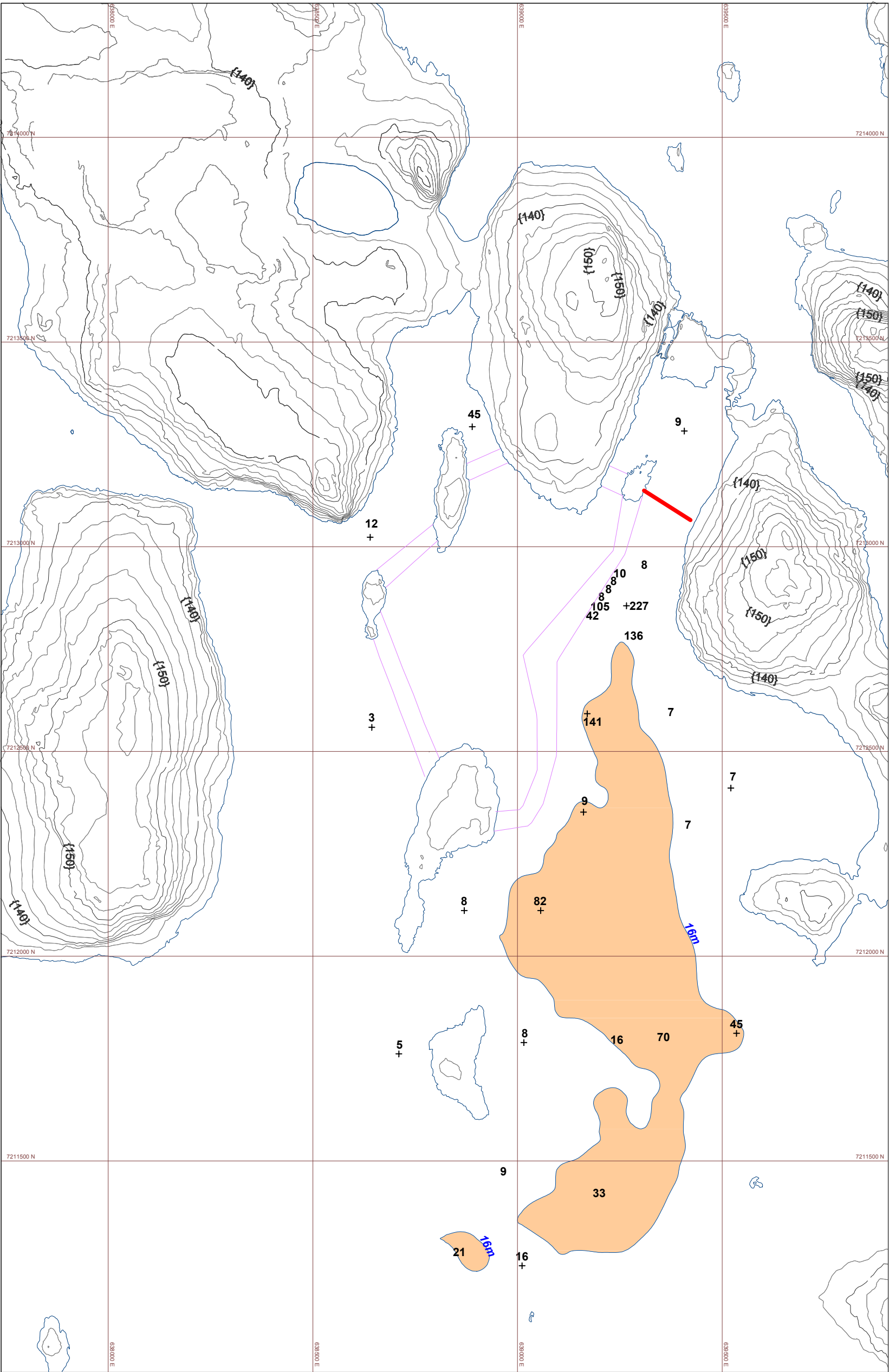


Legend	TSS Trigger Values (mg/L)																		
BG = Bay-Goose Routine Stations HVV = High Value Habitat Stations n/a = data do not cover full duration NS = not sampled	<table><tr><th>Station</th><th>24-hr</th><th>30-day</th></tr><tr><td>Routine</td><td>50</td><td>15</td></tr><tr><td>HVV_a</td><td>50</td><td>15</td></tr><tr><td>HVV_b</td><td>25</td><td>6</td></tr><tr><td colspan="2">a = prior to Sept 1</td><td></td></tr><tr><td colspan="2">b = after Sept 1</td><td></td></tr></table>	Station	24-hr	30-day	Routine	50	15	HVV _a	50	15	HVV _b	25	6	a = prior to Sept 1			b = after Sept 1		
Station	24-hr	30-day																	
Routine	50	15																	
HVV _a	50	15																	
HVV _b	25	6																	
a = prior to Sept 1																			
b = after Sept 1																			

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MEADOWBANK GOLD PROJECT
BAY-GOOSE DIKE CONSTRUCTION MONITORING 2009
DEEP PLUME SURVEY 23 - 25 August, 2009
TURBIDITY-BASED ESTIMATES OF TOTAL SUSPENDED SOLIDS
(TSS IN MG/L)

FIGURE 1

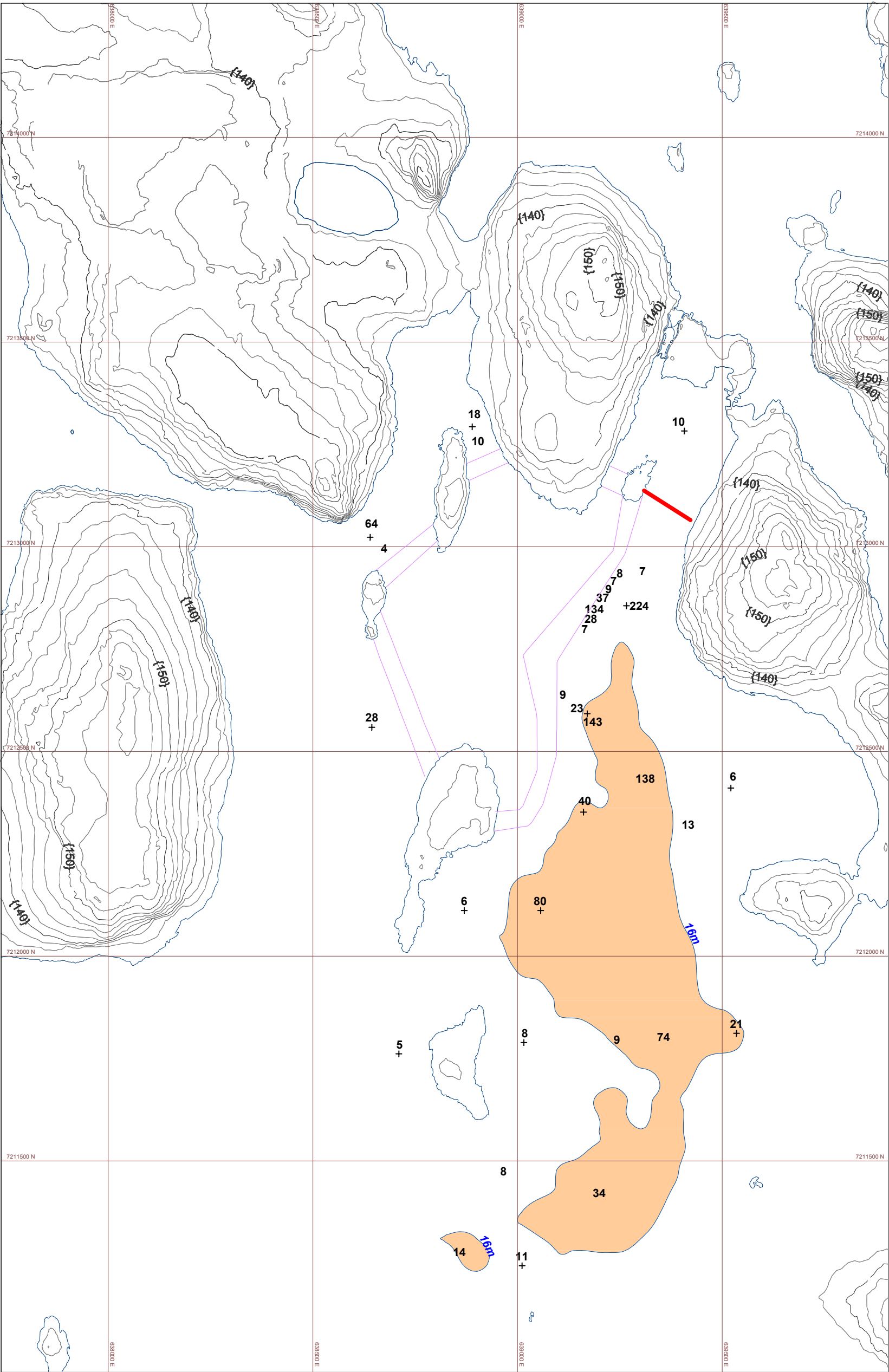


Legend	TSS Trigger Values (mg/L)																		
BG = Bay-Goose Routine Stations HVV = High Value Habitat Stations n/a = data do not cover full duration NS = not sampled	<table><tr><th>Station</th><th>24-hr</th><th>30-day</th></tr><tr><td>Routine</td><td>50</td><td>15</td></tr><tr><td>HVV_a</td><td>50</td><td>15</td></tr><tr><td>HVV_b</td><td>25</td><td>6</td></tr><tr><td colspan="2">a = prior to Sept 1</td><td></td></tr><tr><td colspan="2">b = after Sept 1</td><td></td></tr></table>	Station	24-hr	30-day	Routine	50	15	HVV _a	50	15	HVV _b	25	6	a = prior to Sept 1			b = after Sept 1		
Station	24-hr	30-day																	
Routine	50	15																	
HVV _a	50	15																	
HVV _b	25	6																	
a = prior to Sept 1																			
b = after Sept 1																			

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MEADOWBANK GOLD PROJECT
BAY-GOOSE DIKE CONSTRUCTION MONITORING 2009
DEEP PLUME SURVEY 27 August, 2009
TURBIDITY-BASED ESTIMATES OF TOTAL SUSPENDED SOLIDS
(TSS IN MG/L)

FIGURE 1



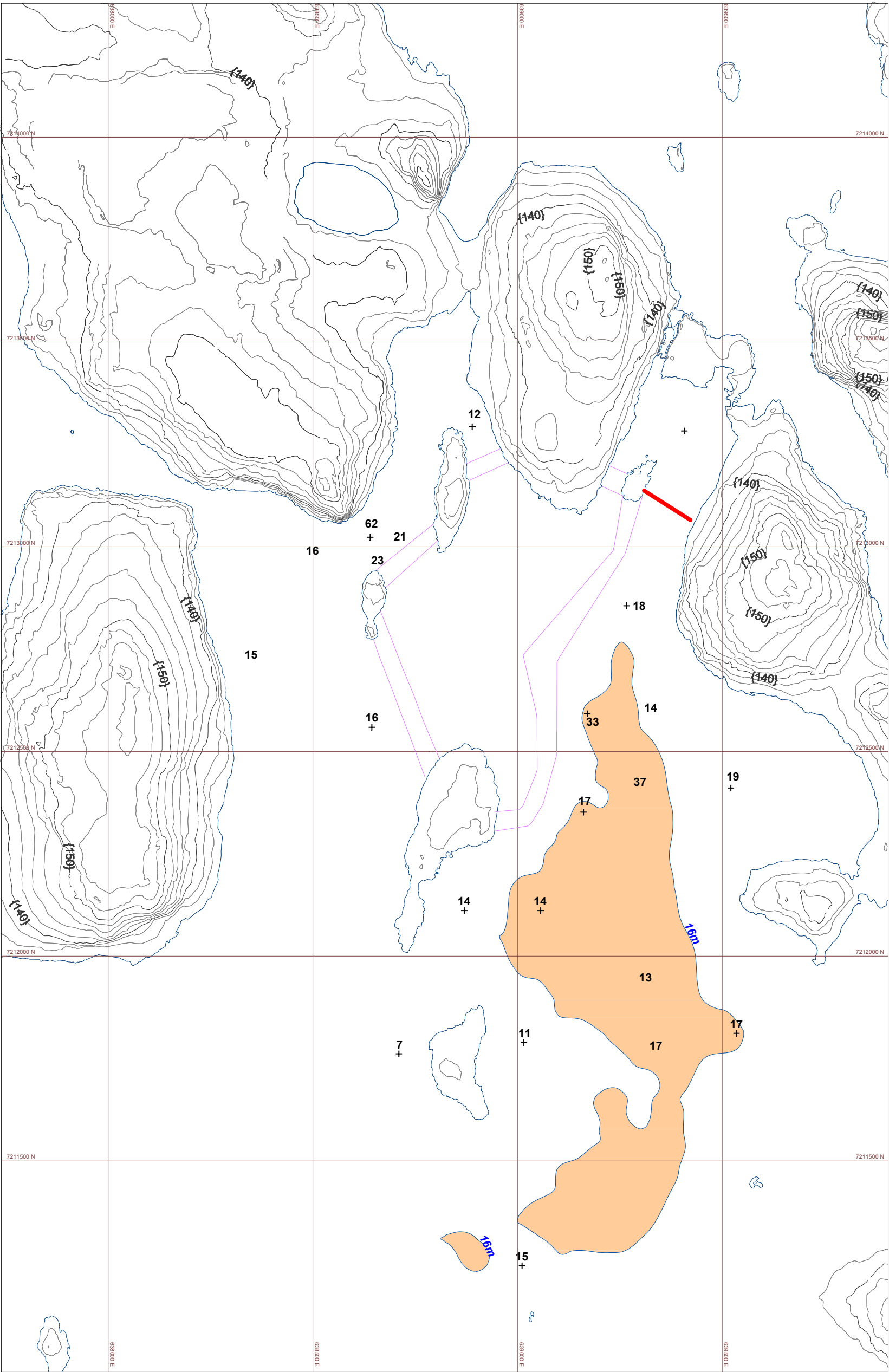
Legend	TSS Trigger Values (mg/L)																				
BG = Bay-Goose Routine Stations HVV = High Value Habitat Stations n/a = data do not cover full duration NS = not sampled	<table><tr><th>Station</th><th>24-hr</th><th>30-day</th></tr><tr><td>Routine</td><td>50</td><td>15</td></tr><tr><td>HVH_a</td><td>50</td><td>15</td></tr><tr><td>HVH_b</td><td>25</td><td>6</td></tr><tr><td>a = prior to Sept 1</td><td></td><td></td></tr><tr><td>b = after Sept 1</td><td></td><td></td></tr></table>	Station	24-hr	30-day	Routine	50	15	HVH _a	50	15	HVH _b	25	6	a = prior to Sept 1			b = after Sept 1				
Station	24-hr	30-day																			
Routine	50	15																			
HVH _a	50	15																			
HVH _b	25	6																			
a = prior to Sept 1																					
b = after Sept 1																					

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MEADOWBANK GOLD PROJECT
BAY-GOOSE DIKE CONSTRUCTION MONITORING 2009

DEEP PLUME SURVEY 28 August, 2009
TURBIDITY-BASED ESTIMATES OF TOTAL SUSPENDED SOLIDS
(TSS IN MG/L)

FIGURE 1

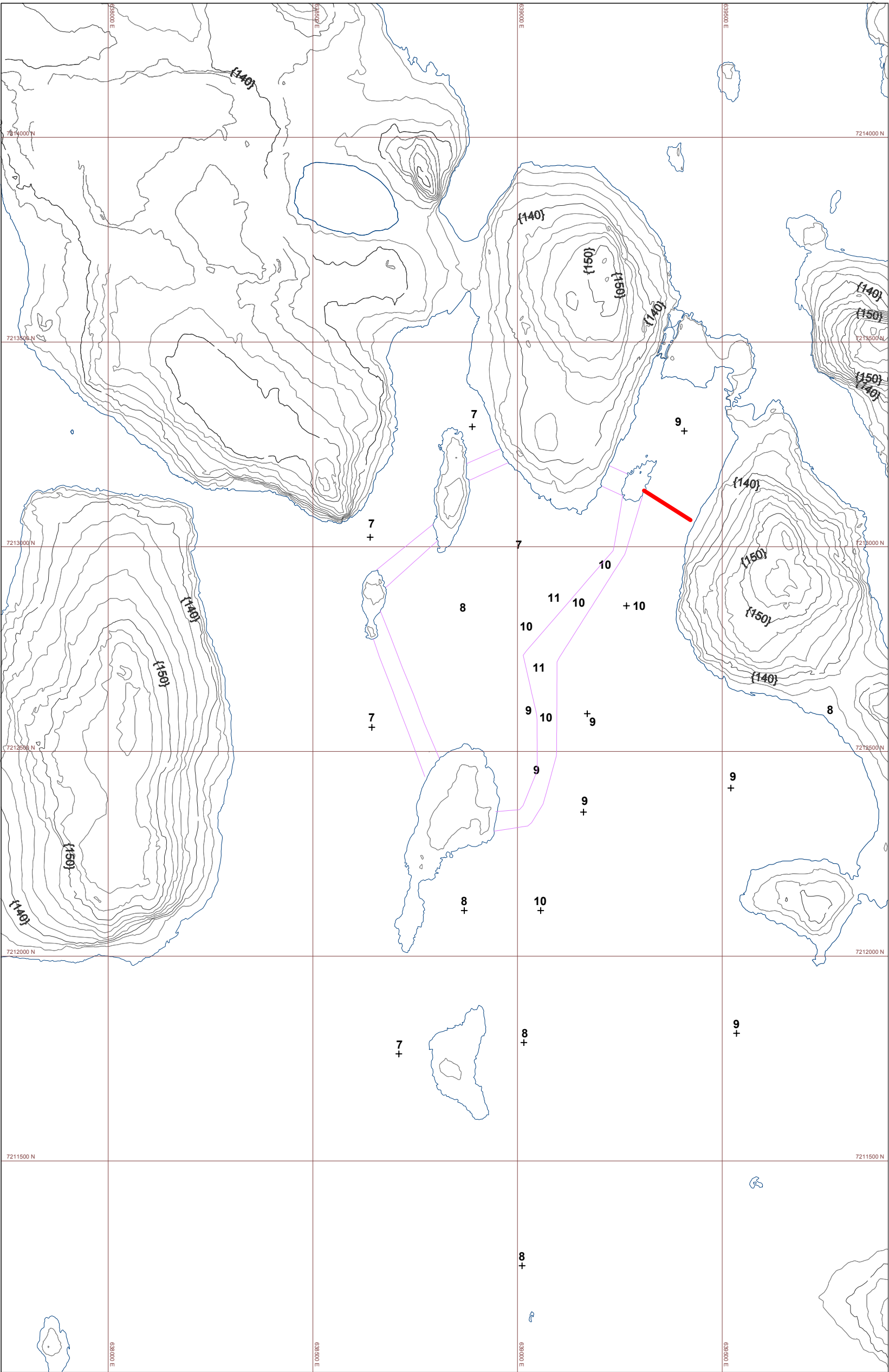


Legend	TSS Trigger Values (mg/L)																				
BG = Bay-Goose Routine Stations HVV = High Value Habitat Stations (BGH3 and BGH5 are at the same locations as the HVH stations, but cover full depth profile (i.e., >8m)) n/a = data do not cover full duration NS = not sampled	<table><tr><th>Station</th><th>24-hr</th><th>30-day</th></tr><tr><td>Routine</td><td>50</td><td>15</td></tr><tr><td>HVV_a</td><td>50</td><td>15</td></tr><tr><td>HVV_b</td><td>25</td><td>6</td></tr><tr><td>a = prior to Sept 1</td><td></td><td></td></tr><tr><td>b = after Sept 1</td><td></td><td></td></tr></table>			Station	24-hr	30-day	Routine	50	15	HVV _a	50	15	HVV _b	25	6	a = prior to Sept 1			b = after Sept 1		
Station	24-hr	30-day																			
Routine	50	15																			
HVV _a	50	15																			
HVV _b	25	6																			
a = prior to Sept 1																					
b = after Sept 1																					

**Azimuth Consulting Group Inc.**

MEADOWBANK GOLD PROJECT
BAY-GOOSE DIKE CONSTRUCTION MONITORING 2009
DEEP PLUME SURVEY September 5, 2009
TURBIDITY-BASED ESTIMATES OF TOTAL SUSPENDED SOLIDS
(TSS IN MG/L)

FIGURE 1



Legend	TSS Trigger Values (mg/L)																				
BG = Bay-Goose Routine Stations HVH = High Value Habitat Stations (BGH3 and BGH5 are at the same locations as the HVH stations, but cover full depth profile (i.e., >8m)) n/a = data do not cover full duration NS = not sampled	<table><tr><th>Station</th><th>24-hr</th><th>30-day</th></tr><tr><td>Routine</td><td>50</td><td>15</td></tr><tr><td>HVH_a</td><td>50</td><td>15</td></tr><tr><td>HVH_b</td><td>25</td><td>6</td></tr><tr><td colspan="2">a = prior to Sept 1</td><td></td></tr><tr><td colspan="2">b = after Sept 1</td><td></td></tr></table>			Station	24-hr	30-day	Routine	50	15	HVH _a	50	15	HVH _b	25	6	a = prior to Sept 1			b = after Sept 1		
Station	24-hr	30-day																			
Routine	50	15																			
HVH _a	50	15																			
HVH _b	25	6																			
a = prior to Sept 1																					
b = after Sept 1																					



Azimuth Consulting Group Inc.

MEADOWBANK GOLD PROJECT
BAY-GOOSE DIKE CONSTRUCTION MONITORING 2009

TARGETED SURVEY September 19, 2009
TURBIDITY-BASED ESTIMATES OF TOTAL SUSPENDED SOLIDS
(TSS IN MG/L)

FIGURE 3-16

Photo 3-1. Recording Analite turbidity probe output.



Photo 3-2. Start of Bay-Goose Dike construction, 27 July 2009 (Day 0).



Photo 3-3. Bay-Goose Dike construction site, 28 July 2009 (Day 1).



Photo 3-4. Bay-Goose Dike turbidity barriers, 1 August 2009 (Day 5).



Photo 3-5. Elevated TSS within Bay-Goose Dike turbidity barriers, 14 August 2009 (Day 18).



Photo 3-6. Bay-Goose Dike turbidity barrier, 20 August 2009 (Day 24).



Photo 3-7. Bay-Goose Dike construction as seen from north looking to south, 23 August 2009 (Day 27).



Photo 3-8. Compromised turbidity barriers on the east side of the Bay-Goose Dike work zone, 3 September 2009 (Day 38).



Photo 3-9. Compromised turbidity barriers on the west side of the Bay-Goose Dike work zone, 3 September 2009 (Day 38).



Photo 3-10. TSS gradient between north (background) and east (foreground) basins of Third Portage Lake, 3 September 2009 (Day 38).



Photo 3-11. Inflow from Third Portage Lake to Second Portage Lake, 3 September 2009 (Day 38).



Photo 3-12. Inflow from Second Portage Lake to Tehek Lake, 3 September 2009 (Day 38).



4. SUMMARY

As stipulated in the monitoring plan (AEM, 2009a), Bay-Goose dike construction monitoring focused primarily on TSS, but also included periodic sampling for a range of other parameters (e.g., nutrients and metals). Key results were as follows:

- Baseline (i.e., background) TSS concentrations typically ranged from 0.2 to 0.6 mg/L and were as high as 2 mg/L.
- Turbidity barriers functioned quite well during the first several weeks of monitoring. TSS concentrations were slightly elevated during the first two weeks of monitoring at select stations, but then dissipated into the water column on August 11 due to wind-driven vertical mixing (resulting in lower overall TSS concentrations throughout the water column). Neither the 24-hr average (STM; 50 mg/L) nor the 30-day average (MMM; 15 mg/L) trigger values for TSS concentrations were exceeded at any station.
- A more intensive TSS plume started to form in deeper areas (>16 m) east of the work area (e.g., BGE-3) between August 13 and 17, but was again dissipated throughout the water column by a SE wind event on August 18. Both the STM and MMM were exceeded at one or more stations during this period.
- Relatively calm conditions over the next two weeks favoured the reformation of the east TSS plume in deep areas (>16 m), primarily from the introduction of new material from between or beneath turbidity barrier panels (e.g., near BGE-2) and the lack of wind-driven vertical mixing. TSS concentrations also started to rise on the west side of the work zone, particularly in the deep area at BGW-2. Focused plume tracking showed that the east TSS plume was largely contained in a bathymetric depression deeper than 16 m (i.e., BGE-2 through BGE-5). Both the STM and MMM were exceeded at several stations during this period. A severe wind storm (i.e., > 90 km/hr) lasting from August 31 through September 2 resulted in the complete vertical and horizontal mixing of the deep plumes throughout the water column and caused extensive damage to the turbidity barriers.
- The water column stayed fairly well mixed for the remainder of the monitoring period, with TSS concentrations gradually improving with time. Despite repairing the turbidity barriers, TSS gradients did not reform across the barriers, likely due to much lower sediment inputs during September's dike construction activities. TSS triggers for high-value habitat areas changed as of September 1 (STM to 25 mg/L; MMM to 6 mg/L); TSS trigger values for other areas (i.e., not high-value habitat) remained the same. The 30-day average TSS concentrations exceeded the MMMs at nearly all stations for most of September; concentrations at routine stations fell below the MMM by early October, while the monthly average

-
- concentrations at high-value habitat stations still exceeded the MMM at all stations. Notwithstanding, 24-hr maximum TSS concentrations at all stations were approximately 6 mg/L (or less) and decreasing by the end of the monitoring program on October 7.
- As a complement to routine daily turbidity monitoring, broad surveys were conducted every one to two weeks to characterize conditions in one or more of the following areas: north and east (southern area) basins of Third Portage Lake, Second Portage Lake and Tehek Lake. TSS concentrations were:
 - Always < 1.2 mg/L and usually < 0.5 in the north basin of Third Portage Lake.
 - Discussed in previous bullets for northern half of the east (i.e., routine monitoring results) in the east basin; maximum TSS concentrations for the TPE stations in the southern portion of the east basin never exceeded 7.1 mg/L.
 - Always < 5 mg/L in discrete areas near the inlet from Third Portage Lake and usually < 2 mg/L in most of Second Portage Lake.
 - Always < 1 mg/L and usually < 0.5 mg/L in Tehek Lake.
 - Weekly water quality (i.e., chemistry and physical parameters) monitoring was conducted to characterize conditions in the receiving environment. To that end, samples were often collected to target a range of conditions (e.g., upper water column or the centre of a TSS plume). TSS concentrations provide the best indicator of “exposure levels” related to construction; TSS concentrations ranged from < 1 mg/L to over 350 mg/L. For nutrients, total phosphorus was the only parameter to exceed CCME guidelines (using the guideline for ultra-oligotrophic lakes); in general, it was higher in samples with elevated TSS concentrations. Several total metal parameters also exceeded CCME guidelines in samples with high TSS concentrations. However, they almost never exceeded CCME guidelines in the dissolved form, which is considered a better indicator of potential effects. These results suggest that the metals are primarily associated with introduced particulates.
 - Due to the unexpected extent and magnitude of the elevated TSS concentrations in the east basin of Third Portage Lake, a TSS Effects Assessment Study (EAS) was conducted in September 2009 to evaluate the ecological significance of the situation. Results of this study are reported elsewhere (Azimuth, 2010).

5. REFERENCES

- Agnico-Eagle Mines Ltd (AEM). 2009a. Water quality monitoring and management plan for dike construction and dewatering at the Meadowbank Mine. Revised Final. March 2009.
- AEM. 2009b. Aquatic Environment Management Program, March 2009.
- Azimuth Consulting Group (Azimuth). 2010. Aquatic Effects Monitoring Program – Targeted Study: Dike Construction TSS Effects Assessment Study 2009, Meadowbank Gold Project. Report prepared by Azimuth Consulting Group Inc., Vancouver, BC for Agnico-Eagle Mines Ltd., Baker Lake, NU.
- Azimuth. 2009. Aquatic Effects Monitoring Program – Targeted Study: Dike Construction Monitoring, Meadowbank Gold Project, 2009. Report prepared by Azimuth Consulting Group Inc., Vancouver, BC for Agnico-Eagle Mines Ltd., Vancouver BC. March 2009.
- Azimuth. 2006. No-Net-Loss Plan (NNLP), Meadowbank Gold Project, 2006. Report prepared by Azimuth Consulting Group Inc. Vancouver BC for Cumberland Resources Ltd., Vancouver BC. November 2006.
- Canadian Council of Ministers of the Environment (CCME). 2007. Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life, 1999, updated December 2007.
- Department of Fisheries and Oceans (DFO). 2000. Effects of sediment on fish and their habitat. Habitat Status Report 2000/01 E, DFO Pacific Region, January 2000, 9p.

APPENDICES



APPENDIX A

TECHNICAL MEMO: PROPOSED REVISION TO THE TSS-TURBIDITY RELATIONSHIP USED FOR DIKE CONSTRUCTION MONITORING AND DEWATERING MONITORING, FEB. 2010





Technical Memorandum

Date: February 5, 2010
To: Stéphane Robert (Agnico-Eagle Mines Ltd.)
From: Ryan Hill and Gary Mann (Azimuth Consulting Group Inc.)
RE: **Proposed revision to the TSS-turbidity relationship used for dike construction monitoring and dewatering (untreated water) monitoring**

Field measurements of turbidity are used as a surrogate for TSS during dike construction monitoring and dewatering monitoring. Prior to 2009, a limited data set was available, and was used to develop a single relationship that was applied to dike construction monitoring and to dewatering (of untreated water¹) monitoring. Intensive sampling during 2009 has now provided a data set that could support development of distinct relationships for dike construction monitoring and dewatering monitoring – the relationships should be distinct in theory because conditions during dewatering are fundamentally different from conditions during dike construction.

Dike Construction Monitoring – The new proposed TSS-turbidity relationship for dike construction monitoring is:

$$\log_{10}(\text{turbidity}) = 0.62196 + (0.95619 * \log_{10}(\text{TSS})),$$

where TSS is measured in the lab in mg/L and turbidity is measured in NTUs in the field using an Analite NEP 160 meter².

This relationship is based on data from targeted TSS samples collected during construction of the Bay-Goose dike in 2009, as well as other relevant data collected in 2009 in Second and Third Portage Lakes (sampling associated with the AEMP, the Effects Assessment for the Bay-Goose dike construction, and weekly dike construction water quality). The 2008 data associated with the East Dike were not included because (a) the 2009 data set was very large and covered a range of conditions, and could therefore support derivation of a rigorous relationship without additional data; (b) there was some *a priori* expectation of differences between the two data sets because the nature of construction material used and the placement methods may have changed slightly in

¹ All discussions herein regarding dewatering refer to untreated water and are not applicable to monitoring of treated water.

² Different turbidity probes often differ systematically in their NTU readings. Results from other meters could only be used with the reported TSS-turbidity relationships if they are first converted to Analite NEP 160 equivalence (i.e., by deriving the relationship between observed NTU values for both meter types).

2009; and (c) statistical analysis confirmed a significant difference between the 2008 and 2009 data sets.

Dewatering Monitoring (see footnote 1) – The new proposed TSS-turbidity relationship for dewatering monitoring is:

$$\log_{10}(\text{turbidity}) = 0.53276 + (0.99276 * \log_{10}(\text{TSS})),$$

where TSS is measured in the lab in mg/L and turbidity is measured in NTUs in the field using an Analite NEP 160 meter¹.

This is based on data from 2009 dewatering of the impounded arm of Second Portage Lake, as well as all of the data related to dike construction from 2008 and 2009. The dewatering data alone are insufficient because (a) they cover only a very limited range of turbidity and TSS values, and cannot be easily extrapolated to higher values; and (b) the data were collected during a narrow time window and their applicability to dewatering conditions in general is unknown. In future it may be possible to exclude the dike construction monitoring data and use only dewatering data, if additional dewatering data are collected across a higher range of turbidity values and at different times of year.

Details regarding the selection of data sets and statistical methods are provided in **Appendix A**.

APPENDIX A – DERIVATION OF TSS-TURBIDITY RELATIONSHIPS FOR DIKE CONSTRUCTION MONITORING AND DEWATERING MONITORING

1. INTRODUCTION

Turbidity is measured in the field during dike construction as a surrogate for total suspended solids (TSS). It is well known that the relationship between turbidity and TSS is site-specific, in part because of site-specific variation in the size, shape and other properties of the suspended particulates.

A TSS-turbidity relationship for dike construction monitoring and dewatering monitoring was developed prior to construction of the East Dike in 2008, based on limited available data. As additional and more relevant data became available, the relationship was updated during construction of the East Dike. The updated relationship was applied to construction of the Bay-Goose dike in 2009.

During 2009, a significant number of paired TSS-turbidity samples were collected, including targeted sampling as well as sampling conducted as part of routine weekly water quality monitoring, the AEMP, and the Effects Assessment Strategy.

This technical appendix develops an updated TSS-turbidity relationship that could be used for dike construction monitoring in 2010, and a second TSS-turbidity relationship that is more appropriate for dewatering monitoring (for untreated water only). **Section 2** reviews the general statistical framework used to analyze the TSS-turbidity relationship. **Section 3** reviews and selects the data to be used for each analysis. **Section 4** presents the new TSS-turbidity relationships.

2. GENERAL STATISTICAL FRAMEWORK

Federal guidance on the use of turbidity as a surrogate for TSS (CCME 1999) provides an example relationship, which has log-turbidity (in NTUs) as a function of log-TSS (in mg/L). The 2008 Meadowbank data set was well described by a similar relationship (i.e., log data), so we used the same type of simple linear regression at that time. In theory, it is suspended solids that cause turbidity, not the other way around, so it makes sense to use TSS as the independent (x) variable. On the other hand, we are measuring turbidity and using it to estimate TSS, so argument could be made to make turbidity the x-variable. For this analysis we use TSS as the x-variable, consistent with the example provided by CCME (1999).

One assumption of linear regression is that data points are independent. In our case, the data points come from distinct data sets. Since the nature of the TSS-turbidity relationship may vary somewhat among these data sets, the assumption of independence may be violated. In such cases, it may be preferable to either exclude certain data sets, or to incorporate multiple data sets

using a mixed-effect modeling approach, or to combine multiple data sets in spite of the violation of independence. We provide rationale for our approaches in this regard in **Section 3**.

Finally, all analyses are conducted by excluding data points where TSS concentrations were below laboratory method detection limits (DLs). We had included those data in earlier analyses (using $\frac{1}{2}$ of the DL) due to the limited number of data points. Now that we have more data, we exclude any data points where measured TSS was below laboratory detection limits. In a case where regression is based on log-values, the low values at or below detection limits have considerable influence on the predicted relationship. From a regulatory perspective, the range of TSS values that we need to characterize accurately does not include the low values around the detection limits, and error at those values has relatively little impact on estimated long-term average TSS levels. It would therefore be preferable to drop some of the data at low TSS concentrations (below DLs) in order to avoid bias at higher, more relevant TSS concentrations.

All statistical analyses reported in this technical memo were implemented using R software version 2.9.0, using methods outlined in Dalgaard (2008) and Venables and Ripley (2002).

3. REVIEW AND SELECTION OF DATA

3.1. General Considerations

This section reviews the available data sets and their relevance to dike construction. There are a few considerations that apply to all of the data sets:

1. *Probe Type* – All of the data sets were generated using the same model of turbidity probe, the Analite NEP 160. It is important that the data are either based on the same probe, or are corrected for differences among probes.
2. *Spatial Bias* – All of the data collected in Second and Third Portage Lakes during dike construction activities share a common limitation which can be expected to bias any derived TSS-turbidity relationship. Specifically, the data points with high TSS / high turbidity tend to be collected near the construction zones (including inside the turbidity barriers) where we expect proportionately more large suspended particles, while the data points with low TSS / low turbidity tend to be collected further away from the construction zone where we expect fewer large suspended particles (because they would have settled out). Particle size influences any TSS-turbidity relationship – TSS is more affected by heavy particles (e.g., sand), while turbidity is more affected by the presence of lots of small particles (e.g., clay)³. Therefore, any TSS-turbidity relationship that is derived has an inherent spatial element – the relationship works well if applied to high turbidity values near the construction zone and to low turbidity values away from the

³ In addition, according to the EPA (1993), coarse particles that settle out rapidly are a source of interference for measurements of turbidity by nephelometry.

construction zone, but the opposite may not be true. Fortunately, the usual pattern is to see high TSS levels near the construction zone and lower TSS levels at a distance.

3. *Temporal Bias* – In addition, since large particles settle out over time, we would also expect data collected several weeks or months after the end of construction activities to consist of proportionately fewer large particles. Therefore, given the effect of particle size on the TSS-turbidity relationship, the relationship during construction would not necessarily be the same as the relationship long after construction, particularly at locations close to the construction zones.

3.2. Description of Available Data Sets

The available data sets are summarized as follows.

East Dike 2008 – These data were collected during the early part of east dike construction in 2008. Many of the samples were taken from inside the turbidity barriers in order to characterize the high end of the TSS-turbidity relationship. Data for the East Dike are shown in **Table 1**.

Bay-Goose Dike 2009 – These data were collected during construction of the Bay-Goose dike in 2009. The Bay-Goose data were collected from all around the dike, both inside and outside the curtains, as well as far out into Third and Second Portage Lakes. Collection of the Bay-Goose data spanned a long time frame, and included many samples of turbid water in areas away from the construction zone, after a major wind event dispersed turbid water beyond the construction zone. Data for the Bay-Goose Dike are also shown in **Table 1**.

Weekly Dike Construction Monitoring Data – During construction of the East Dike in 2008 and the Bay-Goose Dike in 2009, weekly water quality monitoring was conducted at stations close to and away from the construction zone. When vertical profiles existed in the water column, various depths were sometimes targeted. The data include collection of water samples (including for TSS) at a specified depth, plus vertical profiles of turbidity. The turbidity measured at the closest depth interval to the depth of water samples can be paired with the TSS data. Since there may be a time delay in the field (e.g., a couple of minutes) between evaluation of the turbidity profile and collection of the water samples, we can expect slightly more imprecision with these data than with the targeted TSS sampling, but there is no reason to expect bias. The weekly dike construction monitoring data are shown in **Table 2**.

AEMP Water Quality Data – AEMP data are similar to the weekly dike construction monitoring data, involving collection of water samples (including TSS) and vertical profiles of turbidity. Most of the AEMP data are not useful for a TSS-turbidity relationship since they occur at sites not affected by dike construction, and where TSS is often below detection limits. However, samples taken in Second Portage Lake during dike construction activities in 2008/2009, as well as samples taken in the east basin of Third Portage Lake in 2009 can be used. The relevant AEMP data are shown in **Table 2**.

EAS Water Quality Data – As part of the assessment of potential ecological effects of dike construction, limited water quality data have been collected in both 2008 and 2009 in Second

Portage Lake and the east basin of Third Portage Lake. These data are similar to the weekly dike construction monitoring data and the AEMP data described above. The relevant EAS data are shown in **Table 2**.

Dewatering Data 2009 – Dewatering of the impoundment in Second Portage Lake began in winter/spring 2009. Starting in the spring of 2009, data collection included field turbidity, lab turbidity and lab TSS. Field turbidity measurements were taken incorrectly⁴ for the first few months, but methodology was corrected and field data on or after June 20th can be used. In addition, there is a strong correlation between field and lab turbidity, so lab data can be used to predict field turbidity for the earlier period June 9-19. Dewatering data are shown in **Table 3**, with the relationship between field and lab turbidity explained in the footnote. Only those records with simultaneous water collection for field and lab were used (i.e., the water samples for both were collected at the same time). Dewatering data collected over the winter (i.e., earlier in 2009; data not shown) had consistently low turbidity, generally in the range of 2 to 5 NTU. This indicates that most of the turbidity associated with dike construction had settled out by the winter. The higher turbidity over the June-July period shown in **Table 3** is therefore reflective of newly suspended sediments – one potential explanation is erosion of newly exposed banks during freshet, but other explanations are also possible.

AWPAR and Quarry Data – The AWPAP and Quarry data collected since 2007 come from locations around Meadowbank camp and along the road between Meadowbank camp and Baker Lake. The data primarily characterize sediment introduced from quarried construction material contacting water (i.e., either runoff flowing through the road and picking up fines or material placed within stream channels), or ponded water that occurs in quarries or other areas. The quarried construction material may be similar to material used for dike construction. However, the setting for the turbid water is not the same as a lake, occurring instead in ponded water or in streams or runoff areas. In addition, the effect of erosion or resuspension of lake bottom materials would not be captured at all by the AWPAP and Quarry data. The AWPAP and Quarry data are not shown, because they are not relevant to either dike construction or dewatering; there are sufficient other data to allow us to ignore the AWPAP and Quarry data.

3.3. Data Selection for Dike Construction

For the TSS-turbidity relationship for dike construction monitoring, it is appropriate to consider all data except for the dewatering data and the AWPAP & Quarry data (i.e., we initially consider all data in **Table 1** and **Table 2**). These data sets are inherently different from data collected in the lakes during dike construction.

The remaining data sets are all directly relevant to dike construction. The only variable which could potentially differentiate among the data sets is the year (2008 vs. 2009). For example, if construction materials used to build the two dikes were different, or if placement methods changed, the TSS-turbidity relationships may also be different.

⁴ Field crews stirred the water as they measured, which creates air bubbles that interfere with probe function.

The 2008 and 2009 data relevant to dike construction are shown together in **Figure 1** (excluding data points below lab detection limits as discussed above). Log values are used to spread out the data and facilitate visual interpretation. Due to differences in detection limits between 2008 and 2009, the earlier data set lacks values at the low end.

Next, we considered alternative data transformation that would facilitate linear modeling. We evaluated various log and root transformations for both TSS and turbidity (log base 10, natural log, square root, fourth root). In each case we (a) evaluated how effectively the transformation spread the data across each axis, (b) evaluated apparent normality based on plots of the residuals, and (c) tested for normality of the residuals using a Shapiro-Wilks normality test. Our judgment was that the log base 10 transformation (for both variables) performed best overall.

The log-log data shown in **Figure 1** appear to be linear over most of the range, except at low TSS values. Given the log-scale, a log value of 0.50 on the x-axis corresponds to TSS of 3.16 mg/L, so all data to the left of log-TSS of 0.50 are close to detection limits (the detection limit was 3 mg/L for most of the 2008 data, and 1 mg/L for most of the 2009 data). It is not surprising that there is considerably more variability about the relationship at these low values, given their proximity to detection limits (in fact, there hardly appears to be any slope to the data in that range). Rather than try to fit a non-linear relationship to the data, we dropped all of the data points where TSS was less than 3.16 mg/L. Data below that range are unimportant from a decision-making perspective, since the lowest management threshold is at 6 mg/L, and long-term average estimates of TSS levels are not strongly affected by imprecision in low numbers. This cropping of the data set allows more rigorous application of a linear model across the data range from 3.16 mg/L upwards, which should result in better characterization of the relationship at higher TSS levels.

We also deleted one obvious outlier in the 2009 data set, shown in the figure at a log-TSS of 1.15 and log-turbidity of 0.66. This data point is associated with sample BG-TSS-36. The lab-measured turbidity was more than 5-fold higher than field-measured turbidity, suggesting a measurement error in the field.

Finally, we tested for differences between the 2008 and 2009 data sets using Analysis of Covariance. Analysis of covariance indicated no difference in slopes between the two data sets ($p > 0.10$), but there was a significant difference in the intercepts ($p < 0.01$). Visually, it does appear that the 2008 data are shifted slightly down relative to the 2009 data (keeping in mind that data below log TSS of 0.5 are not included). This could be explained by a difference in construction materials or construction practices between 2008 and 2009. Given that future dike construction monitoring is more likely to use materials and practices consistent with 2009 and not 2008, it is appropriate to drop the 2008 data.

In summary, the 2009 data in Second and Third Portage Lakes at TSS values above 3.16 mg/L were retained for derivation of the TSS-turbidity relationship for dike construction monitoring, with the exception of one outlier that was deleted.

3.4. Data Selection for Dewatering

The dewatering data (**Table 3 and Figure 2**) collected in the impoundment of Second Portage Lake are the only data that we know for certain are directly relevant to dewatering monitoring. However, the data have several limitations. First, they cover a narrow range of turbidity and TSS values, so any relationship derived solely on the dewatering data could not easily be extrapolated to higher turbidity levels. Second, they were collected during a relatively narrow time window (June-July 2009) so we do not know how applicable the data would be to the full range of dewatering conditions that may exist over time. Overall, our understanding of the applicability of the data to the full range of dewatering conditions is limited.

For these two reasons, it is appropriate to consider using the dike construction data to supplement the dewatering data. The dike construction data are somewhat relevant to dewatering since some residual East Dike construction material can be expected to be suspended in the impoundment, and because construction of other smaller dikes in the impoundment may overlap in time with dewatering. **Figure 3** shows the dewatering data together with the dike construction data. If we ignore data near the detection limits (i.e., data below log-TSS of 0.5, in accordance with the analysis in **Section 3.3**), the dewatering data appear relatively similar to the dike construction data over the narrow range of overlap. Nevertheless, analysis of covariance of the two data sets (ignoring the data below log-TSS of 0.5, and deleting the outlier point BG-TSS-36 as discussed in **Section 3.3**) indicates significant differences in slope and intercept ($p < 0.01$). In spite of the results of the analysis of covariance, we retain all of the data because of the limitations in the dewatering data.

In summary, all dike construction and dewatering data at TSS values above 3.16 mg/L were retained for derivation of the TSS-turbidity relationship for dewatering monitoring (except for one outlier which was deleted). In future it may be possible to exclude the dike construction monitoring data if additional dewatering data are collected across a higher range of turbidity values and across longer time periods relevant to dewatering.

4. DERIVATION OF NEW RELATIONSHIPS

4.1. Dike Construction

Results of linear regression are shown in **Figure 4**. The precise model is:

$$\log_{10}(\text{turbidity}) = 0.62196 + (0.95619 * \log_{10}(\text{TSS})) \quad [p < 0.001; r^2\text{-adj} = 0.81]$$

where turbidity is measured in NTUs in the field using an Analite NEP 160 meter, and TSS is measured in the lab as mg/L.

4.2. Dewatering

Results of linear regression are shown in **Figure 5**. The precise model is:

$$\log_{10}(\text{turbidity}) = 0.53276 + (0.99276 * \log_{10}(\text{TSS})) \quad [p < 0.001; r^2\text{-adj} = 0.85]$$

where turbidity is measured in NTUs in the field using an Analite NEP 160 meter, and TSS is measured in the lab as mg/L.

5. REFERENCES

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Table 1. Targeted Turbidity-TSS Data for East Dike and Bay-Goose North Dike

2008 East Dike Data				2009 Bay-Goose Dike Data			
Sample ID	Date	Turbidity (NTU)	TSS (mg/L)	Sample ID	Date	Turbidity (NTU)	TSS (mg/L)
DC1	July/Aug 08	17.9	5.8	BG-TSS-1	30-Jul-09	95.9	35
DC10	July/Aug 08	230	89.8	BG-TSS-2	30-Jul-09	103.4	31
DC11	July/Aug 08	157	59.8	BG-TSS-3	30-Jul-09	49.5	12
DC12	July/Aug 08	223	88.4	BG-TSS-4	30-Jul-09	123.5	44
DC13	July/Aug 08	430	181	BG-TSS-5	30-Jul-09	160.4	53
DC14	July/Aug 08	178	69.1	BG-TSS-6	30-Jul-09	5.4	1
DC15	July/Aug 08	59	22.4	BG-TSS-7	30-Jul-09	1.3	<1
DC16	July/Aug 08	66	19.8	BG-TSS-8	30-Jul-09	12.4	2
DC17	July/Aug 08	5.3	<3	BG-TSS-9	30-Jul-09	2.7	<1
DC18	July/Aug 08	2.7	<3	BG-TSS-10	30-Jul-09	38.2	9
DC19	July/Aug 08	3.3	<3	BG-TSS-11	1-Aug-09	56.1	14
DC2	July/Aug 08	8.3	3.8	BG-TSS-12	1-Aug-09	39.6	12
DC20	July/Aug 08	1.3	<3	BG-TSS-13	1-Aug-09	17.4	12
DC21	July/Aug 08	4.2	<3	BG-TSS-14	1-Aug-09	3.3	<1
DC22	July/Aug 08	10.1	4.4	BG-TSS-15	1-Aug-09	1.7	<1
DC23	July/Aug 08	10.9	4.4	BG-TSS-16	1-Aug-09	14.2	4
DC24	July/Aug 08	21	9.8	BG-TSS-17	1-Aug-09	58.0	26
DC25	July/Aug 08	12.6	3.8	BG-TSS-18	1-Aug-09	40.6	8
DC26	July/Aug 08	14	4.4	BG-TSS-19	1-Aug-09	38.1	10
DC27	July/Aug 08	13.2	4.4	BG-TSS-20	1-Aug-09	38.6	9
DC28	July/Aug 08	8.5	3.8	BG-TSS-21	3-Aug-09	20.4	5
DC29	July/Aug 08	8.3	<3	BG-TSS-22	3-Aug-09	5.1	3
DC3	July/Aug 08	7.5	4.4	BG-TSS-23	3-Aug-09	35.4	8
DC30	July/Aug 08	7.6	<3	BG-TSS-24	3-Aug-09	17.3	<1
DC31	July/Aug 08	7.9	<3	BG-TSS-25	3-Aug-09	10.3	2
DC32	July/Aug 08	8.8	3.1	BG-TSS-26	3-Aug-09	71.5	18
DC33	July/Aug 08	20	7.8	BG-TSS-27	3-Aug-09	68.3	18
DC34	July/Aug 08	11.9	3.8	BG-TSS-28	3-Aug-09	65.9	19
DC4	July/Aug 08	36.7	15.8	BG-TSS-29	3-Aug-09	60.5	15
DC5	July/Aug 08	41.5	15.8	BG-TSS-30	3-Aug-09	69.5	16
DC6	July/Aug 08	53.5	19.1	BG-TSS-31	8/9/2009	10.2	4
DC7	July/Aug 08	32	11.8	BG-TSS-32	8/9/2009	40.5	16
DC8	July/Aug 08	19.5	<3	BG-TSS-33	8/9/2009	1.3	2
DC9	July/Aug 08	36.5	7.8	BG-TSS-34	8/9/2009	35.2	12
				BG-TSS-35	8/9/2009	1.35	<1
				BG-TSS-36	8/9/2009	4.55	14
				BG-TSS-37	8/9/2009	43.8	10
				BG-TSS-38	8/9/2009	61.1	19
				BG-TSS-39	8/9/2009	52.9	12
				BG-TSS-40	8/9/2009	50.2	16
				BG-TSS-41	8/9/2009	59.1	15
				BG-TSS-42	8/9/2009	62.2	20
				BG-TSS-43	8/9/2009	31.2	10
				BG-TSS-44	8/9/2009	57.0	14
				BG-TSS-45	8/9/2009	35.9	7
				BG-TSS-46	8/9/2009	62.7	16
				BG-TSS-47	8/9/2009	40.5	14
				BG-TSS-48	8/9/2009	56.9	12
				BG-TSS-49	8/9/2009	34.9	12
				BG-TSS-50	8/9/2009	61.5	16
				BG-TSS-51	8/9/2009	30.0	8
				BG-TSS-52	8/9/2009	31.7	9
				BG-TSS-53	8/9/2009	40.3	10
				BG-TSS-54	8/9/2009	40.1	10
				BG-TSS-55	8/9/2009	30.0	7
				BG-TSS-56	8/9/2009	34.4	8
				BG-TSS-57	8/9/2009	33.2	10
				BG-TSS-58	8/9/2009	39.9	8
				BG-TSS-59	8/9/2009	38.3	6
				BG-TSS-60	8/9/2009	37.0	10
				BG-TSS-61	9/9/2009	102.1	26
				BG-TSS-62	9/9/2009	69.4	12
				BG-TSS-63	9/9/2009	89.9	32
				BG-TSS-64	9/9/2009	52.9	11
				BG-TSS-65	9/9/2009	51.0	15
				BG-TSS-66	9/9/2009	14.3	2
				BG-TSS-67	9/9/2009	9.9	<1
				BG-TSS-68	9/9/2009	34.3	5
				BG-TSS-69	9/9/2009	0.9	2
				BG-TSS-70	9/9/2009	20.6	3
				SP-1	9/12/2009	4.7	3
				Outlet 1	9/12/2009	42.7	13
				Outlet 2	9/12/2009	28.5	8
				SP-10	9/12/2009	0.8	<1
				BGE-5	9/12/2009	33.7	8
				BGE-3	9/12/2009	34.9	8
				BGW-2	9/12/2009	29.5	8
				DUP	9/12/2009	29.5	8

Table 2. Additional Turbidity-TSS Data Collected During Construction of the East Dike (2008) and Bay-Goose North Dike (2009)

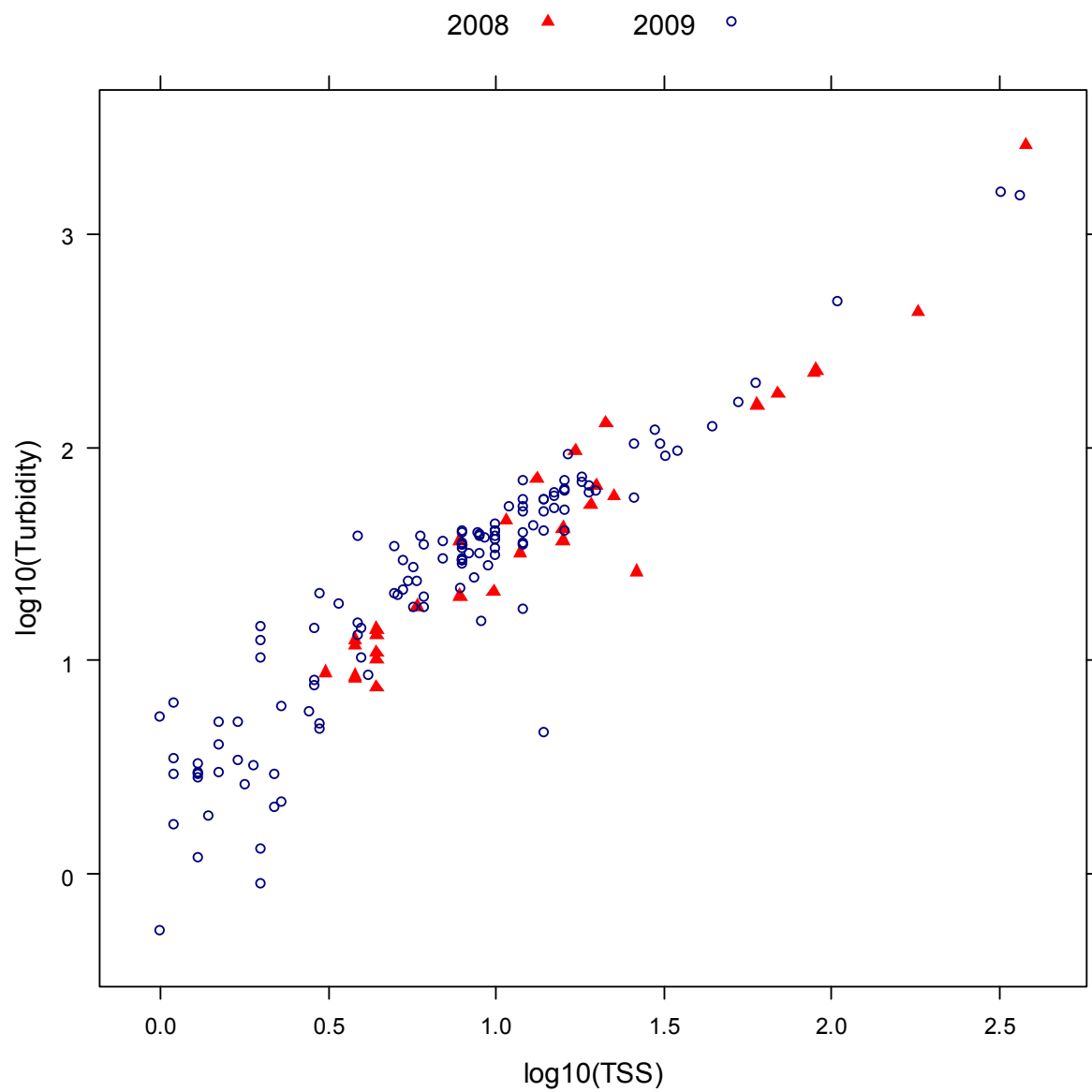
Program	Year	Date	Lake	Station ID/Rep	Field Turb (NTU)	Lab TSS (mg/L)	Lab Turb (NTU)
AEMP	2008	22-Aug-08	SPL	SP	45.5	11	NA
East Dike Construction Weekly Water Quality	2008	22-Aug-08	SPL	E214	96	17.2	NA
East Dike Construction Weekly Water Quality	2008	22-Aug-08	SPL	E214	2600	378	NA
East Dike Construction Weekly Water Quality	2008	22-Aug-08	SPL	A3	71	13.2	NA
East Dike Construction Weekly Water Quality	2008	22-Aug-08	SPL	A3	129	21.2	NA
East Dike Construction Weekly Water Quality	2008	12-Sep-08	SPL	SE2	26	26.2	NA
AEMP	2009	16-Aug-09	TPL	TPE-7	2.16	2.3	0.98
AEMP	2009	11-Sep-09	TPL	TPE-10	23.2	5.5	11
AEMP	2009	11-Sep-09	TPL	TPE-8	27.1	5.7	12.2
AEMP	2009	11-Sep-09	TPL	TPE-9	21.5	5.3	11.1
AEMP	2009	12-Aug-09	SPL	SP-7	0.54	1.00	0.52
AEMP	2009	15-Sep-09	SPL	SP-10	2.91	1.10	2.57
AEMP	2009	15-Sep-09	SPL	SP-8	2.80	1.30	2.15
Bay-Goose Dike Construction Weekly Water Quality	2009	31-Jul-09	TPL	DC-WQ-BGE1	1.2	1.3	0.76
Bay-Goose Dike Construction Weekly Water Quality	2009	31-Jul-09	TPL	DC-WQ-BGW1	17.8	5.7	10.3
Bay-Goose Dike Construction Weekly Water Quality	2009	31-Jul-09	TPL	DC-WQ-BGW2	17.7	6.1	8.54
Bay-Goose Dike Construction Weekly Water Quality	2009	31-Jul-09	TPL	DC-WQ-HVH4	1.71	1.1	1.2
Bay-Goose Dike Construction Weekly Water Quality	2009	08-Aug-09	TPL	DC-WQ-BGE1	8.47	4.2	3.13
Bay-Goose Dike Construction Weekly Water Quality	2009	08-Aug-09	TPL	DC-WQ-BGE3	18.3	3.4	4.22
Bay-Goose Dike Construction Weekly Water Quality	2009	08-Aug-09	TPL	DC-WQ-BGE5	1.85	1.4	1.66
Bay-Goose Dike Construction Weekly Water Quality	2009	08-Aug-09	TPL	DC-WQ-BGW2	5.78	2.8	2.16
Bay-Goose Dike Construction Weekly Water Quality	2009	08-Aug-09	TPL	DC-WQ-HVH2	2.04	2.2	1.36
Bay-Goose Dike Construction Weekly Water Quality	2009	08-Aug-09	TPL	DC-WQ-HVH4	2.92	2.2	1.71
Bay-Goose Dike Construction Weekly Water Quality	2009	16-Aug-09	TPL	DC-WQ-BGE1	14.2	2.9	8.83
Bay-Goose Dike Construction Weekly Water Quality	2009	16-Aug-09	TPL	DC-WQ-BGE3	6.03	2.3	5.8
Bay-Goose Dike Construction Weekly Water Quality	2009	16-Aug-09	TPL	DC-WQ-BGE5	4.05	1.5	3.32
Bay-Goose Dike Construction Weekly Water Quality	2009	16-Aug-09	TPL	DC-WQ-BGW3	3.49	1.1	3.75
Bay-Goose Dike Construction Weekly Water Quality	2009	16-Aug-09	TPL	DC-WQ-HVH2	3.4	1.7	3.46
Bay-Goose Dike Construction Weekly Water Quality	2009	16-Aug-09	TPL	DC-WQ-HVH4	5.11	1.7	3.93
Bay-Goose Dike Construction Weekly Water Quality	2009	21-Aug-09	TPL	DC-WQ-BGE2	1560	320	469
Bay-Goose Dike Construction Weekly Water Quality	2009	22-Aug-09	TPL	DC-WQ-BGE1	37.8	3.9	28
Bay-Goose Dike Construction Weekly Water Quality	2009	22-Aug-09	TPL	DC-WQ-BGW3	8.1	2.9	3.01
Bay-Goose Dike Construction Weekly Water Quality	2009	22-Aug-09	TPL	DC-WQ-HVH4	29.1	5.3	12.4
Bay-Goose Dike Construction Weekly Water Quality	2009	29-Aug-09	TPL	DC-WQ-BGE1	19.6	6.1	9.91
Bay-Goose Dike Construction Weekly Water Quality	2009	29-Aug-09	TPL	DC-WQ-BGE2	1511	367	260
Bay-Goose Dike Construction Weekly Water Quality	2009	29-Aug-09	TPL	DC-WQ-BGE3	200	59.5	86
Bay-Goose Dike Construction Weekly Water Quality	2009	29-Aug-09	TPL	DC-WQ-BGW2	480	105	206
Bay-Goose Dike Construction Weekly Water Quality	2009	29-Aug-09	TPL	DC-WQ-BGW3	6.3	1.1	3.7
Bay-Goose Dike Construction Weekly Water Quality	2009	29-Aug-09	TPL	DC-WQ-HVH4	14.9	3.9	6.3
Bay-Goose Dike Construction Weekly Water Quality	2009	04-Sep-09	TPL	DC-WQ-BGE2	92.1	16.5	32.6
Bay-Goose Dike Construction Weekly Water Quality	2009	04-Sep-09	TPL	DC-WQ-BGE5	39.5	8.9	18.4
Bay-Goose Dike Construction Weekly Water Quality	2009	04-Sep-09	TPL	DC-WQ-BGW2	120	29.7	53
Bay-Goose Dike Construction Weekly Water Quality	2009	04-Sep-09	TPL	DC-WQ-HVH5	34.5	6.1	19.7
Bay-Goose Dike Construction Weekly Water Quality	2009	11-Sep-09	TPL	DC-WQ-BGE3	49.5	13.9	27.6
Bay-Goose Dike Construction Weekly Water Quality	2009	11-Sep-09	TPL	DC-WQ-BGE5	37.7	9.3	23.7
Bay-Goose Dike Construction Weekly Water Quality	2009	11-Sep-09	TPL	DC-WQ-BGW2	20.2	5.1	13.2
Bay-Goose Dike Construction Weekly Water Quality	2009	11-Sep-09	TPL	DC-WQ-HVH5	31.5	8.3	22.8
Bay-Goose Dike Construction Weekly Water Quality	2009	04-Sep-09	TPE	DC-WQ-TPE6	27.5	9.5	21.3
Bay-Goose Dike Construction Weekly Water Quality	2009	21-Aug-09	SPL	DC-WQ-SP8	5.1	1.5	4.99
Bay-Goose Dike Construction Weekly Water Quality	2009	29-Aug-09	SPL	DC-WQ-SP6	2.93	1.3	1.89
Bay-Goose Dike Construction Weekly Water Quality	2009	29-Aug-09	SPL	DC-WQ-SP8	13.1	3.9	5.16
Bay-Goose Dike Construction Weekly Water Quality	2009	04-Sep-09	SPL	DC-WQ-SP6	3.00	1.5	5.03
Bay-Goose Dike Construction Weekly Water Quality	2009	11-Sep-09	SPL	DC-WQ-SP1	3.2	1.9	1.95
Bay-Goose Dike Construction Weekly Water Quality	2009	11-Sep-09	SPL	DC-WQ-SP6	3.27	1.3	3.09
Bay-Goose Dike Construction Weekly Water Quality	2009	11-Sep-09	SPL	DC-WQ-SP8	7.6	2.9	4.27
Bay-Goose Dike Effects Assessment	2009	18-Sep-09	TPL	EAS-BGW-1	23.5	5.8	9.47
Bay-Goose Dike Effects Assessment	2009	18-Sep-09	TPL	EAS-BGE-1	24.1	8.6	12.5
Bay-Goose Dike Effects Assessment	2009	24-Sep-09	TPL	EAS-BGW-1	15.1	9.1	11.2
Bay-Goose Dike Effects Assessment	2009	26-Sep-09	TPL	EAS-BGE-1	21.9	7.9	16.3
Bay-Goose Dike Effects Assessment	2009	19-Sep-09	SPL	EAS-SPC-1	2.6	1.8	2.06
Bay-Goose Dike Effects Assessment	2009	26-Sep-09	SPL	EAS-SPC-1	2.97	1.3	2.7

Table 3. Turbidity-TSS Data for 2009 Dewatering of the Impounded Arm of Second Portage Lake ¹

Sample ID	Date	Time	Measured Field Turbidity	Predicted Field Turbidity	Time	Lab Turbidity	Lab TSS (mg/L)
Intake Unit 1	6/10/2009	8:30	22.40	15.42	8:30	11.00	2
Intake Unit 2	6/10/2009	8:30	22.20	16.80	8:30	12.80	2
Intake Unit 3	6/10/2009	8:30	20.50	15.58	8:30	11.20	1
Intake Unit 4	6/10/2009	8:30	21.50	37.67	8:30	40.10	3
Intake Unit 5	6/10/2009	8:30	17.94	14.89	8:30	10.30	2
Intake Unit 6	6/10/2009	8:30	17.82	14.89	8:30	10.30	2
Intake Unit 1	6/11/2009	8:00	27.10	17.79	8:00	14.10	5
Intake Unit 2	6/11/2009	8:00	27.50	17.41	8:00	13.60	4
Intake Unit 3	6/11/2009	8:00	26.70	16.95	8:00	13.00	4
Intake Unit 4	6/11/2009	8:00	26.70	18.48	8:00	15.00	5
Intake Unit 5	6/11/2009	8:00	20.50	16.03	8:00	11.80	2
Intake Unit 6	6/11/2009	8:00	21.10	15.73	8:00	11.40	3
Intake Unit 1	6/12/2009	7:00	25.10	18.48	7:00	15.00	4
Intake Unit 2	6/12/2009	7:00	23.70	18.10	7:00	14.50	4
Intake Unit 3	6/12/2009	7:00	24.20	17.26	7:00	13.40	4
Intake Unit 4	6/12/2009	7:00	23.70	15.81	7:00	11.50	5
Intake Unit 5	6/12/2009	7:00	22.40	16.95	7:00	13.00	3
Intake Unit 6	6/12/2009	7:00	22.50	16.03	7:00	11.80	3
Intake Unit 5	6/19/2009	17:00	29.90	18.94	17:00	15.60	6
Intake Unit 6	6/19/2009	17:00	32.50	18.79	17:00	15.40	4
Intake Unit 1	6/21/2009	17:30	22.10		17:30	19.80	10
Intake Unit 2	6/21/2009	17:30	21.80		17:30	19.30	10
Intake Unit 3	6/21/2009	17:30	21.30		17:30	21.60	10
Intake Unit 4	6/21/2009	17:30	22.30		17:30	19.60	9
Intake Unit 5	6/21/2009	17:30	17.28		17:30	16.36	7
Intake Unit 6	6/21/2009	17:30	19.01		17:30	17.30	7
Intake Unit 1	6/22/2009	6:30	23.20		6:30	20.40	9
Intake Unit 2	6/22/2009	6:30	21.80		6:30	18.70	9
Intake Unit 3	6/22/2009	6:30	21.40		6:30	17.90	8
Intake Unit 4	6/22/2009	6:30	21.90		6:30	18.90	9
Intake Unit 5	6/22/2009	6:30	16.74		6:30	15.50	6
Intake Unit 6	6/22/2009	6:30	18.18		6:30	15.60	7
Intake Unit 1	6/23/2009	6:30	23.90		6:30	25.60	7
Intake Unit 2	6/23/2009	6:30	20.50		6:30	20.40	5
Intake Unit 3	6/23/2009	6:30	19.52		6:30	20.80	8
Intake Unit 4	6/23/2009	6:30	20.10		6:30	21.00	7
Intake Unit 5	6/23/2009	6:30	22.00		6:30	22.50	7
Intake Unit 6	6/23/2009	6:30	22.10		6:30	22.30	6
Intake Unit 1	6/24/2009	17:30	23.90		17:30	20.30	8
Intake Unit 2	6/24/2009	17:30	23.40		17:30	16.90	7
Intake Unit 3	6/24/2009	17:30	23.80		17:30	17.40	7
Intake Unit 4	6/24/2009	17:30	22.80		17:30	16.60	8
Intake Unit 5	6/24/2009	17:30	18.75		17:30	16.90	7
Intake Unit 6	6/24/2009	17:30	19.07		17:30	17.50	8
Intake Unit 1	6/25/2009	6:30	24.90		6:30	20.70	8
Intake Unit 2	6/25/2009	6:30	22.50		6:30	17.10	8
Intake Unit 3	6/25/2009	6:30	24.50		6:30	17.90	8
Intake Unit 4	6/25/2009	6:30	25.10		6:30	18.80	10
Intake Unit 5	6/25/2009	6:30	20.80		6:30	15.70	7
Intake Unit 6	6/25/2009	6:30	21.90		6:30	17.90	7
Intake Unit 1	6/25/2009	17:30	23.80		17:30	21.20	8
Intake Unit 2	6/25/2009	17:30	22.50		17:30	21.10	6
Intake Unit 3	6/25/2009	17:30	20.10		17:30	19.60	6
Intake Unit 4	6/25/2009	17:30	21.10		17:30	19.80	6
Intake Unit 5	6/25/2009	17:30	17.30		17:30	16.10	4
Intake Unit 6	6/25/2009	17:30	24.40		17:30	24.80	6
Intake Unit 1	6/28/2009	17:30	27.30		17:30	24.00	8
Intake Unit 2	6/28/2009	17:30	24.20		17:30	19.20	7
Intake Unit 3	6/28/2009	17:30	22.60		17:30	19.80	8
Intake Unit 4	6/28/2009	17:30	22.90		17:30	21.40	6
Intake Unit 5	6/28/2009	17:30	17.37		17:30	16.50	6
Intake Unit 6	6/28/2009	17:30	35.10		17:30	35.10	13
Intake Unit 1	7/5/2009	17:30	23.00		17:30	18.30	8
Intake Unit 2	7/5/2009	17:30	22.90		17:30	17.70	8
Intake Unit 6	7/5/2009	17:30	11.97		17:30	10.30	5
Intake Unit 1	7/6/2009	7:00	21.00		7:00	16.30	7
Intake Unit 2	7/6/2009	7:00	17.24		7:00	14.30	8
Intake Unit 6	7/6/2009	7:00	13.16		7:00	12.00	7
Intake Unit 1	7/7/2009	18:00	23.90		18:00	21.50	7
Intake Unit 2	7/7/2009	18:00	24.40		18:00	21.90	9
Intake Unit 1	7/8/2009	18:00	22.60		18:00	16.90	7
Intake Unit 2	7/8/2009	18:00	22.20		18:00	19.80	6
Intake Unit 1	7/9/2009	6:40	22.30		6:40	21.40	8
Intake Unit 2	7/9/2009	6:40	22.80		6:40	22.30	8

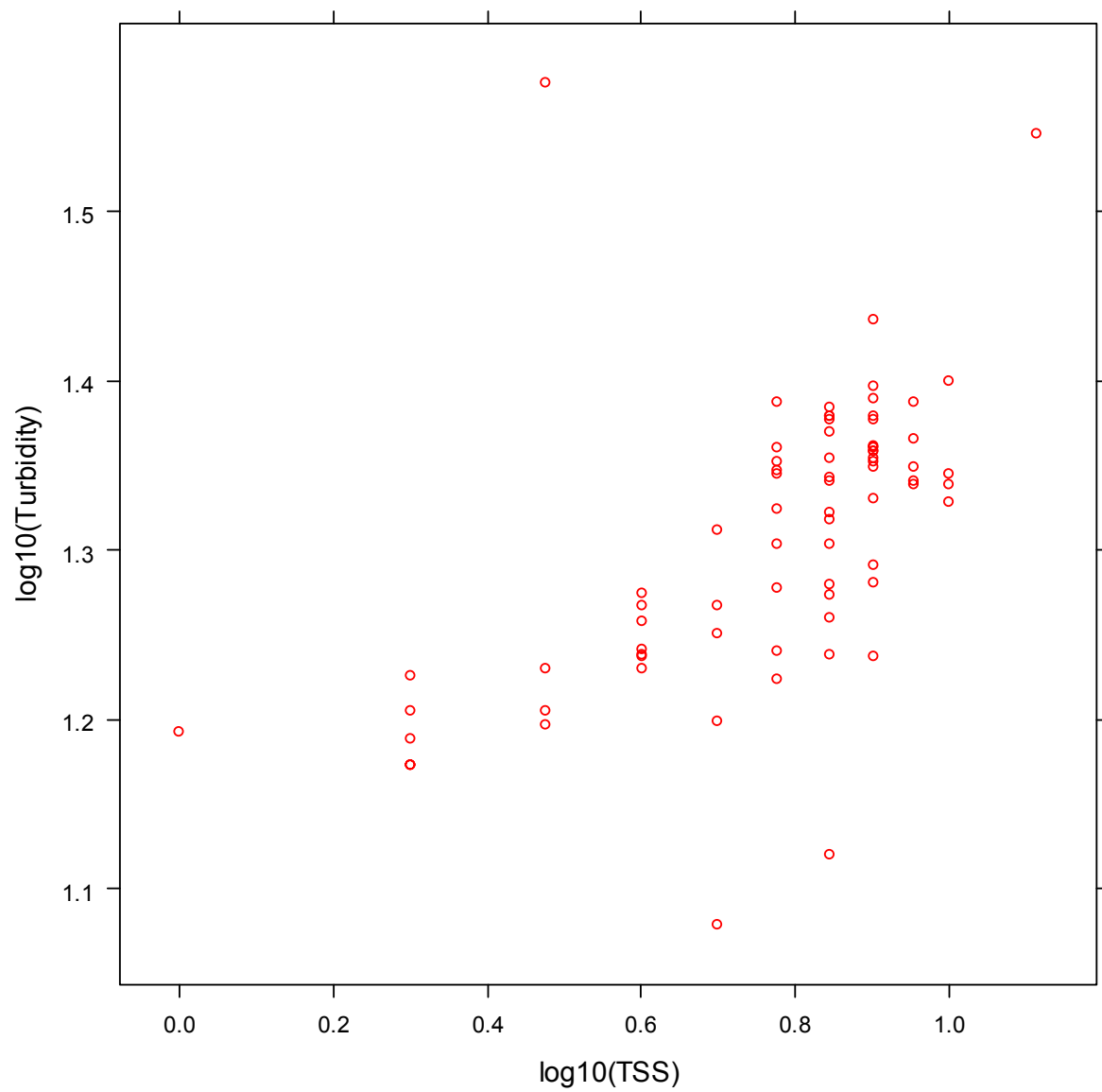
¹ For grey-shaded cells, field turbidity was measured incorrectly so predicted field turbidity is used. Predictions are based on the relationship between field and lab turbidity for other data points (Field=7.014+(0.7645*lab); p<0.001; r²=0.66)

Figure 1. All paired TSS-turbidity data relevant to dike construction monitoring⁵ (2008 and 2009)



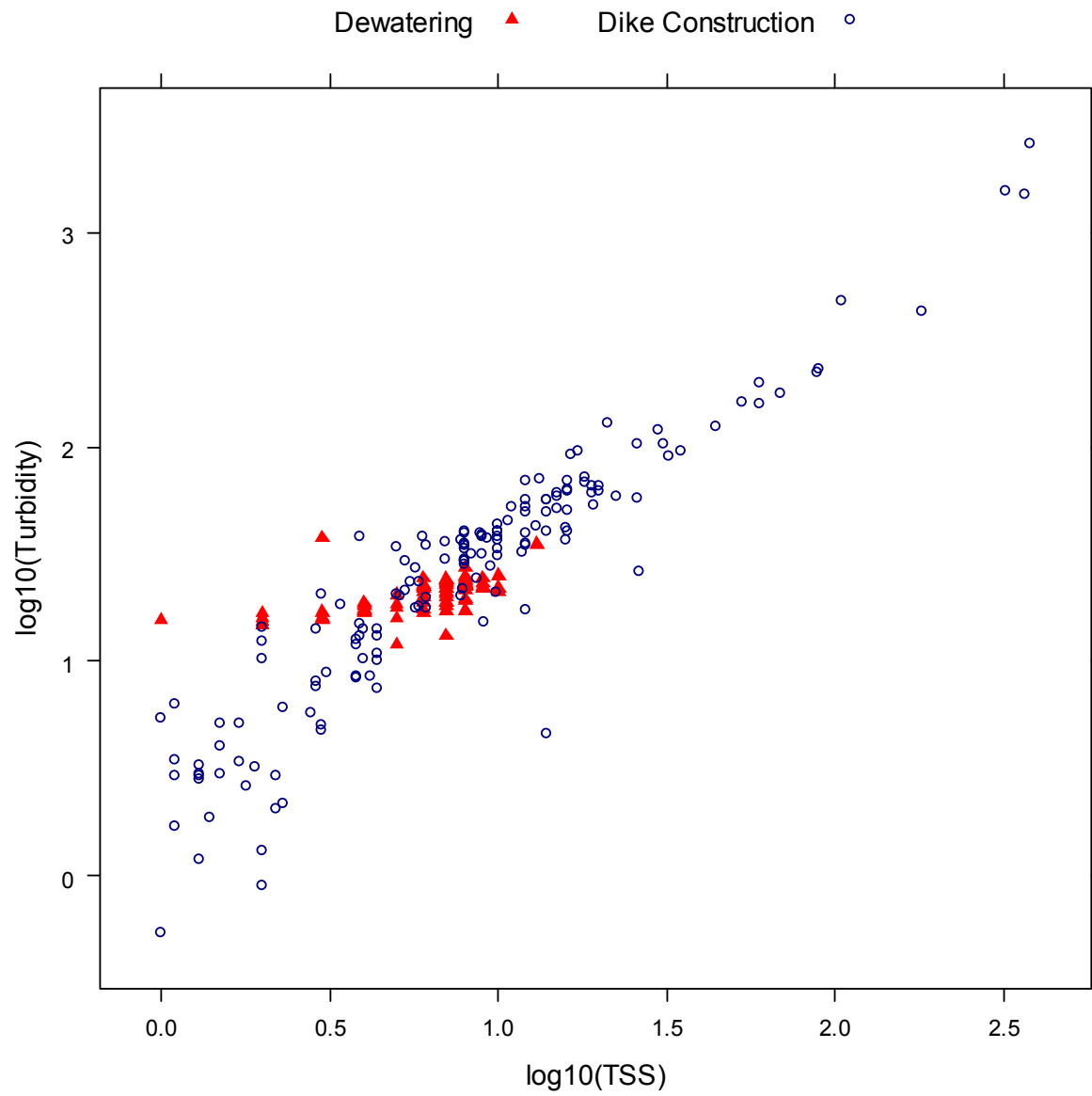
⁵ This figure shows all data contained in Tables 1 and 2, except for data below detection limits.

Figure 2. Paired TSS-turbidity data for dewatering of the impoundment⁶.



⁶ This figure shows all data contained in Table 3, except for data below detection limits

Figure 3. All paired TSS-turbidity data for dewatering and dike construction⁷.



⁷ This figure shows all data contained in Tables 1 to 3, except for data below detection limits

Figure 4. Final data set and recommended TSS-turbidity relationship for dike construction monitoring

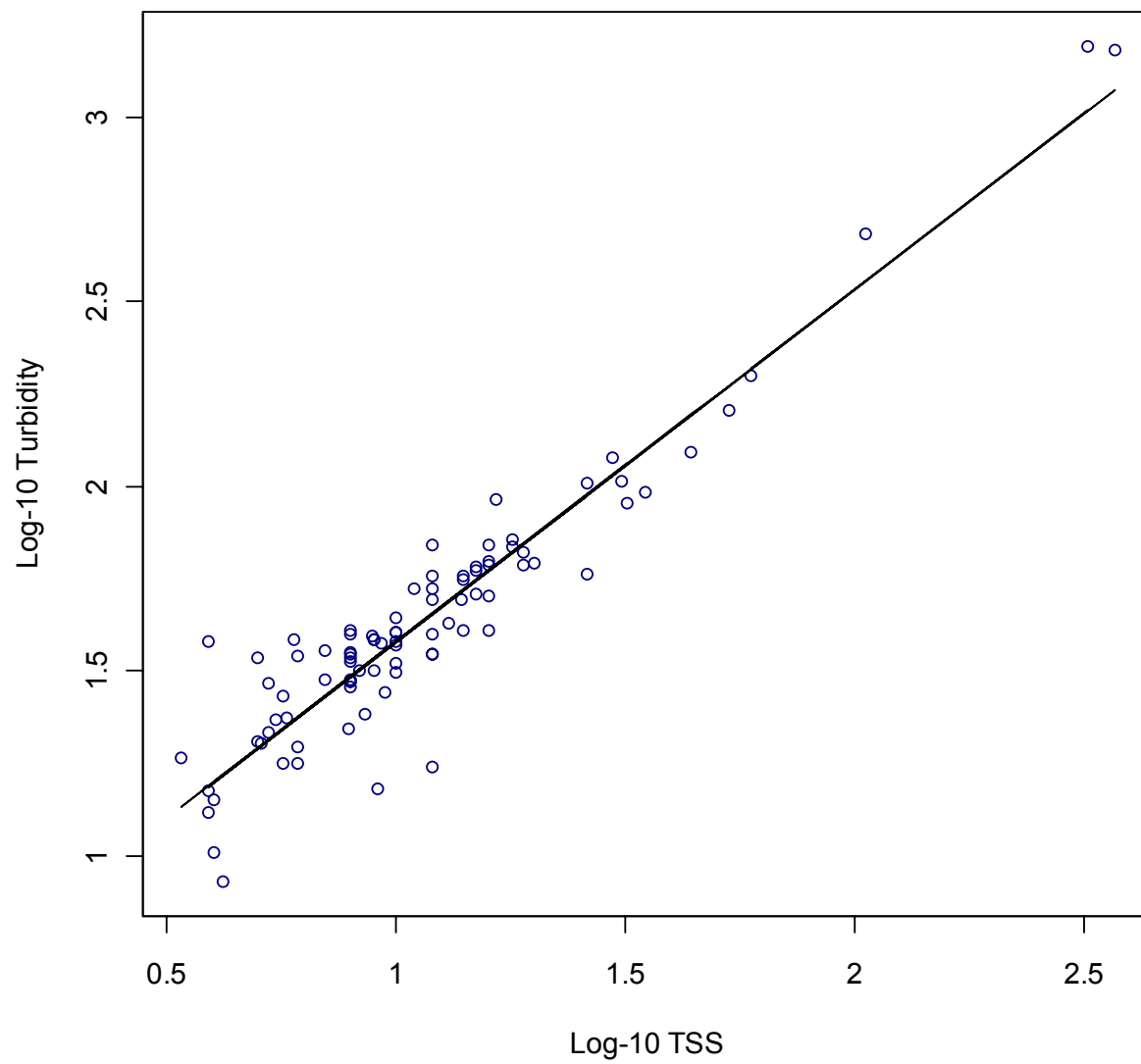
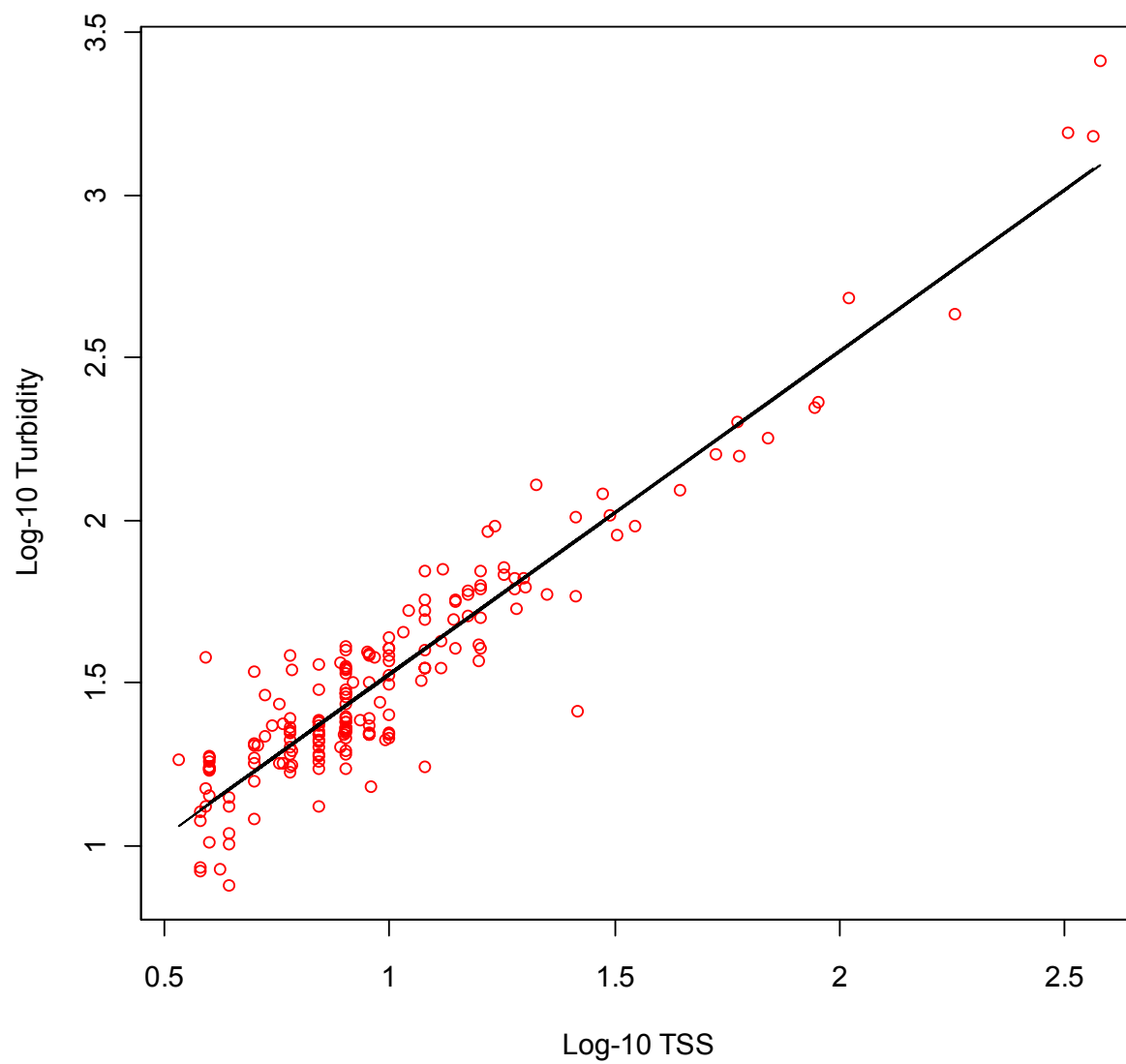


Figure 5. Final data set and recommended TSS-turbidity relationship for dewatering monitoring



APPENDIX B

DAILY SUMMARY OF TSS CONCENTRATIONS FOR ROUTINE AND HVH MONITORING STATIONS, 2009



Appendix B
Bay-Goose Dike Construction Monitoring 2009
Daily Summary of TSS Concentrations for Routine and High Value Habitat Monitoring Stations.

Station:		BGW1				BGW2				BGW3				BGE1				Routine Stations BGE2				BGE3				BGE4				BGE5				BGE6			
		Time Period:	24h Max	24h Avg	7-d Ave	30-d Avg	24h Max	24h Avg	7-d Ave	30-d Avg	24h Max	24h Avg	7-d Ave	30-d Avg	24h Max	24h Avg	7-d Ave	30-d Avg	24h Max	24h Avg	7-d Ave	30-d Avg	24h Max	24h Avg	7-d Ave	30-d Avg	24h Max	24h Avg	7-d Ave	30-d Avg	24h Max	24h Avg	7-d Ave	30-d Avg			
Date of Analysis	Time of Analysis																																				
28-Jul-09	22:00	0.86	0.38 (n/a)	0.38 (n/a)	0.38 (n/a)	0.32	0.27 (n/a)	0.27 (n/a)	0.27 (n/a)	0.29	0.28 (n/a)	0.28 (n/a)	0.28 (n/a)	0.52	0.39 (n/a)	0.39 (n/a)	0.39 (n/a)	0.30	0.28 (n/a)	0.28 (n/a)	0.28 (n/a)	0.25	0.25 (n/a)	0.25 (n/a)	0.25 (n/a)	0.28	0.26 (n/a)	0.26 (n/a)	0.26 (n/a)	0.29	0.28 (n/a)	0.28 (n/a)	0.28 (n/a)	0.22	0.21 (n/a)	0.21 (n/a)	0.21 (n/a)
29-Jul-09	20:00	3.67	2.35	1.48 (n/a)	1.48 (n/a)	0.55	0.42	0.35 (n/a)	0.35 (n/a)	0.26	0.26	0.27 (n/a)	0.27 (n/a)	0.56	0.40	0.39 (n/a)	0.39 (n/a)	5.79	3.32	1.99 (n/a)	1.99 (n/a)	1.35	0.84	0.57 (n/a)	0.57 (n/a)	0.28	0.25	0.26 (n/a)	0.26 (n/a)	0.28	0.28	0.28 (n/a)	0.28 (n/a)	0.24	0.23	0.22 (n/a)	0.22 (n/a)
30-Jul-09	20:00	4.77	4.14	2.33 (n/a)	2.33 (n/a)	2.10	1.55	0.59 (n/a)	0.59 (n/a)	1.17	0.95	0.47 (n/a)	0.47 (n/a)	0.49	0.44	0.42 (n/a)	0.42 (n/a)	11.43	6.84	4.43 (n/a)	4.43 (n/a)	1.16	1.13	0.81 (n/a)	0.81 (n/a)	0.33	0.29	0.26 (n/a)	0.26 (n/a)	0.28	0.27	0.28 (n/a)	0.28 (n/a)	0.34	0.27	0.22 (n/a)	0.22 (n/a)
31-Jul-09	22:00	6.69	6.45	3.31 (n/a)	3.31 (n/a)	6.05	5.61	1.82 (n/a)	1.82 (n/a)	17.95	12.32	3.77 (n/a)	3.77 (n/a)	0.71	0.70	0.48 (n/a)	0.48 (n/a)	12.32	7.32	5.22 (n/a)	5.22 (n/a)	1.78	1.52	0.95 (n/a)	0.95 (n/a)	2.18	1.62	0.48 (n/a)	0.48 (n/a)	2.47	1.60	0.45 (n/a)	0.45 (n/a)	3.26	2.46	0.79 (n/a)	0.79 (n/a)
01-Aug-09	21:00	6.38	5.76	3.96 (n/a)	3.96 (n/a)	4.07	3.87	2.36 (n/a)	2.36 (n/a)	6.09	5.06	4.04 (n/a)	4.04 (n/a)	1.27	1.08	0.61 (n/a)	0.61 (n/a)	1.72	1.48	4.53 (n/a)	4.53 (n/a)	15.93	10.85	3.35 (n/a)	3.35 (n/a)	2.50	1.99	0.82 (n/a)	0.82 (n/a)	9.71	3.69	1.22 (n/a)	1.22 (n/a)	1.77	1.69	0.98 (n/a)	0.98 (n/a)
02-Aug-09	21:00	10.74	8.53	4.76 (n/a)	4.76 (n/a)	4.07	3.88	2.62 (n/a)	2.62 (n/a)	1.87	1.45	3.85 (n/a)	3.85 (n/a)	1.47	1.32	0.72 (n/a)	0.72 (n/a)	2.48	2.24	4.12 (n/a)	4.12 (n/a)	21.45	14.29	4.69 (n/a)	4.69 (n/a)	2.88	2.45	1.16 (n/a)	1.16 (n/a)	4.38	4.06	2.16 (n/a)	2.16 (n/a)	1.72	1.45	1.09 (n/a)	1.09 (n/a)
03-Aug-09	20:00	10.74	9.06	5.39 (n/a)	5.39 (n/a)	15.42	5.89	3.11 (n/a)	3.11 (n/a)	4.34	2.96	3.73 (n/a)	3.73 (n/a)	6.56	4.31	1.29 (n/a)	1.29 (n/a)	30.06	11.67	5.23 (n/a)	5.23 (n/a)	24.49	21.50	7.28 (n/a)	7.28 (n/a)	14.41	10.16	2.63 (n/a)	2.63 (n/a)	8.71	7.21	2.91 (n/a)	2.91 (n/a)	3.83	2.58	1.31 (n/a)	1.31 (n/a)
04-Aug-09	21:00	8.28	6.42	6.08	5.52 (n/a)	15.42	7.15	4.00	3.62 (n/a)	2.16	2.02	3.90	3.54 (n/a)	2.38	2.26	1.53	1.41 (n/a)	37.21	31.96	10.14	9.17 (n/a)	26.79	12.83	8.85	8.01 (n/a)	11.81	6.28	3.44	3.12 (n/a)	8.71	7.73	3.93	3.57 (n/a)	1.34	1.26	1.42	1.3 (n/a)
05-Aug-09	21:00	3.72	3.70	6.58	5.35 (n/a)	1.73	1.61	4.49	3.43 (n/a)	1.46	1.17	4.34	3.3 (n/a)	2.45	2.42	1.93	1.52 (n/a)	4.27	3.26	11.16	9.2 (n/a)	16.75	16.75	12.75	9.62 (n/a)	2.54	2.13	3.99	3.01 (n/a)	9.00	7.17	4.87	3.67 (n/a)	1.46	1.42	1.70	1.3 (n/a)
06-Aug-09	21:00	9.23	6.26	6.77	5.47 (n/a)	1.19	1.14	4.15	3.22 (n/a)	1.27	1.13	3.25	3.07 (n/a)	2.31	2.17	2.04	1.6 (n/a)	3.04	2.36	10.18	8.58 (n/a)	14.85	13.57	13.49	10.21 (n/a)	7.28	4.67	4.54	3.19 (n/a)	8.74	7.99	5.99	4.18 (n/a)	1.38	1.22	1.65	1.29 (n/a)
07-Aug-09	19:00	4.83	3.91	6.52	5.38 (n/a)	2.15	1.68	3.84	3.13 (n/a)	1.27	1.05	2.45	2.96 (n/a)	5.15	3.65	2.46	1.8 (n/a)	7.19	4.60	9.90	8.26 (n/a)	24.30	18.49	15.72	10.96 (n/a)	7.90	5.01	4.74	3.35 (n/a)	8.74	5.15	6.08	4.27 (n/a)	1.38	1.16	1.55	1.28 (n/a)
08-Aug-09	22:00	3.53	3.47	6.09	5.22 (n/a)	2.00	1.71	3.40	2.98 (n/a)	2.76	2.05	1.75	2.84 (n/a)	3.85	3.71	3.12	2.06 (n/a)	3.25	3.07	10.91	7.92 (n/a)	24.30	16.71	16.54	11.46 (n/a)	2.01	1.84	5.23	3.43 (n/a)	5.67	5.26	5.96	4.22 (n/a)	1.22	1.19	1.43	1.26 (n/a)
09-Aug-09	22:00	3.42	2.98	5.32	5.06 (n/a)	2.20	2.04	3.15	2.91 (n/a)	1.42	1.28	1.70	2.73 (n/a)	3.56	3.06	3.19	2.13 (n/a)	2.89	2.74	10.27	7.57 (n/a)	14.21	9.57	16.23	11.24 (n/a)	2.30	1.98	4.94	3.32 (n/a)	5.67	5.10	5.93	4.29 (n/a)	1.53	1.40	1.42	1.27 (n/a)
10-Aug-09	21:00	2.55	2.38	4.09	4.88 (n/a)	1.67	1.64	2.58	2.85 (n/a)	0.98	0.91	1.33	2.61 (n/a)	3.52	2.83	3.06	2.19 (n/a)	3.62	2.71	5.89	7.25 (n/a)	14.21	10.20	15.15	11.17 (n/a)	3.84	2.74	3.44	3.28 (n/a)	4.13	3.49	5.06	4.23 (n/a)	2.03	1.63	1.30	1.3 (n/a)
11-Aug-09	21:00	1.80	1.76	3.69	4.69 (n/a)	0.94	0.93	1.58	2.71 (n/a)	1.15	1.02	1.24	2.51 (n/a)	4.50	4.03	3.36	2.32 (n/a)	3.35	2.65	3.37	6.96 (n/a)	5.17	5.05	12.71	10.82 (n/a)	4.91	3.58	3.74	3.34 (n/a)	3.14	2.81	4.98	4.17 (n/a)	2.19	2.03	1.42	1.35 (n/a)
12-Aug-09	21:00	4.29	3.10	3.61	4.6 (n/a)	2.11	1.54	1.57	2.65 (n/a)	1.18	1.16	1.23	2.44 (n/a)	3.56	3.53	3.42	2.39 (n/a)	4.89	4.14	3.47	6.81 (n/a)	4.92	3.76	11.50	10.45 (n/a)	2.13	1.87	3.58	3.26 (n/a)	2.46	2.01	4.54	4.06 (n/a)	2.19	1.91	1.48	1.38 (n/a)
13-Aug-09	22:00	4.29	4.28	3.21	4.59 (n/a)	4.26	3.22	1.84	2.68 (n/a)	6.37	3.96	1.67	2.52 (n/a)	5.35	4.45	3.71	2.51 (n/a)	11.32	8.24	4.27	6.89 (n/a)	39.18	22.67	12.50	11.16 (n/a)	1.61	1.61	3.16	3.18 (n/a)	1.53	1.52	3.56	3.93 (n/a)	1.62	1.53	1.53	1.39 (n/a)
14-Aug-09	21:00	4.22	4.21	3.18	4.56 (n/a)	3.88	3.47	2.28	2.76 (n/a)	5.83	5.53	2.60	2.77 (n/a)	6.40	6.10	4.02	2.74 (n/a)	13.57	10.07	5.61	7.23 (n/a)	87.57	51.74	21.19	14.99 (n/a)	2.87	2.33	2.37	3.1 (n/a)	1.97	1.87	3.06	3.8 (n/a)	1.73	1.67	1.65	1.4 (n/a)
15-Aug-09	21:00	4.22	3.90	3.24	4.53 (n/a)	3.88	3.18	2.39	2.77 (n/a)	5.83	4.39	2.72	2.81 (n/a)	6.40	6.10	4.26	2.89 (n/a)	13.57	5.96	5.51	7.12 (n/a)	87.57	49.33	24.31	16.5 (n/a)	4.71	3.43	2.53	3.12 (n/a)	8.25	4.40	3.30	3.86 (n/a)	1.73	1.65	1.65	1.41 (n/a)
16-Aug-09	22:00	2.53	no data	3.20	4.44 (n/a)	3.05	no data	2.55	2.79 (n/a)	1.63	no data	2.83	2.76 (n/a)	6.12	no data	4.77	3.08 (n/a)	24.70	15.18	6.62	7.11 (n/a)	156.34	120.22	45.34	23.24 (n/a)	4.03	no data	2.98	3.2 (n/a)	70.14	66.52	13.53	7.46 (n/a)	1.72	no data	1.72	1.43 (n/a)
17-Aug-09	21:00	1.72	1.62	3.12	4.31 (n/a)	2.72	2.10	2.71	2.78 (n/a)	1.48	1.25	2.84	2.69 (n/a)	6.43	6.22	5.31	3.29 (n/a)	24.70	11.15	7.38	7.29 (n/a)	156.34	134.12	53.32	26.98 (n/a)	5.31	4.08	2.98	3.23 (n/a)	70.14	66.52	18.59	9.59 (n/a)	3.42	3.10	1.86	1.49 (n/a)
18-Aug-09	23:00	NS	NS	3.12	4.31 (n/a)	1.63	no data	2.77	2.73 (																												

Station:		High Value Habitat Stations																																	
		BG-HVH1				BG-HVH2				iH3 (full depth profile; HVH thresholds do not apply)								BG-HVH3 (0 to 8m depths only)				BG-HVH4				BGH5 (full depth profile; HVH thresholds don't apply)								BG-HVH5 (0 to 8m depths only)	
Time Period:		24h Max	24h Avg	7-d Ave	30-d Avg	24h Max	24h Avg	7-d Ave	30-d Avg	24h Max	24h Avg	7-d Ave	30-d Avg	24h Max	24h Avg	7-d Ave	30-d Avg	24h Max	24h Avg	7-d Ave	30-d Avg	24h Max	24h Avg	7-d Ave	30-d Avg	24h Max	24h Avg	7-d Ave	30-d Avg	24h Max	24h Avg	7-d Ave	30-d Avg		
Date of Analysis	Time of Analysis																																		
28-Jul-09	22:00	0.28	0.22 (n/a)	0.22 (n/a)	0.22 (n/a)	0.23	0.22 (n/a)	0.22 (n/a)	0.22 (n/a)	0.34	0.26 (n/a)	0.26 (n/a)	0.26 (n/a)	0.34	0.2 (n/a)	0.2 (n/a)	0.2 (n/a)	0.30	0.26 (n/a)	0.26 (n/a)	0.26 (n/a)	0.25	0.24 (n/a)	0.24 (n/a)	0.24 (n/a)	0.25	0.24 (n/a)	0.24 (n/a)	0.24 (n/a)	0.25	0.24 (n/a)	0.24 (n/a)	0.24 (n/a)		
29-Jul-09	20:00	0.29	0.28	0.25 (n/a)	0.25 (n/a)	0.24	0.23	0.23 (n/a)	0.23 (n/a)	0.34	0.30	0.28 (n/a)	0.28 (n/a)	0.34	0.29	0.25 (n/a)	0.25 (n/a)	0.30	0.28	0.27 (n/a)	0.27 (n/a)	0.26	0.26	0.25 (n/a)	0.25 (n/a)	0.26	0.26	0.25 (n/a)	0.25 (n/a)	0.26	0.26	0.25 (n/a)	0.25 (n/a)		
30-Jul-09	20:00	3.33	2.34	0.64 (n/a)	0.64 (n/a)	0.22	0.22	0.23 (n/a)	0.23 (n/a)	0.29	0.27	0.27 (n/a)	0.27 (n/a)	0.26	0.25	0.24 (n/a)	0.24 (n/a)	0.43	0.38	0.29 (n/a)	0.29 (n/a)	0.52	0.38	0.26 (n/a)	0.26 (n/a)	0.52	0.38	0.26 (n/a)	0.26 (n/a)	0.52	0.38	0.26 (n/a)	0.26 (n/a)		
31-Jul-09	22:00	3.21	2.68	1.35 (n/a)	1.35 (n/a)	1.52	1.06	0.34 (n/a)	0.34 (n/a)	1.00	0.79	0.35 (n/a)	0.35 (n/a)	1.00	0.79	0.33 (n/a)	0.33 (n/a)	1.48	1.29	0.48 (n/a)	0.48 (n/a)	6.23	4.35	0.94 (n/a)	0.94 (n/a)	6.23	4.35	0.94 (n/a)	0.94 (n/a)	6.23	4.35	0.94 (n/a)	0.94 (n/a)		
01-Aug-09	21:00	2.12	1.74	1.43 (n/a)	1.43 (n/a)	1.72	1.64	0.64 (n/a)	0.64 (n/a)	1.74	1.44	0.6 (n/a)	0.6 (n/a)	1.59	1.39	0.57 (n/a)	0.57 (n/a)	1.49	1.48	0.7 (n/a)	0.7 (n/a)	6.23	2.89	1.36 (n/a)	1.36 (n/a)	6.23	2.89	1.36 (n/a)	1.36 (n/a)	6.23	2.76	1.33 (n/a)	1.33 (n/a)		
02-Aug-09	21:00	1.25	1.16	1.39 (n/a)	1.39 (n/a)	1.33	1.07	0.78 (n/a)	0.78 (n/a)	1.82	1.56	0.8 (n/a)	0.8 (n/a)	1.31	1.23	0.71 (n/a)	0.71 (n/a)	1.40	1.34	0.82 (n/a)	0.82 (n/a)	0.74	0.64	1.28 (n/a)	1.28 (n/a)	0.74	0.64	1.25 (n/a)	1.25 (n/a)	0.74	0.64	1.25 (n/a)	1.25 (n/a)		
03-Aug-09	20:00	4.30	2.81	1.59 (n/a)	1.59 (n/a)	4.37	2.77	1.08 (n/a)	1.08 (n/a)	5.15	3.37	1.2 (n/a)	1.2 (n/a)	4.87	3.14	1.09 (n/a)	1.09 (n/a)	6.04	3.87	1.3 (n/a)	1.3 (n/a)	5.57	3.32	1.57 (n/a)	1.57 (n/a)	5.57	3.32	1.55 (n/a)	1.55 (n/a)	5.57	3.32	1.55 (n/a)	1.55 (n/a)		
04-Aug-09	21:00	2.49	1.71	1.76	1.6 (n/a)	2.15	1.31	1.21	1.11 (n/a)	1.46	1.14	1.30	1.19 (n/a)	1.22	1.01	1.18	1.08 (n/a)	1.61	1.51	1.45	1.33 (n/a)	1.17	1.05	1.66	1.51 (n/a)	1.03	0.98	1.63	1.48 (n/a)	1.03	0.98	1.63	1.48 (n/a)		
05-Aug-09	21:00	2.10	1.55	2.12	1.66 (n/a)	1.38	1.22	1.50	1.16 (n/a)	2.74	1.88	1.53	1.19 (n/a)	0.95	0.94	1.36	1.06 (n/a)	1.38	1.29	1.72	1.33 (n/a)	1.20	1.19	1.92	1.47 (n/a)	1.16	1.16	1.88	1.44 (n/a)	1.16	1.16	1.88	1.44 (n/a)		
06-Aug-09	21:00	2.00	1.43	1.88	1.64 (n/a)	1.10	1.08	1.59	1.16 (n/a)	3.10	3.01	1.92	1.39 (n/a)	0.99	0.95	1.43	1.05 (n/a)	1.44	1.20	1.79	1.33 (n/a)	1.45	1.24	1.90	1.43 (n/a)	1.13	0.98	1.84	1.4 (n/a)	1.13	0.98	1.84	1.4 (n/a)		
07-Aug-09	19:00	1.06	0.93	1.73	1.59 (n/a)	1.10	1.01	1.55	1.15 (n/a)	3.10	2.19	2.01	1.46 (n/a)	1.19	1.05	1.41	1.05 (n/a)	1.52	1.24	1.75	1.32 (n/a)	1.45	1.15	1.67	1.41 (n/a)	1.13	0.98	1.60	1.36 (n/a)	1.13	0.98	1.60	1.36 (n/a)		
08-Aug-09	22:00	5.20	4.22	2.14	1.8 (n/a)	1.19	1.14	1.45	1.14 (n/a)	1.38	1.33	1.99	1.44 (n/a)	1.26	1.23	1.38	1.07 (n/a)	2.49	1.98	1.81	1.35 (n/a)	2.22	1.82	1.48	1.4 (n/a)	2.22	1.74	1.41	1.35 (n/a)	2.22	1.74	1.41	1.35 (n/a)		
09-Aug-09	22:00	3.19	1.59	2.11	1.78 (n/a)	1.49	1.27	1.45	1.15 (n/a)	1.86	1.63	1.96	1.45 (n/a)	1.86	1.56	1.41	1.1 (n/a)	2.49	1.97	1.85	1.4 (n/a)	1.16	1.14	1.53	1.41 (n/a)	1.13	1.12	1.46	1.36 (n/a)	1.13	1.12	1.46	1.36 (n/a)		
10-Aug-09	21:00	1.48	0.97	1.90	1.73 (n/a)	1.49	1.38	1.26	1.17 (n/a)	1.48	1.41	1.74	1.45 (n/a)	1.48	1.37	1.17	1.12 (n/a)	1.82	1.68	1.54	1.42 (n/a)	1.33	1.18	1.24	1.4 (n/a)	1.33	1.18	1.16	1.35 (n/a)	1.18	1.16	1.35 (n/a)	1.18	1.16	
11-Aug-09	21:00	1.88	1.88	1.81	1.73 (n/a)	1.96	1.83	1.27	1.2 (n/a)	1.65	1.49	1.83	1.46 (n/a)	1.65	1.65	1.28	1.16 (n/a)	1.69	1.67	1.58	1.44 (n/a)	1.19	1.18	1.26	1.38 (n/a)	1.19	1.18	1.19	1.34 (n/a)	1.19	1.18	1.19	1.34 (n/a)		
12-Aug-09	21:00	1.88	1.59	1.79	1.72 (n/a)	1.96	1.85	1.34	1.24 (n/a)	1.66	1.50	1.78	1.46 (n/a)	1.64	1.58	1.33	1.18 (n/a)	1.64	1.63	1.60	1.45 (n/a)	1.16	1.15	1.25	1.37 (n/a)	1.16	1.15	1.19	1.33 (n/a)	1.16	1.15	1.19	1.33 (n/a)		
13-Aug-09	22:00	12.13	7.20	2.66	2.07 (n/a)	1.74	1.50	1.39	1.25 (n/a)	1.66	1.61	1.58	1.47 (n/a)	1.55	1.54	1.42	1.2 (n/a)	2.17	1.90	1.69	1.48 (n/a)	1.55	1.34	1.28	1.37 (n/a)	1.55	1.34	1.24	1.33 (n/a)	1.55	1.34	1.24	1.33 (n/a)		
14-Aug-09	21:00	4.30	3.34	3.57	2.4 (n/a)	1.80	1.79	1.52	1.28 (n/a)	2.08	2.08	1.59	1.49 (n/a)	2.07	2.05	1.57	1.24 (n/a)	2.44	2.35	1.88	1.53 (n/a)	1.94	1.69	1.36	1.38 (n/a)	1.94	1.69	1.35	1.34 (n/a)	1.94	1.69	1.35	1.34 (n/a)		
15-Aug-09	21:00	4.30	3.17	3.52	2.43 (n/a)	1.80	1.76	1.54	1.29 (n/a)	2.08	1.97	1.63	1.51 (n/a)	2.07	1.96	1.61	1.27 (n/a)	2.44	2.37	1.93	1.56 (n/a)	1.94	1.77	1.41	1.4 (n/a)	1.94	1.77	1.40	1.36 (n/a)	1.94	1.77	1.40	1.36 (n/a)		
16-Aug-09	22:00	1.60	no data	3.45	2.38 (n/a)	2.19	no data	1.67	1.34 (n/a)	10.33	8.94	2.62	1.84 (n/a)	3.52	2.96	1.81	1.35 (n/a)	2.09	no data	1.97	1.6 (n/a)	6.48	no data	1.91	1.59 (n/a)	6.48	no data	1.91	1.55 (n/a)	6.48	no data	1.91	1.55 (n/a)		
17-Aug-09	23:00	1.78	1.43	3.48	2.34 (n/a)	2.07	1.98	1.77	1.37 (n/a)	10.33	7.28	3.32	2.11 (n/a)	4.27	3.40	2.04	1.44 (n/a)	2.15	2.13	2.03	1.63 (n/a)	12.27	9.10	2.93	1.93 (n/a)	7.93	5.91	2.63	1.79 (n/a)	7.93	5.91	2.63	1.79 (n/a)		
18-Aug-09	21:00	3.31	no data	3.54	2.34 (n/a)	7.90	no data	2.33	1.58 (n/a)	NS	NS	3.32	2.11 (n/a)	4.27	3.40	2.04	1.44 (n/a)	NS	NS	2.03	1.63 (n/a)	8.71	no data	4.40	2.42 (n/a)	8.71	no data	3.74	2.16 (n/a)	8.71	no data	3.74	2.16 (n/a)		
19-Aug-09	21:00	7.10	6.37	3.58	2.49 (n/a)	9.57	8.37	3.57	1.93 (n/a)	10.47	10.15	5.57	2.69 (n/a)	9.00	8.60	3.96	2.02 (n/a)	15.68	14.79	4.76	2.44 (n/a)	8.71	7.68	5.71	2.67 (n/a)	8.71	7.68	5.01	2.43 (n/a)	8.71	7.68	5.01	2.43 (n/a)		
20-Aug-09	20:00	5.62	3.97	3.02	2.55 (n/a)	9.57	8.01	4.55	2.22 (n/a)	9.82	9.04	6.59	2.98 (n/a)	8.74	8.47	4.97	2.32 (n/a)	15.68	12.94	6.45	2.96 (n/a)	9.23	8.22	6.67	2.93 (n/a)	9.23	8.22	6.00	2.7 (n/a)	9.23	8.22	6.00	2.7 (n/a)		
21-Aug-09	20:00	5.20	4.00	3.00	2.57 (n/a)	8.28	8.16	5.57	2.5 (n/a)	8.68	8.39	7.54	3.22 (n/a)	8.68	8.30	5.95	2.6 (n/a)	10.24	9.12	7.46	3.23 (n/a)	7.28	6.64	7.38	3.12 (n/a)	7.28	6.64	6.73	2.9 (n/a)	7.28	6.64	6.73	2.9 (n/a)		
22-Aug-09	22:00	9.46	8.02	4.12	2.82 (n/a)	8.25	8.03	6.71	2.79 (n/a)	7.84	7.34	7.97	3.42 (n/a)	7.84	7.34	6.85	2.83 (n/a)	10.94	10.16	8.69	3.57 (n/a)	6.67	6.61	7.85	3.29 (n/a)	6.67	6.61	7.20	3.09 (n/a)	6.67	6.61	7.20	3.09 (n/a)		
23-Aug-09	20:00	8.57	7.56	4.47	2.95 (n/a)	9.09	8.45	6.88	2.95 (n/a)	7.84	7.69	7.94	3.54 (n/a)	7.84</																					

APPENDIX C

ALS WATER CHEMISTRY LABORATORY REPORTS FOR BAY-GOOSE DIKE CONSTRUCTION AND TSS EAS, 2009





Environmental Division

Certificate of Analysis

AZIMUTH CONSULTING GROUP INC.

ATTN: RANDY BAKER

218 - 2902 WEST BROADWAY

VANCOUVER BC V6K 2G8

Report Date: 17-AUG-09 16:56 (MT)

Version: FINAL

Lab Work Order #: L800441

Date Received: 04-AUG-09

Project P.O. #:

Job Reference: MEADOWBANK MINE DIKE CONSTRUCTION

Legal Site Desc:

CofC Numbers:

Other Information:

Comments:


NATASHA MARKOVIC-MIROVIC
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L800441-1	L800441-2	L800441-3	L800441-4	L800441-5
		22-JUL-09	22-JUL-09	22-JUL-09	22-JUL-09	22-JUL-09
		DC-WQ-HVH1	DC-WQ-HVH2	DC-WQ-HVH3	DC-WQ-HVH4	DC-WQ-HVH5
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	14.7	14.3	14.3	14.2	14.1
	Hardness (as CaCO3) (mg/L)	5.2	5.3	5.3	5.4	5.3
	pH (pH)	7.38	7.01	6.87	6.92	6.92
	Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Total Dissolved Solids (mg/L)	<10	<10	<10	<10	<10
	Turbidity (NTU)	0.50	0.47	0.42	0.43	0.47
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	4.4	4.3	4.3	4.3	4.3
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Alkalinity, Total (as CaCO3) (mg/L)	4.4	4.3	4.3	4.3	4.3
	Ammonia as N (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.045	0.045	0.046	0.046	0.046
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.115	0.126	0.150	0.111	0.095
	Ortho Phosphate as P (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Phosphate as P (mg/L)	0.0023	<0.0020	<0.0020	<0.0020	<0.0020
	Silicate (as SiO2) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Sulfate (SO4) (mg/L)	1.13	1.12	1.13	1.13	1.13
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.18	1.47	1.34	1.27	1.29
	Total Organic Carbon (mg/L)	1.47	1.41	1.33	1.32	1.24
Total Metals	Aluminum (Al)-Total (mg/L)	0.0095	0.0102	0.0113	0.0122	0.0087
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Beryllium (Be)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017
	Calcium (Ca)-Total (mg/L)	1.22	1.24	1.24	1.25	1.25
	Chromium (Cr)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Cobalt (Co)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Copper (Cu)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Iron (Fe)-Total (mg/L)	0.033	<0.030	<0.030	<0.030	<0.030
	Lead (Pb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Lithium (Li)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Magnesium (Mg)-Total (mg/L)	0.54	0.54	0.55	0.55	0.55
	Manganese (Mn)-Total (mg/L)	0.00143	0.00140	0.00138	0.00145	0.00129
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020

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Sample ID Description Sampled Date Sampled Time Client ID		L800441-6	L800441-7	L800441-8		
		22-JUL-09		23-JUL-09		
		DC-WQ-BGW3	TRAVEL BLANKS	DC-WQ-BG-EB		
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	14.3	<2.0	<2.0		
	Hardness (as CaCO3) (mg/L)	5.4	<1.1	<1.1		
	pH (pH)	6.86	5.60	5.60		
	Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0		
	Total Dissolved Solids (mg/L)	<10	<10	<10		
	Turbidity (NTU)	0.46		<0.10		
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	4.4	<2.0	<2.0		
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0	<2.0	<2.0		
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0	<2.0	<2.0		
	Alkalinity, Total (as CaCO3) (mg/L)	4.4	<2.0	<2.0		
	Ammonia as N (mg/L)	<0.0050	<0.0050	<0.0050		
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050		
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50		
	Fluoride (F) (mg/L)	0.046	<0.020	<0.020		
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050		
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010		
	Total Kjeldahl Nitrogen (mg/L)	0.107	0.124	0.063		
	Ortho Phosphate as P (mg/L)	<0.0010	<0.0010	<0.0010		
	Total Phosphate as P (mg/L)	<0.0020	<0.0020	<0.0020		
	Silicate (as SiO2) (mg/L)	<1.0	<1.0	<1.0		
	Sulfate (SO4) (mg/L)	1.13	<0.50	<0.50		
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.16	<0.50	<0.50		
	Total Organic Carbon (mg/L)	1.21	<0.50	<0.50		
Total Metals	Aluminum (Al)-Total (mg/L)	0.0297	<0.0050	<0.0050		
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050		
	Arsenic (As)-Total (mg/L)	<0.00050	<0.00050	<0.00050		
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020		
	Beryllium (Be)-Total (mg/L)	<0.0010	<0.0010	<0.0010		
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10		
	Cadmium (Cd)-Total (mg/L)	<0.000017	<0.000017	<0.000017		
	Calcium (Ca)-Total (mg/L)	1.32	<0.10	<0.10		
	Chromium (Cr)-Total (mg/L)	<0.0010	<0.0010	<0.0010		
	Cobalt (Co)-Total (mg/L)	<0.00030	<0.00030	<0.00030		
	Copper (Cu)-Total (mg/L)	<0.0010	<0.0010	<0.0010		
	Iron (Fe)-Total (mg/L)	0.047	<0.030	<0.030		
	Lead (Pb)-Total (mg/L)	0.00055	<0.00050	<0.00050		
	Lithium (Li)-Total (mg/L)	<0.0050	<0.0050	<0.0050		
	Magnesium (Mg)-Total (mg/L)	0.59	<0.10	<0.10		
	Manganese (Mn)-Total (mg/L)	0.00248	<0.00030	<0.00030		
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020		

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		Sample ID	L800441-1	L800441-2	L800441-3	L800441-4	L800441-5
		Description					
		Sampled Date	22-JUL-09	22-JUL-09	22-JUL-09	22-JUL-09	22-JUL-09
		Sampled Time					
		Client ID	DC-WQ-HVH1	DC-WQ-HVH2	DC-WQ-HVH3	DC-WQ-HVH4	DC-WQ-HVH5
Grouping	Analyte						
WATER							
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Nickel (Ni)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Potassium (K)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Silver (Ag)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	
	Thallium (Tl)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
	Tin (Sn)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Uranium (U)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Zinc (Zn)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
	Arsenic (As)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
	Barium (Ba)-Dissolved (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020	
	Beryllium (Be)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Boron (B)-Dissolved (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10	
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	
	Calcium (Ca)-Dissolved (mg/L)	1.22	1.25	1.24	1.25	1.24	
	Chromium (Cr)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Cobalt (Co)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
	Copper (Cu)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	<0.030	<0.030	<0.030	
	Lead (Pb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
	Lithium (Li)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Magnesium (Mg)-Dissolved (mg/L)	0.54	0.54	0.54	0.54	0.55	
	Manganese (Mn)-Dissolved (mg/L)	0.00116	0.00102	0.00104	0.00102	0.00095	
	Mercury (Hg)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Nickel (Ni)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Potassium (K)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	
	Selenium (Se)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Silver (Ag)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	
	Thallium (Tl)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
	Tin (Sn)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Uranium (U)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Zinc (Zn)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID Description Sampled Date Sampled Time Client ID	L800441-6	L800441-7	L800441-8		
Grouping	Analyte						
WATER							
Total Metals	Molybdenum (Mo)-Total (mg/L)		<0.0010	<0.0010	<0.0010		
	Nickel (Ni)-Total (mg/L)		<0.0010	<0.0010	<0.0010		
	Potassium (K)-Total (mg/L)		<2.0	<2.0	<2.0		
	Selenium (Se)-Total (mg/L)		<0.0010	<0.0010	<0.0010		
	Silver (Ag)-Total (mg/L)		<0.000020	<0.000020	<0.000020		
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0		
	Thallium (Tl)-Total (mg/L)		<0.00020	<0.00020	<0.00020		
	Tin (Sn)-Total (mg/L)		<0.00050	<0.00050	<0.00050		
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	<0.010		
	Uranium (U)-Total (mg/L)		<0.00020	<0.00020	<0.00020		
	Vanadium (V)-Total (mg/L)		<0.0010	<0.0010	<0.0010		
	Zinc (Zn)-Total (mg/L)		0.0058	<0.0050	<0.0050		
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)		<0.0050		<0.0050		
	Antimony (Sb)-Dissolved (mg/L)		<0.00050		<0.00050		
	Arsenic (As)-Dissolved (mg/L)		<0.00050		<0.00050		
	Barium (Ba)-Dissolved (mg/L)		<0.020		<0.020		
	Beryllium (Be)-Dissolved (mg/L)		<0.0010		<0.0010		
	Boron (B)-Dissolved (mg/L)		<0.10		<0.10		
	Cadmium (Cd)-Dissolved (mg/L)		<0.000017		<0.000017		
	Calcium (Ca)-Dissolved (mg/L)		1.24		<0.10		
	Chromium (Cr)-Dissolved (mg/L)		<0.0010		<0.0010		
	Cobalt (Co)-Dissolved (mg/L)		<0.00030		<0.00030		
	Copper (Cu)-Dissolved (mg/L)		<0.0010		<0.0010		
	Iron (Fe)-Dissolved (mg/L)		<0.030		<0.030		
	Lead (Pb)-Dissolved (mg/L)		<0.00050		<0.00050		
	Lithium (Li)-Dissolved (mg/L)		<0.0050		<0.0050		
	Magnesium (Mg)-Dissolved (mg/L)		0.55		<0.10		
	Manganese (Mn)-Dissolved (mg/L)		0.00082		<0.00030		
	Mercury (Hg)-Dissolved (mg/L)		<0.000020		<0.000020		
	Molybdenum (Mo)-Dissolved (mg/L)		<0.0010		<0.0010		
	Nickel (Ni)-Dissolved (mg/L)		<0.0010		<0.0010		
	Potassium (K)-Dissolved (mg/L)		<2.0		<2.0		
	Selenium (Se)-Dissolved (mg/L)		<0.0010		<0.0010		
	Silver (Ag)-Dissolved (mg/L)		<0.000020		<0.000020		
	Sodium (Na)-Dissolved (mg/L)		<2.0		<2.0		
	Thallium (Tl)-Dissolved (mg/L)		<0.00020		<0.00020		
	Tin (Sn)-Dissolved (mg/L)		<0.00050		<0.00050		
	Titanium (Ti)-Dissolved (mg/L)		<0.010		<0.010		
	Uranium (U)-Dissolved (mg/L)		<0.00020		<0.00020		
	Vanadium (V)-Dissolved (mg/L)		<0.0010		<0.0010		
	Zinc (Zn)-Dissolved (mg/L)		<0.0050		<0.0050		

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Sample ID Description Sampled Date Sampled Time Client ID		L800441-1	L800441-2	L800441-3	L800441-4	L800441-5
		22-JUL-09	22-JUL-09	22-JUL-09	22-JUL-09	22-JUL-09
		DC-WQ-HVH1	DC-WQ-HVH2	DC-WQ-HVH3	DC-WQ-HVH4	DC-WQ-HVH5
Grouping	Analyte					
WATER						
Plant Pigments	Chlorophyll a (ug/L)	0.479	0.317	0.315	0.384	0.233

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID Description Sampled Date Sampled Time Client ID	L800441-6 22-JUL-09 DC-WQ-BGW3	L800441-7 TRAVEL BLANKS	L800441-8 23-JUL-09 DC-WQ-BG-EB		
Grouping	Analyte						
WATER							
Plant Pigments	Chlorophyll a (ug/L)		0.333				

Reference Information

Additional Comments for Sample Listed:

Samplenum	Matrix	Report Remarks	Sample Comments
Methods Listed (if applicable):			
ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
ALK-SCR-VA	Water	Alkalinity by colour or titration	EPA 310.2 OR APHA 2320
This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method. OR This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
ANIONS-BR-IC-VA	Water	Bromide by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
ANIONS-CL-IC-VA	Water	Chloride by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
ANIONS-F-IC-VA	Water	Fluoride by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
ANIONS-NO2-IC-VA	Water	Nitrite by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrite detection is by UV absorbance and not conductivity.			
ANIONS-NO3-IC-VA	Water	Nitrate by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrate detection is by UV absorbance and not conductivity.			
ANIONS-SO4-IC-VA	Water	Sulfate by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
CHLOROA-VA	Water	Chlorophyll a by Fluorometer	EPA 445.0
Chlorophyll and Pheopigments by Fluorometry analysis is carried out using procedures adapted from USEPA Method 445.0. The sample is filtered using either a glass fiber filter or a 0.45 micron Membrane filter. The pigments are extracted from the filter with 90% aqueous acetone. For chlorophyll-a analysis the extract is read using a fluorometer. For pheopigments the extract is first acidified then read. This method is not subject to interferences from chlorophyll b.			
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.			
HG-DIS-CCME-CVAFS-VA	Water	Diss. Mercury in Water by CVAFS (CCME)	EPA 3005A/245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
HG-TOT-CCME-CVAFS-VA	Water	Total Mercury in Water by CVAFS (CCME)	EPA 245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
MET-DIS-CCME-ICP-VA	Water	Diss. Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
MET-DIS-CCME-MS-VA	Water	Diss. Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
MET-TOT-CCME-ICP-VA	Water	Total Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
MET-TOT-CCME-MS-VA	Water	Total Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
NH3-COL-VA	Water	Ammonia by Colour	APHA 4500-NH3 "Nitrogen (Ammonia)"

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
This analysis is carried out, on unpreserved samples, using procedures adapted from APHA Method 4500-NH3 "Nitrogen (Ammonia)". Ammonia is determined using the phenate colourimetric method.			
NH3-COL-VA	Water	Ammonia by Colour	APHA 4500-NH3 Nitrogen (Ammonia)
This analysis is carried out, on unpreserved samples, using procedures adapted from APHA Method 4500-NH3 "Nitrogen (Ammonia)". Ammonia is determined using the phenate colourimetric method.			
PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.			
PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.			
PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Colour	APHA 4500-P "Phosphorous"
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Colour	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-T-COL-VA	Water	Total Phosphate P by Color	APHA 4500-P "Phosphorous"
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-T-COL-VA	Water	Total Phosphate P by Color	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
SILICATE-COL-VA	Water	Silicate by Colourimetric analysis	APHA 4500-SiO2 D.
This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 D. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.			
TDS-VA	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.			
TKN-SIE-VA	Water	Total Kjeldahl Nitrogen by SIE	APHA 4500-Norg (TKN)
This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total kjeldahl nitrogen is determined by sample digestion at 367 celcius with analysis using an ammonia selective electrode.			
TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540 Gravimetric

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
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This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 "Turbidity"
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This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity
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This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

**** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.**

The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA		

GLOSSARY OF REPORT TERMS

Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency.

mg/kg (units) - unit of concentration based on mass, parts per million

mg/L (units) - unit of concentration based on volume, parts per million

N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.



Environmental Division

Certificate of Analysis

AZIMUTH CONSULTING GROUP INC.

ATTN: RANDY BAKER

218 - 2902 WEST BROADWAY

VANCOUVER BC V6K 2G8

Report Date: 26-AUG-09 11:32 (MT)

Version: FINAL

Lab Work Order #: L804653

Date Received: 12-AUG-09

Project P.O. #:

Job Reference: MEADOWBANK MINE DIKE CONSTRUCTION

Legal Site Desc:

CofC Numbers:

Other Information:

Comments:


NATASHA MARKOVIC-MIROVIC
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L804653-1	L804653-2	L804653-3	L804653-4	L804653-5
		31-JUL-09	31-JUL-09	31-JUL-09	31-JUL-09	31-JUL-09
		DC-WQ-SP8	DC-WQ-SP6	DC-WQ-BGW1	DC-WQ-BGW2	DC-WQ-3PL-HVH4
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	20.0	21.8	16.4	16.2	13.9
	Hardness (as CaCO3) (mg/L)	7.9	8.8	6.0	5.9	5.2
	pH (pH)	6.98	6.91	6.94	6.94	6.91
	Total Suspended Solids (mg/L)	<1.0	<1.0	5.7	6.1	1.1
	Total Dissolved Solids (mg/L)	13	20	19	<10	<10
	Turbidity (NTU)	1.07	1.04	10.3	8.54	1.20
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	6.3	6.8	4.3	5.0	4.3
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Alkalinity, Total (as CaCO3) (mg/L)	6.3	6.8	4.3	5.0	4.3
	Ammonia as N (mg/L)	0.035	<0.020	0.031	0.062	<0.020
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.070	0.069	0.075	0.074	0.074
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	0.0247	0.0176	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.084	0.087	0.099	0.119	0.084
	Ortho Phosphate as P (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Phosphate as P (mg/L)	<0.0020	<0.0020	0.0067	0.0033	<0.0020
	Silicate (as SiO2) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Sulfate (SO4) (mg/L)	1.89	2.09	1.42	1.39	1.34
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.31	1.45	1.17	1.11	1.23
	Total Organic Carbon (mg/L)	1.42	1.50	1.16	1.14	1.20
Total Metals	Aluminum (Al)-Total (mg/L)	0.0166	0.0155	0.162	0.148	0.0198
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Beryllium (Be)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017
	Calcium (Ca)-Total (mg/L)	2.01	2.27	1.42	1.36	1.20
	Chromium (Cr)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Cobalt (Co)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Copper (Cu)-Total (mg/L)	<0.0010	<0.0010	<0.0020	<0.0020	<0.0010
	Iron (Fe)-Total (mg/L)	<0.030	<0.030	0.263	0.242	0.032
	Lead (Pb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Lithium (Li)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Magnesium (Mg)-Total (mg/L)	0.71	0.76	0.67	0.65	0.55
	Manganese (Mn)-Total (mg/L)	0.00130	0.00126	0.00730	0.00676	0.00167
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L804653-6	L804653-7	L804653-8	L804653-9	
		31-JUL-09	31-JUL-09	31-JUL-09	31-JUL-09	
		DC-WQ-BGE1	DC-WQ-BGE2	DC-WQ-DUP	TRAVEL BLANKS	
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	14.2	14.3	19.6	<2.0	
	Hardness (as CaCO3) (mg/L)	5.2	5.3	8.0	<1.1	
	pH (pH)	6.91	6.89	6.99	5.61	
	Total Suspended Solids (mg/L)	1.3	<1.0	<1.0	<1.0	
	Total Dissolved Solids (mg/L)	<10	<10	14	<10	
	Turbidity (NTU)	0.76	1.54	0.65		
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	4.2	4.0	6.6	<2.0	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	
	Alkalinity, Total (as CaCO3) (mg/L)	4.2	4.0	6.6	<2.0	
	Ammonia as N (mg/L)	<0.020	<0.020	0.023	<0.020	
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	
	Fluoride (F) (mg/L)	0.074	0.074	0.070	<0.020	
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	0.080	0.066	0.087	<0.050	
	Ortho Phosphate as P (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Total Phosphate as P (mg/L)	0.0052	<0.0020	<0.0020	<0.0020	
	Silicate (as SiO2) (mg/L)	<1.0	<1.0	<1.0	<1.0	
	Sulfate (SO4) (mg/L)	1.34	1.35	1.88	<0.50	
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.11	1.23	1.42	<0.50	
	Total Organic Carbon (mg/L)	1.26	1.19	1.41	2.61 *	
Total Metals	Aluminum (Al)-Total (mg/L)	0.0177	0.0277	0.0170	<0.0050	
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Arsenic (As)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	
	Beryllium (Be)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	
	Cadmium (Cd)-Total (mg/L)	<0.000017	<0.000017	<0.000017	<0.000017	
	Calcium (Ca)-Total (mg/L)	1.21	1.22	2.04	<0.10	
	Chromium (Cr)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Cobalt (Co)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	
	Copper (Cu)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Iron (Fe)-Total (mg/L)	<0.030	0.043	<0.030	<0.030	
	Lead (Pb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Lithium (Li)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	
	Magnesium (Mg)-Total (mg/L)	0.55	0.56	0.71	<0.10	
	Manganese (Mn)-Total (mg/L)	0.00165	0.00196	0.00129	<0.00030	
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L804653-1	L804653-2	L804653-3	L804653-4	L804653-5
		31-JUL-09	31-JUL-09	31-JUL-09	31-JUL-09	31-JUL-09
		DC-WQ-SP8	DC-WQ-SP6	DC-WQ-BGW1	DC-WQ-BGW2	DC-WQ-3PL-HVH4
Grouping	Analyte					
WATER						
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Total (mg/L)	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010
	Potassium (K)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Silver (Ag)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Tin (Sn)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)	0.0626	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Barium (Ba)-Dissolved (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Beryllium (Be)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Boron (B)-Dissolved (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017
	Calcium (Ca)-Dissolved (mg/L)	2.00	2.27	1.41	1.37	1.20
	Chromium (Cr)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Cobalt (Co)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Copper (Cu)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	<0.030	<0.030	<0.030
	Lead (Pb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Lithium (Li)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Magnesium (Mg)-Dissolved (mg/L)	0.69	0.76	0.60	0.59	0.54
	Manganese (Mn)-Dissolved (mg/L)	0.00055	0.00047	0.00346	0.00332	0.00085
	Mercury (Hg)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Potassium (K)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Selenium (Se)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Silver (Ag)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Tin (Sn)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L804653-6	L804653-7	L804653-8	L804653-9	
		Description					
		Sampled Date	31-JUL-09	31-JUL-09	31-JUL-09	31-JUL-09	
		Sampled Time					
		Client ID	DC-WQ-BGE1	DC-WQ-BGE2	DC-WQ-DUP	TRAVEL BLANKS	
Grouping	Analyte						
WATER							
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	Nickel (Ni)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	Potassium (K)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0		
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	Silver (Ag)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020		
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0		
	Thallium (Tl)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020		
	Tin (Sn)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050		
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010		
	Uranium (U)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020		
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	Zinc (Zn)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050		
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050			
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050			
	Arsenic (As)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050			
	Barium (Ba)-Dissolved (mg/L)	<0.020	<0.020	<0.020			
	Beryllium (Be)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010			
	Boron (B)-Dissolved (mg/L)	<0.10	<0.10	<0.10			
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017	<0.000017	<0.000017			
	Calcium (Ca)-Dissolved (mg/L)	1.20	1.21	2.03			
	Chromium (Cr)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010			
	Cobalt (Co)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030			
	Copper (Cu)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010			
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	<0.030			
	Lead (Pb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050			
	Lithium (Li)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050			
	Magnesium (Mg)-Dissolved (mg/L)	0.54	0.54	0.71			
	Manganese (Mn)-Dissolved (mg/L)	0.00093	0.00097	0.00054			
	Mercury (Hg)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020			
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010			
	Nickel (Ni)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010			
	Potassium (K)-Dissolved (mg/L)	<2.0	<2.0	<2.0			
	Selenium (Se)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010			
	Silver (Ag)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020			
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0			
	Thallium (Tl)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020			
	Tin (Sn)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050			
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010			
	Uranium (U)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020			
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010			
	Zinc (Zn)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L804653-1	L804653-2	L804653-3	L804653-4	L804653-5
		31-JUL-09	31-JUL-09	31-JUL-09	31-JUL-09	31-JUL-09
		DC-WQ-SP8	DC-WQ-SP6	DC-WQ-BGW1	DC-WQ-BGW2	DC-WQ-3PL-HVH4
Grouping	Analyte					
WATER						
Plant Pigments	Chlorophyll a (ug/L)	0.381	0.516	0.421	0.457	0.397

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Sample ID Description Sampled Date Sampled Time Client ID		L804653-6	L804653-7	L804653-8	L804653-9	
		31-JUL-09	31-JUL-09	31-JUL-09	31-JUL-09	
		DC-WQ-BGE1	DC-WQ-BGE2	DC-WQ-DUP	TRAVEL BLANKS	
Grouping	Analyte					
WATER						
Plant Pigments	Chlorophyll a (ug/L)	0.408	0.316	0.537		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Additional Comments for Sample Listed:

Samplenum	Matrix	Report Remarks	Sample Comment:
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Qualifiers for Individual Parameters Listed:

Qualifier	Description
RRV	Reported Result Verified By Repeat Analysis

Samples with Qualifiers for Individual Parameters as listed above:

Sample Number	Client Sample ID	Parameters	Qualifier
L804653-9	TRAVEL BLANKS	Total Organic Carbon	RRV

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
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ALK-SCR-VA Water Alkalinity by colour or titration EPA 310.2 OR APHA 2320

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

OR

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

ANIONS-BR-IC-VA Water Bromide by Ion Chromatography APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-CL-IC-VA Water Chloride by Ion Chromatography APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-F-IC-VA Water Fluoride by Ion Chromatography APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-NO2-IC-VA Water Nitrite by Ion Chromatography APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrite detection is by UV absorbance and not conductivity.

ANIONS-NO3-IC-VA Water Nitrate by Ion Chromatography APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrate detection is by UV absorbance and not conductivity.

ANIONS-SO4-IC-VA Water Sulfate by Ion Chromatography APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

CARBONS-DOC-VA Water Dissolved organic carbon by combustion APHA 5310 "TOTAL ORGANIC CARBON (TOC)"

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-DOC-VA Water Dissolved organic carbon by combustion APHA 5310 TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CHLOROA-VA	Water	Chlorophyll a by Fluorometer	EPA 445.0
Chlorophyll and Pheopigments by Fluorometry analysis is carried out using procedures adapted from USEPA Method 445.0. The sample is filtered using either a glass fiber filter or a 0.45 micron Membrane filter. The pigments are extracted from the filter with 90% aqueous acetone. For chlorophyll-a analysis the extract is read using a fluorometer. For pheopigments the extract is first acidified then read. This method is not subject to interferences from chlorophyll b.			
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.			
HG-DIS-CCME-CVAFS-VA	Water	Diss. Mercury in Water by CVAFS (CCME)	EPA 3005A/245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
HG-TOT-CCME-CVAFS-VA	Water	Total Mercury in Water by CVAFS (CCME)	EPA 245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
MET-DIS-CCME-ICP-VA	Water	Diss. Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
MET-DIS-CCME-MS-VA	Water	Diss. Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
MET-TOT-CCME-ICP-VA	Water	Total Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
MET-TOT-CCME-MS-VA	Water	Total Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
NH3-SIE-VA	Water	Ammonia by SIE	APHA 4500 D. - NH3 NITROGEN (AMMONIA)
This analysis is carried out, on sulphuric acid preserved samples, using procedures adapted from APHA Method 4500-NH3 "Nitrogen (Ammonia)". Ammonia is determined using an ammonia selective electrode.			
PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.			
PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Colour	APHA 4500-P "Phosphorous"
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Colour	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-T-COL-VA	Water	Total Phosphate P by Color	APHA 4500-P "Phosphorous"
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-T-COL-VA	Water	Total Phosphate P by Color	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
SILICATE-COL-VA	Water	Silicate by Colourimetric analysis	APHA 4500-SiO2 D.
This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 D. "Silica". Silicate (molybdate-reactive silica) is determined by			

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
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the molybdosilicate-heteropoly blue colourimetric method.

TDS-VA	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC
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This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-SIE-VA	Water	Total Kjeldahl Nitrogen by SIE	APHA 4500-Norg (TKN)
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This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total kjeldahl nitrogen is determined by sample digestion at 367 celcius with analysis using an ammonia selective electrode.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540 Gravimetric
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This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 "Turbidity"
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This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity
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This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

**** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.**

The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA		

GLOSSARY OF REPORT TERMS

Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency.

mg/kg (units) - unit of concentration based on mass, parts per million

mg/L (units) - unit of concentration based on volume, parts per million

N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.



Report to:		Report Format / Distribution		Service Requested:	
Company: Azimuth Consulting Group Inc.		☒ Standard ☐ Other		☒ Regular Service (Default)	
Contact: Randy Baker		☒ PDF ☒ Excel ☐ Fax		☐ Rush Service (2-3 Days)	
Address: Vancouver		Email 1: rbaker@azimuthgroup.ca		☐ Priority Service (1 Day or ASAP)	
Phone: 604-730-1220 Fax: _____		Email 2: gmann@azimuthgroup.ca, mmcconnell@azimuthgroup.ca		☐ Emergency Service (<1 Day / Week) - Contact ALS	
Invoice To: ☒ Same as Report		Indicate Bottles: Filtered / Preserved (F/P) -->		Analysis Request	
Company:		Client / Project Information:			
Contact:		Job #:			
Address:		PO/A/E:			
Sample:		Legal Site Description:			
Phone:		Quote #: ALSEC09-077			
Fax:		ALS Contact: Natasha MM			
Sample Identification (This description will appear on the report)		Date dd-mm-yy	Time hh:mm	Sample Type (Selected from drop-down list)	
DC-WQ-SP8	31-Jul-09		Water		☒ T-Metals (CCME)
DC-WQ-SP6	31-Jul-09		Water		☒ D-Metals (CCME)
DC-WQ-BGW1	31-Jul-09		Water		☒ TOC, DOC
DC-WQ-BGW2	31-Jul-09		Water		☒ TKN, Ammonia
DC-WQ-3PL-HVH4	31-Jul-09		Water		☒ TDS, TSS-low
DC-WQ-BGE1	31-Jul-09		Water		☒ Alk (SPECIATED)
DC-WQ-BGE2	31-Jul-09		Water		☒ Anion Scan, Si, pH, EC
DC-WQ-DUP	31-Jul-09		Water		☒ T-PO4, ortho-PO4
Travel blanks	31-Jul-09		Water		☒ Chlorophyll-a (see Special Ins)
					☒ Turbidity
					☐ Hazardous?
					☐ Highly Contaminated?
					☐ Number of Containers
Guidelines / Regulations The filters are for chlorophyll a analysis: 1L was filtered in all cases except BGW2 (550ml)					
Special Instructions / Hazardous Details					
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.					
Requisitioned By:	Ryan Hill	Date & Time:	1-Aug-09	Received By:	Only
Requisitioned By:		Date & Time:		Received By:	
Temperature			18°C		
Samples Received in Good Condition? Y / N (if no provided details)			Y		

plus one filter each



Environmental Division

Certificate of Analysis

AZIMUTH CONSULTING GROUP INC.

ATTN: RANDY BAKER

218 - 2902 WEST BROADWAY

VANCOUVER BC V6K 2G8

Report Date: 01-SEP-09 11:16 (MT)

Version: FINAL

Lab Work Order #: L806031

Date Received: 14-AUG-09

Project P.O. #:

Job Reference: MEADOWBANK MINE DIKE CONSTRUCTION

Legal Site Desc:

CofC Numbers:

Other Information:

Comments: Please note that the samples for chlorophyll-a were not received in this submission (as requested on the chain of custody). They have been sent at a later date by the client and will be referenced under ALS lab workorder L808869.

Please note that the TKN for sample "TRAVEL BLANK" was confirmed by reanalysis. The duplicate travel bank kept in the lab was run for TKN and the result was <DL.


LINDSAY JONES
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L806031-1	L806031-2	L806031-3	L806031-4	L806031-5
		08-AUG-09	08-AUG-09	08-AUG-09	08-AUG-09	08-AUG-09
		DC-WQ-SP8	DC-WQ-BGE3	DC-WQ-BGE5	DC-WQ-BGW2	DC-WQ-HVH4
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	21.3	15.1	14.6	15.2	14.5
	Hardness (as CaCO3) (mg/L)	8.6	5.5	5.4	5.7	5.4
	pH (pH)	6.92	6.93	6.95	6.93	7.05
	Total Suspended Solids (mg/L)	<1.0	3.4	1.4	2.8	2.2
	Total Dissolved Solids (mg/L)	17	10	<10	<10	15
	Turbidity (NTU)	0.69	4.22	1.66	2.16	1.71
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	7.2	4.6	26.2	5.0	4.7
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Alkalinity, Total (as CaCO3) (mg/L)	7.2	4.6	26.2	5.0	4.7
	Ammonia as N (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.041	0.045	0.045	0.045	0.045
	Nitrate (as N) (mg/L)	<0.0050	0.0119	<0.0050	0.0120	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.128	0.118	0.110	0.107	0.108
	Ortho Phosphate as P (mg/L)	0.0014	<0.0010	<0.0010	<0.0010	0.0019
	Total Phosphate as P (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Silicate (as SiO2) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Sulfate (SO4) (mg/L)	1.78	1.18	1.16	1.19	1.16
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.74	2.03	1.32	1.43	1.25
	Total Organic Carbon (mg/L)	1.63	1.23 *	1.32	1.34	1.30
Total Metals	Aluminum (Al)-Total (mg/L)	0.0214	0.0774	0.0346	0.0550	0.0551
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Beryllium (Be)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017
	Calcium (Ca)-Total (mg/L)	2.30	1.30	1.22	1.33	1.29
	Chromium (Cr)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Cobalt (Co)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Copper (Cu)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Iron (Fe)-Total (mg/L)	<0.030	0.106	0.046	0.072	0.064
	Lead (Pb)-Total (mg/L)	<0.00050	0.00105	0.00075	<0.00050	<0.00050
	Lithium (Li)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Magnesium (Mg)-Total (mg/L)	0.74	0.58	0.53	0.57	0.56
	Manganese (Mn)-Total (mg/L)	0.00126	0.00280	0.00186	0.00261	0.00203
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L806031-6	L806031-7	L806031-8	L806031-9	L806031-10
		08-AUG-09	08-AUG-09	08-AUG-09	08-AUG-09	08-AUG-09
		DC-WQ-BGE1	DC-WQ-HVH2	DC-WQ-DUP	TRAVEL BLANKS	EQUIPMENT BLANKS
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	15.3	14.4	14.7	<2.0	<2.0
	Hardness (as CaCO3) (mg/L)	5.7	5.4	5.5	<1.1	<1.1
	pH (pH)	7.01	7.00	7.01	5.70	5.77
	Total Suspended Solids (mg/L)	4.2	2.2	2.2	1.4	
	Total Dissolved Solids (mg/L)	16	11	14	<10	
	Turbidity (NTU)	3.13	1.36	2.93		
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	4.7	4.4	4.5	<2.0	<2.0
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Alkalinity, Total (as CaCO3) (mg/L)	4.7	4.4	4.5	<2.0	<2.0
	Ammonia as N (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.046	0.045	0.046	<0.020	<0.020
	Nitrate (as N) (mg/L)	0.0188	<0.0050	0.0104	<0.0050	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.114	0.126	0.117	0.152	<0.050
	Ortho Phosphate as P (mg/L)	0.0013	<0.0010	<0.0010	<0.0010	<0.0010
	Total Phosphate as P (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Silicate (as SiO2) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Sulfate (SO4) (mg/L)	1.18	1.16	1.16	<0.50	<0.50
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.30	1.26	2.24	<0.50	0.73 *
	Total Organic Carbon (mg/L)	1.21	1.39	1.27 *	<0.50	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	0.133	0.0337	0.0778	<0.0050	<0.0050
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Beryllium (Be)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017
	Calcium (Ca)-Total (mg/L)	1.37	1.27	1.30	<0.10	<0.10
	Chromium (Cr)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Cobalt (Co)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Copper (Cu)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Iron (Fe)-Total (mg/L)	0.202	0.043	0.109	<0.030	<0.030
	Lead (Pb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Lithium (Li)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Magnesium (Mg)-Total (mg/L)	0.64	0.56	0.58	<0.10	<0.10
	Manganese (Mn)-Total (mg/L)	0.00440	0.00175	0.00313	<0.00030	<0.00030
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L806031-1	L806031-2	L806031-3	L806031-4	L806031-5
		Description					
		Sampled Date	08-AUG-09	08-AUG-09	08-AUG-09	08-AUG-09	08-AUG-09
		Sampled Time					
		Client ID	DC-WQ-SP8	DC-WQ-BGE3	DC-WQ-BGE5	DC-WQ-BGW2	DC-WQ-HVH4
Grouping	Analyte						
WATER							
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Nickel (Ni)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Potassium (K)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Silver (Ag)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	
	Thallium (Tl)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
	Tin (Sn)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Uranium (U)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Zinc (Zn)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	0.0092	<0.0050	0.0051	<0.0050	<0.0050	
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
	Arsenic (As)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
	Barium (Ba)-Dissolved (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020	
	Beryllium (Be)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Boron (B)-Dissolved (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10	
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	
	Calcium (Ca)-Dissolved (mg/L)	2.27	1.30	1.28	1.35	1.27	
	Chromium (Cr)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Cobalt (Co)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
	Copper (Cu)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	<0.030	<0.030	<0.030	
	Lead (Pb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
	Lithium (Li)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Magnesium (Mg)-Dissolved (mg/L)	0.72	0.55	0.54	0.57	0.54	
	Manganese (Mn)-Dissolved (mg/L)	0.00041	0.00123	0.00078	0.00117	0.00082	
	Mercury (Hg)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Nickel (Ni)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Potassium (K)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	
	Selenium (Se)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Silver (Ag)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	
	Thallium (Tl)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
	Tin (Sn)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Uranium (U)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Zinc (Zn)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L806031-6	L806031-7	L806031-8	L806031-9	L806031-10
		Description					
		Sampled Date	08-AUG-09	08-AUG-09	08-AUG-09	08-AUG-09	08-AUG-09
		Sampled Time					
		Client ID	DC-WQ-BGE1	DC-WQ-HVH2	DC-WQ-DUP	TRAVEL BLANKS	EQUIPMENT BLANKS
Grouping	Analyte						
WATER							
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Nickel (Ni)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Potassium (K)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Silver (Ag)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	
	Thallium (Tl)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
	Tin (Sn)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Uranium (U)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Zinc (Zn)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	<0.0050	<0.0050	0.0069		<0.0050	
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050		<0.00050	
	Arsenic (As)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050		<0.00050	
	Barium (Ba)-Dissolved (mg/L)	<0.020	<0.020	<0.020		<0.020	
	Beryllium (Be)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010		<0.0010	
	Boron (B)-Dissolved (mg/L)	<0.10	<0.10	<0.10		<0.10	
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017	<0.000017	<0.000017		<0.000017	
	Calcium (Ca)-Dissolved (mg/L)	1.36	1.27	1.31		<0.10	
	Chromium (Cr)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010		<0.0010	
	Cobalt (Co)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030		<0.00030	
	Copper (Cu)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010		<0.0010	
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	<0.030		<0.030	
	Lead (Pb)-Dissolved (mg/L)	<0.00050	0.00293	<0.00050		<0.00050	
	Lithium (Li)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050		<0.0050	
	Magnesium (Mg)-Dissolved (mg/L)	0.56	0.54	0.55		<0.10	
	Manganese (Mn)-Dissolved (mg/L)	0.00187	0.00075	0.00112		<0.00030	
	Mercury (Hg)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020		<0.000020	
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010		<0.0010	
	Nickel (Ni)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010		<0.0010	
	Potassium (K)-Dissolved (mg/L)	<2.0	<2.0	<2.0		<2.0	
	Selenium (Se)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010		<0.0010	
	Silver (Ag)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020		<0.000020	
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0		<2.0	
	Thallium (Tl)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020		<0.00020	
	Tin (Sn)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050		<0.00050	
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010		<0.010	
	Uranium (U)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020		<0.00020	
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010		<0.0010	
	Zinc (Zn)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050		<0.0050	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Additional Comments for Sample Listed:

Sample Number	Matrix	Report Remarks	Sample Comment:
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Qualifiers for Individual Parameters Listed:

Qualifier	Description
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RRV Reported Result Verified By Repeat Analysis

Samples with Qualifiers for Individual Parameters as listed above:

Sample Number	Client Sample ID	Parameters	Qualifier
L806031-10	EQUIPMENT BLANKS	Dissolved Organic Carbon	RRV
L806031-2	DC-WQ-BGE3	Total Organic Carbon	RRV
L806031-8	DC-WQ-DUP	Total Organic Carbon	RRV

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
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ALK-SCR-VA Water Alkalinity by colour or titration EPA 310.2 OR APHA 2320

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

OR

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

ANIONS-BR-IC-VA Water Bromide by Ion Chromatography APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-CL-IC-VA Water Chloride by Ion Chromatography APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-F-IC-VA Water Fluoride by Ion Chromatography APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-NO2-IC-VA Water Nitrite by Ion Chromatography APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrite detection is by UV absorbance and not conductivity.

ANIONS-NO3-IC-VA Water Nitrate by Ion Chromatography APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrate detection is by UV absorbance and not conductivity.

ANIONS-SO4-IC-VA Water Sulfate by Ion Chromatography APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

CARBONS-DOC-VA Water Dissolved organic carbon by combustion APHA 5310 "TOTAL ORGANIC CARBON (TOC)"

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-DOC-VA Water Dissolved organic carbon by combustion APHA 5310 TOTAL ORGANIC CARBON (TOC)

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.			
HG-DIS-CCME-CVAFS-VA	Water	Diss. Mercury in Water by CVAFS (CCME)	EPA 3005A/245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
HG-TOT-CCME-CVAFS-VA	Water	Total Mercury in Water by CVAFS (CCME)	EPA 245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
MET-DIS-CCME-ICP-VA	Water	Diss. Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
MET-DIS-CCME-MS-VA	Water	Diss. Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
MET-TOT-CCME-ICP-VA	Water	Total Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
MET-TOT-CCME-MS-VA	Water	Total Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
NH3-SIE-VA	Water	Ammonia by SIE	APHA 4500 D. - NH3 NITROGEN (AMMONIA)
This analysis is carried out, on sulphuric acid preserved samples, using procedures adapted from APHA Method 4500-NH3 "Nitrogen (Ammonia)". Ammonia is determined using an ammonia selective electrode.			
PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.			
PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Colour	APHA 4500-P "Phosphorous"
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Colour	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-T-COL-VA	Water	Total Phosphate P by Color	APHA 4500-P "Phosphorous"
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-T-COL-VA	Water	Total Phosphate P by Color	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
SILICATE-COL-VA	Water	Silicate by Colourimetric analysis	APHA 4500-SiO2 D.
This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 D. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.			

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
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TDS-VA	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC
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This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-SIE-VA	Water	Total Kjeldahl Nitrogen by SIE	APHA 4500-Norg (TKN)
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This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total kjeldahl nitrogen is determined by sample digestion at 367 celcius with analysis using an ammonia selective electrode.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540 Gravimetric
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This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 "Turbidity"
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This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity
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This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

**** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.**

The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA		

GLOSSARY OF REPORT TERMS

Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency.

mg/kg (units) - unit of concentration based on mass, parts per million

mg/L (units) - unit of concentration based on volume, parts per million

N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

Report to: Randy Baker		Report Format / Distribution		Service Requested:	
Company: Azimuth Consulting Group Inc.		☒ Standard ☐ Other		☒ Regular Service (Default)	
Contact: Randy Baker		☒ PDF ☒ Excel ☐ Fax		☐ Rush Service (2-3 Days)	
Address: Vancouver		Email 1: rbaker@azimuthgroup.ca		☐ Priority Service (1 Day or ASAP)	
Phone: 604-730-1220 Fax:		Email 2: gmantr@azimuthgroup.ca, mmccconnell@azimuthgroup.ca		☐ Emergency Service (<1 Day / Weekend) - Contact ALS	
Invoice To: ☒ Same as Repon		Indicate Bottles: Filtered / Preserved (FFP) →		Analysis Request	
Company:		Client / Project Information:			
Contact:		Job #: Meadowbank Mine DIKE CONSTRUCTION			
Address:		PO/AFE:			
Sample:		Legal Site Description:			
Phone:		Quote #: ALSEQ09-077			
Fax:		ALS Contact: Natasha MM			
Lab Work Order # 1806031		Sampler (Initials)			
Sample Identification (This description will appear on the report)		Date		Sample Type (Select from drop-down list)	
Sample #		dd-mm-yy	hh:mm		
DC-WQ-SP8		08-Aug-09		Water	
DC-WQ-BGE3		08-Aug-09		Water	
DC-WQ-BGE5		08-Aug-09		Water	
DC-WQ-BGW2		08-Aug-09		Water	
DC-WQ-HVH4		08-Aug-09		Water	
DC-WQ-BGE1		08-Aug-09		Water	
DC-WQ-HVH2		08-Aug-09		Water	
DC-WQ-DUP		08-Aug-09		Water	
Travel Blanks		08-Aug-09		Water	
Equipment Blanks		08-Aug-09		Water	
Guidelines / Regulations		Special Instructions / Hazardous Details			
		The filters are for Chlorophyll Analysis			
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.					
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the adjacent worksheet.					
Relinquished By: Randy Baker	Date & Time: 08-Aug-09	Received By: Carly	Date & Time: 08/14/09 1330	Temperature: 4°C	Sample Condition (lab use only)
Relinquished By:	Date & Time:	Received By:	Date & Time:		Samples Received in Good Condition? Y / N (if no provided details)



Environmental Division

Certificate of Analysis

AZIMUTH CONSULTING GROUP INC.

ATTN: RANDY BAKER

218 - 2902 WEST BROADWAY

VANCOUVER BC V6K 2G8

Report Date: 09-SEP-09 17:09 (MT)

Version: FINAL

Lab Work Order #: L809462

Date Received: 24-AUG-09

Project P.O. #:

Job Reference: MEADOWBANK MINE DIKE CONSTRUCTION

Legal Site Desc:

CofC Numbers:

Other Information:

Comments: Please note that the volumes for the chlorophyll a filters was assumed to be 1L as per the client's request.


LINDSAY JONES
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L809462-1	L809462-2	L809462-3	L809462-4	L809462-5
		16-AUG-09	16-AUG-09	16-AUG-09	16-AUG-09	16-AUG-09
		DC-WQ-BGE3	DC-WQ-BGE5	DC-WQ-BGW3	DC-WQ-HVH4	DC-WQ-BGE1
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	16.1	15.5	15.7	15.1	15.4
	Hardness (as CaCO3) (mg/L)	5.9	5.8	5.9	5.9	5.9
	pH (pH)	6.83	6.97	7.00	6.94	7.01
	Total Suspended Solids (mg/L)	2.3	1.5	1.1	1.7	2.9
	Total Dissolved Solids (mg/L)	<10	<10	12	<10	<10
	Turbidity (NTU)	5.80	3.32	3.75	3.93	8.83
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	4.7	4.5	4.0	4.7	4.8
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Alkalinity, Total (as CaCO3) (mg/L)	4.7	4.5	4.0	4.7	4.8
	Ammonia as N (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	0.53	0.52	0.52	0.52	0.53
	Fluoride (F) (mg/L)	0.063	0.064	0.072	0.066	0.065
	Nitrate (as N) (mg/L)	0.0062	0.0058	0.0070	0.0055	0.0081
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.119	0.103	0.097	0.093	0.101
	Ortho Phosphate as P (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Phosphate as P (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Silicate (as SiO2) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Sulfate (SO4) (mg/L)	1.53	1.53	1.54	1.53	1.55
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.28	1.20	1.20	1.09	2.22
	Total Organic Carbon (mg/L)	1.23	3.79	1.31	1.18	1.48 *
Total Metals	Aluminum (Al)-Total (mg/L)	0.139	0.0822	0.0685	0.0879	0.158
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Beryllium (Be)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017
	Calcium (Ca)-Total (mg/L)	1.41	1.39	1.19	1.23	1.42
	Chromium (Cr)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Cobalt (Co)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Copper (Cu)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Iron (Fe)-Total (mg/L)	0.202	0.123	0.103	0.117	0.267
	Lead (Pb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Lithium (Li)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Magnesium (Mg)-Total (mg/L)	0.67	0.63	0.60	0.60	0.67
	Manganese (Mn)-Total (mg/L)	0.00399	0.00261	0.00270	0.00309	0.00537
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L809462-6	L809462-7	L809462-8	L809462-9	
		16-AUG-09	16-AUG-09	16-AUG-09	16-AUG-09	
		DC-WQ-HVH2	DC-WQ-DUP	TRAVEL BLANKS	EQUIPMENT BLANKS	
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	14.8	14.9	<2.0	<2.0	
	Hardness (as CaCO3) (mg/L)	5.8	5.8	<1.1	<1.1	
	pH (pH)	7.00	6.97	5.62	5.73	
	Total Suspended Solids (mg/L)	1.7	1.5	<1.0	<1.0	
	Total Dissolved Solids (mg/L)	<10	<10	<10	<10	
	Turbidity (NTU)	3.46	3.79	<0.10	<0.10	
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	4.6	4.5	<2.0	<2.0	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	
	Alkalinity, Total (as CaCO3) (mg/L)	4.6	4.5	<2.0	<2.0	
	Ammonia as N (mg/L)	0.022	<0.020	<0.020	<0.020	
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Chloride (Cl) (mg/L)	0.52	0.53	<0.50	<0.50	
	Fluoride (F) (mg/L)	0.072	0.064	<0.020	<0.020	
	Nitrate (as N) (mg/L)	<0.0050	0.0061	<0.0050	<0.0050	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	0.117	0.126	<0.050	<0.050	
	Ortho Phosphate as P (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Total Phosphate as P (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	
	Silicate (as SiO2) (mg/L)	<1.0	<1.0	<1.0	<1.0	
	Sulfate (SO4) (mg/L)	1.52	1.55	<0.50	<0.50	
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.17	1.15	<0.50	<0.50	
	Total Organic Carbon (mg/L)	1.26	1.27	<0.50	<0.50	
Total Metals	Aluminum (Al)-Total (mg/L)	0.0747	0.0732	<0.0050	<0.0050	
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Arsenic (As)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	
	Beryllium (Be)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	
	Cadmium (Cd)-Total (mg/L)	<0.000017	<0.000017	<0.000017	<0.000017	
	Calcium (Ca)-Total (mg/L)	1.39	1.19	<0.10	<0.10	
	Chromium (Cr)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Cobalt (Co)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	
	Copper (Cu)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Iron (Fe)-Total (mg/L)	0.128	0.103	<0.030	<0.030	
	Lead (Pb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Lithium (Li)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	
	Magnesium (Mg)-Total (mg/L)	0.61	0.58	<0.10	<0.10	
	Manganese (Mn)-Total (mg/L)	0.00241	0.00282	<0.00030	<0.00030	
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L809462-1	L809462-2	L809462-3	L809462-4	L809462-5
		16-AUG-09	16-AUG-09	16-AUG-09	16-AUG-09	16-AUG-09
		DC-WQ-BGE3	DC-WQ-BGE5	DC-WQ-BGW3	DC-WQ-HVH4	DC-WQ-BGE1
Grouping	Analyte					
WATER						
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Total (mg/L)	<0.0010	<0.0010	<0.0010	0.0011	<0.0010
	Potassium (K)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Silver (Ag)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Tin (Sn)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Barium (Ba)-Dissolved (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Beryllium (Be)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Boron (B)-Dissolved (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017
	Calcium (Ca)-Dissolved (mg/L)	1.40	1.38	1.40	1.39	1.39
	Chromium (Cr)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Cobalt (Co)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Copper (Cu)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	<0.030	<0.030	<0.030
	Lead (Pb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Lithium (Li)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Magnesium (Mg)-Dissolved (mg/L)	0.59	0.58	0.58	0.58	0.59
	Manganese (Mn)-Dissolved (mg/L)	0.00113	0.00117	0.00099	0.00091	0.00165
	Mercury (Hg)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Potassium (K)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Selenium (Se)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Silver (Ag)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Tin (Sn)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L809462-6	L809462-7	L809462-8	L809462-9	
		Description					
		Sampled Date	16-AUG-09	16-AUG-09	16-AUG-09	16-AUG-09	
		Sampled Time					
		Client ID	DC-WQ-HVH2	DC-WQ-DUP	TRAVEL BLANKS	EQUIPMENT BLANKS	
Grouping	Analyte						
WATER							
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	Nickel (Ni)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	Potassium (K)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0		
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	Silver (Ag)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020		
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0		
	Thallium (Tl)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020		
	Tin (Sn)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050		
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010		
	Uranium (U)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020		
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	Zinc (Zn)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050		
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	<0.0050	<0.0050				
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050				
	Arsenic (As)-Dissolved (mg/L)	<0.00050	<0.00050				
	Barium (Ba)-Dissolved (mg/L)	<0.020	<0.020				
	Beryllium (Be)-Dissolved (mg/L)	<0.0010	<0.0010				
	Boron (B)-Dissolved (mg/L)	<0.10	<0.10				
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017	<0.000017				
	Calcium (Ca)-Dissolved (mg/L)	1.38	1.38				
	Chromium (Cr)-Dissolved (mg/L)	<0.0010	<0.0010				
	Cobalt (Co)-Dissolved (mg/L)	<0.00030	<0.00030				
	Copper (Cu)-Dissolved (mg/L)	<0.0010	<0.0010				
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030				
	Lead (Pb)-Dissolved (mg/L)	<0.00050	<0.00050				
	Lithium (Li)-Dissolved (mg/L)	<0.0050	<0.0050				
	Magnesium (Mg)-Dissolved (mg/L)	0.57	0.58				
	Manganese (Mn)-Dissolved (mg/L)	0.00169	0.00090				
	Mercury (Hg)-Dissolved (mg/L)	<0.000020	<0.000020				
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010	<0.0010				
	Nickel (Ni)-Dissolved (mg/L)	<0.0010	<0.0010				
	Potassium (K)-Dissolved (mg/L)	<2.0	<2.0				
	Selenium (Se)-Dissolved (mg/L)	<0.0010	<0.0010				
	Silver (Ag)-Dissolved (mg/L)	<0.000020	<0.000020				
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0				
	Thallium (Tl)-Dissolved (mg/L)	<0.00020	<0.00020				
	Tin (Sn)-Dissolved (mg/L)	<0.00050	<0.00050				
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010				
	Uranium (U)-Dissolved (mg/L)	<0.00020	<0.00020				
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010				
	Zinc (Zn)-Dissolved (mg/L)	<0.0050	<0.0050				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L809462-1	L809462-2	L809462-3	L809462-4	L809462-5
		16-AUG-09	16-AUG-09	16-AUG-09	16-AUG-09	16-AUG-09
		DC-WQ-BGE3	DC-WQ-BGE5	DC-WQ-BGW3	DC-WQ-HVH4	DC-WQ-BGE1
Grouping	Analyte					
WATER						
Plant Pigments	Chlorophyll a (ug/L)	0.445	0.256	0.252	0.159	0.277

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID Description Sampled Date Sampled Time Client ID	L809462-6 16-AUG-09 DC-WQ-HVH2	L809462-7 16-AUG-09 DC-WQ-DUP	L809462-8 16-AUG-09 TRAVEL BLANKS	L809462-9 16-AUG-09 EQUIPMENT BLANKS	
Grouping	Analyte						
WATER							
Plant Pigments	Chlorophyll a (ug/L)	0.182	0.466				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Additional Comments for Sample Listed:

Samplenum	Matrix	Report Remarks	Sample Comment:
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Qualifiers for Individual Parameters Listed:

Qualifier	Description
RRV	Reported Result Verified By Repeat Analysis

Samples with Qualifiers for Individual Parameters as listed above:

Sample Number	Client Sample ID	Parameters	Qualifier
L809462-5	DC-WQ-BGE1	Total Organic Carbon	RRV

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
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ALK-SCR-VA Water Alkalinity by colour or titration EPA 310.2 OR APHA 2320

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

OR

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

ANIONS-BR-IC-VA Water Bromide by Ion Chromatography APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-CL-IC-VA Water Chloride by Ion Chromatography APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-F-IC-VA Water Fluoride by Ion Chromatography APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-NO2-IC-VA Water Nitrite by Ion Chromatography APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrite detection is by UV absorbance and not conductivity.

ANIONS-NO3-IC-VA Water Nitrate by Ion Chromatography APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrate detection is by UV absorbance and not conductivity.

ANIONS-SO4-IC-VA Water Sulfate by Ion Chromatography APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

CARBONS-DOC-VA Water Dissolved organic carbon by combustion APHA 5310 "TOTAL ORGANIC CARBON (TOC)"

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-DOC-VA Water Dissolved organic carbon by combustion APHA 5310 TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CHLOROA-VA	Water	Chlorophyll a by Fluorometer	EPA 445.0
Chlorophyll and Pheopigments by Fluorometry analysis is carried out using procedures adapted from USEPA Method 445.0. The sample is filtered using either a glass fiber filter or a 0.45 micron Membrane filter. The pigments are extracted from the filter with 90% aqueous acetone. For chlorophyll-a analysis the extract is read using a fluorometer. For pheopigments the extract is first acidified then read. This method is not subject to interferences from chlorophyll b.			
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.			
HG-DIS-CCME-CVAFS-VA	Water	Diss. Mercury in Water by CVAFS (CCME)	EPA 3005A/245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
HG-TOT-CCME-CVAFS-VA	Water	Total Mercury in Water by CVAFS (CCME)	EPA 245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
MET-DIS-CCME-ICP-VA	Water	Diss. Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
MET-DIS-CCME-MS-VA	Water	Diss. Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
MET-TOT-CCME-ICP-VA	Water	Total Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
MET-TOT-CCME-MS-VA	Water	Total Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
NH3-SIE-VA	Water	Ammonia by SIE	APHA 4500 D. - NH3 NITROGEN (AMMONIA)
This analysis is carried out, on sulphuric acid preserved samples, using procedures adapted from APHA Method 4500-NH3 "Nitrogen (Ammonia)". Ammonia is determined using an ammonia selective electrode.			
PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.			
PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.			
PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Colour	APHA 4500-P "Phosphorous"
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Colour	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-T-COL-VA	Water	Total Phosphate P by Color	APHA 4500-P "Phosphorous"
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-T-COL-VA	Water	Total Phosphate P by Color	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
SILICATE-COL-VA	Water	Silicate by Colourimetric analysis	APHA 4500-SiO2 D.
This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 D. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.			
TDS-VA	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.			
TKN-SIE-VA	Water	Total Kjeldahl Nitrogen by SIE	APHA 4500-Norg (TKN)
This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total kjeldahl nitrogen is determined by			

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
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sample digestion at 367 celcius with analysis using an ammonia selective electrode.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540 Gravimetric
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This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 "Turbidity"
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This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity
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This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

**** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies. The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:**

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA		

GLOSSARY OF REPORT TERMS

Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency.

mg/kg (units) - unit of concentration based on mass, parts per million

mg/L (units) - unit of concentration based on volume, parts per million

N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.



Report to: Randy Baker				Report Format / Distribution				Service Requested:					
Company: Azimuth Consulting Group Inc.				☒ Standard ☐ Other				☒ Regular Service (Default)					
Contact: Randy Baker				☒ PDF ☒ Excel ☐ Fax				☐ Rush Service (2-3 Days)					
Address: Vancouver				Email 1: rbaker@azimuthgroup.ca				☐ Priority Service (1 Day or ASAP)					
Phone: 604-730-1220 Fax:				Email 2: gmann@azimuthgroup.ca, mmcconnell@azimuthgroup.ca				☐ Emergency Service (< 1 Day / Weekend) - Contact ALS					
Invoice To: ☒ Same as Report				Indicate Bottles: Filtered / Preserved (FRP) -->				Analysis Request					
Company:				Client / Project Information:									
Contact:				Job #:									
Address:				PO/AFE:									
Sample:				Legal Site Description:									
Phone:				Quote #: ALSEQ09-077									
Lab Work Order # (lab use only)				ALS Contact: Natasha MM									
Sample #		Sample Identification (This description will appear on the report)		Date		Time		Sample Type					
				dd-mm-yy		hh:mm		(Select from drop-down list)					
DC-WQ-BGE3				16-Aug-09				Water		T-Metals (CCME)			
DC-WQ-BGE5				16-Aug-09				Water		D-Metals (CCME)			
DC-WQ-BGW3				16-Aug-09				Water		TOC, DOC			
DC-WQ-HVH4				16-Aug-09				Water		TKN, Ammonia			
DC-WQ-BGE1				16-Aug-09				Water		TDS, TSS-low			
DC-WQ-HVH2				16-Aug-09				Water		Alk (SPECIATED)			
DC-WQ-DUP				16-Aug-09				Water		Anion Scan, Si, pH, EC			
Travel Blanks				16-Aug-09				Water		T-PO4, ortho-PO4			
Equipment Blanks				16-Aug-09				Water		Chlorophyll-a			
										Turbidity			
										Hazardous?			
										Highly Contaminated?			
										Number of Containers			
Guidelines / Regulations													
The filters are for Chlorophyll Analysis													
Special Instructions / Hazardous Details													
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.													
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the adjacent worksheet.													
Relinquished By: Randy Baker		Date & Time: 09-Aug-09		Received By:		Date & Time:		Temperature: 21.0C		Samples Received in Good Condition? Y / N (if no provided details)			
Relinquished By:		Date & Time:		Received By:		Date & Time: Aug. 24/09							

10:46am

(all coolers)



Environmental Division

Certificate of Analysis

AZIMUTH CONSULTING GROUP INC.

ATTN: RANDY BAKER

218 - 2902 WEST BROADWAY

VANCOUVER BC V6K 2G8

Report Date: 21-SEP-09 15:29 (MT)

Version: FINAL

Lab Work Order #: L812291

Date Received: 31-AUG-09

Project P.O. #:

Job Reference: MEADOWBANK MINE DIKE CONSTRUCTION

Legal Site Desc:

CofC Numbers:

Other Information:

Comments:


NATASHA MARKOVIC-MIROVIC
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L812291-1	L812291-2	L812291-3	L812291-4	L812291-5
		22-AUG-09	22-AUG-09	21-AUG-09	22-AUG-09	21-AUG-09
		DC-WQ-BGW3	DC-WQ-BGE1	DC-WQ-BGE2	DC-WQ-HVH4	DC-WQ-SP8
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	15.4	16.7	26.6	16.2	21.2
	Hardness (as CaCO3) (mg/L)	5.8	6.5	10.8	6.2	8.9
	pH (pH)	6.88	6.91	7.08	6.92	7.04
	Total Suspended Solids (mg/L)	2.9	3.9	320	5.3	1.5
	Total Dissolved Solids (mg/L)	10	<10	28	11	14
	Turbidity (NTU)	3.01	28.0	469	12.4	4.99
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	4.5	4.4	11.0	4.3	6.4
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0	<2.0	<1.0	<2.0	<2.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0	<2.0	<1.0	<2.0	<2.0
	Alkalinity, Total (as CaCO3) (mg/L)	4.5	4.4	11.0	4.3	6.4
	Ammonia as N (mg/L)	0.031	0.026	<0.020	0.023	0.125
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.043	0.046	0.067	0.046	0.042
	Nitrate (as N) (mg/L)	<0.0050	0.0226	0.0926	0.0136	0.0083
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	0.0028	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.065	0.074	0.278	0.079	0.079
	Ortho Phosphate as P (mg/L)	0.0014	<0.0010	0.0016	<0.0010	<0.0010
	Total Phosphate as P (mg/L)	<0.0020	0.0047	0.144	0.0040	0.0020
	Silicate (as SiO2) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Sulfate (SO4) (mg/L)	1.31	1.30	1.64	1.31	1.84
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.12	1.14	2.85	1.20	1.48
	Total Organic Carbon (mg/L)	1.34	1.23	3.06	1.22	1.56
Total Metals	Aluminum (Al)-Total (mg/L)	0.149	0.660	15.3	0.516	0.134
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	<0.00050	0.00081	0.00987	0.00069	<0.00050
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	0.103	<0.020	<0.020
	Beryllium (Be)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.000017	<0.000017	0.000057	<0.000017	<0.000017
	Calcium (Ca)-Total (mg/L)	1.23	1.41	3.68	1.45	2.11
	Chromium (Cr)-Total (mg/L)	<0.0010	0.0032	0.0772	0.0024	<0.0010
	Cobalt (Co)-Total (mg/L)	<0.00030	0.00042	0.00770	0.00037	<0.00030
	Copper (Cu)-Total (mg/L)	<0.0010	0.0015	0.0177	0.0013	<0.0010
	Iron (Fe)-Total (mg/L)	0.170	0.826	18.7	0.696	0.176
	Lead (Pb)-Total (mg/L)	<0.00050	<0.00050	0.00819	<0.00050	<0.00050
	Lithium (Li)-Total (mg/L)	<0.0050	<0.0050	0.0258	<0.0050	<0.0050
	Magnesium (Mg)-Total (mg/L)	0.61	0.87	7.41	0.81	0.77
	Manganese (Mn)-Total (mg/L)	0.00365	0.0157	0.326	0.0141	0.00340
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L812291-6	L812291-7	L812291-8	L812291-9	
		22-AUG-09	22-AUG-09	22-AUG-09	17-AUG-09	
		DC-WQ-EB	DC-WQ-DUP	TRAVEL BLANKS	DC-WQ-SP8	
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	<2.0	16.6	<2.0	21.6	
	Hardness (as CaCO3) (mg/L)	<1.1	6.4	<1.1	9.1	
	pH (pH)	5.83	6.95	5.57	6.77	
	Total Suspended Solids (mg/L)	<1.0	5.7	<1.0	<1.0	
	Total Dissolved Solids (mg/L)	<10	14	<10	12	
	Turbidity (NTU)	<0.10	29.6	<0.10	1.69	
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<2.0	4.4	<2.0	6.7	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	
	Alkalinity, Total (as CaCO3) (mg/L)	<2.0	4.4	<2.0	6.7	
	Ammonia as N (mg/L)	0.022	0.021	<0.020	<0.020	
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	
	Fluoride (F) (mg/L)	<0.020	0.046	<0.020	0.033	
	Nitrate (as N) (mg/L)	<0.0050	0.0142	<0.0050	<0.0050	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	<0.050	0.100	<0.050	0.119	
	Ortho Phosphate as P (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Total Phosphate as P (mg/L)	<0.0020	0.0056	<0.0020	<0.0020	
	Silicate (as SiO2) (mg/L)	<1.0	<1.0	<1.0	<1.0	
	Sulfate (SO4) (mg/L)	<0.50	1.22	<0.50	1.89	
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	<0.50	1.20	<0.50	1.56	
	Total Organic Carbon (mg/L)	0.59	1.15	<0.50	1.61	
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0050	0.734	<0.0050	0.0359	
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Arsenic (As)-Total (mg/L)	<0.00050	0.00085	<0.00050	<0.00050	
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	
	Beryllium (Be)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	
	Cadmium (Cd)-Total (mg/L)	<0.000017	<0.000017	<0.000017	<0.000017	
	Calcium (Ca)-Total (mg/L)	<0.10	1.47	<0.10	2.15	
	Chromium (Cr)-Total (mg/L)	<0.0010	0.0038	<0.0010	<0.0010	
	Cobalt (Co)-Total (mg/L)	<0.00030	0.00044	<0.00030	<0.00030	
	Copper (Cu)-Total (mg/L)	<0.0010	0.0015	<0.0010	<0.0010	
	Iron (Fe)-Total (mg/L)	<0.030	0.920	<0.030	0.047	
	Lead (Pb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Lithium (Li)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	
	Magnesium (Mg)-Total (mg/L)	<0.10	0.90	<0.10	0.75	
	Manganese (Mn)-Total (mg/L)	<0.00030	0.0165	<0.00030	0.00156	
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	

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		Sample ID	L812291-1	L812291-2	L812291-3	L812291-4	L812291-5
		Description					
		Sampled Date	22-AUG-09	22-AUG-09	21-AUG-09	22-AUG-09	21-AUG-09
		Sampled Time					
		Client ID	DC-WQ-BGW3	DC-WQ-BGE1	DC-WQ-BGE2	DC-WQ-HVH4	DC-WQ-SP8
Grouping	Analyte						
WATER							
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010	<0.0010	0.0015	<0.0010	<0.0010	
	Nickel (Ni)-Total (mg/L)	<0.0010	0.0021	0.0355	0.0018	<0.0010	
	Potassium (K)-Total (mg/L)	<2.0	<2.0	6.3	<2.0	<2.0	
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Silver (Ag)-Total (mg/L)	<0.000020	<0.000020	0.000090	<0.000020	<0.000020	
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	
	Thallium (Tl)-Total (mg/L)	<0.00020	<0.00020	0.00021	<0.00020	<0.00020	
	Tin (Sn)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
	Titanium (Ti)-Total (mg/L)	<0.010	0.028	0.632	0.023	<0.010	
	Uranium (U)-Total (mg/L)	<0.00020	0.00035	0.00659	0.00033	<0.00020	
	Vanadium (V)-Total (mg/L)	<0.0010	0.0010	0.0239	<0.0010	<0.0010	
	Zinc (Zn)-Total (mg/L)	<0.0050	<0.0050	0.0408	<0.0050	<0.0050	
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	<0.0050	<0.0050	0.0555	<0.0050	<0.0050	
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
	Arsenic (As)-Dissolved (mg/L)	<0.00050	<0.00050	0.00154	<0.00050	<0.00050	
	Barium (Ba)-Dissolved (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020	
	Beryllium (Be)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Boron (B)-Dissolved (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10	
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	
	Calcium (Ca)-Dissolved (mg/L)	1.40	1.56	2.74	1.53	2.37	
	Chromium (Cr)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Cobalt (Co)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
	Copper (Cu)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	0.053	<0.030	<0.030	
	Lead (Pb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
	Lithium (Li)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Magnesium (Mg)-Dissolved (mg/L)	0.57	0.62	0.96	0.59	0.74	
	Manganese (Mn)-Dissolved (mg/L)	0.00121	0.00377	0.0212	0.00335	0.00084	
	Mercury (Hg)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	
	Nickel (Ni)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Potassium (K)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	
	Selenium (Se)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Silver (Ag)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	
	Thallium (Tl)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
	Tin (Sn)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Uranium (U)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Zinc (Zn)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID				
		Description				
		Sampled Date				
		Sampled Time				
		Client ID				
Grouping	Analyte					
WATER						
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Nickel (Ni)-Total (mg/L)	<0.0010	0.0023	<0.0010	<0.0010	
	Potassium (K)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Silver (Ag)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	
	Thallium (Tl)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	
	Tin (Sn)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Titanium (Ti)-Total (mg/L)	<0.010	0.030	<0.010	<0.010	
	Uranium (U)-Total (mg/L)	<0.00020	0.00037	<0.00020	<0.00020	
	Vanadium (V)-Total (mg/L)	<0.0010	0.0012	<0.0010	<0.0010	
	Zinc (Zn)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	<0.0050	<0.0050		<0.0050	
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050		<0.00050	
	Arsenic (As)-Dissolved (mg/L)	<0.00050	<0.00050		<0.00050	
	Barium (Ba)-Dissolved (mg/L)	<0.020	<0.020		<0.020	
	Beryllium (Be)-Dissolved (mg/L)	<0.0010	<0.0010		<0.0010	
	Boron (B)-Dissolved (mg/L)	<0.10	<0.10		<0.10	
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017	<0.000017		<0.000017	
	Calcium (Ca)-Dissolved (mg/L)	<0.10	1.55		2.39	
	Chromium (Cr)-Dissolved (mg/L)	<0.0010	<0.0010		<0.0010	
	Cobalt (Co)-Dissolved (mg/L)	<0.00030	<0.00030		<0.00030	
	Copper (Cu)-Dissolved (mg/L)	<0.0010	<0.0010		<0.0010	
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030		<0.030	
	Lead (Pb)-Dissolved (mg/L)	<0.00050	<0.00050		<0.00050	
	Lithium (Li)-Dissolved (mg/L)	<0.0050	<0.0050		<0.0050	
	Magnesium (Mg)-Dissolved (mg/L)	<0.10	0.61		0.75	
	Manganese (Mn)-Dissolved (mg/L)	<0.00030	0.00390		0.00033	
	Mercury (Hg)-Dissolved (mg/L)	<0.000020	<0.000020		<0.000020	
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010	<0.0010		<0.0010	
	Nickel (Ni)-Dissolved (mg/L)	<0.0010	<0.0010		<0.0010	
	Potassium (K)-Dissolved (mg/L)	<2.0	<2.0		<2.0	
	Selenium (Se)-Dissolved (mg/L)	<0.0010	<0.0010		<0.0010	
	Silver (Ag)-Dissolved (mg/L)	<0.000020	<0.000020		<0.000020	
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0		<2.0	
	Thallium (Tl)-Dissolved (mg/L)	<0.00020	<0.00020		<0.00020	
	Tin (Sn)-Dissolved (mg/L)	<0.00050	<0.00050		<0.00050	
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010		<0.010	
	Uranium (U)-Dissolved (mg/L)	<0.00020	<0.00020		<0.00020	
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010		<0.0010	
	Zinc (Zn)-Dissolved (mg/L)	<0.0050	<0.0050		<0.0050	

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID Description Sampled Date Sampled Time Client ID	L812291-1 22-AUG-09 DC-WQ-BGW3	L812291-2 22-AUG-09 DC-WQ-BGE1	L812291-3 21-AUG-09 DC-WQ-BGE2	L812291-4 22-AUG-09 DC-WQ-HVH4	L812291-5 21-AUG-09 DC-WQ-SP8
Grouping	Analyte						
WATER							
Plant Pigments	Chlorophyll a (ug)	0.513	0.165			0.161	0.418

		Sample ID Description Sampled Date Sampled Time Client ID	L812291-6 22-AUG-09 DC-WQ-EB	L812291-7 22-AUG-09 DC-WQ-DUP	L812291-8 22-AUG-09 TRAVEL BLANKS	L812291-9 17-AUG-09 DC-WQ-SP8	
Grouping	Analyte						
WATER							
Plant Pigments	Chlorophyll a (ug)			0.104		0.355	

Reference Information

Additional Comments for Sample Listed:

Sample Number	Matrix	Report Remarks	Sample Comments
Methods Listed (if applicable):			
ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
ALK-PCT-VA	Water	Alkalinity by Auto. Titration	APHA 2320 "Alkalinity"
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
ALK-PCT-VA	Water	Alkalinity by Auto. Titration	APHA 2320 Alkalinity
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
ALK-SCR-VA	Water	Alkalinity by colour or titration	EPA 310.2 OR APHA 2320
This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method. OR This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
ANIONS-BR-IC-VA	Water	Bromide by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
ANIONS-CL-IC-VA	Water	Chloride by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
ANIONS-F-IC-VA	Water	Fluoride by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
ANIONS-NO2-IC-VA	Water	Nitrite by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrite detection is by UV absorbance and not conductivity.			
ANIONS-NO3-IC-VA	Water	Nitrate by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrate detection is by UV absorbance and not conductivity.			
ANIONS-SO4-IC-VA	Water	Sulfate by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CHLOROA-VA	Water	Chlorophyll a by Fluorometer	EPA 445.0
Chlorophyll and Pheopigments by Fluorometry analysis is carried out using procedures adapted from USEPA Method 445.0. The sample is filtered using either a glass fiber filter or a 0.45 micron Membrane filter. The pigments are extracted from the filter with 90% aqueous acetone. For chlorophyll-a analysis the extract is read using a fluorometer. For pheopigments the extract is first acidified then read. This method is not subject to interferences from chlorophyll b.			
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.			
HG-DIS-CCME-CVAFS-VA	Water	Diss. Mercury in Water by CVAFS (CCME)	EPA 3005A/245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
HG-TOT-CCME-CVAFS-VA	Water	Total Mercury in Water by CVAFS (CCME)	EPA 245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
MET-DIS-CCME-ICP-VA	Water	Diss. Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
MET-DIS-CCME-MS-VA	Water	Diss. Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
MET-TOT-CCME-ICP-VA	Water	Total Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
MET-TOT-CCME-MS-VA	Water	Total Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
NH3-SIE-VA	Water	Ammonia by SIE	APHA 4500 D. - NH3 NITROGEN (AMMONIA)
This analysis is carried out, on sulphuric acid preserved samples, using procedures adapted from APHA Method 4500-NH3 "Nitrogen (Ammonia)". Ammonia is determined using an ammonia selective electrode.			
PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.			
PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Colour	APHA 4500-P "Phosphorous"
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Colour	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-T-COL-VA	Water	Total Phosphate P by Color	APHA 4500-P "Phosphorous"
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-T-COL-VA	Water	Total Phosphate P by Color	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
SILICATE-COL-VA	Water	Silicate by Colourimetric analysis	APHA 4500-SiO2 D.
This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 D. "Silica". Silicate (molybdate-reactive silica) is determined by			

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
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the molybdosilicate-heteropoly blue colourimetric method.

TDS-VA	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC
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This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-SIE-VA	Water	Total Kjeldahl Nitrogen by SIE	APHA 4500-Norg (TKN)
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This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total kjeldahl nitrogen is determined by sample digestion at 367 celcius with analysis using an ammonia selective electrode.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540 Gravimetric
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This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 "Turbidity"
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This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity
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This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

**** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.**

The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA		

GLOSSARY OF REPORT TERMS

Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency.

mg/kg (units) - unit of concentration based on mass, parts per million

mg/L (units) - unit of concentration based on volume, parts per million

N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

Short Holding Time

Report to: Randy Baker						Report Format / Distribution						Service Requested:											
Company: Azimuth Consulting Group Inc.						☒ Standard ☐ Other ☒ PDF ☒ Excel ☐ Fax						☒ Regular Service (Default) ☐ Rush Service (2-3 Days) ☐ Priority Service (1 Day or ASAP) ☐ Emergency Service (<1 Day / Weekend) - Contact ALS											
Contact: Randy Baker						Email 1: rbaker@azimuthgroup.ca																	
Address: Vancouver						Email 2: gmamm@azimuthgroup.ca , mmccormell@azimuthgroup.ca																	
Phone: 604-730-1220 Fax:						Indicate Bottles: Filtered / Preserved (F/P) --						Analysis Request											
Invoice To: ☒ Same as Report						Client / Project Information:																	
Company:						Job #:						Meadowbank Mine DIKE CONSTRUCTION											
Contact:						PO/A/E:																	
Address:						Legal Site Description:																	
Sample						Quote #: ALSEC09-077																	
Phone:						ALS Contact: Natasha MM						Sampler (Initials)											
Lab Work Order # (lab use only)						Date						Time											
Sample #						(This description will appear on the report)						Sample Type											
						dd-mm-yy						hh:mm (Select from drop-down list)											
DC-WQ-BGW3						22-Aug-09						Water											
DC-WQ-BGE1						22-Aug-09						Water											
DC-WQ-BGE2						21-Aug-09						Water											
DC-WQ-HVH4						22-Aug-09						Water											
DC-WQ-SP8						21-Aug-09						Water											
DC-WQ-EB						22-Aug-09						Water											
DC-WQ-DUP						22-Aug-09						Water											
Travel Blanks						22-Aug-09						Water											
DC-WQ-SP8						17-Aug-09						Water											
Guidelines / Regulations												Special Instructions / Hazardous Details											
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.												Filters for chlorophyll-a: the two DC-WQ-SP8 samples are from the same locations on different dates											
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the adjacent worksheet.																							
Reinquired By: Gary Mann						Date & Time: 22-Aug-09						Received By: [Signature]											
Reinquired By:						Date & Time:						Date & Time: 08/31/09											
Temperature: 20°C						Samples Received in Good Condition? Y / N (if no provided details)																	



Environmental Division

Certificate of Analysis

AZIMUTH CONSULTING GROUP INC.

ATTN: RANDY BAKER

218 - 2902 WEST BROADWAY

VANCOUVER BC V6K 2G8

Report Date: 23-SEP-09 10:46 (MT)

Version: FINAL

Lab Work Order #: L813538

Date Received: 02-SEP-09

Project P.O. #:

Job Reference: MEADOWBANK MINE DIKE CONSTRUCTION

Legal Site Desc:

CofC Numbers:

Other Information:

Comments:


NATASHA MARKOVIC-MIROVIC
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L813538-1	L813538-2	L813538-3	L813538-4	L813538-5
		29-AUG-09	29-AUG-09	29-AUG-09	29-AUG-09	29-AUG-09
		DC-WQ-BGW2	DC-WQ-BGW3	DC-WQ-BGE1	DC-WQ-BGE2	DC-WQ-BGE3
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	24.3	15.2	15.9	29.5	19.4
	Hardness (as CaCO3) (mg/L)	9.7	5.6	6.1	11.0	7.4
	pH (pH)	6.56	7.26	7.33	6.47	7.20
	Total Suspended Solids (mg/L)	105	1.1	6.1	367	59.5
	Total Dissolved Solids (mg/L)	61	<10	<10	34	22
	Turbidity (NTU)	206	3.70	9.91	260	86.0
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	10.0	4.6	4.6	10.6	8.5
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<2.0	<2.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<2.0	<2.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	10.0	4.6	4.6	10.6	8.5
	Ammonia as N (mg/L)	0.095	0.022	0.028	0.149	0.063
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	0.57	<0.50	0.50	0.62	0.54
	Fluoride (F) (mg/L)	0.086	0.064	0.066	0.099	0.074
	Nitrate (as N) (mg/L)	0.0608	<0.0050	0.0140	0.0996	0.0426
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	0.0046	0.0022
	Total Kjeldahl Nitrogen (mg/L)	0.266	0.093	0.106	0.393	0.161
	Ortho Phosphate as P (mg/L)	0.0010	<0.0010	<0.0010	0.0015	<0.0010
	Total Phosphate as P (mg/L)	0.081	<0.0020	0.0051	0.170	0.033
	Silicate (as SiO2) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Sulfate (SO4) (mg/L)	1.82	1.41	1.43	2.03	1.58
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.17	1.28	1.27	1.13	1.13
	Total Organic Carbon (mg/L)	2.59	1.23	1.23	3.27	1.85
Total Metals	Aluminum (Al)-Total (mg/L)	9.21	0.139	0.520	16.8	3.57
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	0.00525	<0.00050	0.00057	0.0117	0.00281
	Barium (Ba)-Total (mg/L)	0.072	<0.020	<0.020	0.123	0.029
	Beryllium (Be)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	0.000038	<0.000017	<0.000017	0.000060	<0.000017
	Calcium (Ca)-Total (mg/L)	2.83	1.32	1.39	4.52	2.04
	Chromium (Cr)-Total (mg/L)	0.0302	<0.0010	0.0023	0.0784	0.0169
	Cobalt (Co)-Total (mg/L)	0.00431	<0.00030	0.00031	0.00979	0.00200
	Copper (Cu)-Total (mg/L)	0.0111	<0.0010	0.0012	0.0220	0.0050
	Iron (Fe)-Total (mg/L)	9.99	0.181	0.620	22.2	4.40
	Lead (Pb)-Total (mg/L)	0.00645	<0.00050	<0.00050	0.00981	0.00206
	Lithium (Li)-Total (mg/L)	0.0145	<0.0050	<0.0050	0.0292	0.0058
	Magnesium (Mg)-Total (mg/L)	4.33	0.63	0.79	8.89	2.24
	Manganese (Mn)-Total (mg/L)	0.171	0.00377	0.0120	0.342	0.0663
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L813538-6	L813538-7	L813538-8	L813538-9	L813538-10
		29-AUG-09	29-AUG-09	29-AUG-09	29-AUG-09	29-AUG-09
		DC-WQ-SP8	DC-WQ- HVH4	DC-WQ-DUP	DC-WQ-EB	TRAVEL BLANKS
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	16.7	15.4	16.5	<2.0	
	Hardness (as CaCO3) (mg/L)	7.7	5.8	7.0	<1.1	<1.1
	pH (pH)	7.16	7.10	7.01	5.85	
	Total Suspended Solids (mg/L)	3.9	3.9	3.3	<1.0	
	Total Dissolved Solids (mg/L)	<10	14	18	<10	
	Turbidity (NTU)	5.16	6.30	6.22	0.12	
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	5.6	4.5	4.6	<2.0	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	
	Alkalinity, Total (as CaCO3) (mg/L)	5.6	4.5	4.6	<2.0	
	Ammonia as N (mg/L)	0.032	0.021	0.022	<0.020	<0.020
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	
	Fluoride (F) (mg/L)	0.065	0.064	0.064	<0.020	
	Nitrate (as N) (mg/L)	0.0112	0.0079	0.0101	<0.0050	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	0.098	0.110	0.104	<0.050	<0.050
	Ortho Phosphate as P (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Total Phosphate as P (mg/L)	0.0029	0.0029	0.0026	<0.0020	
	Silicate (as SiO2) (mg/L)	<1.0	<1.0	<1.0	<1.0	
	Sulfate (SO4) (mg/L)	1.58	1.38	1.49	<0.50	
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.28	1.44	1.31	<0.50	
	Total Organic Carbon (mg/L)	1.32	1.30	1.32	<0.50	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	0.295	0.268	0.290	<0.0050	<0.0050
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Beryllium (Be)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017
	Calcium (Ca)-Total (mg/L)	1.52	1.35	1.51	<0.10	<0.10
	Chromium (Cr)-Total (mg/L)	0.0013	0.0013	0.0013	<0.0010	<0.0010
	Cobalt (Co)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Copper (Cu)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Iron (Fe)-Total (mg/L)	0.369	0.363	0.358	<0.030	<0.030
	Lead (Pb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Lithium (Li)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Magnesium (Mg)-Total (mg/L)	0.74	0.69	0.73	<0.10	<0.10
	Manganese (Mn)-Total (mg/L)	0.00655	0.00699	0.00665	<0.00030	<0.00030
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID				
		Description				
		Sampled Date				
		Sampled Time				
		Client ID				
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	21.3				
	Hardness (as CaCO3) (mg/L)	8.9				
	pH (pH)	6.67				
	Total Suspended Solids (mg/L)	1.3				
	Total Dissolved Solids (mg/L)	19				
	Turbidity (NTU)	1.89				
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	6.6				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0				
	Alkalinity, Total (as CaCO3) (mg/L)	6.6				
	Ammonia as N (mg/L)	<0.020				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	<0.50				
	Fluoride (F) (mg/L)	0.060				
	Nitrate (as N) (mg/L)	<0.0050				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	0.118				
	Ortho Phosphate as P (mg/L)	<0.0010				
	Total Phosphate as P (mg/L)	<0.0020				
	Silicate (as SiO2) (mg/L)	<1.0				
	Sulfate (SO4) (mg/L)	2.06				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.44				
	Total Organic Carbon (mg/L)	1.51				
Total Metals	Aluminum (Al)-Total (mg/L)	0.0933				
	Antimony (Sb)-Total (mg/L)	<0.00050				
	Arsenic (As)-Total (mg/L)	<0.00050				
	Barium (Ba)-Total (mg/L)	<0.020				
	Beryllium (Be)-Total (mg/L)	<0.0010				
	Boron (B)-Total (mg/L)	<0.10				
	Cadmium (Cd)-Total (mg/L)	<0.000017				
	Calcium (Ca)-Total (mg/L)	2.30				
	Chromium (Cr)-Total (mg/L)	<0.0010				
	Cobalt (Co)-Total (mg/L)	<0.00030				
	Copper (Cu)-Total (mg/L)	<0.0010				
	Iron (Fe)-Total (mg/L)	0.101				
	Lead (Pb)-Total (mg/L)	<0.00050				
	Lithium (Li)-Total (mg/L)	<0.0050				
	Magnesium (Mg)-Total (mg/L)	0.80				
	Manganese (Mn)-Total (mg/L)	0.00231				
	Mercury (Hg)-Total (mg/L)	<0.000020				

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L813538-1	L813538-2	L813538-3	L813538-4	L813538-5
		29-AUG-09	29-AUG-09	29-AUG-09	29-AUG-09	29-AUG-09
		DC-WQ-BGW2	DC-WQ-BGW3	DC-WQ-BGE1	DC-WQ-BGE2	DC-WQ-BGE3
Grouping	Analyte					
WATER						
Total Metals	Molybdenum (Mo)-Total (mg/L)	0.0012	<0.0010	<0.0010	0.0023	<0.0010
	Nickel (Ni)-Total (mg/L)	0.0172	<0.0010	0.0017	0.0422	0.0093
	Potassium (K)-Total (mg/L)	3.8	<2.0	<2.0	6.3	<2.0
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	0.0012	<0.0010
	Silver (Ag)-Total (mg/L)	0.000068	<0.000020	<0.000020	0.000117	0.000032
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl)-Total (mg/L)	<0.00020	<0.00020	<0.00020	0.00024	<0.00020
	Tin (Sn)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Titanium (Ti)-Total (mg/L)	0.390	<0.010	0.022	0.787	0.155
	Uranium (U)-Total (mg/L)	0.00398	<0.00020	0.00026	0.00714	0.00144
	Vanadium (V)-Total (mg/L)	0.0131	<0.0010	<0.0010	0.0269	0.0054
	Zinc (Zn)-Total (mg/L)	0.0231	<0.0050	<0.0050	0.0515	0.0089
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	0.0162	0.0106	0.0081	<0.0050	<0.0050
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Dissolved (mg/L)	0.00083	<0.00050	<0.00050	0.00109	0.00059
	Barium (Ba)-Dissolved (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Beryllium (Be)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Boron (B)-Dissolved (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017
	Calcium (Ca)-Dissolved (mg/L)	2.38	1.30	1.43	2.77	1.79
	Chromium (Cr)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Cobalt (Co)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Copper (Cu)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	<0.030	<0.030	<0.030
	Lead (Pb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Lithium (Li)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Magnesium (Mg)-Dissolved (mg/L)	0.92	0.57	0.61	0.99	0.71
	Manganese (Mn)-Dissolved (mg/L)	0.0224	0.00083	0.00268	0.0184	0.0107
	Mercury (Hg)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	0.0016	<0.0010
	Nickel (Ni)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Potassium (K)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Selenium (Se)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Silver (Ag)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Tin (Sn)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L813538-6	L813538-7	L813538-8	L813538-9	L813538-10
		Description					
		Sampled Date	29-AUG-09	29-AUG-09	29-AUG-09	29-AUG-09	29-AUG-09
		Sampled Time					
		Client ID	DC-WQ-SP8	DC-WQ- HVH4	DC-WQ-DUP	DC-WQ-EB	TRAVEL BLANKS
Grouping	Analyte						
WATER							
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Nickel (Ni)-Total (mg/L)	0.0010	0.0011	0.0011	<0.0010	<0.0010	
	Potassium (K)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Silver (Ag)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	
	Thallium (Tl)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
	Tin (Sn)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
	Titanium (Ti)-Total (mg/L)	0.014	0.012	0.013	<0.010	<0.010	
	Uranium (U)-Total (mg/L)	0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Zinc (Zn)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	<0.0050	0.0114	0.0063	<0.0050		
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050		
	Arsenic (As)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050		
	Barium (Ba)-Dissolved (mg/L)	<0.020	<0.020	<0.020	<0.020		
	Beryllium (Be)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	Boron (B)-Dissolved (mg/L)	<0.10	<0.10	<0.10	<0.10		
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017	<0.000017	<0.000017	<0.000017		
	Calcium (Ca)-Dissolved (mg/L)	1.92	1.36	1.70	<0.10		
	Chromium (Cr)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	Cobalt (Co)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030		
	Copper (Cu)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	<0.030	<0.030		
	Lead (Pb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050		
	Lithium (Li)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050		
	Magnesium (Mg)-Dissolved (mg/L)	0.69	0.59	0.66	<0.10		
	Manganese (Mn)-Dissolved (mg/L)	0.00069	0.00135	0.00078	<0.00030		
	Mercury (Hg)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020		
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	Nickel (Ni)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	Potassium (K)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0		
	Selenium (Se)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	Silver (Ag)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020		
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0		
	Thallium (Tl)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020		
	Tin (Sn)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050		
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010		
	Uranium (U)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020		
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	Zinc (Zn)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050		

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID				
		Description				
		Sampled Date				
		Sampled Time				
		Client ID				
Grouping	Analyte					
WATER						
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010				
	Nickel (Ni)-Total (mg/L)	<0.0010				
	Potassium (K)-Total (mg/L)	<2.0				
	Selenium (Se)-Total (mg/L)	<0.0010				
	Silver (Ag)-Total (mg/L)	<0.000020				
	Sodium (Na)-Total (mg/L)	<2.0				
	Thallium (Tl)-Total (mg/L)	<0.00020				
	Tin (Sn)-Total (mg/L)	<0.00050				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	<0.00020				
	Vanadium (V)-Total (mg/L)	<0.0010				
	Zinc (Zn)-Total (mg/L)	<0.0050				
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	0.0055				
	Antimony (Sb)-Dissolved (mg/L)	<0.00050				
	Arsenic (As)-Dissolved (mg/L)	<0.00050				
	Barium (Ba)-Dissolved (mg/L)	<0.020				
	Beryllium (Be)-Dissolved (mg/L)	<0.0010				
	Boron (B)-Dissolved (mg/L)	<0.10				
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017				
	Calcium (Ca)-Dissolved (mg/L)	2.29				
	Chromium (Cr)-Dissolved (mg/L)	<0.0010				
	Cobalt (Co)-Dissolved (mg/L)	<0.00030				
	Copper (Cu)-Dissolved (mg/L)	<0.0010				
	Iron (Fe)-Dissolved (mg/L)	<0.030				
	Lead (Pb)-Dissolved (mg/L)	<0.00050				
	Lithium (Li)-Dissolved (mg/L)	<0.0050				
	Magnesium (Mg)-Dissolved (mg/L)	0.76				
	Manganese (Mn)-Dissolved (mg/L)	0.00032				
	Mercury (Hg)-Dissolved (mg/L)	<0.000020				
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010				
	Nickel (Ni)-Dissolved (mg/L)	<0.0010				
	Potassium (K)-Dissolved (mg/L)	<2.0				
	Selenium (Se)-Dissolved (mg/L)	<0.0010				
	Silver (Ag)-Dissolved (mg/L)	<0.000020				
	Sodium (Na)-Dissolved (mg/L)	<2.0				
	Thallium (Tl)-Dissolved (mg/L)	<0.00020				
	Tin (Sn)-Dissolved (mg/L)	<0.00050				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	<0.00020				
	Vanadium (V)-Dissolved (mg/L)	<0.0010				
	Zinc (Zn)-Dissolved (mg/L)	<0.0050				

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L813538-1	L813538-2	L813538-3	L813538-4	L813538-5
		29-AUG-09	29-AUG-09	29-AUG-09	29-AUG-09	29-AUG-09
		DC-WQ-BGW2	DC-WQ-BGW3	DC-WQ-BGE1	DC-WQ-BGE2	DC-WQ-BGE3
Grouping	Analyte					
WATER						
Plant Pigments	Chlorophyll a (ug/L)	0.793	0.219	0.447	0.36	0.258

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID Description Sampled Date Sampled Time Client ID	L813538-6 29-AUG-09 DC-WQ-SP8	L813538-7 29-AUG-09 DC-WQ- HVH4	L813538-8 29-AUG-09 DC-WQ-DUP	L813538-9 29-AUG-09 DC-WQ-EB	L813538-10 29-AUG-09 TRAVEL BLANKS
Grouping	Analyte						
WATER							
Plant Pigments	Chlorophyll a (ug/L)		0.434	0.623	0.397		

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID Description Sampled Date Sampled Time Client ID	L813538-11 29-AUG-09 DC-WQ-SP06				
Grouping	Analyte						
WATER							
Plant Pigments	Chlorophyll a (ug/L)	0.391					

Reference Information

Additional Comments for Sample Listed:

Sample Number	Matrix	Report Remarks	Sample Comments
Methods Listed (if applicable):			
ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
ALK-PCT-VA	Water	Alkalinity by Auto. Titration	APHA 2320 "Alkalinity"
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
ALK-PCT-VA	Water	Alkalinity by Auto. Titration	APHA 2320 Alkalinity
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
ALK-SCR-VA	Water	Alkalinity by colour or titration	EPA 310.2 OR APHA 2320
This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method. OR This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
ANIONS-BR-IC-VA	Water	Bromide by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
ANIONS-CL-IC-VA	Water	Chloride by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
ANIONS-F-IC-VA	Water	Fluoride by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
ANIONS-NO2-IC-VA	Water	Nitrite by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrite detection is by UV absorbance and not conductivity.			
ANIONS-NO3-IC-VA	Water	Nitrate by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrate detection is by UV absorbance and not conductivity.			
ANIONS-SO4-IC-VA	Water	Sulfate by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CHLOROA-VA	Water	Chlorophyll a by Fluorometer	EPA 445.0
Chlorophyll and Pheopigments by Fluorometry analysis is carried out using procedures adapted from USEPA Method 445.0. The sample is filtered using either a glass fiber filter or a 0.45 micron Membrane filter. The pigments are extracted from the filter with 90% aqueous acetone. For chlorophyll-a analysis the extract is read using a fluorometer. For pheopigments the extract is first acidified then read. This method is not subject to interferences from chlorophyll b.			
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.			
HG-DIS-CCME-CVAFS-VA	Water	Diss. Mercury in Water by CVAFS (CCME)	EPA 3005A/245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
HG-TOT-CCME-CVAFS-VA	Water	Total Mercury in Water by CVAFS (CCME)	EPA 245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
MET-DIS-CCME-ICP-VA	Water	Diss. Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
MET-DIS-CCME-MS-VA	Water	Diss. Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
MET-TOT-CCME-ICP-VA	Water	Total Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
MET-TOT-CCME-MS-VA	Water	Total Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
NH3-SIE-VA	Water	Ammonia by SIE	APHA 4500 D. - NH3 NITROGEN (AMMONIA)
This analysis is carried out, on sulphuric acid preserved samples, using procedures adapted from APHA Method 4500-NH3 "Nitrogen (Ammonia)". Ammonia is determined using an ammonia selective electrode.			
PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.			
PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Colour	APHA 4500-P "Phosphorous"
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Colour	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-T-COL-VA	Water	Total Phosphate P by Color	APHA 4500-P "Phosphorous"
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-T-COL-VA	Water	Total Phosphate P by Color	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
SILICATE-COL-VA	Water	Silicate by Colourimetric analysis	APHA 4500-SiO2 D.
This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 D. "Silica". Silicate (molybdate-reactive silica) is determined by			

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
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the molybdosilicate-heteropoly blue colourimetric method.

TDS-VA	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC
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This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-SIE-VA	Water	Total Kjeldahl Nitrogen by SIE	APHA 4500-Norg (TKN)
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This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total kjeldahl nitrogen is determined by sample digestion at 367 celcius with analysis using an ammonia selective electrode.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540 Gravimetric
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This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 "Turbidity"
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This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity
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This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

**** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.**

The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA		

GLOSSARY OF REPORT TERMS

Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency.

mg/kg (units) - unit of concentration based on mass, parts per million

mg/L (units) - unit of concentration based on volume, parts per million

N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

Short Holding Time

Rush Processing Required

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.aisglobal.com

COC #

Page 1 of 2

Report to: Randy Baker				Report Format / Distribution				Service Requested:			
Company: Azimuth Consulting Group Inc.				☒ Standard ☐ Other				☒ Regular Service (Default)			
Contact: Randy Baker				☒ PDF ☒ Excel ☐ Fax				☐ Rush Service (2-3 Days)			
Address: Vancouver				Email 1: rbaker@azimuthgroup.ca				☐ Priority Service (1 Day or ASAP)			
Phone: 604-730-1220 Fax:				Email 2: gmann@azimuthgroup.ca				☐ Emergency Service (<1 Day / Weekend) - Contact ALS			
Invoice To: ☒ Same as Report				Client / Project Information:				Analysis Request			
Company:				Job #:							
Address:				PO/A/E:							
Sample:				Legal Site Description:							
Phone:				Quote #:							
Fax:				ALS Contact:							
Lab Work Order # (lab use only) 1813538				ALS Natascha MM				Sampler (initials) MF/AC/ZI			
Sample Identification (This description will appear on the report)				Date		Time		Sample Type (Select from drop-down list)			
DC-WQ-BGW2 (200 ml for chlor-a)				29-Aug-09		dd-mm-yy		hh:mm		Water	
DC-WQ-BGW3 (500 ml for chlor-a)				29-Aug-09						Water	
DC-WQ-BGE1 (500 ml for chlor-a)				29-Aug-09						Water	
DC-WQ-BGE2 (100 ml for chlor-a)				29-Aug-09						Water	
DC-WQ-BGE3 (200 ml for chlor-a)				29-Aug-09						Water	
DC-WQ-SP8 (1-L for chlor-a)				29-Aug-09						Water	
DC-WQ-HVH4 (1-L for chlor-a)				29-Aug-09						Water	
DC-WQ-DUP (1-L for chlor-a)				29-Aug-09						Water	
DC-WQ-EB				29-Aug-09						Water	
Travel Blanks				29-Aug-09						Water	
Guidelines / Regulations				Special Instructions / Hazardous Details							
				note - 1-L travel blanks not available (please do as much as you can)							
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the adjacent worksheet.											
Reinquired By:		Date & Time:		29-Aug-09		Received By:		Date & Time:			
Reinquired By:		Date & Time:				Received By:		Date & Time:			
By:		Date & Time:		29-Aug-09		By:		Date & Time:		9/12	
By:		Date & Time:				By:		Date & Time:		19	
										Temperature Samples Received in Good Condition? Y / N (if no provided details)	

[illegible]



Environmental Division

Certificate of Analysis

AZIMUTH CONSULTING GROUP INC.

ATTN: RANDY BAKER

218 - 2902 WEST BROADWAY

VANCOUVER BC V6K 2G8

Report Date: 25-SEP-09 14:36 (MT)

Version: FINAL

Lab Work Order #: L816563

Date Received: 10-SEP-09

Project P.O. #:

Job Reference: MEADOWBANK MINE DIKE CONSTRUCTION

Legal Site Desc:

CofC Numbers:

Other Information:

Comments:


LINDSAY JONES
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L816563-1	L816563-2	L816563-3	L816563-4	L816563-5
		04-SEP-09	04-SEP-09	04-SEP-09	04-SEP-09	04-SEP-09
		DC-WQ-BGW2	DC-WQ-BGE2	DC-WQ-BGE5	DC-WQ-HVH5	DC-WQ-TPE6
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	18.6	17.5	16.8	16.7	16.8
	Hardness (as CaCO3) (mg/L)	6.7	6.6	6.2	6.2	6.2
	pH (pH)	6.90	7.01	7.03	7.11	7.04
	Total Suspended Solids (mg/L)	29.7	16.5	8.9	6.1	9.5
	Total Dissolved Solids (mg/L)	24	14	11	13	11
	Turbidity (NTU)	53.0	32.6	18.4	19.7	21.3
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	4.5	4.5	4.6	4.5	4.4
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Alkalinity, Total (as CaCO3) (mg/L)	4.5	4.5	4.6	4.5	4.4
	Ammonia as N (mg/L)	0.032	0.021	0.021	0.022	0.020
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.069	0.069	0.067	0.067	0.067
	Nitrate (as N) (mg/L)	0.0186	0.0160	0.0129	0.0113	0.0127
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.113	0.111	0.097	0.129	0.116
	Ortho Phosphate as P (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Phosphate as P (mg/L)	0.021	0.011	0.013	0.0100	0.0077
	Silicate (as SiO2) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Sulfate (SO4) (mg/L)	1.55	1.48	1.45	1.45	1.45
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	2.05	1.21	1.18	1.35	1.12
	Total Organic Carbon (mg/L)	1.17	1.30	1.16	1.21	1.12
Total Metals	Aluminum (Al)-Total (mg/L)	2.44	1.37	0.902	0.931	0.823
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	0.00165	0.00116	0.00084	0.00084	0.00082
	Barium (Ba)-Total (mg/L)	0.021	<0.020	<0.020	<0.020	<0.020
	Beryllium (Be)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017
	Calcium (Ca)-Total (mg/L)	1.62	1.55	1.46	1.44	1.42
	Chromium (Cr)-Total (mg/L)	0.0094	0.0060	0.0038	0.0038	0.0033
	Cobalt (Co)-Total (mg/L)	0.00121	0.00079	0.00050	0.00049	0.00048
	Copper (Cu)-Total (mg/L)	0.0032	0.0024	0.0016	0.0016	0.0018
	Iron (Fe)-Total (mg/L)	2.61	1.72	1.04	1.03	0.934
	Lead (Pb)-Total (mg/L)	0.00136	0.00089	0.00056	0.00057	0.00055
	Lithium (Li)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Magnesium (Mg)-Total (mg/L)	1.57	1.22	0.97	0.96	0.93
	Manganese (Mn)-Total (mg/L)	0.0445	0.0293	0.0183	0.0179	0.0175
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L816563-6	L816563-7	L816563-8	L816563-9	L816563-10
		04-SEP-09	04-SEP-09	04-SEP-09	04-SEP-09	04-SEP-09
		DC-WQ-SP6	DC-WQ-SP8	DC-WQ-DUP	DC-WQ-EB	TRAVEL BLANKS
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	21.6	21.5	15.9	<2.0	<2.0
	Hardness (as CaCO3) (mg/L)	9.0	9.2	6.3	<1.1	<1.1
	pH (pH)	6.49	6.74	7.05	5.83	5.71
	Total Suspended Solids (mg/L)	1.5	<1.0	9.3	<1.0	<1.0
	Total Dissolved Solids (mg/L)	<10	17	10	<10	<10
	Turbidity (NTU)	5.03	2.49	23.0	0.21	<0.10
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	6.6	6.6	4.5	<2.0	<2.0
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Alkalinity, Total (as CaCO3) (mg/L)	6.6	6.6	4.5	<2.0	<2.0
	Ammonia as N (mg/L)	0.022	<0.020	<0.020	<0.020	<0.020
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.061	0.060	0.067	<0.020	<0.020
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	0.0119	<0.0050	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.105	0.089	0.086	<0.050	<0.050
	Ortho Phosphate as P (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Phosphate as P (mg/L)	<0.0020	<0.0020	0.0069	<0.0020	<0.0020
	Silicate (as SiO2) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Sulfate (SO4) (mg/L)	2.05	2.10	1.45	<0.50	<0.50
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.44	1.45	1.15	<0.50	<0.50
	Total Organic Carbon (mg/L)	1.44	1.43	1.27	<0.50	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	0.140	0.0834	0.810	<0.0050	<0.0050
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	<0.00050	<0.00050	0.00084	<0.00050	<0.00050
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Beryllium (Be)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017
	Calcium (Ca)-Total (mg/L)	2.33	2.23	1.47	<0.10	<0.10
	Chromium (Cr)-Total (mg/L)	<0.0010	<0.0010	0.0032	<0.0010	<0.0010
	Cobalt (Co)-Total (mg/L)	<0.00030	<0.00030	0.00046	<0.00030	<0.00030
	Copper (Cu)-Total (mg/L)	<0.0010	<0.0010	0.0016	<0.0010	<0.0010
	Iron (Fe)-Total (mg/L)	0.181	0.106	0.979	<0.030	<0.030
	Lead (Pb)-Total (mg/L)	<0.00050	<0.00050	0.00054	<0.00050	<0.00050
	Lithium (Li)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Magnesium (Mg)-Total (mg/L)	0.85	0.80	0.95	<0.10	<0.10
	Manganese (Mn)-Total (mg/L)	0.00323	0.00285	0.0163	<0.00030	<0.00030
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L816563-1	L816563-2	L816563-3	L816563-4	L816563-5
		04-SEP-09	04-SEP-09	04-SEP-09	04-SEP-09	04-SEP-09
		DC-WQ-BGW2	DC-WQ-BGE2	DC-WQ-BGE5	DC-WQ-HVH5	DC-WQ-TPE6
Grouping	Analyte					
WATER						
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Total (mg/L)	0.0054	0.0038	0.0024	0.0024	0.0024
	Potassium (K)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Silver (Ag)-Total (mg/L)	0.000021	<0.000020	<0.000020	<0.000020	<0.000020
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Tin (Sn)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Titanium (Ti)-Total (mg/L)	0.101	0.060	0.038	0.040	0.035
	Uranium (U)-Total (mg/L)	0.00102	0.00064	0.00041	0.00046	0.00040
	Vanadium (V)-Total (mg/L)	0.0035	0.0021	0.0013	0.0014	0.0012
	Zinc (Zn)-Total (mg/L)	0.0066	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	0.0234	0.0096	0.0071	0.0100	<0.0050
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Barium (Ba)-Dissolved (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Beryllium (Be)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Boron (B)-Dissolved (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017
	Calcium (Ca)-Dissolved (mg/L)	1.56	1.55	1.43	1.45	1.46
	Chromium (Cr)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Cobalt (Co)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Copper (Cu)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	<0.030	<0.030	<0.030
	Lead (Pb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Lithium (Li)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Magnesium (Mg)-Dissolved (mg/L)	0.68	0.65	0.62	0.63	0.62
	Manganese (Mn)-Dissolved (mg/L)	0.00644	0.00457	0.00280	0.00280	0.00278
	Mercury (Hg)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Potassium (K)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Selenium (Se)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Silver (Ag)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Tin (Sn)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L816563-6	L816563-7	L816563-8	L816563-9	L816563-10
		Description					
		Sampled Date	04-SEP-09	04-SEP-09	04-SEP-09	04-SEP-09	04-SEP-09
		Sampled Time					
		Client ID	DC-WQ-SP6	DC-WQ-SP8	DC-WQ-DUP	DC-WQ-EB	TRAVEL BLANKS
Grouping	Analyte						
WATER							
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Nickel (Ni)-Total (mg/L)	<0.0010	<0.0010	0.0023	<0.0010	<0.0010	
	Potassium (K)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Silver (Ag)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	
	Thallium (Tl)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
	Tin (Sn)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	0.037	<0.010	<0.010	
	Uranium (U)-Total (mg/L)	<0.00020	<0.00020	0.00039	<0.00020	<0.00020	
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	0.0012	<0.0010	<0.0010	
	Zinc (Zn)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	0.0099	<0.0050	0.0065	<0.0050		
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050		
	Arsenic (As)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050		
	Barium (Ba)-Dissolved (mg/L)	<0.020	<0.020	<0.020	<0.020		
	Beryllium (Be)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	Boron (B)-Dissolved (mg/L)	<0.10	<0.10	<0.10	<0.10		
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017	<0.000017	<0.000017	<0.000017		
	Calcium (Ca)-Dissolved (mg/L)	2.31	2.37	1.46	<0.10		
	Chromium (Cr)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	Cobalt (Co)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030		
	Copper (Cu)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	<0.030	<0.030		
	Lead (Pb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050		
	Lithium (Li)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050		
	Magnesium (Mg)-Dissolved (mg/L)	0.79	0.80	0.64	<0.10		
	Manganese (Mn)-Dissolved (mg/L)	0.00050	<0.00040	0.00311	<0.00030		
	Mercury (Hg)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020		
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	Nickel (Ni)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	Potassium (K)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0		
	Selenium (Se)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	Silver (Ag)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020		
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0		
	Thallium (Tl)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020		
	Tin (Sn)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050		
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010		
	Uranium (U)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020		
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	Zinc (Zn)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050		

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L816563-1 04-SEP-09 DC-WQ-BGW2	L816563-2 04-SEP-09 DC-WQ-BGE2	L816563-3 04-SEP-09 DC-WQ-BGE5	L816563-4 04-SEP-09 DC-WQ-HVH5	L816563-5 04-SEP-09 DC-WQ-TPE6
Grouping	Analyte					
WATER						
Plant Pigments	Chlorophyll a (ug/L)	0.484	0.387	0.466	0.548	0.554

	Sample ID	L816563-6	L816563-7	L816563-8	L816563-9	L816563-10
	Description					
	Sampled Date	04-SEP-09	04-SEP-09	04-SEP-09	04-SEP-09	04-SEP-09
	Sampled Time					
	Client ID	DC-WQ-SP6	DC-WQ-SP8	DC-WQ-DUP	DC-WQ-EB	TRAVEL BLANKS
Grouping	Analyte					
WATER						
Plant Pigments	Chlorophyll a (ug/L)	0.747	0.488	1.76		

Reference Information

Additional Comments for Sample Listed:

Samplenum	Matrix	Report Remarks	Sample Comments
Methods Listed (if applicable):			
ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
ALK-SCR-VA	Water	Alkalinity by colour or titration	EPA 310.2 OR APHA 2320
This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method. OR This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
ANIONS-BR-IC-VA	Water	Bromide by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
ANIONS-CL-IC-VA	Water	Chloride by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
ANIONS-F-IC-VA	Water	Fluoride by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
ANIONS-NO2-IC-VA	Water	Nitrite by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrite detection is by UV absorbance and not conductivity.			
ANIONS-NO3-IC-VA	Water	Nitrate by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrate detection is by UV absorbance and not conductivity.			
ANIONS-SO4-IC-VA	Water	Sulfate by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
CHLOROA-VA	Water	Chlorophyll a by Fluorometer	EPA 445.0
Chlorophyll and Pheopigments by Fluorometry analysis is carried out using procedures adapted from USEPA Method 445.0. The sample is filtered using either a glass fiber filter or a 0.45 micron Membrane filter. The pigments are extracted from the filter with 90% aqueous acetone. For chlorophyll-a analysis the extract is read using a fluorometer. For pheopigments the extract is first acidified then read. This method is not subject to interferences from chlorophyll b.			
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.			
HG-DIS-CCME-CVAFS-VA	Water	Diss. Mercury in Water by CVAFS (CCME)	EPA 3005A/245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
HG-TOT-CCME-CVAFS-VA	Water	Total Mercury in Water by CVAFS (CCME)	EPA 245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
MET-DIS-CCME-ICP-VA	Water	Diss. Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
MET-DIS-CCME-MS-VA	Water	Diss. Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
MET-TOT-CCME-ICP-VA	Water	Total Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
MET-TOT-CCME-MS-VA	Water	Total Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
NH3-SIE-VA	Water	Ammonia by SIE	APHA 4500 D. - NH3 NITROGEN (AMMONIA)

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
This analysis is carried out, on sulphuric acid preserved samples, using procedures adapted from APHA Method 4500-NH3 "Nitrogen (Ammonia)". Ammonia is determined using an ammonia selective electrode.			
PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.			
PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Colour	APHA 4500-P "Phosphorous"
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Colour	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-T-COL-VA	Water	Total Phosphate P by Color	APHA 4500-P "Phosphorous"
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-T-COL-VA	Water	Total Phosphate P by Color	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
SILICATE-COL-VA	Water	Silicate by Colourimetric analysis	APHA 4500-SiO2 D.
This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 D. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.			
TDS-VA	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.			
TKN-SIE-VA	Water	Total Kjeldahl Nitrogen by SIE	APHA 4500-Norg (TKN)

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
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This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total kjeldahl nitrogen is determined by sample digestion at 367 celcius with analysis using an ammonia selective electrode.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540 Gravimetric
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This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 "Turbidity"
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This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity
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This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

**** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies. The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:**

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
----------------------------	---------------------	----------------------------	---------------------

VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA
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GLOSSARY OF REPORT TERMS

Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency.

mg/kg (units) - unit of concentration based on mass, parts per million

mg/L (units) - unit of concentration based on volume, parts per million

N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

Short Holding Time

TKSSUE

Rush Processing

ALS Laboratory
ANALYTICAL CHEMISTRY & TESTING SERVICES
Environmental Division



Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC #

Page 1 of 1

Report to: Randy Baker				Report Format / Distribution				Service Requested:							
Company: Azimuth Consulting Group Inc.				☒ Standard ☐ Other				☒ Regular Service (Default)							
Contact: Randy Baker				☒ PDF ☐ Excel ☐ Fax				☐ Rush Service (2-3 Days)							
Address: Vancouver				Email 1: rbaker@azimuthgroup.ca				☐ Priority Service (1 Day or ASAP)							
Phone: 604-730-1220 Fax:				Email 2: gmann@azimuthgroup.ca, mmccormell@azimuthgroup.ca				☐ Emergency Service (<1 Day / Weekend) - Contact ALS							
Invoice To: ☒ Same as Report				Indicate Bottles Filled / Preserved (F/P) -->				Analysis Request							
Company:				Client / Project Information:											
Contact:				Job #:											
Address:				PO/A/E:											
Sample:				Legal Site Description:											
Phone:				Quote #: ALSEQ09-077											
Fax:				ALS Contact: Natasha MM											
Lab Work Order # (lab use only)				Sampler (includes):				M/F/A/C/Z/I							
Sample Identification (This description will appear on the report)				Date		Time		Sample Type							
#				dd-mm-yy		hh:mm		(Select from drop-down list)							
DC-WQ-BGW2 (500 ml for chlor-a)				04-Sep-09				Water		T-Metals (CCME)					
DC-WQ-BGE2 (500 ml for chlor-a)				04-Sep-09				Water		D-Metals (CCME)					
DC-WQ-BGE5 (500 ml for chlor-a)				04-Sep-09				Water		TOC, DOC					
DC-WQ-HVH5 (500 ml for chlor-a)				04-Sep-09				Water		TKN, Ammonia					
DC-WQ-TPE6 (500 ml for chlor-a)				04-Sep-09				Water		TDS, TSS-low					
DC-WQ-SP6 (1 L for chlor-a)				04-Sep-09				Water		Alk (SPECIATED)					
DC-WQ-SP8 (750 ml for chlor-a)				04-Sep-09				Water		Anion Scan, Si, pH, EC					
DC-WQ-DUP (500 ml for chlor-a)				04-Sep-09				Water		T-PO4, ortho-PO4					
DC-WQ-EB				04-Sep-09				Water		Chlorophyll-a (filters)					
Travel Blanks				04-Sep-09				Water		Turbidity					
										Hazardous?					
										Highly Contaminated?					
										Number of Containers					
Guidelines / Regulations												Special Instructions / Hazardous Details			
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.															
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the adjacent worksheet.															
Relinquished By: Ryan Hill		Date & Time: 5-Sep-09		Received By:		Date & Time: #D		Temperature		Sample Condition (lab use only) Samples Received in Good Condition? Y / N (if no provided details)					
Relinquished By:		Date & Time:		Received By:		Date & Time: 09/09/10		8:59		(2)					



Environmental Division

Certificate of Analysis

AZIMUTH CONSULTING GROUP INC.

ATTN: RANDY BAKER

218 - 2902 WEST BROADWAY

VANCOUVER BC V6K 2G8

Report Date: 29-SEP-09 17:52 (MT)

Version: FINAL

Lab Work Order #: L819453

Date Received: 17-SEP-09

Project P.O. #:

Job Reference: MEADOWBANK MINE DIKE CONSTRUCTION

Legal Site Desc:

CofC Numbers:

Other Information:

Comments:

Can Dang
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L819453-1	L819453-2	L819453-3	L819453-4	L819453-5
		11-SEP-09	11-SEP-09	11-SEP-09	11-SEP-09	11-SEP-09
		DC-WQ-BGW2	DC-WQ-BGE3	DC-WQ-BGE5	DC-WQ-HVH5	DC-WQ-SP1
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	16.8	17.3	17.0	16.8	22.9
	Hardness (as CaCO3) (mg/L)	6.1	6.5	6.4	6.2	9.4
	pH (pH)	6.82	6.92	6.91	6.92	7.31
	Total Suspended Solids (mg/L)	5.1	13.9	9.3	8.3	1.9
	Total Dissolved Solids (mg/L)	15	18	15	15	17
	Turbidity (NTU)	13.2	27.6	23.7	22.8	1.95
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	4.4	4.9	4.6	4.4	7.0
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Alkalinity, Total (as CaCO3) (mg/L)	4.4	4.9	4.6	4.4	7.0
	Ammonia as N (mg/L)	<0.020	0.024	0.023	<0.020	0.027
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	0.51	0.51	0.51	0.54	0.51
	Fluoride (F) (mg/L)	0.066	0.068	0.068	0.068	0.060
	Nitrate (as N) (mg/L)	0.0081	0.0162	0.0130	0.0130	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.326	0.151	0.145	0.152	0.159
	Ortho Phosphate as P (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Phosphate as P (mg/L)	0.0034	0.0084	0.0063	0.0068	<0.0020
	Silicate (as SiO2) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Sulfate (SO4) (mg/L)	1.51	1.51	1.51	1.55	2.17
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.31	1.07	1.13	1.18	1.50
	Total Organic Carbon (mg/L)	1.27	1.20	1.06	1.05	1.52
Total Metals	Aluminum (Al)-Total (mg/L)	0.567	0.749	0.811	0.670	0.0924
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	0.00056	0.00084	0.00081	0.00071	<0.00050
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Beryllium (Be)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017
	Calcium (Ca)-Total (mg/L)	1.42	1.55	1.55	1.51	2.36
	Chromium (Cr)-Total (mg/L)	0.0022	0.0028	0.0031	0.0025	<0.0010
	Cobalt (Co)-Total (mg/L)	0.00031	0.00049	0.00048	0.00040	<0.00030
	Copper (Cu)-Total (mg/L)	0.0011	0.0014	0.0014	0.0014	<0.0010
	Iron (Fe)-Total (mg/L)	0.674	1.06	1.03	0.857	0.121
	Lead (Pb)-Total (mg/L)	<0.00050	0.00062	0.00055	<0.00050	<0.00050
	Lithium (Li)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Magnesium (Mg)-Total (mg/L)	0.83	0.97	0.97	0.90	0.83
	Manganese (Mn)-Total (mg/L)	0.0109	0.0186	0.0171	0.0143	0.00269
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L819453-6	L819453-7	L819453-8	L819453-9	L819453-10
		11-SEP-09	11-SEP-09	11-SEP-09	11-SEP-09	11-SEP-09
		DC-WQ-SP6	DC-WQ-SP8	DC-WQ-DUP	DC-WQ-EB	TRAVEL BLANK
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	22.8	22.3	16.5	<2.0	<2.0
	Hardness (as CaCO3) (mg/L)	9.3	9.1	6.1	<1.1	<1.1
	pH (pH)	7.30	7.29	6.94	5.68	5.75
	Total Suspended Solids (mg/L)	1.3	2.9	4.9	<1.0	<1.0
	Total Dissolved Solids (mg/L)	20	16	15	<10	<10
	Turbidity (NTU)	3.09	4.27	12.2	<0.10	<0.10
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	7.1	6.9	4.6	<2.0	<2.0
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Alkalinity, Total (as CaCO3) (mg/L)	7.1	6.9	4.6	<2.0	<2.0
	Ammonia as N (mg/L)	<0.020	0.025	<0.020	<0.020	<0.020
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	0.51	0.52	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.061	0.062	0.066	<0.020	<0.020
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	0.0091	<0.0050	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.129	0.138	0.114	<0.050	<0.050
	Ortho Phosphate as P (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Phosphate as P (mg/L)	<0.0020	<0.0020	0.0039	<0.0020	<0.0020
	Silicate (as SiO2) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Sulfate (SO4) (mg/L)	2.18	2.12	1.49	<0.50	<0.50
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.52	1.39	1.42	0.60	
	Total Organic Carbon (mg/L)	1.43	1.45	1.18	<0.50	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	0.101	0.0781	0.498	<0.0050	<0.0050
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	<0.00050	<0.00050	0.00053	<0.00050	<0.00050
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Beryllium (Be)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017
	Calcium (Ca)-Total (mg/L)	2.35	2.19	1.41	<0.10	<0.10
	Chromium (Cr)-Total (mg/L)	<0.0010	<0.0010	0.0019	<0.0010	<0.0010
	Cobalt (Co)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Copper (Cu)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Iron (Fe)-Total (mg/L)	0.128	0.101	0.663	<0.030	<0.030
	Lead (Pb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Lithium (Li)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Magnesium (Mg)-Total (mg/L)	0.83	0.78	0.81	<0.10	<0.10
	Manganese (Mn)-Total (mg/L)	0.00277	0.00250	0.0108	<0.00030	<0.00030
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020

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Sample ID Description Sampled Date Sampled Time Client ID		L819453-1	L819453-2	L819453-3	L819453-4	L819453-5
		11-SEP-09	11-SEP-09	11-SEP-09	11-SEP-09	11-SEP-09
		DC-WQ-BGW2	DC-WQ-BGE3	DC-WQ-BGE5	DC-WQ-HVH5	DC-WQ-SP1
Grouping	Analyte					
WATER						
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Total (mg/L)	0.0015	0.0022	0.0023	0.0018	<0.0010
	Potassium (K)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Silver (Ag)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Tin (Sn)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Titanium (Ti)-Total (mg/L)	0.023	0.035	0.034	0.029	<0.010
	Uranium (U)-Total (mg/L)	0.00029	0.00046	0.00043	0.00038	<0.00020
	Vanadium (V)-Total (mg/L)	0.0013	0.0015	0.0014	0.0012	<0.0010
	Zinc (Zn)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	0.0061	<0.0050	<0.0050	0.0059	<0.0050
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Barium (Ba)-Dissolved (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Beryllium (Be)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Boron (B)-Dissolved (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017
	Calcium (Ca)-Dissolved (mg/L)	1.43	1.55	1.50	1.47	2.46
	Chromium (Cr)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Cobalt (Co)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Copper (Cu)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	<0.030	<0.030	<0.030
	Lead (Pb)-Dissolved (mg/L)	0.00305	<0.00050	<0.00050	<0.00050	<0.00050
	Lithium (Li)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Magnesium (Mg)-Dissolved (mg/L)	0.61	0.64	0.64	0.62	0.80
	Manganese (Mn)-Dissolved (mg/L)	0.00123	0.00311	0.00228	0.00179	<0.00030
	Mercury (Hg)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Potassium (K)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Selenium (Se)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Silver (Ag)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Tin (Sn)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

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Sample ID Description Sampled Date Sampled Time Client ID		L819453-6	L819453-7	L819453-8	L819453-9	L819453-10
		11-SEP-09	11-SEP-09	11-SEP-09	11-SEP-09	11-SEP-09
		DC-WQ-SP6	DC-WQ-SP8	DC-WQ-DUP	DC-WQ-EB	TRAVEL BLANK
Grouping	Analyte					
WATER						
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Total (mg/L)	<0.0010	<0.0010	0.0014	<0.0010	<0.0010
	Potassium (K)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Silver (Ag)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Tin (Sn)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	0.022	<0.010	<0.010
	Uranium (U)-Total (mg/L)	<0.00020	<0.00020	0.00028	<0.00020	<0.00020
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	<0.0050	0.0072	0.0060	<0.0050	
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Arsenic (As)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Barium (Ba)-Dissolved (mg/L)	<0.020	<0.020	<0.020	<0.020	
	Beryllium (Be)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Boron (B)-Dissolved (mg/L)	<0.10	<0.10	<0.10	<0.10	
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017	<0.000017	<0.000017	<0.000017	
	Calcium (Ca)-Dissolved (mg/L)	2.41	2.35	1.44	<0.10	
	Chromium (Cr)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Cobalt (Co)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	
	Copper (Cu)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	<0.030	<0.030	
	Lead (Pb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Lithium (Li)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	
	Magnesium (Mg)-Dissolved (mg/L)	0.80	0.79	0.62	<0.10	
	Manganese (Mn)-Dissolved (mg/L)	<0.00030	0.00036	0.00132	<0.00030	
	Mercury (Hg)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Nickel (Ni)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Potassium (K)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	
	Selenium (Se)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Silver (Ag)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	
	Thallium (Tl)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	
	Tin (Sn)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
	Uranium (U)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Zinc (Zn)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	

		Sample ID	L819453-1	L819453-2	L819453-3	L819453-4	L819453-5
		Description					
		Sampled Date	11-SEP-09	11-SEP-09	11-SEP-09	11-SEP-09	11-SEP-09
		Sampled Time					
		Client ID	DC-WQ-BGW2	DC-WQ-BGE3	DC-WQ-BGE5	DC-WQ-HVH5	DC-WQ-SP1
Grouping	Analyte						
WATER							
Plant Pigments	Chlorophyll a (ug/L)	0.474	0.352	0.362	0.401	0.448	

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Sample ID Description Sampled Date Sampled Time Client ID		L819453-6	L819453-7	L819453-8	L819453-9	L819453-10
		11-SEP-09	11-SEP-09	11-SEP-09	11-SEP-09	11-SEP-09
		DC-WQ-SP6	DC-WQ-SP8	DC-WQ-DUP	DC-WQ-EB	TRAVEL BLANK
Grouping	Analyte					
WATER						
Plant Pigments	Chlorophyll a (ug/L)	0.462	0.536	0.484		

Reference Information

Additional Comments for Sample Listed:

Samplenum	Matrix	Report Remarks	Sample Comments
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Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
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ALK-SCR-VA

Water

Alkalinity by colour or titration

EPA 310.2 OR APHA 2320

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

OR

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

ANIONS-BR-IC-VA

Water

Bromide by Ion Chromatography

APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-CL-IC-VA

Water

Chloride by Ion Chromatography

APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-F-IC-VA

Water

Fluoride by Ion Chromatography

APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-NO2-IC-VA

Water

Nitrite by Ion Chromatography

APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrite detection is by UV absorbance and not conductivity.

ANIONS-NO3-IC-VA

Water

Nitrate by Ion Chromatography

APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrate detection is by UV absorbance and not conductivity.

ANIONS-SO4-IC-VA

Water

Sulfate by Ion Chromatography

APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

CARBONS-DOC-VA

Water

Dissolved organic carbon by combustion

APHA 5310 "TOTAL ORGANIC CARBON (TOC)"

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-DOC-VA

Water

Dissolved organic carbon by combustion

APHA 5310 TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA

Water

Total organic carbon by combustion

APHA 5310 "TOTAL ORGANIC CARBON (TOC)"

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CARBONS-TOC-VA

Water

Total organic carbon by combustion

APHA 5310 TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
CHLOROA-VA	Water	Chlorophyll a by Fluorometer	EPA 445.0
Chlorophyll and Pheopigments by Fluorometry analysis is carried out using procedures adapted from USEPA Method 445.0. The sample is filtered using either a glass fiber filter or a 0.45 micron Membrane filter. The pigments are extracted from the filter with 90% aqueous acetone. For chlorophyll-a analysis the extract is read using a fluorometer. For pheopigments the extract is first acidified then read. This method is not subject to interferences from chlorophyll b.			
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.			
HG-DIS-CCME-CVAFS-VA	Water	Diss. Mercury in Water by CVAFS (CCME)	EPA 3005A/245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
HG-TOT-CCME-CVAFS-VA	Water	Total Mercury in Water by CVAFS (CCME)	EPA 245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
MET-DIS-CCME-ICP-VA	Water	Diss. Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
MET-DIS-CCME-MS-VA	Water	Diss. Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
MET-TOT-CCME-ICP-VA	Water	Total Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
MET-TOT-CCME-MS-VA	Water	Total Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
NH3-SIE-VA	Water	Ammonia by SIE	APHA 4500 D. - NH3 NITROGEN (AMMONIA)

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
This analysis is carried out, on sulphuric acid preserved samples, using procedures adapted from APHA Method 4500-NH3 "Nitrogen (Ammonia)". Ammonia is determined using an ammonia selective electrode.			
PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.			
PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Colour	APHA 4500-P "Phosphorous"
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Colour	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-T-COL-VA	Water	Total Phosphate P by Color	APHA 4500-P "Phosphorous"
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-T-COL-VA	Water	Total Phosphate P by Color	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
SILICATE-COL-VA	Water	Silicate by Colourimetric analysis	APHA 4500-SiO2 D.
This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 D. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.			
TDS-VA	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.			
TKN-SIE-VA	Water	Total Kjeldahl Nitrogen by SIE	APHA 4500-Norg (TKN)

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
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This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total kjeldahl nitrogen is determined by sample digestion at 367 celcius with analysis using an ammonia selective electrode.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540 Gravimetric
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This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 "Turbidity"
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This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity
---------------------	-------	--------------------	---------------------

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

**** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies. The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:**

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
----------------------------	---------------------	----------------------------	---------------------

VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA
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GLOSSARY OF REPORT TERMS

Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency.

mg/kg (units) - unit of concentration based on mass, parts per million

mg/L (units) - unit of concentration based on volume, parts per million

N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

Short Holding Time

Rush Processing

Environmental Division



Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC #

Page 1 of 1

Report to: Randy Baker		Report Format / Distribution		Service Requested:	
Company: Azimuth Consulting Group Inc.		☒ Standard ☐ PDF ☐ Excel ☐ Fax		☒ Regular Service (Default) ☐ Rush Service (2-3 Days) ☐ Priority Service (1 Day or ASAP) ☐ Emergency Service (< 1 Day / Weekend) - Contact ALS	
Contact: Randy Baker		Email 1: rbaker@azimuthgroup.ca			
Address: Vancouver		Email 2: gmann@azimuthgroup.ca, mmccormell@azimuthgroup.ca			
Phone: 604-730-1220 Fax:					
Invoice To: ☒ Same as Report		Indicate Bottles: Filled / Preserved (F/P) -->			
Company:		Client / Project Information:			
Contact:		Job #:		Meadowbank Mine DIKE CONSTRUCTION	
Address:		PO/AFE:			
Sample:		Legal Site Description:			
Phone:		Quote #: ALSEQ09-077			
Fax:		ALS Contact: Natasha MM		Sampler (Initials) SH/NW/RT	
Lab Work Order # (lab use only) 1819453		Date		Time	
Sample #		Sample Identification (This description will appear on the report)		Sample Type (Select from drop-down list)	
DC-WQ-BGW2		(500 ml for chlor-a)		Water	
DC-WQ-BGE3		(500 ml for chlor-a)		Water	
DC-WQ-BGE5		(250 ml for chlor-a)		Water	
DC-WQ-HVH5		(500 ml for chlor-a)		Water	
DC-WQ-SP1		(500 ml for chlor-a)		Water	
DC-WQ-SP6		(750 for chlor-a)		Water	
DC-WQ-SP8		(500 ml for chlor-a)		Water	
DC-WQ-DUP		(500 ml for chlor-a)		Water	
DC-WQ-EB				Water	
Travel Blanks		11-Sep-09		Water	
Guidelines / Regulations					
Special Instructions / Hazardous Details					
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the adjacent worksheet.					
Relinquished By:	Ryan Hill	Date & Time:	18 Sep 13/09	Received By:	THD
Relinquished By:		Date & Time:		Received By:	09/09/17
		Date & Time:		Date & Time:	0857
		Temperature	16	Sample Condition (lab use only) Samples Received in Good Condition? Y / N (if no provided details)	



Environmental Division

Certificate of Analysis

AZIMUTH CONSULTING GROUP INC.

ATTN: RANDY BAKER

218 - 2902 WEST BROADWAY

VANCOUVER BC V6K 2G8

Report Date: 14-OCT-09 18:32 (MT)

Version: FINAL

Lab Work Order #: L824494

Date Received: 29-SEP-09

Project P.O. #:

Job Reference: MEADOWBANK MINE BG-EAS

Legal Site Desc:

CofC Numbers:

Other Information:

Comments:

Natasha Markovic-Mirovic
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L824494-1	L824494-2	L824494-3	L824494-4	L824494-5
		Description					
		Sampled Date	17-SEP-09	17-SEP-09	17-SEP-09	17-SEP-09	17-SEP-09
		Sampled Time					
		Client ID	EAS-TPS-1	EAS-TPS-2	EAS-TPS-3	EAS-TPS-4	EAS-TPS-5
Grouping	Analyte						
WATER							
Physical Tests	Conductivity (uS/cm)	14.9					
	Hardness (as CaCO3) (mg/L)	4.9					
	pH (pH)	6.88					
	Total Suspended Solids (mg/L)	1.0					
	Total Dissolved Solids (mg/L)	15					
	Turbidity (NTU)	0.30					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	3.7					
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0					
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0					
	Alkalinity, Total (as CaCO3) (mg/L)	3.7					
	Ammonia as N (mg/L)	0.094					
	Bromide (Br) (mg/L)	<0.050					
	Chloride (Cl) (mg/L)	0.55					
	Fluoride (F) (mg/L)	0.055					
	Nitrate (as N) (mg/L)	<0.0050					
	Nitrite (as N) (mg/L)	<0.0010					
	Total Kjeldahl Nitrogen (mg/L)	0.128					
	Ortho Phosphate as P (mg/L)	<0.0010					
	Total Phosphate as P (mg/L)	<0.0020					
	Silicate (as SiO2) (mg/L)	<1.0					
	Sulfate (SO4) (mg/L)	1.44					
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.22					
	Total Organic Carbon (mg/L)	1.21					
Total Metals	Aluminum (Al)-Total (mg/L)	0.0075					
	Antimony (Sb)-Total (mg/L)	<0.00050					
	Arsenic (As)-Total (mg/L)	<0.00050					
	Barium (Ba)-Total (mg/L)	<0.020					
	Beryllium (Be)-Total (mg/L)	<0.0010					
	Boron (B)-Total (mg/L)	<0.10					
	Cadmium (Cd)-Total (mg/L)	<0.000017					
	Calcium (Ca)-Total (mg/L)	1.17					
	Chromium (Cr)-Total (mg/L)	<0.0010					
	Cobalt (Co)-Total (mg/L)	<0.00030					
	Copper (Cu)-Total (mg/L)	0.0013					
	Iron (Fe)-Total (mg/L)	<0.030					
	Lead (Pb)-Total (mg/L)	<0.00050					
	Lithium (Li)-Total (mg/L)	<0.0050					
	Magnesium (Mg)-Total (mg/L)	0.53					
	Manganese (Mn)-Total (mg/L)	0.00070					
	Mercury (Hg)-Total (mg/L)	<0.000020					

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L824494-6	L824494-7	L824494-8	L824494-9	L824494-10
		Description					
		Sampled Date	18-SEP-09	18-SEP-09	18-SEP-09	18-SEP-09	18-SEP-09
		Sampled Time					
		Client ID	EAS-DT-1	EAS-DT-2	EAS-DT-3	EAS-DT-4	EAS-DT-5
Grouping	Analyte						
WATER							
Physical Tests	Conductivity (uS/cm)	27.1					
	Hardness (as CaCO3) (mg/L)	11.2					
	pH (pH)	6.95					
	Total Suspended Solids (mg/L)	<1.0					
	Total Dissolved Solids (mg/L)	12					
	Turbidity (NTU)	0.42					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	8.9					
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0					
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0					
	Alkalinity, Total (as CaCO3) (mg/L)	8.9					
	Ammonia as N (mg/L)	0.104					
	Bromide (Br) (mg/L)	<0.050					
	Chloride (Cl) (mg/L)	0.52					
	Fluoride (F) (mg/L)	0.050					
	Nitrate (as N) (mg/L)	<0.0050					
	Nitrite (as N) (mg/L)	<0.0010					
	Total Kjeldahl Nitrogen (mg/L)	0.163					
	Ortho Phosphate as P (mg/L)	<0.0010					
	Total Phosphate as P (mg/L)	<0.0020					
	Silicate (as SiO2) (mg/L)	<1.0					
	Sulfate (SO4) (mg/L)	2.67					
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.64					
	Total Organic Carbon (mg/L)	1.68					
Total Metals	Aluminum (Al)-Total (mg/L)	0.0097					
	Antimony (Sb)-Total (mg/L)	<0.00050					
	Arsenic (As)-Total (mg/L)	<0.00050					
	Barium (Ba)-Total (mg/L)	<0.020					
	Beryllium (Be)-Total (mg/L)	<0.0010					
	Boron (B)-Total (mg/L)	<0.10					
	Cadmium (Cd)-Total (mg/L)	<0.000017					
	Calcium (Ca)-Total (mg/L)	2.97					
	Chromium (Cr)-Total (mg/L)	<0.0010					
	Cobalt (Co)-Total (mg/L)	<0.00030					
	Copper (Cu)-Total (mg/L)	<0.0010					
	Iron (Fe)-Total (mg/L)	<0.030					
	Lead (Pb)-Total (mg/L)	<0.00050					
	Lithium (Li)-Total (mg/L)	<0.0050					
	Magnesium (Mg)-Total (mg/L)	0.92					
	Manganese (Mn)-Total (mg/L)	0.00081					
	Mercury (Hg)-Total (mg/L)	<0.000020					

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L824494-11	L824494-12	L824494-13	L824494-14	L824494-15
		Description					
		Sampled Date	18-SEP-09	18-SEP-09	18-SEP-09	18-SEP-09	18-SEP-09
		Sampled Time					
		Client ID	EAS-BGW-1	EAS-BGW-2	EAS-BGW-3	EAS-BGW-4	EAS-BGW-5
Grouping	Analyte						
WATER							
Physical Tests	Conductivity (uS/cm)	16.9					
	Hardness (as CaCO3) (mg/L)	6.0					
	pH (pH)	7.00					
	Total Suspended Solids (mg/L)	5.8					
	Total Dissolved Solids (mg/L)	10					
	Turbidity (NTU)	9.47					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	4.9					
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0					
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0					
	Alkalinity, Total (as CaCO3) (mg/L)	4.9					
	Ammonia as N (mg/L)	0.066					
	Bromide (Br) (mg/L)	<0.050					
	Chloride (Cl) (mg/L)	0.50					
	Fluoride (F) (mg/L)	0.062					
	Nitrate (as N) (mg/L)	0.0112					
	Nitrite (as N) (mg/L)	<0.0010					
	Total Kjeldahl Nitrogen (mg/L)	0.080					
	Ortho Phosphate as P (mg/L)	<0.0010					
	Total Phosphate as P (mg/L)	0.0039					
	Silicate (as SiO2) (mg/L)	<1.0					
	Sulfate (SO4) (mg/L)	1.45					
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.16					
	Total Organic Carbon (mg/L)	1.06					
Total Metals	Aluminum (Al)-Total (mg/L)	0.414					
	Antimony (Sb)-Total (mg/L)	<0.00050					
	Arsenic (As)-Total (mg/L)	0.00054					
	Barium (Ba)-Total (mg/L)	<0.020					
	Beryllium (Be)-Total (mg/L)	<0.0010					
	Boron (B)-Total (mg/L)	<0.10					
	Cadmium (Cd)-Total (mg/L)	<0.000017					
	Calcium (Ca)-Total (mg/L)	1.42					
	Chromium (Cr)-Total (mg/L)	0.0017					
	Cobalt (Co)-Total (mg/L)	<0.00030					
	Copper (Cu)-Total (mg/L)	0.0010					
	Iron (Fe)-Total (mg/L)	0.540					
	Lead (Pb)-Total (mg/L)	<0.00050					
	Lithium (Li)-Total (mg/L)	<0.0050					
	Magnesium (Mg)-Total (mg/L)	0.76					
	Manganese (Mn)-Total (mg/L)	0.00942					
	Mercury (Hg)-Total (mg/L)	<0.000020					

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L824494-16	L824494-17	L824494-18	L824494-19	L824494-20
		Description					
		Sampled Date	19-SEP-09	19-SEP-09	19-SEP-09	19-SEP-09	19-SEP-09
		Sampled Time					
		Client ID	EAS-SPC-1	EAS-SPC-2	EAS-SPC-3	EAS-SPC-4	EAS-SPC-5
Grouping	Analyte						
WATER							
Physical Tests	Conductivity (uS/cm)	23.1					
	Hardness (as CaCO3) (mg/L)	9.2					
	pH (pH)	6.77					
	Total Suspended Solids (mg/L)	1.8					
	Total Dissolved Solids (mg/L)	11					
	Turbidity (NTU)	2.06					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	6.9					
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0					
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0					
	Alkalinity, Total (as CaCO3) (mg/L)	6.9					
	Ammonia as N (mg/L)	0.020					
	Bromide (Br) (mg/L)	<0.050					
	Chloride (Cl) (mg/L)	0.59					
	Fluoride (F) (mg/L)	0.056					
	Nitrate (as N) (mg/L)	<0.0050					
	Nitrite (as N) (mg/L)	<0.0010					
	Total Kjeldahl Nitrogen (mg/L)	0.080					
	Ortho Phosphate as P (mg/L)	<0.0010					
	Total Phosphate as P (mg/L)	<0.0020					
	Silicate (as SiO2) (mg/L)	<1.0					
	Sulfate (SO4) (mg/L)	2.19					
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.54					
	Total Organic Carbon (mg/L)	1.47					
Total Metals	Aluminum (Al)-Total (mg/L)	0.0709					
	Antimony (Sb)-Total (mg/L)	<0.00050					
	Arsenic (As)-Total (mg/L)	<0.00050					
	Barium (Ba)-Total (mg/L)	<0.020					
	Beryllium (Be)-Total (mg/L)	<0.0010					
	Boron (B)-Total (mg/L)	<0.10					
	Cadmium (Cd)-Total (mg/L)	<0.000017					
	Calcium (Ca)-Total (mg/L)	2.41					
	Chromium (Cr)-Total (mg/L)	<0.0010					
	Cobalt (Co)-Total (mg/L)	<0.00030					
	Copper (Cu)-Total (mg/L)	<0.0010					
	Iron (Fe)-Total (mg/L)	0.087					
	Lead (Pb)-Total (mg/L)	<0.00050					
	Lithium (Li)-Total (mg/L)	<0.0050					
	Magnesium (Mg)-Total (mg/L)	0.82					
	Manganese (Mn)-Total (mg/L)	0.00210					
	Mercury (Hg)-Total (mg/L)	<0.000020					

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L824494-21	L824494-22	L824494-23	L824494-24	L824494-25
		Description					
		Sampled Date	18-SEP-09	18-SEP-09	18-SEP-09	18-SEP-09	18-SEP-09
		Sampled Time					
		Client ID	EAS-BGE-1	EAS-BGE-2	EAS-BGE-3	EAS-BGE-4	EAS-BGE-5
Grouping	Analyte						
WATER							
Physical Tests	Conductivity (uS/cm)	16.8					
	Hardness (as CaCO3) (mg/L)	6.1					
	pH (pH)	6.91					
	Total Suspended Solids (mg/L)	8.6					
	Total Dissolved Solids (mg/L)	<10					
	Turbidity (NTU)	12.5					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	4.4					
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0					
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0					
	Alkalinity, Total (as CaCO3) (mg/L)	4.4					
	Ammonia as N (mg/L)	0.092					
	Bromide (Br) (mg/L)	<0.050					
	Chloride (Cl) (mg/L)	0.58					
	Fluoride (F) (mg/L)	0.067					
	Nitrate (as N) (mg/L)	0.0141					
	Nitrite (as N) (mg/L)	<0.0010					
	Total Kjeldahl Nitrogen (mg/L)	0.083					
	Ortho Phosphate as P (mg/L)	<0.0010					
	Total Phosphate as P (mg/L)	0.0058					
	Silicate (as SiO2) (mg/L)	<1.0					
	Sulfate (SO4) (mg/L)	1.51					
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.08					
	Total Organic Carbon (mg/L)	1.11					
Total Metals	Aluminum (Al)-Total (mg/L)	0.513					
	Antimony (Sb)-Total (mg/L)	<0.00050					
	Arsenic (As)-Total (mg/L)	0.00061					
	Barium (Ba)-Total (mg/L)	<0.020					
	Beryllium (Be)-Total (mg/L)	<0.0010					
	Boron (B)-Total (mg/L)	<0.10					
	Cadmium (Cd)-Total (mg/L)	<0.000017					
	Calcium (Ca)-Total (mg/L)	1.44					
	Chromium (Cr)-Total (mg/L)	0.0021					
	Cobalt (Co)-Total (mg/L)	0.00032					
	Copper (Cu)-Total (mg/L)	0.0013					
	Iron (Fe)-Total (mg/L)	0.664					
	Lead (Pb)-Total (mg/L)	<0.00050					
	Lithium (Li)-Total (mg/L)	<0.0050					
	Magnesium (Mg)-Total (mg/L)	0.79					
	Manganese (Mn)-Total (mg/L)	0.0119					
	Mercury (Hg)-Total (mg/L)	<0.000020					

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID				
Description		L824494-26	L824494-27	L824494-28	L824494-29	
Sampled Date		19-SEP-09	19-SEP-09	19-SEP-09	19-SEP-09	
Sampled Time						
Client ID		EAS-DUP 1	EAS-DUP 2	TRAVEL BLANK	EAS-EQ-1	
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	27.0		<2.0	<2.0	
	Hardness (as CaCO3) (mg/L)	11.2		<1.1	<1.1	
	pH (pH)	6.83		5.70	5.71	
	Total Suspended Solids (mg/L)	<1.0		<1.0	<1.0	
	Total Dissolved Solids (mg/L)	12		<10	<10	
	Turbidity (NTU)	0.46		<0.10	0.14	
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	8.7		<2.0	<2.0	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0		<2.0	<2.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0		<2.0	<2.0	
	Alkalinity, Total (as CaCO3) (mg/L)	8.7		<2.0	<2.0	
	Ammonia as N (mg/L)	0.049		<0.020	0.047	
	Bromide (Br) (mg/L)	<0.050		<0.050	<0.050	
	Chloride (Cl) (mg/L)	0.50		<0.50	<0.50	
	Fluoride (F) (mg/L)	0.053		<0.020	<0.020	
	Nitrate (as N) (mg/L)	<0.0050		<0.0050	<0.0050	
	Nitrite (as N) (mg/L)	<0.0010		<0.0010	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	0.082		<0.050	<0.050	
	Ortho Phosphate as P (mg/L)	<0.0010		<0.0010	<0.0010	
	Total Phosphate as P (mg/L)	0.0022		<0.0020	<0.0020	
	Silicate (as SiO2) (mg/L)	<1.0		<1.0	<1.0	
	Sulfate (SO4) (mg/L)	2.67		<0.50	<0.50	
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.73			<0.50	
	Total Organic Carbon (mg/L)	1.70		<0.50	<0.50	
Total Metals	Aluminum (Al)-Total (mg/L)	0.0114		<0.0050	<0.0050	
	Antimony (Sb)-Total (mg/L)	<0.00050		<0.00050	<0.00050	
	Arsenic (As)-Total (mg/L)	<0.00050		<0.00050	<0.00050	
	Barium (Ba)-Total (mg/L)	<0.020		<0.020	<0.020	
	Beryllium (Be)-Total (mg/L)	<0.0010		<0.0010	<0.0010	
	Boron (B)-Total (mg/L)	<0.10		<0.10	<0.10	
	Cadmium (Cd)-Total (mg/L)	<0.000017		<0.000017	<0.000017	
	Calcium (Ca)-Total (mg/L)	2.98		<0.10	<0.10	
	Chromium (Cr)-Total (mg/L)	<0.0010		<0.0010	<0.0010	
	Cobalt (Co)-Total (mg/L)	<0.00030		<0.00030	<0.00030	
	Copper (Cu)-Total (mg/L)	<0.0010		<0.0010	<0.0010	
	Iron (Fe)-Total (mg/L)	<0.030		<0.030	<0.030	
	Lead (Pb)-Total (mg/L)	<0.00050		<0.00050	<0.00050	
	Lithium (Li)-Total (mg/L)	<0.0050		<0.0050	<0.0050	
	Magnesium (Mg)-Total (mg/L)	0.93		<0.10	<0.10	
	Manganese (Mn)-Total (mg/L)	0.00086		<0.00030	<0.00030	
	Mercury (Hg)-Total (mg/L)	<0.000020		<0.000020	<0.000020	

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		Sample ID	L824494-1	L824494-2	L824494-3	L824494-4	L824494-5
		Description					
		Sampled Date	17-SEP-09	17-SEP-09	17-SEP-09	17-SEP-09	17-SEP-09
		Sampled Time					
		Client ID	EAS-TPS-1	EAS-TPS-2	EAS-TPS-3	EAS-TPS-4	EAS-TPS-5
Grouping	Analyte						
WATER							
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010					
	Nickel (Ni)-Total (mg/L)	<0.0010					
	Potassium (K)-Total (mg/L)	<2.0					
	Selenium (Se)-Total (mg/L)	<0.0010					
	Silver (Ag)-Total (mg/L)	<0.000020					
	Sodium (Na)-Total (mg/L)	<2.0					
	Thallium (Tl)-Total (mg/L)	<0.00020					
	Tin (Sn)-Total (mg/L)	<0.00050					
	Titanium (Ti)-Total (mg/L)	<0.010					
	Uranium (U)-Total (mg/L)	<0.00020					
	Vanadium (V)-Total (mg/L)	<0.0010					
	Zinc (Zn)-Total (mg/L)	<0.0050					
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	<0.0050					
	Antimony (Sb)-Dissolved (mg/L)	<0.00050					
	Arsenic (As)-Dissolved (mg/L)	<0.00050					
	Barium (Ba)-Dissolved (mg/L)	<0.020					
	Beryllium (Be)-Dissolved (mg/L)	<0.0010					
	Boron (B)-Dissolved (mg/L)	<0.10					
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017					
	Calcium (Ca)-Dissolved (mg/L)	1.14					
	Chromium (Cr)-Dissolved (mg/L)	<0.0010					
	Cobalt (Co)-Dissolved (mg/L)	<0.00030					
	Copper (Cu)-Dissolved (mg/L)	<0.0010					
	Iron (Fe)-Dissolved (mg/L)	<0.030					
	Lead (Pb)-Dissolved (mg/L)	<0.00050					
	Lithium (Li)-Dissolved (mg/L)	<0.0050					
	Magnesium (Mg)-Dissolved (mg/L)	0.51					
	Manganese (Mn)-Dissolved (mg/L)	<0.00030					
	Mercury (Hg)-Dissolved (mg/L)	<0.000020					
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010					
	Nickel (Ni)-Dissolved (mg/L)	<0.0010					
	Potassium (K)-Dissolved (mg/L)	<2.0					
	Selenium (Se)-Dissolved (mg/L)	<0.0010					
	Silver (Ag)-Dissolved (mg/L)	<0.000020					
	Sodium (Na)-Dissolved (mg/L)	<2.0					
	Thallium (Tl)-Dissolved (mg/L)	<0.00020					
	Tin (Sn)-Dissolved (mg/L)	<0.00050					
	Titanium (Ti)-Dissolved (mg/L)	<0.010					
	Uranium (U)-Dissolved (mg/L)	<0.00020					
	Vanadium (V)-Dissolved (mg/L)	<0.0010					
	Zinc (Zn)-Dissolved (mg/L)	<0.0050					

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		Sample ID	L824494-6	L824494-7	L824494-8	L824494-9	L824494-10
		Description					
		Sampled Date	18-SEP-09	18-SEP-09	18-SEP-09	18-SEP-09	18-SEP-09
		Sampled Time					
		Client ID	EAS-DT-1	EAS-DT-2	EAS-DT-3	EAS-DT-4	EAS-DT-5
Grouping	Analyte						
WATER							
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010					
	Nickel (Ni)-Total (mg/L)	<0.0010					
	Potassium (K)-Total (mg/L)	<2.0					
	Selenium (Se)-Total (mg/L)	<0.0010					
	Silver (Ag)-Total (mg/L)	<0.000020					
	Sodium (Na)-Total (mg/L)	<2.0					
	Thallium (Tl)-Total (mg/L)	<0.00020					
	Tin (Sn)-Total (mg/L)	<0.00050					
	Titanium (Ti)-Total (mg/L)	<0.010					
	Uranium (U)-Total (mg/L)	<0.00020					
	Vanadium (V)-Total (mg/L)	<0.0010					
	Zinc (Zn)-Total (mg/L)	<0.0050					
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	<0.0050					
	Antimony (Sb)-Dissolved (mg/L)	<0.00050					
	Arsenic (As)-Dissolved (mg/L)	<0.00050					
	Barium (Ba)-Dissolved (mg/L)	<0.020					
	Beryllium (Be)-Dissolved (mg/L)	<0.0010					
	Boron (B)-Dissolved (mg/L)	<0.10					
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017					
	Calcium (Ca)-Dissolved (mg/L)	2.96					
	Chromium (Cr)-Dissolved (mg/L)	<0.0010					
	Cobalt (Co)-Dissolved (mg/L)	<0.00030					
	Copper (Cu)-Dissolved (mg/L)	<0.0010					
	Iron (Fe)-Dissolved (mg/L)	<0.030					
	Lead (Pb)-Dissolved (mg/L)	<0.00050					
	Lithium (Li)-Dissolved (mg/L)	<0.0050					
	Magnesium (Mg)-Dissolved (mg/L)	0.92					
	Manganese (Mn)-Dissolved (mg/L)	0.00041					
	Mercury (Hg)-Dissolved (mg/L)	<0.000020					
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010					
	Nickel (Ni)-Dissolved (mg/L)	<0.0010					
	Potassium (K)-Dissolved (mg/L)	<2.0					
	Selenium (Se)-Dissolved (mg/L)	<0.0010					
	Silver (Ag)-Dissolved (mg/L)	<0.000020					
	Sodium (Na)-Dissolved (mg/L)	<2.0					
	Thallium (Tl)-Dissolved (mg/L)	<0.00020					
	Tin (Sn)-Dissolved (mg/L)	<0.00050					
	Titanium (Ti)-Dissolved (mg/L)	<0.010					
	Uranium (U)-Dissolved (mg/L)	<0.00020					
	Vanadium (V)-Dissolved (mg/L)	<0.0010					
	Zinc (Zn)-Dissolved (mg/L)	<0.0050					

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		Sample ID	L824494-11	L824494-12	L824494-13	L824494-14	L824494-15
		Description					
		Sampled Date	18-SEP-09	18-SEP-09	18-SEP-09	18-SEP-09	18-SEP-09
		Sampled Time					
		Client ID	EAS-BGW-1	EAS-BGW-2	EAS-BGW-3	EAS-BGW-4	EAS-BGW-5
Grouping	Analyte						
WATER							
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010					
	Nickel (Ni)-Total (mg/L)	0.0013					
	Potassium (K)-Total (mg/L)	<2.0					
	Selenium (Se)-Total (mg/L)	<0.0010					
	Silver (Ag)-Total (mg/L)	0.000036					
	Sodium (Na)-Total (mg/L)	<2.0					
	Thallium (Tl)-Total (mg/L)	<0.00020					
	Tin (Sn)-Total (mg/L)	<0.00050					
	Titanium (Ti)-Total (mg/L)	0.019					
	Uranium (U)-Total (mg/L)	0.00026					
	Vanadium (V)-Total (mg/L)	<0.0010					
	Zinc (Zn)-Total (mg/L)	<0.0050					
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	<0.0050					
	Antimony (Sb)-Dissolved (mg/L)	<0.00050					
	Arsenic (As)-Dissolved (mg/L)	<0.00050					
	Barium (Ba)-Dissolved (mg/L)	<0.020					
	Beryllium (Be)-Dissolved (mg/L)	<0.0010					
	Boron (B)-Dissolved (mg/L)	<0.10					
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017					
	Calcium (Ca)-Dissolved (mg/L)	1.43					
	Chromium (Cr)-Dissolved (mg/L)	<0.0010					
	Cobalt (Co)-Dissolved (mg/L)	<0.00030					
	Copper (Cu)-Dissolved (mg/L)	<0.0010					
	Iron (Fe)-Dissolved (mg/L)	<0.030					
	Lead (Pb)-Dissolved (mg/L)	<0.00050					
	Lithium (Li)-Dissolved (mg/L)	<0.0050					
	Magnesium (Mg)-Dissolved (mg/L)	0.60					
	Manganese (Mn)-Dissolved (mg/L)	0.00090					
	Mercury (Hg)-Dissolved (mg/L)	<0.000020					
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010					
	Nickel (Ni)-Dissolved (mg/L)	<0.0010					
	Potassium (K)-Dissolved (mg/L)	<2.0					
	Selenium (Se)-Dissolved (mg/L)	<0.0010					
	Silver (Ag)-Dissolved (mg/L)	<0.000020					
	Sodium (Na)-Dissolved (mg/L)	<2.0					
	Thallium (Tl)-Dissolved (mg/L)	<0.00020					
	Tin (Sn)-Dissolved (mg/L)	<0.00050					
	Titanium (Ti)-Dissolved (mg/L)	<0.010					
	Uranium (U)-Dissolved (mg/L)	<0.00020					
	Vanadium (V)-Dissolved (mg/L)	<0.0010					
	Zinc (Zn)-Dissolved (mg/L)	<0.0050					

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		Sample ID	L824494-16	L824494-17	L824494-18	L824494-19	L824494-20
		Description					
		Sampled Date	19-SEP-09	19-SEP-09	19-SEP-09	19-SEP-09	19-SEP-09
		Sampled Time					
		Client ID	EAS-SPC-1	EAS-SPC-2	EAS-SPC-3	EAS-SPC-4	EAS-SPC-5
Grouping	Analyte						
WATER							
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010					
	Nickel (Ni)-Total (mg/L)	<0.0010					
	Potassium (K)-Total (mg/L)	<2.0					
	Selenium (Se)-Total (mg/L)	<0.0010					
	Silver (Ag)-Total (mg/L)	<0.000020					
	Sodium (Na)-Total (mg/L)	<2.0					
	Thallium (Tl)-Total (mg/L)	<0.00020					
	Tin (Sn)-Total (mg/L)	<0.00050					
	Titanium (Ti)-Total (mg/L)	<0.010					
	Uranium (U)-Total (mg/L)	<0.00020					
	Vanadium (V)-Total (mg/L)	<0.0010					
	Zinc (Zn)-Total (mg/L)	<0.0050					
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	<0.0050					
	Antimony (Sb)-Dissolved (mg/L)	<0.00050					
	Arsenic (As)-Dissolved (mg/L)	<0.00050					
	Barium (Ba)-Dissolved (mg/L)	<0.020					
	Beryllium (Be)-Dissolved (mg/L)	<0.0010					
	Boron (B)-Dissolved (mg/L)	<0.10					
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017					
	Calcium (Ca)-Dissolved (mg/L)	2.40					
	Chromium (Cr)-Dissolved (mg/L)	<0.0010					
	Cobalt (Co)-Dissolved (mg/L)	<0.00030					
	Copper (Cu)-Dissolved (mg/L)	<0.0010					
	Iron (Fe)-Dissolved (mg/L)	<0.030					
	Lead (Pb)-Dissolved (mg/L)	<0.00050					
	Lithium (Li)-Dissolved (mg/L)	<0.0050					
	Magnesium (Mg)-Dissolved (mg/L)	0.78					
	Manganese (Mn)-Dissolved (mg/L)	<0.00030					
	Mercury (Hg)-Dissolved (mg/L)	<0.000020					
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010					
	Nickel (Ni)-Dissolved (mg/L)	<0.0010					
	Potassium (K)-Dissolved (mg/L)	<2.0					
	Selenium (Se)-Dissolved (mg/L)	<0.0010					
	Silver (Ag)-Dissolved (mg/L)	<0.000020					
	Sodium (Na)-Dissolved (mg/L)	<2.0					
	Thallium (Tl)-Dissolved (mg/L)	<0.00020					
	Tin (Sn)-Dissolved (mg/L)	<0.00050					
	Titanium (Ti)-Dissolved (mg/L)	<0.010					
	Uranium (U)-Dissolved (mg/L)	<0.00020					
	Vanadium (V)-Dissolved (mg/L)	<0.0010					
	Zinc (Zn)-Dissolved (mg/L)	<0.0050					

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		Sample ID	L824494-21	L824494-22	L824494-23	L824494-24	L824494-25
		Description					
		Sampled Date	18-SEP-09	18-SEP-09	18-SEP-09	18-SEP-09	18-SEP-09
		Sampled Time					
		Client ID	EAS-BGE-1	EAS-BGE-2	EAS-BGE-3	EAS-BGE-4	EAS-BGE-5
Grouping	Analyte						
WATER							
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010					
	Nickel (Ni)-Total (mg/L)	0.0016					
	Potassium (K)-Total (mg/L)	<2.0					
	Selenium (Se)-Total (mg/L)	<0.0010					
	Silver (Ag)-Total (mg/L)	0.000040					
	Sodium (Na)-Total (mg/L)	<2.0					
	Thallium (Tl)-Total (mg/L)	<0.00020					
	Tin (Sn)-Total (mg/L)	<0.00050					
	Titanium (Ti)-Total (mg/L)	0.022					
	Uranium (U)-Total (mg/L)	0.00031					
	Vanadium (V)-Total (mg/L)	<0.0010					
	Zinc (Zn)-Total (mg/L)	<0.0050					
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	0.0053					
	Antimony (Sb)-Dissolved (mg/L)	<0.00050					
	Arsenic (As)-Dissolved (mg/L)	<0.00050					
	Barium (Ba)-Dissolved (mg/L)	<0.020					
	Beryllium (Be)-Dissolved (mg/L)	<0.0010					
	Boron (B)-Dissolved (mg/L)	<0.10					
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017					
	Calcium (Ca)-Dissolved (mg/L)	1.43					
	Chromium (Cr)-Dissolved (mg/L)	<0.0010					
	Cobalt (Co)-Dissolved (mg/L)	<0.00030					
	Copper (Cu)-Dissolved (mg/L)	<0.0010					
	Iron (Fe)-Dissolved (mg/L)	<0.030					
	Lead (Pb)-Dissolved (mg/L)	<0.00050					
	Lithium (Li)-Dissolved (mg/L)	<0.0050					
	Magnesium (Mg)-Dissolved (mg/L)	0.60					
	Manganese (Mn)-Dissolved (mg/L)	0.00125					
	Mercury (Hg)-Dissolved (mg/L)	<0.000020					
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010					
	Nickel (Ni)-Dissolved (mg/L)	<0.0010					
	Potassium (K)-Dissolved (mg/L)	<2.0					
	Selenium (Se)-Dissolved (mg/L)	<0.0010					
	Silver (Ag)-Dissolved (mg/L)	<0.000020					
	Sodium (Na)-Dissolved (mg/L)	<2.0					
	Thallium (Tl)-Dissolved (mg/L)	<0.00020					
	Tin (Sn)-Dissolved (mg/L)	<0.00050					
	Titanium (Ti)-Dissolved (mg/L)	<0.010					
	Uranium (U)-Dissolved (mg/L)	<0.00020					
	Vanadium (V)-Dissolved (mg/L)	<0.0010					
	Zinc (Zn)-Dissolved (mg/L)	<0.0050					

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		Sample ID	L824494-26	L824494-27	L824494-28	L824494-29	
		Description					
		Sampled Date	19-SEP-09	19-SEP-09	19-SEP-09	19-SEP-09	
		Sampled Time					
		Client ID	EAS-DUP 1	EAS-DUP 2	TRAVEL BLANK	EAS-EQ-1	
Grouping	Analyte						
WATER							
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010			<0.0010	<0.0010	
	Nickel (Ni)-Total (mg/L)	<0.0010			<0.0010	<0.0010	
	Potassium (K)-Total (mg/L)	<2.0			<2.0	<2.0	
	Selenium (Se)-Total (mg/L)	<0.0010			<0.0010	<0.0010	
	Silver (Ag)-Total (mg/L)	<0.000020			<0.000020	<0.000020	
	Sodium (Na)-Total (mg/L)	<2.0			<2.0	<2.0	
	Thallium (Tl)-Total (mg/L)	<0.00020			<0.00020	<0.00020	
	Tin (Sn)-Total (mg/L)	<0.00050			<0.00050	<0.00050	
	Titanium (Ti)-Total (mg/L)	<0.010			<0.010	<0.010	
	Uranium (U)-Total (mg/L)	<0.00020			<0.00020	<0.00020	
	Vanadium (V)-Total (mg/L)	<0.0010			<0.0010	<0.0010	
	Zinc (Zn)-Total (mg/L)	<0.0050			<0.0050	<0.0050	
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	<0.0050				<0.0050	
	Antimony (Sb)-Dissolved (mg/L)	<0.00050				<0.00050	
	Arsenic (As)-Dissolved (mg/L)	<0.00050				<0.00050	
	Barium (Ba)-Dissolved (mg/L)	<0.020				<0.020	
	Beryllium (Be)-Dissolved (mg/L)	<0.0010				<0.0010	
	Boron (B)-Dissolved (mg/L)	<0.10				<0.10	
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017				<0.000017	
	Calcium (Ca)-Dissolved (mg/L)	2.97				<0.10	
	Chromium (Cr)-Dissolved (mg/L)	<0.0010				<0.0010	
	Cobalt (Co)-Dissolved (mg/L)	<0.00030				<0.00030	
	Copper (Cu)-Dissolved (mg/L)	<0.0010				<0.0010	
	Iron (Fe)-Dissolved (mg/L)	<0.030				<0.030	
	Lead (Pb)-Dissolved (mg/L)	<0.00050				<0.00050	
	Lithium (Li)-Dissolved (mg/L)	<0.0050				<0.0050	
	Magnesium (Mg)-Dissolved (mg/L)	0.93				<0.10	
	Manganese (Mn)-Dissolved (mg/L)	0.00031				<0.00030	
	Mercury (Hg)-Dissolved (mg/L)	<0.000020				<0.000020	
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010				<0.0010	
	Nickel (Ni)-Dissolved (mg/L)	<0.0010				<0.0010	
	Potassium (K)-Dissolved (mg/L)	<2.0				<2.0	
	Selenium (Se)-Dissolved (mg/L)	<0.0010				<0.0010	
	Silver (Ag)-Dissolved (mg/L)	<0.000020				<0.000020	
	Sodium (Na)-Dissolved (mg/L)	<2.0				<2.0	
	Thallium (Tl)-Dissolved (mg/L)	<0.00020				<0.00020	
	Tin (Sn)-Dissolved (mg/L)	<0.00050				<0.00050	
	Titanium (Ti)-Dissolved (mg/L)	<0.010				<0.010	
	Uranium (U)-Dissolved (mg/L)	<0.00020				<0.00020	
	Vanadium (V)-Dissolved (mg/L)	<0.0010				<0.0010	
	Zinc (Zn)-Dissolved (mg/L)	<0.0050				<0.0050	

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Sample ID Description Sampled Date Sampled Time Client ID		L824494-1	L824494-2	L824494-3	L824494-4	L824494-5
		17-SEP-09	17-SEP-09	17-SEP-09	17-SEP-09	17-SEP-09
		EAS-TPS-1	EAS-TPS-2	EAS-TPS-3	EAS-TPS-4	EAS-TPS-5
Grouping	Analyte					
WATER						
Plant Pigments	Chlorophyll a (ug/L)	0.159	0.306	0.238	0.351	0.366

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		Sample ID Description Sampled Date Sampled Time Client ID	L824494-6 18-SEP-09 EAS-DT-1	L824494-7 18-SEP-09 EAS-DT-2	L824494-8 18-SEP-09 EAS-DT-3	L824494-9 18-SEP-09 EAS-DT-4	L824494-10 18-SEP-09 EAS-DT-5
Grouping	Analyte						
WATER							
Plant Pigments	Chlorophyll a (ug/L)		0.331	0.246	0.336	0.566	0.500

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Sample ID Description Sampled Date Sampled Time Client ID		L824494-11	L824494-12	L824494-13	L824494-14	L824494-15
		18-SEP-09	18-SEP-09	18-SEP-09	18-SEP-09	18-SEP-09
		EAS-BGW-1	EAS-BGW-2	EAS-BGW-3	EAS-BGW-4	EAS-BGW-5
Grouping	Analyte					
WATER						
Plant Pigments	Chlorophyll a (ug/L)	0.308	0.267	0.238	0.095	0.179

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L824494-16	L824494-17	L824494-18	L824494-19	L824494-20
		19-SEP-09	19-SEP-09	19-SEP-09	19-SEP-09	19-SEP-09
		EAS-SPC-1	EAS-SPC-2	EAS-SPC-3	EAS-SPC-4	EAS-SPC-5
Grouping	Analyte					
WATER						
Plant Pigments	Chlorophyll a (ug/L)	0.448	0.391	0.345	0.307	0.295

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L824494-21	L824494-22	L824494-23	L824494-24	L824494-25
		Description					
		Sampled Date	18-SEP-09	18-SEP-09	18-SEP-09	18-SEP-09	18-SEP-09
		Sampled Time					
		Client ID	EAS-BGE-1	EAS-BGE-2	EAS-BGE-3	EAS-BGE-4	EAS-BGE-5
Grouping	Analyte						
WATER							
Plant Pigments	Chlorophyll a (ug/L)	0.268	0.253	0.388	0.306	0.286	

		Sample ID Description Sampled Date Sampled Time Client ID	L824494-26 19-SEP-09 EAS-DUP 1	L824494-27 19-SEP-09 EAS-DUP 2	L824494-28 19-SEP-09 TRAVEL BLANK	L824494-29 19-SEP-09 EAS-EQ-1	
Grouping	Analyte						
WATER							
Plant Pigments	Chlorophyll a (ug/L)		0.334	0.466			

Reference Information

Additional Comments for Sample Listed:

Samplenum	Matrix	Report Remarks	Sample Comments
Methods Listed (if applicable):			
ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
ALK-SCR-VA	Water	Alkalinity by colour or titration	EPA 310.2 OR APHA 2320
This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method. OR This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
ANIONS-BR-IC-VA	Water	Bromide by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
ANIONS-CL-IC-VA	Water	Chloride by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
ANIONS-F-IC-VA	Water	Fluoride by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
ANIONS-NO2-IC-VA	Water	Nitrite by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrite detection is by UV absorbance and not conductivity.			
ANIONS-NO3-IC-VA	Water	Nitrate by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrate detection is by UV absorbance and not conductivity.			
ANIONS-SO4-IC-VA	Water	Sulfate by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
CHLOROA-VA	Water	Chlorophyll a by Fluorometer	EPA 445.0
Chlorophyll and Pheopigments by Fluorometry analysis is carried out using procedures adapted from USEPA Method 445.0. The sample is filtered using either a glass fiber filter or a 0.45 micron Membrane filter. The pigments are extracted from the filter with 90% aqueous acetone. For chlorophyll-a analysis the extract is read using a fluorometer. For pheopigments the extract is first acidified then read. This method is not subject to interferences from chlorophyll b.			
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.			
HG-DIS-CCME-CVAFS-VA	Water	Diss. Mercury in Water by CVAFS (CCME)	EPA 3005A/245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
HG-TOT-CCME-CVAFS-VA	Water	Total Mercury in Water by CVAFS (CCME)	EPA 245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
MET-DIS-CCME-ICP-VA	Water	Diss. Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
MET-DIS-CCME-MS-VA	Water	Diss. Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
MET-TOT-CCME-ICP-VA	Water	Total Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
MET-TOT-CCME-MS-VA	Water	Total Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
NH3-SIE-VA	Water	Ammonia by SIE	APHA 4500 D. - NH3 NITROGEN (AMMONIA)

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
This analysis is carried out, on sulphuric acid preserved samples, using procedures adapted from APHA Method 4500-NH3 "Nitrogen (Ammonia)". Ammonia is determined using an ammonia selective electrode.			
PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.			
PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Colour	APHA 4500-P "Phosphorous"
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Colour	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-T-COL-VA	Water	Total Phosphate P by Color	APHA 4500-P "Phosphorous"
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-T-COL-VA	Water	Total Phosphate P by Color	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
SILICATE-COL-VA	Water	Silicate by Colourimetric analysis	APHA 4500-SiO2 D.
This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 D. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.			
TDS-VA	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.			
TKN-SIE-VA	Water	Total Kjeldahl Nitrogen by SIE	APHA 4500-Norg (TKN)

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
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This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total kjeldahl nitrogen is determined by sample digestion at 367 celcius with analysis using an ammonia selective electrode.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540 Gravimetric
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This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 "Turbidity"
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This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity
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This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

**** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies. The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:**

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
----------------------------	---------------------	----------------------------	---------------------

VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA
----	---

GLOSSARY OF REPORT TERMS

Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency.

mg/kg (units) - unit of concentration based on mass, parts per million

mg/L (units) - unit of concentration based on volume, parts per million

N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

Short Holding Time

Rush Processing



Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC #

Page 1 of 3

Report to: Randy Baker		Report Format / Distribution		Service Requested:	
Company: Azimuth Consulting Group Inc.		☒ Standard ☐ Other ☒ PDF ☒ Excel ☐ Fax		☒ Regular Service (Default) ☐ Rush Service (2-3 Days) ☐ Priority Service (1 Day or ASAP) ☐ Emergency Service (<1 Day / Weekend) - Contact ALS	
Contact: Randy Baker		Email 1: rbaker@azimuthgroup.ca			
Address: Vancouver		Email 2: gmann@azimuthgroup.ca, rmmccormell@azimuthgroup.ca			
Phone: 604-730-1220 Fax:		Indicate Bottles: Filtered / Preserved (F/P) -->		Analysis Request	
Invoice To: ☒ Same as Report		Client / Project Information:			
Company:		Job #:			
Contact:		PO/A/E:			
Address:		Legal Site Description:			
Sample		Quote #: ALSEQ09-077			
Phone:		ALS Contact: Natasha MM			
Lab Work Order # (lab use only) 1504494		Sampler (Initials)		SH/NW/RT	
Sample #		Date		Time	
(This description will appear on the report)		dd-mm-yy		hh:mm	
				(Select from drop-down list)	
EAS-TPS-1		17-Sep-09		Water	
EAS-TPS-2		17-Sep-09		Water	
EAS-TPS-3		17-Sep-09		Water	
EAS-TPS-4		17-Sep-09		Water	
EAS-TPS-5		17-Sep-09		Water	
EAS-DT-1		18-Sep-09		Water	
EAS-DT-2		18-Sep-09		Water	
EAS-DT-3		18-Sep-09		Water	
EAS-DT-4		18-Sep-09		Water	
EAS-DT-5		18-Sep-09		Water	
Guidelines / Regulations		Special Instructions / Hazardous Details			
		1L filtered for chlor-a unless otherwise noted.			
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the adjacent worksheet.					
Reinquired By:	Gay Mann	Date & Time:	19-Sep-09	Received By:	<i>[Signature]</i>
Reinquired By:		Date & Time:		Received By:	<i>[Signature]</i>
Temperature		14		Sample Condition (lab use only)	
				Samples Received in Good Condition? Y / N (if no provided details)	



Report to: Randy Baker				Report Format / Distribution				Service Requested:			
Company: Azimuth Consulting Group Inc.				☒ Standard ☐ Other				☒ Regular Service (Default)			
Contact: Randy Baker				☒ PDF ☐ Excel ☐ Fax				☐ Rush Service (2-3 Days)			
Address: Vancouver				Email 1: rbaker@azimuthgroup.ca				☐ Priority Service (1 Day or ASAP)			
Phone: 604-730-1220 Fax: _____				Email 2: gmann@azimuthgroup.ca, mmccomnell@azimuthgroup.ca				☐ Emergency Service (<1 Day / Weekend) - Contact ALS			
Invoice To: ☒ Same as Report				Indicate Bottles: Filtered / Preserved (F/P) →				Analysis Request			
Company:				Client / Project Information:							
Contact:				Job #:				Meadowbank Mine BG-EAS			
Address:				PO/A/E:							
Sample				Legal Site Description:							
Phone: _____ Fax: _____				Quote #: ALSEQ09-077							
Lab Work Order # (lab use only) <u>15824494</u>				ALS Contact: Natasha MM		Sampler (Initials):		SH/NW/RT			
Sample #	Sample Identification (This description will appear on the report)	Date dd-mm-yy	Time hh:mm	Sample Type (Select from drop-down list)							
EAS-BGW-1	(500 ml filtered for chlor-a)	18-Sep-09		Water		T-Metals (CCME) ☒					
EAS-BGW-2	(500 ml filtered for chlor-a)	18-Sep-09		Water		D-Metals (CCME) ☒					
EAS-BGW-3	(500 ml filtered for chlor-a)	18-Sep-09		Water		TOC, DOC ☒					
EAS-BGW-4	(500 ml filtered for chlor-a)	18-Sep-09		Water		TKN, Ammonia ☒					
EAS-BGW-5	(500 ml filtered for chlor-a)	18-Sep-09		Water		TDS, TSS-low ☒					
EAS-SPC-1	(500 ml filtered for chlor-a)	19-Sep-09		Water		Alk (SPECIATED) ☒					
EAS-SPC-2	(500 ml filtered for chlor-a)	19-Sep-09		Water		Anion Scan, Si, pH, EC ☒					
EAS-SPC-3	(500 ml filtered for chlor-a)	19-Sep-09		Water		T-PO4, ortho-PO4 ☒					
EAS-SPC-4	(500 ml filtered for chlor-a)	19-Sep-09		Water		Chlorophyll-a (filters) ☒					
EAS-SPC-5	(500 ml filtered for chlor-a)	19-Sep-09		Water		Turbidity ☒					
Guidelines / Regulations						Hazardous Details					
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the adjacent worksheet.											
Relinquished By: Gary Mann	Date & Time: 19-Sep-09	Received By: <u>[Signature]</u>	Date & Time: 09/29/09 11:46	Temperature: <u>14</u>		Sample Condition (lab use only) Samples Received in Good Condition? Y / N (if no provided details)					
Relinquished By: _____	Date & Time: _____	Received By: _____	Date & Time: _____	_____		_____					



Report to: Randy Baker				Report Format / Distribution				Service Requested:			
Company: Azimuth Consulting Group Inc.				☒ Standard ☐ Other ☒ PDF ☐ Excel ☐ Fax				☒ Regular Service (Default) ☐ Rush Service (2-3 Days) ☐ Priority Service (1 Day or ASAP) ☐ Emergency Service (<1 Day / Weekend) - Contact ALS			
Contact: Randy Baker				Email 1: rbaker@azimuthgroup.ca							
Address: Vancouver				Email 2: gmann@azimuthgroup.ca, mmccormell@azimuthgroup.ca							
Phone: 604-730-1220 Fax:											
Invoice To: ☒ Same as Report				Indicate Bottles: Filtered / Preserved (F/P) → Client / Project Information:							
Company:				Job #:				Meadowbank Mine BG-EAS			
Contact:				PO/AFE:							
Address:				Legal Site Description:							
Sample:				Quote #: ALSEQ09-077							
Phone:				ALS Contract:							
Lab Work Order # (lab use only) 18024494				Natashe MM		Sampler (initials)		SH/NW/RT			
Sample #		Sample Identification (This description will appear on the report)		Date		Time		Sample Type (Select from drop-down list)			
EAS-BGE-1		(500 ml filtered for chlor-a)		18-Sep-09		dd-mm-yy		Water		☒ T-Metals (CCME) ☒ D-Metals (CCME) ☒ TOC, DOC ☒ TKN, Ammonia ☒ TDS, TSS-low ☒ Alk (SPECIATED) ☒ Anion Scan, Si, pH, EC ☒ T-PO4, ortho-PO4 ☒ Chlorophyll-a (filters) ☒ Turbidity ☐ Hazardous? ☐ Highly Contaminated? ☐ Number of Containers	
EAS-BGE-2		(500 ml filtered for chlor-a)		18-Sep-09				Water			
EAS-BGE-3		(250 ml filtered for chlor-a)		18-Sep-09				Water			
EAS-BGE-4		(250 ml filtered for chlor-a)		18-Sep-09				Water			
EAS-BGE-5		(250 ml filtered for chlor-a)		18-Sep-09				Water			
EAS-DUP1				19-Sep-09				Water			
EAS-DUP2		(500 ml filtered for chlor-a)		19-Sep-09				Water			
TRAVEL BLANK				19-Sep-09				Water			
EAS-EQ-1				19-Sep-09				Water			
Guidelines / Regulations											
Special Instructions / Hazardous Details											
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the adjacent worksheet.											
Relinquished By: Gary Mann		Date & Time: 19-Sep-09		Received By: [Signature]		Date & Time: 09/09/09 11:40		Temperature: 14		Sample Condition (lab use only) Samples Received in Good Condition? Y / N (if no provided details)	



Environmental Division

Certificate of Analysis

AZIMUTH CONSULTING GROUP INC.

ATTN: RANDY BAKER

218 - 2902 WEST BROADWAY

VANCOUVER BC V6K 2G8

Report Date: 15-OCT-09 16:05 (MT)

Version: FINAL

Lab Work Order #: L826904

Date Received: 06-OCT-09

Project P.O. #:

Job Reference: MEADOWBANK MINE BG-EAS

Legal Site Desc:

CofC Numbers:

Other Information:

Comments:


Lindsay Jones
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L826904-1	L826904-2	L826904-3	L826904-4	L826904-5
		Description					
		Sampled Date	27-SEP-09	27-SEP-09	27-SEP-09	27-SEP-09	27-SEP-09
		Sampled Time					
		Client ID	EAS-TPS-1	EAS-TPS-2	EAS-TPS-3	EAS-TPS-4	EAS-TPS-5
Grouping	Analyte						
WATER							
Physical Tests	Conductivity (uS/cm)	15.1					
	Hardness (as CaCO3) (mg/L)	5.3					
	pH (pH)	6.92					
	Total Suspended Solids (mg/L)	<1.0					
	Total Dissolved Solids (mg/L)	<10					
	Turbidity (NTU)	0.53					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	4.2					
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0					
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0					
	Alkalinity, Total (as CaCO3) (mg/L)	4.2					
	Ammonia as N (mg/L)	0.024					
	Bromide (Br) (mg/L)	<0.050					
	Chloride (Cl) (mg/L)	<0.50					
	Fluoride (F) (mg/L)	0.040					
	Nitrate (as N) (mg/L)	<0.0050					
	Nitrite (as N) (mg/L)	<0.0010					
	Total Kjeldahl Nitrogen (mg/L)	0.070					
	Ortho Phosphate as P (mg/L)	<0.0010					
	Total Phosphate as P (mg/L)	<0.0020					
	Silicate (as SiO2) (mg/L)	<1.0					
	Sulfate (SO4) (mg/L)	1.14					
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	4.45					
	Total Organic Carbon (mg/L)	1.31 *					
Total Metals	Aluminum (Al)-Total (mg/L)	0.0147					
	Antimony (Sb)-Total (mg/L)	<0.00050					
	Arsenic (As)-Total (mg/L)	<0.00050					
	Barium (Ba)-Total (mg/L)	<0.020					
	Beryllium (Be)-Total (mg/L)	<0.0010					
	Boron (B)-Total (mg/L)	<0.10					
	Cadmium (Cd)-Total (mg/L)	<0.000017					
	Calcium (Ca)-Total (mg/L)	1.20					
	Chromium (Cr)-Total (mg/L)	<0.0010					
	Cobalt (Co)-Total (mg/L)	<0.00030					
	Copper (Cu)-Total (mg/L)	<0.0010					
	Iron (Fe)-Total (mg/L)	0.031					
	Lead (Pb)-Total (mg/L)	<0.00050					
	Lithium (Li)-Total (mg/L)	<0.0050					
	Magnesium (Mg)-Total (mg/L)	0.57					
	Manganese (Mn)-Total (mg/L)	0.00109					
	Mercury (Hg)-Total (mg/L)	<0.000020					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L826904-1	L826904-2	L826904-3	L826904-4	L826904-5
		Description					
		Sampled Date	27-SEP-09	27-SEP-09	27-SEP-09	27-SEP-09	27-SEP-09
		Sampled Time					
		Client ID	EAS-TPS-1	EAS-TPS-2	EAS-TPS-3	EAS-TPS-4	EAS-TPS-5
Grouping	Analyte						
WATER							
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010					
	Nickel (Ni)-Total (mg/L)	<0.0010					
	Potassium (K)-Total (mg/L)	<2.0					
	Selenium (Se)-Total (mg/L)	<0.0010					
	Silver (Ag)-Total (mg/L)	<0.000020					
	Sodium (Na)-Total (mg/L)	<2.0					
	Thallium (Tl)-Total (mg/L)	<0.00020					
	Tin (Sn)-Total (mg/L)	<0.00050					
	Titanium (Ti)-Total (mg/L)	<0.010					
	Uranium (U)-Total (mg/L)	<0.00020					
	Vanadium (V)-Total (mg/L)	<0.0010					
	Zinc (Zn)-Total (mg/L)	<0.0050					
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	<0.0050					
	Antimony (Sb)-Dissolved (mg/L)	<0.00050					
	Arsenic (As)-Dissolved (mg/L)	<0.00050					
	Barium (Ba)-Dissolved (mg/L)	<0.020					
	Beryllium (Be)-Dissolved (mg/L)	<0.0010					
	Boron (B)-Dissolved (mg/L)	<0.10					
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017					
	Calcium (Ca)-Dissolved (mg/L)	1.19					
	Chromium (Cr)-Dissolved (mg/L)	<0.0010					
	Cobalt (Co)-Dissolved (mg/L)	<0.00030					
	Copper (Cu)-Dissolved (mg/L)	<0.0010					
	Iron (Fe)-Dissolved (mg/L)	<0.030					
	Lead (Pb)-Dissolved (mg/L)	<0.00050					
	Lithium (Li)-Dissolved (mg/L)	<0.0050					
	Magnesium (Mg)-Dissolved (mg/L)	0.56					
	Manganese (Mn)-Dissolved (mg/L)	0.00031					
	Mercury (Hg)-Dissolved (mg/L)	<0.000020					
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010					
	Nickel (Ni)-Dissolved (mg/L)	<0.0010					
	Potassium (K)-Dissolved (mg/L)	<2.0					
	Selenium (Se)-Dissolved (mg/L)	<0.0010					
	Silver (Ag)-Dissolved (mg/L)	<0.000020					
	Sodium (Na)-Dissolved (mg/L)	<2.0					
	Thallium (Tl)-Dissolved (mg/L)	<0.00020					
	Tin (Sn)-Dissolved (mg/L)	<0.00050					
	Titanium (Ti)-Dissolved (mg/L)	<0.010					
	Uranium (U)-Dissolved (mg/L)	<0.00020					
	Vanadium (V)-Dissolved (mg/L)	<0.0010					
	Zinc (Zn)-Dissolved (mg/L)	<0.0050					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L826904-1	L826904-2	L826904-3	L826904-4	L826904-5
		27-SEP-09	27-SEP-09	27-SEP-09	27-SEP-09	27-SEP-09
		EAS-TPS-1	EAS-TPS-2	EAS-TPS-3	EAS-TPS-4	EAS-TPS-5
Grouping	Analyte					
WATER						
Plant Pigments	Chlorophyll a (ug/L)	0.728	0.750	0.780	0.778	0.734

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Additional Comments for Sample Listed:

Samplenum	Matrix	Report Remarks	Sample Comment:
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Qualifiers for Individual Parameters Listed:

Qualifier	Description
RRV	Reported Result Verified By Repeat Analysis

Samples with Qualifiers for Individual Parameters as listed above:

Sample Number	Client Sample ID	Parameters	Qualifier
L826904-1	EAS-TPS-1	Total Organic Carbon	RRV

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
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ALK-SCR-VA Water Alkalinity by colour or titration EPA 310.2 OR APHA 2320

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

OR

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

ANIONS-BR-IC-VA Water Bromide by Ion Chromatography APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-CL-IC-VA Water Chloride by Ion Chromatography APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-F-IC-VA Water Fluoride by Ion Chromatography APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-NO2-IC-VA Water Nitrite by Ion Chromatography APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrite detection is by UV absorbance and not conductivity.

ANIONS-NO3-IC-VA Water Nitrate by Ion Chromatography APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrate detection is by UV absorbance and not conductivity.

ANIONS-SO4-IC-VA Water Sulfate by Ion Chromatography APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

CARBONS-DOC-VA Water Dissolved organic carbon by combustion APHA 5310 "TOTAL ORGANIC CARBON (TOC)"

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-DOC-VA Water Dissolved organic carbon by combustion APHA 5310 TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CHLOROA-VA	Water	Chlorophyll a by Fluorometer	EPA 445.0
Chlorophyll and Pheopigments by Fluorometry analysis is carried out using procedures adapted from USEPA Method 445.0. The sample is filtered using either a glass fiber filter or a 0.45 micron Membrane filter. The pigments are extracted from the filter with 90% aqueous acetone. For chlorophyll-a analysis the extract is read using a fluorometer. For pheopigments the extract is first acidified then read. This method is not subject to interferences from chlorophyll b.			
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.			
HG-DIS-CCME-CVAFS-VA	Water	Diss. Mercury in Water by CVAFS (CCME)	EPA 3005A/245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
HG-TOT-CCME-CVAFS-VA	Water	Total Mercury in Water by CVAFS (CCME)	EPA 245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
MET-DIS-CCME-ICP-VA	Water	Diss. Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
MET-DIS-CCME-MS-VA	Water	Diss. Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
MET-TOT-CCME-ICP-VA	Water	Total Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
MET-TOT-CCME-MS-VA	Water	Total Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
NH3-SIE-VA	Water	Ammonia by SIE	APHA 4500 D. - NH3 NITROGEN (AMMONIA)
This analysis is carried out, on sulphuric acid preserved samples, using procedures adapted from APHA Method 4500-NH3 "Nitrogen (Ammonia)". Ammonia is determined using an ammonia selective electrode.			
PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.			
PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.			
PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Colour	APHA 4500-P "Phosphorous"
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Colour	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-T-COL-VA	Water	Total Phosphate P by Color	APHA 4500-P "Phosphorous"
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-T-COL-VA	Water	Total Phosphate P by Color	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
SILICATE-COL-VA	Water	Silicate by Colourimetric analysis	APHA 4500-SiO2 D.
This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 D. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.			
TDS-VA	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.			
TKN-SIE-VA	Water	Total Kjeldahl Nitrogen by SIE	APHA 4500-Norg (TKN)
This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total kjeldahl nitrogen is determined by			

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
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sample digestion at 367 celcius with analysis using an ammonia selective electrode.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540 Gravimetric
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This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 "Turbidity"
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This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity
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This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

**** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies. The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:**

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA		

GLOSSARY OF REPORT TERMS

Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency.

mg/kg (units) - unit of concentration based on mass, parts per million

mg/L (units) - unit of concentration based on volume, parts per million

N/A - Result not available. Refer to qualifier code and definition for explanation

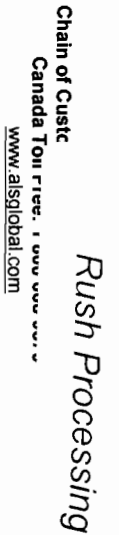
Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES
Environmental Division



Page 1 of 1

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Environmental Division

Certificate of Analysis

AZIMUTH CONSULTING GROUP INC.

ATTN: RANDY BAKER

218 - 2902 WEST BROADWAY

VANCOUVER BC V6K 2G8

Report Date: 20-OCT-09 15:16 (MT)

Version: FINAL

Lab Work Order #: L826912

Date Received: 06-OCT-09

Project P.O. #:

Job Reference: MEADOWBANK MINE BG-EAS

Legal Site Desc:

CofC Numbers:

Other Information:

Comments:


Lindsay Jones
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L826912-1	L826912-2	L826912-3	L826912-4	L826912-5
		24-SEP-09	26-SEP-09	26-SEP-09	26-SEP-09	26-SEP-09
		EAS-DT-1	EAS-DT-2	EAS-DT-3	EAS-DT-4	EAS-DT-5
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	27.0				
	Hardness (as CaCO3) (mg/L)	11.3				
	pH (pH)	7.67				
	Total Suspended Solids (mg/L)	<1.0				
	Total Dissolved Solids (mg/L)	12				
	Turbidity (NTU)	0.49				
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	8.5				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0				
	Alkalinity, Total (as CaCO3) (mg/L)	8.5				
	Ammonia as N (mg/L)	<0.020				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	0.73				
	Fluoride (F) (mg/L)	0.038				
	Nitrate (as N) (mg/L)	<0.0050				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	0.118				
	Ortho Phosphate as P (mg/L)	<0.0010				
	Total Phosphate as P (mg/L)	<0.0020				
	Silicate (as SiO2) (mg/L)	<1.0				
	Sulfate (SO4) (mg/L)	2.40				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.73				
	Total Organic Carbon (mg/L)	1.80				
Total Metals	Aluminum (Al)-Total (mg/L)	0.0166				
	Antimony (Sb)-Total (mg/L)	<0.00050				
	Arsenic (As)-Total (mg/L)	<0.00050				
	Barium (Ba)-Total (mg/L)	<0.020				
	Beryllium (Be)-Total (mg/L)	<0.0010				
	Boron (B)-Total (mg/L)	<0.10				
	Cadmium (Cd)-Total (mg/L)	<0.000017				
	Calcium (Ca)-Total (mg/L)	2.96				
	Chromium (Cr)-Total (mg/L)	<0.0010				
	Cobalt (Co)-Total (mg/L)	<0.00030				
	Copper (Cu)-Total (mg/L)	<0.0010				
	Iron (Fe)-Total (mg/L)	<0.030				
	Lead (Pb)-Total (mg/L)	<0.00050				
	Lithium (Li)-Total (mg/L)	<0.0050				
	Magnesium (Mg)-Total (mg/L)	0.94				
	Manganese (Mn)-Total (mg/L)	0.00092				
	Mercury (Hg)-Total (mg/L)	<0.000020				

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L826912-6	L826912-7	L826912-8	L826912-9	L826912-10
		24-SEP-09	24-SEP-09	24-SEP-09	24-SEP-09	24-SEP-09
		EAS-BGW-1	EAS-BGW-2	EAS-BGW-3	EAS-BGW-4	EAS-BGW-5
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	17.0				
	Hardness (as CaCO3) (mg/L)	6.4				
	pH (pH)	6.97				
	Total Suspended Solids (mg/L)	9.1				
	Total Dissolved Solids (mg/L)	10				
	Turbidity (NTU)	11.2				
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	4.5				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0				
	Alkalinity, Total (as CaCO3) (mg/L)	4.5				
	Ammonia as N (mg/L)	<0.020				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	<0.50				
	Fluoride (F) (mg/L)	0.047				
	Nitrate (as N) (mg/L)	0.0095				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	0.095				
	Ortho Phosphate as P (mg/L)	<0.0010				
	Total Phosphate as P (mg/L)	0.0064				
	Silicate (as SiO2) (mg/L)	<1.0				
	Sulfate (SO4) (mg/L)	1.27				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.30				
	Total Organic Carbon (mg/L)	1.08				
Total Metals	Aluminum (Al)-Total (mg/L)	0.269				
	Antimony (Sb)-Total (mg/L)	<0.00050				
	Arsenic (As)-Total (mg/L)	<0.00050				
	Barium (Ba)-Total (mg/L)	<0.020				
	Beryllium (Be)-Total (mg/L)	<0.0010				
	Boron (B)-Total (mg/L)	<0.10				
	Cadmium (Cd)-Total (mg/L)	<0.000017				
	Calcium (Ca)-Total (mg/L)	1.56				
	Chromium (Cr)-Total (mg/L)	0.0013				
	Cobalt (Co)-Total (mg/L)	<0.00030				
	Copper (Cu)-Total (mg/L)	<0.0010				
	Iron (Fe)-Total (mg/L)	0.461				
	Lead (Pb)-Total (mg/L)	<0.00050				
	Lithium (Li)-Total (mg/L)	<0.0050				
	Magnesium (Mg)-Total (mg/L)	0.77				
	Manganese (Mn)-Total (mg/L)	0.00741				
	Mercury (Hg)-Total (mg/L)	<0.000020				

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L826912-11	L826912-12	L826912-13	L826912-14	L826912-15
		Description					
		Sampled Date	26-SEP-09	26-SEP-09	26-SEP-09	26-SEP-09	26-SEP-09
		Sampled Time					
		Client ID	EAS-SPC-1	EAS-SPC-2	EAS-SPC-3	EAS-SPC-4	EAS-SPC-5
Grouping	Analyte						
WATER							
Physical Tests	Conductivity (uS/cm)	23.0					
	Hardness (as CaCO3) (mg/L)	9.4					
	pH (pH)	7.41					
	Total Suspended Solids (mg/L)	1.3					
	Total Dissolved Solids (mg/L)	<10					
	Turbidity (NTU)	2.70					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	7.6					
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0					
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0					
	Alkalinity, Total (as CaCO3) (mg/L)	7.6					
	Ammonia as N (mg/L)	<0.020					
	Bromide (Br) (mg/L)	<0.050					
	Chloride (Cl) (mg/L)	<0.50					
	Fluoride (F) (mg/L)	0.042					
	Nitrate (as N) (mg/L)	<0.0050					
	Nitrite (as N) (mg/L)	<0.0010					
	Total Kjeldahl Nitrogen (mg/L)	0.126					
	Ortho Phosphate as P (mg/L)	<0.0010					
	Total Phosphate as P (mg/L)	0.0030					
	Silicate (as SiO2) (mg/L)	<1.0					
	Sulfate (SO4) (mg/L)	1.91					
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.60					
	Total Organic Carbon (mg/L)	1.47					
Total Metals	Aluminum (Al)-Total (mg/L)	0.0976					
	Antimony (Sb)-Total (mg/L)	<0.00050					
	Arsenic (As)-Total (mg/L)	<0.00050					
	Barium (Ba)-Total (mg/L)	<0.020					
	Beryllium (Be)-Total (mg/L)	<0.0010					
	Boron (B)-Total (mg/L)	<0.10					
	Cadmium (Cd)-Total (mg/L)	<0.000017					
	Calcium (Ca)-Total (mg/L)	2.42					
	Chromium (Cr)-Total (mg/L)	<0.0010					
	Cobalt (Co)-Total (mg/L)	<0.00030					
	Copper (Cu)-Total (mg/L)	<0.0010					
	Iron (Fe)-Total (mg/L)	0.119					
	Lead (Pb)-Total (mg/L)	<0.00050					
	Lithium (Li)-Total (mg/L)	<0.0050					
	Magnesium (Mg)-Total (mg/L)	0.86					
	Manganese (Mn)-Total (mg/L)	0.00280					
	Mercury (Hg)-Total (mg/L)	<0.000020					

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L826912-16	L826912-17	L826912-18	L826912-19	L826912-20
		Description					
		Sampled Date	26-SEP-09	26-SEP-09	26-SEP-09	26-SEP-09	26-SEP-09
		Sampled Time					
		Client ID	EAS-BGE-1	EAS-BGE-2	EAS-BGE-3	EAS-BGE-4	EAS-BGE-5
Grouping	Analyte						
WATER							
Physical Tests	Conductivity (uS/cm)	16.7					
	Hardness (as CaCO3) (mg/L)	6.3					
	pH (pH)	6.92					
	Total Suspended Solids (mg/L)	7.9					
	Total Dissolved Solids (mg/L)	<10					
	Turbidity (NTU)	16.3					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	5.1					
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0					
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0					
	Alkalinity, Total (as CaCO3) (mg/L)	5.1					
	Ammonia as N (mg/L)	<0.020					
	Bromide (Br) (mg/L)	<0.050					
	Chloride (Cl) (mg/L)	<0.50					
	Fluoride (F) (mg/L)	0.046					
	Nitrate (as N) (mg/L)	0.0128					
	Nitrite (as N) (mg/L)	<0.0010					
	Total Kjeldahl Nitrogen (mg/L)	0.100					
	Ortho Phosphate as P (mg/L)	<0.0010					
	Total Phosphate as P (mg/L)	0.0071					
	Silicate (as SiO2) (mg/L)	<1.0					
	Sulfate (SO4) (mg/L)	1.22					
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.12					
	Total Organic Carbon (mg/L)	1.17					
Total Metals	Aluminum (Al)-Total (mg/L)	0.630					
	Antimony (Sb)-Total (mg/L)	<0.00050					
	Arsenic (As)-Total (mg/L)	0.00066					
	Barium (Ba)-Total (mg/L)	<0.020					
	Beryllium (Be)-Total (mg/L)	<0.0010					
	Boron (B)-Total (mg/L)	<0.10					
	Cadmium (Cd)-Total (mg/L)	<0.000017					
	Calcium (Ca)-Total (mg/L)	1.49					
	Chromium (Cr)-Total (mg/L)	0.0028					
	Cobalt (Co)-Total (mg/L)	0.00035					
	Copper (Cu)-Total (mg/L)	0.0013					
	Iron (Fe)-Total (mg/L)	0.783					
	Lead (Pb)-Total (mg/L)	<0.00050					
	Lithium (Li)-Total (mg/L)	<0.0050					
	Magnesium (Mg)-Total (mg/L)	0.87					
	Manganese (Mn)-Total (mg/L)	0.0129					
	Mercury (Hg)-Total (mg/L)	<0.000020					

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Sample ID Description Sampled Date Sampled Time Client ID		L826912-21	L826912-22	L826912-23	L826912-24	L826912-25
		24-SEP-09	26-SEP-09	26-SEP-09	24-SEP-09	26-SEP-09
		EAS-DUP1	TRAVEL BLANK	EAS-EQ-1	EAS-DUP2	BLANK
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	26.8	<2.0	<2.0		
	Hardness (as CaCO3) (mg/L)	11.3	<1.1	<1.1		
	pH (pH)	7.20	5.63	5.70		
	Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0		
	Total Dissolved Solids (mg/L)	14	<10	<10		
	Turbidity (NTU)	0.52	<0.10	<0.10		
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	8.6	<2.0	<2.0		
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0	<2.0	<2.0		
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0	<2.0	<2.0		
	Alkalinity, Total (as CaCO3) (mg/L)	8.6	<2.0	<2.0		
	Ammonia as N (mg/L)	<0.020	<0.020	<0.020		
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050		
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50		
	Fluoride (F) (mg/L)	0.037	<0.020	<0.020		
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050		
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010		
	Total Kjeldahl Nitrogen (mg/L)	0.124	<0.050	<0.050		
	Ortho Phosphate as P (mg/L)	<0.0010	<0.0010	<0.0010		
	Total Phosphate as P (mg/L)	0.0024	<0.0020	<0.0020		
	Silicate (as SiO2) (mg/L)	<1.0	<1.0	<1.0		
	Sulfate (SO4) (mg/L)	2.40	<0.50	<0.50		
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.75	<0.50	<0.50		
	Total Organic Carbon (mg/L)	1.78	<0.50	<0.50		
Total Metals	Aluminum (Al)-Total (mg/L)	0.0219	<0.0050	<0.0050		
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050		
	Arsenic (As)-Total (mg/L)	<0.00050	<0.00050	<0.00050		
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020		
	Beryllium (Be)-Total (mg/L)	<0.0010	<0.0010	<0.0010		
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10		
	Cadmium (Cd)-Total (mg/L)	<0.000017	<0.000017	<0.000017		
	Calcium (Ca)-Total (mg/L)	2.95	<0.10	<0.10		
	Chromium (Cr)-Total (mg/L)	<0.0010	<0.0010	<0.0010		
	Cobalt (Co)-Total (mg/L)	<0.00030	<0.00030	<0.00030		
	Copper (Cu)-Total (mg/L)	0.0011	<0.0010	<0.0010		
	Iron (Fe)-Total (mg/L)	<0.030	<0.030	<0.030		
	Lead (Pb)-Total (mg/L)	<0.00050	<0.00050	<0.00050		
	Lithium (Li)-Total (mg/L)	<0.0050	<0.0050	<0.0050		
	Magnesium (Mg)-Total (mg/L)	0.95	<0.10	<0.10		
	Manganese (Mn)-Total (mg/L)	0.00115	<0.00030	<0.00030		
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020		

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		Sample ID	L826912-1	L826912-2	L826912-3	L826912-4	L826912-5
		Description					
		Sampled Date	24-SEP-09	26-SEP-09	26-SEP-09	26-SEP-09	26-SEP-09
		Sampled Time					
		Client ID	EAS-DT-1	EAS-DT-2	EAS-DT-3	EAS-DT-4	EAS-DT-5
Grouping	Analyte						
WATER							
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010					
	Nickel (Ni)-Total (mg/L)	<0.0010					
	Potassium (K)-Total (mg/L)	<2.0					
	Selenium (Se)-Total (mg/L)	<0.0010					
	Silver (Ag)-Total (mg/L)	<0.000020					
	Sodium (Na)-Total (mg/L)	<2.0					
	Thallium (Tl)-Total (mg/L)	<0.00020					
	Tin (Sn)-Total (mg/L)	<0.00050					
	Titanium (Ti)-Total (mg/L)	<0.010					
	Uranium (U)-Total (mg/L)	<0.00020					
	Vanadium (V)-Total (mg/L)	<0.0010					
	Zinc (Zn)-Total (mg/L)	<0.0050					
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	<0.0050					
	Antimony (Sb)-Dissolved (mg/L)	<0.00050					
	Arsenic (As)-Dissolved (mg/L)	<0.00050					
	Barium (Ba)-Dissolved (mg/L)	<0.020					
	Beryllium (Be)-Dissolved (mg/L)	<0.0010					
	Boron (B)-Dissolved (mg/L)	<0.10					
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017					
	Calcium (Ca)-Dissolved (mg/L)	2.96					
	Chromium (Cr)-Dissolved (mg/L)	<0.0010					
	Cobalt (Co)-Dissolved (mg/L)	<0.00030					
	Copper (Cu)-Dissolved (mg/L)	<0.0010					
	Iron (Fe)-Dissolved (mg/L)	<0.030					
	Lead (Pb)-Dissolved (mg/L)	<0.00050					
	Lithium (Li)-Dissolved (mg/L)	<0.0050					
	Magnesium (Mg)-Dissolved (mg/L)	0.96					
	Manganese (Mn)-Dissolved (mg/L)	0.00037					
	Mercury (Hg)-Dissolved (mg/L)	<0.000020					
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010					
	Nickel (Ni)-Dissolved (mg/L)	<0.0010					
	Potassium (K)-Dissolved (mg/L)	<2.0					
	Selenium (Se)-Dissolved (mg/L)	<0.0010					
	Silver (Ag)-Dissolved (mg/L)	<0.000020					
	Sodium (Na)-Dissolved (mg/L)	<2.0					
	Thallium (Tl)-Dissolved (mg/L)	<0.00020					
	Tin (Sn)-Dissolved (mg/L)	<0.00050					
	Titanium (Ti)-Dissolved (mg/L)	<0.010					
	Uranium (U)-Dissolved (mg/L)	<0.00020					
	Vanadium (V)-Dissolved (mg/L)	<0.0010					
	Zinc (Zn)-Dissolved (mg/L)	<0.0050					

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		Sample ID	L826912-6	L826912-7	L826912-8	L826912-9	L826912-10
		Description					
		Sampled Date	24-SEP-09	24-SEP-09	24-SEP-09	24-SEP-09	24-SEP-09
		Sampled Time					
		Client ID	EAS-BGW-1	EAS-BGW-2	EAS-BGW-3	EAS-BGW-4	EAS-BGW-5
Grouping	Analyte						
WATER							
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010					
	Nickel (Ni)-Total (mg/L)	0.0011					
	Potassium (K)-Total (mg/L)	<2.0					
	Selenium (Se)-Total (mg/L)	<0.0010					
	Silver (Ag)-Total (mg/L)	<0.000020					
	Sodium (Na)-Total (mg/L)	<2.0					
	Thallium (Tl)-Total (mg/L)	<0.00020					
	Tin (Sn)-Total (mg/L)	<0.00050					
	Titanium (Ti)-Total (mg/L)	0.016					
	Uranium (U)-Total (mg/L)	0.00021					
	Vanadium (V)-Total (mg/L)	<0.0010					
	Zinc (Zn)-Total (mg/L)	<0.0050					
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	0.0091					
	Antimony (Sb)-Dissolved (mg/L)	<0.00050					
	Arsenic (As)-Dissolved (mg/L)	<0.00050					
	Barium (Ba)-Dissolved (mg/L)	<0.020					
	Beryllium (Be)-Dissolved (mg/L)	<0.0010					
	Boron (B)-Dissolved (mg/L)	<0.10					
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017					
	Calcium (Ca)-Dissolved (mg/L)	1.50					
	Chromium (Cr)-Dissolved (mg/L)	<0.0010					
	Cobalt (Co)-Dissolved (mg/L)	<0.00030					
	Copper (Cu)-Dissolved (mg/L)	<0.0010					
	Iron (Fe)-Dissolved (mg/L)	<0.030					
	Lead (Pb)-Dissolved (mg/L)	<0.00050					
	Lithium (Li)-Dissolved (mg/L)	<0.0050					
	Magnesium (Mg)-Dissolved (mg/L)	0.65					
	Manganese (Mn)-Dissolved (mg/L)	0.00099					
	Mercury (Hg)-Dissolved (mg/L)	<0.000020					
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010					
	Nickel (Ni)-Dissolved (mg/L)	<0.0010					
	Potassium (K)-Dissolved (mg/L)	<2.0					
	Selenium (Se)-Dissolved (mg/L)	<0.0010					
	Silver (Ag)-Dissolved (mg/L)	<0.000020					
	Sodium (Na)-Dissolved (mg/L)	<2.0					
	Thallium (Tl)-Dissolved (mg/L)	<0.00020					
	Tin (Sn)-Dissolved (mg/L)	<0.00050					
	Titanium (Ti)-Dissolved (mg/L)	<0.010					
	Uranium (U)-Dissolved (mg/L)	<0.00020					
	Vanadium (V)-Dissolved (mg/L)	<0.0010					
	Zinc (Zn)-Dissolved (mg/L)	<0.0050					

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		Sample ID	L826912-11	L826912-12	L826912-13	L826912-14	L826912-15
		Description					
		Sampled Date	26-SEP-09	26-SEP-09	26-SEP-09	26-SEP-09	26-SEP-09
		Sampled Time					
		Client ID	EAS-SPC-1	EAS-SPC-2	EAS-SPC-3	EAS-SPC-4	EAS-SPC-5
Grouping	Analyte						
WATER							
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010					
	Nickel (Ni)-Total (mg/L)	<0.0010					
	Potassium (K)-Total (mg/L)	<2.0					
	Selenium (Se)-Total (mg/L)	<0.0010					
	Silver (Ag)-Total (mg/L)	<0.000020					
	Sodium (Na)-Total (mg/L)	<2.0					
	Thallium (Tl)-Total (mg/L)	<0.00020					
	Tin (Sn)-Total (mg/L)	<0.00050					
	Titanium (Ti)-Total (mg/L)	<0.010					
	Uranium (U)-Total (mg/L)	<0.00020					
	Vanadium (V)-Total (mg/L)	<0.0010					
	Zinc (Zn)-Total (mg/L)	<0.0050					
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	0.0053					
	Antimony (Sb)-Dissolved (mg/L)	<0.00050					
	Arsenic (As)-Dissolved (mg/L)	<0.00050					
	Barium (Ba)-Dissolved (mg/L)	<0.020					
	Beryllium (Be)-Dissolved (mg/L)	<0.0010					
	Boron (B)-Dissolved (mg/L)	<0.10					
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017					
	Calcium (Ca)-Dissolved (mg/L)	2.44					
	Chromium (Cr)-Dissolved (mg/L)	<0.0010					
	Cobalt (Co)-Dissolved (mg/L)	<0.00030					
	Copper (Cu)-Dissolved (mg/L)	<0.0010					
	Iron (Fe)-Dissolved (mg/L)	<0.030					
	Lead (Pb)-Dissolved (mg/L)	<0.00050					
	Lithium (Li)-Dissolved (mg/L)	<0.0050					
	Magnesium (Mg)-Dissolved (mg/L)	0.82					
	Manganese (Mn)-Dissolved (mg/L)	0.00032					
	Mercury (Hg)-Dissolved (mg/L)	<0.000020					
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010					
	Nickel (Ni)-Dissolved (mg/L)	<0.0010					
	Potassium (K)-Dissolved (mg/L)	<2.0					
	Selenium (Se)-Dissolved (mg/L)	<0.0010					
	Silver (Ag)-Dissolved (mg/L)	<0.000020					
	Sodium (Na)-Dissolved (mg/L)	<2.0					
	Thallium (Tl)-Dissolved (mg/L)	<0.00020					
	Tin (Sn)-Dissolved (mg/L)	<0.00050					
	Titanium (Ti)-Dissolved (mg/L)	<0.010					
	Uranium (U)-Dissolved (mg/L)	<0.00020					
	Vanadium (V)-Dissolved (mg/L)	<0.0010					
	Zinc (Zn)-Dissolved (mg/L)	<0.0050					

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		Sample ID	L826912-16	L826912-17	L826912-18	L826912-19	L826912-20
		Description					
		Sampled Date	26-SEP-09	26-SEP-09	26-SEP-09	26-SEP-09	26-SEP-09
		Sampled Time					
		Client ID	EAS-BGE-1	EAS-BGE-2	EAS-BGE-3	EAS-BGE-4	EAS-BGE-5
Grouping	Analyte						
WATER							
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010					
	Nickel (Ni)-Total (mg/L)	0.0019					
	Potassium (K)-Total (mg/L)	<2.0					
	Selenium (Se)-Total (mg/L)	<0.0010					
	Silver (Ag)-Total (mg/L)	<0.000020					
	Sodium (Na)-Total (mg/L)	<2.0					
	Thallium (Tl)-Total (mg/L)	<0.00020					
	Tin (Sn)-Total (mg/L)	<0.00050					
	Titanium (Ti)-Total (mg/L)	0.025					
	Uranium (U)-Total (mg/L)	0.00029					
	Vanadium (V)-Total (mg/L)	0.0010					
	Zinc (Zn)-Total (mg/L)	<0.0050					
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	0.0057					
	Antimony (Sb)-Dissolved (mg/L)	<0.00050					
	Arsenic (As)-Dissolved (mg/L)	<0.00050					
	Barium (Ba)-Dissolved (mg/L)	<0.020					
	Beryllium (Be)-Dissolved (mg/L)	<0.0010					
	Boron (B)-Dissolved (mg/L)	<0.10					
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017					
	Calcium (Ca)-Dissolved (mg/L)	1.47					
	Chromium (Cr)-Dissolved (mg/L)	<0.0010					
	Cobalt (Co)-Dissolved (mg/L)	<0.00030					
	Copper (Cu)-Dissolved (mg/L)	<0.0010					
	Iron (Fe)-Dissolved (mg/L)	<0.030					
	Lead (Pb)-Dissolved (mg/L)	<0.00050					
	Lithium (Li)-Dissolved (mg/L)	<0.0050					
	Magnesium (Mg)-Dissolved (mg/L)	0.64					
	Manganese (Mn)-Dissolved (mg/L)	0.00117					
	Mercury (Hg)-Dissolved (mg/L)	<0.000020					
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010					
	Nickel (Ni)-Dissolved (mg/L)	<0.0010					
	Potassium (K)-Dissolved (mg/L)	<2.0					
	Selenium (Se)-Dissolved (mg/L)	<0.0010					
	Silver (Ag)-Dissolved (mg/L)	<0.000020					
	Sodium (Na)-Dissolved (mg/L)	<2.0					
	Thallium (Tl)-Dissolved (mg/L)	<0.00020					
	Tin (Sn)-Dissolved (mg/L)	<0.00050					
	Titanium (Ti)-Dissolved (mg/L)	<0.010					
	Uranium (U)-Dissolved (mg/L)	<0.00020					
	Vanadium (V)-Dissolved (mg/L)	<0.0010					
	Zinc (Zn)-Dissolved (mg/L)	<0.0050					

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		Sample ID	L826912-21	L826912-22	L826912-23	L826912-24	L826912-25
		Description					
		Sampled Date	24-SEP-09	26-SEP-09	26-SEP-09	24-SEP-09	26-SEP-09
		Sampled Time					
		Client ID	EAS-DUP1	TRAVEL BLANK	EAS-EQ-1	EAS-DUP2	BLANK
Grouping	Analyte						
WATER							
Total Metals	Molybdenum (Mo)-Total (mg/L)	<0.0010	<0.0010	<0.0010			
	Nickel (Ni)-Total (mg/L)	<0.0010	<0.0010	<0.0010			
	Potassium (K)-Total (mg/L)	<2.0	<2.0	<2.0			
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010			
	Silver (Ag)-Total (mg/L)	<0.000020	<0.000020	<0.000020			
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0			
	Thallium (Tl)-Total (mg/L)	<0.00020	<0.00020	<0.00020			
	Tin (Sn)-Total (mg/L)	<0.00050	<0.00050	<0.00050			
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010			
	Uranium (U)-Total (mg/L)	<0.00020	<0.00020	<0.00020			
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010			
	Zinc (Zn)-Total (mg/L)	<0.0050	<0.0050	<0.0050			
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	<0.0050		<0.0050			
	Antimony (Sb)-Dissolved (mg/L)	<0.00050		<0.00050			
	Arsenic (As)-Dissolved (mg/L)	<0.00050		<0.00050			
	Barium (Ba)-Dissolved (mg/L)	<0.020		<0.020			
	Beryllium (Be)-Dissolved (mg/L)	<0.0010		<0.0010			
	Boron (B)-Dissolved (mg/L)	<0.10		<0.10			
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017		<0.000017			
	Calcium (Ca)-Dissolved (mg/L)	2.97		<0.10			
	Chromium (Cr)-Dissolved (mg/L)	<0.0010		<0.0010			
	Cobalt (Co)-Dissolved (mg/L)	<0.00030		<0.00030			
	Copper (Cu)-Dissolved (mg/L)	<0.0010		<0.0010			
	Iron (Fe)-Dissolved (mg/L)	<0.030		<0.030			
	Lead (Pb)-Dissolved (mg/L)	<0.00050		<0.00050			
	Lithium (Li)-Dissolved (mg/L)	<0.0050		<0.0050			
	Magnesium (Mg)-Dissolved (mg/L)	0.95		<0.10			
	Manganese (Mn)-Dissolved (mg/L)	0.00040		<0.00030			
	Mercury (Hg)-Dissolved (mg/L)	<0.000020		<0.000020			
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010		<0.0010			
	Nickel (Ni)-Dissolved (mg/L)	<0.0010		<0.0010			
	Potassium (K)-Dissolved (mg/L)	<2.0		<2.0			
	Selenium (Se)-Dissolved (mg/L)	<0.0010		<0.0010			
	Silver (Ag)-Dissolved (mg/L)	<0.000020		<0.000020			
	Sodium (Na)-Dissolved (mg/L)	<2.0		<2.0			
	Thallium (Tl)-Dissolved (mg/L)	<0.00020		<0.00020			
	Tin (Sn)-Dissolved (mg/L)	<0.00050		<0.00050			
	Titanium (Ti)-Dissolved (mg/L)	<0.010		<0.010			
	Uranium (U)-Dissolved (mg/L)	<0.00020		<0.00020			
	Vanadium (V)-Dissolved (mg/L)	<0.0010		<0.0010			
	Zinc (Zn)-Dissolved (mg/L)	<0.0050		<0.0050			

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L826912-1	L826912-2	L826912-3	L826912-4	L826912-5
	Description					
	Sampled Date	24-SEP-09	26-SEP-09	26-SEP-09	26-SEP-09	26-SEP-09
	Sampled Time					
	Client ID	EAS-DT-1	EAS-DT-2	EAS-DT-3	EAS-DT-4	EAS-DT-5
Grouping	Analyte					
WATER						
Plant Pigments	Chlorophyll a (ug/L)	0.666	0.718	0.804	0.856	0.632

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L826912-6	L826912-7	L826912-8	L826912-9	L826912-10
		Description					
		Sampled Date	24-SEP-09	24-SEP-09	24-SEP-09	24-SEP-09	24-SEP-09
		Sampled Time					
		Client ID	EAS-BGW-1	EAS-BGW-2	EAS-BGW-3	EAS-BGW-4	EAS-BGW-5
Grouping	Analyte						
WATER							
Plant Pigments	Chlorophyll a (ug/L)	0.715	0.377	0.244	0.522	0.523	

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID Description Sampled Date Sampled Time Client ID	L826912-11 26-SEP-09 EAS-SPC-1	L826912-12 26-SEP-09 EAS-SPC-2	L826912-13 26-SEP-09 EAS-SPC-3	L826912-14 26-SEP-09 EAS-SPC-4	L826912-15 26-SEP-09 EAS-SPC-5
Grouping	Analyte						
WATER							
Plant Pigments	Chlorophyll a (ug/L)	0.996	0.715	0.681	0.746	0.473	

		Sample ID Description Sampled Date Sampled Time Client ID	L826912-16 26-SEP-09 EAS-BGE-1	L826912-17 26-SEP-09 EAS-BGE-2	L826912-18 26-SEP-09 EAS-BGE-3	L826912-19 26-SEP-09 EAS-BGE-4	L826912-20 26-SEP-09 EAS-BGE-5
Grouping	Analyte						
WATER							
Plant Pigments	Chlorophyll a (ug/L)		0.697	0.366	0.305	0.280	0.327

		Sample ID Description Sampled Date Sampled Time Client ID	L826912-21 24-SEP-09 EAS-DUP1	L826912-22 26-SEP-09 TRAVEL BLANK	L826912-23 26-SEP-09 EAS-EQ-1	L826912-24 24-SEP-09 EAS-DUP2	L826912-25 26-SEP-09 BLANK
Grouping	Analyte						
WATER							
Plant Pigments	Chlorophyll a (ug/L)		0.639			0.929	<0.010

Reference Information

Additional Comments for Sample Listed:

Samplenum	Matrix	Report Remarks	Sample Comments
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Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
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ALK-SCR-VA

Water

Alkalinity by colour or titration

EPA 310.2 OR APHA 2320

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

OR

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

ANIONS-BR-IC-VA

Water

Bromide by Ion Chromatography

APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-CL-IC-VA

Water

Chloride by Ion Chromatography

APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-F-IC-VA

Water

Fluoride by Ion Chromatography

APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-NO2-IC-VA

Water

Nitrite by Ion Chromatography

APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrite detection is by UV absorbance and not conductivity.

ANIONS-NO3-IC-VA

Water

Nitrate by Ion Chromatography

APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrate detection is by UV absorbance and not conductivity.

ANIONS-SO4-IC-VA

Water

Sulfate by Ion Chromatography

APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

CARBONS-DOC-VA

Water

Dissolved organic carbon by combustion

APHA 5310 "TOTAL ORGANIC CARBON (TOC)"

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-DOC-VA

Water

Dissolved organic carbon by combustion

APHA 5310 TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA

Water

Total organic carbon by combustion

APHA 5310 "TOTAL ORGANIC CARBON (TOC)"

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CARBONS-TOC-VA

Water

Total organic carbon by combustion

APHA 5310 TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
CHLOROA-VA	Water	Chlorophyll a by Fluorometer	EPA 445.0
Chlorophyll and Pheopigments by Fluorometry analysis is carried out using procedures adapted from USEPA Method 445.0. The sample is filtered using either a glass fiber filter or a 0.45 micron Membrane filter. The pigments are extracted from the filter with 90% aqueous acetone. For chlorophyll-a analysis the extract is read using a fluorometer. For pheopigments the extract is first acidified then read. This method is not subject to interferences from chlorophyll b.			
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.			
HG-DIS-CCME-CVAFS-VA	Water	Diss. Mercury in Water by CVAFS (CCME)	EPA 3005A/245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
HG-TOT-CCME-CVAFS-VA	Water	Total Mercury in Water by CVAFS (CCME)	EPA 245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
MET-DIS-CCME-ICP-VA	Water	Diss. Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
MET-DIS-CCME-MS-VA	Water	Diss. Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
MET-TOT-CCME-ICP-VA	Water	Total Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
MET-TOT-CCME-MS-VA	Water	Total Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
NH3-SIE-VA	Water	Ammonia by SIE	APHA 4500 D. - NH3 NITROGEN (AMMONIA)

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
This analysis is carried out, on sulphuric acid preserved samples, using procedures adapted from APHA Method 4500-NH3 "Nitrogen (Ammonia)". Ammonia is determined using an ammonia selective electrode.			
PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.			
PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Colour	APHA 4500-P "Phosphorous"
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Colour	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-T-COL-VA	Water	Total Phosphate P by Color	APHA 4500-P "Phosphorous"
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
PO4-T-COL-VA	Water	Total Phosphate P by Color	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.			
SILICATE-COL-VA	Water	Silicate by Colourimetric analysis	APHA 4500-SiO2 D.
This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 D. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.			
TDS-VA	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.			
TKN-SIE-VA	Water	Total Kjeldahl Nitrogen by SIE	APHA 4500-Norg (TKN)

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
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This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total kjeldahl nitrogen is determined by sample digestion at 367 celcius with analysis using an ammonia selective electrode.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540 Gravimetric
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This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 "Turbidity"
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This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity
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This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

**** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies. The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:**

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
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VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA
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GLOSSARY OF REPORT TERMS

Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency.

mg/kg (units) - unit of concentration based on mass, parts per million

mg/L (units) - unit of concentration based on volume, parts per million

N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

Page 1 of 3

COOLER 1 of 2
this is core



Report to: Randy Baker		Report Format / Distribution		Service Requested:	
Company: Azimuth Consulting Group Inc.		☒ Standard ☐ Other ☒ PDF ☐ Excel ☐ Fax		☒ Regular Service (Default) ☐ Rush Service (2-3 Days) ☐ Priority Service (1 Day or ASAP) ☐ Emergency Service (<1 Day / Weekend) - Contact ALS	
Contact: Randy Baker		Email 1: rbaker@azimuthgroup.ca			
Address: Vancouver		Email 2: gmann@azimuthgroup.ca, mmccconnell@azimuthgroup.ca			
Phone: 604-730-1220 Fax:		Indicate Bottles: Filtered / Preserved (F/P) →			
Invoice To: ☒ Same as Report		Client / Project Information:			
Company:		Job #:			
Contact:		PO/A/E:			
Address:		Legal Site Description:			
Sample:		Quote #: ALSEQ09-077			
Phone:		Fax:			
Lab Work Order # (lab use only)		ALS Contact: Natasha MM		Sampler (Initials): SH/NW/RT	
Sample Identification (This description will appear on the report)		Date		Time	
#		dd-mm-yy		hh:mm	
				(Select from drop-down list)	
EAS-BGW-1 (1000 ml filtered for chlor-a)		24-Sep-09		Water	
EAS-BGW-2 (1000 ml filtered for chlor-a)		24-Sep-09		Water	
EAS-BGW-3 (1000 ml filtered for chlor-a)		24-Sep-09		Water	
EAS-BGW-4 (1000 ml filtered for chlor-a)		24-Sep-09		Water	
EAS-BGW-5 (1000 ml filtered for chlor-a)		24-Sep-09		Water	
EAS-SPC-1 (1000 ml filtered for chlor-a)		26-Sep-09		Water	
EAS-SPC-2 1000 ml filtered for chlor-a		26-Sep-09		Water	
EAS-SPC-3 (1000 ml filtered for chlor-a)		26-Sep-09		Water	
EAS-SPC-4 (1000 ml filtered for chlor-a)		26-Sep-09		Water	
EAS-SPC-5 (1000 ml filtered for chlor-a)		26-Sep-09		Water	
Guidelines / Regulations					
Special Instructions / Hazardous Details					
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.					
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the adjacent worksheet.					
Relinquished	Date & Time	Received	Date & Time	Temperature	Sample Condition (lab use only)
By: Gary Mann	26-Sep-09	By: [Signature]	10/06/09	91.3°C	Samples Received in Good Condition? Y / N (if no provided details)
Relinquished	Date & Time	Received	Date & Time	Temperature	Sample Condition (lab use only)
By:		By:		110°C	

Report to: Randy Baker				Report Format / Distribution				Service Requested:			
Company: Azimuth Consulting Group Inc.				☒ Standard ☐ Other				☒ Regular Service (Default)			
Contact: Randy Baker				☒ PDF ☒ Excel ☐ Fax				☐ Rush Service (2-3 Days)			
Address: Vancouver				Email 1: rbaker@azimuthgroup.ca				☐ Priority Service (1 Day or ASAP)			
Phone: 604-730-1220 Fax:				Email 2: gmann@azimuthgroup.ca, mmcconnell@azimuthgroup.ca				☐ Emergency Service (<1 Day / Wkend) - Contact ALS			
Invoice To: ☒ Same as Report				Indicate Bottles: Filled / Preserved (F/P) -->				Analysis Request			
Company:				Client / Project Information:							
Contact:				Job #:				Meadowbank Mine BG-EAS			
Address:				PO/AFE:							
Sample				Legal Site Description:							
Phone:				Quote #: ALS009-077							
Fax:											
Lab Work Order # (lab use only)		1826912		ALS Contact:		Natasha MM		Sampler (Initials):		SH/NW/RT	
Sample #		Sample Identification (This description will appear on the report)		Date		Time		Sample Type (Selected from drop-down list)			
		EAS-BGE-1 (1000 ml filtered for chlor-a)		26-Sep-09		dd-mm-yy		hh:mm		Water	
		EAS-BGE-2 (1000 ml filtered for chlor-a)		26-Sep-09				Water		x	
		EAS-BGE-3 (1000 ml filtered for chlor-a)		26-Sep-09				Water		x	
		EAS-BGE-4 (1000 ml filtered for chlor-a)		26-Sep-09				Water		x	
		EAS-BGE-5 (1000 ml filtered for chlor-a)		26-Sep-09				Water		x	
		EAS-DUP1 (1000 ml filtered for chlor-a)		24-Sep-09				Water		x	
		EAS-DUP2 (1000 ml filtered for chlor-a)		24-Sep-09				Water		x	
		TRAVEL BLANK		26-Sep-09				Water		x	
		EAS-EQ-1		26-Sep-09				Water		x	
Guidelines / Regulations				Special Instructions / Hazardous Details							
				Note: Travel blank only contains 1 x 1L plastic bottle; do what you can, but TSS would be lowest priority for analysis.							
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the adjacent worksheet.											
Relinquished By:		Date & Time:		Received By:		Date & Time:		Temperature		Sample Condition (lab use only)	
Gary Mann		26-Sep-09		By: <i>gmann</i>		10/06/07 9:17 AM		11°C		Samples Received in Good Condition? Y / N (if no provided details)	