Appendix C5

Report: *Aquatic Effects Management Program – Receiving Environment Monitoring 2008, Meadowbank Golder Project*

Aquatic Effects Management Program – Receiving Environment Monitoring 2008

Meadowbank Gold Project

Prepared for:

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ACKNOWLEDGEMENTS

Azimuth would like to thank AEM for their continued support of this program and for facilitating our work by providing logistical assistance and help whenever needed. Key personnel conducting this project were as follows:

- Gary Mann (Azimuth) – Gary was responsible for overall management of this project. He also provided oversight and logistical support for the field crew, and reviewed the AEMP report.
- Maggie McConnell (Azimuth) – Maggie was responsible for implementing the AEMP field monitoring program in 2008. In addition to participating in all sampling trips, Maggie conducted most of the data analysis, interpretation, and report writing.
- Randy Baker (Azimuth) – Randy provided oversight and logistical support for the field crew and conducted the technical review of the AEMP report.
- Ryan Hill (Azimuth) – Ryan provided oversight and logistical support to the field crew.
- Ralph Turner (Azimuth) – Ralph was responsible for implementing the sediment core sampling, as part of the AEMP field monitoring in 2008. In addition to leading the sediment sampling, Ralph participated in both the July and August sampling trips.
- William Scottie (Baker Lake) – William assisted Maggie and Ralph in conducting the spring, summer and fall water, sediment and benthic sampling components. His Petite Ponar grab sampler and periphyton scrubber handling skills cannot go without specific mention.

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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This report and the assessments and recommendations contained in it are intended for the sole and exclusive use of AEM.

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This report is intended to provide environmental information to support the Aquatic Effects Management Program (AEMP) for AEM's Meadowbank Project. The AEMP monitoring scope and design was developed in consideration of a specific project development plan. It is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the proposed development may necessitate modification of the AEMP and may potentially reduce the utility of this baseline data.

The findings contained in this report are based, in part, upon information provided by others. In preparing this report, Azimuth has assumed that the data or other information provided by others is factual and accurate. If any of the information is inaccurate, site conditions change, new information is discovered, and/or unexpected conditions are encountered in future work, then modifications by Azimuth to the findings, conclusions and recommendations of this report may be necessary.

In addition, the conclusions and recommendations of this report are based upon applicable legislation existing at the time the report was drafted. Changes to legislation, such as an alteration in acceptable limits of contamination, may alter conclusions and recommendations.

This report is time-sensitive and pertains to a specific site and a specific scope of work. It is not applicable to any other site, development or remediation other than that to which it specifically refers. Any change in the site, remediation or proposed development may necessitate a supplementary investigation and assessment.

ACRONYMS

AEMP – Aquatic Effects Management Program
ANOVA – Analysis of Variance
AWPAR – All Weather Private Access Road
BBD – Baker Lake – barge dock
BPJ – Baker Lake – proposed jetty
BAP – Baker Lake – Akilahaarjuk Point
DFO – Department of Fisheries and Oceans
DLs – Detection limits
DQO – Data Quality Objective
EAS – Effects Assessment Strategy
EEM – Environmental Effects Monitoring
EIA – Environmental Impact Assessment
GPS – Global Positioning System
INUG – Inuggugayualik Lake
ISQG – Interim Sediment Quality Guidelines
MDL – Method detection limit
MMER – Metal Mining Effluent Regulations
PAHs – Polycyclic Aromatic Hydrocarbons
PEL – Probable Effect Level
QA/QC – Quality Assurance / Quality Control
RPD – Relative percent difference
SOP – Standard Operating Procedure
SQG – Sediment Quality Guidelines
SP – Second Portage Lake
TE – Tehek Lake
TPE, TPN, TPS – Third Portage Lake – East, North, and South Basins
UTM – Universal Transverse Mercator
WAL – Wally Lake

EXECUTIVE SUMMARY

Overview

This Aquatic Effects Management Program (AEMP) for the Meadowbank Gold Project describes the strategy, methodology and results of aquatic monitoring activities during the 2008 open-water season of the Meadowbank study lakes and, for the first time, at Baker Lake.

Monitoring Strategy and General Study Design

At its core, the AEMP was designed to address key issues identified in the Meadowbank EIA (i.e., mining-related activities with the potential to affect water quality, fish habitat and fish populations). The core program is tailored based on our understanding of mine construction, operation and infrastructure (e.g., dikes, effluents, stream crossings, roads, etc.) and has been developed to detect mine-related impacts at temporal and spatial scales that are ecologically relevant. The core program initially focused solely on the project lakes, but was expanded to Baker Lake in 2008 to ensure that monitoring was also in place to track project-related activities in that area. The 2008 program consisted of 10 stations, each categorized into one of the three main types of stations described below:

- *Near-field (NF) areas* – Stations are situated in close proximity to the development, in particular near dikes and effluent sources. They are the first line of defense or early-warning locations for introductions of stressors into the receiving environment. NF stations are Third Portage North (TPN), Third Portage East (TPE), Second Portage (SP), and Wally Lake (WAL) for the Meadowbank study lakes and Baker Barge Dock (BBD) and the Baker Proposed Jetty (BPJ) for Baker Lake.
- *Far-field (FF) area* – The intent of this station is to monitor downstream of project infrastructure to provide insights into the spatial extent of any effects observed at the near-field stations. Given the natural drainage of the entire Meadowbank project area, the Tehek Lake (TE) station is a key location to assess whether or not contaminants are detectable downstream of the entire mine development.
- *Reference (Ref) areas* – Reference stations are sufficiently removed from the mine that they are presumed to be unaffected by any infrastructure (roads, dikes, runways) and point sources (aerial and aquatic) associated with mine development. Internal (Third Portage South [TPS]) and external (Inuggugayualik Lake [INUG]) reference areas were chosen for the purposes of making comparisons with the Meadowbank study lakes (BAER, 2005); For Baker Lake,

an internal reference area was added several kilometers to the east of the hamlet along the north shore of the lake at Baker Akilahaarjuk Point (BAP).

In addition to the core AEMP program, the following targeted monitoring studies were conducted in 2008:

- *Surface sediment coring* – this study is reported along with the core AEMP study in this document. It was undertaken to characterize the baseline spatial variability in metals concentrations in surface sediments (top 1 cm only) prior to the onset of in-water construction activities.
- *"Explosives" lake assessment* – this study, appended to this report, was conducted to collect basic information regarding the morphology, limnology and fisheries status of this lake, located next to the new location of the explosives plant.
- *Dike construction monitoring* – A detailed monitoring and management program for dike construction was developed as part of the Nunavut Water Board (NWB) A License process. The program was implemented for the construction of the East Dike and Western Channel Dike during open water 2008. Monitoring program results are documented in a separate report (Azimuth, 2009).
- *Total suspended solids (TSS) effects assessment strategy (EAS)* – In response to elevated TSS concentrations related to construction of the East Dike, the TSS EAS was implemented to determine the ecological significance of the situation. This study is documented along with dike construction monitoring (Azimuth, 2009).

Meadowbank Gold Project – Development Status

Construction phase of the Meadowbank Gold Project officially started in June 2008, upon receipt of the NWB A Water License (2AM-MEA0815). The DFO *Fisheries Act* Authorization (NU-03-0191) for the project was issued on July 30, 2008 and construction of the East Dike started that day. Major in-water construction activities for 2008 included the East Dike and installation of the Western Channel Dike, located between Third Portage Lake and Second Portage Lake. The closest AEMP stations to these activities were the Second Portage Lake station (SP) and Tehek Lake (TE), further downstream.

Meadowbank Study Lakes

- Limnology results show that the lakes are generally cold, clear, isothermal, well mixed, and well oxygenated. These results are consistent among stations and seasons for 2008 and similar to historical data.
- Water chemistry results show that the lakes are circum-neutral with low conductivity, hardness and ions. Total and dissolved solids concentrations are

very low and typically below detection limits. Nitrogen, carbon and phosphorus were also low, close to laboratory detection limits and did not differ appreciably within or among lakes and seasons. Total metals in water were consistently low among study lakes and seasons, with only four of 28 metals consistently above detection limits and none exceeding CCME guidelines. These results are generally consistent with previous years and confirm their status as ultra-oligotrophic lakes.

- Construction of the East Dike did result in the introduction of suspended sediments into Second Portage Lake in August and September 2008. This resulted in elevated concentrations of total suspended solids (TSS), certain nutrients and some metals (aluminum, chromium and iron exceeded CCME guidelines) in Second Portage Lake. These conditions extended to Tehek Lake in the fall sampling period, but to a lesser degree. The extent and ecological significance of the sediment introductions is assessed in greater detail in the dike construction monitoring report (Azimuth, 2009).
- Sediment chemistry results showed naturally elevated metals (primarily arsenic, cadmium, copper, chromium, and zinc, which typically exceeded CCME guidelines) at many locations. A target coring study was conducted during the spring (i.e., prior to any in-water construction activities) to improve the characterization of within-station spatial variability of metals concentrations for baseline conditions. The study focused on only the top 1 cm of sediment and will be used to help monitor whether mining activities are changing sediment quality over time. Interestingly, detectable oil & grease concentrations were found at a number of stations, including the reference areas; these results are thought to be related to natural conditions rather than hydrocarbon contamination and will be explored further in 2009.
- Primary productivity was uniformly low, as indicated by low phytoplankton biomass and low chlorophyll-α, as expected for these ultra-oligotrophic systems. Phytoplankton biomass was depressed in Second Portage Lake during summer and to a lesser degree in the fall, likely associated with the construction-related TSS introductions. This is discussed further in the dike construction monitoring report (Azimuth, 2009).
- Periphyton biomass, as expected and consistent with previous years, was quite variable among and within stations in 2008. There were some apparent patterns, with lower biomass at stations with deeper, colder water (e.g., Third Portage Lake). Several years of baseline periphyton data are available with which to compare periphyton growth on habitat compensation features. Further periphyton sampling at the AEMP stations is not needed.

- Benthic community samples were dominated by chironomid larvae in 2008, consistent with previous years. Total abundance and richness were depressed in Second Portage Lake in August 2008, likely due to construction-related sediment inputs. The extent of sediment-related impacts to benthic community did not appear to significantly affect the Tehek Lake station. This is discussed further in the dike construction monitoring report (Azimuth, 2009).

Baker Lake

- Limnology results suggest some influence of marine water at the Baker Lake stations, with fairly widespread elevated conductivity, hardness and ions relative to the Meadowbank study lakes. However, inputs from the Thelon River, which is more similar to water from the Meadowbank study lakes, seem to prevail under certain conditions (e.g., strong southerly winds). Despite some vertical differences in salinity, oxygen and temperature profiles show unstratified conditions.
- Water chemistry results show 23 of 28 metals below detection limits and all below CCME guidelines.
- Sediment chemistry showed lower metals concentrations than the Meadowbank study lakes, with only arsenic exceeding CCME guidelines. The higher arsenic concentrations were found primarily at the proposed jetty location, with each of the 15 sediment core samples exceeding CCME guidelines.
- Primary productivity was slightly higher at the Baker Lake stations relative to the Meadowbank study lakes, with the highest phytoplankton biomass found at the proposed jetty station.

Benthic community samples in Baker Lake were dominated by chironomid larvae. Total abundance and diversity at Baker Lake stations were generally higher than the Meadowbank study lakes, despite having sandier substrate.

1. INTRODUCTION

1.1. Background

The Meadowbank Gold Project is situated approximately 75 km north of the hamlet of Baker Lake, Nunavut. The Aquatic Effects Management Program (AEMP; BAER, 2005) was developed to address issues identified during the environmental impact assessment (EIA) process that could potentially impact the aquatic receiving environments surrounding the development. To this end, the AEMP describes the general monitoring strategy designed to detect these impacts and support the development of appropriate mitigation measures, as necessary. The core monitoring strategy was implemented for two complete annual cycles (2006 and 2007; Azimuth, 2008*a, b*) in advance of starting construction on the Meadowbank Gold Project, augmenting the existing baseline environmental data set. This AEMP monitoring report documents the strategy, methods and results of aquatic receiving environment monitoring activities undertaken during the 2008 open-water season, which is the first season where significant construction activities have been conducted (see **Section 1.4** for an overview).

1.2. Environmental Setting

Understanding the environmental setting of the project lakes is integral to understanding the design of the AEMP. The Meadowbank project lakes are situated in the barren-ground central Arctic region of Nunavut within an area of continuous permafrost. These are headwater ultra-oligotrophic/oligotrophic (nutrient poor and unproductive) lakes, situated on the watershed boundary that separates two main drainages—the Arctic and Hudson Bay drainages. Only a few hundred meters to the north of Second and Third Portage lakes is the divide between water that flows north to the Arctic Ocean (via the Meadowbank and Back River system) or to Chesterfield Inlet and Hudson Bay (via the Quoich River system).

The landscape consists of rolling hills and relief with low-growing vegetative cover and poor soil development. Numerous lakes are interspersed among boulder fields, eskers and bedrock outcrops, with indistinct and complex drainages. The main lakes in the Meadowbank project area (**Figure 1-1**) include: Third Portage Lake (TP), Second Portage Lake (SP), Tehek Lake (TE), and the Vault Lake system – Vault, Wally (WAL) and Drilltrail lakes. As is common of headwater lakes, all of the project lakes have small drainage areas relative to the surface area of the lakes themselves. Local inflow from surrounding terrain is the predominant influence on water movement within the system. Small channels connect the project area lakes, although there is little flow between lakes during most of the year. The ice-free season on these lakes is very short, with ice break-

up in late-June to mid-July and ice-up beginning in late September or early October. Maximum ice thickness is at least 2 m by March/April.

Overall, the Meadowbank project lakes support healthy communities of plankton, benthos and fish that are typical of oligotrophic Arctic lakes (BAER, 2005). Biological productivity of the lakes is limited by nutrient availability, cold water and a short growing season.

1.3. Objectives and Approach

The overall objective of the AEMP is to ensure that the aquatic environment and its resources are protected by considering all aspects of mine operations with the potential to adversely affect the aquatic environment. The AEMP takes an integrated, ecosystem-based approach that links mitigation and monitoring of physical/chemical effects on key ecological receptors in the receiving environment.

At its core, the AEMP was designed to address key issues identified in the Meadowbank EIA (i.e., mining-related activities with the potential to affect water quality, fish habitat and fish populations). Monitoring results are intended to inform the adaptive management process, supporting the early identification of potential problems and development of mitigation options to address them. Consistent with the principles of adaptive management, the AEMP will be subject to periodic review to refine the program to improve its effectiveness as our understanding of key issues evolves over time. The Meadowbank AEMP has two primary components, which are described below.

1.3.1. Core Monitoring Program

The core program consists of a general strategy to monitor water and sediment quality, phytoplankton, periphyton, and benthic invertebrates. The core program is tailored based on our understanding of mine construction, operation and infrastructure (e.g., dikes, effluents, stream crossings, roads, etc.) and has been developed to detect mine-related impacts at temporal and spatial scales that are ecologically relevant. The core program initially focused solely on the project lakes, but was expanded to Baker Lake in 2008 to ensure that monitoring was also in place to track project-related activities in that area. The study design is based on a control-impact approach but has also incorporated the concept of gradients in exposure. To this end, the 2008 program consisted of 10 stations (see **Figures 1-1 through 1-4**), each categorized into one of the three main types of stations described below:

- *Near-field (NF) areas* – Stations are situated in close proximity to the development, in particular near dikes and effluent sources (**Figure 1-1; Figure 1-4**). These stations provide the first line of defense or early-warning locations for introductions of stressors into the receiving environment. For the project lakes area, these stations

include: Third Portage North (TPN), Third Portage East (TPE), Second Portage (SP) and Wally Lake (WAL). For Baker Lake, there are two NF stations, one targeting the hamlet's barge landing area (Baker Barge Dock [BBD]) and the other AEM's fuel storage facility (Baker Proposed Jetty [BPJ]).

- *Far-field (FF) area* – The intent of this station is to monitor downstream of project infrastructure to provide insights into the spatial extent of any effects observed at the near-field stations. The Tehek Lake (TE) station is a key location that will ultimately determine whether or not contaminants are detectable downstream of the entire mine development (**Figure 1-2**). Lake waters from Second and Third Portage Lakes and the Vault Lakes (Vault, Wally, Drilltrail) meet at the southern end of Second Portage Lake and discharge via a single channel into Tehek Lake (**Figure 1-3**). Monitoring the water and sediment quality and the health of the benthic invertebrate community in the basin adjoining the discharge point from Second Portage Lake will help determine if any effects identified at NF stations are extending into Tehek Lake.
- *Reference (Ref) areas* – By definition, reference stations are sufficiently removed from the mine that they are presumed to be unaffected by any infrastructure (roads, dikes, runways) and point sources (aerial and aquatic) associated with mine development. Internal (Third Portage South [TPS]) and external (Inuggugayualik Lake [INUG]) reference areas were chosen for the purposes of making comparisons with the project lakes (BAER, 2005). Monitoring of reference areas is important because it is necessary to distinguish between possible mine-related changes in water quality or ecological parameters and natural changes, unrelated to the mine. The internal reference area (at the extreme headwaters of Third Portage Lake) is far removed from the mine, upstream of the development area and is removed from the prevailing wind direction. The external reference area (Inuggugayualik Lake) is situated about 16 km west of the mine site (**Figure 1-1**). Inuggugayualik Lake is a headwater lake of the Meadowbank River system that flows north to the Arctic Ocean. Despite the different drainage basin, Inuggugayualik Lake satisfies the requirements of an external reference lake from a physical/chemical perspective because it is at the same latitude, has similar geology, relief and climate, does not have any significant inflows and has similar limnological parameters, water chemistry and aquatic biological community structure to the project lakes (BAER, 2005). For Baker Lake, an internal reference area was added several kilometers to the east of the hamlet along the north shore of the lake (Baker Akilahaarjuk Point [BAP]).

Thus, the core monitoring program design not only allows for the detection of impacts, but also should provide an indication of the extent (both spatially and temporally) of any adverse effects.

1.3.2. Targeted Monitoring Studies

Targeted studies are specific studies that typically have narrower temporal or spatial bounds or are designed to address specific questions related to particular components of mine development during construction or operation. These are integrated with, and complementary to, the core monitoring design. The following target monitoring studies were conducted in 2008:

- *Surface sediment coring* – The sediment sampling collection (i.e., the Petite Ponar grab) and processing (i.e., compositing of sediments from three separate grabs) methods used in the core monitoring program were designed to broadly characterize conditions within a station. Recognizing that early open water in 2008 would be the last time any additional baseline data could be collected, a study was designed to characterize the spatial variability of surface sediments (i.e., top 1-cm only) at each AEMP monitoring station. Coring was selected as the best sampling method and 15 replicate samples were collected broadly across each station. All sampling was conducted prior to the onset of major construction activities. This study is reported within this document. Ultimately, the results will be used to support the refinement of the AEMP program.
- *"Explosives" Lake assessment* – The revised location for the Meadowbank explosives plant is situated adjacent to an unnamed lake that had not been assessed during baseline environmental studies. Consequently, key information gaps existed as to its status as fish habitat and as to its basic morphology. A study was undertaken to characterize the lake and to provide answers to some basic questions related to using the lake as a water source. The study is document in **Appendix E** of this report.
- *Dike construction monitoring* – A detailed monitoring and management program for dike construction was developed as part of the Nunavut Water Board (NWB) A License process. The program was implemented for the construction of the East Dike and Western Channel Dike during open water 2008. Monitoring program results are documented in a separate report (Azimuth, 2009).
- *Total suspended solids (TSS) effects assessment strategy (EAS)* – In response to elevated TSS concentrations related to construction of the East Dike, the TSS EAS was implemented to determine the ecological significance of the situation. This study is documented along with dike construction monitoring (Azimuth, 2009).

1.4. Meadowbank Gold Project Development

The construction phase of the Meadowbank Gold Project officially started in June 2008, upon receipt of the NWB A Water License (2AM-MEA0815) for the project. The Fisheries and Oceans Canada (DFO) *Fisheries Act* Authorization (NU-03-0191) for the project was issued on July 30, 2008, thus allowing the start of in-water construction activities, which started that same day. Major in-water construction activities for 2008 included the East Dike (located in Second Portage Lake) and the Western Channel Dike (located between Third Portage Lake and Second Portage Lake); the closest AEMP station to these activities was the Second Portage Lake station (SP).

While a significant amount of construction activities were conducted across the site, those conducted adjacent to, or particularly within, aquatic receiving environments were of greatest interest due to their higher potential to introduce sediments or other contaminants. As discussed previously, targeted studies were developed to closely monitor in-water construction activities (i.e., dike construction). Notwithstanding, the AEMP program was also designed provide insights into the potential adverse effects of these activities. Consequently, the studies should be viewed as complementary, rather than independent.

While the onset of construction activities signaled the end of the baseline (i.e., pre-development) phase for certain AEMP stations, it is important to note that no activities were undertaken in the immediate vicinity of several NF stations (i.e., Wally Lake [WAL] and Third Portage Lake [TPN and TPE]). The 2008 monitoring results for these stations, consequently, can still provide insights into how they vary naturally. Furthermore, certain 2008 events were conducted prior to the onset of in-water construction activities. For example, the surface sediment coring program was conducted in Second Portage Lake before any activities started on the East Dike. Thus, the spatial and temporal mosaic of development activities needs to be considered when discussing the 2008 AEMP monitoring results.

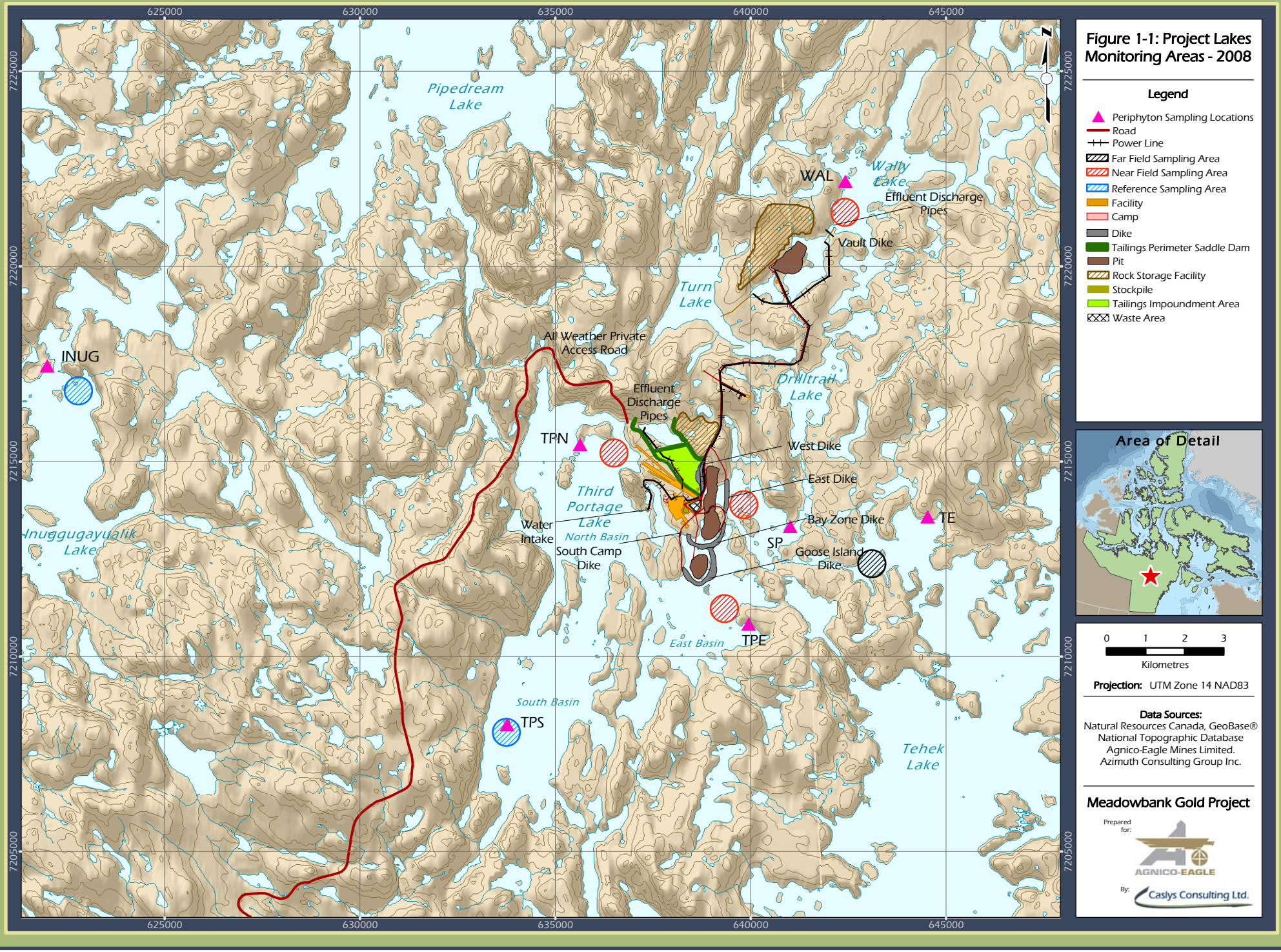


Figure 1-1: Project Lakes Monitoring Areas - 2008

Legend

- Periphyton Sampling Locations
- Road
- Power Line
- Far Field Sampling Area
- Near Field Sampling Area
- Reference Sampling Area
- Facility
- Camp
- Dike
- Tailings Perimeter Saddle Dam
- Pit
- Rock Storage Facility
- Stockpile
- Tailings Impoundment Area
- Waste Area

Area of Detail

0 1 2 3

Kilometres

Projection: UTM Zone 14 NAD83

Data Sources:
Natural Resources Canada, GeoBase® National Topographic Database
Agnico-Eagle Mines Limited.
Azimuth Consulting Group Inc.

Meadowbank Gold Project

Prepared for: AGNICO-EAGLE

By: Caslys Consulting Ltd.

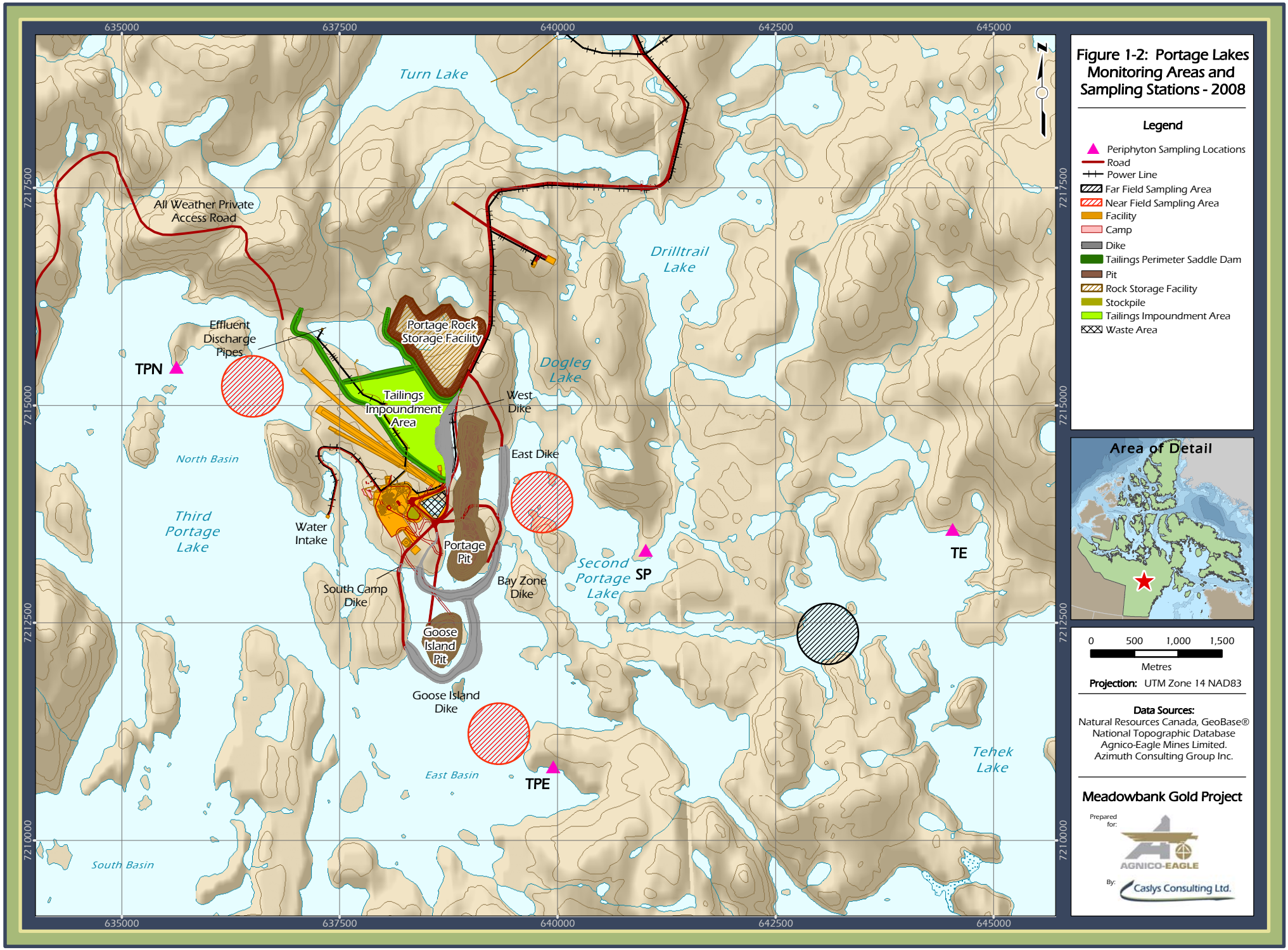


Figure 1-2: Portage Lakes Monitoring Areas and Sampling Stations - 2008

Legend

- Periphyton Sampling Locations
- Road
- Power Line
- Far Field Sampling Area
- Near Field Sampling Area
- Facility
- Camp
- Dike
- Tailings Perimeter Saddle Dam
- Pit
- Rock Storage Facility
- Stockpile
- Tailings Impoundment Area
- Waste Area

Area of Detail

0 500 1,000 1,500

Metres

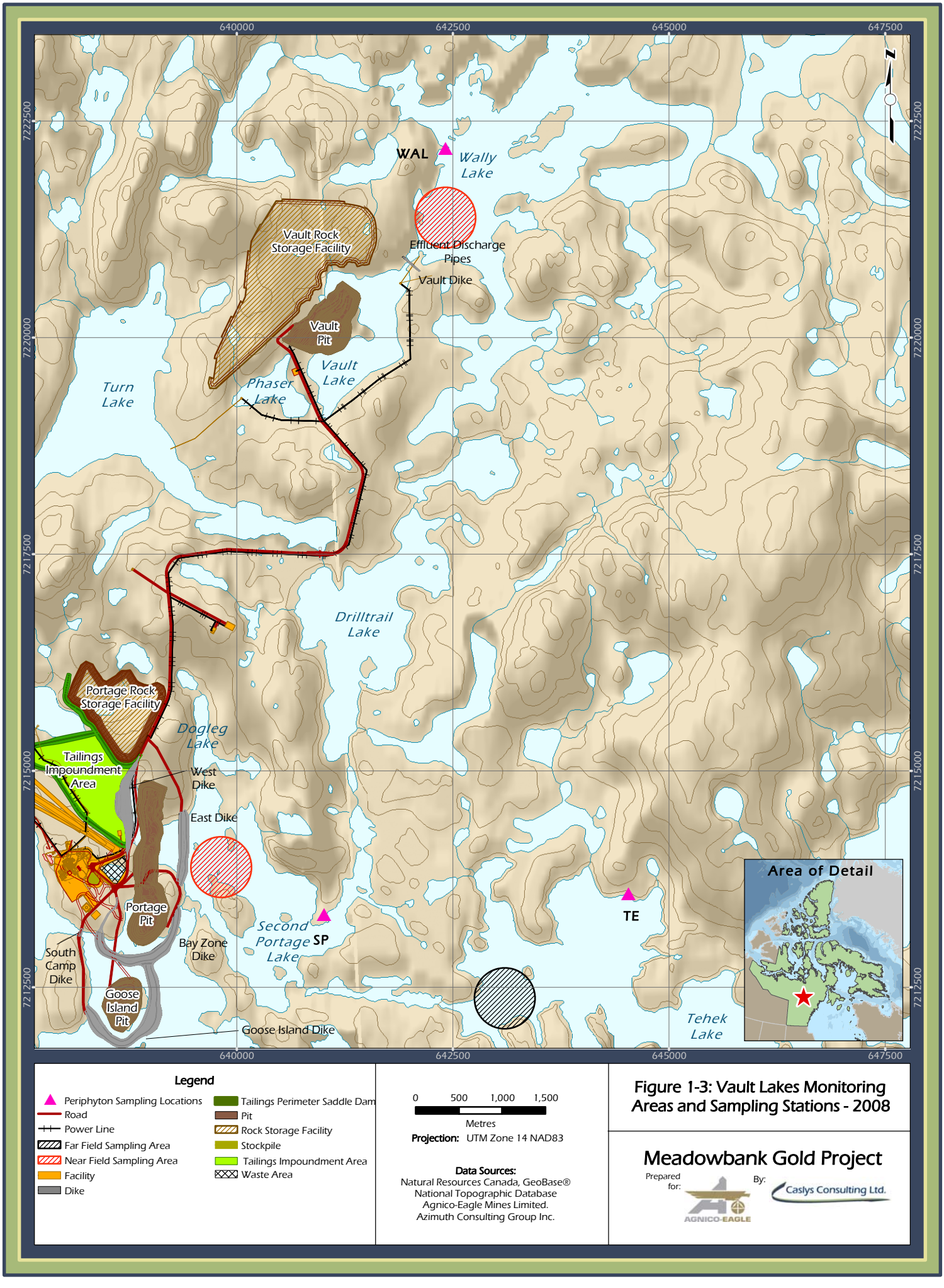
Projection: UTM Zone 14 NAD83

Data Sources:
Natural Resources Canada, GeoBase® National Topographic Database
Agnico-Eagle Mines Limited.
Azimuth Consulting Group Inc.

Meadowbank Gold Project

Prepared for: AGNICO-EAGLE

By: Caslys Consulting Ltd.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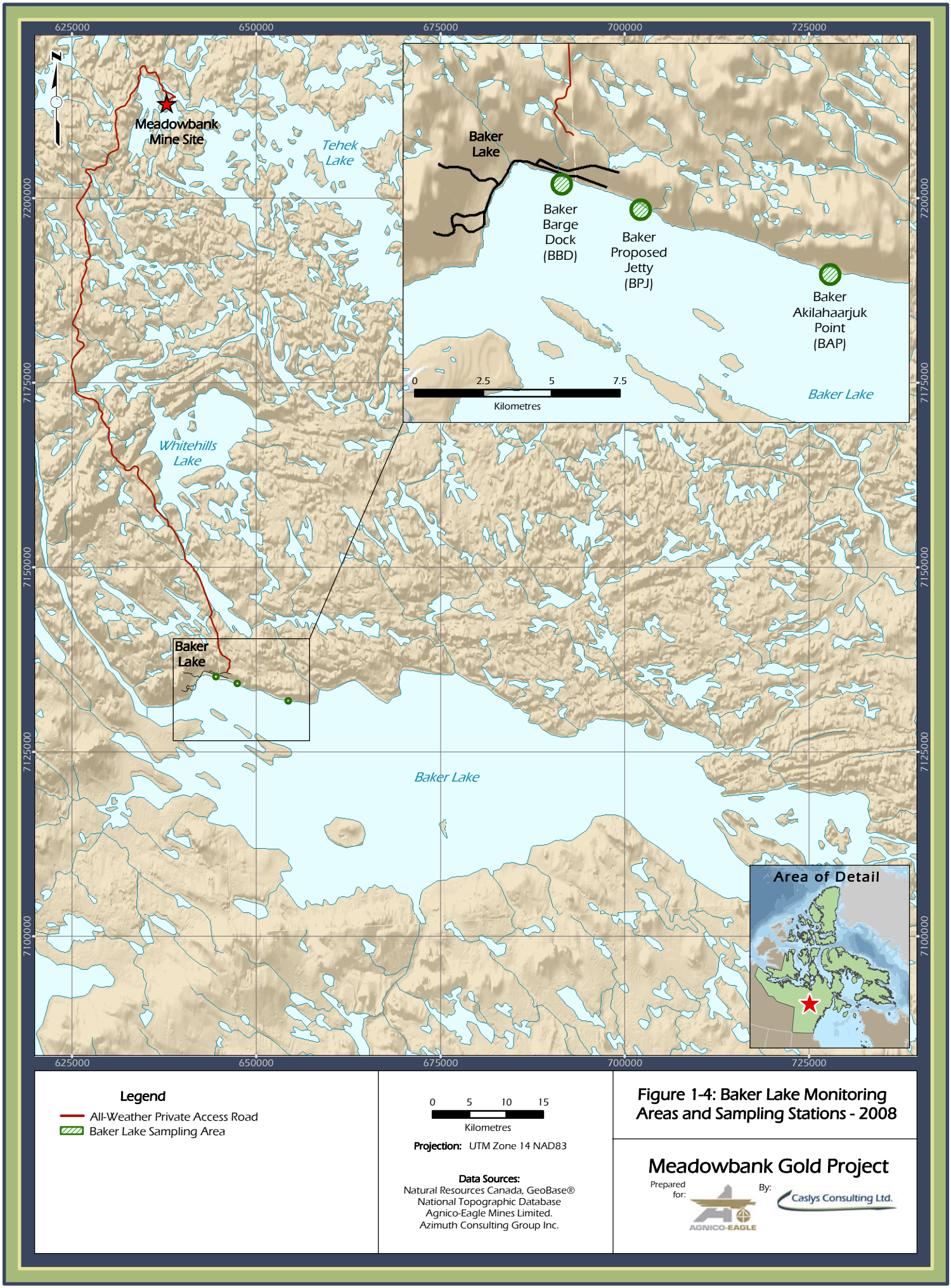
WAL
Wally Lake
Vault Rock Storage Facility
Effluent Discharge Pipes
Vault Dike
Vault Pit
Vault Lake
Phaser Lake
Turn Lake
Drilltrail Lake
Portage Rock Storage Facility
Dogleg Lake
Tailings Impoundment Area
West Dike
East Dike
Portage Pit
Bay Zone Dike
South Camp Dike
Goose Island Pit
Goose Island Dike
Second Portage Lake
SP
TE
Tehek Lake
Area of Detail
Legend
Periphyton Sampling Locations
Road
Power Line
Far Field Sampling Area
Near Field Sampling Area
Facility
Dike
Tailings Perimeter Saddle Dam
Pit
Rock Storage Facility
Stockpile
Tailings Impoundment Area
Waste Area
0 500 1,000 1,500
Metres
Projection: UTM Zone 14 NAD83
Data Sources:
Natural Resources Canada, GeoBase®
National Topographic Database
Agnico-Eagle Mines Limited.
Azimuth Consulting Group Inc.
Figure 1-3: Vault Lakes Monitoring Areas and Sampling Stations - 2008
Meadowbank Gold Project
Prepared for:
AGNICO-EAGLE
By:
Caslys Consulting Ltd.


625000
650000
675000
700000
725000
7200000
7175000
7150000
7125000
7100000
N
Meadowbank Mine Site
Tehek Lake
Whitehills Lake
Baker Lake
Baker Lake
Baker Barge Dock (BBD)
Baker Proposed Jetty (BPJ)
Baker Akilahaarjuk Point (BAP)
0 2.5 5 7.5
Kilometres
Baker Lake
Baker Lake
Area of Detail
Legend
All-Weather Private Access Road
Baker Lake Sampling Area
0 5 10 15
Kilometres
Projection: UTM Zone 14 NAD83
Data Sources:
Natural Resources Canada, GeoBase®
National Topographic Database
Agnico-Eagle Mines Limited.
Azimuth Consulting Group Inc.
Figure 1-4: Baker Lake Monitoring Areas and Sampling Stations - 2008
Meadowbank Gold Project
Prepared for:
AGNICO-EAGLE
By:
Caslys Consulting Ltd.

2. METHODS

2.1. 2008 AEMP Program Overview

Field sampling in 2008 was conducted during three time periods; spring (July 19–28), summer (August 16–29) and fall (September 17–21). Sample collection for all AEMP core monitoring components are shown for each season in **Table 2-1**, while Global Positioning System (GPS) Universal Transverse Mercator (UTM) coordinates (in NAD 83) for the sampling stations are shown in **Table 2-2**.

General limnology, water and phytoplankton samples were collected in the spring, summer and fall (WAL and INUG could not be accessed due to helicopter limitations and TE had limited access), while sediment, benthos and periphyton (not for Baker Lake) sampling was conducted in summer only. Phytoplankton was not collected in week 1 of August as was planned in 2007 (Azimuth, 2008*a*) because sampling for week 3 of July had just been completed as it extended into week 4.

2.2. General Limnology

Vertical temperature (^{o}C), oxygen (mg/L) and conductivity (µS/cm) depth profiles were acquired using the YSI Model 85 temperature – oxygen meter. Profiles were acquired from each station at each sampling event to track changes in oxygen and temperature profiles. Secchi depth (m) was measured prior to collection of water and sediment samples.

2.3. Water Chemistry

Water samples were collected from all sampling stations in spring and summer and from most stations in the fall (as described above, WAL and INUG could not be accessed due to helicopter limitations and TE had limited access). In addition, three additional samples were collected in the north basin of Third Portage Lake (TPN) in the fall to provide some insights into within-station spatial variability. Water was collected from 4 m depth by pumping lake water using weighted flexible (food-grade silicone) tubing and a diaphragm pump connected to a 12 volt battery. The procedures for collecting the water samples are outlined in detail in the Standard Operating Procedure (SOP) for Water and Phytoplankton Sampling (AEM, 2009).

ALS Environmental (Vancouver, BC) provided all of the sampling containers and appropriate preservatives. 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 and total dissolved and suspended solids), anions (alkalinity, chloride and sulfate), nutrients (ammonia, nitrate, nitrite, total Kjeldahl nitrogen, orthophosphate and total phosphate), organic parameters (chlorophyll-*a*, dissolved and total organic carbon, oil and grease) and total metals.

Water chemistry concentrations were tabulated and compared against each other, and, when available, the federal Canadian Council of Ministers of the Environment (CCME, 2007) water quality guidelines for the protection of aquatic life. 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).

2.4. Sediment Chemistry

2.4.1. Bulk Grab Sampling Program

Sediment was collected in the summer (August) using proven sample collection and handling techniques (Environment Canada, 1984). The procedures for collecting the sediment samples are outlined in detail in the SOP for Benthos and Sediment Sampling (AEM, 2009). Sediment (top 3–5 cm) was collected from all stations using a Petite Ponar grab (sampling area of 0.023 m^2). Three grab samples were composited from each station to reduce the influence of within-station spatial heterogeneity[1]. Sediment chemistry grabs were collected after benthic invertebrate sampling to avoid possible disturbance of biota.

Only those grab samples that met the following acceptability criteria were retained for analysis: did not contain large foreign objects; adequate penetration depth (i.e., 10–15 cm); not overfilled (sediment surface not touching the top of sampler); did not leak (there was overlying water present and no visible leaks); and was undisturbed (sediment surface was relatively flat). Grabs that did not satisfy these conditions were discarded.

Sampling jars were placed in a cooler with ice packs and transported to ALS Environmental (Vancouver, BC) for analysis. A completed chain-of-custody form accompanied the samples during transport. Sediment samples were analyzed for pH, total organic carbon, moisture content, particle size (% gravel, sand, silt and clay), oil and grease, PAHs (polycyclic aromatic hydrocarbons) and total metals concentrations.

[1] Within-station spatial variability was directly assessed in the targeted sediment coring study reported herein.

Sediment metals concentrations were compared to sediment quality guideline (SQG) concentrations developed by the CCME (2002) for the protection of aquatic life. There are two levels of SQGs: Interim Sediment Quality Guidelines (ISQG) and Probable Effects Level (PEL) concentrations. ISQGs are conservative values that represent the concentration below which adverse effects are unexpected. The PEL is less conservative and represents a concentration above which adverse effects may be observed, based on laboratory studies. It is important to realize that background metals concentrations in sediments routinely exceed both ISQG and PEL concentrations, especially in mineralized areas and that this does not mean that adverse effects should be expected. All of the measured sediment chemistry concentrations from the study lakes were tabulated and compared against each other and, when available, the SQGs.

2.4.2. Target Sediment Coring

The early open water in 2008 is the last time that additional baseline data to characterize the spatial variability of surface sediments (i.e., top 1-cm only) at each AEMP monitoring station could be acquired. Coring was selected as the best sampling method and 15 replicate samples were collected broadly across each AEMP station, prior to starting any in-water construction activities. The objective of this coring program was to characterize spatial variability of surface (<1 cm) sediment chemistry at each station. These results will provide a more comprehensive characterization of baseline conditions and provide a better data set against which to compare future sediment chemistry monitoring results.

Collection of surface sediment cores was conducted in July (Meadowbank study lakes) and August (Baker Lake stations) from all stations using a hand-operated corer (barrel diameter of 7 cm). Fifteen independent cores plus one field duplicate were collected from each station. Cores were collected over a wide area (at least 25-50 m between cores) within the bounds of each sampling station (**Figures 1-1 and 1-4**). Core samples were analyzed for pH, total organic carbon and total metals concentrations.

Only those core samples that met the following acceptability criteria were retained for analysis: corer was deployed and remained perpendicular to the bottom; corer did not hit hard, impenetrable substrate; and the core sediment sample was undisturbed (did not mix or fall out of bottom while being pulled to the surface). Cores that did not satisfy these conditions were discarded. The procedures for collecting the sediment cores are outlined in the AEMP sediment coring terms of reference memo in **Appendix A**. Only the top 1 cm was retained for analysis.

Once collected, these sediments were stored, transported, analyzed (for total metals, pH and total organic carbon only), and tabulated in a similar manner to the bulk grab sediment samples (see **Section 2.4.1)**.

2.5. Phytoplankton

Phytoplankton are microscopic, unicellular plant species that are suspended in the water column and, as primary producers, comprise the base of the food web. There are six major groups of phytoplankton present in lakes: cyanophytes (blue green algae), chlorophytes (green algae), chrysophytes (golden-brown algae), diatoms, cryptophytes and dinoflagellates. Seasonal production of phytoplankton can vary widely depending upon water temperature, nutrient concentration, time of year, water clarity and amount of sunlight and predation by zooplankton. Estimates of phytoplankton biomass (mg/m^3) are useful as gross indicators of lake productivity.

Unfiltered water (125 mL) was collected at the surface[2] from each sampling station during the spring and summer of 2008, and from a subset of stations in the fall. The procedures for collecting the phytoplankton samples are outlined in detail in the SOP for Water and Phytoplankton Sampling (AEM, 2009).

Samples were preserved in the field with a small amount (approx. 1 ml) of Lugol's solution and later transported to Winnipeg, MB for taxonomic identification and analysis by Plankton R Us Inc. For the analysis, 10-mL aliquots of preserved sample were gravity settled for 24 hours. Counts were performed on an inverted microscope at magnifications of 125X, 400X, and 1200X with phase contrast illumination. Cell counts were performed using the Ütermohl technique as modified by Nauwerck (1963). Cell counts were converted to wet weight biomass (mg/m^3) by estimating cell volume. Estimates of cell volume for each species were obtained by measurements of up to 50 cells of an individual species and applying the geometric formula best fitted to the shape of the cell (Vollenweider, 1968; Rott, 1981). A specific gravity of 1 was assumed for cellular mass. All biomass (mg/m^3) and density (cells/L) estimates are summed by major taxa, per station and sampling event.

Simpson's diversity index was calculated for each station to quantify phytoplankton species diversity among stations and sampling events (Washington, 1984). Simpson's diversity (D) is calculated as follows:

$$D = 1 - \Sigma S (p_i)^2$$

where: S is the total number of taxa/station; pi is the relative proportion of the *ith* taxa at each station (based on relative abundance). The number of species occurring per sample was calculated to measure the species richness among stations and sampling events.

[2] Although water was collected at 4 m depth for water chemistry, surface water was sampled for phytoplankton analyses.

2.6. Periphyton

Periphyton are unicellular and colonial aquatic algae species attached to and coating rocks and other hard substrates beneath the water surface. Periphyton provide an important food source for certain benthic invertebrate species and form the base of the food web, together with phytoplankton and benthic algae. Periphyton are most abundant between the surface and several meters water depth, and typically increase in biomass during the course of the open water season, reaching maximum abundance during late summer, and decline during late fall and winter, as the sun disappears.

Species composition and biomass of periphyton are indirect indicators of lake productivity, reflecting nutrient concentrations in the lake, and are sometimes indicators of the presence of contaminants. Because some periphyton species are sensitive to the presence of metals, reductions in periphyton communities over time can indicate the presence of dissolved metals in the water column.

Sampling stations were located near the basin-based chemistry and benthos stations. However, due to specific site requirements for periphyton (see below) there were differences in proximity to the basin-based stations. Sampling locations are illustrated in **Figures 1-1 to 1-3**; UTM coordinates for each sample are presented in **Table 2-2**. Five replicate samples were collected per sampling station. Stations were chosen according to the following criteria: a sufficient number of large, flat rocks, in no more than 0.5 m depth water; flat rock surface facing up as much as possible, if not, with only a small slope; and rocks with uniform algal coverage, not uniformly dense or sparse.

Periphyton were semi-quantitatively sampled with a specially designed algae scrubber. The procedures for collecting the samples are outlined in detail in the SOP for Periphyton Sampling (AEM, 2009). Periphyton samples were preserved in the field with a small amount of Lugol's solution and sent to Plankton R Us Inc. (Winnipeg, MB) for taxonomic identification and analysis.

Photo: Algae scrubber used to remove periphyton from rocks. Three rocks were sampled per replicate; five replicates conducted per station.

In the laboratory, each periphyton sample was well mixed and 2-mL sub-samples of suspension were sonicated for 10–20 seconds using a Sonifer Cell Disruptor (model w140) and gravity settled for 24 h in an Ütermohl chamber (Findlay et al., 1999). Counts were performed on an inverted microscope at magnifications of 125X, 400X, and 1200X with phase contrast illumination. Cells were identified, counted and measured from random fields until 100 cells of the dominant species were found. Cell counts were converted to wet weight biomass (mg/m^2) by approximating cell volume. Estimates of cell volume for each species were obtained by measurements of up to 50 cells of an individual species and applying the geometric formula best fitted to the shape of the cell (Vollenweider, 1968; Rott, 1981). Data were reported in terms of abundance (number of $cells/cm^2$) and biomass ($\mu g/cm^2$).

Simpson's diversity index was calculated for each station to quantify periphyton species diversity among stations and replicate samples (Washington, 1984). Simpson's diversity (D) is calculated as follows:

$$D = 1 - \Sigma S (p_i)^2$$

where: S is the total number of taxa/station; pi is the relative proportion of the *ith* taxa at each station (based on relative abundance). The number of species occurring per sample was calculated to measure the species richness among stations and replicate samples.

2.7. Benthic Invertebrates

Benthic invertebrates are small animals that live in or on bottom sediments. The most commonly encountered organisms include the aquatic larval stages (i.e., resembling worms) of insects, especially chironomids (i.e., midge larvae). Other common organisms are oligochaete worms, small bivalve clams and amphipods (i.e., crustaceans). Benthic invertebrates form a very important food source for all juvenile fish, especially lake trout, arctic char and lake whitefish.

Benthic invertebrates were collected from each sampling station in the summer (August) of 2008, using a Petite Ponar grab (0.023 m^2) and a 500-µm sieve. Sampling locations are illustrated in **Figures 1-1 to 1-3**; UTM coordinates for each sample are presented in **Table 2-2**. Five replicate samples were collected per station. Two independent grabs per station were composited to form a single sample to reduce sampling variation within stations and to increase the surface area sampled. Depths ranged from 6.7 to 13.4 m.

Only those grab samples that met the following acceptability criteria were retained for analysis: did not contain large foreign objects; adequate penetration depth (i.e., 10–15 cm); not overfilled (sediment surface not touching the top of sampler); did not leak (there was overlying water present and no visible leaks); and was undisturbed (sediment surface was relatively flat). Grabs that did not satisfy these conditions were discarded.

The procedures for collecting the benthic invertebrate samples are outlined in detail in the SOP for Benthos and Sediment Sampling (AEM, 2009).

Benthos samples were preserved in the field with a 10% buffered formalin solution and sent to Zaranko Environmental Assessment Services (ZEAS) (Nobleton, ON) for taxonomic identification and analysis.

Upon arrival at ZEAS, samples were immediately logged and inspected to ensure adequate preservation to a minimum level of 10% buffered formalin and checked for correct labeling. Benthos samples were sorted at a magnification of between 7 and 10 times with the use of a stereomicroscope. To expedite sorting prior to processing, all samples were stained with a protein dye that is absorbed by aquatic organisms but not by organic material, such as detritus and algae.

Prior to sorting, samples were washed free of formalin in a 500-µm sieve. In samples containing sand, gravel, or rocks, elutriation techniques were used to separate the lighter benthic macroinvertebrates and associated debris from the heavier sand, gravel and rocks. Elutriation techniques effectively removed almost all organisms except some heavy-bodied organisms such as molluscs and caddisflies with rock cases. As such, the remaining sand and gravel fraction was closely inspected. After elutriation, the remaining debris and benthic macroinvertebrates were washed through a series of two sieves, (i.e., 3.36-mm and 500-µm

respectively). The screening of material through a series of sieves is used to facilitate sorting. This procedure separates macroinvertebrates and detritus into a set of size-based fractions that can be sorted under a more constant magnification.

Benthos were enumerated and sorted into major taxonomic groups, (i.e., order and family), placed in glass bottles and re-preserved in 80% ethanol for more detailed taxonomic analysis by senior staff. Each bottle was labeled internally with the survey name, date, station and replicate number.

Abundance of organisms/m^2 was determined from the total number of organisms enumerated (see **Section 3.6**). Nematodes and ostracods were not reported, nor were they included in abundance and richness calculations because they are too small to be reliably retained on a 500-µm sieve.

The following endpoints were used for assessing benthic community structure, based on sensitivity, objectivity, ease of interpretation and cost-effectiveness:

- Taxa richness (i.e., corresponds to the number of species or taxa per sample and provides a measure of diversity).
- Total abundance (i.e., number of organisms per m^2).
- Abundance and richness of all major taxa (e.g., insects, molluscs, worms).

Statistical analyses were used to explore spatial differences (i.e., to test for "lake effect," which looks for differences among lakes and/or basins) in total abundance and richness, and in abundance and richness of all major taxa groups. Differences among lake stations are investigated independently using ANOVA (or Kruskal-Wallis tests where data are not normally distributed). Where significant differences exist, post-hoc testing (Tukey's HSD [honestly significant difference] multiple comparisons) was used to determine where differences existed.

2.8. Quality Assurance / Quality Control

The objective of quality assurance and quality control (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.

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 very tiny 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.

Field QA/QC: Water Sampling – Field QA/QC standards during water sampling were maintained for every sample. The standard QA/QC procedures included thoroughly flushing the flexible tubing and pump to prevent cross-contamination between stations and thoroughly rinsing the sample containers with site water prior to sample collection.

A field duplicate at one of station per sampling event was collected to assess sampling variability and sample homogeneity; a RPD of 50% for concentrations that exceed 10x the MDL is considered acceptable.

Field QA/QC: Sediment Sampling – Field QA/QC during sediment sampling was careful to avoid cross-contamination between sampling areas by rinsing and cleaning the Petite Ponar grab, buckets, stainless steel compositing bowls and spoons between stations. This entailed rinsing the equipment with site water to remove sediment and organic material, scrubbing with phosphate-free cleaning detergent, and again rinsing with site water. An ashless filter was swiped over the pre-cleaned bowl and Ponar at one location to assess the cleaning procedures.

A field duplicate at one station was collected to assess sampling variability and sample homogeneity; a RPD of 50% for concentrations that exceed 10x the MDL is considered acceptable.

Field and Laboratory QA/QC: Biota Sampling – Standard procedures were used to collect biota samples. All sampling gear was thoroughly rinsed between sampling stations to ensure that there was no inadvertent introduction of biota from one station to another.

A field duplicate was collected for phytoplankton at one sampling station per sampling event to assess sampling variability and sample homogeneity. A RPD of 50% for density and biomass concentrations is considered acceptable. As a measure of QA/QC on the enumeration method replicate counts were preformed on ~10% (3) of the samples. Replicate samples were chosen at random and processed at different times from the original analysis to reduce biased.

Field replicates were collected for periphyton and benthos to determine natural variability and heterogeneity. Also, laboratory replicate counts (density and biomass) for periphyton were performed on ~10% of all samples and were chosen at random. Data quality objectives (DQO) for replicates should be within ± 25% of the first count (i.e., the RPD).

ZEAS incorporates the following set of QA/QC procedures in all benthic projects undertaken by the company to ensure the generation of high quality and reliable data:

- Samples were logged upon arrival, inspected, and enumerated;
- Samples were checked for proper preservation;
- Samples were stained to facilitate sorting;
- Taxonomic identifications were based on the most updated and widely used keys;
- 10% of the samples were re-sorted, documenting 90% recovery;
- Precision and accuracy estimates were calculated;
- A voucher was compiled;
- Sorted sediments and debris are re-preserved in 10% formalin and are retained for up to three months. For samples subject to subsampling, sorted and unsorted fractions were represerved separately.

Data quality objectives (DQO) for replicate counts should be within ± 20% of the first count (i.e., the RPD). Field replicate RPD values less than 50% are usually indicative that sampling bias is not excessive and that the resident biota population has been sampled representatively.

Table 2-1: AEMP core monitoring components conducted in 2008.

Project Lake	UTM (NAD 83) Easting	UTM (NAD 83) Northing	Station ID	SEASON	SPRING				SUMMER				FALL		
				Month	July				August				September[1]		
				Week	1	2	3	4	1	2	3	4	1	2	3
Third Portage	14W 0638558	7211292	*TPE*		Ice		Limno Water Sed Phyto Peri Coring				Limno Water Sed Phyto Peri Benthos				Limno Water Phyto
	14W 0639934	7210849													
	14W 0636503	7215322	*TPN*		Ice		Limno Water Sed Phyto Peri Coring				Limno Water Sed Phyto Peri Benthos				Limno Water Phyto
	14W 0635635	7215462													
	14W 0633840	7208079	*TPS*		Ice		Limno Water Sed Phyto Peri Coring				Limno Water Sed Phyto Peri Benthos				Limno Water Phyto
	14W 0633774	7208286													
Second Portage	14W 0639832	7213979	*SP*		Ice		Limno Water Sed Phyto Peri Coring				Limno Water Sed Phyto Peri Benthos				Limno Water Phyto
	14W 0641016	7213346													
Wally	15W 0360424	7221343	*WAL*		Ice		Limno Water Sed Phyto Peri Coring				Limno Water Sed Phyto Peri Benthos				
	15W 0360521	7222047													
Tehek	15W 0360061	7212182	*TE*		Ice		Limno Water Sed Phyto Peri Coring				Limno Water Sed Phyto Peri Benthos				Limno Water Phyto
	15W 0361837	7213265													
Inuggugayualik	14W 0622843	7216842	*INUG*		Ice		Limno Water Sed Phyto Peri Coring				Limno Water Sed Phyto Peri Benthos				
	14W 0621980	7217467													

Table 2-1 con't: AEMP core monitoring components conducted in 2008.

Project Lake	UTM (NAD 83) Easting	UTM (NAD 83) Northing	Station ID	SEASON	SPRING				SUMMER				FALL		
				Month	July				August				September[1]		
				Week	1	2	3	4	1	2	3	4	1	2	3
Baker Lake	14W 0644467	7135221	*BBD*		Ice			Limno Water Phyto				Limno Water Sed Phyto Benthos Coring			Limno Water Phyto
	15W 0357188	7134092	*BPJ*		Ice			Limno Water Phyto				Limno Water Sed Phyto Benthos Coring			Limno Water Phyto
	15W 0363884	7131039	*BAP*		Ice			Limno Water Phyto				Limno Water Sed Phyto Benthos Coring			Limno Water Phyto

Notes:

Limno: 1 profile; parameters includes vertical temperature (°C), oxygen (mg/L) and conductivity (µS/cm) depth profiles; same approximate sampling location as water.

Water: 1 sample; analysis includes conventional parameters (hardness, conductivity, pH, total dissolved & suspended solids), anions (alkalinity, chloride, sulfate), nutrients (ammonia, nitrate, nitrite, total kjeldahl nitrogen, orthophosphate, total phosphate), organics (total & dissolved organic carbon, chlorophyll-a, oil & grease) and total metals.

Sed: 1 sample (3 grab composite); analysis includes pH, total organic carbon (TOC), moisture content, particle size, PAHs, oil & grease, and total metals concentrations; same approximate sampling location as water.

Phyto: 1 sample; analysis includes identification of species, biomass (mg/m^3) and density (cells/L) for each major taxa from a 125ml sample; week 1 August was not sampled as planned in 2007 because weeks 3 & 4 July had just been completed; same approximate sampling location as water.

Peri: 5 replicate samples (3 composites/rep); analysis includes identification of species, abundance ($cells/cm^2$) and biomass ($\mu g/cm^2$) for each major taxa; station location differs from rest of components; periphyton was not collected at Baker Lake stations.

Benthos: 5 replicate samples (2 grabs/sample); analysis includes identification of species, abundance ($\#/m^2$) and richness (# taxa) (total & for each major taxa group); same approximate sampling location as water.

Coring: 15 replicate samples; analysis includes pH, TOC, and total metals; sediment coring was a targeted study and is not part of the core AEMP monitoring program.

[1] Week 3 September sampling in Wally and Inuggugayualik Lakes was not possible because the helicopter was no longer available.

Table 2-2: AEMP sampling location coordinates (GPS, UTM, NAD83), Meadowbank study lakes, July, August and September 2008.

Station ID[1]	Station Type[2]	**Water & Phytoplankton** (monthly)			**Sediment** (August)				**Periphyton** (August)			**Benthos** (August)			
		Date	Easting	Northing	Grab #	Depth (m)	Easting	Northing	Replicate #	Easting	Northing	Replicate #	Depth (m)	Easting	Northing
TPN	NF	July	14W 0636503	7215322	1	7.8	14W 0637010	7215235	1	14W 0635635	7215462	1	7.8	14W 0637010	7215235
		August	14W 0636603	7215297	2	9.2	14W 0636953	7215174	2	14W 0635630	7215444	2	9.2	14W 0636953	7215174
TPN-1		September	14W 0636786	7215133	3	8.4	14W 0636977	7215034	3	14W 0635632	7215424	3	8.4	14W 0636977	7215034
TPN-2		September	14W 0637022	7215097					4	14W 0635624	7215419	4	8.4	14W 0636995	7214917
TPN-3		September	14W 0637050	7214814					5	14W 0635610	7215443	5	7.8	14W 0636989	7214850
TPN-4		September	14W 0636509	7214757											
TPE	NF	July	14W 0638558	7211292	1	10.4	14W 0638754	7211349	1	14W 0639934	7210849	1	8.7	14W 0638643	7211327
		August	14W 0638738	7211300	2	10.1	14W 0638770	7211337	2	14W 0639948	7210846	2	7.8	14W 0638643	7211221
		September	14W 0638731	7211288	3	7.7	14W 0638803	7211381	3	14W 0639972	7210840	3	11.5	14W 0638820	7211258
									4	14W 0639988	7210834	4	11.2	14W 0638905	7211443
									5	14W 0640020	7210835	5	8.9	14W 0638753	7211357
SP	NF	July	14W 0639832	7213979	1	9.9	14W 0639885	7213836	1	14W 0641016	7213346	1	9.9	14W 0639885	7213836
		August	14W 0639869	7213961	2	7.0	14W 0640093	7213968	2	14W 0641008	7213340	2	7.0	14W 0640093	7213968
		September	14W 0639955	7213825	3	13.2	14W 0639945	7213828	3	14W 0641006	7213322	3	13.2	14W 0639945	7213828
									4	14W 0641007	7213314	4	7.8	14W 0640087	7213992
									5	14W 0641044	7213385	5	10.1	14W 0640131	7214121
WAL	NF	July	15W 0360424	7221343	1	7.3	15W 0360882	7220815	1	15W 0360521	7222047	1	7.3	15W 0360882	7220815
		August	15W 0360411	7221329	2	8.0	15W 0360906	7220762	2	15W 0360538	7222043	2	8.0	15W 0360906	7220762
					3	6.7	15W 0360959	7220749	3	15W 0360547	7222043	3	6.7	15W 0360959	7220749
									4	15W 0360560	7222041	4	8.9	15W 0360937	7220658
									5	15W 0360570	7222046	5	10.7	15W 0360964	7220533
TE	FF	July	15W 0360061	7212182	1	7.5	15W 0360045	7212230	1	15W 0361837	7213265	1	7.5	15W 0360045	7212230
		August	15W 0360051	7212224	2	9.4	15W 0360077	7212218	2	15W 0361826	7213278	2	9.4	15W 0360077	7212218
					3	11.7	15W 0360141	7212244	3	15W 0361789	7213292	3	11.7	15W 0360141	7212244
									4	15W 0361768	7213296	4	13.1	15W 0360180	7212281
									5	15W 0361756	7213295	5	12.6	15W 0360248	7212276
TPS	Int. Ref	July	14W 0633840	7208079	1	9.7	14W 0633616	7208076	1	14W 0633774	7208286	1	9.1	14W 0633583	7207979
		August	14W 0633586	7207981	2	11.7	14W 0633560	7208124	2	14W 0633766	7208270	2	9.7	14W 0633616	7208076
		September	14W 0633628	7207981	3	9.9	14W 0633542	7208189	3	14W 0633758	7208253	3	11.7	14W 0633560	7208124
									4	14W 0633752	7208221	4	9.9	14W 0633542	7208189
									5	14W 0633739	7208196	5	10.0	14W 0633598	7208049
INUG	Ext. Ref	July	14W 0622843	7216842	1	8.1	14W 0622876	7216843	1	14W 0621980	7217467	1	8.1	14W 0622876	7216843
		August	14W 0622876	7216843	2	8.7	14W 0622771	7216749	2	14W 0621996	7217454	2	8.7	14W 0622771	7216749
					3	9.8	14W 0622617	7216704	3	14W 0622000	7217443	3	9.8	14W 0622617	7216704
									4	14W 0622000	7217435	4	12.6	14W 0622579	7216434
									5	14W 0622006	7217429	5	8.0	14W 0622505	7216560

Table 2-2 con't: AEMP sampling location coordinates (GPS, UTM, NAD83), Baker Lake, July, August and September 2008.

Station ID[1]	Station Type[2]	**Water & Phytoplankton** (monthly)			**Sediment** (August)				**Periphyton** (August)			**Benthos** (August)			
		Date	Easting	Northing	Grab #	Depth (m)	Easting	Northing	Replicate #	Easting	Northing	Replicate #	Depth (m)	Easting	Northing
BBD	NF	July	14W 0644467	7135221	1	9.5	14W 0644508	7135305	1	NA	NA	1	9.5	14W 0644508	7135305
		August	14W 0644447	7135161	2	13.0	14W 0644468	7135202	2	NA	NA	2	13.0	14W 0644468	7135202
		September	14W 0644521	7135276	3	11.2	14W 0644402	7135312	3	NA	NA	3	11.2	14W 0644402	7135312
									4	NA	NA	4	11.6	14W 0644616	7135224
									5	NA	NA	5	13.0	14W 0644734	7135144
BPJ	NF	July	15W 0357188	7134092	1	13.4	15W 0357109	7134123	1	NA	NA	1	13.4	15W 0357109	7134123
		August	15W 0357109	7134123	2	11.3	15W 0357063	7134184	2	NA	NA	2	11.3	15W 0357063	7134184
		September	15W 0357143	7134136	3	8.4	15W 0357012	7134233	3	NA	NA	3	8.4	15W 0357012	7134233
									4	NA	NA	4	8.0	15W 0357323	7134076
									5	NA	NA	5	8.4	15W 0357451	7133993
BAP	Int. Ref	July	15W 0363884	7131039	1	11.4	15W 0363856	7131191	1	NA	NA	1	11.4	15W 0363856	7131191
		August	15W 0363856	7131191	2	9.5	15W 0363813	7131210	2	NA	NA	2	9.5	15W 0363813	7131210
		September	15W 0363908	7131207	3	10.6	15W 0363727	7131191	3	NA	NA	3	10.6	15W 0363727	7131191
									4	NA	NA	4	11.0	15W 0363866	7131194
									5	NA	NA	5	12.1	15W 0364078	7131074

Notes:

[1] Station IDs are as follows: TPN, TPE, TPS = Third Portage North, East, and South basins; SP = Second Portage; WAL = Wally; TE = Tehek; INUG = Inuggugayualik; BBD = Baker Barge Dock; BPJ = Baker Proposed Jetty; BAP = Baker Akilahaarjuk Point.

[2] Station types are as follows: NF = near-field; FF = far-field; Int. Ref.= internal reference; Ext. Ref. = external reference.

3. RESULTS AND DISCUSSION

3.1. QA/QC

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. Results of the QA/QC analyses are presented in **Tables 3-1 to 3-6** for water and sediment chemistry, phytoplankton, periphyton and benthos, respectively.

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.

Duplicate water samples were collected from random stations once during each of the July, August and September sampling events. The results of the RPD analysis (for conventional parameters, anions and nutrients, organic parameters and total metals) are presented in **Table 3-1**. Firstly, the measured concentrations in the field duplicate samples showed a high level of consistency with the original samples and none of the parameters exceeded the DQO (i.e., RPD < 50%). Secondly, internal QA/QC was performed by the laboratory on randomly chosen samples. In one case the DQO for the laboratory duplicate exceeded 25%; the concentration of iron was at the detection limit (MDL) in the original sample but was detected slightly above this MDL in the laboratory duplicate. However, the concentration measured was much less than 10 times the MDL. Thirdly, the measured concentrations in travel and equipment blanks were also consistently below detection limits for each of the three sampling events, with the exception of two parameters. Concentrations of ammonia for the final travel blank and DOC for the second equipment blank were narrowly in exceedence of their MDLs but were again much less than 10 times the MDL. 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 as there did not appear to be contamination of any other samples. Notwithstanding this, all of the measured concentrations met the QA/QC data quality objectives for the project.

Similar consistency was accomplished for the field sediment sample duplicates (**Table 3-2**). None of the RPD values exceeded the DQO for field duplicate samples. Several of RPDs for PAHs exceeded 25% but in all cases concentrations measured were less than 10 times the MDL. Also, recovery of surrogate standards for PAH analysis was quite high

(87-109%). The QA/QC filter swipe was analyzed for total metals. Many of the measured concentrations were below the laboratory MDL, and the others were considerably lower than measured concentrations in the sediment samples (**Table 3-2**). Consequently, the sediment sampling equipment cleaning procedures were successful; no significant cross contamination of the equipment occurred between sampling stations.

One sediment core sample was collected in duplicate at each coring station, except for the Baker Lake Barge dock station due to poor weather conditions. The results of the RPD analysis (for pH, total organic carbon and total metals) are presented in **Table 3-3.** Only one of the RPD values for concentration of arsenic (at the Inuggugayualik Lake station) exceeded 50%. All of the laboratory duplicates met the DQO (RPD < 25%).

The phytoplankton field duplicates evaluated sampling variability and sample homogeneity of phytoplankton density (cells/L) and biomass (mg/m^3) in Wally Lake, Inuggugayualik Lake, and Second Portage Lake in July, August, and September, respectively. Within taxa variability was moderately high. For example, dinoflagellates in SP in September had a RPD of 200% for both density and biomass because dinoflagellates were present in the duplicate sample but not the original (**Table 3-4**). Other density RPDs ranged from -173% to +174%, and biomass RPDs from -87.7% to +161%. Because very small volumes of water are examined for phytoplankton density and biomass, and because abundance of cells is extremely high, this magnitude of difference is to be expected for phytoplankton samples. Overall RPDs for total density and total biomass for all three duplicate samples were low, however, and well within the data quality objective. RPD values were also less than 25% for number of species and Simpson's diversity (**Table 3-4**).

The phytoplankton laboratory duplicates evaluated the variability of the enumeration method on phytoplankton density and biomass in Tehek Lake, Inuggugayualik Lake, and Baker Lake Barge dock. Similar to field duplicates, laboratory duplicates showed moderately high within taxa variability but overall RPDs on total density and total biomass for all three duplicate samples were again low and met the DQO.

Five field replicates were collected at each periphyton sampling station to determine natural variability and heterogeneity. The field replicate data was used to statistically compare the results from each of the sampling stations. Internal QA/QC was also performed at the laboratory when the periphyton samples were being identified and counted. Laboratory duplicates were conducted on 10% of periphyton samples (i.e., 3 duplicates for each of density and biomass analyses) (**Table 3-5**). In two cases within taxa variability was moderately high: chlorophytes in TE had RPDs of -120% and -85.7% and in WAL had RPDs of 66.7% and 96.9% for density and biomass, respectively (**Table 3-5**). Other density RPDs ranged from -25.0% to +22.2%, and biomass RPDs from -28.8% to +22.2%.

Laboratory replicate counts were performed on 10% of all samples for benthos. Replicate samples were chosen at random and processed at different times from the original analysis to reduce bias. Of the re-sorted samples, 2/197 (1.0%), 5/201 (2.5%), 5/272 (1.8%), 17/389 (4.4%), 27/370 (7.3%) and 0/136 (0%) of organisms were missed (**Table 3-6**), with an overall omission rate of less than 3%. These results suggest that the vast majority of animals observed in benthic samples by the taxonomist were recovered. A reference collection of benthic taxa has been compiled.

Table 3-1: QA/QC data for 2008 water parameters, Meadowbank study lakes & Baker Lake, July, August and September 2008.

	Wally Lake			Inuggugayualik Lake			Baker Lake - Akilahaarjuk Point			Various Lakes		
	WAL	Field Dup	RPD	INUG	Field Dup	RPD	BAP	Field Dup	RPD	Original	Laboratory Duplicate	RPD
	22-Jul-08	22-Jul-08	(%)	20-Aug-08	20-Aug-08	(%)	21-Sep-08	21-Sep-08	(%)	July		(%)
CONVENTIONAL PARAMETERS												
Physical Tests												
Conductivity (µS/cm)	25.9	26.1	-0.77	14.0	14.2	-1.4	581	586	-0.86	-	-	-
Hardness (mg/L)	11.3	11.2	0.89	4.97	5.00	-0.60	60.6	59.1	2.5	-	-	-
pH	7.31	7.30	0.14	6.74	6.71	0.45	7.11	7.13	-0.28	-	-	-
Total Suspended Solids (mg/L)	<3.0	<3.0	0	<3.0	<3.0	0	<3.0	<3.0	0	-	-	-
Total Dissolved Solids (mg/L)	17	13	27	<10	13	-26	302	303	-0.33	<10	<10	0
Anions & Nutrients (mg/L)												
Alkalinity - Bicarbonate (as $CaCO_3$)	8.9	8.1	9.4	4.3	3.8	12	9.2	8.8	4.4	-	-	-
Alkalinity - Carbonate (as $CaCO_3$)	<2.0	<2.0	0	<2.0	<2.0	0	<2.0	<2.0	0	-	-	-
Alkalinity - Hydroxide (as $CaCO_3$)	<2.0	<2.0	0	<2.0	<2.0	0	<2.0	<2.0	0	-	-	-
Alkalinity - Total (as $CaCO_3$)	8.9	8.1	9.4	4.3	3.8	12	9.2	8.8	4.4	-	-	-
Ammonia (as N)	0.020	0.021	-4.9	0.030	<0.020	40	<0.020	<0.020	0	0.045	0.047	-4.3
Chloride	<0.50	<0.50	0	0.690	0.680	1.5	151	150	0.66	216	216	0
Nitrate (as N)	<0.0050	<0.0050	0	<0.0050	<0.0050	0	0.0286	0.0286	0	0.0637	0.0626	1.7
Nitrite (as N)	<0.0010	<0.0010	0	<0.0010	<0.0010	0	0.0010	<0.0010	0	<0.0010	<0.0010	0
Total Kjeldahl Nitrogen	0.124	0.145	-16	0.0980	0.0670	38	0.135	0.156	-14	<0.050	<0.050	0
Ortho Phosphate (as P)	0.0013	<0.0010	26	<0.0010	<0.0010	0	<0.0010	<0.0010	0	0.0010	<0.0010	0
Total Phosphate (as P)	0.0037	0.0030	21	0.0027	0.0035	-26	0.0075	0.0070	6.9	-	-	-
Sulfate (SO_4)	2.27	2.26	0.44	0.960	0.880	8.7	21.9	21.9	0	30.5	30.5	0
ORGANIC / INORGANIC CARBON												
Dissolved Organic Carbon (mg/L)	2.34	2.09	11	2.48	1.93	25	3.44	3.4	1.2	-	-	-
Total Organic Carbon (mg/L)	1.84	1.93	-4.8	1.80	1.84	-2.2	3.18	3.18	0	-	-	-
AGGREGATE ORGANICS (mg/L)												
Oil and Grease	<5.0	<5.0	0	<5.0	<5.0	0	<5.0	<5.0	0	-	-	-
PLANT PIGMENTS												
Chlorophyll a (µg)	0.557	0.585	-4.9	0.616	0.632	-2.6	0.965	0.938	2.8	-	-	-
TOTAL METALS (mg/L)												
Aluminum	<0.0050	<0.0050	0	0.0060	0.0077	-25	0.0074	0.0055	29	-	-	-
Antimony	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	-	-	-
Arsenic	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00070	<0.00060	15	-	-	-
Barium	<0.020	<0.020	0	<0.020	<0.020	0	<0.020	<0.020	0	-	-	-
Beryllium	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	-	-	-
Boron	<0.10	<0.10	0	<0.10	<0.10	0	<0.10	<0.10	0	-	-	-
Cadmium	<0.000017	<0.000017	0	<0.000017	<0.000017	0	<0.000017	<0.000017	0	-	-	-
Calcium	3.07	3.04	0.98	0.990	0.990	0	6.15	5.52	11	-	-	-
Chromium	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	-	-	-
Cobalt	<0.00030	<0.00030	0	<0.00030	<0.00030	0	<0.00030	<0.00030	0	-	-	-
Copper	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	-	-	-
Iron	<0.030	<0.030	0	<0.030	<0.030	0	<0.030	<0.030	0	-	-	-
Lead	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	-	-	-
Lithium	<0.0050	<0.0050	0	<0.0050	<0.0050	0	<0.0050	<0.0050	0	-	-	-
Magnesium	0.87	0.87	0	0.61	0.62	-1.6	11	11	0	-	-	-
Manganese	0.00102	0.00101	0.99	0.00193	0.00201	-4.1	0.00241	0.00182	28	-	-	-
Mercury	<0.000020	<0.000020	0	<0.000020	<0.000020	0	<0.000020	<0.000020	0	<0.000020	<0.000020	0
Molybdenum	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	-	-	-
Nickel	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	-	-	-
Potassium	<2.0	<2.0	0	<2.0	<2.0	0	3.6	3.6	0	-	-	-
Selenium	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0030	<0.0030	0	-	-	-
Silver	<0.000020	<0.000020	0	<0.000020	<0.000020	0	<0.000020	<0.000020	0	-	-	-
Sodium	<2.0	<2.0	0	<2.0	<2.0	0	83.8	85.5	-2.0	-	-	-
Thallium	<0.00020	<0.00020	0	<0.00020	<0.00020	0	<0.00020	<0.00020	0	-	-	-
Tin	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	-	-	-
Titanium	<0.010	<0.010	0	<0.010	<0.010	0	<0.010	<0.010	0	-	-	-
Uranium	<0.00020	<0.00020	0	<0.00020	<0.00020	0	<0.00020	<0.00020	0	-	-	-
Vanadium	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	-	-	-
Zinc	<0.0050	<0.0050	0	<0.0050	<0.0050	0	<0.0050	<0.0050	0	-	-	-

Notes:

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

Shaded RPDs exceed 25% (lab duplicates) or 50% (field duplicates).

Shaded travel and equipment blanks exceed laboratory method detection limits.

Table 3-1 con't: QA/QC data for 2008 water parameters, Meadowbank study lakes & Baker Lake, July, August and September 2008.

	Various Lakes			Various Lakes			Travel Blanks			Equipment Blanks		
	Original August	Laboratory Duplicate	RPD (%)	Original September	Laboratory Duplicate	RPD (%)	27-Jul-08	22-Aug-08	18-Sep-08	25-Jul-08	22-Aug-08	12-Sep-08
CONVENTIONAL PARAMETERS												
Physical Tests												
Conductivity (µS/cm)	13.9	13.9	0	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Hardness (mg/L)	-	-	-	-	-	-	<0.70	<0.70	<0.70	<0.70	<0.70	<0.50
pH	-	-	-	6.79	6.79	0	5.54	5.76	5.37	5.62	5.74	5.36
Total Suspended Solids (mg/L)	10.7	11.7	-8.9	<3.0	<3.0	0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids (mg/L)	21	25	-17	15	13	14	<10	<10	<10	<10	<10	<10
Anions & Nutrients (mg/L)												
Alkalinity - Bicarbonate (as $CaCO_3$)	-	-	-	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity - Carbonate (as $CaCO_3$)	-	-	-	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity - Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity - Total (as $CaCO_3$)	-	-	-	3.8	4.3	-12	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Ammonia (as N)	<0.020	<0.020	0	<0.020	<0.020	0	<0.020	-	0.026	<0.020	<0.020	<0.020
Chloride	<0.50	<0.50	0	<0.50	<0.50	0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Nitrate (as N)	<0.0050	<0.0050	0	<0.0050	<0.0050	0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ortho Phosphate (as P)	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Phosphate (as P)	0.0032	0.0036	-12	0.0064	0.0064	0	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Sulfate (SO_4)	2.64	2.68	-1.5	1.22	1.21	0.82	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ORGANIC / INORGANIC CARBON												
Dissolved Organic Carbon (mg/L)	2.48	2.55	-2.8	1.50	1.46	2.7	-	-	-	<0.50	0.76	-
Total Organic Carbon (mg/L)	1.80	1.79	0.56	1.32	1.34	-1.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
AGGREGATE ORGANICS (mg/L)												
Oil and Grease	-	-	-	-	-	-	-	-	-	<5.0	-	-
PLANT PIGMENTS												
Chlorophyll a (µg)	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL METALS (mg/L)												
Aluminum	-	-	-	0.0142	0.0134	5.8	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-
Antimony	-	-	-	<0.00050	<0.00050	0	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Arsenic	-	-	-	<0.00050	<0.00050	0	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Barium	-	-	-	<0.020	<0.020	0	<0.020	<0.020	<0.020	<0.020	<0.020	-
Beryllium	-	-	-	<0.0010	<0.0010	0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Boron	-	-	-	<0.10	<0.10	0	<0.10	<0.10	<0.10	<0.10	<0.10	-
Cadmium	-	-	-	<0.000017	<0.000010	-	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	-
Calcium	-	-	-	1.30	1.23	5.5	<0.10	<0.10	<0.10	<0.10	<0.10	-
Chromium	-	-	-	<0.0010	<0.0010	0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Cobalt	-	-	-	<0.00030	<0.00030	0	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	-
Copper	-	-	-	<0.0010	<0.0010	0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Iron	-	-	-	<0.030	0.055	-59	<0.030	<0.030	<0.030	<0.030	<0.030	-
Lead	-	-	-	<0.00050	<0.00050	0	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Lithium	-	-	-	<0.0050	<0.0050	0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-
Magnesium	-	-	-	0.57	0.55	3.6	<0.10	<0.10	<0.10	<0.10	<0.10	-
Manganese	-	-	-	0.00102	0.00092	10	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	-
Mercury	<0.000020	<0.000020	0	<0.0010	<0.0010	0	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	-
Molybdenum	-	-	-	<0.0010	<0.0010	0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Nickel	-	-	-	<2.0	<2.0	0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Potassium	-	-	-	<0.0010	<0.0010	0	<2.0	<2.0	<2.0	<2.0	<2.0	-
Selenium	-	-	-	<0.000020	<0.000020	0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Silver	-	-	-	<2.0	<2.0	0	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	-
Sodium	-	-	-	<0.00020	<0.00020	0	<2.0	<2.0	<2.0	<2.0	<2.0	-
Thallium	-	-	-	<0.00050	<0.00050	0	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	-
Tin	-	-	-	<0.010	<0.010	0	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Titanium	-	-	-	<0.00020	<0.00020	0	<0.010	<0.010	<0.010	<0.010	<0.010	-
Uranium	-	-	-	<0.0010	<0.0010	0	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	-
Vanadium	-	-	-	<0.0050	<0.0050	0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Zinc	-	-	-	<0.000020	<0.000020	0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-

Notes:

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

Shaded RPDs exceed 25% (lab duplicates) or 50% (field duplicates).

Shaded travel and equipment blanks exceed laboratory method detection limits.

Table 3-2: QA/QC data for 2008 sediment parameters, Meadowbank study lakes & Baker Lake, August 2008.

Analytes	Third Portage Lake - North Basin			Various Lakes			TPN	TPS	TPE	TPN	SP	TE	WAL	INUG	BBD	BPJ	BAP
	TPN	Field Dup	RPD	Original	Laboratory Duplicate	RPD	QA/QC FILTER	Recovery of Surrogate Standards for PAHs (%)									
	18-Aug-08	18-Aug-08	(%)	August		(%)	18-Aug-08										
CONVENTIONAL PARAMETERS																	
Physical & Organic Parameters																	
Moisture (%)	82.3	83.0	-0.8	-	-	-	-										
pH	6.13	6.11	0.3	6.94	6.84	1.5	-										
Total Organic Carbon (% dw)	3.1	3.0	3.3	5.0	5.0	0	-										
Particle Size																	
% Gravel (>2mm)	<1	<1	0	-	-	-	-										
% Sand (2.00mm - 0.063mm)	20	18	11	-	-	-	-										
% Silt (0.063mm - 4µm)	62	62	0	-	-	-	-										
% Clay (<4µm)	18	20	-11	-	-	-	-										
AGGREGATE ORGANICS (mg/kg)																	
Oil and Grease	3170	2870	9.9	2870	3310	-14	-										
POLYCYCLIC AROMATIC HYDROCARBONS																	
Acenaphthene (mg/kg)	<0.092	<0.092	0	<0.13	<0.040	-	-										
Acenaphthylene (mg/kg)	<0.12	<0.12	0	<0.16	<0.050	-	-										
Anthracene (mg/kg)	<0.12	<0.12	0	<0.16	<0.050	-	-										
Benz(a)anthracene (mg/kg)	<0.12	<0.12	0	<0.16	0.10	42	-										
Benzo(a)pyrene (mg/kg)	<0.12	<0.12	0	<0.16	0.089	57	-										
Benzo(b)fluoranthene (mg/kg)	<0.12	<0.12	0	<0.16	0.086	60	-										
Benzo(g,h,i)perylene (mg/kg)	<0.12	<0.12	0	<0.16	<0.050	-	-										
Benzo(k)fluoranthene (mg/kg)	<0.12	<0.12	0	<0.16	<0.050	-	-										
Chrysene (mg/kg)	<0.12	<0.12	0	<0.16	0.096	50	-										
Dibenz(a,h)anthracene (mg/kg)	<0.12	<0.12	0	<0.16	<0.050	-	-										
Fluoranthene (mg/kg)	<0.12	<0.12	0	<0.16	0.14	13	-										
Fluorene (mg/kg)	<0.12	<0.12	0	<0.16	<0.050	-	-										
Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.12	<0.12	0	<0.16	0.059	92	-										
2-Methylnaphthalene (mg/kg)	<0.12	<0.12	0	<0.16	<0.050	-	-										
Naphthalene (mg/kg)	<0.12	<0.12	0	<0.16	<0.050	-	-										
Phenanthrene (mg/kg)	<0.12	<0.12	0	<0.80	<0.50	-	-										
Pyrene (mg/kg)	<0.12	<0.12	0	<0.16	0.22	-30	-										
d10-Acenaphthene (%)	-	-	-	-	-	-	-	95	93	93	93	92	92	91	94	94	98
d12-Chrysene (%)	-	-	-	-	-	-	-	109	104	109	95	105	103	106	88	87	91
d8-Naphthalene (%)	-	-	-	-	-	-	-	97	95	94	99	95	95	93	90	92	93
d10-Phenanthrene (%)	-	-	-	-	-	-	-	100	95	96	105	95	96	94	94	93	97

Table 3-2 con't: QA/QC data for 2008 sediment parameters, Meadowbank study lakes & Baker Lake, August 2008.

Analytes	Third Portage Lake - North Basin			Various Lakes			TPN	TPS	TPE	TPN	SP	TE	WAL	INUG	BBD	BPJ	BAP
	TPN	Field Dup	RPD	Original	Laboratory Duplicate	RPD	QA/QC FILTER	Recovery of Surrogate Standards for PAHs (%)									
	18-Aug-08	18-Aug-08	(%)	August		(%)	18-Aug-08										
TOTAL METALS (mg/kg dw)							**TOTAL METALS (µg)**										
Aluminum	-	-	-	-	-	-	<20										
Antimony	<10	<10	0	<10	<10	0	<10										
Arsenic	20.8	17.3	18	5.40	<5.0	7.7	<10										
Barium	70.0	76.9	-9.4	64.2	66.7	-3.8	2.46										
Beryllium	1.01	1.06	-4.8	<0.50	<0.50	0	<0.30										
Bismuth	-	-	-	-	-	-	<10										
Cadmium	<0.50	<0.50	0	<0.50	<0.50	0	<0.50										
Calcium	-	-	-	-	-	-	31.5										
Chromium	105	108	-2.8	13.6	13.7	-0.7	7.24										
Cobalt	16.5	16.1	2.5	4.40	4.30	2.3	<0.50										
Copper	40.2	41.8	-3.9	7.30	7.20	1.4	1.07										
Iron	-	-	-	-	-	-	52										
Lead	<30	<30	0	<30	<30	0	<3.0										
Lithium	-	-	-	-	-	-	<0.50										
Magnesium	-	-	-	-	-	-	10.1										
Manganese	-	-	-	-	-	-	1.53										
Mercury	0.0142	0.0128	10	<0.0050	<0.0050	0	-										
Molybdenum	<4.0	<4.0	0	<4.0	<4.0	0	<2.0										
Nickel	60.7	66.7	-9.4	8.40	8.10	3.6	3.90										
Phosphorus	-	-	-	-	-	-	<20										
Potassium	-	-	-	-	-	-	<100										
Selenium	<2.0	<2.0	0	<2.0	<2.0	0	<10										
Silver	<2.0	<2.0	0	<2.0	<2.0	0	<0.50										
Sodium	-	-	-	-	-	-	120										
Strontium	-	-	-	-	-	-	<0.30										
Thallium	<1.0	<1.0	0	<1.0	<1.0	0	<10										
Tin	<5.0	<5.0	0	<5.0	<5.0	0	<2.0										
Titanium	-	-	-	-	-	-	<0.50										
Vanadium	28.8	29.8	-3.4	16.5	16.6	-0.6	<2.0										
Zinc	69.6	73.9	-6.0	26.1	27.5	-5.2	0.900										

Notes:

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

Shaded RPDs exceed 25% (lab duplicates) or 50% (field duplicates).

Table 3-3: QA/QC data for 2008 sediment core parameters, Meadowbank study lakes & Baker Lake, July and August 2008.

Analytes	Third Portage Lake - South Basin			Third Portage Lake - East Basin			Third Portage Lake - North Basin			Second Portage Lake			Tehek Lake			Wally Lake		
	TPS-SC-08	Field Dup	RPD	TPE-SC-05	Field Dup	RPD	TPN-SC-11	Field Dup	RPD	SP-SC-10	Field Dup	RPD	TE-SC-08	Field Dup	RPD	WAL-SC-05	Field Dup	RPD
	24-Jul-08	24-Jul-08	(%)	23-Jul-08	23-Jul-08	(%)	24-Jul-08	24-Jul-08	(%)	19-Jul-08	19-Jul-08	(%)	20-Jul-08	20-Jul-08	(%)	22-Jul-08	22-Jul-08	(%)
CONVENTIONAL PARAMETERS																		
Physical & Organic Parameters																		
pH	5.82	5.84	-0.3	5.89	6.03	-2.3	5.87	5.87	0	6.20	6.15	0.8	5.89	5.90	-0.2	7.14	6.99	2.1
Total Organic Carbon (% dw)	5.0	4.6	8.3	4.7	5.1	-8.2	4.5	4.5	0	5.4	5.4	0	4.2	4.2	0	8.3	9.9	-18
TOTAL METALS (mg/kg dw)																		
Antimony	<10	<10	0	<10	<10	0	<10	<10	0	<10	<10	0	<10	<10	0	<10	<10	0
Arsenic	36.4	27.2	29	15.9	11.6	31	21.2	22.8	-7.3	26.7	30.8	-14	45.0	47.8	-6.0	19.8	20.7	-4.4
Barium	124	122	1.6	126	109	14	87.1	96.0	-9.7	119	134	-12	132	136	-3.0	90.0	63.7	34
Beryllium	1.5	1.6	-4.5	1.8	1.7	4.6	1.3	1.4	-8.4	1.9	2.1	-9.9	1.9	1.9	-2.1	1.2	0.99	18
Cadmium	0.92	0.76	19	<0.50	<0.50	0	<0.50	<0.50	0	<0.50	0.67	29	0.87	0.83	4.7	0.54	<0.50	7.7
Chromium	100	108	-7.7	75.1	72.2	3.9	109	118	-7.9	65.0	76.3	-16	44.3	45.7	-3.1	44.5	35.3	23
Cobalt	49.7	32.3	42	15.8	14.0	12	18.7	19.6	-4.7	14.0	15.9	-13	14.8	15.5	-4.6	7.80	6.00	26
Copper	77.8	77.3	0.6	49.8	46.1	7.7	60.8	65.3	-7.1	80.4	91.0	-12	63.8	64.6	-1.2	109	81.0	29
Lead	<30	<30	0	<30	<30	0	<30	<30	0	<30	<30	0	<30	<30	0	31	<30	3.3
Mercury	0.0560	0.0406	32	0.0251	0.0248	1.2	0.0285	0.0284	0.4	0.0452	0.0516	-13	0.0356	0.0388	-8.6	0.0570	0.0534	6.5
Molybdenum	7.1	5.4	27	4.4	4.3	2.3	4.1	4.5	-9.3	5.3	6.1	-14	11.1	11.3	-1.8	<4.0	<4.0	0
Nickel	137	120	13	88.2	61.1	36	73.8	89.1	-19	50.4	57.1	-12	52.7	54.0	-2.4	41.7	32.7	24
Selenium	<2.0	<2.0	0	<2.0	<2.0	0	<2.0	<2.0	0	<2.0	<2.0	0	<3.0	<3.0	0	<2.0	<2.0	0
Silver	<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
Thallium	<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
Tin	<5.0	<5.0	0	<5.0	<5.0	0	<5.0	<5.0	0	<5.0	<5.0	0	<5.0	<5.0	0	<5.0	<5.0	0
Vanadium	39.8	41.9	-5.1	36.8	35.1	4.7	34.4	37.5	-8.6	33.7	38.4	-13	25.9	26.4	-1.9	22.8	20.8	9.2
Zinc	104	102	1.9	101	92.7	8.6	78.1	84.0	-7.3	97.8	110	-12	82.8	85.8	-3.6	89.3	65.6	31

Notes:

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

Shaded RPDs exceed 25% (lab duplicates) or 50% (field duplicates).

Table 3-3 con't: QA/QC data for 2008 sediment core parameters, Meadowbank study lakes & Baker Lake, July and August 2008.

Analytes	Inuggugayualik Lake			Baker Lake - Proposed Jetty			Baker Lake - Akilahaarjuk Point			Various Lakes			Various Lakes		
	INUG-SC-07	Field Dup	RPD	BPJ-SC-06	Field Dup	RPD	BAP-SC-12	Field Dup	RPD	Original	Laboratory Duplicate	RPD	Original	Laboratory Duplicate	RPD
	25-Jul-08	25-Jul-08	(%)	28-Aug-08	28-Aug-08	(%)	25-Aug-08	25-Aug-08	(%)	July/August		(%)	July/August		(%)
CONVENTIONAL PARAMETERS															
Physical & Organic Parameters															
pH	5.96	5.95	0.2	6.48	6.50	-0.3	6.83	6.73	1.5	6.50	6.60	-1.5	6.74	6.71	0.4
Total Organic Carbon (% dw)	4.6	7.1	-43	1.3	1.2	8.0	0.30	0.30	0	3.4	3.5	-2.9	6.0	6.0	0
TOTAL METALS (mg/kg dw)															
Antimony	<10	<10	0	<10	<10	0	<10	<10	0	<10	<10	0	<10	<10	0
Arsenic	49.7	18.9	90	15.9	10.4	42	<5.0	<5.0	0	10.4	11.3	-8.3	<5.0	<5.0	0
Barium	95.8	100	-4.3	202	187	7.7	213	255	-18	187	194	-3.7	385	386	-0.3
Beryllium	1.2	1.4	-10	0.53	<0.50	5.8	<0.50	<0.50	0	<0.50	0.51	0	<0.50	<0.50	0
Cadmium	<0.50	<0.50	0	<0.50	<0.50	0	<0.50	<0.50	0	<0.50	<0.50	0	<0.50	<0.50	0
Chromium	79.8	94.3	-17	24.8	23.5	5.4	18.8	17.2	8.9	23.5	24.2	-2.9	16.2	15.3	5.7
Cobalt	16.7	17.9	-6.9	10.3	9.70	6.0	4.50	4.20	6.9	9.70	9.80	-1.0	4.80	4.80	0
Copper	40.3	46.1	-13	12.1	11.2	7.7	4.80	4.30	11	11.2	11.7	-4.4	5.30	5.50	-3.7
Lead	<30	<30	0	<30	<30	0	<30	<30	0	<30	<30	0	<30	<30	0
Mercury	0.0530	0.0414	25	0.0244	0.0175	33	0.0055	0.0062	-12	0.0175	0.0176	-0.6	0.0062	0.0064	-3.2
Molybdenum	6.5	5.0	26	<4.0	<4.0	0	<4.0	<4.0	0	<4.0	<4.0	0	<4.0	<4.0	0
Nickel	71.1	66.8	6.2	16.4	15.7	4.4	11.2	9.20	20	15.7	15.9	-1.3	9.60	9.40	2.1
Selenium	<2.0	<2.0	0	<4.0	<2.0	0	<2.0	<2.0	0	<2.0	<2.0	0	<2.0	<2.0	0
Silver	<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
Thallium	<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
Tin	<5.0	<5.0	0	<5.0	<5.0	0	<5.0	<5.0	0	<5.0	<5.0	0	<5.0	<5.0	0
Vanadium	32.7	35.8	-9.1	27.9	26.7	4.4	17.7	17.8	-0.6	26.7	27.5	-3.0	20.6	20.7	-0.5
Zinc	71.3	76.4	-6.9	47.7	46.5	2.5	23.6	21.4	9.8	46.5	47.5	-2.1	24.3	24.3	0

Notes:

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

Shaded RPDs exceed 25% (lab duplicates) or 50% (field duplicates).

Table 3-4: QA/QC data for phytoplankton, Meadowbank study lakes & Baker Lake, July, August and September 2008.

	Wally Lake			Inuggugayualik Lake			Second Portage Lake		
	WAL	**Field**	**RPD**	**INUG**	**Field**	**RPD**	**SP**	**Field**	**RPD**
	22-Jul-08	**Duplicate**	(%)	20-Aug-08	**Duplicate**	(%)	17-Sep-08	**Duplicate**	(%)
Phytoplankton Density (cells/L)									
Cyanophyte	7784	14368	-59	7384	102776	-173	400	800	-67
Chlorophyte	79224	66456	18	162248	382952	-81	252640	352416	-33
Chrysophyte	2473296	2099328	16	1964432	1243632	45	899000	819576	9
Diatom	205152	236488	-14	37720	67256	-56	45120	35136	25
Cryptophyte	161248	76040	72	114944	152064	-28	128128	178416	-33
Dinoflagellate	22952	1600	174	14768	1400	165	0	7384	-200
Total	**2949656**	**2494280**	**17**	**2301496**	**1950080**	**17**	**1325288**	**1393728**	**-5.0**
Mean RPD			***34***			***-21***			***-50***
Phytoplankton Biomass (mg/m^3)									
Cyanophyte	1.03	1.44	-33	0.938	2.40	-88	0.840	0.0905	161
Chlorophyte	4.30	4.10	4.9	12.0	11.0	8.2	6.34	5.13	21
Chrysophyte	172	164	4.7	147	125	17	49.0	77.0	-44
Diatom	15.2	17.0	-11	2.88	4.85	-51	8.43	10.4	-21
Cryptophyte	10.9	12.8	-16	4.74	8.57	-58	12.3	15.6	-24
Dinoflagellate	13.2	5.11	89	5.67	13.4	-81	0	4.22	-200
Total	**216**	**204**	**5.8**	**173**	**165**	**5.0**	**76.9**	**113**	**-38**
Mean RPD			***6.3***			***-42***			***-18***
# Species	38	42	-10	45	43	4.5	41	36	13
Simpsons Diversity	0.89	0.87	2.6	0.84	0.93	-9.8	0.92	0.92	-0.22

Notes:

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

Shaded RPDs exceed 50% (field duplicates) or 25% (lab duplicates).

Table 3-4 con't: QA/QC data for phytoplankton, Meadowbank study lakes & Baker Lake, July, August and September 2008.

	Tehek Lake			Inuggugayualik Lake			Baker Barge Dock		
	TE 20-Jul-08	**Lab Duplicate**	**RPD** (%)	**INUG** 20-Aug-08	**Lab Duplicate**	**RPD** (%)	**BBD** 21-Sep-08	**Lab Duplicate**	**RPD** (%)
Phytoplankton Density (cells/L)									
Cyanophyte	0	29136	-200	7384	8384	-13	400	600	-40
Chlorophyte	14368	43904	-101	162248	219320	-30	280576	237872	16
Chrysophyte	2186336	2013520	8.2	1964432	2035272	-3.5	1121104	1185760	-5.6
Diatom	89608	76040	16	37720	17168	75	60920	65720	-7.6
Cryptophyte	58672	58872	-0.34	114944	107760	6.5	490912	504880	-2.8
Dinoflagellate	15968	600	186	14768	14568	1.4	9184	8584	6.8
Total	**2364952**	**2222072**	**6.2**	**2301496**	**2402472**	**-4.3**	**1963096**	**2003416**	**-2.0**
Mean RPD			***-15***			***6.1***			***-5.5***
Phytoplankton Biomass (mg/m^3)									
Cyanophyte	0	0.560	-200	0.938	2.04	-74	0.840	1.26	-40
Chlorophyte	0.313	2.12	-148	12.0	10.4	14	16.5	5.80	96
Chrysophyte	181	162	11	147	137	7.2	50.5	52.1	-3.0
Diatom	8.78	8.34	5.1	2.88	3.12	-7.9	11.5	17.4	-41
Cryptophyte	8.39	7.55	10	4.74	4.50	5.2	49.8	51.9	-4.2
Dinoflagellate	10.8	1.59	149	5.67	5.24	7.9	9.97	8.86	12
Total	**210**	**182**	**14**	**173**	**162**	**6.6**	**139**	**137**	**1.3**
Mean RPD			***-29***			***-8.0***			***3.3***
# Species	36	39	-8.0	45	42	6.9	39	42	-7.4
Simpsons Diversity	0.87	0.88	-1.2	0.84	0.84	0.49	0.88	0.87	0.66

Notes:

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

Shaded RPDs exceed 50% (field duplicates) or 25% (lab duplicates).

Table 3-5: QA/QC data for periphyton, Meadowbank study lakes, August 2008.

	Second Portage Lake			Tehek Lake			Wally Lake		
	SP-1 24-Aug-08	**Lab Duplicate**	**RPD** (%)	**TE-3** 19-Aug-08	**Lab Duplicate**	**RPD** (%)	**WAL-1** 21-Aug-08	**Lab Duplicate**	**RPD** (%)
Periphyton Density (cells/cm^2)									
Cyanophyte	768016	721361	6.3	551146	643431	-15	857738	886449	-3.3
Chlorophyte	17944	14355	22	2564	10254	-120	14355	7178	67
Chrysophyte	0	0	0	0	0	0	0	0	0
Diatom	240454	244043	-1.5	248657	276855	-11	251220	322997	-25
Dinoflagellate	0	0	0	0	0	0	0	0	0
Total	**1026414**	**979759**	**4.7**	**802367**	**930540**	**-15**	**1123313**	**1216624**	**-8.0**
Mean RPD			***5.4***			***-29***			***7.7***
Periphyton Biomass (µg/cm^2)									
Cyanophyte	307	305	0.62	54.4	72.7	-29	212	180	17
Chlorophyte	36.1	28.9	22	3.60	9.00	-86	21.6	7.50	97
Chrysophyte	0	0	0	0	0	0	0	0	0
Diatom	378	403	-6.4	299	346	-15	116	144	-22
Dinoflagellate	0	0	0	0	0	0	0	0	0
Total	**720**	**736**	**-2.2**	**357**	**428**	**-18**	**349**	**331**	**5.4**
Mean RPD			***3.3***			***-26***			***18***
# Species	16	16	0	15	15	0	18	16	12
Simpsons Diversity	0.76	0.79	-3.9	0.76	0.77	-1.3	0.78	0.75	3.9

Notes:

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

Shaded RPDs exceed 25% (lab duplicates).

Table 3-6: Percent recovery of benthic invertebrate samples, Meadowbank study lakes & Baker Lake, August 2008.

Station	Number of Organisms Recovered	Number of Organisms in Re-sort	Percent Recovery
BAP-3	195	197	99.0%
BBD-2	196	201	97.5%
INUG-4	267	272	98.2%
TPE-1	372	389	95.6%
TPE-4	343	370	92.7%
TPS-1	136	136	100%
		Average % Recovery	97.2%

Notes:

All fifty samples were sorted in their entirety.

3.2. Limnology and Water Chemistry

3.2.1. Meadowbank Study Lakes

Vertical temperature and dissolved oxygen profiles of all lakes and seasons were isothermal with little evidence of stratification (**Figures 3-1 to 3-7**). Generally, water temperatures at Meadowbank increased through the spring and summer open water season, followed by cooling in the fall. Given the frequency of wind events at Meadowbank, none of the lakes are ever stratified by more than two or three degrees for more than a few days (BAER, 2005). Dissolved oxygen concentrations were always high, related to temperature changes, and were nearly always completely saturated.

Maximum water temperature varied among lakes and was related to water depth and volume of water in the basin being measured. For example, water temperatures at Meadowbank were lowest in the large, deep south basin of Third Portage Lake (**Figure 3-6**) in the spring (5.0–7.0^{o}C) and barely exceeded 10.5^{o}C as a maximum. Water temperatures were warmest in Wally Lake, reaching almost 15.0^{o}C in this lake in spring (**Figure 3-4**).

Conventional water quality parameters were generally similar among the Meadowbank study lakes (**Table 3-7**) and typical of ultra-oligotrophic/oligotrophic lakes (Welch et al., 1989) in this region of the Arctic.

The pH of surface waters was circum-neutral (6.5–7.3). Conductivity was lowest in Third Portage (13.6–14.1 µS/cm) and Inuggugayualik lakes (14.0 µS/cm) and somewhat higher in Second Portage (21.4–23.8 µS/cm), Tehek (17.6–18.7 µS/cm) and Wally (25.9–27.4 µS/cm) lakes. Total suspended (TSS) and dissolved solids (TDS) in surface waters were consistently low (<3.0 mg/L and <10 mg/L, respectively) in all lakes which is consistent with previous work (BAER, 2005). The one exception to this pattern occurred in Second Portage Lake in the summer (11 mg/L and 21 mg/L, respectively) and fall (3.6 mg/L and 13 mg/L, respectively) sampling programs. These elevated suspended and dissolved concentrations of solids in Second Portage Lake are a direct result of introductions of suspended sediment due to construction of the East Dike that began on 30 July, and despite installation of silt curtains, released sediments to the lake. These suspended and dissolved solids became dispersed by wind and were eventually transported out of Second Portage Lake and into Tehek Lake (TSS was measured at 3.1 mg/L in the fall sampling period). Although this is marginally above the detection limit, the actual background TSS concentration in the study lakes is more likely to be on the order of <0.5 mg/L, so this represents a measurable increase. More details on the extent and magnitude of elevated TSS in Second Portage and Tehek Lakes, as well as the ecological

significance of the sediment inputs, are discussed within the dike construction monitoring report (Azimuth, 2009).

Nutrient concentrations (nitrogen, phosphorus) in the Meadowbank study lakes were low, generally close to laboratory detection limits and did not differ appreciably within or among lakes and seasons. Ammonia concentrations exceeded detection limits (less than 2 times) periodically and in different lakes and different seasons but were generally low. Except for Third Portage North in spring (6.95 mg/L), dissolved organic carbon ranged from 1.45–2.48 mg/L in the Meadowbank lakes.

Oil and grease in water was not detected from all locations in all seasons.

Chlorophyll-α concentrations in the study lakes were usually low, ranging from 0.309–1.11 µg/L which are typical of ultra-oligotrophic/oligotrophic lakes. Chlorophyll-α increased over the season. Low productivity is primarily a reflection of low nutrient levels in the project lakes, as well as cold water temperature, short growing season and other inorganic nutrients that are in very low concentration in the project lakes. There were no meaningful differences in chlorophyll-α concentrations among lakes; concentrations tended to be somewhat higher in September than in July and August. There did not appear to be a reduction in chlorophyll-α concentration in Second Portage Lake related to increased TSS from construction of the East Dike (see Azimuth, 2009 for more details).

Total metals concentrations measured in 2008 from surface waters in the spring, summer, and fall were consistently low among the project lakes (**Table 3-7**). Of the 28 metals for which concentration data were measured, 24 are consistently below detection limits (DLs). No metal for which there are CCME (2007) guideline concentrations for the protection of aquatic life exceeded thresholds. The concentrations of common salts (calcium, magnesium, manganese and potassium) exceeded DLs but were always low in concentration with no trend or pattern over time or between lakes. Results from 2008 were consistent to monitoring results from previous years (Azimuth, 2008*a*, *b*; BAER, 2005).

The exception to this pattern was related to the elevated TSS event in Second Portage Lake in summer/fall as a result of sediment release from construction of the East Dike. Chromium, copper and iron concentrations exceeded DLs and in some cases exceeded the CCME (2007) guideline for protection of aquatic life (**Table 3-7**). Concentrations for these metals peaked in August and were lower in September, as did TSS concentrations. Aluminum in water also increased and had a similar pattern as these three metals. Aluminum, chromium, copper and iron also increased in Tehek Lake, but to a lesser degree and only in September because of the time delay between sediment release in Second Portage Lake in July/August and sediment transport to Tehek Lake by September. Total concentrations of other metals were not affected by the TSS event. It is

important to note that dissolved metals concentrations were much lower than total metals concentrations in Second Portage Lake (as measured for the effects assessment strategy as part of East Dike construction monitoring) which suggests that the metals are in particulate form. Implications of the TSS event on water quality and potential impacts to aquatic resources are discussed in the dike construction monitoring report (Azimuth, 2009).

Limnological data, conventional water quality parameters, chlorophyll-α and nutrient concentrations indicate that the Meadowbank study lakes are ultra-oligotrophic (i.e., clear, nutrient poor) with very low productivity. Lake waters are neutral pH, soft (i.e., low hardness), and well mixed throughout the open water season with high oxygen concentration, and low turbidity which is consistent with previous work and with the remote, pristine nature of these headwater lakes. Because the study lakes are situated in the uppermost reaches of the Quioch River system, they do not receive inputs from upstream lakes or streams that might carry suspended and dissolved solids and/or nutrients into the study lakes.

3.2.2. Baker Lake

Vertical temperature and dissolved oxygen profiles of all stations and seasons were isothermal with little evidence of stratification (**Figures 3-8 to 3-10**). Water temperatures were cooler in the spring than in the fall in Baker Lake, but still warmest in summer.

Water samples from Baker Lake were analyzed for the same parameters as samples from the Meadowbank lakes (**Table 3-7**). Conventional water chemistry parameters from Baker Lake were clearly different from the Meadowbank study lakes. These differences are explored below.

Conductivity in Baker Lake ranged from 25.2–802 µS/cm near surface, with some vertical stratification in conductivity with a maximum over 1,000 µS/cm. While total suspended solids in surface waters were consistently low (<3.0 mg/L) at all stations, total dissolved solids (13–434 mg/L), chloride (1.5–216 mg/L) and sulfate (0.68–30.5 mg/L) varied substantially and were very closely related to conductivity patterns in these surface waters. Explanations for the high conductivity measurements and the substantial differences in conductivity between sampling seasons in Baker Lake will be explored more fully in 2009. The varying conductivity values are likely related to wind speed and direction and inflow from the Thelon River, just east of Baker Lake. Because the sampling stations are situated relatively close to shore, low conductivity water from the Thelon River can move west along shore displacing the naturally high-conductivity water, depending on wind conditions. Conductivity profiles in the field also revealed vertical differences with 2 times higher conductivity at depth relative to surface. Elevated conductivity (>1,000 µS/cm) at depth suggests a possible association with marine water

from Chesterfield Inlet and Hudson Bay which may affect limnological profiles. Furthermore, differences in conductivity (laboratory measured from discrete depth) may be influenced by vertical mixing and a reflection of the conductivity of water collected for this analysis at 4 m depth.

Nutrient concentrations (nitrogen, phosphorus) were low, generally close to laboratory detection limits and did not differ appreciably within the lake and among seasons; ammonia was slightly higher for all stations in the spring. As discussed above, anions, chloride, and sulfate concentrations varied among stations and seasons, and were related to hardness and conductivity. Dissolved and total organic carbon did not vary much among stations or seasons, ranging from 3.28–3.54 mg/L and 2.92–3.28 mg/L, respectively. Oil and grease concentrations in water were consistently below DLs at all stations.

Chlorophyll-α concentrations in Baker Lake were low, ranging from 0.436–1.76 µg/L which is typical of oligotrophic lakes. Chlorophyll- α concentrations increased over the season and peaked in summer.

Of the 28 metals analyzed in water 23 were consistently below detection limits at all stations and over seasons and were well below CCME (2007) guidelines for the protection of aquatic life. Only the common salts calcium, magnesium, manganese, potassium and sodium (**Table 3-7**) exceeded DLs and again, were related to conductivity/hardness in surface waters, which could be described as slightly brackish. Only aluminum from the Barge Dock area exceeded the CCME (2007) guideline concentration in August and may have been related to shipping activity in the dock area. Concentrations were less than these guidelines in September for this location and for all other locations and seasons.

Table 3-7: Conventional water chemistry and total metals (mg/L), Meadowbank study lakes, July, August and September 2008.

Lake & Basin		Third Portage Lake											
		South			East			North					
Station ID	CCME (2007)	TPS			TPE			TPN					
Date	Guideline[1]	24-Jul-08	17-Aug-08	18-Sep-08	23-Jul-08	16-Aug-08	18-Sep-08	24-Jul-08	17-Aug-08	18-Sep-08	18-Sep-08	18-Sep-08	18-Sep-08
CONVENTIONAL PARAMETERS													
Physical Tests													
Conductivity (µS/cm)	NG	14.1	14.1	13.6	13.8	13.9	16.4	13.6	14.0	13.6	13.6	13.5	13.5
Hardness (mg/L)	NG	5.07	5.01	5.07	4.99	4.96	5.57	4.89	4.98	5.10	5.08	5.11	5.12
pH	6.5 - 9.0	6.47	6.47	6.83	6.52	6.55	6.75	6.52	6.61	6.81	6.79	6.83	6.77
Total Suspended Solids (mg/L)	NG	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.1	<3.0
Total Dissolved Solids (mg/L)	NG	<10	15	<10	<10	13	15	<10	14	<10	<10	<10	<10
Anions & Nutrients (mg/L)													
Alkalinity - Bicarbonate (as $CaCO_3$)	NG	3.4	4.2	3.9	3.8	5.0	3.8	4.0	3.9	3.7	3.7	3.8	4.0
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
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
Alkalinity - Total (as $CaCO_3$)	NG	3.4	4.2	3.9	3.8	5.0	3.8	4.0	3.9	3.7	3.7	3.8	4.0
Ammonia (as N)[2]	25.9 @ pH6.5; 8.24 @ pH7.0; 2.61 @ pH7.5	0.064	<0.020	<0.020	0.046	<0.020	<0.020	0.028	0.023	<0.020	<0.020	<0.020	<0.020
Chloride	NG	<0.50	0.510	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Nitrate (as N)	2.9	<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)	0.06	<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	NG	0.081	0.099	<0.050	0.081	0.093	0.069	0.084	0.081	0.055	0.066	0.087	0.053
Ortho Phosphate (as P)	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
Total Phosphate (as P)	NG	0.0020	0.0022	<0.0020	<0.0020	<0.0020	<0.0020	0.0021	0.0024	0.0042	<0.0020	<0.0020	0.0022
Sulfate (SO_4)	NG	1.23	1.53	1.22	1.17	1.62	1.22	1.17	1.43	1.21	1.20	1.22	1.22
ORGANIC / INORGANIC CARBON													
Dissolved Organic Carbon (mg/L)	NG	1.51	1.90	1.64	1.54	1.94	1.75	6.95	1.92	1.50	1.50	1.45	1.47
Total Organic Carbon (mg/L)	NG	1.41	1.33	1.35	1.31	1.35	1.44	1.30	1.31	1.36	1.32	1.33	1.36
AGGREGATE ORGANICS (mg/L)													
Oil and Grease	NG	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
PLANT PIGMENTS													
Chlorophyll a - standardized (µg/L)	NG	0.394	0.327	0.595	0.398	0.398	0.708	0.363	0.337	0.573	0.526	0.495	0.515
TOTAL METALS (mg/L)													
Aluminum[3]	0.005 @pH<6.5 0.100 @ pH≥6.5	<0.0050	<0.0050	0.0097	0.0083	0.0074	0.014	<0.0050	<0.0050	0.0081	0.0083	0.0070	0.0079
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
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
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
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
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
Cadmium[4]	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	1.19	1.15	1.15	1.18	1.14	1.30	1.16	1.14	1.17	1.15	1.16	1.16
Chromium[5]	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	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
Copper*	0.0020	<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	0.300	0.031	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead*	0.0010	<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	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium	NG	0.51	0.52	0.54	0.49	0.51	0.57	0.49	0.52	0.53	0.53	0.54	0.54
Manganese	NG	0.000590	0.000640	0.000780	0.000900	0.000970	0.00102	0.000610	0.000610	0.000730	0.000690	0.000670	0.000660
Mercury	0.000026	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Molybdenum	0.073	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nickel*	0.025	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Potassium	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
Selenium	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
Silver	0.00010	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Sodium	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
Thallium	0.00080	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Tin	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
Titanium	NG	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	NG	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Vanadium	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
Zinc	0.030	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

Notes:

NG = no guideline.

[1]CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated December 2007.

[2]Ammonia guidelines are for 10 °C.

[3]Aluminum guideline is pH dependent.

[4]Interim cadmium guideline.

[5]Chromium guideline is for Cr VI, which yields the most conservative guideline.

*Copper, lead and nickel guidelines are hardness dependent; minimum hardness was selected to yield the most conservative guideline.

Shaded concentrations exceed the CCME guideline.

Table 3-7 con't: Conventional water chemistry and total metals (mg/L), Meadowbank study lakes, July, August and September 2008.

Lake & Basin		Second Portage Lake			Tehek Lake			Wally Lake		Inuggugayualik Lake	
Station ID	CCME (2007)	SP			TE			WAL		INUG	
Date	Guideline[1]	19-Jul-08	22-Aug-08	17-Sep-08	20-Jul-08	19-Aug-08	15-Sep-08	22-Jul-08	21-Aug-08	25-Jul-08	20-Aug-08
CONVENTIONAL PARAMETERS											
Physical Tests											
Conductivity (µS/cm)	NG	21.4	23.8	25.5	17.6	18.7	23.4	25.9	27.4	14.0	14.0
Hardness (mg/L)	NG	8.79	11.8	10.8	6.84	7.24	9.85	11.3	11.7	5.01	4.97
pH	6.5 - 9.0	7.18	7.24	7.15	6.51	6.76	7.11	7.31	7.31	6.53	6.74
Total Suspended Solids (mg/L)	NG	<3.0	11	3.6	<3.0	<3.0	3.1	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids (mg/L)	NG	10	21	13	<10	13	10	17	15	<10	<10
Anions & Nutrients (mg/L)											
Alkalinity - Bicarbonate (as $CaCO_3$)	NG	6.8	6.6	7.9	5.5	5.0	7.3	8.9	9.2	4.6	4.3
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
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
Alkalinity - Total (as $CaCO_3$)	NG	6.8	6.6	7.9	5.5	5.0	7.3	8.9	9.2	4.6	4.3
Ammonia (as N)[2]	25.9 @ pH6.5; 8.24 @ pH7.0; 2.61 @ pH7.5	0.045	<0.020	<0.020	0.052	<0.020	<0.020	0.020	0.021	0.058	0.030
Chloride	NG	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.600	0.690
Nitrate (as N)	2.9	<0.0050	0.080	0.029	<0.0050	<0.0050	0.021	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	0.06	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	NG	0.14	0.093	0.10	0.097	0.090	0.089	0.12	0.10	0.16	0.098
Ortho Phosphate (as P)	NG	<0.0010	<0.0010	<0.0010	0.0010	<0.0010	<0.0010	0.0013	<0.0010	<0.0010	<0.0010
Total Phosphate (as P)	NG	0.0022	0.015	0.0064	0.0022	0.0030	0.0056	0.0037	0.0025	0.0021	0.0027
Sulfate (SO_4)	NG	2.08	2.49	2.14	1.72	2.01	1.95	2.27	2.64	0.700	0.960
ORGANIC / INORGANIC CARBON											
Dissolved Organic Carbon (mg/L)	NG	1.72	1.75	2.01	1.65	1.74	1.90	2.34	2.06	2.05	2.48
Total Organic Carbon (mg/L)	NG	1.56	1.43	1.61	1.44	1.44	1.64	1.84	1.86	1.82	1.80
AGGREGATE ORGANICS (mg/L)											
Oil and Grease	NG	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
PLANT PIGMENTS											
Chlorophyll a - standardized (µg/L)	NG	0.336	0.556	0.654	0.309	0.595	1.11	0.557	0.659	0.506	0.616
TOTAL METALS (mg/L)											
Aluminum[3]	0.005 @pH<6.5 0.100 @ pH≥6.5	0.0064	1.2	0.34	0.0085	0.061	0.39	<0.0050	0.0053	0.0068	0.0060
Antimony	NG	<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	0.00054	<0.00050	<0.00050	<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
Beryllium	NG	<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
Cadmium[4]	0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017
Calcium	NG	2.31	2.68	2.7	1.74	1.80	2.41	3.07	3.14	1.02	0.990
Chromium[5]	0.0010	<0.0010	0.0039	0.0011	<0.0010	<0.0010	0.0013	<0.0010	<0.0010	<0.0010	<0.0010
Cobalt	NG	<0.00030	0.00065	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Copper*	0.0020	<0.0010	0.0031	0.0017	<0.0010	<0.0010	0.0016	<0.0010	<0.0010	<0.0010	<0.0010
Iron	0.300	<0.030	1.3	0.37	<0.030	0.092	0.43	<0.030	<0.030	<0.030	<0.030
Lead*	0.0010	<0.00050	0.00087	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Lithium	NG	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium	NG	0.73	1.2	0.99	0.61	0.67	0.93	0.87	0.93	0.60	0.61
Manganese	NG	0.00113	0.0242	0.00757	0.00119	0.00257	0.00801	0.00102	0.00136	0.00181	0.00193
Mercury	0.000026	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Molybdenum	0.073	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nickel*	0.025	<0.0010	0.0027	0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010
Potassium	NG	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Selenium	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Silver	0.00010	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Sodium	NG	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Thallium	0.00080	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Tin	NG	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Titanium	NG	<0.010	0.049	0.013	<0.010	<0.010	0.016	<0.010	<0.010	<0.010	<0.010
Uranium	NG	<0.00020	0.00056	0.00022	<0.00020	<0.00020	0.00025	<0.00020	<0.00020	<0.00020	<0.00020
Vanadium	NG	<0.0010	0.0019	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc	0.030	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

Notes:

NG = no guideline.

[1]CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated December 2007.

[2]Ammonia guidelines are for 10 °C.

[3]Aluminum guideline is pH dependent.

[4]Interim cadmium guideline.

[5]Chromium guideline is for Cr VI, which yields the most conservative guideline.

*Copper, lead and nickel guidelines are hardness dependent; minimum hardness was selected to yield the most conservative guideline.

Shaded concentrations exceed the CCME guideline.

Table 3-7 con't: Conventional water chemistry and total metals (mg/L), Baker Lake, July, August and September 2008.

Lake & Basin		Baker Lake								
		Barge Dock			Proposed Jetty			Akilahaarjuk Point		
Station ID	CCME (2007)	BBD			BPJ			BAP		
Date	Guideline[1]	27-Jul-08	28-Aug-08	21-Sep-08	27-Jul-08	28-Aug-08	21-Sep-08	28-Jul-08	25-Aug-08	21-Sep-08
CONVENTIONAL PARAMETERS										
Physical Tests										
Conductivity (µS/cm)	NG	802	25.2	660	426	135	624	266	323	581
Hardness (mg/L)	NG	80.8	16.8	67.7	51.7	18.7	64.5	31.8	33.3	60.6
pH	6.5 - 9.0	7.20	7.83	7.09	7.22	7.74	7.13	7.23	7.64	7.11
Total Suspended Solids (mg/L)	NG	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids (mg/L)	NG	434	13	345	222	71	329	135	177	302
Anions & Nutrients (mg/L)										
Alkalinity - Bicarbonate (as $CaCO_3$)	NG	9.1	8.2	5.8	8.8	8.1	9.3	9.1	8.0	9.2
Alkalinity - Carbonate (as $CaCO_3$)	NG	<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
Alkalinity - Total (as $CaCO_3$)	NG	9.1	8.2	5.8	8.8	8.1	9.3	9.1	8.0	9.2
Ammonia (as N)[2]	25.9 @ pH6.5; 8.24 @ pH7.0; 2.61 @ pH7.5	0.029	<0.020	<0.020	0.045	0.024	<0.020	0.022	0.021	<0.020
Chloride	NG	216	1.50	173	110	30.7	163	65.4	81.4	151
Nitrate (as N)	2.9	0.064	0.0082	0.036	0.039	0.0083	0.033	0.025	0.015	0.029
Nitrite (as N)	0.06	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010
Total Kjeldahl Nitrogen	NG	0.13	0.27	0.14	0.14	0.24	0.14	0.18	0.19	0.14
Ortho Phosphate (as P)	NG	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Phosphate (as P)	NG	0.0055	0.0068	0.0072	0.0058	0.0093	0.0075	0.050	0.0032	0.0075
Sulfate (SO_4)	NG	30.5	0.680	25.2	15.5	4.60	23.8	9.37	11.7	21.9
ORGANIC / INORGANIC CARBON										
Dissolved Organic Carbon (mg/L)	NG	3.54	3.54	3.48	3.28	3.42	3.29	3.39	3.40	3.44
Total Organic Carbon (mg/L)	NG	3.04	3.28	3.11	3.15	3.16	3.13	3.16	2.92	3.18
AGGREGATE ORGANICS (mg/L)										
Oil and Grease	NG	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
PLANT PIGMENTS										
Chlorophyll a - standardized (µg/L)	NG	0.436	1.34	0.938	0.802	1.76	0.847	0.931	1.04	0.965
TOTAL METALS (mg/L)										
Aluminum[3]	0.005 @pH<6.5 0.100 @ pH≥6.5	<0.010	0.14	0.0053	0.0065	0.035	<0.0050	0.0094	0.0057	0.0074
Antimony	NG	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Arsenic	0.0050	<0.0010	<0.00050	<0.00070	<0.00050	<0.00050	<0.00060	<0.00050	<0.00050	<0.00070
Barium	NG	<0.020	<0.060	<0.020	<0.020	<0.060	<0.020	<0.020	<0.060	<0.020
Beryllium	NG	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Boron	NG	<0.10	<0.30	<0.10	<0.10	<0.30	<0.10	<0.10	<0.30	<0.10
Cadmium[4]	0.000017	<0.000034	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017
Calcium	NG	7.02	4.95	6.13	5.02	2.90	5.89	3.79	3.75	6.15
Chromium[5]	0.0010	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cobalt	NG	<0.00060	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Copper*	0.0020	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Iron	0.300	<0.030	<0.090	<0.030	<0.030	<0.090	<0.030	<0.030	<0.090	<0.030
Lead*	0.0010	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Lithium	NG	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium	NG	15	1.1	13	9.5	2.8	12	5.4	5.8	11
Manganese	NG	0.00467	0.01040	0.00266	0.00328	0.00507	0.00209	0.00279	0.00169	0.00241
Mercury	0.000026	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Molybdenum	0.073	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nickel*	0.025	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Potassium	NG	4.8	<6.0	4.1	3.0	<6.0	3.9	<2.0	<6.0	3.6
Selenium	0.0010	<0.0040	<0.0010	<0.0030	<0.0020	<0.0010	<0.0030	<0.0010	<0.0010	<0.0030
Silver	0.00010	<0.000040	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Sodium	NG	112	<6.0	98.5	66.4	15.8	94.4	34.7	42.2	83.8
Thallium	0.00080	<0.00040	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Tin	NG	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Titanium	NG	<0.010	<0.030	<0.010	<0.010	<0.030	<0.010	<0.010	<0.030	<0.010
Uranium	NG	<0.00040	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Vanadium	NG	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc	0.030	<0.0050	<0.0150	<0.0050	<0.0050	<0.0150	<0.0050	<0.0050	<0.0150	<0.0050

Notes:

NG = no guideline.

[1]CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated December 2007.

[2]Ammonia guidelines are for 10 °C.

[3]Aluminum guideline is pH dependent.

[4]Interim cadmium guideline.

[5]Chromium guideline is for Cr VI, which yields the most conservative guideline.

*Copper, lead and nickel guidelines are hardness dependent; minimum hardness was selected to yield the most conservative guideline.

Shaded concentrations exceed the CCME guideline.

Figure 3-1: Temperature (°C) and dissolved oxygen (mg/L) profiles for Third Portage Lake– North Basin, July, August and September 2008.

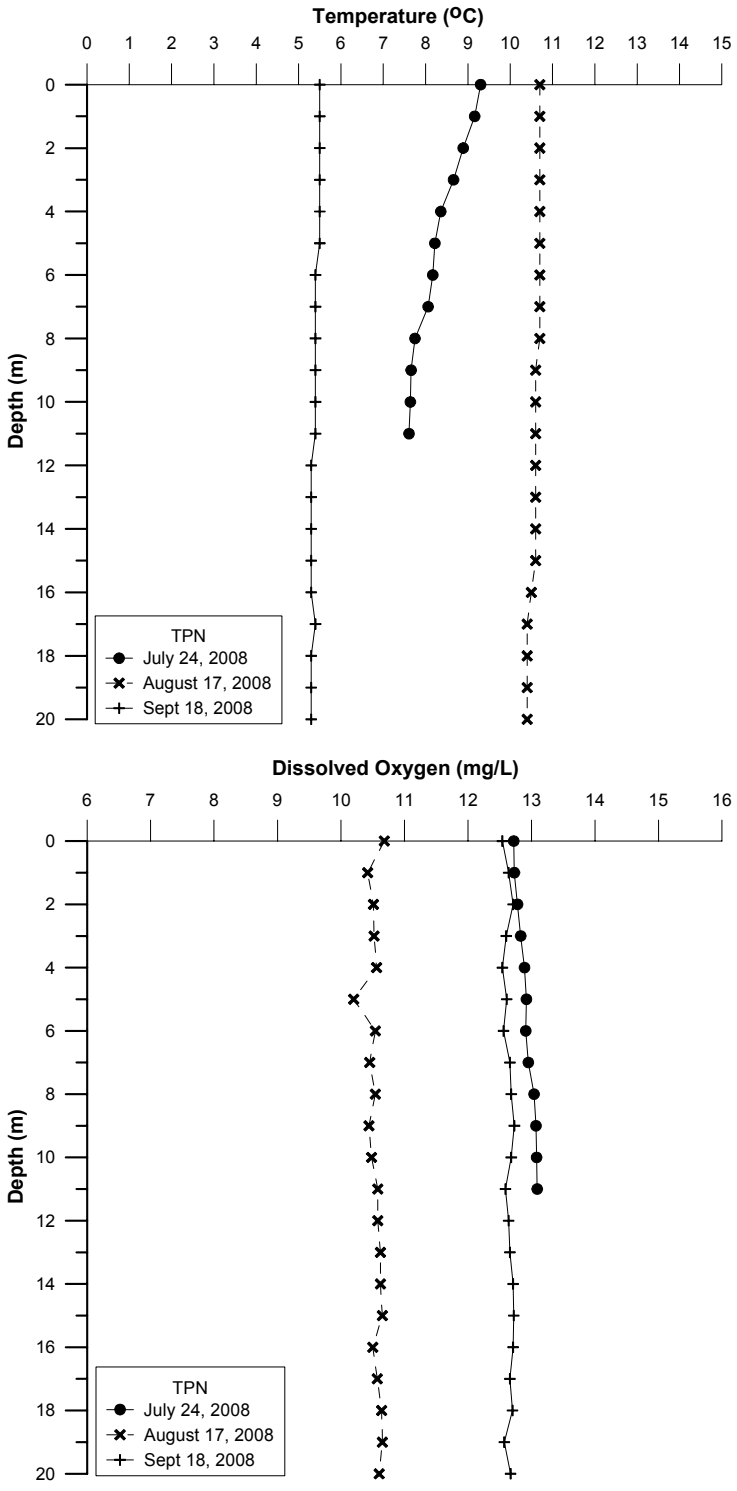


Figure 3-2: Temperature (°C) and dissolved oxygen (mg/L) profiles for Third Portage Lake– East Basin, July, August and September 2008.

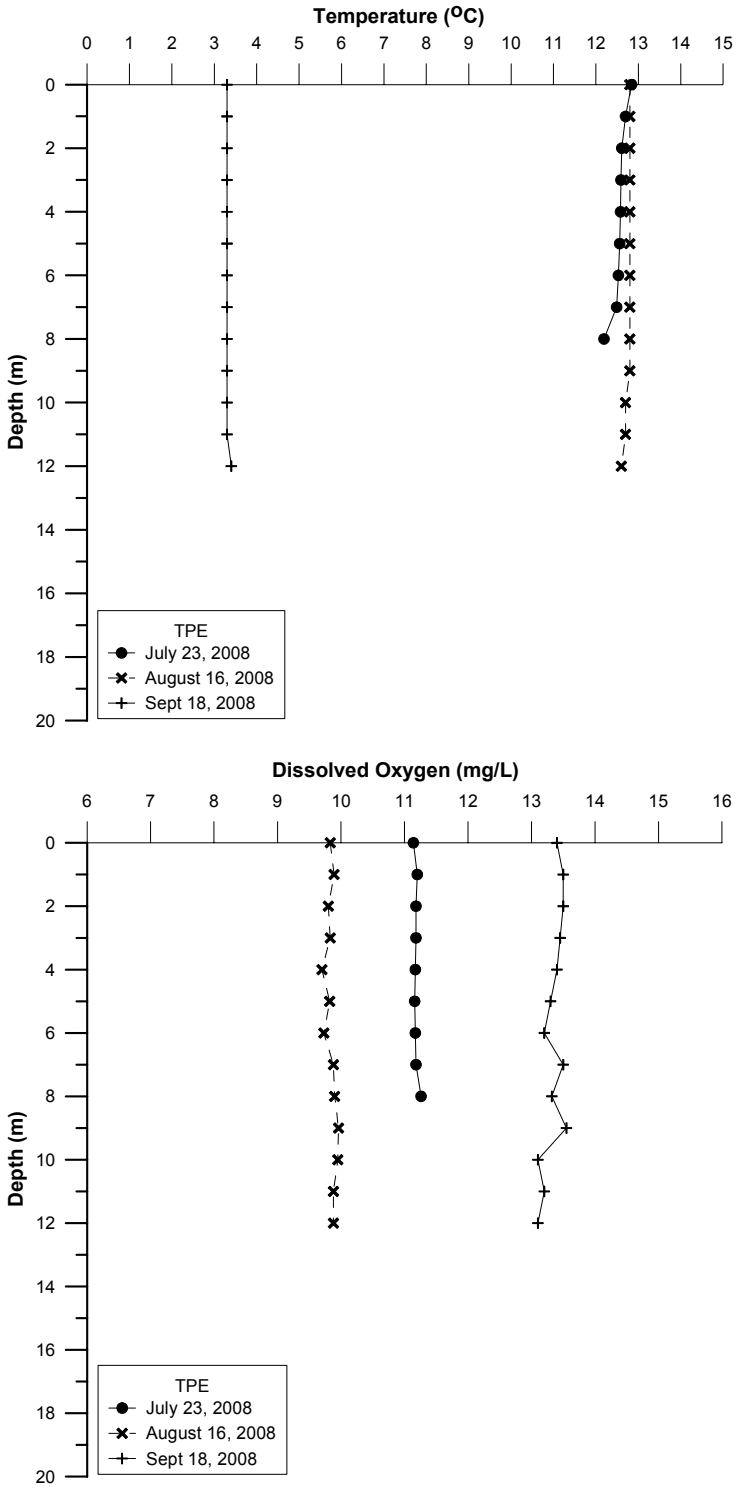


Figure 3-3: Temperature (°C) and dissolved oxygen (mg/L) profiles for Second Portage Lake, July, August and September 2008.

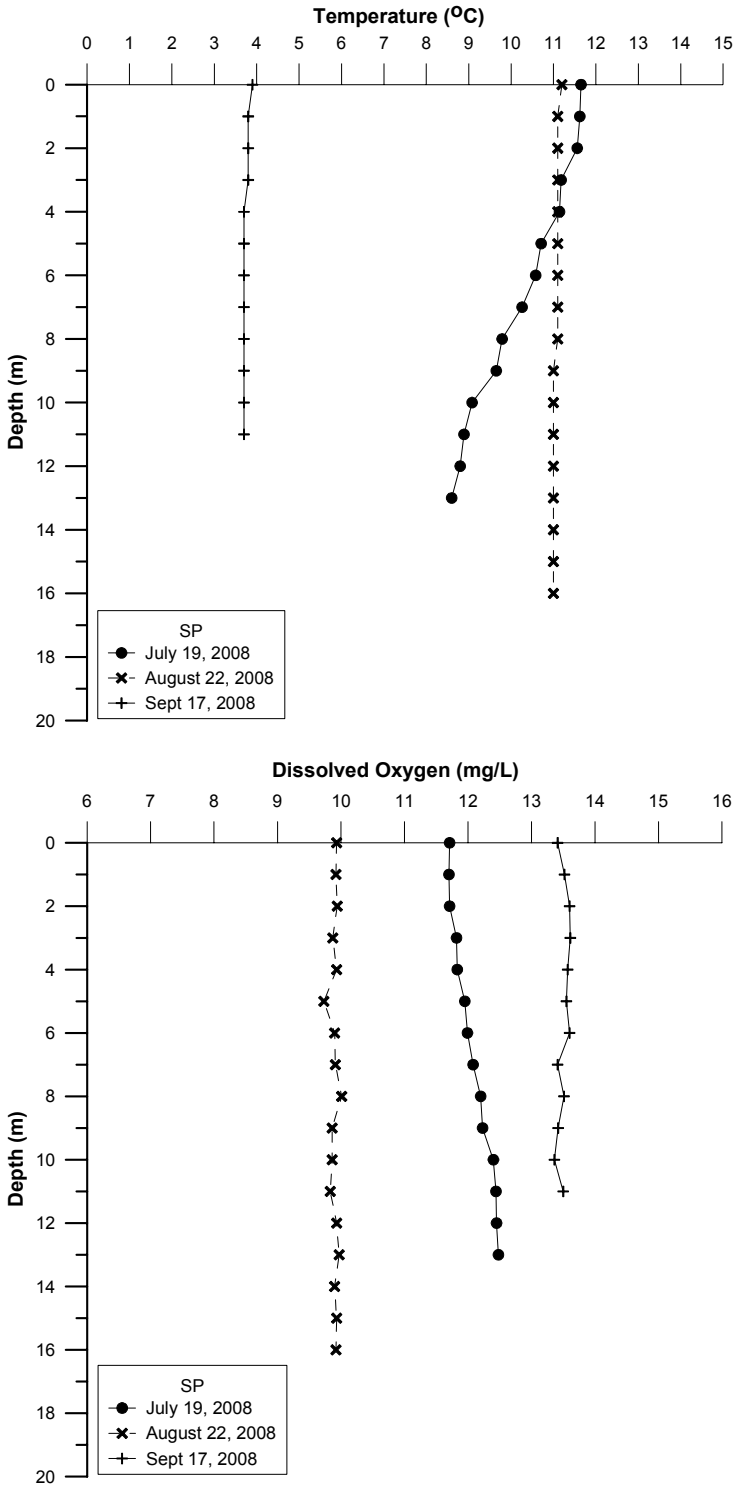


Figure 3-4: Temperature (°C) and dissolved oxygen (mg/L) profiles for Wally Lake, July and August 2008.

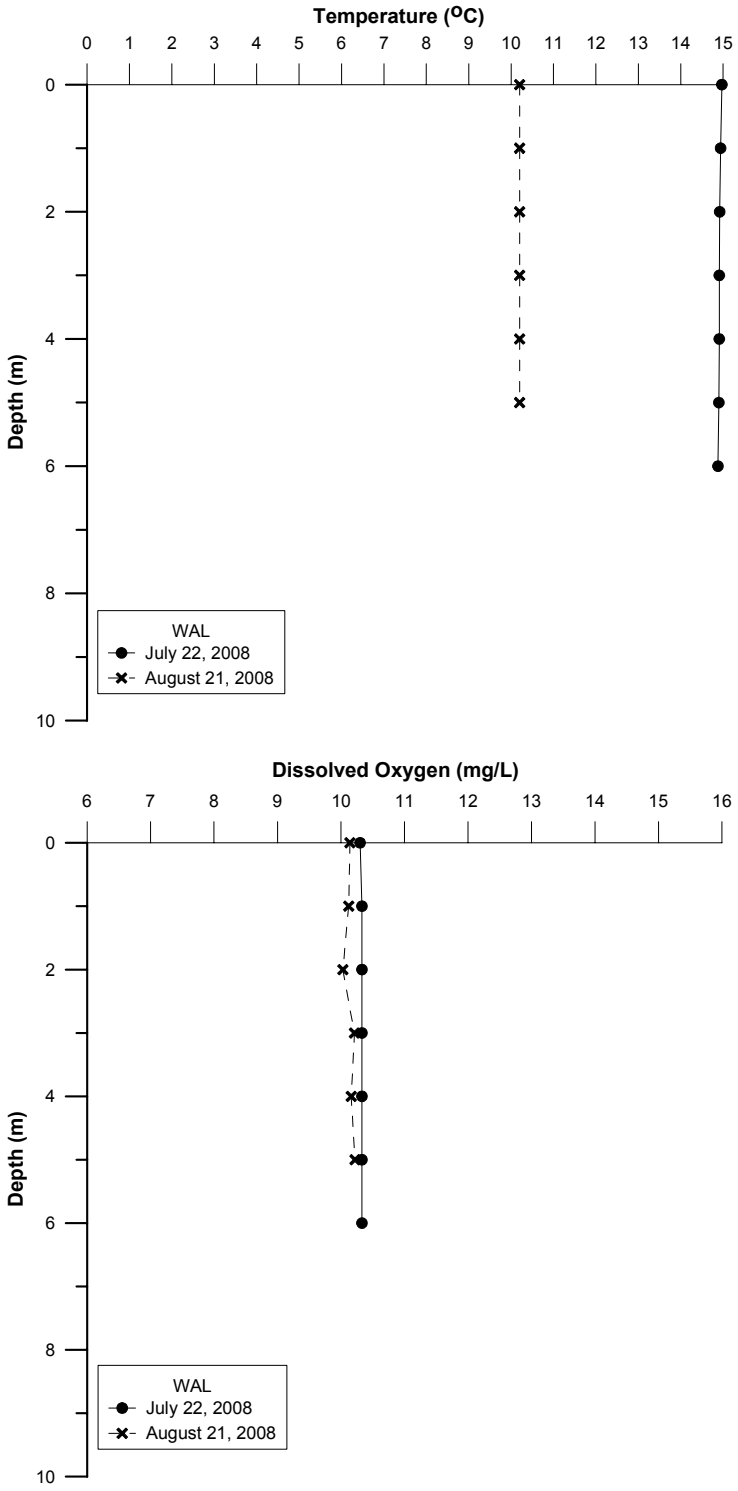


Figure 3-5: Temperature (°C) and dissolved oxygen (mg/L) profiles for Tehek Lake, July and August 2008.

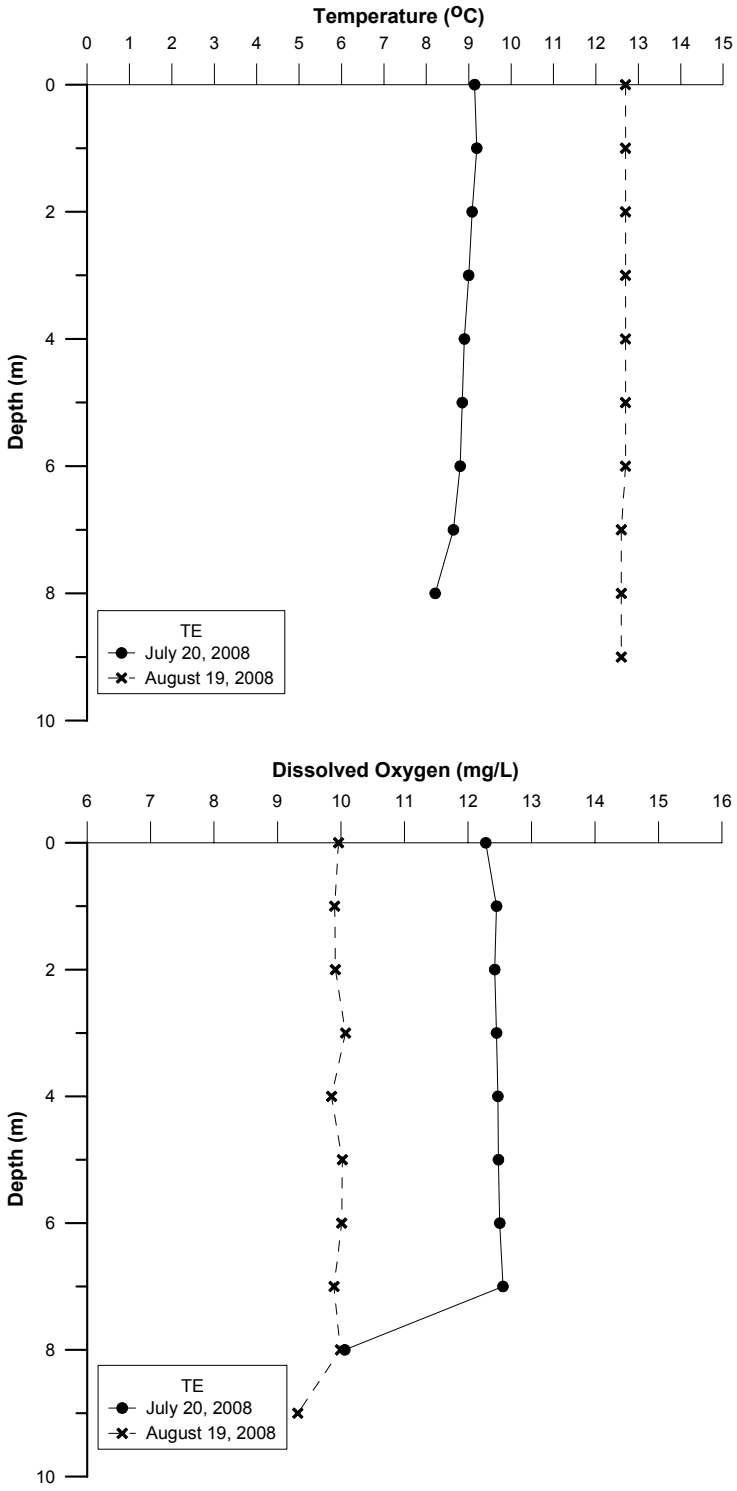


Figure 3-6: Temperature (°C) and dissolved oxygen (mg/L) profiles for Third Portage Lake– South Basin, July, August and September 2008.

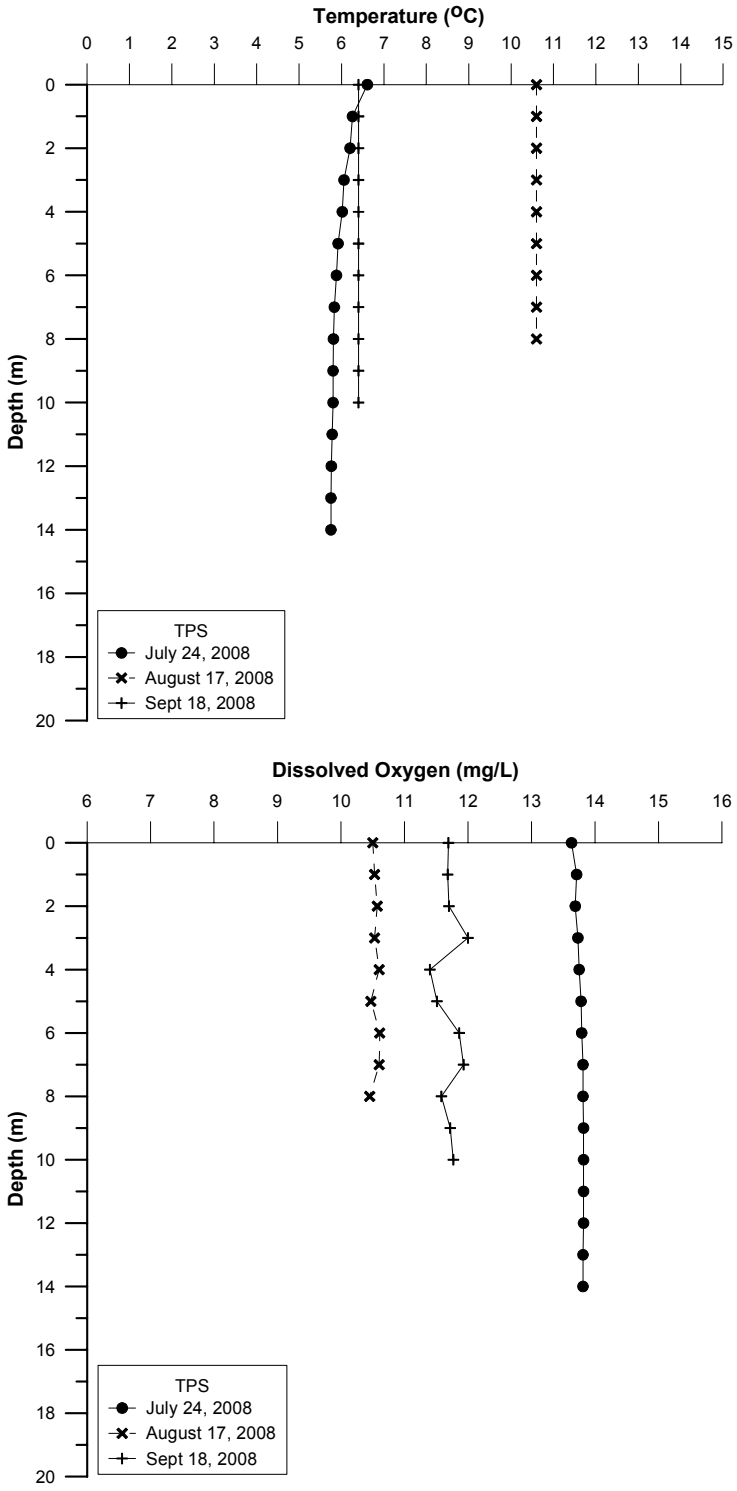


Figure 3-7: Temperature (°C) and dissolved oxygen (mg/L) profiles for Inuggugayualik Lake, July and August 2008.

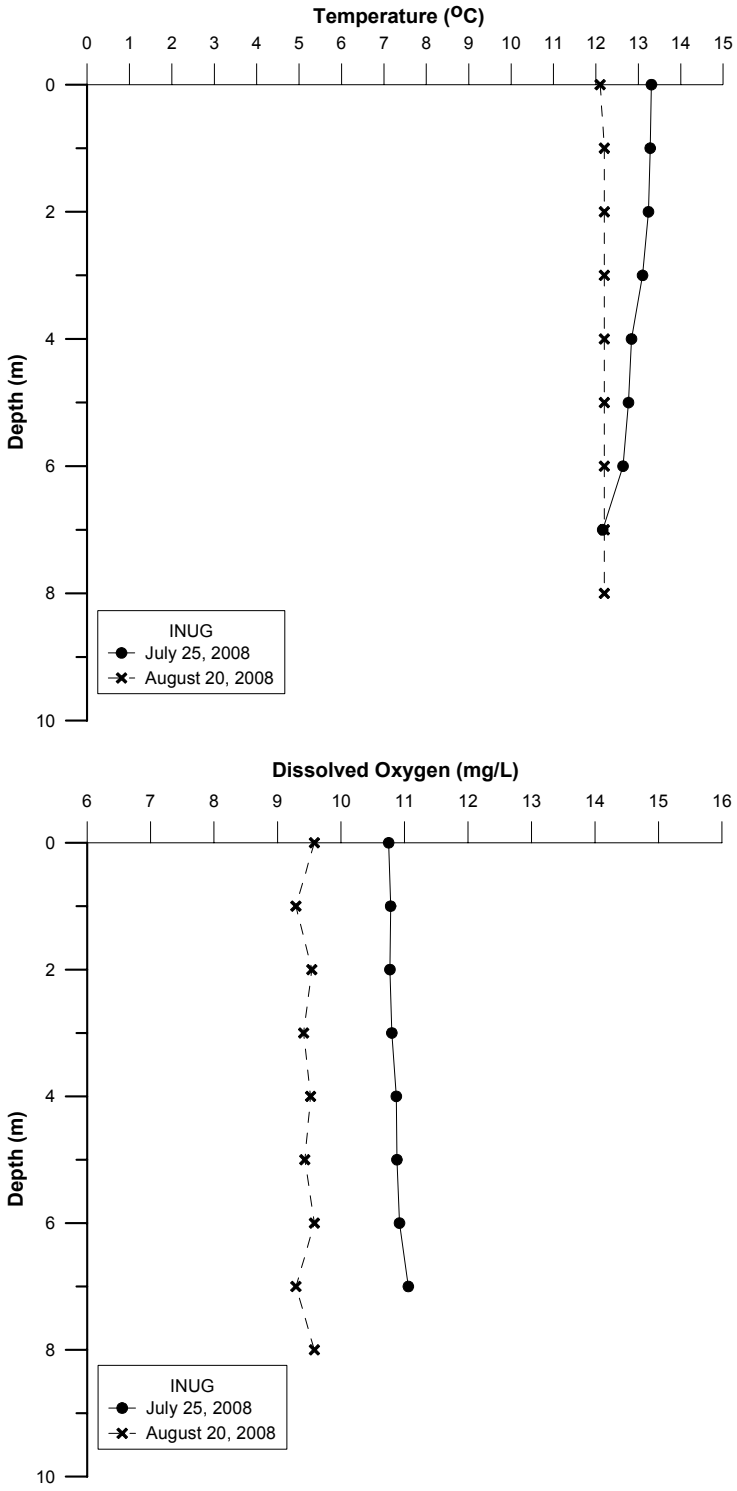


Figure 3-8: Temperature (°C) and dissolved oxygen (mg/L) profiles for Baker Lake – Barge Dock, July, August and September 2008.

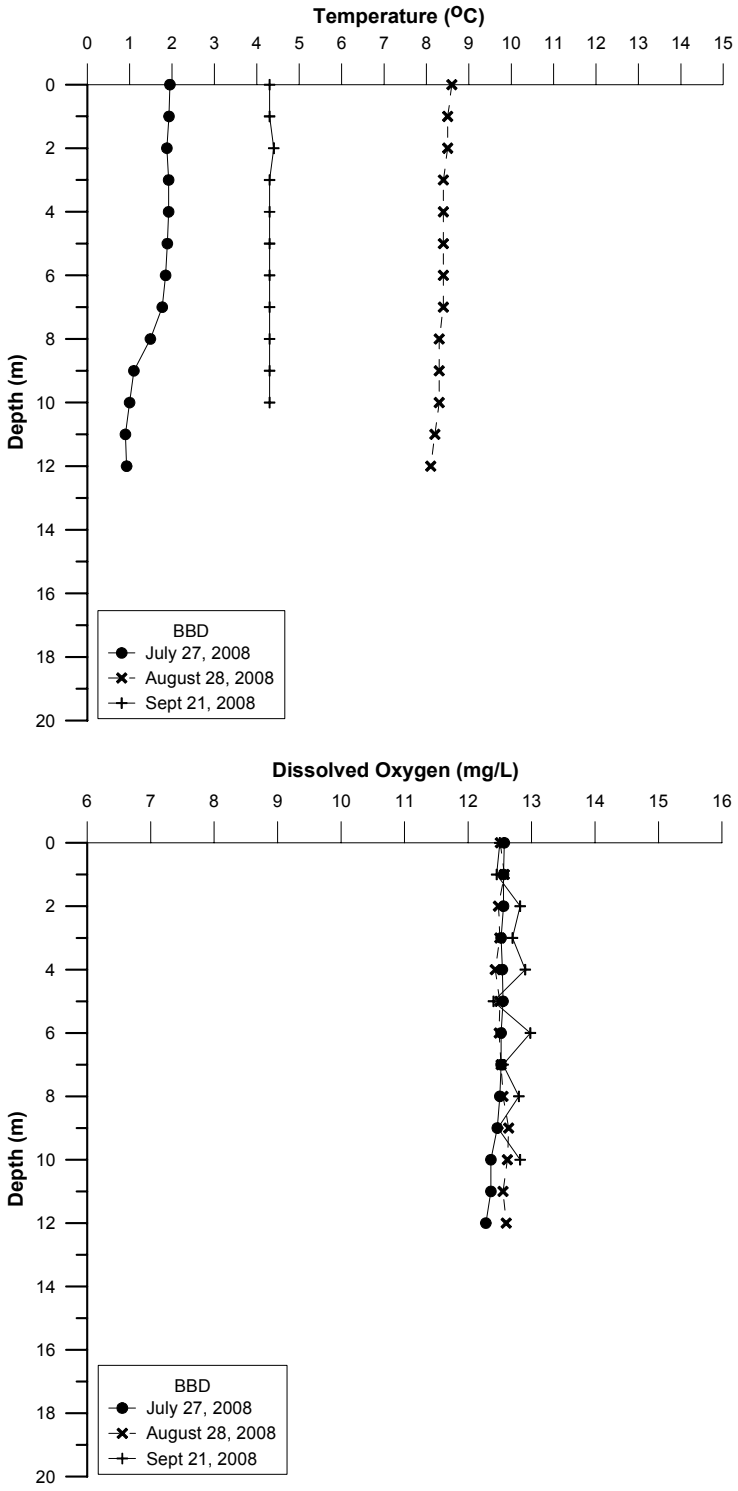


Figure 3-9: Temperature (°C) and dissolved oxygen (mg/L) profiles for Baker Lake – Proposed Jetty, July, August and September 2008.

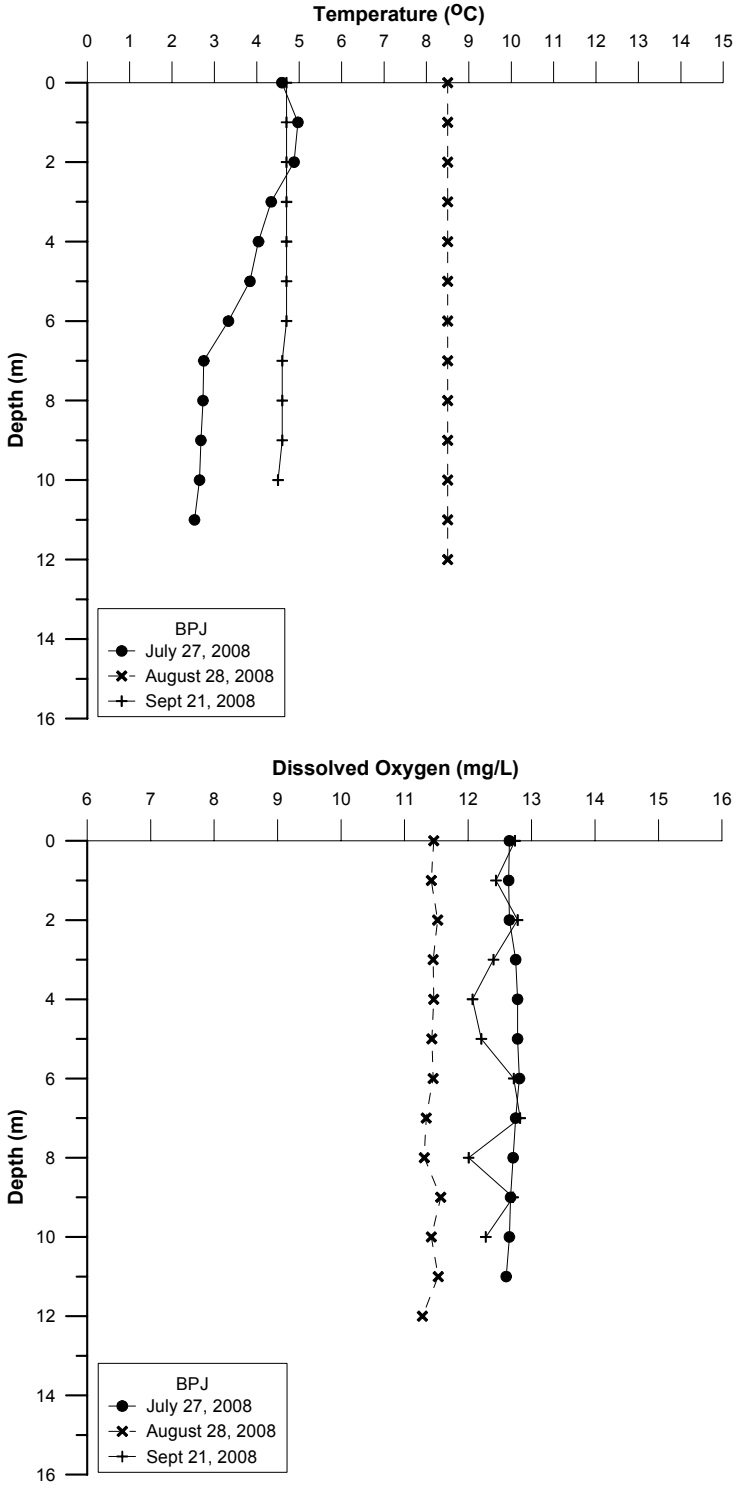
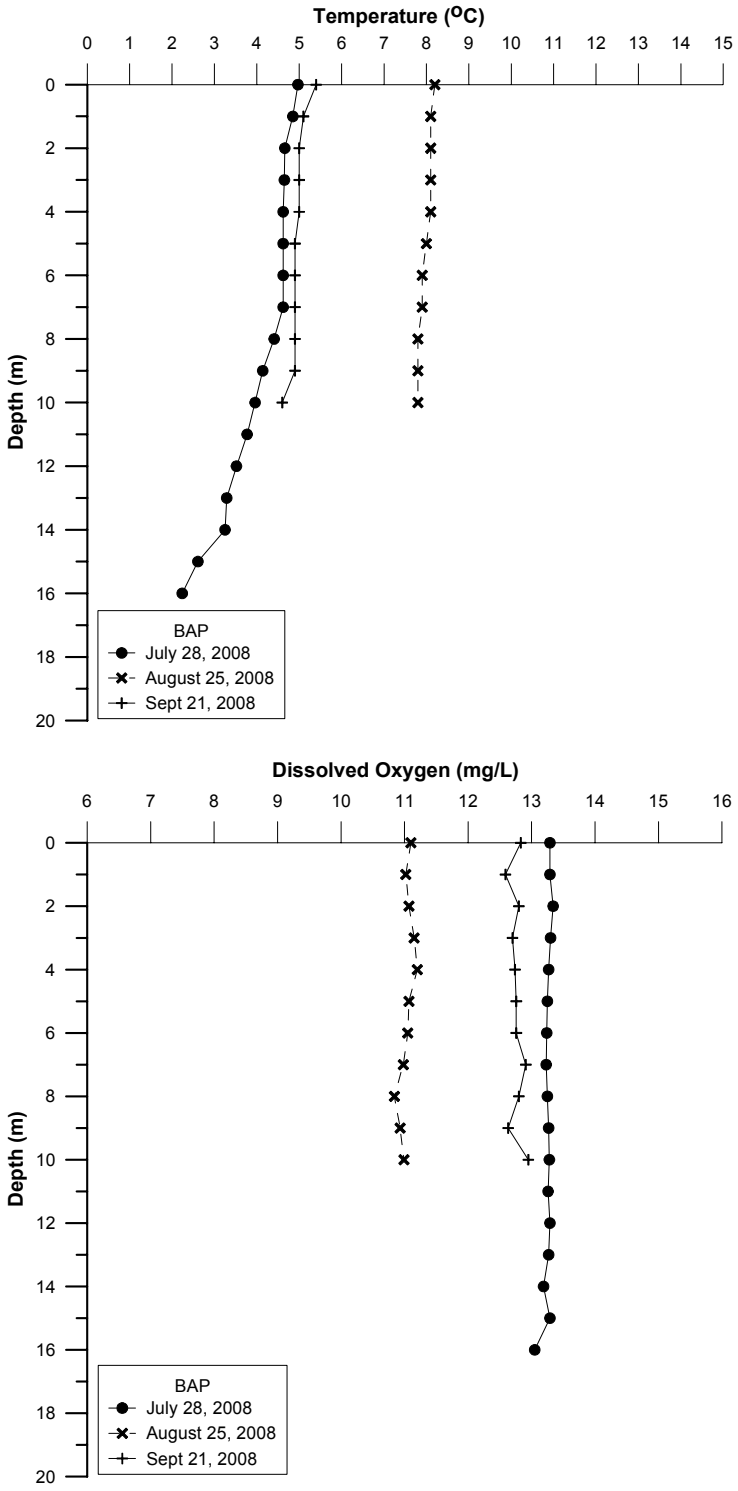


Figure 3-10: Temperature (°C) and dissolved oxygen (mg/L) profiles for Baker Lake–Akilahaarjuk Point, July, August and September 2008.



3.3. Sediment Chemistry

3.3.1. Bulk Grab Sampling Program

3.3.1.1. Meadowbank Study Lakes

Total metals concentrations (mg/kg dry weight), PAHs, oil and grease, pH, moisture content, total organic carbon and particle size were measured in sediment from each sampling station during summer sampling only (**Table 3-8**). Because the study lakes are headwater lakes, there are no stream sources of sediments; therefore sedimentation rates in the lakes are likely extremely low. Previous sampling episodes of sediment chemistry from different locations within the project lakes bear this out (BAER, 2005), as there is very little variability within or among project lakes.

Sediment was acquired from all stations at depths ranging from 6.7–13.2 m. To ensure consistency and provide relevant information for benthic communities, the sediment was sampled from the same depths/locations as the benthos samples. For this reason, and partly because of the similar geochemistry of the lakes, sediment grain size was consistent among lakes and was dominated by fine sediments (80–98% silt/clay).

Total organic carbon concentrations ranged from 3.1–5.0% dry weight over the study lakes, which is reasonably high for an oligotrophic system and illustrates the likely small amount of inorganic input into the lakes and low sedimentation rate. These values are consistent with total organic carbon concentrations measured in previous years (Azimuth, 2008*a*, *b*; BAER, 2005).

Sediment metals concentrations measured in each of the study lakes were compared against federal (CCME, 2002) ISQG and PEL sediment quality guidelines (**Table 3-8**) for those metals for which there are SQG guidelines. Note that exceedences of these guideline values does not necessarily imply that adverse effects have occurred or are expect to occur. These values are relatively conservative and do not reflect site-specific conditions, regional geochemistry or adaptations by benthic organisms to regional characteristics.

Arsenic, chromium and copper exceeded ISQGs in all Meadowbank study lakes in 2008 which was consistent with results from all previous years at all locations (BAER, 2005; Azimuth, 2008*a*, *b*). Arsenic exceeded the PEL in all lakes, while chromium exceeded the PEL in two of the basins (north and south) of Third Portage Lake and the ISQG at all other locations. Zinc slightly exceeded the ISQG (123 mg/kg) in Second Portage and Wally Lakes (125 mg/kg) in 2008, but fell within the typical range for this metal from previous years (BAER, 2005). Baseline concentrations of zinc hover around the ISQG

and will occasionally exceed the conservative guideline concentration at some locations, but not in any consistent pattern (Azimuth, 2008*a*, *b*; BAER, 2005).

The range in concentration of metals among stations and lakes was relatively small for most metals, usually less than 2 times the average concentration. An exception to this trend was arsenic. Within the project lakes arsenic ranged from 19–50 mg/kg; at the reference station Inuggugayualik Lake arsenic was 145 mg/kg. This trend was also observed in 2007 sediment data for project lakes (20–87 mg/kg) and in Inuggugayualik Lake (164 mg/kg) (Azimuth, 2008*a*). This range of concentrations is consistent with data collected since 1997, notwithstanding some differences between years. For example, in 2007 arsenic in TPN sediments was 87.7 mg/kg but was only 26.2 mg/kg in 2006 (Azimuth, 2008*a*, *b*). This illustrates the spatial heterogeneity that can sometimes exist within lakes, particularly close to heavily mineralized geology. It is partly for this reason that the targeted core study was conducted, i.e., to better understand and define the natural spatial variability in sediment metals concentrations within each station (see **Section 3.3.2** below). Given the low sedimentation rates in the lakes and the naturally elevated mineralogy of the local geology, which is typical for mining locations, these background levels are not unexpected.

Polycyclic aromatic hydrocarbons (PAHs) and oil & grease were measured in sediment in 2008 for the first time as part of the AEMP. These parameters have been measured in order to establish a baseline prior to mine development. Concentrations of all PAHs were below detection limits in sediment for all stations (**Table 3-8**). However, oil & grease concentrations exceeded the DL of 500 mg/kg in all Third Portage Lake stations including the internal reference (TPS), as well as in Wally, Tehek and the external reference lake (INUG). This result was unexpected and is not likely due to hydrocarbons considering that PAHs were non-detectable at all locations, including TPE where the highest concentration of oil and grease was measured (5,070 mg/kg). Results of oil & grease analyses were discussed with the laboratory. From these relatively high oil and grease concentrations (approx. 2–5 g/kg or 0.2–0.5%), that were found even at reference areas which are far removed from any anthropogenic activity, we conclude that some other factor(s) is responsible for the inconsistency. The laboratory has suggested that other organics, such as plant material, may have confounded the results. However, we have not observed emergent vegetation in benthic samples. It is highly unlikely that these are real results (i.e., indicative of actual hydrocarbon contamination), especially when the PAHs were not detectable and there were no visible (i.e., sheen) or olfactory (i.e., smell) signs of contamination observed during sample collection. This issue will be explored further in 2009 with support from the laboratory.

3.3.1.2. Baker Lake

Baker Lake sediments were analyzed for the same parameters as were Meadowbank study sediments (**Table 3-8**). Sediment was acquired from the three stations at depths ranging from 8.4–13.4 m. Sediment grain size was consistent among Baker Lake stations and was generally dominated by sand (~50% sand at BBD and BAP). Total organic carbon concentrations were low and ranged from 0.4–0.9% dry weight.

Sediment metals concentrations measured in each of the study lakes were compared against federal (CCME, 2002) ISQG and PEL sediment quality guidelines (**Table 3-8**) for those metals for which there are SQG guidelines. Arsenic was the only metal that exceeded CCME guideline concentrations and only at the proposed jetty location (BPJ). None of the other metals that exceeded guidelines from the study lakes were exceeded in Baker Lake; this may be in part due to larger grain size material (e.g., sand rather than clay). The range in metals concentration among stations was relatively small, usually less than 2 times the average concentration.

Interestingly, despite the much higher levels of local fuel usage (e.g., barges, ships, boats, and snowmobiles), PAHs and oil & grease concentrations were below detection limits in sediment at all stations (**Table 3-8**).

3.3.2. Target Sediment Coring

3.3.2.1. Meadowbank Study Lakes

Total metals concentrations (mg/kg dry weight), pH, and total organic carbon were measured in surface sediment from the top 1 cm of each core from each sampling station during the spring sampling event (**Table 3-9**). This is the first time sediment cores have been collected as part of the AEMP monitoring program. This component was added to characterize the spatial variability of sediment chemistry within AEMP sampling stations covering a variety of depths within the basin being sampled.

Sediment was acquired at depths ranging from 4.5–17.5 m, depending on the sampling location, but targeted fine sediments. Total organic carbon concentrations typically fell within the 4–6% range and are a reflection of the very slow sedimentation rates in the project lakes. TOC was also fairly consistent within and among stations, although shallower lakes such as Wally Lake tended to have slightly higher TOC concentrations (e.g., three of the cores from this lake had TOC from 10–14%).

Arsenic, cadmium (except reference lake, INUG), chromium and copper concentrations exceeded at least the ISQG guideline in all study lakes from nearly all core samples (**Table 3-9**), which is consistent with results of bulk sediment collections in 2008 and

historic data (BAER, 2005). For example mean chromium concentrations in the bulk sediment samples over all study lakes ranged from about 60-110 mg/kg, by contrast mean concentrations in sediment cores ranged from about 50-100 mg/kg. To better illustrate and characterize the variability in results within stations for these four metals, box and whisker plots were made depicting mean values, upper and lower quartile values and the range in concentrations relative to ISQG or PEL threshold concentrations (**Figure 3-11**). Although variability in arsenic was relatively low within and among lakes (except for one high sample in TPS), arsenic exceeded the PEL at all stations. The ISQG for cadmium (0.6 mg/kg) is just above the DL (0.5 mg/kg). Where there were exceedences of the DL (about 1/3 of samples), cadmium exceeded the ISQG (up to 1.2 mg/kg) but was well below the PEL (3.5 mg/kg). Because most concentrations were at or below the DL, there was very little difference in mean and maximum concentrations of cadmium within and between lakes. Mean chromium concentrations were more variable between lakes, with TP and INUG tending to be higher than SP, TE and WAL, with concentrations of most core samples falling between the ISQG and the PEL. Mean copper concentrations in core samples were also fairly similar between lakes, ranging between 45 mg/kg and 79 mg/kg, except for Wally Lake (higher), with nearly all values exceeding the ISQG and none exceeding the PEL.

The data confirm that for those metals exceeding at least the ISQG (arsenic, cadmium, copper, chromium) concentrations are relatively similar across a wide area and are due to background mineralization of the study area. Other metals such as lead (WAL only) and zinc (WAL and TPE only) exceeded the ISQG from only a few of core samples. Further exploration and characterization of surface (<1 cm) sediment metals concentration will be provided in the AEMP design review that is currently in preparation and will be used to guide future monitoring decisions (e.g., sampling location and intensity).

3.3.2.2. Baker Lake

Sediment core sample were collected from Baker Lake sediments during summer and analyzed for TOC, grain size and metals, as per Meadowbank samples (**Table 3-9**). Sediment was acquired at depths ranging from 6.7–13.5 m. Total organic carbon concentrations were low and ranged between 0.1 and 1.6% dry weight. This is due to the sandy grain size and distance from organic inputs from tributary streams.

Arsenic was the only metal to consistently exceed the ISQG for all cores at the proposed jetty location and for three of 15 cores from the reference location (BAP) (**Table 3-9**). Although no other ISQG values were exceeded, concentrations of most other detectable metals (e.g., chromium, cobalt, copper, nickel, and zinc) were higher at the proposed jetty location than both the barge dock area and Akilahaarjuk Point, the reference area. Given the relatively low level of project-related activities at the proposed jetty location

compared to the Baker Barge Dock, these data suggest naturally higher metals concentrations at the proposed jetty location than the other two stations surveyed from Baker Lake.

Table 3-8: Conventional sediment chemistry, PAHs and total metals (mg/kg), Meadowbank study lakes & Baker Lake, August 2008.

Lake & Basin			Third Portage Lake			Second Portage Lake	Tehek Lake	Wally Lake	Inuggugayualik Lake	Baker Lake		
			South	East	North					Barge Dock	Proposed Jetty	Akilahaarjuk Point
Station ID	**Sediment Quality Guidelines (CCME 2002)[1]**		TPS	TPE	TPN	SP	TE	WAL	INUG	BBD	BPJ	BAP
Date	**ISQG**	**PEL**	17-Aug-08	16-Aug-08	18-Aug-08	23-Aug-08	19-Aug-08	21-Aug-08	20-Aug-08	29-Aug-08	28-Aug-08	25-Aug-08
CONVENTIONAL PARAMETERS												
Physical & Organic Parameters												
Moisture (%)	NG	NG	85.6	87.7	82.3	84.2	83.6	84.7	82.7	35.6	63.3	37.5
pH	NG	NG	6.04	6.20	6.13	6.28	6.03	6.34	5.98	6.94	6.49	6.73
Total Organic Carbon (% dw)	NG	NG	4.5	5.0	3.1	3.7	3.7	4.9	4.2	0.40	0.90	0.40
Particle Size												
% Gravel (>2mm)	NG	NG	<1	<1	<1	<1	<1	<1	<1	<1	<1	3
% Sand (2.00mm - 0.063mm)	NG	NG	7.0	3.0	20	5.0	5.0	10	9.0	52	10	56
% Silt (0.063mm - 4µm)	NG	NG	65	62	62	72	70	64	67	44	80	38
% Clay (<4µm)	NG	NG	28	36	18	23	25	27	25	3.0	9.0	4.0
AGGREGATE ORGANICS (mg/kg)												
Oil and Grease	NG	NG	3250	5070	3170	<500	1590	2880	2380	<500	<500	<500
POLYCYCLIC AROMATIC HYDROCARBONS												
Acenaphthene (mg/kg)	0.00671	0.0889	<0.10	<0.13	<0.092	<0.040	<0.092	<0.040	<0.086	<0.040	<0.040	<0.040
Acenaphthylene (mg/kg)	0.00587	-0.128	<0.13	<0.16	<0.12	<0.050	<0.12	<0.050	<0.11	<0.050	<0.050	<0.050
Anthracene (mg/kg)	0.0469	0.245	<0.13	<0.16	<0.12	<0.050	<0.12	<0.050	<0.11	<0.050	<0.050	<0.050
Benz(a)anthracene (mg/kg)	0.0317	0.385	<0.13	<0.16	<0.12	<0.050	<0.12	<0.050	<0.11	<0.050	<0.050	<0.050
Benzo(a)pyrene (mg/kg)	0.0319	0.782	<0.13	<0.16	<0.12	<0.050	<0.12	<0.050	<0.11	<0.050	<0.050	<0.050
Benzo(b)fluoranthene (mg/kg)	NG	NG	<0.13	<0.16	<0.12	<0.050	<0.12	<0.050	<0.11	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene (mg/kg)	NG	NG	<0.13	<0.16	<0.12	<0.050	<0.12	<0.050	<0.11	<0.050	<0.050	<0.050
Benzo(k)fluoranthene (mg/kg)	NG	NG	<0.13	<0.16	<0.12	<0.050	<0.12	<0.050	<0.11	<0.050	<0.050	<0.050
Chrysene (mg/kg)	0.0571	0.862	<0.13	<0.16	<0.12	<0.050	<0.12	<0.050	<0.11	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene (mg/kg)	0.00622	0.135	<0.13	<0.16	<0.12	<0.050	<0.12	<0.050	<0.11	<0.050	<0.050	<0.050
Fluoranthene (mg/kg)	0.111	2.355	<0.13	<0.16	<0.12	<0.050	<0.12	<0.050	<0.11	<0.050	<0.050	<0.050
Fluorene (mg/kg)	0.0212	0.144	<0.13	<0.16	<0.12	<0.050	<0.12	<0.050	<0.11	<0.050	<0.050	<0.050
Indeno(1,2,3-c,d)pyrene (mg/kg)	NG	NG	<0.13	<0.16	<0.12	<0.050	<0.12	<0.050	<0.11	<0.050	<0.050	<0.050
2-Methylnaphthalene (mg/kg)	0.0202	0.201	<0.13	<0.16	<0.12	<0.050	<0.12	<0.050	<0.11	<0.050	<0.050	<0.050
Naphthalene (mg/kg)	0.0346	0.391	<0.13	<0.16	<0.12	<0.050	<0.12	<0.050	<0.11	<0.050	<0.050	<0.050
Phenanthrene (mg/kg)	0.0419	0.515	<0.13	<0.80	<0.12	<0.050	<0.12	<0.50	<0.11	<0.050	<0.050	<0.050
Pyrene (mg/kg)	0.0530	0.8750	<0.13	<0.16	<0.12	<0.050	<0.12	<0.050	<0.11	<0.050	<0.050	<0.050

Table 3-8 con't: Conventional sediment chemistry, PAHs and total metals (mg/kg), Meadowbank study lakes & Baker Lake, August 2008.

Lake & Basin			Third Portage Lake			Second Portage Lake	Tehek Lake	Wally Lake	Inuggugayualik Lake	Baker Lake		
			South	East	North					Barge Dock	Proposed Jetty	Akilahaarjuk Point
Station ID	**Sediment Quality Guidelines (CCME 2002)[1]**		TPS	TPE	TPN	SP	TE	WAL	INUG	BBD	BPJ	BAP
Date	**ISQG**	**PEL**	17-Aug-08	16-Aug-08	18-Aug-08	23-Aug-08	19-Aug-08	21-Aug-08	20-Aug-08	29-Aug-08	28-Aug-08	25-Aug-08
TOTAL METALS (mg/kg dw)												
Antimony	NG	NG	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Arsenic	5.9	17.0	26.4	25.5	20.8	29.2	19.1	50.2	145	5.40	25.0	<5.0
Barium	NG	NG	118	143	70.0	136	125	132	98.3	64.2	160	308
Beryllium	NG	NG	1.65	1.77	1.01	2.25	2.21	1.99	1.03	<0.50	<0.50	<0.50
Cadmium	0.6	3.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium	37.3	90.0	111	76.8	105	85.9	57.3	61.2	87.9	13.6	24.1	17.0
Cobalt	NG	NG	23.4	17.9	16.5	16.5	12.4	11.1	15.2	4.40	8.10	4.60
Copper	35.7	197	78.9	54.2	40.2	95.7	68.2	149	38.3	7.30	11.3	4.80
Lead	35.0	91.3	<30	<30	<30	<30	<30	34	<30	<30	<30	<30
Mercury	0.17	0.486	0.0271	0.0253	0.0142	0.0372	0.0287	0.0360	0.0329	<0.0050	0.0172	0.00580
Molybdenum	NG	NG	5.4	5.9	<4.0	7.1	6.2	8.6	10	<4.0	<4.0	<4.0
Nickel	NG	NG	99.1	78.7	60.7	59.8	44.2	58.0	60.2	8.40	14.0	7.90
Selenium	NG	NG	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	NG	NG	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Thallium	NG	NG	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tin	NG	NG	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Vanadium	NG	NG	40.8	35.7	28.8	45.6	37.6	36.4	32.3	16.5	27.0	25.2
Zinc	123	315	114	104	69.6	125	113	125	64.7	26.1	45.2	22.5

Notes:

NG = no guideline.

[1]CCME (Canadian Council of Ministers of the Environment) Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, 1999, updated in 2002.

ISQG = Interim freshwater Sediment Quality Guideline, PEL = Probable Effect Level.

Shaded concentrations = or > ISQG.

Boxed concentrations also > PEL.

Table 3-9: Sediment core chemistry and total metals (mg/kg), Meadowbank study lakes & Baker Lake, July and August 2008.

Lake & Basin		Station ID	Date	Depth (m)	CONVENTIONAL PARAMETERS		TOTAL METALS (mg/kg dw)																
					pH	Total Organic Carbon (% dw)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Tin	Vanadium	Zinc
		Sediment Quality Guidelines (CCME 2002)[1]		ISQG	NG	NG	NG	5.9	NG	NG	0.6	37.3	NG	35.7	35.0	0.170	NG	NG	NG	NG	NG	NG	NG	123
				PEL	NG	NG	NG	17	NG	NG	3.5	90.0	NG	197	91.3	0.486	NG	NG	NG	NG	NG	NG	NG	315
Third Portage Lake	South	TPS-SC-01	24-Jul-08	11.8	5.99	5.0	<10	70.5	114	1.65	0.66	96.7	50.4	81.0	32	0.0511	11	115	<2.0	<2.0	<1.0	<5.0	40.8	104
		TPS-SC-02	24-Jul-08	10.5	6.05	5.0	<10	40.4	124	1.65	0.72	102	35.6	72.4	<30	0.0367	7.1	116	<2.0	<2.0	<1.0	<5.0	41.4	104
		TPS-SC-03	24-Jul-08	10.2	5.36	6.0	<10	56.2	108	1.35	<0.50	76.6	26.0	59.7	<30	0.0386	6.5	91.2	<2.0	<2.0	<1.0	<5.0	36.1	90.1
		TPS-SC-04	24-Jul-08	14.1	5.95	6.0	<10	118	149	1.28	0.83	72.3	52.7	62.1	<30	0.0426	13	155	<6.0	<2.0	<1.0	<5.0	35.5	85.6
		TPS-SC-05	24-Jul-08	12.5	5.94	5.4	<10	42.0	152	1.48	0.87	89.3	68.7	75.9	<30	0.0468	7.2	162	<4.0	<2.0	<1.0	<5.0	38.2	106
		TPS-SC-06	24-Jul-08	14.4	5.82	4.1	<10	80.7	110	1.70	0.65	95.6	32.5	79.7	<30	0.0334	9.8	102	<2.0	<2.0	<1.0	<5.0	41.2	91.0
		TPS-SC-07	24-Jul-08	10.5	5.99	5.2	<10	76.7	95.0	1.38	<0.50	82.7	61.2	71.0	<30	0.0401	9.6	88.7	<2.0	<2.0	<1.0	<5.0	36.5	85.1
		TPS-SC-08	24-Jul-08	14.0	5.82	5.0	<10	36.4	124	1.52	0.92	100	49.7	77.8	<30	0.0560	7.1	137	<2.0	<2.0	<1.0	<5.0	39.8	104
		TPS-SC-09	24-Jul-08	12.3	5.78	5.5	<10	42.3	95.5	1.32	0.61	88.2	31.6	63.6	<30	0.0444	7.9	88.4	<2.0	<2.0	<1.0	<5.0	36.6	83.5
		TPS-SC-10	24-Jul-08	11.1	5.36	4.8	<10	120	109	1.54	<0.50	100	21.6	80.2	<30	0.0389	9.9	85.7	<2.0	<2.0	<1.0	<5.0	40.7	94.1
		TPS-SC-11	24-Jul-08	11.3	5.85	6.1	<10	105	100	1.19	<0.50	66.1	28.8	59.8	<30	0.0448	10	77.6	<2.0	<2.0	<1.0	<5.0	32.5	73.9
		TPS-SC-12	24-Jul-08	12.6	5.73	5.5	<10	23.5	114	1.67	<0.50	107	12.6	85.4	31	0.0443	7.0	68.6	<4.0	<2.0	<1.0	<5.0	40.3	102
		TPS-SC-13	24-Jul-08	13.7	5.76	5.4	<10	24.4	120	1.35	0.52	95.1	48.1	68.5	<30	0.0440	5.0	111	<2.0	<2.0	<1.0	<5.0	38.0	87.7
		TPS-SC-14	24-Jul-08	11.8	5.85	5.5	<20	420	148	1.20	1.0	72.0	37.6	71.8	<60	0.0370	30	122	<4.0	<4.0	<1.0	<10	19.4	77.0
		TPS-SC-15	24-Jul-08	11.7	5.86	4.3	<10	24.7	105	1.59	<0.50	114	21.8	76.9	<30	0.0276	5.9	71.4	<4.0	<2.0	<1.0	<5.0	41.3	89.0
	East	TPE-SC-01	23-Jul-08	8.4	6.02	6.6	<10	<5.0	125	1.38	<0.50	74.6	7.10	44.5	<30	0.0322	<4.0	51.3	<4.0	<2.0	<1.0	<5.0	31.2	76.1
		TPE-SC-02	23-Jul-08	6.8	5.52	4.5	<10	14.0	142	1.82	<0.50	75.9	15.4	47.6	<30	0.0314	5.5	62.5	<2.0	<2.0	<1.0	<5.0	37.3	97.8
		TPE-SC-03	23-Jul-08	8.3	5.97	4.1	<10	12.6	132	1.85	<0.50	80.2	13.1	48.6	<30	0.0251	5.3	75.6	<2.0	<2.0	<1.0	<5.0	39.1	100
		TPE-SC-04	23-Jul-08	10.6	5.97	4.9	<10	14.1	117	1.70	<0.50	72.8	13.9	49.0	<30	0.0288	4.7	79.9	<2.0	<2.0	<1.0	<5.0	35.9	97.3
		TPE-SC-05	23-Jul-08	8.0	5.89	4.7	<10	15.9	126	1.79	<0.50	75.1	15.8	49.8	<30	0.0251	4.4	88.2	<2.0	<2.0	<1.0	<5.0	36.8	101
		TPE-SC-06	23-Jul-08	10.0	5.97	4.7	<10	14.1	115	1.78	<0.50	74.7	14.4	49.0	<30	0.0261	5.1	64.4	<2.0	<2.0	<1.0	<5.0	36.6	94.5
		TPE-SC-07	23-Jul-08	10.8	6.22	4.0	<10	17.4	102	1.71	<0.50	74.1	12.6	49.3	<30	0.0257	5.7	51.2	<2.0	<2.0	<1.0	<5.0	37.0	86.2
		TPE-SC-08	23-Jul-08	9.7	6.01	4.9	<10	15.4	113	1.74	<0.50	73.4	16.9	47.1	<30	0.0376	5.7	54.5	<2.0	<2.0	<1.0	<5.0	37.1	89.2
		TPE-SC-09	23-Jul-08	12.5	5.47	3.5	<10	14.6	200	1.84	1.1	76.9	17.3	65.7	<30	0.0337	7.6	162	<2.0	<2.0	<1.0	<5.0	40.4	126
		TPE-SC-10	23-Jul-08	12.8	5.85	4.3	<10	26.7	122	1.78	<0.50	72.2	16.2	55.7	<30	0.0392	8.2	73.6	<2.0	<2.0	<1.0	<5.0	39.0	92.1
		TPE-SC-11	23-Jul-08	17.1	5.46	3.2	<10	46.3	150	3.18	<0.50	97.6	17.3	111	<30	0.0318	16	81.5	<2.0	<2.0	<1.0	<5.0	54.3	152
		TPE-SC-12	23-Jul-08	15.0	5.78	3.6	<10	14.6	215	1.88	1.2	80.9	19.7	75.8	<30	0.0392	7.0	190	<4.0	<2.0	<1.0	<5.0	42.7	145
		TPE-SC-13	23-Jul-08	17.0	5.50	3.9	<10	26.0	223	1.81	0.90	69.2	17.0	74.8	<30	0.0576	9.7	165	<4.0	<2.0	<1.0	<5.0	40.7	118
		TPE-SC-14	23-Jul-08	12.0	5.96	3.9	<10	27.9	206	1.62	0.65	64.3	23.5	58.1	<30	0.0330	7.8	151	<12	<2.0	<1.0	<5.0	39.2	97.8
		TPE-SC-15	23-Jul-08	14.7	5.91	6.0	<10	17.3	122	1.88	<0.50	79.6	15.5	61.7	<30	0.0378	5.1	82.9	<4.0	<2.0	<1.0	<5.0	39.0	104
	North	TPN-SC-01	24-Jul-08	10.9	5.80	5.6	<20	62.0	115	<1.0	<1.0	74.2	54.0	60.2	<60	0.0332	11	118	<4.0	<4.0	<1.0	<10	16.2	59.4
		TPN-SC-02	24-Jul-08	11.4	5.83	4.8	<10	30.0	93.6	1.44	0.51	106	21.3	65.6	<30	0.0287	5.5	82.4	<2.0	<2.0	<1.0	<5.0	34.9	83.2
		TPN-SC-03	24-Jul-08	14.4	5.85	5.3	<10	54.9	123	1.05	<0.50	79.4	32.8	60.7	<30	0.0425	6.7	96.7	<2.0	<2.0	<1.0	<5.0	30.5	74.3
		TPN-SC-04	24-Jul-08	9.3	5.83	5.4	<10	27.2	100	1.48	0.96	106	23.4	56.9	<30	0.0271	4.5	130	<2.0	<2.0	<1.0	<5.0	34.7	92.0
		TPN-SC-05	24-Jul-08	12.9	5.82	4.8	<10	53.5	138	1.16	0.86	82.8	44.8	64.5	<30	0.0362	7.3	184	<4.0	<2.0	<1.0	<5.0	32.7	91.4
		TPN-SC-06	24-Jul-08	17.5	5.84	3.6	<10	22.5	102	1.63	<0.50	136	18.7	83.3	<30	0.0198	5.0	71.1	<2.0	<2.0	<1.0	<5.0	43.8	92.7
		TPN-SC-07	24-Jul-08	11.9	5.89	4.0	<10	21.4	84.8	1.33	<0.50	115	17.3	57.5	<30	0.0215	<4.0	63.4	<2.0	<2.0	<1.0	<5.0	35.1	79.8
		TPN-SC-08	24-Jul-08	11.0	5.88	2.7	<10	20.2	83.7	1.26	<0.50	116	13.8	56.6	<30	0.0194	<4.0	60.3	<2.0	<2.0	<1.0	<5.0	35.7	78.5
		TPN-SC-09	24-Jul-08	14.0	5.94	0.7	<10	6.50	27.8	<0.50	<0.50	41.5	11.6	15.3	<30	0.0074	<4.0	28.1	<2.0	<2.0	<1.0	<5.0	14.9	30.5
		TPN-SC-10	24-Jul-08	14.5	5.93	3.2	<10	23.0	97.2	1.48	<0.50	129	16.5	67.4	<30	0.0210	4.4	63.2	<2.0	<2.0	<1.0	<5.0	41.3	84.8
		TPN-SC-11	24-Jul-08	14.6	5.87	4.5	<10	21.2	87.1	1.25	<0.50	109	18.7	60.8	<30	0.0285	4.1	73.8	<2.0	<2.0	<1.0	<5.0	34.4	78.1
		TPN-SC-12	24-Jul-08	14.7	5.86	4.9	<10	31.5	111	1.20	0.54	102	30.0	61.4	<30	0.0355	5.5	106	<4.0	<2.0	<1.0	<5.0	34.6	83.6
		TPN-SC-13	24-Jul-08	15.0	5.86	4.5	<10	20.7	87.6	1.30	<0.50	115	16.9	61.8	<30	0.0287	<4.0	66.1	<2.0	<2.0	<1.0	<5.0	35.6	77.8
		TPN-SC-14	24-Jul-08	14.5	5.95	4.8	<10	31.4	101	1.18	<0.50	108	27.3	61.8	<30	0.0291	5.6	85.5	<2.0	<2.0	<1.0	<5.0	35.0	79.1
		TPN-SC-15	24-Jul-08	14.9	5.82	5.6	<10	37.6	80.1	1.22	<0.50	107	18.5	61.5	<30	0.0380	5.6	71.9	<4.0	<2.0	<1.0	<5.0	35.8	74.9

Table 3-9 con't: Sediment core chemistry and total metals (mg/kg), Meadowbank study lakes & Baker Lake, July and August 2008.

Lake & Basin	Station ID	Date	Depth (m)	CONVENTIONAL PARAMETERS		TOTAL METALS (mg/kg dw)																
				pH	Total Organic Carbon (% dw)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Tin	Vanadium	Zinc
	Sediment Quality Guidelines (CCME 2002)[1]		**ISQG**	NG	NG	NG	5.9	NG	NG	0.6	37.3	NG	35.7	35.0	0.170	NG	NG	NG	NG	NG	NG	NG	123
			PEL	NG	NG	NG	17	NG	NG	3.5	90.0	NG	197	91.3	0.486	NG	NG	NG	NG	NG	NG	NG	315
Second Portage Lake	SP-SC-01	19-Jul-08	11.7	6.12	4.2	<10	31.6	139	2.26	0.64	77.9	16.0	98.2	<30	0.0330	5.9	53.2	<2.0	<2.0	<1.0	<5.0	39.6	108
	SP-SC-02	19-Jul-08	14.0	6.04	4.1	<10	28.2	142	1.96	0.67	69.6	16.4	89.4	<30	0.0397	6.1	68.0	<2.0	<2.0	<1.0	<5.0	36.2	101
	SP-SC-03	19-Jul-08	11.4	5.91	5.2	<10	30.5	125	1.72	0.61	55.2	12.6	75.9	<30	0.0515	6.9	61.9	<4.0	<2.0	<1.0	<5.0	29.9	87.8
	SP-SC-04	19-Jul-08	12.7	6.10	3.9	<10	36.5	153	2.26	0.67	76.5	18.3	100	<30	0.0420	9.1	66.7	<2.0	<2.0	<1.0	<5.0	42.2	114
	SP-SC-05	19-Jul-08	9.3	6.08	4.6	<10	53.7	148	1.71	0.96	52.0	18.9	72.9	<30	0.0445	11	70.6	<3.0	<2.0	<1.0	<5.0	24.9	76.5
	SP-SC-06	19-Jul-08	9.6	6.24	5.6	<10	40.8	134	1.71	0.68	53.7	17.5	70.7	<30	0.0450	7.4	64.3	<4.0	<2.0	<1.0	<5.0	27.8	83.8
	SP-SC-07	19-Jul-08	11.2	6.24	4.5	<10	25.3	118	1.81	<0.50	62.0	13.1	72.2	<30	0.0376	5.1	47.9	<2.0	<2.0	<1.0	<5.0	33.9	91.4
	SP-SC-08	19-Jul-08	10.9	6.06	4.6	<10	19.9	132	2.08	0.76	70.9	14.7	86.9	<30	0.0411	4.2	85.1	<2.0	<2.0	<1.0	<5.0	36.9	114
	SP-SC-09	19-Jul-08	10.9	6.19	5.1	<10	26.4	113	1.82	<0.50	62.4	12.9	76.5	<30	0.0374	5.1	45.2	<2.0	<2.0	<1.0	<5.0	32.8	92.7
	SP-SC-10	19-Jul-08	12.3	6.20	5.4	<10	26.7	119	1.93	<0.50	65.0	14.0	80.4	<30	0.0452	5.3	50.4	<2.0	<2.0	<1.0	<5.0	33.7	97.8
	SP-SC-11	19-Jul-08	11.5	6.08	5.1	<10	27.6	121	1.97	0.50	68.1	13.7	82.1	<30	0.0443	5.5	50.9	<2.0	<2.0	<1.0	<5.0	35.2	102
	SP-SC-12	19-Jul-08	12.2	5.91	4.9	<10	23.4	121	1.82	0.59	64.2	12.5	79.8	<30	0.0442	4.8	51.8	<2.0	<2.0	<1.0	<5.0	34.0	97.2
	SP-SC-13	19-Jul-08	13.0	5.92	5.5	<10	56.2	137	1.82	0.77	61.2	14.9	79.8	<30	0.0633	9.9	54.0	<2.0	<2.0	<1.0	<5.0	30.2	83.0
	SP-SC-14	19-Jul-08	12.5	5.88	5.7	<10	29.8	149	2.07	0.69	69.5	16.5	89.1	<30	0.0606	6.5	76.5	<2.0	<2.0	<1.0	<5.0	36.8	110
	SP-SC-15	19-Jul-08	13.0	6.02	5.0	<10	31.8	143	2.07	0.75	72.0	16.3	92.4	<30	0.0522	6.3	75.1	<3.0	<2.0	<1.0	<5.0	37.0	106
Tehek Lake	TE-SC-01	20-Jul-08	9.2	6.08	3.2	<10	21.3	135	2.36	0.53	60.3	13.7	72.0	<30	0.0269	6.1	46.8	<2.0	<2.0	<1.0	<5.0	38.3	107
	TE-SC-02	20-Jul-08	8.2	5.94	3.6	<10	30.2	120	1.99	0.66	49.8	12.6	64.4	<30	0.0355	9.1	42.9	<3.0	<2.0	<1.0	<5.0	31.4	89.9
	TE-SC-03	20-Jul-08	10.9	5.94	4.3	<10	33.4	133	1.98	0.84	48.2	14.7	66.8	<30	0.0422	8.9	50.6	<2.0	<2.0	<1.0	<5.0	29.3	86.8
	TE-SC-04	20-Jul-08	10.8	5.98	4.4	<10	35.6	138	1.90	0.81	45.8	16.6	63.5	<30	0.0397	11	48.7	<5.0	<2.0	<1.0	<5.0	26.0	84.1
	TE-SC-05	20-Jul-08	10.9	5.94	3.9	<10	28.4	147	2.01	0.61	50.1	13.6	66.2	<30	0.0385	8.1	54.9	<10	<2.0	<1.0	<5.0	31.6	95.1
	TE-SC-06	20-Jul-08	13.5	5.67	6.4	<10	8.80	164	2.07	0.78	53.1	8.40	67.7	<30	0.0593	<4.0	50.6	<2.0	<2.0	<1.0	<5.0	32.8	109
	TE-SC-07	20-Jul-08	7.5	6.03	4.6	<10	20.9	135	2.31	0.52	56.1	12.4	68.6	<30	0.0338	5.9	50.4	<2.0	<2.0	<1.0	<5.0	36.0	108
	TE-SC-08	20-Jul-08	8.4	5.89	4.2	<10	45.0	132	1.87	0.87	44.3	14.8	63.8	<30	0.0356	11	52.7	<3.0	<2.0	<1.0	<5.0	25.9	82.8
	TE-SC-09	20-Jul-08	10.6	5.85	2.9	<10	30.9	130	1.98	0.69	52.6	13.2	66.3	<30	0.0293	8.7	39.8	<2.0	<2.0	<1.0	<5.0	30.7	86.1
	TE-SC-10	20-Jul-08	11.6	5.81	3.2	<10	11.3	114	1.89	0.61	48.1	9.10	64.6	<30	0.0312	4.4	41.4	<2.0	<2.0	<1.0	<5.0	31.7	92.6
	TE-SC-11	20-Jul-08	11.3	6.01	3.6	<10	43.7	88.8	1.67	0.72	40.6	12.2	59.3	<30	0.0081	11	33.2	<3.0	<2.0	<1.0	<5.0	23.0	70.2
	TE-SC-12	20-Jul-08	9.1	5.90	4.1	<10	34.6	112	1.54	1.2	37.6	13.6	58.5	<30	0.0368	12	43.8	<2.0	<2.0	<1.0	<5.0	17.3	66.3
	TE-SC-13	20-Jul-08	7.8	5.76	3.4	<10	19.1	109	1.97	0.55	49.8	11.7	61.5	<30	0.0297	5.8	40.1	<2.0	<2.0	<1.0	<5.0	31.5	94.6
	TE-SC-14	20-Jul-08	10.0	6.03	4.8	<10	36.6	159	1.70	1.0	38.1	20.0	61.6	<30	0.0458	9.6	65.1	<4.0	<2.0	<1.0	<5.0	22.0	81.5
	TE-SC-15	20-Jul-08	9.6	5.93	3.5	<10	21.7	124	1.91	0.51	48.4	14.3	63.9	<30	0.0331	6.3	42.6	<2.0	<2.0	<1.0	<5.0	32.0	91.8
Wally Lake	WAL-SC-01	22-Jul-08	5.2	6.36	7.3	<10	26.5	110	1.41	0.65	52.7	9.60	123	35	0.0640	4.9	52.8	<2.0	<2.0	<1.0	<5.0	27.3	107
	WAL-SC-02	22-Jul-08	4.5	6.28	4.6	<10	17.8	81.7	1.06	<0.50	41.9	6.50	83.6	<30	0.0297	<4.0	36.8	<2.0	<2.0	<1.0	<5.0	21.8	75.7
	WAL-SC-03	22-Jul-08	6.4	6.54	10	<10	22.6	78.5	1.06	0.53	41.8	7.50	99.6	<30	0.0684	4.0	39.4	<2.0	<2.0	<1.0	<5.0	21.2	82.6
	WAL-SC-04	22-Jul-08	5.5	6.42	5.7	<10	17.9	74.2	0.96	<0.50	53.5	7.40	87.1	<30	0.0386	<4.0	41.6	<2.0	<2.0	<1.0	<5.0	20.7	75.5
	WAL-SC-05	22-Jul-08	5.4	7.14	8.3	<10	19.8	90.0	1.18	0.54	44.5	7.80	109	31	0.0570	<4.0	41.7	<2.0	<2.0	<1.0	<5.0	22.8	89.3
	WAL-SC-06	22-Jul-08	6.2	6.47	12	<10	24.2	80.0	1.03	0.51	41.1	8.00	103	<30	0.0752	4.6	41.1	<2.0	<2.0	<1.0	<5.0	20.4	83.1
	WAL-SC-07	23-Jul-08	6.7	6.54	6.6	<10	29.1	130	1.77	<0.50	58.3	8.00	153	32	0.0471	9.4	49.7	<2.0	<2.0	<1.0	<5.0	32.4	104
	WAL-SC-08	23-Jul-08	6.8	6.53	6.3	<10	25.7	140	1.83	0.51	58.4	8.50	160	33	0.0490	9.1	55.2	<3.0	<2.0	<1.0	<5.0	32.5	106
	WAL-SC-09	23-Jul-08	7.5	6.38	8.9	<10	44.5	117	1.67	0.75	50.9	8.90	154	36	0.0728	10	53.6	<2.0	<2.0	<1.0	<5.0	29.4	115
	WAL-SC-10	23-Jul-08	9.2	6.88	2.1	<10	31.9	133	2.02	0.51	68.6	12.1	143	36	0.0319	7.6	66.0	<2.0	<2.0	<1.0	<5.0	37.6	130
	WAL-SC-11	23-Jul-08	8.0	6.49	6.3	<10	19.0	127	1.64	0.58	56.8	8.20	164	33	0.0569	6.4	51.0	<2.0	<2.0	<1.0	<5.0	31.6	104
	WAL-SC-12	23-Jul-08	9.6	6.04	5.7	<10	23.8	77.1	1.05	<0.50	31.9	5.80	76.3	<30	0.0637	4.8	29.6	<2.0	<2.0	<1.0	<5.0	21.0	68.8
	WAL-SC-13	23-Jul-08	9.2	6.08	13	<10	29.8	102	1.39	0.50	44.2	8.10	133	32	0.0958	7.8	47.5	<2.0	<2.0	<1.0	<5.0	26.8	99.3
	WAL-SC-14	23-Jul-08	8.0	5.84	14	<10	38.7	90.8	1.29	<0.50	41.0	7.20	117	<30	0.0861	8.4	45.0	<4.0	<2.0	<1.0	<5.0	25.5	95.7
	WAL-SC-15	23-Jul-08	7.5	6.32	8.7	<10	29.1	137	1.89	<0.50	59.0	8.60	177.0	41	0.0806	11	55.3	<4.0	<2.0	<1.0	<5.0	35.5	121.0
Inuggugayualik Lake	INUG-SC-01	25-Jul-08	7.4	5.80	4.5	<10	25.4	122	1.44	<0.50	95.4	10.7	49.9	<30	0.0336	4.9	72.3	<2.0	<2.0	<1.0	<5.0	35.8	78.6
	INUG-SC-02	25-Jul-08	6.5	5.93	4.9	<10	21.5	104	1.39	<0.50	94.8	15.2	46.9	<30	0.0336	5.1	75.7	<2.0	<2.0	<1.0	<5.0	36.6	79.1
	INUG-SC-03	25-Jul-08	7.6	6.01	4.8	<10	23.4	118	1.19	<0.50	72.0	20.6	40.2	<30	0.0402	5.9	82.5	<2.0	<2.0	<1.0	<5.0	33.1	67.1
	INUG-SC-04	25-Jul-08	8.1	6.07	4.5	<20	60.0	107	1.10	<1.0	85.1	18.8	48.7	<60	0.0344	<8.0	70.0	<4.0	<4.0	<1.0	<10	23.6	58.8
	INUG-SC-05	25-Jul-08	8.4	5.80	5.1	<10	9.70	133	1.41	<0.50	99.4	10.4	48.5	<30	0.0515	<4.0	74.7	<2.0	<2.0	<1.0	<5.0	35.6	83.0
	INUG-SC-06	25-Jul-08	6.9	5.85	4.3	<10	11.1	122	1.62	<0.50	110	12.2	54.0	<30	0.0360	4.1	80.8	<2.0	<2.0	<1.0	<5.0	40.7	92.5
	INUG-SC-07	25-Jul-08	11.5	5.96	4.6	<10	49.7	95.8	1.22	<0.50	79.8	16.7	40.3	<30	0.0530	6.5	71.1	<2.0	<2.0	<1.0	<5.0	32.7	71.3
	INUG-SC-08	25-Jul-08	10.4	5.95	4.3	<20	115.0	110	1.10	<1.0	83.9	20.9	48.2	<60	0.0410	11	71.0	<4.0	<4.0	<1.0	<10	23.7	58.4
	INUG-SC-09	25-Jul-08	9.8	6.15	2.7	<10	8.80	74.5	1.00	<0.50	79.9	10.4	30.1	<30	0.0193	<4.0	49.7	<2.0	<2.0	<1.0	<5.0	28.1	59.6
	INUG-SC-10	25-Jul-08	7.9	5.98	2.7	<10	26.3	117	1.16	<0.50	67.8	25.0	40.9	<30	0.0440	5.8	98.6	<2.0	<2.0	<1.0	<5.0	32.9	67.0
	INUG-SC-11	25-Jul-08	12.3	5.98	3.6	<10	36.7	171	1.39	<0.50	86.1	47.2	44.5	<30	0.0586	7.2	78.2	<6.0	<2.0	<1.0	<5.0	37.4	81.1
	INUG-SC-12	25-Jul-08	12.5	6.06	3.6	<10	<5.0	114	1.26	<0.50	91.0	9.20	36.4	<30	0.0313	<4.0	74.0	<2.0	<2.0	<1.0	<5.0	31.9	76.3
	INUG-SC-13	25-Jul-08	7.7	5.98	5.0	<10	31.7	108	1.39	<0.50	91.0	12.7	47.6	<30	0.0414	4.9	71.0	<2.0	<2.0	<1.0	<5.0	35.3	76.6
	INUG-SC-14	25-Jul-08	6.4	5.54	5.0	<10	26.5	115	1.51	<0.50	96.4	16.1	49.9	<30	0.0462	5.6	90.1	<4.0	<2.0	<1.0	<5.0	37.5	91.0
	INUG-SC-15	25-Jul-08	8.7	5.97	5.1	<10	29.6	99.5	1.45	<0.50	89.6	13.4	47.0	<30	0.0359	7.2	64.1	<2.0	<2.0	<1.0	<5.0	37.3	71.4

Table 3-9 con't: Sediment core chemistry and total metals (mg/kg), Meadowbank study lakes & Baker Lake, July and August 2008.

Lake & Basin		Station ID	Date	Depth (m)	CONVENTIONAL PARAMETERS		TOTAL METALS (mg/kg dw)																
					pH	Total Organic Carbon (% dw)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Tin	Vanadium	Zinc
		Sediment Quality Guidelines (CCME 2002)[1]		**ISQG**	NG	NG	NG	5.9	NG	NG	0.6	37.3	NG	35.7	35.0	0.170	NG	NG	NG	NG	NG	NG	NG	123
				PEL	NG	NG	NG	17	NG	NG	3.5	90.0	NG	197	91.3	0.486	NG	NG	NG	NG	NG	NG	NG	315
Baker Lake	Barge Dock	BBD-SC-01	29-Aug-08	9.5	6.46	0.10	<10	<5.0	25.9	<0.50	<0.50	7.6	2.70	2.80	<30	<0.0050	<4.0	<5.0	<2.0	<2.0	<1.0	<5.0	8.90	15.8
		BBD-SC-02	29-Aug-08	13.0	6.16	0.50	<10	<5.0	84.2	<0.50	<0.50	14.6	4.30	7.70	<30	0.0074	<4.0	9.00	<2.0	<2.0	<1.0	<5.0	17.2	29.0
		BBD-SC-03	29-Aug-08	11.2	6.33	0.70	<10	5.60	80.7	<0.50	<0.50	13.2	4.90	7.50	<30	0.0061	<4.0	8.40	<2.0	<2.0	<1.0	<5.0	17.4	26.9
		BBD-SC-04	29-Aug-08	11.6	6.35	0.40	<10	<5.0	60.2	<0.50	<0.50	11.6	3.90	5.50	<30	0.0053	<4.0	7.50	<2.0	<2.0	<1.0	<5.0	14.5	23.5
		BBD-SC-05	29-Aug-08	13.0	5.49	0.80	<10	<5.0	100	<0.50	<0.50	19.6	5.60	10.4	<30	0.0109	<4.0	11.8	<2.0	<2.0	<1.0	<5.0	21.6	36.9
		BBD-SC-06	29-Aug-08	12.5	5.89	0.70	<10	8.00	100	<0.50	<0.50	16.6	5.30	9.10	<30	0.0081	<4.0	9.60	<2.0	<2.0	<1.0	<5.0	19.9	30.8
	Proposed Jetty	BPJ-SC-01	28-Aug-08	13.4	6.11	1.4	<10	65.7	214	<0.50	<0.50	24.1	8.80	12.2	<30	0.0203	<4.0	12.9	<2.0	<2.0	<1.0	<5.0	26.9	44.7
		BPJ-SC-02	28-Aug-08	11.3	5.99	1.2	<10	58.1	242	<0.50	<0.50	23.4	10.4	11.4	<30	0.0173	4.1	13.9	<2.0	<2.0	<1.0	<5.0	26.5	44.4
		BPJ-SC-03	28-Aug-08	8.4	6.30	0.70	<10	18.3	142	0.51	<0.50	24.4	8.50	10.8	<30	0.0166	<4.0	14.4	<2.0	<2.0	<1.0	<5.0	27.3	47.2
		BPJ-SC-04	28-Aug-08	8.0	6.46	1.0	<10	12.4	150	<0.50	<0.50	22.0	8.40	10.2	<30	0.0135	<4.0	14.3	<2.0	<2.0	<1.0	<5.0	24.9	44.2
		BPJ-SC-05	28-Aug-08	8.4	6.45	1.4	<10	22.2	168	0.56	<0.50	23.1	11.7	10.8	<30	0.0191	<4.0	15.4	<2.0	<2.0	<1.0	<5.0	26.9	46.7
		BPJ-SC-06	28-Aug-08	11.3	6.48	1.3	<10	15.9	202	0.53	<0.50	24.8	10.3	12.1	<30	0.0244	<4.0	16.4	<4.0	<2.0	<1.0	<5.0	27.9	47.7
		BPJ-SC-07	28-Aug-08	10.1	6.60	1.6	<10	10.4	186	0.54	<0.50	25.6	10.0	12.1	<30	0.0191	<4.0	17.0	<2.0	<2.0	<1.0	<5.0	28.8	49.6
		BPJ-SC-08	28-Aug-08	9.8	6.50	1.3	<10	20.6	205	0.51	<0.50	25.1	10.1	12.8	<30	0.0191	<4.0	16.2	<4.0	<2.0	<1.0	<5.0	27.2	47.6
		BPJ-SC-09	28-Aug-08	9.4	6.49	1.1	<10	18.0	160	0.51	<0.50	24.7	9.40	11.5	<30	0.0158	<4.0	16.2	<2.0	<2.0	<1.0	<5.0	27.9	47.9
		BPJ-SC-10	28-Aug-08	8.9	6.49	1.3	<10	44.3	233	0.52	<0.50	24.6	10.3	11.8	<30	0.0190	<4.0	15.5	<4.0	<2.0	<1.0	<5.0	27.8	47.8
		BPJ-SC-11	28-Aug-08	8.9	6.40	1.1	<10	49.5	196	<0.50	<0.50	20.9	12.0	10.5	<30	0.0151	5.5	12.5	<2.0	<2.0	<1.0	<5.0	25.0	42.0
		BPJ-SC-12	28-Aug-08	9.2	6.54	0.30	<10	19.5	83.6	<0.50	<0.50	13.2	4.90	5.30	<30	0.0052	<4.0	8.00	<2.0	<2.0	<1.0	<5.0	18.9	25.5
		BPJ-SC-13	28-Aug-08	6.7	6.45	0.30	<10	6.70	119	<0.50	<0.50	17.2	4.80	6.60	<30	<0.0050	<4.0	9.70	<2.0	<2.0	<1.0	<5.0	27.9	28.7
		BPJ-SC-14	28-Aug-08	8.2	6.64	1.0	<10	9.70	115	<0.50	<0.50	23.9	8.40	10.2	<30	0.0166	<4.0	15.0	<2.0	<2.0	<1.0	<5.0	26.6	45.4
		BPJ-SC-15	28-Aug-08	10.3	6.53	1.2	<10	38.4	179	<0.50	<0.50	23.8	9.20	12.1	<30	0.0189	<4.0	15.1	<2.0	<2.0	<1.0	<5.0	26.2	46.5
	Akilahaarjuk Point	BAP-SC-01	25-Aug-08	11.0	6.72	0.50	<10	<5.0	270	<0.50	<0.50	15.9	4.60	5.40	<30	0.0069	<4.0	9.40	<2.0	<2.0	<1.0	<5.0	20.5	25.3
		BAP-SC-02	25-Aug-08	9.5	6.61	0.40	<10	<5.0	269	<0.50	<0.50	16.8	4.80	5.80	<30	0.0055	<4.0	8.30	<2.0	<2.0	<1.0	<5.0	25.3	24.1
		BAP-SC-03	25-Aug-08	10.6	6.64	0.40	<10	<5.0	187	<0.50	<0.50	15.5	4.10	4.50	<30	0.0063	<4.0	7.30	<2.0	<2.0	<1.0	<5.0	23.7	20.9
		BAP-SC-04	25-Aug-08	11.0	6.61	0.40	<10	<5.0	334	<0.50	<0.50	14.8	4.30	4.90	<30	0.0059	<4.0	8.30	<2.0	<2.0	<1.0	<5.0	19.6	22.7
		BAP-SC-05	25-Aug-08	12.1	6.53	0.50	<10	<5.0	277	<0.50	<0.50	17.3	5.50	6.80	<30	0.0092	<4.0	9.80	<2.0	<2.0	<1.0	<5.0	22.1	27.6
		BAP-SC-06	25-Aug-08	12.5	6.44	0.90	<10	9.10	327	0.53	<0.50	23.9	6.70	10.0	<30	0.0154	<4.0	12.9	<2.0	<2.0	<1.0	<5.0	30.0	38.4
		BAP-SC-07	25-Aug-08	12.1	6.50	0.60	<10	8.00	341	<0.50	<0.50	18.1	5.50	6.40	<30	0.0090	<4.0	10.1	<2.0	<2.0	<1.0	<5.0	23.0	29.4
		BAP-SC-08	25-Aug-08	11.2	6.74	0.40	<10	<5.0	385	<0.50	<0.50	16.2	4.80	5.30	<30	0.0062	<4.0	9.60	<2.0	<2.0	<1.0	<5.0	20.6	24.3
		BAP-SC-09	25-Aug-08	12.6	6.55	0.60	<10	5.90	313	<0.50	<0.50	16.6	5.70	6.20	<30	0.0095	<4.0	10.4	<2.0	<2.0	<1.0	<5.0	21.4	27.8
		BAP-SC-10	25-Aug-08	13.5	6.56	0.50	<10	<5.0	121	<0.50	<0.50	16.7	5.20	6.50	<30	0.0094	<4.0	9.80	<2.0	<2.0	<1.0	<5.0	20.1	27.8
		BAP-SC-11	25-Aug-08	10.2	6.83	0.40	<10	<5.0	185	<0.50	<0.50	13.9	3.70	3.60	<30	<0.0050	<4.0	7.80	<2.0	<2.0	<1.0	<5.0	15.9	18.4
		BAP-SC-12	25-Aug-08	12.7	6.83	0.30	<10	<5.0	213	<0.50	<0.50	18.8	4.50	4.80	<30	0.0055	<4.0	11.2	<2.0	<2.0	<1.0	<5.0	17.7	23.6
		BAP-SC-13	25-Aug-08	10.9	6.85	0.40	<10	<5.0	312	<0.50	<0.50	17.7	4.30	5.20	<30	0.0053	<4.0	9.60	<2.0	<2.0	<1.0	<5.0	21.1	20.6
		BAP-SC-14	25-Aug-08	13.0	6.70	0.50	<10	<5.0	290	<0.50	<0.50	17.4	4.60	5.10	<30	0.0082	<4.0	8.90	<2.0	<2.0	<1.0	<5.0	20.7	24.0
		BAP-SC-15	25-Aug-08	12.7	6.78	0.30	<10	<5.0	281	<0.50	<0.50	16.0	3.90	4.30	<30	<0.0050	<4.0	9.30	<2.0	<2.0	<1.0	<5.0	16.3	20.4

Notes:

NG = no guideline.

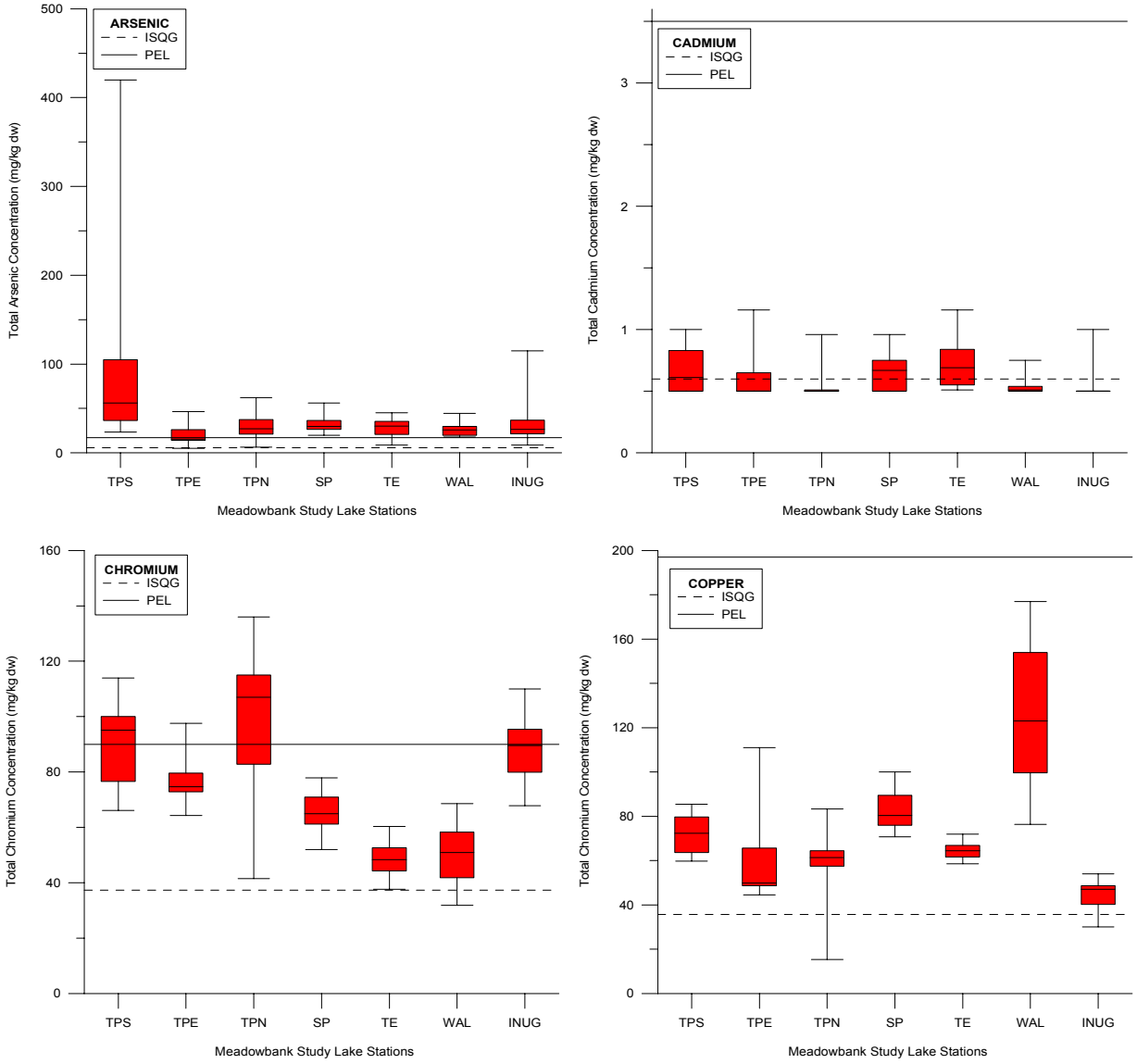
[1]CCME (Canadian Council of Ministers of the Environment) Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, 1999, updated in 2002.

ISQG = Interim freshwater Sediment Quality Guideline, PEL = Probable Effect Level.

Shaded concentrations = or > ISQG.

Boxed concentrations also > PEL.

Figure 3-11: Median (& range) concentration values of arsenic, cadmium, chromium, and copper in sediment cores from Meadowbank study lakes, August 2008.



Notes:

TPE,TPN,TPS=Third Portage Lake - East, North, South basins; SP=Second Portage Lake; TE=Tehek Lake; WAL=Wally Lake; INUG=Inuggugayualik Lake.

Boxes show the lower quartile, median, and upper quartile concentration values for each station; whiskers show the minimum and maximum concentration values for each station.

3.4. Phytoplankton

3.4.1. Meadowbank Study Lakes

At least 100 phytoplankton species were identified from the Meadowbank study lakes, represented by six major taxa: 11 cyanophytes (blue green algae), 29 chlorophytes (green algae), 34 chrysophytes (golden-brown algae), 15 diatoms, 6 cryptophytes and 5 dinoflagellates (**Appendix B**).

Density (**Table 3-10**) and biomass (**Table 3-11**) based results for major taxa groups show fairly similar results among stations during the open water season. Biomass-based community assemblage results across stations are shown in **Figure 3-12**. The phytoplankton assemblages were dominated by chrysophytes, with smaller populations of the other five major groups.

The dominant chrysophytes for the Meadowbank lakes were: *Dinobryon bavaricum* Imhof, *Chrysochromulina laurentiana* Kling, *Chrysochromulina parva* Lackey, *Chrysolkos skuja* (Nauwerck) Willen, *Uroglena volvox* Ehrenberg, and *Kephyrion*.

Dominating species for the other groups were: *Chlamydomonas* for chlorophytes, *Aphanothece* for cyanophytes, *Cyclotella stelligera* Cleve and Grunow for diatoms, *Rhodomonas minuta* Skuja for cryptophytes, and *Gymnodinium* for dinoflagellates.

Chrysophytes are small, usually unicellular, and are very numerous in lake water; by virtue of their very large numbers, they frequently comprise the greatest biomass as a group. Density of chrysophytes was high, comprising 76% of the total phytoplankton density (cells/L) with cyanophytes having the next highest density at only 8.3% (**Table 3-10**). Compositionally, the study lakes in 2008 had comparable assemblages to those documented from the same stations in 2006 and 2007 (Azimuth, 2008*a*, *b*). A chart of the phytoplankton species presence/absence at each sampling station in 2008, by season, is presented in **Appendix B**.

Phytoplankton biomass (mg/m^3) is generally a more important metric ecologically than density, as this represents the amount (by weight) of food available to fish. Trends in biomass were similar to density, with chrysophytes dominating biomass at 77% (**Table 3-11**). Diatoms and dinoflagellates were the next most important groups (see also **Figures 3-12 and 3-13**).

Phytoplankton biomass among the seven sampling areas ranged from approximately 100 mg/m^3 to 281 mg/m^3 (Inuggugayualik Lake in late July). Mean biomass (**Figure 3-13**) was comparable among Meadowbank study lakes except for Second Portage Lake (SP) in summer and fall. Biomass at SP was relatively low in August and September (37 mg/m^3 and 77 mg/m^3, respectively) which is likely due to reduced light penetration as a result of

elevated TSS concentrations (**Table 3-7**) in the lake from sediment release during the East Dike construction. The slightly elevated TSS concentration in Tehek Lake were not likely high enough to limit light penetration sufficiently to cause a decline in phytoplankton biomass (**Figures 3-12 and 3-13**). The decline in phytoplankton biomass in Second Portage Lake was not however necessarily reflected in chlorophyll-α concentrations. Implications of reduced phytoplankton biomass in Second Portage Lake are discussed more fully in the dike construction monitoring report (Azimuth, 2009).

One hundred species were identified for the seven study sites in July, August and September 2008, averaging 37 species per station (**Table 3-11 and Appendix B**). The range in species richness was very similar to the biomass results per station and season, where the lowest richness was seen for Second Portage Lake in August (17) and the highest was for Inuggugayualik Lake in August (45). Reduced richness in Second Portage Lake is related to lower abundance and biomass results due to elevated TSS in Second Portage from East Dike construction (Azimuth, 2009).

Species diversity was relatively stable among the seven study sites, with a Simpson's diversity index averaging 0.81 (**Table 3-11**). Most stations had similar species diversity but the north basin of Third Portage Lake in July and Second Portage Lake in August were particularly low. With the exception of Tehek Lake, species diversity was highest in September. The estimates of diversity and richness in 2008 were similar to those observed in 2006 and 2007 (Azimuth, 2008*a*, *b*).

3.4.2. Baker Lake

At least 86 phytoplankton species were identified in Baker Lake, represented by six major taxa: 8 cyanophytes (blue green algae), 25 chlorophytes (green algae), 29 chrysophytes (golden-brown algae), 14 diatoms, 6 cryptophytes and 4 dinoflagellates (**Appendix B**).

Density (**Table 3-10**) and biomass-(**Table 3-11**) based results for major taxa groups showed fairly similar results among stations during the open water season. Biomass-based community assemblage results across stations are shown in **Figure 3-12**. The phytoplankton assemblages were dominated by chrysophytes, with smaller populations of the other five major groups.

The dominant chrysophytes for Baker Lake were: *Chrysochromulina parva* Lackey, *Uroglena volvox* Ehrenberg, and *Chrysococcus*. Dominating species for the other groups were: *Chlamydomonas* for chlorophytes, *Merismopedia tenuissima* Lemmermann for cyanophytes, *Cyclotella stelligera* Cleve and Grunow, *Synedra acus* Kutzing, and *Asterionella formosa* Hassall for diatoms, *Rhodomonas minuta* Skuja and *Cryptomonas erosa* Ehrenberg for cryptophytes, and *Gymnodinium* for dinoflagellates.

Chrysophytes comprised 67% of the total phytoplankton density (cells/L) with chlorophytes having the next highest density at only 16% (**Table 3-10**). A chart of the phytoplankton species presence/absence at each of the three sampling station in 2008, by season, is presented in **Appendix B**.

Trends in biomass were similar to density, with chrysophytes dominating biomass at 66% (**Table 3-11**). Diatoms and cryptophytes were the next most important groups (see also **Figures 3-12 and 3-13**). The three sampling stations had phytoplankton biomass ranging from 139 mg/m^3 (for Baker Lake at the barge dock station in September) to 361 mg/m^3 (for Baker Lake at the proposed jetty station in late July).

Eighty-six species were identified for the three study sites in July, August and September 2008, averaging 39 species per station (**Table 3-11 and Appendix B**). The range in species richness was very similar to the biomass results per station and season, where the lowest richness was seen for Baker Lake at the barge dock station in July (32) and the highest was for Baker Lake at the proposed jetty station in August (50).

Species diversity was relatively stable among the three stations, with a Simpson's diversity index averaging 0.88 (**Table 3-11**). Species diversity was highest in August for all stations on Baker Lake.

Table 3-10: Seasonal density (cells/L) of major phytoplankton groups, Meadowbank study lakes & Baker Lake, July, August and September 2008.

Station	Date	Phytoplankton Density (cells/L)						
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	Total
Third Portage Lake								
TPS	24-Jul-08	64656	51704	1159424	123928	14768	15768	1430248
TPS	17-Aug-08	0	88008	1257800	110160	65856	23352	1545176
TPS	18-Sep-08	16168	94992	1553144	154064	50888	22552	1891808
TPE	23-Jul-08	0	68656	1839704	160848	36320	24352	2129880
TPE	16-Aug-08	0	161048	1727760	176416	66056	30152	2161432
TPE	18-Sep-08	0	201552	1847488	152064	25152	11384	2237640
TPN	24-Jul-08	14384	32336	2134448	130512	43704	2400	2357784
TPN	17-Aug-08	7184	60272	1933696	183000	79424	58672	2322248
TPN	18-Sep-08	32336	181800	1544960	117744	44104	1400	1922344
Second Portage Lake								
SP	19-Jul-08	14768	35920	2658680	105976	72640	3600	2891584
SP	22-Aug-08	3139408	115544	193968	10584	120344	200	3580048
SP	17-Sep-08	400	252640	899000	45120	128128	0	1325288
Tehek Lake								
TE	20-Jul-08	0	14368	2186336	89608	58672	15968	2364952
TE	19-Aug-08	21552	216320	1394296	66656	95392	29536	1823752
TE	15-Sep-08	15784	128528	416672	74536	91208	400	727128
Wally Lake								
WAL	22-Jul-08	7784	79224	2473296	205152	161248	22952	2949656
WAL	21-Aug-08	93792	259424	2105312	67256	116944	14968	2657696
Inuggugayualik Lake								
INUG	25-Jul-08	7184	231888	2356368	132512	36920	7384	2772256
INUG	20-Aug-08	7384	162248	1964432	37720	114944	14768	2301496
MEADOWBANK LAKES								
Relative Abundance (%)		**8.3**	**5.9**	**76**	**5.2**	**3.4**	**0.72**	**NA**
Baker Lake								
BBD	27-Jul-08	0	136496	955872	153896	95992	2800	1345056
BBD	28-Aug-08	0	920152	1916144	112272	95392	200	3044160
BBD	21-Sep-08	400	280576	1121104	60920	490912	9184	1963096
BPJ	27-Jul-08	28736	143880	2043656	298008	172232	16968	2703480
BPJ	28-Aug-08	7184	697648	2769456	118472	182800	2400	3777960
BPJ	21-Sep-08	188784	517248	1027512	81888	418072	8784	2242288
BAP	28-Jul-08	0	172416	1454168	360248	144896	400	2132128
BAP	25-Aug-08	800	245056	2022304	134760	153064	14968	2570952
BAP	21-Sep-08	0	374568	1350992	100040	232688	800	2059088
BAKER LAKE								
Relative Abundance (%)		**1.0**	**16**	**67**	**6.5**	**9.1**	**0.26**	**NA**

Table 3-11: Seasonal biomass (mg/m ^{3}) and diversity of major phytoplankton groups, Meadowbank study lakes & Baker Lake, July, August and September 2008.

Station	Date	Phytoplankton Biomass (mg/m^3)							# Species	Simpsons Diversity
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	Total		
Third Portage Lake										
TPS	24-Jul-08	1.13	5.10	98.0	6.96	0.976	7.11	119	33	0.85
TPS	17-Aug-08	0	6.39	90.0	8.84	4.94	11.9	122	39	0.84
TPS	18-Sep-08	0.792	4.14	97.3	13.9	4.04	15.2	135	39	0.86
TPE	23-Jul-08	0	7.63	131	14.6	1.82	23.1	178	36	0.86
TPE	16-Aug-08	0	7.51	129	11.7	5.13	31.8	185	41	0.86
TPE	18-Sep-08	0	6.19	157	10.6	4.95	17.2	196	38	0.87
TPN	24-Jul-08	2.03	1.61	218	9.91	2.55	16.6	251	37	0.64
TPN	17-Aug-08	1.79	4.73	119	13.6	4.27	31.1	174	34	0.86
TPN	18-Sep-08	3.48	8.47	113	10.5	3.10	5.75	144	38	0.85
Second Portage Lake										
SP	19-Jul-08	0.850	1.13	218	14.4	3.51	16.4	254	34	0.77
SP	22-Aug-08	0.628	1.58	7.81	7.35	16.3	3.12	36.8	17	0.23
SP	17-Sep-08	0.840	6.34	49.0	8.43	12.3	0	76.9	41	0.92
Tehek Lake										
TE	20-Jul-08	0	0.313	181	8.78	8.39	10.8	210	36	0.87
TE	19-Aug-08	0.121	10.7	104	5.90	7.35	16.7	144	37	0.90
TE	15-Sep-08	2.57	12.9	20.4	49.5	11.0	8.98	105	36	0.83
Wally Lake										
WAL	22-Jul-08	1.03	4.30	172	15.2	10.9	13.2	216	38	0.89
WAL	21-Aug-08	3.73	9.04	133	4.83	10.1	7.12	168	41	0.89
Inuggugayualik Lake										
INUG	25-Jul-08	0.718	5.90	258	7.80	2.87	5.77	281	37	0.83
INUG	20-Aug-08	0.938	12.0	147	2.88	4.74	5.67	173	45	0.84
MEADOWBANK LAKES										
Relative Biomass (%)		**0.65**	**3.7**	**77**	**7.1**	**3.8**	**7.8**	**NA**	**NA**	**NA**
Baker Lake										
BBD	27-Jul-08	0	4.70	92.6	28.0	7.10	12.2	145	32	0.87
BBD	28-Aug-08	0	15.7	164	26.0	6.37	0.429	213	42	0.91
BBD	21-Sep-08	0.840	16.5	50.5	11.5	49.8	9.97	139	39	0.88
BPJ	27-Jul-08	0.460	5.66	253	48.5	19.9	33.0	361	39	0.89
BPJ	28-Aug-08	3.17	14.5	251	35.6	12.7	20.3	337	50	0.88
BPJ	21-Sep-08	3.27	13.9	76.1	17.6	34.8	14.7	160	37	0.90
BAP	28-Jul-08	0	6.2	115	52.0	22.5	2.92	199	34	0.83
BAP	25-Aug-08	0.617	12.0	182	24.6	14.5	7.35	241	41	0.89
BAP	21-Sep-08	0	16.2	83	18.1	17.2	5.85	141	37	0.87
BAKER LAKE										
Relative Biomass (%)		**0.43**	**5.4**	**66**	**14**	**9.6**	**5.5**	**NA**	**NA**	**NA**

Figure 3-12: Seasonal biomass (mg/m^3) of major phytoplankton groups, Meadowbank study lakes & Baker Lake, July, August and September 2008.

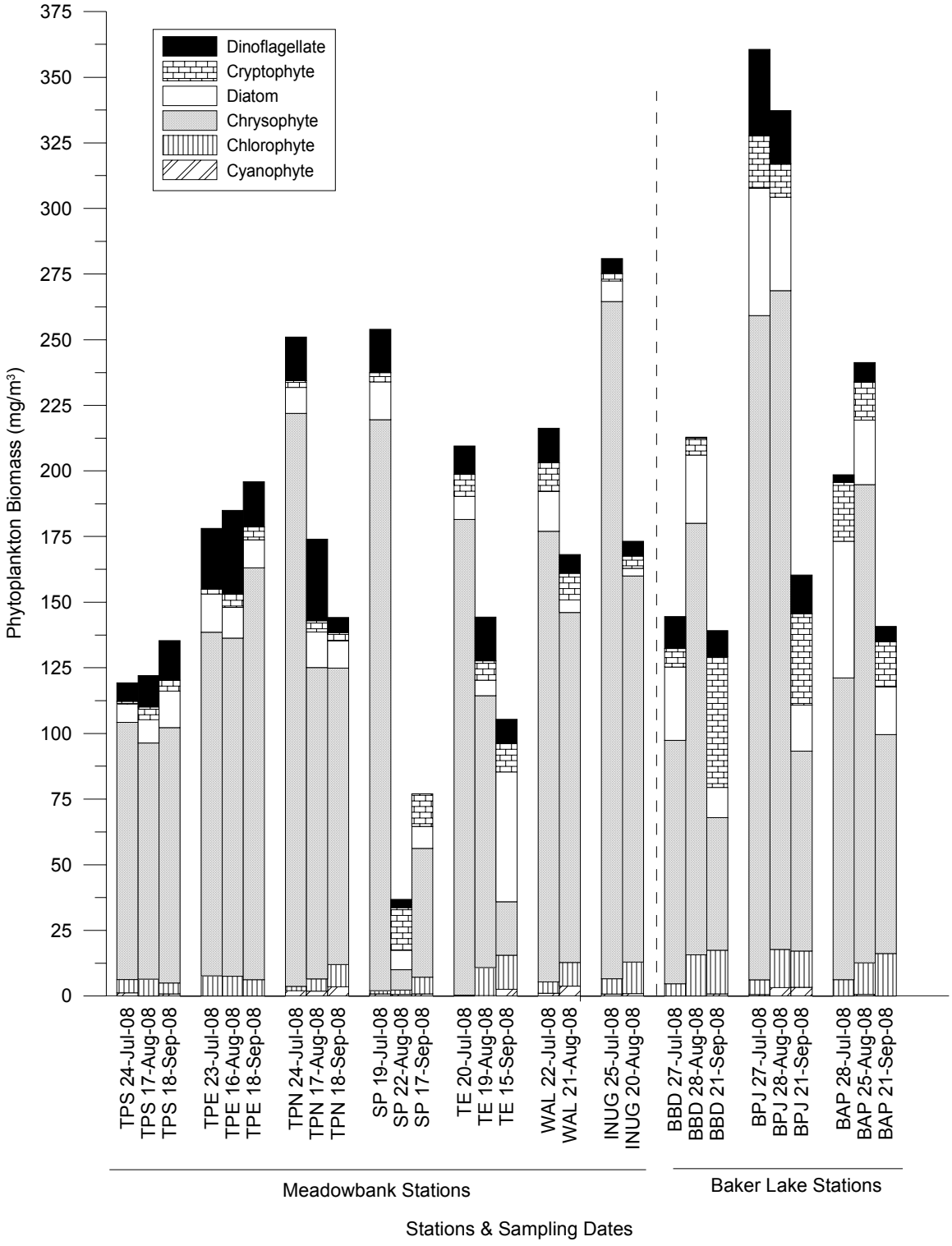
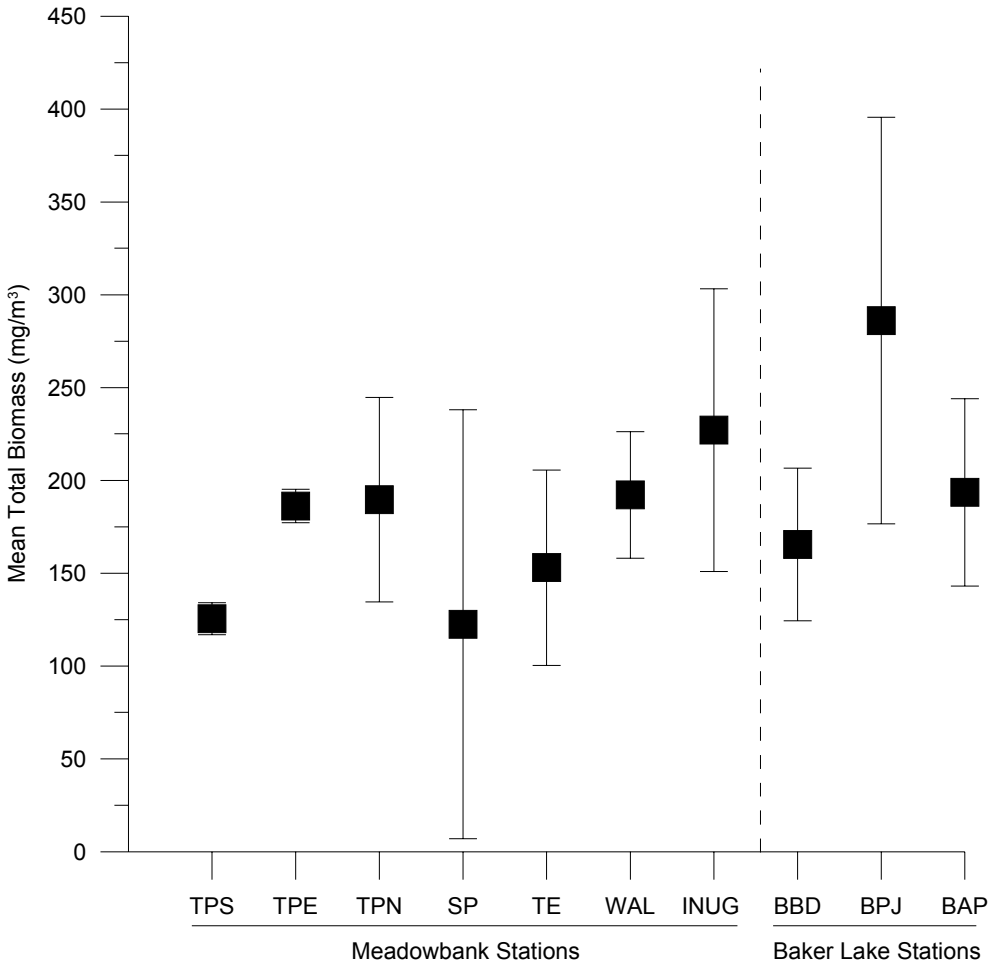


Figure 3-13: Phytoplankton mean total biomass (mg/m^3), +/- 1 standard deviation, Meadowbank study lakes & Baker Lake, July, August and September 2008.



3.5. Periphyton

Periphyton density (cells/cm^2) and biomass (µg/cm^2) was measured from samples collected in mid to late August 2008, near the height of the growing season. It should be noted that apparent periphyton biomass was highly variable based on field observations and that variability will be naturally higher due to selection by the sampler and the small surface area sampled. Periphyton density is subject to great natural variability due to differences in sun exposure and aspect (i.e., angle towards the sun), nutrient availability, water depth and clarity, and grazing by invertebrates and fish. Although we tried to select rocks with similar characteristics (e.g., depths, aspects and coverage by periphyton), this was achieved to varying degrees at each station. Furthermore, while "flat", "smooth" rocks were targeted, it was impossible to achieve total uniformity within and among stations. Indeed, these challenges are often raised as reasons not to use periphyton in long-term monitoring programs. Periphyton is being monitored in the AEMP to help assess whether the planned dike habitat areas (e.g., dike faces and finger dikes), included as habitat compensation, are functioning as intended. Because of the large natural variation, it is very difficult to discern between natural changes, sampling bias and real effects. Consequently, while results are presented in absolute terms of density or biomass, the relative composition of the periphyton community is probably the most robust metric to characterize the 2008 results and for interpreting future dike habitat studies.

A total of 67 periphyton species were identified in the study lakes, represented by 5 major taxonomic groups. The community was dominated/co-dominated by cyanophytes (*Lyngbya mucicola* Lemmermann, *Petalonema alatum* Berk, *Rivularia dura* Roth and *Gloeothece*), diatoms (*Achnanthes minutissima* Kutzing, *Tabellaria flocculosa* (Roth) Kutzing, *Cymbella microcephala* Grunow, *Cymbella silesiaca* Bleisch, *Nitzschia palea* (Kutzing) W. Smith, and *Anomoenies vitrea* Ross), and chlorophytes (*Mougeotia*, and *Bulbochaete*) (**Figure 3-14**). A matrix of the periphyton species presence/absence at each sampling station is presented in **Appendix C**.

As expected, total periphyton density was quite variable and ranged from 141,401 cells/cm^2 in the south basin of Third Portage Lake to 1.23 million cells/cm^2 in Second Portage Lake (**Table 3-12**). Cyanophytes comprised 79% of the total periphyton density in the study lakes, with diatoms having the next highest density at only 17% (**Table 3-12**). While biomass (µg/cm^2) is a more ecologically important metric than density, it is subject to the limitations described above. Trends in biomass were similar to density, with cyanophytes and diatoms dominating biomass at 62% and 27%, respectively (**Table 3-13, Figure 3-14**). Total biomass per sample was less variable than density and ranged from 137 to 842 µg/cm^2. Mean biomass per station ranged from 216 µg/cm^2 in the south basin of Third Portage Lake (TPS) to 546 µg/cm^2 in Second Portage Lake (SP). Note that TPS is a colder and thus more nutrient poor station than the others, which may explain

why periphyton biomass was lower here as compared to stations within the same lake and among the other lakes. Also, within station variability was often just as wide as among station variability both for density and for biomass (**Figure 3-15**).

Periphyton species composition based on mean relative biomass is shown in **Figure 3-16**. Gross periphyton community structure was relatively similar within and among lakes, with cyanophytes dominating at all stations. Diatoms were the next most dominant overall, followed by chlorophytes. Dinoflagellates represented a low percentage of biomass at all stations.

Periphyton species richness ranged from 10 to 20 species per sample, with an average of 15 (**Table 3-13**). Species diversity was also variable, with a Simpson's diversity index ranging from 0.54 to 0.83, with an average of 0.72 (**Table 3-13**).

Although periphyton species richness and diversity varied widely among stations and lakes, this is not uncommon. Several factors influence these metrics. The most obvious are nutrients, light and temperature. However, species competition by highly adaptable species may also dictate the community structure. The study lakes were dominated by a filamentous cyanophyte complex (*Lyngbya mucicola, Petalonema alatum* and *Rivularia dura*) embedded with loosely attached diatoms (*Tabellaria flocculsa* and *Cymbella microcephala* and *C. silesiaca*) or chlorophytes (*Mougeotia*). In most cases, one or two species dominated, contributing a majority of the biomass and limiting the contribution of less competitive species. This is not uncommon in harsh Arctic environments. A brief description of each of these periphyton species follows.

- *Lyngbya* is one of the most common cyanophytes genera, found in periphyton and metaphyton assemblages in a variety of freshwater environments (Anagnostidis and Komárek, 1988). This species was present at all of the sampling stations in 2008 and often dominated or co-dominated the assemblage.
- *Petalonema* and *Rivularia* were present in all of the 35 individual samples. These are species that prefer submerged habitats on calcareous substrata within the splash zone (water surface to 0.7 m), forming large attached colonies that are capable of fixing atmospheric nitrogen. Bergmann and Welch (1990) documented 16% of the annual nitrogen budget of a small lake, in the Saqvaqjuac region, was via nitrogen fixation by the natural periphyton community. In addition, these species have been documented to occur in extreme environments such as coastal lakes in the eastern Arctic (Komarek et al., 2002) and Antarctica (Vincent, 2000).
- The diatoms *Tabellaria* and *Cyclotella* are cosmopolitan genera that have been documented in northern temperate lakes (Findlay et al., 1999), Arctic lakes (Welch et al., 1989) as well as in several paleolimnological studies covering areas of the Arctic (Lim et al., 2001; Michelutti et al., 2003). Ecologically, *Tabellaria* prefers lakes and ponds that are oligo-mesotrophic, attached to rocks in shallow water (Patrick and

Reimer, 1966). However, it does occur in planktonic (free swimming) form. *Cyclotella bodanica* is widely distributed, and generally occurs in oligotrophic lakes with a preference towards circum-neutral environments (pH >7.1). It has been observed in lakes in Alaska, northwestern Ontario, and Shell Lake near Inuvik (Kling and Håkansson, 1988).

- *Mougeotia* (a chlorophyte) is a true benthic genus with numerous species. This organism has a wide ecological distribution, occurring in extreme conditions such as low pH, excessive nutrients and arctic lakes with shortened growing seasons. These species occur in a broad spectrum of lake trophic levels from oligotrophic to eutrophic (Prescott, 1962).

Based on the results from 2008, the study lakes appear to have a diverse periphyton assemblage, dominated by species that have been reported to occur or dominate other lakes in the region.

The primary use of these data will be to provide a gross characterization of periphyton community structure to support evaluating periphyton community development on dike faces, finger dikes and other habitat compensation features. Several years of baseline periphyton data are available with which to compare periphyton growth on habitat compensation features. Further periphyton sampling at the AEMP stations is not needed.

Table 3-12: Density of cell (cells/cm ^{2}) of major periphyton groups, Meadowbank study lakes, August 2008.

Station	Date	Periphyton Density (cells/cm^2)					
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Dinoflagellate	Total
Third Portage Lake							
TPS-1	17-Aug-08	412719	33895	0	83740	0	530354
TPS-2	17-Aug-08	290276	11611	0	28500	0	330386
TPS-3	17-Aug-08	111888	7389	2111	25333	0	146721
TPS-4	17-Aug-08	119150	0	0	22251	0	141401
TPS-5	17-Aug-08	264180	8972	0	12960	0	286112
TPE-1	18-Aug-08	309539	8972	0	112152	2243	432906
TPE-2	18-Aug-08	256604	3589	0	55627	0	315820
TPE-3	18-Aug-08	574218	9969	0	25920	0	610106
TPE-4	18-Aug-08	450851	0	0	51590	0	502441
TPE-5	18-Aug-08	469115	7690	0	53833	2564	533202
TPN-1	18-Aug-08	215332	4486	0	44861	0	264679
TPN-2	18-Aug-08	433227	0	15381	53833	0	502440
TPN-3	18-Aug-08	360880	7975	0	65796	0	434651
TPN-4	18-Aug-08	378625	10767	0	80749	0	470141
TPN-5	18-Aug-08	334213	17944	0	53833	0	405990
Second Portage Lake							
SP-1	24-Aug-08	768016	17944	0	240454	0	1026414
SP-2	24-Aug-08	690856	107666	0	210846	0	1009367
SP-3	24-Aug-08	540893	33325	20508	53833	0	648558
SP-4	24-Aug-08	1015647	35889	0	175854	0	1227390
SP-5	24-Aug-08	570629	64600	0	168676	0	803905
Tehek Lake							
TE-1	19-Aug-08	328381	16150	0	186621	0	531151
TE-2	19-Aug-08	616835	2243	0	224304	0	843382
TE-3	19-Aug-08	551146	2564	0	248657	0	802367
TE-4	19-Aug-08	957029	38879	0	149536	0	1145445
TE-5	19-Aug-08	233276	34393	0	106170	0	373840
Wally Lake							
WAL-1	21-Aug-08	857738	14355	0	251220	0	1123313
WAL-2	21-Aug-08	796727	43066	0	233276	0	1073069
WAL-3	21-Aug-08	517821	46143	0	253784	0	817748
WAL-4	21-Aug-08	746483	28711	0	211743	0	986937
WAL-5	21-Aug-08	837401	23926	0	176452	0	1037779
Inuggugayualik Lake							
INUG-1	20-Aug-08	613097	23926	0	119629	0	756651
INUG-2	20-Aug-08	517122	4894	0	37520	0	559536
INUG-3	20-Aug-08	575849	29363	0	22838	0	628051
INUG-4	20-Aug-08	654967	22430	0	31403	0	708800
INUG-5	20-Aug-08	600137	29907	0	45858	0	675902
Relative Abundance (%)		**79**	**3.3**	**0.17**	**17**	**0.021**	**NA**

Table 3-13: Biomass (µg/cm ^{2}) and diversity of major periphyton groups, Meadowbank study lakes, August 2008.

Station	Date	Periphyton Biomass (µg/cm^2)						# Species	Simpsons Diversity
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Dinoflagellate	Total		
Third Portage Lake									
TPS-1	17-Aug-08	180	70.7	0	43.1	0	294	14	0.77
TPS-2	17-Aug-08	179	34.0	0	8.80	0	222	15	0.80
TPS-3	17-Aug-08	171	3.60	0.500	20.9	0	196	16	0.77
TPS-4	17-Aug-08	125	0	0	11.7	0	137	13	0.83
TPS-5	17-Aug-08	199	18.9	0	12.1	0	230	15	0.70
	Station Mean	***171***	***25.4***	***0***	***19.3***	***0***	***216***	***15***	***0.77***
TPE-1	18-Aug-08	146	21.8	0	79.8	6.80	255	18	0.64
TPE-2	18-Aug-08	159	6.70	0	53.8	0	220	16	0.60
TPE-3	18-Aug-08	302	12.6	0	24.4	0	339	16	0.63
TPE-4	18-Aug-08	441	0	0	46.1	0	487	10	0.71
TPE-5	18-Aug-08	520	8.50	0	25.4	7.80	562	15	0.66
	Station Mean	***314***	***9.92***	***0***	***45.9***	***2.92***	***372***	***15***	***0.65***
TPN-1	18-Aug-08	215	9.50	0	14.5	0	239	12	0.72
TPN-2	18-Aug-08	285	0	4	39.4	0	328	13	0.59
TPN-3	18-Aug-08	286	14.4	0	82.2	0	383	14	0.72
TPN-4	18-Aug-08	186	30.4	0	43.0	0	259	13	0.75
TPN-5	18-Aug-08	150	29.8	0	54.8	0	235	12	0.54
	Station Mean	***224***	***16.8***	***0.700***	***46.8***	***0***	***289***	***13***	***0.66***
Second Portage Lake									
SP-1	24-Aug-08	307	36.1	0	378	0	720	16	0.76
SP-2	24-Aug-08	435	167	0	148	0	751	15	0.74
SP-3	24-Aug-08	411	21.6	1.00	26.4	0	460	14	0.74
SP-4	24-Aug-08	149	86.6	0	86.6	0	322	17	0.74
SP-5	24-Aug-08	157	119	0	203	0	479	14	0.73
	Station Mean	***292***	***86.2***	***0***	***168***	***0***	***546***	***15***	***0.74***
Tehek Lake									
TE-1	19-Aug-08	222	32.5	0	243	0	497	17	0.79
TE-2	19-Aug-08	93.9	11.3	0	292	0	397	17	0.75
TE-3	19-Aug-08	54.4	3.60	0	299	0	357	15	0.76
TE-4	19-Aug-08	599	70.0	0	174	0	842	13	0.76
TE-5	19-Aug-08	232	52.2	0	211	0	495	16	0.75
	Station Mean	***240***	***33.9***	***0***	***244***	***0***	***518***	***16***	***0.76***
Wally Lake									
WAL-1	21-Aug-08	212	21.6	0	116	0	349	18	0.78
WAL-2	21-Aug-08	91.8	97.0	0	309	0	498	20	0.75
WAL-3	21-Aug-08	104	99.4	0	187	0	391	20	0.79
WAL-4	21-Aug-08	403	72.2	0	149	0	624	15	0.78
WAL-5	21-Aug-08	439	82.7	0	192	0	713	16	0.76
	Station Mean	***250***	***74.6***	***0***	***190***	***0***	***515***	***18***	***0.77***
Inuggugayualik Lake									
INUG-1	20-Aug-08	228	56.9	0	69.4	0	354	16	0.69
INUG-2	20-Aug-08	298	16.1	0	41.6	0	356	16	0.69
INUG-3	20-Aug-08	162	52.7	0	13.8	0	229	17	0.66
INUG-4	20-Aug-08	249	10.4	0	19.8	0	279	13	0.68
INUG-5	20-Aug-08	125	68.5	0	44.9	0	239	17	0.69
	Station Mean	***212***	***40.9***	***0***	***37.9***	***0***	***291***	***16***	***0.68***
Relative Biomass (%)		**62**	**10**	**0.04**	**27**	**0.11**	**NA**	**NA**	**NA**

Figure 3-14: Mean biomass (µg/cm^2) of major periphyton groups, Meadowbank study lakes, August 2008.

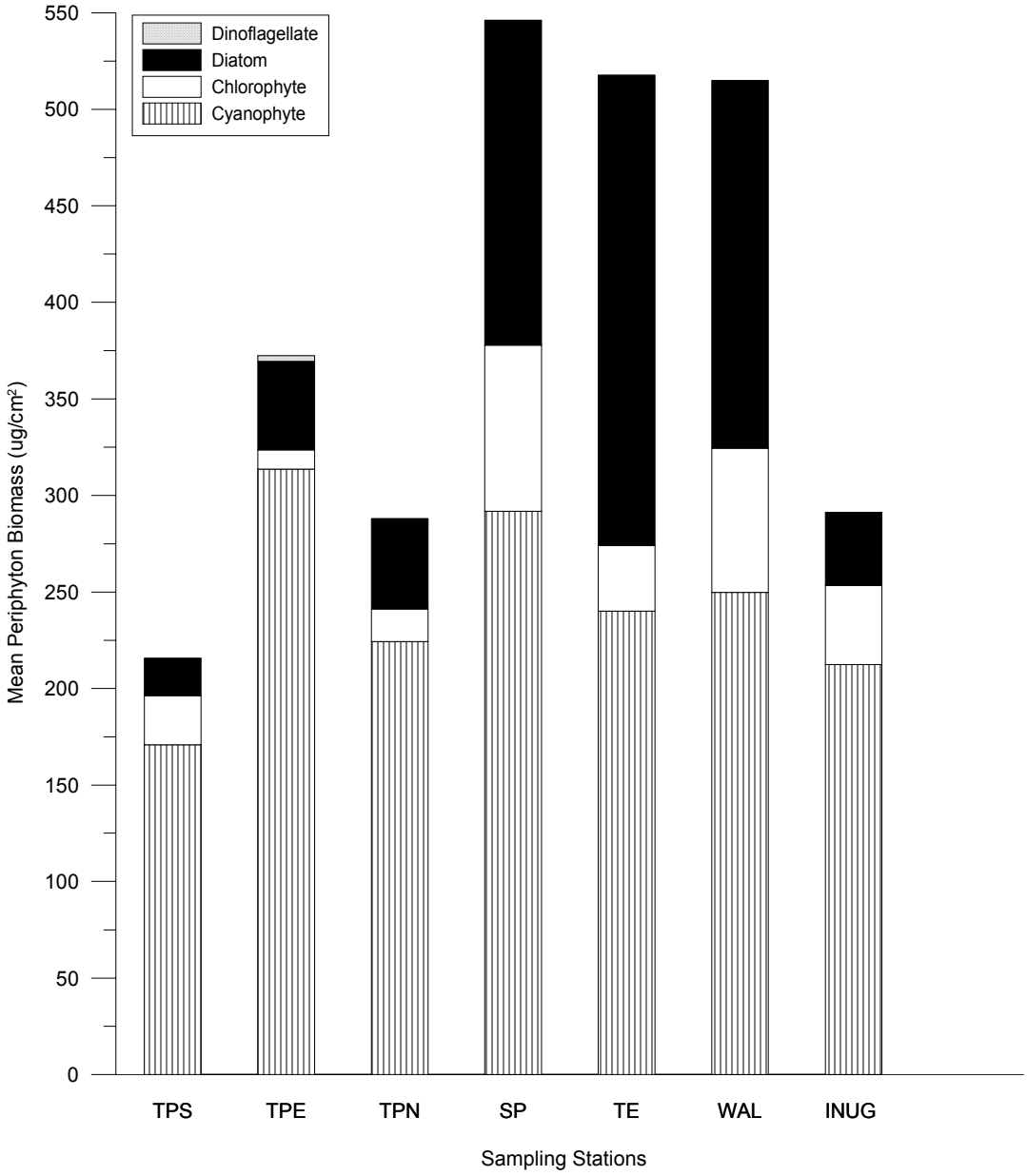


Figure 3-15: Periphyton mean total biomass (µg/cm^2), +/- 1 standard deviation, Meadowbank study lakes, August 2008.

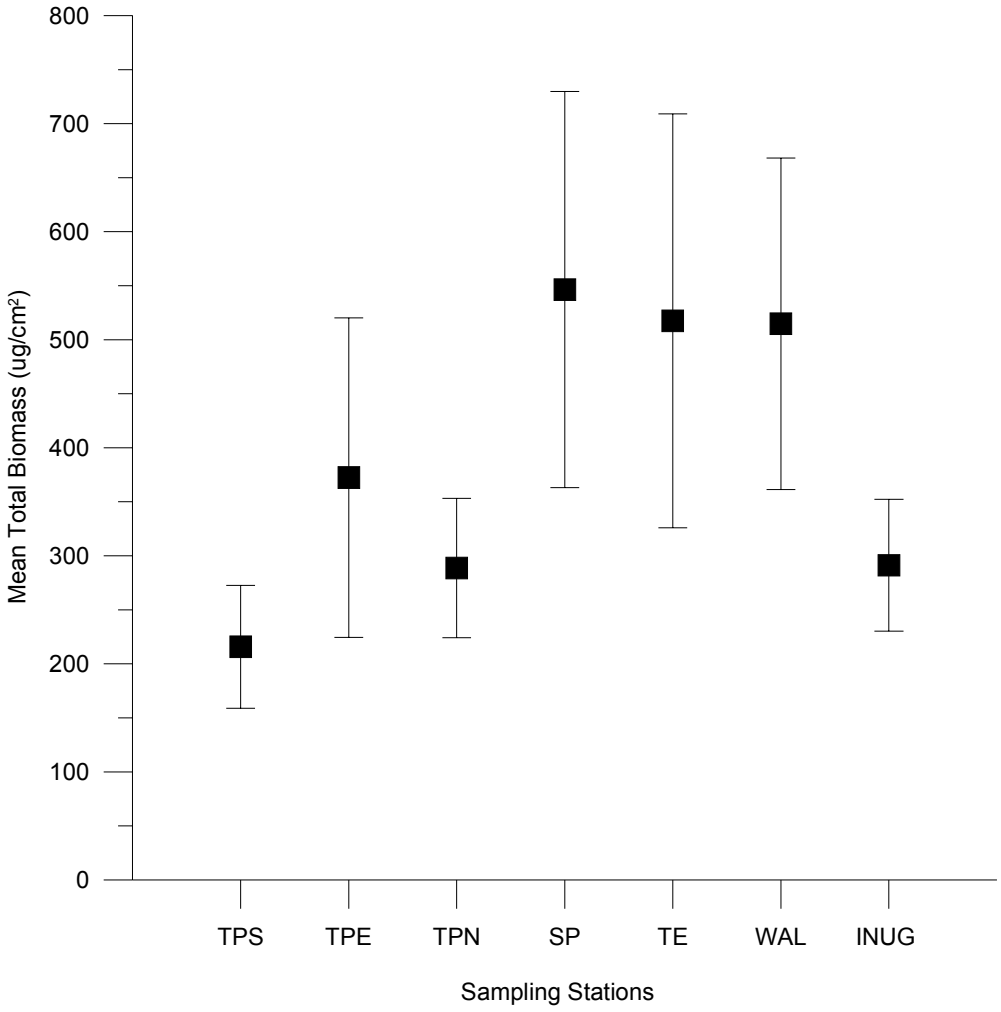
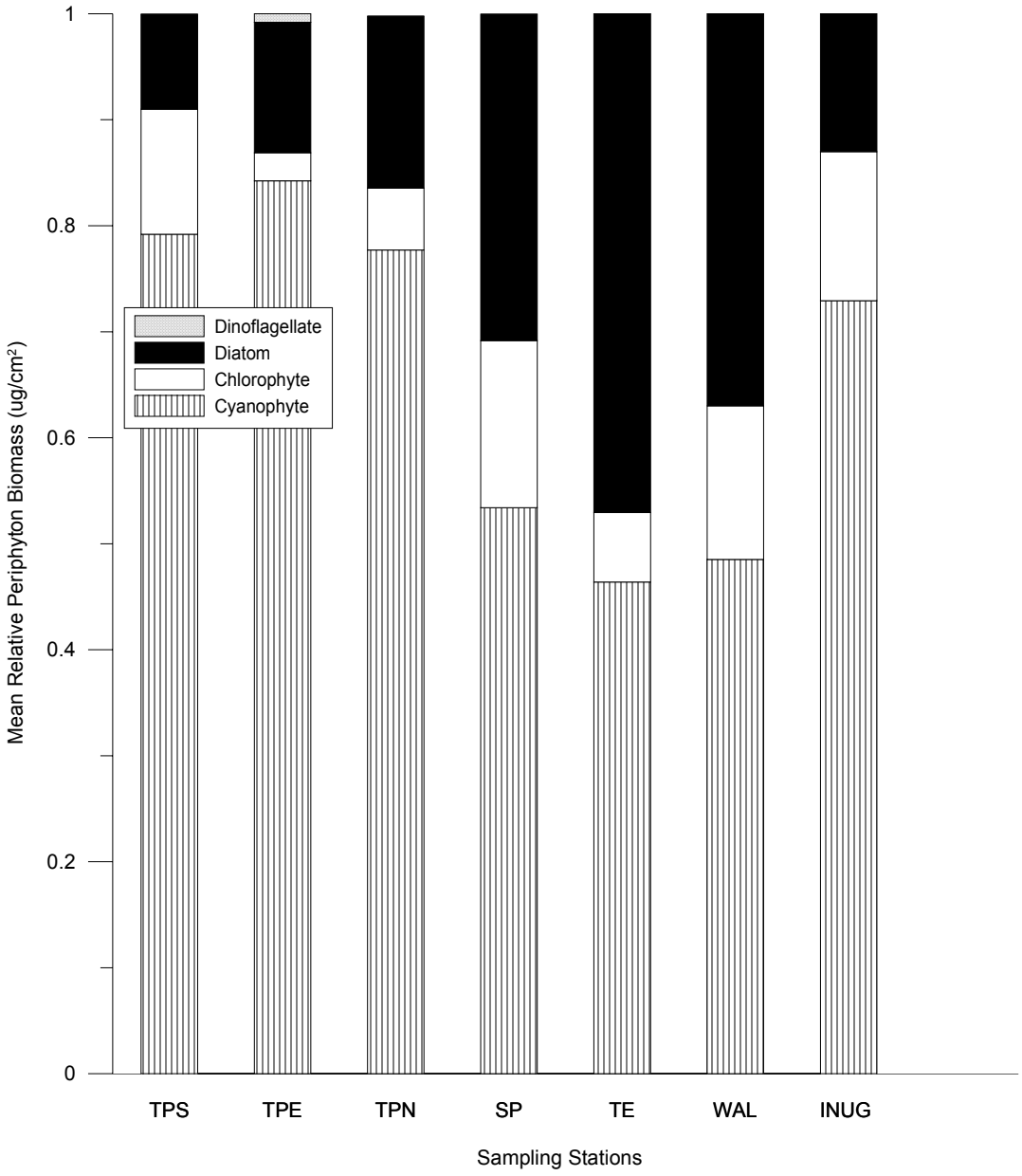


Figure 3-16: Mean relative biomass (ug/cm^2) of major periphyton groups, Meadowbank study lakes, August 2008.



3.6. Benthic Invertebrates

Benthic invertebrates (collectively referred to as "benthos") are small animals that live on or in the bottom sediments and are an important food source for most fish species, especially young-of-the-year and juvenile lake trout, round whitefish, and arctic char (Machniak, 1975; Scott and Crossman, 1979). This section gives a general description of observations made on abundance and richness of all major taxa (e.g., insects, molluscs, worms). The abundance of roundworms (Nematoda) and seed shrimp (Ostracoda) is reported but is not included in statistical comparisons of total number of genera or abundance. Because of their small size they are not consistently retained on a 500-μm sieve, thus their presence would be confounding if they were used to quantitatively compare abundance estimates among stations. Summarized data are in **Tables 3-14 and 3-15** and raw data are in **Appendix D**.

3.6.1. Meadowbank Study Lakes

A total of 36 taxa were identified and enumerated in the benthic invertebrate samples collected from the seven stations (**Appendix D**). Insects, almost exclusively chironomids, dominated number of organisms enumerated and number of taxa identified at all stations (**Tables 3-14 and 3-15**). Clearly, chironomid larvae (F. Chironomidae) were the dominant taxonomic group over all stations with 80% of all taxa identified consisting of chironomids within five subfamilies (**Appendix D**). Six genera of chironomids dominated richness.

The most abundant chironomid genus was *Paratanytarsus* (SF. Chironominae); however, this chironomid was only found in large numbers in the east basin of Third Portage Lake. *Heterotrissocladius* (SF. Orthocladiinae) was fairly abundant throughout all the study lakes except for Wally Lake, which had only one these organisms. *Micropsectra* (SF. Chironominae) was abundant in Third Portage (east and south basins only) and Inuggugayualik Lakes, but rarely in the other lakes.

In addition to chironomid larvae, *Cyclocalyx/Neopisidium*, genera of the family Sphaeriidae (fingernail clams), were also abundant in the study lakes. Oligochaete worms were also reasonably abundant in the lake sediments; generally, at least one oligochaete genus was present at all stations except for Second Portage Lake (**Appendix D**).

Abundance of organisms (#/m^2) was relatively similar among lakes (757 organisms/m^2 from Tehek Lake to 1900 organisms/m^2 from Inuggugayualik Lake) except for unusually low abundance in Second Portage Lake (413 organisms/m^2) and unusually high abundance from Third Portage East basin (5626 organisms/m^2) (**Table 3-14**). Benthic invertebrate abundance can be patchy, depending on the specific location of sampling. For example, in 2007, abundance ranged from 913–2100 organisms/m^2 over all lakes

except Wally Lake, which was much higher (4700 organisms/m^2). Abundance in Second Portage Lake in 2007 (913 organisms/m^2) was more than double 2008 abundance (413 organisms/m^2), perhaps because of sedimentation due to construction of the East Dike. Sampling of benthos in August occurred during the most intense construction activity and it is possible density and richness (**Tables 3-14** and **3-15**) were reduced. Effects of the sedimentation event on the benthic invertebrate community of Second Portage Lake will be investigated further as part of the EAS (Azimuth, 2009).

This section explores the spatial difference (i.e., test for "lake effect," which looks for differences among lakes and/or basins) on total abundance and richness, and abundance and richness of all major taxa groups. Differences among lake stations that were normally (or log-normally) distributed were investigated independently using ANOVA. Where significant differences exist, post-hoc testing (Tukey's HSD [honestly significant difference] multiple comparisons) was used to determine which lake stations were different from one another. Kruskal-Wallis, the non-parametric test was used in a few cases instead of an ANOVA where lake station data were not normally (or log-normally) distributed.

The statistical results from these tests for all variables (total abundance, abundance of each of four major taxa groups, total richness, and richness of each of four major taxa groups) are presented and plotted in **Table 3-16** and **Figure 3-17**.

Abundance and richness of organisms (total and individual taxa groups) were similar for the most part among Meadowbank lake stations, except for the east basin of Third Portage (TPE) and Second Portage (SP) Lakes (**Figure 3-17**). Where significant differences existed, the TPE station had greater abundance and richness than at least one other lake station, but usually greater than all stations and SP often had the lowest abundance and richness (**Table 3-16**). This effect was apparent in terms of richness and abundance without a statistical analysis, and may have been due to East Dike construction. To put these results in context, abundance at the SP station in late August of 2006, 2007 and 2008 was 623, 913 and 413 organisms/m^2, respectively. This will be explored further in the dike construction monitoring report (Azimuth, 2009).

3.6.2. Baker Lake

A total of 32 taxa were identified and enumerated in the benthic invertebrate samples collected from the three stations (**Appendix D**). Similar to Meadowbank lake stations, insects were dominant in terms of numbers of organisms enumerated and taxa identified at all three lake stations (**Tables 3-14** and **3-15**). Again, chironomid larvae (F. Chironomidae) were the dominant taxonomic group with about 89% of all taxa identified consisting of chironomids within five subfamilies (**Appendix D**).

Some differences were found among the Baker Lake stations. The most abundant chironomid genus was *Stictochironomus* (SF. Chironominae) which was found in high numbers at the barge dock (BBD) and the proposed jetty (BPJ) but rarely at the Akilahaarjuk point station (BAP). Similar to Meadowbank, *Heterotrissocladius* (SF. Orthocladiinae) was quite abundant in all Baker Lake stations.

In addition to chironomid larvae, *Cyclocalyx/Neopisidium*, genera of the family Sphaeriidae (fingernail clams), were also abundant in Baker Lake. Oligochaete worms were also reasonably abundant in the lake sediments; generally, at least one oligochaete genus was present at all stations (**Appendix D**).

As for Meadowbank lakes, this next section explores the spatial difference on total abundance and richness, and abundance and richness of all major taxa groups. Differences among lake stations that were normally (or log-normally) distributed were investigated independently using ANOVA. Where significant differences exist, post-hoc testing (Tukey's HSD [honestly significant difference] multiple comparisons) was used to determine which lake stations were different from one another. Kruskal-Wallis, the non-parametric test was used in a few cases instead of an ANOVA where lake station data were not normally (or log-normally) distributed. The statistical results from these tests for all variables are presented and plotted in **Table 3-16** and **Figure 3-17**.

Abundance and richness of organisms (total and individual taxa groups) were visually similar for the most part among the Baker Lake stations (**Figure 3-17**). Accordingly, no significant differences were found among lake stations for all parameters, with the exception of oligochaete abundance (**Table 3-16**).

Total abundance of organisms ranged from 3,300 organisms/m^2 (mean for BAP) to 6,300 organisms/m^2 (mean for BBD). These abundances are several times higher than mean abundances in Meadowbank project lakes, Meadowbank lakes despite larger grain size and lower total organic carbon content of the sediment in Baker Lake. Mean total richness ranged from 11–16 taxa (**Figure 3-17**) at Baker Lake stations.

Table 3-14: Benthic invertebrate total abundance (#/m ^{2}), Meadowbank study lakes, August 2008.

Station	Date	Depth (m)	Total Abundance (#/m^2)				Total
			Oligochaetes	Insects	Molluscs	Other Taxa	
Third Portage Lake							
TPS-1	17-Aug-08	9.1	22	1935	87	0	2043
TPS-2	17-Aug-08	9.7	22	478	196	0	696
TPS-3	17-Aug-08	11.7	43	1630	370	0	2043
TPS-4	17-Aug-08	9.9	0	1130	413	22	1565
TPS-5	17-Aug-08	10.0	0	1304	370	0	1674
		Station Mean	***17***	***1296***	***287***	***4***	***1604***
TPE-1	16-Aug-08	8.7	109	5370	239	304	6022
TPE-2	16-Aug-08	7.8	0	4652	565	0	5217
TPE-3	16-Aug-08	11.5	0	6326	696	130	7152
TPE-4	16-Aug-08	11.2	22	4065	87	304	4478
TPE-5	16-Aug-08	8.9	87	4435	196	543	5261
		Station Mean	***43***	***4970***	***357***	***257***	***5626***
TPN-1	18-Aug-08	7.8	0	1326	65	0	1391
TPN-2	18-Aug-08	9.2	0	652	65	0	717
TPN-3	18-Aug-08	8.4	22	1022	261	22	1326
TPN-4	18-Aug-08	8.4	0	174	87	0	261
TPN-5	18-Aug-08	7.8	0	1261	130	0	1391
		Station Mean	***4***	***887***	***122***	***4***	***1017***
Second Portage Lake							
SP-1	23-Aug-08	9.9	0	130	109	0	239
SP-2	23-Aug-08	7.0	0	304	130	43	478
SP-3	23-Aug-08	13.2	0	326	196	43	565
SP-4	23-Aug-08	7.8	0	326	130	0	457
SP-5	23-Aug-08	10.1	0	196	109	22	326
		Station Mean	***0***	***257***	***135***	***22***	***413***
Tehek Lake							
TE-1	19-Aug-08	7.5	0	500	283	22	804
TE-2	19-Aug-08	9.4	22	413	500	43	978
TE-3	19-Aug-08	11.7	0	261	283	0	543
TE-4	19-Aug-08	13.1	22	457	174	43	696
TE-5	19-Aug-08	12.6	0	565	196	0	761
		Station Mean	***9***	***439***	***287***	***22***	***757***
Wally Lake							
WAL-1	21-Aug-08	7.3	22	326	217	22	587
WAL-2	21-Aug-08	8.0	0	370	217	0	587
WAL-3	21-Aug-08	6.7	0	848	304	22	1174
WAL-4	21-Aug-08	8.9	0	196	370	0	565
WAL-5	21-Aug-08	10.7	22	1848	978	43	2891
		Station Mean	***9***	***717***	***417***	***17***	***1161***
Inuggugayualik Lake							
INUG-1	20-Aug-08	8.1	0	500	326	22	848
INUG-2	20-Aug-08	8.7	43	1261	326	65	1696
INUG-3	20-Aug-08	9.8	22	1022	152	43	1239
INUG-4	20-Aug-08	12.6	43	4565	652	65	5326
INUG-5	20-Aug-08	8.0	0	239	130	22	391
		Station Mean	***22***	***1517***	***317***	***43***	***1900***

Table 3-14 con't: Benthic invertebrate total abundance (#/m ^{2}), Baker Lake, August 2008.

Station	Date	Depth (m)	Total Abundance (#/m^2)				Total
			Oligochaetes	Insects	Molluscs	Other Taxa	
Baker Lake							
BBD-1	29-Aug-08	9.5	130	696	0	0	826
BBD-2	29-Aug-08	13.0	391	3674	152	0	4217
BBD-3	29-Aug-08	11.2	326	9000	543	65	9935
BBD-4	29-Aug-08	11.6	109	6587	22	0	6717
BBD-5	29-Aug-08	13.0	326	7609	1848	22	9804
		Station Mean	***257***	***5513***	***513***	***17***	***6300***
BPJ-1	28-Aug-08	13.4	0	1652	22	43	1717
BPJ-2	28-Aug-08	11.3	0	935	43	22	1000
BPJ-3	28-Aug-08	8.4	0	1891	0	0	1891
BPJ-4	28-Aug-08	8.0	43	5891	609	261	6804
BPJ-5	28-Aug-08	8.4	43	5391	522	478	6435
		Station Mean	***17***	***3152***	***239***	***161***	***3570***
BAP-1	25-Aug-08	11.4	43	5043	152	87	5326
BAP-2	25-Aug-08	9.5	0	1761	109	87	1957
BAP-3	25-Aug-08	10.6	65	3239	22	109	3435
BAP-4	25-Aug-08	11.0	0	2630	109	109	2848
BAP-5	25-Aug-08	12.1	0	2826	65	43	2935
		Station Mean	***22***	***3100***	***91***	***87***	***3300***

Table 3-15: Benthic invertebrate total richness (#taxa), Meadowbank study lakes, August 2008.

Station	Date	Total Richness (#taxa)				Total
		Oligochaetes	Insects	Molluscs	Other Taxa	
Third Portage Lake						
TPS-1	17-Aug-08	1	11	1	0	13
TPS-2	17-Aug-08	1	7	2	0	10
TPS-3	17-Aug-08	1	8	1	0	10
TPS-4	17-Aug-08	0	9	1	1	11
TPS-5	17-Aug-08	0	8	1	0	9
	Station Mean	***1***	***9***	***1***	***0***	***11***
TPE-1	16-Aug-08	1	13	1	1	16
TPE-2	16-Aug-08	0	9	1	0	10
TPE-3	16-Aug-08	0	11	1	2	14
TPE-4	16-Aug-08	1	11	1	3	16
TPE-5	16-Aug-08	2	10	1	2	15
	Station Mean	***1***	***11***	***1***	***2***	***14***
TPN-1	18-Aug-08	0	7	1	0	8
TPN-2	18-Aug-08	0	9	1	0	10
TPN-3	18-Aug-08	1	8	1	1	11
TPN-4	18-Aug-08	0	2	1	0	3
TPN-5	18-Aug-08	0	8	1	0	9
	Station Mean	***0***	***7***	***1***	***0***	***8***
Second Portage Lake						
SP-1	23-Aug-08	0	4	1	0	5
SP-2	23-Aug-08	0	6	1	1	8
SP-3	23-Aug-08	0	9	1	1	11
SP-4	23-Aug-08	0	6	1	0	7
SP-5	23-Aug-08	0	4	1	1	6
	Station Mean	***0***	***6***	***1***	***1***	***7***
Tehek Lake						
TE-1	19-Aug-08	0	9	2	1	12
TE-2	19-Aug-08	1	8	1	1	11
TE-3	19-Aug-08	0	7	1	0	8
TE-4	19-Aug-08	1	7	1	1	10
TE-5	19-Aug-08	0	8	1	0	9
	Station Mean	***0***	***8***	***1***	***1***	***10***
Wally Lake						
WAL-1	21-Aug-08	1	6	3	1	11
WAL-2	21-Aug-08	0	6	1	0	7
WAL-3	21-Aug-08	0	4	1	1	6
WAL-4	21-Aug-08	0	3	2	0	5
WAL-5	21-Aug-08	0	9	3	1	13
	Station Mean	***0***	***6***	***2***	***1***	***8***
Inuggugayualik Lake						
INUG-1	20-Aug-08	0	11	2	1	14
INUG-2	20-Aug-08	1	9	1	2	13
INUG-3	20-Aug-08	1	12	2	2	17
INUG-4	20-Aug-08	1	12	3	1	17
INUG-5	20-Aug-08	0	6	1	1	8
	Station Mean	***1***	***10***	***2***	***1***	***14***

Table 3-15 con't: Benthic invertebrate total richness (#taxa), Baker Lake, August 2008.

Station	Date	Total Richness (#taxa)				Total
		Oligochaetes	Insects	Molluscs	Other Taxa	
Baker Lake						
BBD-1	29-Aug-08	1	9	0	0	10
BBD-2	29-Aug-08	2	7	1	0	10
BBD-3	29-Aug-08	2	9	2	1	14
BBD-4	29-Aug-08	1	8	1	0	10
BBD-5	29-Aug-08	1	9	2	1	13
	Station Mean	***1***	***8***	***1***	***0***	***11***
BPJ-1	28-Aug-08	0	7	1	1	9
BPJ-2	28-Aug-08	0	6	1	1	8
BPJ-3	28-Aug-08	0	9	0	0	9
BPJ-4	28-Aug-08	2	16	1	2	21
BPJ-5	28-Aug-08	1	15	1	2	19
	Station Mean	***1***	***11***	***1***	***1***	***13***
BAP-1	25-Aug-08	1	16	1	1	19
BAP-2	25-Aug-08	0	14	1	1	16
BAP-3	25-Aug-08	2	14	1	1	18
BAP-4	25-Aug-08	0	11	1	1	13
BAP-5	25-Aug-08	0	11	1	1	13
	Station Mean	***1***	***13***	***1***	***1***	***16***

Table 3-16: ANOVA (or Kruskal-Wallis) results testing differences among lake stations, Meadowbank study lakes & Baker Lake, August 2008.

MEADOWBANK LAKES

Dependent Variable	N	Lake Effect		
		S or NS[1]	p-value	Result[2]
(Log) Total Abundance	35	S	<0.001	TPE>All; INUG,TPS>SP
(Log) Oligochaete Abundance*	14	NS	0.368	
(Log) Insect Abundance	35	S	<0.001	TPE>All; INUG,TPS>SP
(Log) Mollusc Abundance	35	S	0.034	WAL>TPN
(Log) Other Taxa Abundance*	20	NS	0.064	
Total Richness	35	S	0.001	TPE>SP,TPN,WAL; INUG>SP,TPN
Oligochaete Richness*	35	NS	0.267	
Insect Richness	35	S	0.002	TPE, INUG>SP,WAL
Mollusc Richness*	35	NS	0.050	
Other Taxa Richness*	35	S	0.031	NA

BAKER LAKE

Dependent Variable	N	Lake Effect		
		S or NS[1]	p-value	Result[2]
(Log) Total Abundance	15	NS	0.547	
(Log) Oligochaete Abundance*	9	S	0.041	NA
(Log) Insect Abundance	15	NS	0.593	
(Log) Mollusc Abundance*	13	NS	0.529	
(Log) Other Taxa Abundance*	11	NS	0.423	
Total Richness	15	NS	0.273	
Oligochaete Richness	15	NS	0.227	
Insect Richness	15	NS	0.075	
Mollusc Richness*	15	NS	0.497	
Other Taxa Richness*	15	NS	0.119	

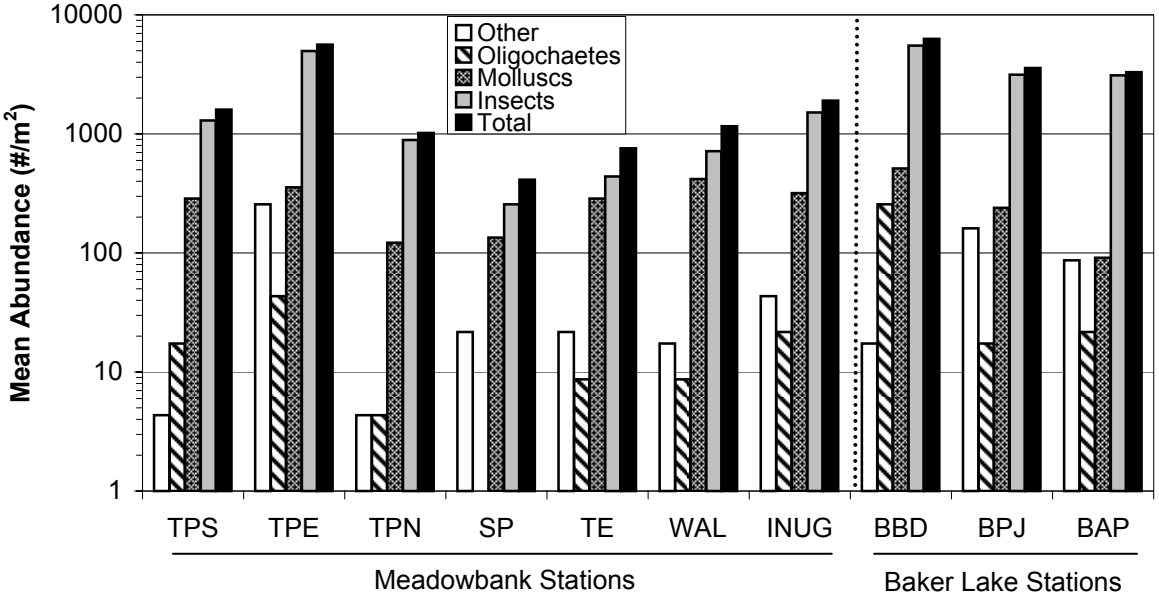
Notes:

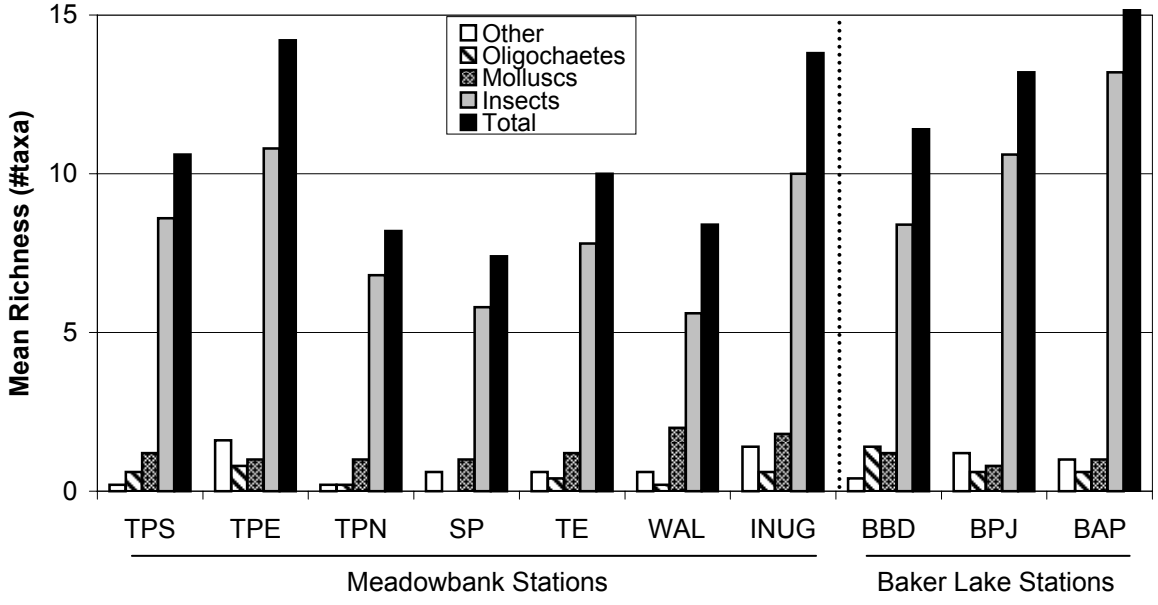
[1] S = significant, NS = nonsignificant.

[2] TPE,TPN,TPS = Third Portage Lake - East, North, South basins; SP = Second Portage Lake; TE = Tehek Lake; WAL = Wally Lake; INUG = Inuggugayualik Lake; BBD,BPJ,BAP = Baker Lake - Barge Dock, Proposed Jetty, Akilahaarjuk Point; All = all lakes.

* Indicates non-normal data; Kruskal-Wallis test was used instead of ANOVA; no post-hoc tests were used (NA = not available).

Figure 3-17: Benthic invertebrate mean abundance and richness (total and individual taxa groups) Meadowbank study lakes & Baker Lake, August 2008.





Notes:

TPE,TPN,TPS=Third Portage Lake - East, North, South basins; SP=Second Portage Lake; INUG=Inuggugayualik Lake; TE=Tehek Lake; WAL=Wally Lake; BBD,BPJ,BAP=Baker Lake - Barge Dock, Proposed Jetty, Akilahaarjuk Point.

4. SUMMARY

AEMP receiving environment monitoring focused on two main areas in 2008: Meadowbank study lakes (as in past years) and Baker Lake (new for 2008). With the onset of construction activities starting in late July after successful completion of the permitting process, this year marked the transition between the baseline phase and the construction phase. It should be noted that in-water construction activities were limited to the East Dike and the Western Channel Dike, so the results for most AEMP stations still reflect baseline conditions. Key results for 2008 for each of the two monitoring areas are listed below.

Meadowbank Study Lakes

- Limnology results show that the lakes are generally cold, clear, isothermal, well mixed, and well oxygenated. These results are consistent among stations and seasons for 2008 and similar to historical data.
- Water chemistry results show that the lakes are circum-neutral with low conductivity, hardness and ions. Total and dissolved solids concentrations are very low and typically below detection limits. Nitrogen, carbon and phosphorus were also low, close to laboratory detection limits and did not differ appreciably within or among lakes and seasons. Total metals in water were consistently low among study lakes and seasons, with only four of 28 metals consistently above detection limits and none exceeding CCME guidelines. These results are generally consistent with previous years and confirm their status as ultra-oligotrophic lakes.
- Construction of the East Dike did result in the introduction of suspended sediments into Second Portage Lake in August and September 2008. This resulted in elevated concentrations of total suspended solids (TSS), certain nutrients and some metals (aluminum, chromium and iron exceeded CCME guidelines) in Second Portage Lake. These conditions extended to Tehek Lake in the fall sampling period, but to a lesser degree. The extent and ecological significance of the sediment introductions is assessed in greater detail in the dike construction monitoring report (Azimuth, 2009).
- Sediment chemistry results showed naturally elevated metals (primarily arsenic, cadmium, copper, chromium, and zinc, which typically exceeded CCME guidelines) at many locations. A target coring study was conducted during the spring (i.e., prior to any in-water construction activities) to improve the characterization of within-station spatial variability of metals concentrations for

baseline conditions. The study focused on only the top 1 cm of sediment and will be used to help monitor whether mining activities are changing sediment quality over time. Interestingly, detectable oil & grease concentrations were found at a number of stations, including the reference areas; these results are thought to be related to natural conditions rather than hydrocarbon contamination and will be explored further in 2009.

- Primary productivity was uniformly low, as indicated by low phytoplankton biomass and low chlorophyll-α, as expected for these ultra-oligotrophic systems. Phytoplankton biomass was depressed in Second Portage Lake during summer and to a lesser degree in the fall, likely associated with the construction-related TSS introductions. This is discussed further in the dike construction monitoring report (Azimuth, 2009).
- Periphyton biomass, as expected and consistent with previous years, was quite variable among and within stations in 2008. There were some apparent patterns, with lower biomass at stations with deeper, colder water (e.g., Third Portage Lake). Several years of baseline periphyton data are available with which to compare periphyton growth on habitat compensation features. Further periphyton sampling at the AEMP stations is not needed.
- Benthic community samples were dominated by chironomid larvae in 2008, consistent with previous years. Total abundance and richness were depressed in Second Portage Lake in August 2008, likely due to construction-related sediment inputs. The extent of sediment-related impacts to benthic community did not appear to significantly affect the Tehek Lake station. This is discussed further in the dike construction monitoring report (Azimuth, 2009).

Baker Lake

- Limnology results suggest some influence of marine water at the Baker Lake stations, with fairly widespread elevated conductivity, hardness and ions relative to the Meadowbank study lakes. However, inputs from the Thelon River, which is more similar to water from the Meadowbank study lakes, seem to prevail under certain conditions (e.g., strong southerly winds). Despite some vertical differences in salinity, oxygen and temperature profiles show unstratified conditions.
- Water chemistry results show 23 of 28 metals below detection limits and all below CCME guidelines.
- Sediment chemistry showed lower metals concentrations than the Meadowbank study lakes, with only arsenic exceeding CCME guidelines. The higher arsenic

concentrations were found primarily at the proposed jetty location, with each of the 15 sediment core samples exceeding CCME guidelines.

- Primary productivity was slightly higher at the Baker Lake stations relative to the Meadowbank study lakes, with the highest phytoplankton biomass found at the proposed jetty station.
- Benthic community samples in Baker Lake were dominated by chironomid larvae. Total abundance and diversity at Baker Lake stations were generally higher than the Meadowbank study lakes, despite having sandier substrate.

5. REFERENCES

AEM (Agnico-Eagle Mines Ltd.). 2009. Aquatic Environment Management Program, March 2009.

Anagnostidis, K. and J. Komárek. 1988. Modern approaches to the classification system of cyanophytes. 3. Oscillatoriales. Archiv. fur Hydrobiologie/Algological Studies. 50/53: 327-472.

Azimuth. 2009. Aquatic Effects Monitoring Program – Targeted Study: Dike Construction Monitoring, Meadowbank Gold Project, 2008. Report prepared by Azimuth Consulting Group Inc. Vancouver BC for Agnico-Eagle Mines Ltd., Vancouver, BC. March 2009.

Azimuth. 2008*a*. Aquatic Effects Management Program Monitoring – Meadowbank Gold Project, 2007. Report prepared by Azimuth Consulting Group Inc., Vancouver, BC for Agnico-Eagle Mines Ltd., Vancouver, BC. March 2008.

Azimuth. 2008*b*. Aquatic Effects Management Program Monitoring – Meadowbank Gold Project, 2006. Report prepared by Azimuth Consulting Group Inc., Vancouver, BC for Agnico-Eagle Mines Ltd., Vancouver, BC. March 2008.

BAER (Baseline Aquatic Ecosystem Report). 2005. A report prepared by Azimuth Consulting Group, Vancouver for Cumberland Resources Ltd. October, 2005.

Bergmann, M.A., and H.E. Welch. 1990. Nitrogen fixation by epilithic periphyton in small Arctic lakes in response to experimental nitrogen and phosphorus fertilization. Canadian Journal of Fisheries and Aquatic Sciences. 47: 1545-1550.

CCME (Canadian Council of Ministers of the Environment) 2007. Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life, 1999, updated December 2007.

CCME (Canadian Council of Ministers of the Environment) 2002. Canadian Sediment Quality Guidelines for the Protection of Freshwater Aquatic Life, 1999, updated 2002.

Environment Canada. 1984. Guidance document on collection and preparation of sediments for physicochemical characterization and biological testing. Environmental Protection Series. Report EPS 1/RM/29.

Findlay, D.L., Kasian, S.E.M., Turner, M.T., and M.P. Stainton. 1999. Responses of phytoplankton and epilithon during acidification and early recovery. Freshwater Biology. 42: 159-175.

Kling, H.J., and H. Håkansson. 1988. A light and electron microscope study of *Cyclotella* species (Bacillariophyceae) from central and northern Canadian lakes. Diatom Research. 3: 55-82.

Komárek, J., Kling, H., and J. Komarkova. 2002. Filamentous cyanobacteria [Wehr, J.D. and R.G. Sheath. - editors.]. In Freshwater Algae of North America. Ecology and classification. Academic Press. U.S. 918 P.

Lim, D.S.S., Kwan, C., and M.S.V. Douglas. 2001. Periphytic diatoms assemblages from Bathurst Island, Nunavut, Canadian high Arctic: an examination of community relationships and habitat preference. J. Phycology. 37: 379-392.

Machniak, K., 1975. The effects of hydroelectric development on the biology of northern fishes (reproduction and population dynamics) IV. Lake trout *Salvelinus namaycush* (Walabum). A literature review and bibliography. Fisheries and Marine Services Division Technical Report No. 530. 52 p.

Michelutti, N., Holtham, A.J., Douglas, M.S.V., and J.P. Smol. 2003. Periphytic diatom assemblages from ultra-oligotrophic and UV transparent lakes and ponds on Victoria Island and comparisons with other diatom surveys in the Canadian Arctic. J. Phycology. 39: 465-480.

Nauwerck, A. 1963. Die Beziehungen zwischen Zooplankton und Phytoplankton in See Erken. Symbolae Botanicae Upsaliensis, 17: 1-163.

Patrick, R. and C.W. Reimer. 1966. The diatoms of the United States, 1. Academy of Natural Sciences Monograph No. 13. 688 p.

Prescott, G.W. 1962. Algae of the Western Great Lakes Area. Wm. C. Brown Company Publishers. U.S. 977 p.

Rott, E. 1981. Some results from phytoplankton counting intercalibrations. Schweiz. Z. Hydrobiologia, 43: 43-62.

Scott, W.B. and E.J. Crossman. 1979. Freshwater fishes of Canada. Bulletin 184. Fisheries Research Board of Canada. 966 p.

Vincent, W.F. 2000. Cyanobacterial dominance in the polar Regions. *In* Whtthon, B. & M. Potts, Ecology of the Cyanobacteria: their diversity in space and time. Dordrecht: Kluwer Academin Press. 321-340.

Vollenweider, R.A. 1968. Scientific fundamentals of the eutrophication of lakes and flowing waters, with particular reference to nitrogen and phosphorus as factors in eutrophication. Technical Report, Organization for Economic Cooperation and Development, Paris, 27: 1-182.

Washington, H.G. 1984. Review: diversity, biotic and similarity indices. A review with special relevance to aquatic ecosystems. Water Res. 186: 652-694.

Welch, H.E., J.A. Legault, and H.J. Kling. 1989. Phytoplankton, nutrients, and primary production in fertilized and natural lakes at Saqvaqjuac, N.W.T. Can. J. Fish. Aquat. Sci. 46: 90-107.

APPENDICES

APPENDIX A

AEMP SEDIMENT CORING TERMS OF REFERENCE MEMO

Technical Memorandum

Date: June 2, 2008

To: **Rachel Gould (AEM)**

cc: **Ralph Turner, Maggie McConnell**

From: **Randy Baker and Gary Mann**

RE: **Meadowbank Gold Project: AEMP Sediment Coring Terms of Reference**

This technical memorandum lays out the terms of reference for 2008 sediment coring as an addendum to the Aquatic Effects Monitoring Program (AEMP).

Objective:

The main objectives for 2008 are:

1. Characterization of spatial variability in sediment chemistry – Previous sediment sampling of the Meadowbank project lakes was conducted to characterize baseline conditions within discrete areas of the near-field, far-field and reference AEMP stations. Prior to moving forward to the construction and operation phases of the project, a more intensive sampling approach is required this year to provide the necessary data to characterize spatial variability within the area. This information will help determine the needs of future sampling events (e.g., sample size needed to detect specified effect size with known statistical power) to allow detection of potential mine-related changes to surface sediment chemistry.
2. Define very near-surface chemistry – Coring, unlike traditional tools such as a Petit Ponar, allows for precise and small depth ranges to be sampled. The corer will be used to sample the top 1.0 cm of sediment to define near-surface chemistry.

Sediment Coring Program:

Surface (top 1 cm) sediment chemistry at all AEMP stations (i.e., 7 stations in project lakes and three (3) new Baker Lake stations) will be characterized using sediment cores. Note that this complements, rather than replaces, the grab samples (top 3 to 4 cm) collected synoptically with benthic community samples in late August. This is in addition to the traditional composite sample using the petite Ponar grab. Fifteen (15) independent cores are to be collected from each of the ten (10) stations. Cores will be collected within the bounds of each sampling area. The intent is to collect cores over a wide area, covering a variety of depths within the basin being sampled. The protocol for collecting sediment cores is as follows:

1. Conduct the limnology, water and benthic sampling program prior to core sampling. Consideration can be given to identifying core sample locations prior to field collections.
2. Anchor the boat at least 25 m away from where sediment/benthos collections were made. If conditions are windy, anchor the boat. If calm, anchoring is not necessary. Survey the area to be sampled with the sonar to determine bottom type.
3. Deploy the corer from the boat and try to ensure that the core barrel is perpendicular with the surface before penetration. Depending on results, the corer can free-fall from 1 m above the surface. Avoid sampling over steep gradient slopes or over coarse grain substrate.
4. Raise the core to just below the water surface and cap prior to bringing above the water to ensure sediment is not lost out the bottom.
5. Check to make sure that the surface of the core is intact and is not mixed or disturbed and that the overlying water is clear. Record water depth and UTM location (NAD 83) of all successful core samples.
6. Process the core on the boat. Decant overlying water and collect only the top 1 cm of sediment.
7. Place the entire 1 cm slice into a 125 mL or 250 mL glass jar. Discard the remaining core sample.
8. Label the jars as per AEMP protocol (e.g., TE-x) but with a suffix indicating a core sample (e.g., TE-SC-01 to TE-SC-15).
9. Fill in the data sheet and record any observations about the core sample such as presence of varves, distinct changes in color, grain size, or any other unusual features.
10. Repeat the procedure above by re-positioning the boat and anchoring (if necessary) at a different location, at least 25 m away from other core collection locations. Repeat again until all 15 core samples have been collected, randomly covering the general sampling area.
11. All core samples are to be analysed for total metals, grain size and total organic carbon. Fill in COCs as necessary.
12. Hold on ice or in the refrigerator until shipping to ALS, Winnipeg.

Randy Baker and/or Gary Mann will be at Meadowbank Camp to help with any questions that may arise during implementation of this program.

APPENDIX B

PRESENCE (+) / ABSENCE (-) MATRIX OF PHYTOPLANKTON SPECIES IN MEADOWBANK STUDY LAKES AND BAKER LAKE, 2008

Appendix B: Presence (+) / absence (-) matrix of phytoplankton species in Meadowbank study lakes and Baker Lake, 2008.

		Third Portage Lake - South Basin			Third Portage Lake - East Basin			Third Portage Lake - North Basin			Second Portage Lake			Wally Lake	
		TPS			TPE			TPN			SP			WAL	
	Species & Code	24-Jul-08	17-Aug-08	18-Sep-08	23-Jul-08	16-Aug-08	18-Sep-08	24-Jul-08	17-Aug-08	18-Sep-08	19-Jul-08	22-Aug-08	17-Sep-08	22-Jul-08	21-Aug-08
	Cyanophyte														
1008	*Aphanocapsa*	-	-	-	-	-	-	-	-	-	+	-	-	-	+
1012	*Aphanothece*	+	-	-	-	-	-	-	-	+	-	-	-	+	+
1014	*Chroococcus limneticus* Lemmermann	+	-	-	-	-	-	-	-	-	+	-	-	-	-
1024	*Woronichinia naegelianum* (Unger) Elenk.	-	-	-	-	-	-	-	-	-	-	-	+	-	-
1026	*Merismopedia tenuissima* Lemmermann	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1030	*Synechococcus*	-	-	-	-	-	-	-	-	-	-	+	-	-	-
1033	*Rhabdogloea lineare* Schmidle and Lauterborn	-	-	+	-	-	-	-	-	-	-	-	-	-	-
1044	*Anabaena planctonica* Brunnthaler	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1054	*Planktolyngbya limnetica*	-	-	+	-	-	-	+	-	+	-	-	-	+	-
1062	Small blue greens	-	-	-	-	-	-	-	-	-	-	-	-	-	+
1073	*Snowella*	-	-	-	-	-	-	-	-	-	-	-	-	-	+
1077	*Pseudoanabaena*	-	-	-	-	-	-	-	+	-	-	-	-	-	-
1088	*Anabaena solitaria* Klebs	-	-	-	-	-	-	+	-	-	-	-	-	-	-
	Chlorophyte														
2100	*Pyramidomonas tetrarhynchus* Schmarda	-	+	-	-	-	+	-	+	-	-	-	-	-	-
2101	*Carteria*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2105	*Chlamydomonas*	+	+	+	+	-	+	+	-	+	+	-	+	+	+
2107	*Chlorogonium maximum* Skuja	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2112	*Sphaerocystis schroeteri* Chodat	-	-	-	-	-	-	-	-	-	-	-	-	-	+
2121	*Oocystis lacustris* Chodat	-	+	-	-	+	+	-	-	+	-	-	+	-	+
2127	*Tetraedron minimum* (Brunow) Hansgrig	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2132	*Scenedesmus denticulatus* Lagerhiem	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2133	*Scenedesmus brevispina* (G.M Smith) Chodat	-	-	-	-	-	-	-	-	-	-	-	+	-	-
2137	*Dictyosphaerium simplex* Sukja	-	-	-	-	-	+	-	-	-	-	-	+	-	-
2138	*Monoraphidium komarkovae* (Nyg.) Komarkova-Legnero	+	-	-	-	-	-	-	-	-	-	-	+	+	-
2141	*Monoraphidium contortum* (Thur.) Komarkova-Legnerova	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2143	*Monoraphidium minutum* (Nag.) Komarkova-Legnerova	+	-	-	-	+	-	+	-	-	-	-	-	-	-
2145	*Crucigenia quadrata* Morr.	-	-	-	-	-	-	-	-	-	-	+	+	-	+
2157	*Kichnerella lunaris* (Kirchn.) Moeb.	-	-	-	+	-	-	-	-	-	-	-	-	-	-
2164	*Quadrigula closterioides* (Bohl.) Printz	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2167	*Elakatothrix gelatinosa* Willen	-	+	+	+	+	+	-	+	+	+	-	-	+	+
2178	*Cosmarium*	+	+	-	-	+	-	-	-	+	-	-	-	-	-
2183	*Euastrum sinuosum* Lenorm.	-	-	+	-	-	-	-	-	-	-	-	-	-	-
2185	*Micrasterias*	-	-	-	-	-	-	-	-	-	-	-	+	-	-
2186	*Xanthidium*	-	-	-	-	-	+	-	+	+	-	-	-	-	-
2187	*Staurodesmus extensus* (Andersson) Teiling	+	+	+	+	+	+	+	+	+	-	-	+	-	-
2193	*Staurodesmus paradoxum* Meyen	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2196	*Staurodesmus*	-	-	+	-	-	-	-	-	-	-	-	-	-	-
2199	*Spondylosium planum* (Wolle) W. and G.S. West	-	-	-	+	+	+	+	-	+	+	-	-	+	-
2202	*Scourfieldia cordiformis* Takeda	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2204	*Ankrya judai* (G.M. Smith) Fott	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2205	*Mougeotia*	-	-	-	-	+	-	-	-	-	-	+	-	-	-
2206	*Botryococcus braunii* Kutzing	+	+	+	+	+	-	-	+	+	-	+	+	+	+
2215	*Tetraedron caudatum* (Corda) Hansgrig	-	-	+	-	-	-	-	-	-	-	-	+	-	+
2216	*Zygnema*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2217	*Collodictyon*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2222	*Treubaria*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2235	*Ankistrodesmus spiralis* Lemmermann	+	+	-	+	-	+	+	+	+	+	-	-	-	+
2247	*Oocystis gigas* Archer	-	+	-	-	+	-	-	-	-	-	-	-	-	+

Appendix B: Presence (+) / absence (-) matrix of phytoplankton species in Meadowbank study lakes and Baker Lake, 2008.

		Third Portage Lake - South Basin			Third Portage Lake - East Basin			Third Portage Lake - North Basin			Second Portage Lake			Wally Lake	
		TPS			TPE			TPN			SP			WAL	
	Species & Code	24-Jul-08	17-Aug-08	18-Sep-08	23-Jul-08	16-Aug-08	18-Sep-08	24-Jul-08	17-Aug-08	18-Sep-08	19-Jul-08	22-Aug-08	17-Sep-08	22-Jul-08	21-Aug-08
	Chrysophyte														
4351	Small chrysophyceae	+	+	+	+	+	+	+	+	+	+	+	+	+	+
4352	Large chrysophyceae	+	+	+	+	+	+	+	+	+	+	+	+	+	+
4355	*Chrysochromulina parva* Lackey	+	+	+	+	+	+	+	+	+	+	-	+	+	+
4357	*Chrysococcus*	+	+	+	+	-	+	+	+	+	+	-	+	+	+
4358	*Chrysostephanospaera globulifera* Scherffel	+	-	-	-	+	+	-	-	+	+	-	-	-	+
4361	*Kephyrion boreale* Skuja	+	+	+	-	-	+	-	-	-	-	-	+	-	+
4362	*Kephyrion*	+	+	+	+	+	+	+	+	+	+	-	+	+	+
4363	*Spinifiromonas sirratus**	-	-	+	+	+	+	+	+	-	+	-	+	+	+
4364	*Mallomonas caudata* Ivanov	-	-	-	-	-	-	-	-	-	-	-	+	-	-
4367	*Mallomonas duerrschmidtiae* Siver, Hamer and Kling	-	-	-	+	+	-	-	-	-	-	-	-	-	-
4368	*Mallomonas crassisquama* (Asmund) Fott	-	-	-	-	+	-	-	+	+	-	-	+	+	+
4370	*Mallomonas akrokomos* Asmund and Kristiansen	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4372	*Mallomonas tonsurata* Teiling and Krieger	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4375	*Synura sphagnicola* Korschikow	-	-	-	-	-	-	+	-	-	-	-	-	-	-
4378	*Dinobryon borgei* Lemmermann	-	+	+	-	+	+	+	+	+	+	-	-	+	+
4380	*Dinobryon suecicum* Lemmermann	-	-	-	-	-	-	-	-	-	-	-	+	-	-
4381	*Dinobryon mucronutom* Nygaard	+	+	+	+	+	+	-	+	+	+	-	-	+	+
4383	*Dinobryon bavaricum* Imhof	+	+	+	+	+	+	+	+	+	+	+	+	+	+
4384	*Dinobryon bavaricum v vanhoeffenii* (Bachmann) Krieger	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4387	*Dinobryon cylindricum* Imhof	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4388	*Dinobryon sertularia* Ehrenberg	+	-	-	+	+	-	+	-	-	+	-	+	+	-
4390	*Dinobryon sociale* Ehrenberg	-	+	+	-	+	+	-	+	-	-	-	+	-	-
4393	*Dinobryon*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4396	*Chrysolkos skuja* (Nauwerck) Willen	+	+	+	+	+	+	+	+	+	+	-	+	+	+
4400	*Ochromonas*	-	-	+	-	-	-	-	-	-	-	-	-	-	-
4401	*Uroglena volvox* Ehrenberg	+	+	+	+	+	+	+	+	+	+	-	+	+	+
4403	*Chrysosphaerella longispina* Lauterborn	-	-	-	+	-	-	-	-	-	-	-	-	+	-
4411	*Bitrichia chodatii* (Reverdin) Chodat	-	-	+	+	+	+	-	+	-	+	-	-	+	-
4413	*Chrysochromulina laurentiana* Kling	+	+	+	+	+	+	+	+	+	+	-	+	+	+
4414	*Stichogloea*	+	+	+	-	+	+	+	-	+	-	-	+	+	+
4418	*Salpingoeca frequentissima* (Zach.) Lemmermann	+	+	+	+	-	-	+	+	+	-	-	+	+	+
4425	*Mallomonas hamata* Asmund	-	-	-	-	-	-	-	-	-	+	-	-	-	-
4436	*Dinobryon attenatum* Hill	-	-	-	-	+	-	+	+	-	+	-	-	-	-
4437	*Pteridomonas*	-	+	-	+	-	+	+	+	+	-	-	-	+	-
4440	*Stelexomonas dichotoma* Lackey	-	-	-	-	-	-	-	-	-	-	-	+	-	-
4444	*Dinobryon pediforme* (Lemmermann) Steineche	-	-	-	-	+	-	-	-	-	-	-	-	-	-

Appendix B: Presence (+) / absence (-) matrix of phytoplankton species in Meadowbank study lakes and Baker Lake, 2008.

		Third Portage Lake - South Basin			Third Portage Lake - East Basin			Third Portage Lake - North Basin			Second Portage Lake			Wally Lake	
		TPS			TPE			TPN			SP			WAL	
	Species & Code	24-Jul-08	17-Aug-08	18-Sep-08	23-Jul-08	16-Aug-08	18-Sep-08	24-Jul-08	17-Aug-08	18-Sep-08	19-Jul-08	22-Aug-08	17-Sep-08	22-Jul-08	21-Aug-08
	Diatom														
5507	*Cyclotella stelligera* Cleve and Grunow	+	+	+	+	+	+	+	+	+	+	+	+	+	+
5511	*Rhizosolenia eriense* H.L. Smith	+	+	+	+	+	+	+	+	+	+	-	+	+	+
5513	*Tabellaria fenestrata* (Lyngbye) Kutzing	-	-	-	-	-	-	+	+	-	-	-	+	-	-
5514	*Tabellaria flocculsa* (Roth) Kutzing	-	+	+	+	+	-	+	-	+	-	+	+	+	-
5515	*Fragilaria crotonensis* Kitton	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5518	*Synedra acus* Kutzing	+	-	+	+	+	+	+	-	+	+	+	+	+	+
5523	*Synedra ulna* (Nitzsch) Ehrenberg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5524	*Asterionella formosa* Hassall	-	+	-	+	-	-	-	-	-	+	-	-	-	-
5530	*Stephanodiscus niagarae* Ehrenberg	-	-	-	-	-	-	-	-	-	-	+	-	-	-
5540	*Aulacoseira italica v subarctica* (O. Muller) Simonsen	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5546	*Gyrosigma*	-	+	+	-	-	+	-	-	-	-	-	-	-	-
5547	*Frustulia rhomboides* (Ehrenberg) de Toni	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5551	*Cyclotella michiganiana* Skvortzow	+	+	-	-	+	-	+	+	-	-	+	-	+	+
5733	*Eunotia pectinalis* (Kutzing) Rabenhorst	-	-	-	+	-	-	-	-	-	-	-	+	-	-
5768	*Nitzschia linearis* W. Smith	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5873	*Gomphonema minutum*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5881	*Diatoma elongatum* Agardh	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5908	*Diatoma tenuis* Agardh	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5916	*Fragilaria capucina* Grunow	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cryptophyte														
6554	*Rhodomonas minuta* Skuja	+	+	+	+	+	-	+	+	+	+	+	+	+	+
6558	*Cryptomonas erosa* Ehrenberg	+	+	+	+	+	+	+	-	+	+	+	+	+	+
6559	*Cryptomonas ovata* Ehrenberg	-	+	-	-	+	-	-	-	-	-	-	-	-	+
6562	*Cryptomonas reflexa* (Marsson) Skuja	-	+	-	+	-	+	+	-	+	+	+	+	+	+
6565	*Cryptomonas rostratiformis* Skuja	-	+	+	-	+	+	-	+	+	-	+	+	+	-
6568	*Katablepharis ovalis* Skuja	+	+	+	+	+	+	+	+	+	+	-	+	+	+
	Dinoflagellate														
7631	*Gymnodinium helveticum* Penard	-	-	+	-	-	+	+	-	-	+	-	-	-	-
7632	*Gymnodinium*	+	+	+	+	+	+	+	+	+	+	+	-	+	+
7635	*Peridinium willei* Huitfeldt-Kaas	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7639	*Peridinium pusillum* (Penard) Lemmermann	+	+	+	+	+	+	+	+	+	+	-	-	+	+
7641	*Peridinium aciculiferum* Lemmermann	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix B: Presence (+) / absence (-) matrix of phytoplankton species in Meadowbank study lakes and Baker Lake, 2008.

		Tehek Lake			Inuggugayualik Lake		Baker Lake - Barge Dock			Baker Lake - Proposed Jetty			Baker Lake - Akilahaarjuk Point		
		TE			INUG		BBD			BPJ			BAP		
	Species & Code	20-Jul-08	19-Aug-08	15-Sep-08	25-Jul-08	20-Aug-08	27-Jul-08	28-Aug-08	21-Sep-08	27-Jul-08	28-Aug-08	21-Sep-08	28-Jul-08	25-Aug-08	21-Sep-08
	Cyanophyte														
1008	*Aphanocapsa*	-	-	+	-	-	-	-	-	-	-	-	-	-	-
1012	*Aphanothece*	-	-	-	+	+	-	-	-	-	-	+	-	-	-
1014	*Chroococcus limneticus* Lemmermann	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1024	*Woronichinia naegelianum* (Unger) Elenk.	-	-	-	-	-	-	-	+	-	-	-	-	-	-
1026	*Merismopedia tenuissima* Lemmermann	-	-	-	-	-	-	-	-	+	-	+	-	-	-
1030	*Synechococcus*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1033	*Rhabdogloea lineare* Schmidle and Lauterborn	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1044	*Anabaena planctonica* Brunnthaler	-	-	-	-	-	-	-	-	-	-	-	-	+	-
1054	*Planktolyngbya limnetica*	-	-	+	-	-	-	-	-	-	-	+	-	-	-
1062	Small blue greens	-	+	-	-	-	-	-	-	-	-	-	-	-	-
1073	*Snowella*	-	-	-	-	+	-	-	-	-	-	-	-	+	-
1077	*Pseudoanabaena*	-	-	-	-	-	-	-	-	-	+	-	-	-	-
1088	*Anabaena solitaria* Klebs	-	-	+	-	-	-	-	-	-	-	+	-	-	-
	Chlorophyte														
2100	*Pyramidomonas tetrarhynchus* Schmarda	-	+	-	+	+	-	-	-	-	-	-	-	-	+
2101	*Carteria*	-	-	-	-	-	-	+	-	-	-	-	-	+	-
2105	*Chlamydomonas*	-	-	+	+	+	+	+	+	+	+	+	-	+	+
2107	*Chlorogonium maximum* Skuja	-	-	+	-	-	-	-	-	-	-	-	-	-	-
2112	*Sphaerocystis schroeteri* Chodat	-	-	-	-	-	-	-	-	-	+	-	-	-	-
2121	*Oocystis lacustris* Chodat	-	+	+	+	+	-	+	+	-	-	+	-	+	+
2127	*Tetraedron minimum* (Brunow) Hansgrig	-	-	-	-	-	-	-	+	-	-	-	-	-	-
2132	*Scenedesmus denticulatus* Lagerhiem	-	-	-	+	-	+	-	-	-	-	-	-	-	-
2133	*Scenedesmus brevispina* (G.M Smith) Chodat	-	-	-	-	-	-	+	+	+	+	+	-	+	+
2137	*Dictyosphaerium simplex* Sukja	-	-	+	-	-	-	+	-	+	-	-	+	-	-
2138	*Monoraphidium komarkovae* (Nyg.) Komarkova-Legnero	-	-	-	-	-	-	+	-	-	+	-	-	+	+
2141	*Monoraphidium contortum* (Thur.) Komarkova-Legnerova	-	-	-	-	-	-	-	-	-	-	+	-	-	-
2143	*Monoraphidium minutum* (Nag.) Komarkova-Legnerova	-	-	-	-	-	-	-	-	-	+	-	+	-	-
2145	*Crucigenia quadrata* Morr.	-	-	+	-	-	-	+	-	-	+	-	+	-	-
2157	*Kichnerella lunaris* (Kirchn.) Moeb.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2164	*Quadrigula closterioides* (Bohl.) Printz	-	-	-	+	-	-	-	-	-	-	-	-	-	-
2167	*Elakatothrix gelatinosa* Willen	-	+	-	+	+	+	+	-	-	+	-	-	-	-
2178	*Cosmarium*	-	-	+	-	+	-	-	+	+	-	-	-	+	+
2183	*Euastrum sinuosum* Lenorm.	-	-	+	-	-	-	-	-	-	-	-	-	-	-
2185	*Micrasterias*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2186	*Xanthidium*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2187	*Staurodesmus extensus* (Andersson) Teiling	-	-	+	+	+	-	+	-	-	+	-	-	-	+
2193	*Staurodesmus paradoxum* Meyen	-	+	-	-	+	-	-	-	-	+	-	-	-	-
2196	*Staurodesmus*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2199	*Spondylosium planum* (Wolle) W. and G.S. West	+	+	+	+	-	-	-	-	-	+	-	-	-	-
2202	*Scourfieldia cordiformis* Takeda	-	-	-	-	-	-	-	-	-	-	-	-	-	+
2204	*Ankrya judai* (G.M. Smith) Fott	-	-	-	-	+	+	-	-	-	+	+	-	-	-
2205	*Mougeotia*	-	+	+	-	+	-	-	-	-	-	-	-	-	-
2206	*Botryococcus braunii* Kutzing	-	-	+	-	+	-	-	+	-	+	-	-	+	-
2215	*Tetraedron caudatum* (Corda) Hansgrig	-	+	-	-	-	-	+	-	-	+	+	-	-	-
2216	*Zygnema*	-	-	+	-	-	-	-	-	-	-	-	-	-	-
2217	*Collodictyon*	-	-	-	-	-	-	-	+	-	-	-	-	-	-
2222	*Treubaria*	-	-	-	-	-	-	-	-	-	-	-	-	-	+
2235	*Ankistrodesmus spiralis* Lemmermann	-	-	+	+	+	+	+	+	+	+	+	-	+	-
2247	*Oocystis gigas* Archer	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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		Tehek Lake			Inuggugayualik Lake		Baker Lake - Barge Dock			Baker Lake - Proposed Jetty			Baker Lake - Akilahaarjuk Point		
		TE			INUG		BBD			BPJ			BAP		
	Species & Code	20-Jul-08	19-Aug-08	15-Sep-08	25-Jul-08	20-Aug-08	27-Jul-08	28-Aug-08	21-Sep-08	27-Jul-08	28-Aug-08	21-Sep-08	28-Jul-08	25-Aug-08	21-Sep-08
	Chrysophyte														
4351	Small chrysophyceae	+	+	+	+	+	+	+	+	+	+	+	+	+	+
4352	Large chrysophyceae	+	+	+	+	+	+	+	+	+	+	+	+	+	+
4355	*Chrysochromulina parva* Lackey	+	+	-	+	+	+	+	+	+	+	+	+	+	+
4357	*Chrysococcus*	+	+	-	+	+	+	+	+	+	+	+	+	+	+
4358	*Chrysostephanospaera globulifera* Scherffel	+	-	-	-	-	-	-	-	-	-	+	+	-	-
4361	*Kephyrion boreale* Skuja	+	+	-	-	+	-	-	-	-	-	-	-	-	-
4362	*Kephyrion*	+	+	-	+	+	-	+	+	+	+	-	+	+	+
4363	*Spinifiromonas sirratus**	-	+	-	+	+	-	+	+	+	+	-	-	+	-
4364	*Mallomonas caudata* Ivanov	-	-	-	-	-	-	+	-	-	-	+	+	-	+
4367	*Mallomonas duerrschmidtiae* Siver, Hamer and Kling	+	-	-	-	-	-	-	+	-	-	-	-	-	-
4368	*Mallomonas crassisquama* (Asmund) Fott	-	-	-	-	+	-	+	-	-	-	-	-	-	-
4370	*Mallomonas akrokomos* Asmund and Kristiansen	+	-	-	-	+	-	-	-	+	-	-	-	-	-
4372	*Mallomonas tonsurata* Teiling and Krieger	-	-	-	-	-	+	-	-	+	+	-	+	-	-
4375	*Synura sphagnicola* Korschikow	+	-	-	-	-	+	+	+	+	-	-	+	-	+
4378	*Dinobryon borgei* Lemmermann	+	+	+	+	+	+	+	-	+	+	-	+	+	-
4380	*Dinobryon suecicum* Lemmermann	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4381	*Dinobryon mucronutom* Nygaard	+	+	-	+	-	+	-	-	-	+	-	-	-	-
4383	*Dinobryon bavaricum* Imhof	+	+	-	+	+	+	+	-	+	+	+	+	+	+
4384	*Dinobryon bavaricum v vanhoeffenii* (Bachmann) Krieger	-	-	-	-	+	-	-	-	-	-	-	-	-	-
4387	*Dinobryon cylindricum* Imhof	-	-	-	+	-	-	-	-	-	-	-	-	-	-
4388	*Dinobryon sertularia* Ehrenberg	+	-	+	+	+	+	+	-	+	+	-	+	+	+
4390	*Dinobryon sociale* Ehrenberg	-	+	-	-	-	-	+	-	-	+	-	-	+	-
4393	*Dinobryon*	-	-	-	-	-	-	-	-	+	-	-	-	-	-
4396	*Chrysolkos skuja* (Nauwerck) Willen	+	+	-	+	+	+	+	+	-	+	-	+	+	+
4400	*Ochromonas*	-	-	-	-	-	+	-	+	-	+	+	+	+	+
4401	*Uroglena volvox* Ehrenberg	+	+	-	+	+	+	+	+	+	+	+	+	+	+
4403	*Chrysosphaerella longispina* Lauterborn	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4411	*Bitrichia chodatii* (Reverdin) Chodat	+	+	+	+	+	-	+	-	+	-	-	-	-	-
4413	*Chrysochromulina laurentiana* Kling	+	+	+	+	+	-	+	+	+	+	+	-	+	+
4414	*Stichogloea*	+	-	-	+	+	-	-	+	-	-	-	-	+	-
4418	*Salpingoeca frequentissima* (Zach.) Lemmermann	+	+	+	+	+	+	+	+	+	+	+	+	-	+
4425	*Mallomonas hamata* Asmund	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4436	*Dinobryon attenatum* Hill	-	-	+	-	-	+	-	-	+	-	-	+	-	-
4437	*Pteridomonas*	+	-	-	+	+	-	-	-	-	+	-	-	+	-
4440	*Stelexomonas dichotoma* Lackey	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4444	*Dinobryon pediforme* (Lemmermann) Steineche	-	-	-	-	+	-	-	+	-	-	-	-	+	-

Appendix B: Presence (+) / absence (-) matrix of phytoplankton species in Meadowbank study lakes and Baker Lake, 2008.

		Tehek Lake			Inuggugayualik Lake		Baker Lake - Barge Dock			Baker Lake - Proposed Jetty			Baker Lake - Akilahaarjuk Point		
		TE			INUG		BBD			BPJ			BAP		
	Species & Code	20-Jul-08	19-Aug-08	15-Sep-08	25-Jul-08	20-Aug-08	27-Jul-08	28-Aug-08	21-Sep-08	27-Jul-08	28-Aug-08	21-Sep-08	28-Jul-08	25-Aug-08	21-Sep-08
	Diatom														
5507	*Cyclotella stelligera* Cleve and Grunow	+	+	+	+	+	+	+	+	+	+	+	+	+	+
5511	*Rhizosolenia eriense* H.L. Smith	+	+	+	-	-	+	+	-	+	+	-	+	+	+
5513	*Tabellaria fenestrata* (Lyngbye) Kutzing	-	-	+	-	+	-	-	+	+	+	+	+	-	+
5514	*Tabellaria flocculsa* (Roth) Kutzing	+	+	+	+	-	-	+	+	+	+	+	-	+	-
5515	*Fragilaria crotonensis* Kitton	-	-	-	-	-	-	+	+	-	+	+	-	+	+
5518	*Synedra acus* Kutzing	+	+	+	+	+	+	+	+	+	+	+	+	+	+
5523	*Synedra ulna* (Nitzsch) Ehrenberg	-	-	+	-	-	-	-	-	-	-	-	-	-	-
5524	*Asterionella formosa* Hassall	-	-	-	-	-	+	+	+	+	+	+	+	+	+
5530	*Stephanodiscus niagarae* Ehrenberg	-	-	-	-	-	-	-	-	-	+	-	-	-	-
5540	*Aulacoseira italica v subarctica* (O. Muller) Simonsen	-	-	-	-	-	+	+	+	+	+	+	+	-	+
5546	*Gyrosigma*	-	-	-	-	-	-	-	+	-	-	-	-	-	-
5547	*Frustulia rhomboides* (Ehrenberg) de Toni	-	-	-	-	+	-	-	-	-	-	-	-	-	-
5551	*Cyclotella michiganiana* Skvortzow	-	+	-	+	+	+	+	-	+	+	-	-	+	-
5733	*Eunotia pectinalis* (Kutzing) Rabenhorst	+	-	+	-	-	-	-	-	-	-	-	-	-	-
5768	*Nitzschia linearis* W. Smith	-	-	-	-	+	-	-	-	-	-	-	-	-	-
5873	*Gomphonema minutum*	-	-	-	-	-	-	-	-	-	-	+	-	-	-
5881	*Diatoma elongatum* Agardh	-	-	+	-	-	-	-	-	-	-	-	-	-	-
5908	*Diatoma tenuis* Agardh	-	-	-	-	-	-	-	+	-	-	-	-	-	+
5916	*Fragilaria capucina* Grunow	-	-	-	-	+	+	-	-	+	-	-	-	-	-
	Cryptophyte														
6554	*Rhodomonas minuta* Skuja	+	+	+	+	+	+	+	+	+	+	+	+	+	+
6558	*Cryptomonas erosa* Ehrenberg	+	+	+	+	-	+	+	+	+	+	+	+	+	+
6559	*Cryptomonas ovata* Ehrenberg	+	-	-	-	-	-	-	-	+	-	-	+	+	+
6562	*Cryptomonas reflexa* (Marsson) Skuja	+	+	-	+	-	-	+	-	-	-	+	+	-	-
6565	*Cryptomonas rostratiformis* Skuja	+	+	+	-	-	-	-	-	-	+	-	+	+	+
6568	*Katablepharis ovalis* Skuja	+	+	-	+	+	+	+	+	+	+	+	+	+	-
	Dinoflagellate														
7631	*Gymnodinium helveticum* Penard	-	-	-	-	-	-	-	-	-	+	-	-	-	-
7632	*Gymnodinium*	+	+	-	+	+	+	-	+	+	+	+	+	+	+
7635	*Peridinium willei* Huitfeldt-Kaas	-	+	+	-	-	-	-	-	-	-	-	-	-	-
7639	*Peridinium pusillum* (Penard) Lemmermann	+	+	-	-	+	+	+	+	-	+	+	-	+	+
7641	*Peridinium aciculiferum* Lemmermann	+	-	-	-	-	-	-	+	+	-	+	+	-	-

APPENDIX C

PRESENCE (+) / ABSENCE (-) MATRIX OF PERIPHYTON SPECIES IN MEADOWBANK STUDY LAKES, 2008

Appendix C: Presence (+) / absence (-) matrix of periphyton species in Meadowbank study lakes, 2008.

	Species & Code	Third Portage Lake			Second Portage Lake	Tehek Lake	Wally Lake	Inuggugayualik Lake
		South Basin	East Basin	North Basin				
	Cyanophyte							
1014	*Chroococcus limneticus* Lemmermann	-	-	-	+	-	+	+
1033	*Rhabdogloea lineare* Schmidle and Lauterborn	-	-	-	-	-	+	+
1070	*Anabaenopsis*	+	+	-	-	+	+	+
1073	*Snowella*	-	+	-	-	-	+	-
1077	*Pseudoanabaena*	+	+	-	+	+	-	+
1081	*Nostoc*	-	-	-	+	-	-	+
1084	*Gloeocapsa punctata*	-	-	-	+	-	-	-
1088	*Anabaena solitaria* Klebs	-	-	-	-	+	-	-
1102	*Gloeothece*	+	+	+	+	+	+	+
1117	*Merismopedia punctata* Meyen	-	+	-	-	-	-	-
1119	*Stigonema*	+	+	+	-	+	-	+
1124	*Petalonema alatum* Berk	+	+	+	+	+	+	+
1134	*Pseudoanabaena galeata*	-	-	-	+	-	-	-
1136	*Lyngbya mucicola* Lemmermann	+	+	+	+	+	+	+
1220	*Rivularia dura* Roth	+	+	+	+	+	+	+
	Chlorophyte							
2178	*Cosmarium*	+	+	-	-	+	-	+
2182	*Euastrum*	-	-	-	-	-	+	-
2191	*Staurodesmus cuspidatus* (Brebisson and Ralfs) Teiling	-	-	-	-	+	-	-
2199	*Spondylosium planum* (Wolle) W. and G.S. West	+	-	-	+	-	-	-
2205	*Mougeotia*	+	+	+	+	+	+	+
2216	*Zygnema*	-	-	+	+	+	+	+
2226	*Ulothrix*	+	+	+	+	-	-	+
2231	*Bulbochaete*	+	+	-	+	+	+	+
2235	*Ankistrodesmus spiralis* Lemmermann	-	-	-	-	-	-	+
2247	*Oocystis gigas* Archer	-	-	+	+	-	-	+
	Chrysophyte							
4383	*Dinobryon bavaricum* Imhof	+	-	+	-	-	-	-
4414	*Stichogloea*	-	-	-	+	-	-	-

Appendix C: Presence (+) / absence (-) matrix of periphyton species in Meadowbank study lakes, 2008.

	Species & Code	Third Portage Lake			Second Portage Lake	Tehek Lake	Wally Lake	Inuggugayualik Lake
		South Basin	East Basin	North Basin				
	Diatom							
5507	*Cyclotella stelligera* Cleve and Grunow	+	-	+	+	+	+	+
5513	*Tabellaria fenestrata* (Lyngbye) Kutzing	-	+	+	+	+	+	+
5514	*Tabellaria flocculsa* (Roth) Kutzing	+	+	+	+	+	+	+
5516	*Fragilaria construens* (Ehrenberg) Grunow	-	-	+	+	-	-	-
5518	*Synedra acus* Kutzing	-	+	+	+	-	+	+
5540	*Aulacoseira italica v subarctica* (O. Muller) Simonsen	+	-	-	-	-	-	-
5546	*Gyrosigma*	+	-	-	+	-	-	+
5547	*Frustulia rhomboides* (Ehrenberg) de Toni	-	-	+	+	+	-	+
5551	*Cyclotella michiganiana* Skvortzow	+	+	+	+	-	-	+
5702	*Achnanthes minutissima* Kutzing	+	+	+	+	+	+	+
5726	*Eucocconeis*	-	+	-	-	-	+	+
5728	*Epithemia argus* Kutzing	-	-	-	+	-	+	-
5733	*Eunotia pectinalis* (Kutzing) Rabenhorst	-	+	-	+	+	-	+
5734	*Eunotia lunaris* (Ehrenberg) Grunow	-	-	+	-	-	+	-
5751	*Navicula incerta* Grunow	-	-	-	-	-	+	+
5767	*Nitzschia fonticola* Grunow	-	+	-	-	+	+	+
5778	*Stauroneis anceps* Ehrenberg	-	-	-	-	+	-	-
5792	*Neidium iridis* (Ehrenberg) Cleve	+	+	-	-	+	+	-
5794	*Pinnularia flexuosa* Cleve	-	-	-	-	+	-	-
5805	*Cocconies*	-	-	-	-	-	-	+
5821	*Eunotia exigua* (Brebisson) Grunow	-	+	+	-	+	-	-
5825	*Fragilaria pinata* Ehrenberg	-	+	-	-	+	-	-
5826	*Cymbella gracilis* (Rabhorst) Cleve	-	-	-	+	-	-	-
5834	*Cymbella microcephala* Grunow	+	+	+	+	+	+	+
5836	*Cymbella silesiaca* Bleisch	+	+	+	+	+	+	+
5854	*Pinnularia borealis* Ehrenberg	-	-	-	+	-	-	-
5860	*Diatoma vulgare* Bory	-	-	-	-	+	+	+
5865	*Cymbella prostata* (Berkeley) Cleve	-	-	+	+	+	+	-
5866	*Surirella ovata* Kutzing	-	-	-	+	-	-	-
5870	*Navicula radiosa* Kutzing	+	-	+	+	+	+	+
5871	*Cymbella lapponica*	-	+	-	-	-	+	+
5873	*Gomphonema minutum*	+	-	+	-	-	+	-
5874	*Nitzschia palea* (Kutzing) W. Smith	+	+	+	+	+	+	+
5881	*Diatoma elongatum* Agardh	-	-	-	-	+	-	-
5882	*Anomoenies vitrea* Ross	+	+	+	+	+	+	+
5884	*Gomphonema angustum* Agardh	-	-	+	+	-	+	-
5887	*Navicula pupula* Kutzing	+	+	+	-	-	+	-
5908	*Diatoma tenuis* Agardh	+	-	-	-	-	-	-
5916	*Fragilaria capucina* Grunow	+	-	-	-	-	+	+
	Dinoflagellate							
7639	*Peridinium pusillum* (Penard) Lemmermann	-	+	-	-	-	-	-

APPENDIX D

BENTHIC INVERTEBRATE RAW DATA, MEADOWBANK STUDY LAKES AND BAKER LAKE, 2008

Appendix D: Benthic invertebrate raw data (total number of organisms in two 0.023m ^{2} grabs), Meadowbank study lakes and Baker Lake, 2008.

Station	TPS					TPE					TPN					SP					TE				
Replicate	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ROUNDWORMS																									
P. Nemata	4	3	3	5	1	11	5	31	20	17	3	3	-	1	-	5	3	5	1	4	5	2	2	1	1
FLATWORMS																									
P. Platyhelminthes																									
Cl. Turbellaria																									
indeterminate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANNELIDS																									
P. Annelida																									
WORMS																									
Cl. Oligochaeta																									
F. Enchytraeidae	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. Naididae																									
Nais communis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nais	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. Tubificidae																									
Limnodrilus hoffmeisteri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhyacodrilus coccineus	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhyacodrilus sodalis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
immatures with hair chaetae	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
immatures without hair chaetae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. Lumbriculidae																									
Lumbriculus	-	1	1	-	-	4	-	-	1	1	-	-	1	-	-	-	-	-	-	-	-	1	-	1	-
ARTHROPODS																									
P. Arthropoda																									
MITES																									
Cl. Arachnida																									
O. Acarina	-	-	-	1	-	14	-	3	12	10	-	-	1	-	-	-	2	2	-	-	1	2	-	2	-
HARPACTICOIDS																									
O. Harpacticoida	-	-	-	-	-	-	-	3	1	15	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
SEED SHRIMPS																									
Cl. Ostracoda	38	30	17	33	16	101	88	161	144	83	17	8	3	-	5	7	4	9	5	-	-	2	1	1	6
TADPOLE SHRIMP																									
O. Notostraca																									
Lepidurus arcticus	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix D: Benthic invertebrate raw data (total number of organisms in two 0.023m ^{2} grabs), Meadowbank study lakes and Baker Lake, 2008.

Station	TPS					TPE					TPN					SP					TE				
Replicate	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
INSECTS																									
Cl. Insecta																									
CADDISFLIES																									
O. Trichoptera																									
F. Limnephilidae																									
Grensia praeterita	-	-	-	-	1	1	-	1	-	-	2	5	2	-	-	1	-	-	-	-	-	-	1	3	-
pupae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
immature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRUE FLIES																									
O. Diptera																									
MIDGES																									
F. Chironomidae																									
chironomid pupae	3	-	-	1	-	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S.F. Chironominae																									
Chironomus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cladotanytarsus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Constempellina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Corynocera	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Micropsectra	19	-	5	4	3	29	46	13	31	29	-	-	1	-	7	-	-	1	1	-	-	-	-	-	-
Paratanytarsus	9	1	-	2	-	148	114	211	83	97	-	-	-	-	3	-	-	-	-	-	-	-	1	8	1
Polypedilum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sergentia	-	-	-	-	-	1	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stempellinella	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Stictochironomus	-	2	4	7	2	5	-	3	18	15	-	-	-	-	1	-	8	2	3	5	2	1	2	-	1
Tanytarsus	-	3	1	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-	-	4
S.F. Diamesinae																									
Protanypus	-	-	2	1	-	-	-	-	1	-	1	1	1	-	-	1	1	1	-	-	1	-	1	1	3
Pseudodiamesa	3	6	13	3	5	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
S.F. Orthocladiinae																									
Abiskomyia	1	-	4	-	-	3	6	3	1	3	-	-	-	-	1	-	1	1	-	-	1	-	-	-	-
Corynoneura	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cricotopus	-	-	-	-	-	3	1	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Heterotrissocladius	31	4	45	27	44	19	21	25	5	22	34	13	35	7	32	2	1	2	2	-	4	8	4	1	5
Hydrobaenus	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix D: Benthic invertebrate raw data (total number of organisms in two 0.023m ^{2} grabs), Meadowbank study lakes and Baker Lake, 2008.

Station	TPS					TPE					TPN					SP					TE				
Replicate	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Mesocricotopus	6	-	1	-	1	-	-	-	-	-	3	1	-	-	-	-	-	-	-	2	-	-	-	-	2
Paracladius	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
Parakiefferiella	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	1	-	-	-
Psectrocladius	1	-	-	3	-	6	7	11	7	7	4	1	-	-	2	-	-	-	-	-	-	1	-	-	-
Zalutschia	1	-	-	-	-	-	-	-	-	3	-	-	1	-	-	-	2	4	3	-	-	1	-	3	-
indeterminate	-	-	-	-	-	-	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S.F. Prodiamesinae																									
Monodiamesa	-	-	-	-	-	2	1	-	-	1	-	1	1	1	-	-	-	1	-	-	3	1	-	-	2
S.F. Tanypodinae																									
Ablabesmyia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Procladius	1	3	-	2	2	12	11	6	22	22	2	2	3	-	3	2	-	1	4	1	9	4	1	4	8
Thienemannimyia complex	13	3	-	2	2	10	7	12	7	5	15	5	2	-	9	-	-	-	-	-	1	-	-	-	-
indeterminate	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
F. Empididae																									
Chelifera/Neoplasta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	-	-
MOLLUSCS																									
P. Mollusca																									
CLAMS																									
Cl. Bivalvia																									
F. Sphaeriidae																									
Cyclocalyx/Neopisidium	4	8	17	19	17	11	26	32	4	9	3	3	12	4	6	5	6	9	6	5	12	23	13	8	9
Cyclocalyx	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Sphaerium nitidum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL NUMBER OF ORGANISMS [1]	**94**	**32**	**94**	**72**	**77**	**277**	**240**	**329**	**206**	**242**	**64**	**33**	**61**	**12**	**64**	**11**	**22**	**26**	**21**	**15**	**37**	**45**	**25**	**32**	**35**
TOTAL NUMBER OF TAXA [2]	**13**	**10**	**10**	**11**	**9**	**16**	**10**	**14**	**16**	**15**	**8**	**10**	**11**	**3**	**9**	**5**	**8**	**11**	**7**	**6**	**12**	**11**	**8**	**10**	**9**

Notes:

[1] Number of organisms totals exclude nematodes & ostracods.

[2] Number of taxa totals exclude nematodes & ostracods, immatures & pupae (Tubificidae, Limnephilidae, Chironomidae), and indeterminates (Orthocladiinae, Tanypodinae).

Appendix D: Benthic invertebrate raw data (total number of organisms in two 0.023m ^{2} grabs), Meadowbank study lakes and Baker Lake, 2008.

Station	WAL					INUG					BBD					BPJ					BAP				
Replicate	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ROUNDWORMS																									
P. Nemata	3	4	1	1	5	3	5	6	8	2	4	5	10	5	9	4	2	10	26	30	18	19	34	-	13
FLATWORMS																									
P. Platyhelminthes																									
Cl. Turbellaria																									
indeterminate	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANNELIDS																									
P. Annelida																									
WORMS																									
Cl. Oligochaeta																									
F. Enchytraeidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-
F. Naididae																									
Nais communis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
Nais	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
F. Tubificidae																									
Limnodrilus hoffmeisteri	-	-	-	-	-	-	-	-	-	-	-	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Rhyacodrilus coccineus	-	-	-	-	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhyacodrilus sodalis	-	-	-	-	-	-	-	-	-	-	6	8	11	5	15	-	-	-	-	-	2	-	2	-	-
immatures with hair chaetae	-	-	-	-	1	-	-	-	1	-	-	5	1	-	-	-	-	-	-	-	-	-	-	-	-
immatures without hair chaetae	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
F. Lumbriculidae																									
Lumbriculus	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARTHROPODS																									
P. Arthropoda																									
MITES																									
Cl. Arachnida																									
O. Acarina	1	-	1	-	2	1	2	1	3	1	-	-	-	-	-	2	1	-	9	9	4	4	5	5	2
HARPACTICOIDS																									
O. Harpacticoida	-	-	-	-	-	-	-	-	-	-	-	-	3	-	1	-	-	-	3	13	-	-	-	-	-
SEED SHRIMPS																									
Cl. Ostracoda	6	3	2	4	5	3	3	4	19	3	-	2	29	1	36	9	4	6	39	39	29	13	5	8	5
TADPOLE SHRIMP																									
O. Notostraca																									
Lepidurus arcticus	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix D: Benthic invertebrate raw data (total number of organisms in two 0.023m ^{2} grabs), Meadowbank study lakes and Baker Lake, 2008.

Station	WAL					INUG					BBD					BPJ					BAP				
Replicate	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
INSECTS																									
Cl. Insecta																									
CADDISFLIES																									
O. Trichoptera																									
F. Limnephilidae																									
Grensia praeterita	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	4	-	-
pupae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
immature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
TRUE FLIES																									
O. Diptera																									
MIDGES																									
F. Chironomidae																									
chironomid pupae	-	-	-	-	-	-	-	-	1	-	-	-	2	1	3	-	-	-	2	-	1	1	-	-	-
S.F. Chironominae																									
Chironomus	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cladotanytarsus	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Constempellina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	2	2	3	2	11	2	2
Corynocera	1	-	-	-	37	-	-	3	48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Micropsectra	-	-	-	-	4	1	4	3	21	-	-	2	7	-	6	1	-	-	6	41	25	7	8	4	3
Paratanytarsus	-	-	6	1	1	-	7	6	21	-	1	-	-	-	2	-	-	1	15	22	7	10	15	5	2
Polypedilum	-	-	-	-	-	-	-	-	-	-	-	-	-	9	-	-	-	-	-	-	-	-	-	-	-
Sergentia	-	-	-	-	1	-	-	-	25	-	4	5	7	-	21	-	-	-	-	-	-	-	-	-	-
Stempellinella	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Stictochironomus	8	5	25	-	-	1	3	6	22	2	14	151	334	259	213	56	29	67	89	55	1	-	-	-	-
Tanytarsus	-	1	-	-	37	-	2	6	28	1	-	3	16	2	8	2	-	1	7	-	3	1	8	2	6
S.F. Diamesinae																									
Protanypus	-	-	-	-	-	-	-	1	1	-	-	2	3	1	-	-	1	1	7	6	2	4	4	-	1
Pseudodiamesa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	1	-	9	2	3	3	3
S.F. Orthocladiinae																									
Abiskomyia	-	-	-	-	-	1	2	3	5	3	-	2	2	5	2	3	2	1	7	4	3	2	3	2	3
Corynoneura	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
Cricotopus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Heterotrissocladius	-	-	-	-	1	13	22	10	24	1	3	4	33	19	91	12	9	6	109	67	164	41	80	97	104
Hydrobaenus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix D: Benthic invertebrate raw data (total number of organisms in two 0.023m ^{2} grabs), Meadowbank study lakes and Baker Lake, 2008.

Station	WAL					INUG					BBD					BPJ					BAP				
Replicate	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Mesocricotopus	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	1	-	5	4	4	3	4
Paracladius	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	2	3	1	1	-
Parakiefferiella	-	-	-	-	-	1	-	1	-	-	4	-	-	-	-	-	-	-	15	12	3	1	3	-	1
Psectrocladius	2	2	3	2	1	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zalutschia	-	-	-	-	-	-	8	1	-	1	2	-	-	-	-	-	-	-	-	10	-	-	-	-	-
indeterminate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
S.F. Prodiamesinae																									
Monodiamesa	1	4	-	6	-	1	2	1	3	3	2	-	9	3	2	1	-	7	2	6	1	1	-	-	-
S.F. Tanypodinae																									
Ablabesmyia	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Procladius	2	4	5	-	-	1	8	6	9	-	-	-	1	4	-	-	1	1	5	8	1	1	4	1	1
Thienemannimyia complex	-	1	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	1	6	-	1	-	-	-
indeterminate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. Empididae																									
Chelifera/Neoplasta	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	1	1	-
MOLLUSCS																									
P. Mollusca																									
CLAMS																									
Cl. Bivalvia																									
F. Sphaeriidae																									
Cyclocalyx/Neopisidium	8	10	-	14	13	13	15	6	16	6	-	7	20	-	81	1	2	-	28	24	7	5	1	5	3
Cyclocalyx	1	-	14	3	31	2	-	1	10	-	-	-	5	1	4	-	-	-	-	-	-	-	-	-	-
Sphaerium nitidum	1	-	-	-	1	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL NUMBER OF ORGANISMS [1]	**27**	**27**	**54**	**26**	**133**	**39**	**78**	**57**	**245**	**18**	**38**	**194**	**457**	**309**	**451**	**79**	**46**	**87**	**313**	**296**	**245**	**90**	**158**	**131**	**135**
TOTAL NUMBER OF TAXA [2]	**11**	**7**	**6**	**5**	**13**	**14**	**13**	**17**	**17**	**8**	**10**	**10**	**14**	**10**	**13**	**9**	**8**	**9**	**21**	**19**	**19**	**16**	**18**	**13**	**13**

Notes:

[1] Number of organisms totals exclude nematodes & ostracods.

[2] Number of taxa totals exclude nematodes & ostracods, immatures & pupae (Tubificidae, Limnephilidae, Chironomidae), and indeterminates (Orthocladiinae, Tanypodinae).

APPENDIX E

EXPLOSIVES LAKE ASSESSMENT MEMO, 2008

Technical Memorandum

Date: 10 October 2008

To: **Meadowbank AEMP Monitoring Report 2008**

Cc:

From: **Gary Mann**

RE: **Meadowbank AEMP Targeted Study: "Explosives Lake" Fish Status Assessment Results**

Background and Summary

The location of the explosives plant for Agnico Eagle Mines Ltd's (AEM) Meadowbank Gold Project was moved northwest of the mine site in early 2008 (**Figure 1**; **Photo 1**). The new location is adjacent to a small, unnamed lake (herein referred to as "Explosives Lake") from which water will be sourced for operation of the explosives plant. This targeted study, implemented on 22 July 2008, was developed to address key information gaps regarding the lake and will be included as an appendix of the 2008 Aquatic Effects Monitoring Program (AEMP). The lake was found to contain lake trout and sufficient overwintering habitat to support the population year round. Planned water use was shown to have a negligible impact to lake hydrology.

Objectives

The main objectives of this targeted AEMP study were to:

- Describe local hydrology – Provide a general understanding of water flow paths in this part of the site.
- Characterize bathymetry/hydrology – No information on depth features or bathymetry (max depth, mean depth) of Explosives Lake exists and whether it is deep enough to provide sufficient overwintering habitat to sustain a fish population. AEM plans to withdraw up to 200 m^3 of water per month. Outlet discharge rates were estimated to determine the approximate influence of this withdrawal on water volume and on daily discharge.
- Fish presence/connectivity – Adequate bathymetry and presence of fish will confirm overwintering potential and verify the issue of fish habitat from DFO's perspective. The presence/absence of fish was determined by setting gill nets in the lake. Connectivity with the much larger Turn Lake was evaluated by assessing the streams to the lake.

Local Hydrology

As seen in **Figure 1**, Explosives Lake receives water from a small headwater lake to the northwest. Explosives Lake drains via a stream at the northeast end into a small lake (see **Photos 2 - 4**), which drains into Turn Lake (i.e., part of the Second Portage Lake drainage system via Drilltrail Lake).

Bathymetry/Hydrology Results

The bathymetric survey was conducted using a Garmin GPSMAP 76 GPS and a Hawkeye Digital Sonar. Survey locations are shown in **Figure 2**. Surfer was used to create a 3-D grid of the lake (based on kriging), bathymetric contours, and surface/volume estimates. The results for bathymetry are shown in **Figure 3**. Lake surface area and volume were estimated at approximately 25 ha and 0.6 Mm^3, respectively. Mean depth, therefore, would be about 2.4m.

Discharge estimates were obtained by combining the rough cross-sectional area of the four small (20 to 25-cm wide) channels and approximated velocities. The resulting estimate was 15 to 20 L/s, or approximately 39,000 to 53,000 m^3/month. It is important to note that this estimate was made well past freshet.

Planned Water Use by AEM

AEM's planned monthly water use for the explosive plant is 200 m^3. Removing this small amount of water would lower the lake by less than 0.1 cm; it represents 0.51% of estimated monthly discharge volume and 0.03% of the total lake volume. Consequently, the planned water use would have a negligible impact on lake hydrology.

Fish Presence/Absence and Habitat Suitability

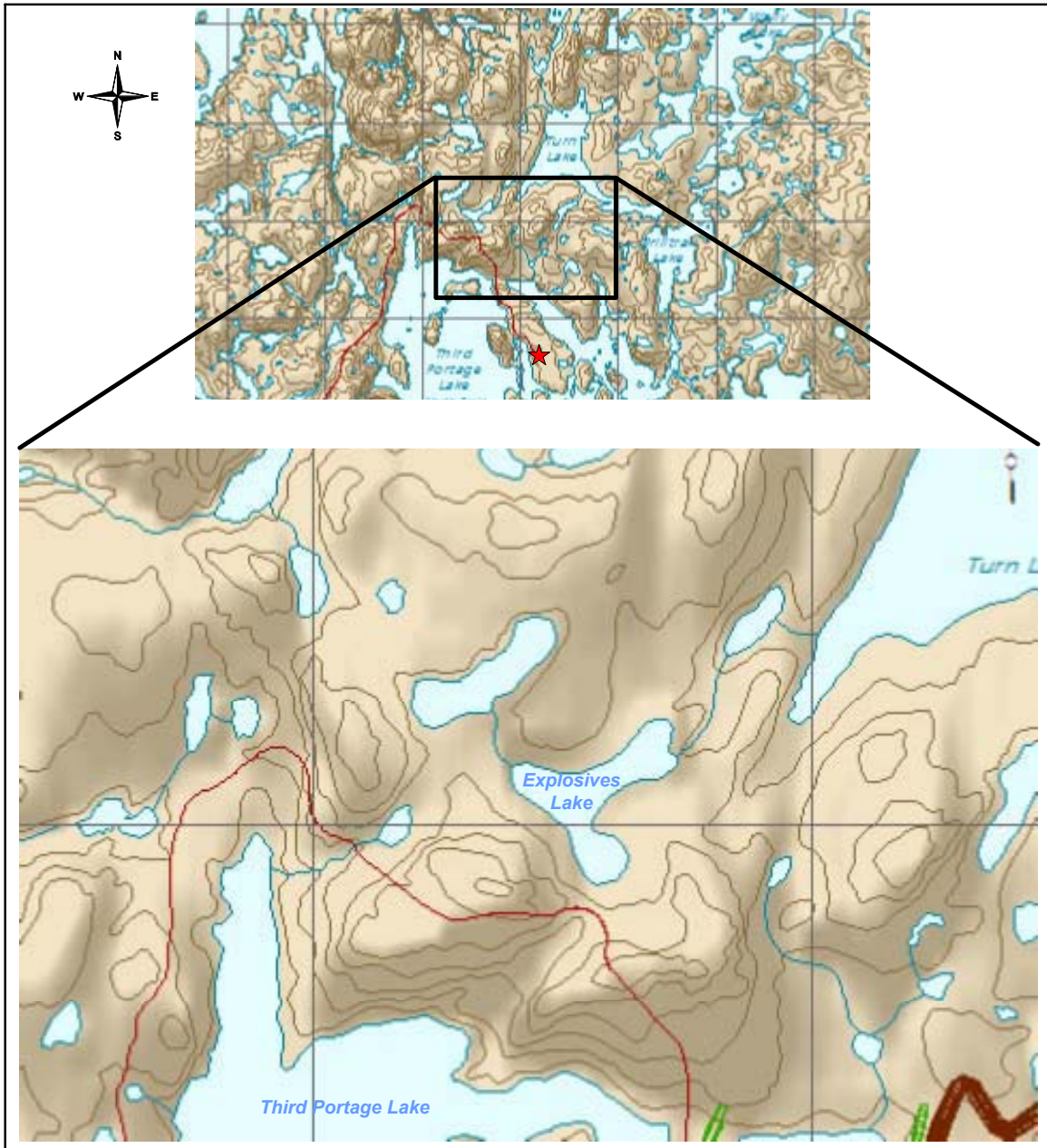
The presence/absence of fish was evaluated by setting two 50-m long gill nets in the lake (**Figure 4**). Both small mesh (38 mm [1.5"]) and short set duration were employed to minimize harm to fish. Four lake trout were caught (**Table 1**; **Photo 5**). Based on the bathymetry, there is clearly suitable habitat for overwintering in Explosives Lake.

Table 1. Gill net catch results for Explosives Lake.

Net ID	Species	Length
E001	LKTR	213
E002	LKTR	263
E002	LKTR	238
E002	LKTR	255

Lake Connectivity

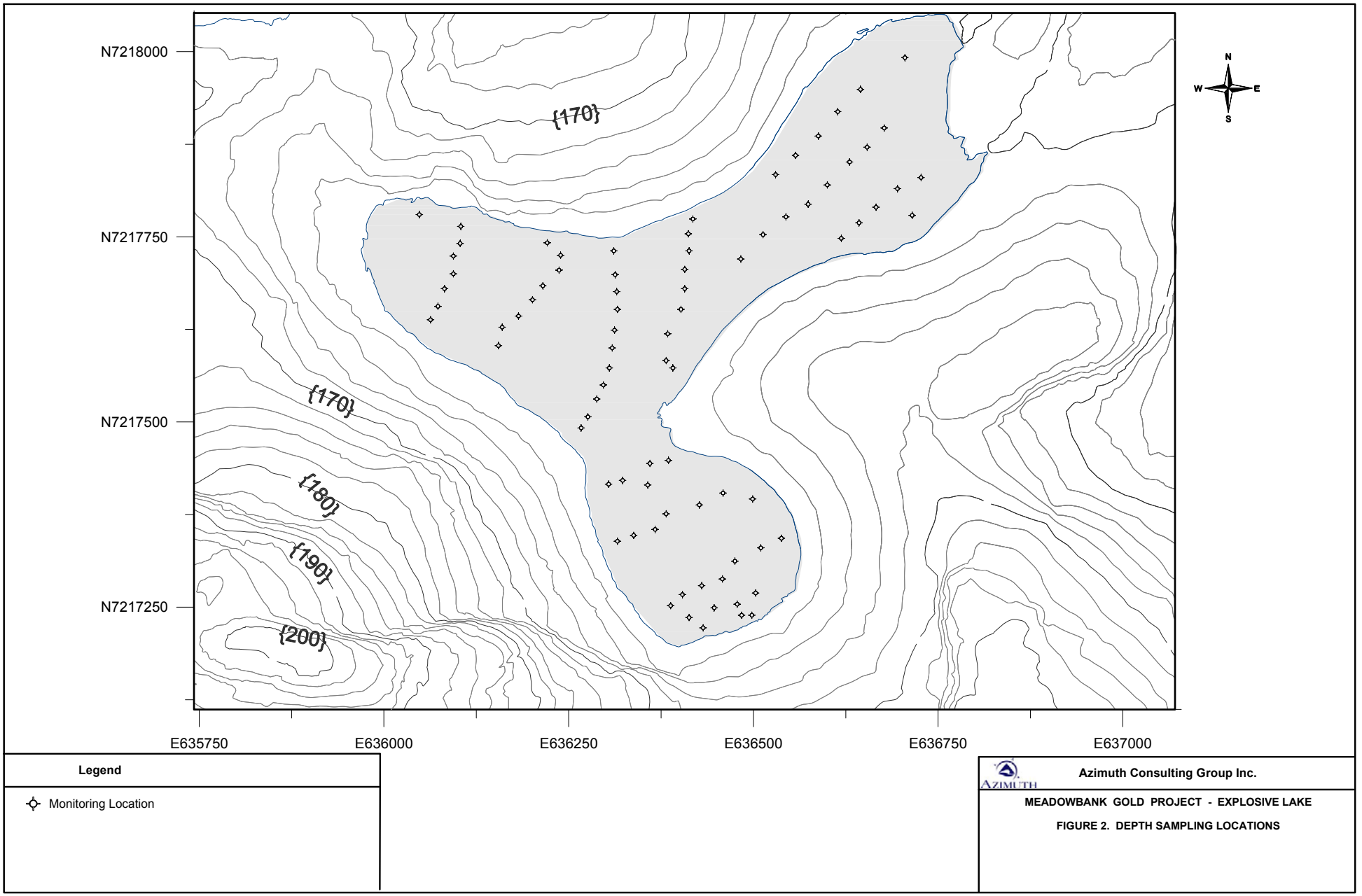
As discussed previously, Explosives Lake discharges to an unnamed lake to the NE that discharges to Turn Lake. There are two outlet paths from Explosives Lake: the N flow path is likely only active during freshet conditions and appears to be dominated by terrestrial vegetation; the S flow path is the primary discharge point. It starts with a boulder field (**Photo 2**) and a diffuse, saturated grassy area that are unlikely passable by fish. It then continues in four small channels (**Photos 3 and 4**) over a fairly steep gradient to the next small lake; no fish were observed in these channels during our survey. Overall, connectivity appears low (possibly during freshet) to nil (most likely).



Azimuth Consulting Group Inc.

MEADOWBANK GOLD PROJECT - EXPLOSIVE LAKE

FIGURE 1. EXPLOSIVES LAKE OVERVIEW.



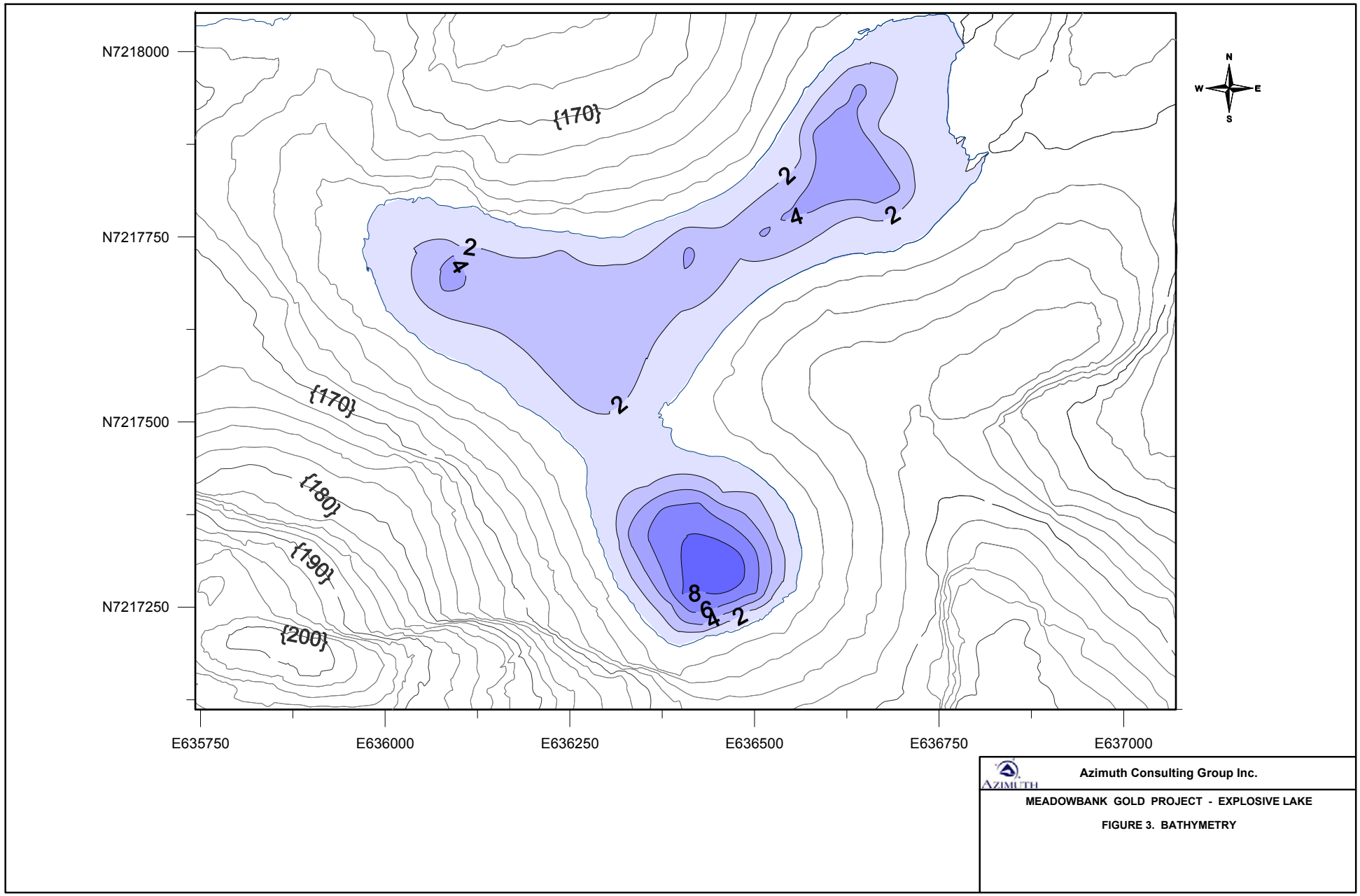
Legend

Monitoring Location

Azimuth Consulting Group Inc.

MEADOWBANK GOLD PROJECT - EXPLOSIVE LAKE

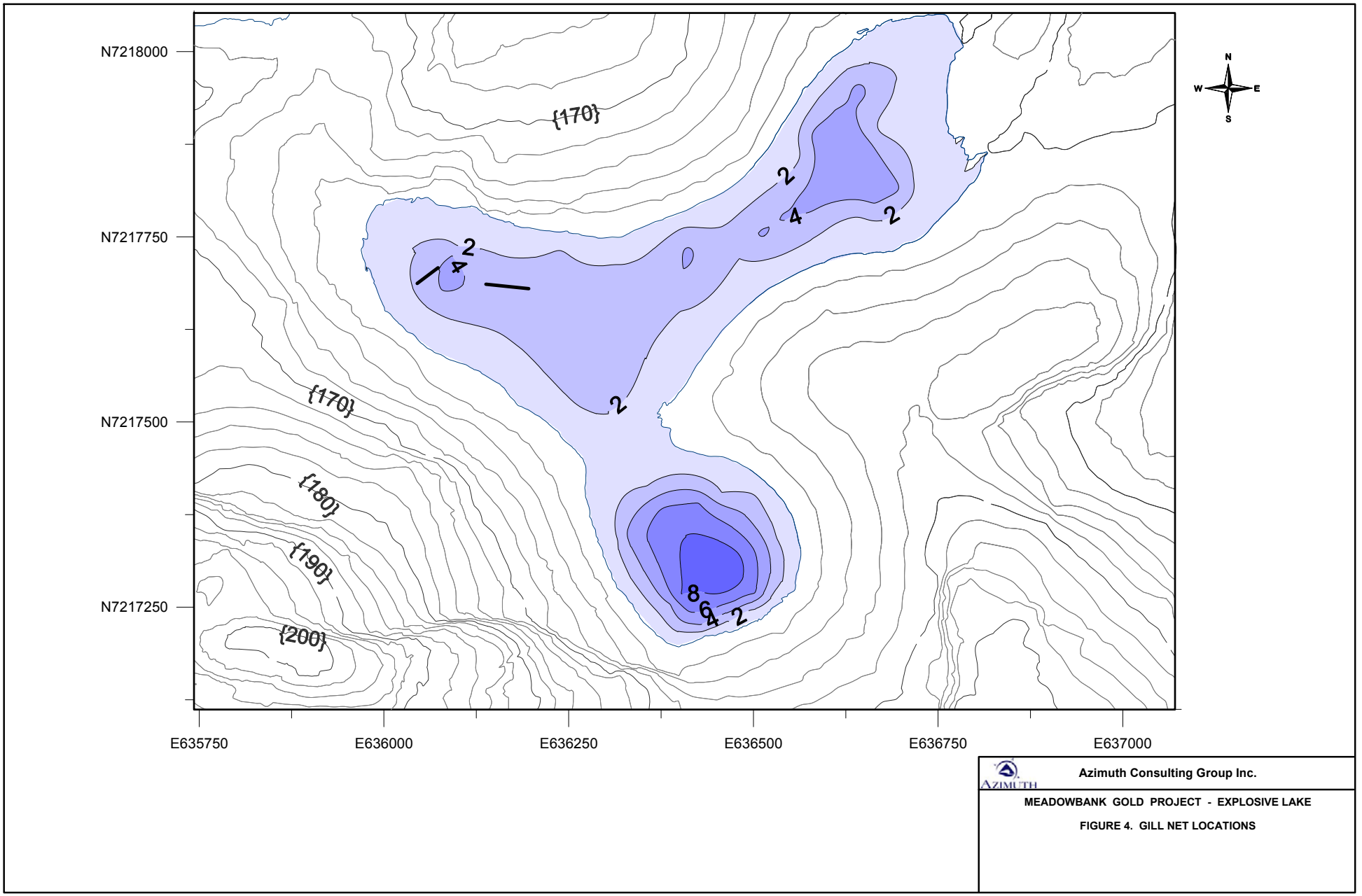
FIGURE 2. DEPTH SAMPLING LOCATIONS



Azimuth Consulting Group Inc.

MEADOWBANK GOLD PROJECT - EXPLOSIVE LAKE

FIGURE 3. BATHYMETRY



Azimuth Consulting Group Inc.

MEADOWBANK GOLD PROJECT - EXPLOSIVE LAKE

FIGURE 4. GILL NET LOCATIONS

Explosives Lake Photos

Photo 1. Explosives Lake overview showing drainage to Turn Lake (looking from south) .

Photo 2. South outlet path looking upstream to boulder field; unlikely passable by fish.

Photo 3. South flow path, looking downstream to channel starting after grassy area.

Photo 4. One of the south flow path channels looking upstream to grassy.

Photo 5. Lake trout caught in Explosives Lake

APPENDIX F

LABORATORY REPORTS, 2008

1. Water and Sediment Cores Chemistry Data for Meadowbank lakes – July 2008
2. Water Chemistry Data for Baker Lake – July 2008
3. Water and Sediment Chemistry Data for Meadowbank lakes – August 2008
4. Water, Sediment and Sediment Cores Chemistry Data for Baker Lake – August 2008
5. Water Chemistry Data for Meadowbank lakes and Baker Lake – September 2008

Certificate of Analysis

AZIMUTH CONSULTING GROUP INC.
ATTN: RANDY BAKER
218 - 2902 WEST BROADWAY
VANCOUVER BC V6K 2G8

Reported On: 22-AUG-08 03:49 PM
Revision: 1

Lab Work Order #: **L664196** **Date Received:** **01-AUG-08**

Project P.O. #:
Job Reference: MEADOW BANK
Legal Site Desc:
CofC Numbers: C098382, C098383, C098384, C098385, C098386, C098387, C098388, C098389, C098390, C098391, C098395, C098396, C098409, C098410, C098411
Other Information:

Comments: Please note that due to the insufficient sample volumes, Particle Size Analysis was not perfomed on the sediment samples.

NATASHA MARKOVIC-MIROVIC
Account Manager

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L664196-1	L664196-2	L664196-3	L664196-4	L664196-5
		Description					
		Sampled Date	19-JUL-08	19-JUL-08	19-JUL-08	19-JUL-08	19-JUL-08
		Sampled Time					
		Client ID	SP-SC-01	SP-SC-02	SP-SC-03	SP-SC-04	SP-SC-05
Grouping	**Analyte**						
SOIL							
Physical Tests	pH (pH)		6.12	6.04	5.91	6.10	6.08
Organic / Inorganic Carbon	Total Organic Carbon (%)		4.2	4.1	5.2	3.9	4.6
Metals	Antimony (Sb) (mg/kg)		<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)		31.6	28.2	30.5	36.5	53.7
	Barium (Ba) (mg/kg)		139	142	125	153	148
	Beryllium (Be) (mg/kg)		2.26	1.96	1.72	2.26	1.71
	Cadmium (Cd) (mg/kg)		0.64	0.67	0.61	0.67	0.96
	Chromium (Cr) (mg/kg)		77.9	69.6	55.2	76.5	52.0
	Cobalt (Co) (mg/kg)		16.0	16.4	12.6	18.3	18.9
	Copper (Cu) (mg/kg)		98.2	89.4	75.9	100	72.9
	Lead (Pb) (mg/kg)		<30	<30	<30	<30	<30
	Mercury (Hg) (mg/kg)		0.0330	0.0397	0.0515	0.0420	0.0445
	Molybdenum (Mo) (mg/kg)		5.9	6.1	6.9	9.1	11.0
	Nickel (Ni) (mg/kg)		53.2	68.0	61.9	66.7	70.6
	Selenium (Se) (mg/kg)		<2.0	<2.0	<4.0	<2.0	<3.0
	Silver (Ag) (mg/kg)		<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)		<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)		<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)		39.6	36.2	29.9	42.2	24.9
	Zinc (Zn) (mg/kg)		108	101	87.8	114	76.5

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

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L664196-6	L664196-7	L664196-8	L664196-9	L664196-10
	Description					
	Sampled Date	19-JUL-08	19-JUL-08	19-JUL-08	19-JUL-08	19-JUL-08
	Sampled Time					
	Client ID	SP-SC-06	SP-SC-07	SP-SC-08	SP-SC-09	SP-SC-10
Grouping	**Analyte**					
SOIL						
Physical Tests	pH (pH)	6.24	6.24	6.06	6.19	6.20
Organic / Inorganic Carbon	Total Organic Carbon (%)	5.6	4.5	4.6	5.1	5.4
Metals	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	40.8	25.3	19.9	26.4	26.7
	Barium (Ba) (mg/kg)	134	118	132	113	119
	Beryllium (Be) (mg/kg)	1.71	1.81	2.08	1.82	1.93
	Cadmium (Cd) (mg/kg)	0.68	<0.50	0.76	<0.50	<0.50
	Chromium (Cr) (mg/kg)	53.7	62.0	70.9	62.4	65.0
	Cobalt (Co) (mg/kg)	17.5	13.1	14.7	12.9	14.0
	Copper (Cu) (mg/kg)	70.7	72.2	86.9	76.5	80.4
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Mercury (Hg) (mg/kg)	0.0450	0.0376	0.0411	0.0374	0.0452
	Molybdenum (Mo) (mg/kg)	7.4	5.1	4.2	5.1	5.3
	Nickel (Ni) (mg/kg)	64.3	47.9	85.1	45.2	50.4
	Selenium (Se) (mg/kg)	<4.0	<2.0	<2.0	<2.0	<2.0
	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)	27.8	33.9	36.9	32.8	33.7
	Zinc (Zn) (mg/kg)	83.8	91.4	114	92.7	97.8

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

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L664196-11	L664196-12	L664196-13	L664196-14	L664196-15
		Description					
		Sampled Date	19-JUL-08	19-JUL-08	19-JUL-08	19-JUL-08	19-JUL-08
		Sampled Time					
		Client ID	SP-SC-11	SP-SC-12	SP-SC-13	SP-SC-14	SP-SC-15
Grouping	**Analyte**						
SOIL							
Physical Tests	pH (pH)		6.08	5.91	5.92	5.88	6.02
Organic / Inorganic Carbon	Total Organic Carbon (%)		5.1	4.9	5.5	5.7	5.0
Metals	Antimony (Sb) (mg/kg)		<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)		27.6	23.4	56.2	29.8	31.8
	Barium (Ba) (mg/kg)		121	121	137	149	143
	Beryllium (Be) (mg/kg)		1.97	1.82	1.82	2.07	2.07
	Cadmium (Cd) (mg/kg)		0.50	0.59	0.77	0.69	0.75
	Chromium (Cr) (mg/kg)		68.1	64.2	61.2	69.5	72.0
	Cobalt (Co) (mg/kg)		13.7	12.5	14.9	16.5	16.3
	Copper (Cu) (mg/kg)		82.1	79.8	79.8	89.1	92.4
	Lead (Pb) (mg/kg)		<30	<30	<30	<30	<30
	Mercury (Hg) (mg/kg)		0.0443	0.0442	0.0633	0.0606	0.0522
	Molybdenum (Mo) (mg/kg)		5.5	4.8	9.9	6.5	6.3
	Nickel (Ni) (mg/kg)		50.9	51.8	54.0	76.5	75.1
	Selenium (Se) (mg/kg)		<2.0	<2.0	<2.0	<2.0	<3.0
	Silver (Ag) (mg/kg)		<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)		<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)		<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)		35.2	34.0	30.2	36.8	37.0
	Zinc (Zn) (mg/kg)		102	97.2	83.0	110	106

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

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L664196-16	L664196-17	L664196-18	L664196-19	L664196-20
	Description					
	Sampled Date	19-JUL-08	20-JUL-08	20-JUL-08	20-JUL-08	20-JUL-08
	Sampled Time					
	Client ID	SP-SC-DUP	TE-SC-01	TE-SC-02	TE-SC-03	TE-SC-04
Grouping	**Analyte**					
SOIL						
Physical Tests	pH (pH)	6.15	6.08	5.94	5.94	5.98
Organic / Inorganic Carbon	Total Organic Carbon (%)	5.4	3.2	3.6	4.3	4.4
Metals	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	30.8	21.3	30.2	33.4	35.6
	Barium (Ba) (mg/kg)	134	135	120	133	138
	Beryllium (Be) (mg/kg)	2.13	2.36	1.99	1.98	1.90
	Cadmium (Cd) (mg/kg)	0.67	0.53	0.66	0.84	0.81
	Chromium (Cr) (mg/kg)	76.3	60.3	49.8	48.2	45.8
	Cobalt (Co) (mg/kg)	15.9	13.7	12.6	14.7	16.6
	Copper (Cu) (mg/kg)	91.0	72.0	64.4	66.8	63.5
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Mercury (Hg) (mg/kg)	0.0516	0.0269	0.0355	0.0422	0.0397
	Molybdenum (Mo) (mg/kg)	6.1	6.1	9.1	8.9	10.5
	Nickel (Ni) (mg/kg)	57.1	46.8	42.9	50.6	48.7
	Selenium (Se) (mg/kg)	<2.0	<2.0	<3.0	<2.0	<5.0
	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)	38.4	38.3	31.4	29.3	26.0
	Zinc (Zn) (mg/kg)	110	107	89.9	86.8	84.1

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

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L664196-21	L664196-22	L664196-23	L664196-24	L664196-25
	Description					
	Sampled Date	20-JUL-08	20-JUL-08	20-JUL-08	20-JUL-08	20-JUL-08
	Sampled Time					
	Client ID	TE-SC-05	TE-SC-06	TE-SC-07	TE-SC-08	TE-SC-09
Grouping	**Analyte**					
SOIL						
Physical Tests	pH (pH)	5.94	5.67	6.03	5.89	5.85
Organic / Inorganic Carbon	Total Organic Carbon (%)	3.9	6.4	4.6	4.2	2.9
Metals	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	28.4	8.8	20.9	45.0	30.9
	Barium (Ba) (mg/kg)	147	164	135	132	130
	Beryllium (Be) (mg/kg)	2.01	2.07	2.31	1.87	1.98
	Cadmium (Cd) (mg/kg)	0.61	0.78	0.52	0.87	0.69
	Chromium (Cr) (mg/kg)	50.1	53.1	56.1	44.3	52.6
	Cobalt (Co) (mg/kg)	13.6	8.4	12.4	14.8	13.2
	Copper (Cu) (mg/kg)	66.2	67.7	68.6	63.8	66.3
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Mercury (Hg) (mg/kg)	0.0385	0.0593	0.0338	0.0356	0.0293
	Molybdenum (Mo) (mg/kg)	8.1	<4.0	5.9	11.1	8.7
	Nickel (Ni) (mg/kg)	54.9	50.6	50.4	52.7	39.8
	Selenium (Se) (mg/kg)	<10	<2.0	<2.0	<3.0	<2.0
	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)	31.6	32.8	36.0	25.9	30.7
	Zinc (Zn) (mg/kg)	95.1	109	108	82.8	86.1

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

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L664196-26	L664196-27	L664196-28	L664196-29	L664196-30
		Description					
		Sampled Date	20-JUL-08	20-JUL-08	20-JUL-08	20-JUL-08	20-JUL-08
		Sampled Time					
		Client ID	TE-SC-10	TE-SC-11	TE-SC-12	TE-SC-13	TE-SC-14
Grouping	**Analyte**						
SOIL							
Physical Tests	pH (pH)		5.81	6.01	5.90	5.76	6.03
Organic / Inorganic Carbon	Total Organic Carbon (%)		3.2	3.6	4.1	3.4	4.8
Metals	Antimony (Sb) (mg/kg)		<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)		11.3	43.7	34.6	19.1	36.6
	Barium (Ba) (mg/kg)		114	88.8	112	109	159
	Beryllium (Be) (mg/kg)		1.89	1.67	1.54	1.97	1.70
	Cadmium (Cd) (mg/kg)		0.61	0.72	1.16	0.55	1.01
	Chromium (Cr) (mg/kg)		48.1	40.6	37.6	49.8	38.1
	Cobalt (Co) (mg/kg)		9.1	12.2	13.6	11.7	20.0
	Copper (Cu) (mg/kg)		64.6	59.3	58.5	61.5	61.6
	Lead (Pb) (mg/kg)		<30	<30	<30	<30	<30
	Mercury (Hg) (mg/kg)		0.0312	0.0081	0.0368	0.0297	0.0458
	Molybdenum (Mo) (mg/kg)		4.4	11.2	12.0	5.8	9.6
	Nickel (Ni) (mg/kg)		41.4	33.2	43.8	40.1	65.1
	Selenium (Se) (mg/kg)		<2.0	<3.0	<2.0	<2.0	<4.0
	Silver (Ag) (mg/kg)		<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)		<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)		<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)		31.7	23.0	17.3	31.5	22.0
	Zinc (Zn) (mg/kg)		92.6	70.2	66.3	94.6	81.5

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

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L664196-31	L664196-32	L664196-33	L664196-34	L664196-35
		Description					
		Sampled Date	20-JUL-08	20-JUL-08	22-JUL-08	22-JUL-08	22-JUL-08
		Sampled Time					
		Client ID	TE-SC-15	TE-SC-DUP	WAL-SC-01	WAL-SC-02	WAL-SC-03
Grouping	**Analyte**						
SOIL							
Physical Tests	pH (pH)		5.93	5.90	6.36	6.28	6.54
Organic / Inorganic Carbon	Total Organic Carbon (%)		3.5	4.2	7.3	4.6	10.0
Metals	Antimony (Sb) (mg/kg)		<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)		21.7	47.8	26.5	17.8	22.6
	Barium (Ba) (mg/kg)		124	136	110	81.7	78.5
	Beryllium (Be) (mg/kg)		1.91	1.91	1.41	1.06	1.06
	Cadmium (Cd) (mg/kg)		0.51	0.83	0.65	<0.50	0.53
	Chromium (Cr) (mg/kg)		48.4	45.7	52.7	41.9	41.8
	Cobalt (Co) (mg/kg)		14.3	15.5	9.6	6.5	7.5
	Copper (Cu) (mg/kg)		63.9	64.6	123	83.6	99.6
	Lead (Pb) (mg/kg)		<30	<30	35	<30	<30
	Mercury (Hg) (mg/kg)		0.0331	0.0388	0.0640	0.0297	0.0684
	Molybdenum (Mo) (mg/kg)		6.3	11.3	4.9	<4.0	4.0
	Nickel (Ni) (mg/kg)		42.6	54.0	52.8	36.8	39.4
	Selenium (Se) (mg/kg)		<2.0	<3.0	<2.0	<2.0	<2.0
	Silver (Ag) (mg/kg)		<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)		<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)		<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)		32.0	26.4	27.3	21.8	21.2
	Zinc (Zn) (mg/kg)		91.8	85.8	107	75.7	82.6

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

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID: L664196-36 Description: Sampled Date: 22-JUL-08 Sampled Time: Client ID: WAL-SC-04	L664196-37 22-JUL-08 WAL-SC-05	L664196-38 22-JUL-08 WAL-SC-06	L664196-39 23-JUL-08 WAL-SC-07	L664196-40 23-JUL-08 WAL-SC-08
SOIL						
Physical Tests	pH (pH)	6.42	7.14	6.47	6.54	6.53
Organic / Inorganic Carbon	Total Organic Carbon (%)	5.7	8.3	11.7	6.6	6.3
Metals	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	17.9	19.8	24.2	29.1	25.7
	Barium (Ba) (mg/kg)	74.2	90.0	80.0	130	140
	Beryllium (Be) (mg/kg)	0.96	1.18	1.03	1.77	1.83
	Cadmium (Cd) (mg/kg)	<0.50	0.54	0.51	<0.50	0.51
	Chromium (Cr) (mg/kg)	53.5	44.5	41.1	58.3	58.4
	Cobalt (Co) (mg/kg)	7.4	7.8	8.0	8.0	8.5
	Copper (Cu) (mg/kg)	87.1	109	103	153	160
	Lead (Pb) (mg/kg)	<30	31	<30	32	33
	Mercury (Hg) (mg/kg)	0.0386	0.0570	0.0752	0.0471	0.0490
	Molybdenum (Mo) (mg/kg)	<4.0	<4.0	4.6	9.4	9.1
	Nickel (Ni) (mg/kg)	41.6	41.7	41.1	49.7	55.2
	Selenium (Se) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<3.0
	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)	20.7	22.8	20.4	32.4	32.5
	Zinc (Zn) (mg/kg)	75.5	89.3	83.1	104	106

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

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L664196-41	L664196-42	L664196-43	L664196-44	L664196-45
		Description					
		Sampled Date	23-JUL-08	23-JUL-08	23-JUL-08	23-JUL-08	23-JUL-08
		Sampled Time					
		Client ID	WAL-SC-09	WAL-SC-10	WAL-SC-11	WAL-SC-12	WAL-SC-13
Grouping	**Analyte**						
SOIL							
Physical Tests	pH (pH)		6.38	6.88	6.49	6.04	6.08
Organic / Inorganic Carbon	Total Organic Carbon (%)		8.9	2.1	6.3	5.7	12.8
Metals	Antimony (Sb) (mg/kg)		<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)		44.5	31.9	19.0	23.8	29.8
	Barium (Ba) (mg/kg)		117	133	127	77.1	102
	Beryllium (Be) (mg/kg)		1.67	2.02	1.64	1.05	1.39
	Cadmium (Cd) (mg/kg)		0.75	0.51	0.58	<0.50	0.50
	Chromium (Cr) (mg/kg)		50.9	68.6	56.8	31.9	44.2
	Cobalt (Co) (mg/kg)		8.9	12.1	8.2	5.8	8.1
	Copper (Cu) (mg/kg)		154	143	164	76.3	133
	Lead (Pb) (mg/kg)		36	36	33	<30	32
	Mercury (Hg) (mg/kg)		0.0728	0.0319	0.0569	0.0637	0.0958
	Molybdenum (Mo) (mg/kg)		10.0	7.6	6.4	4.8	7.8
	Nickel (Ni) (mg/kg)		53.6	66.0	51.0	29.6	47.5
	Selenium (Se) (mg/kg)		<2.0	<2.0	<2.0	<2.0	<2.0
	Silver (Ag) (mg/kg)		<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)		<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)		<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)		29.4	37.6	31.6	21.0	26.8
	Zinc (Zn) (mg/kg)		115	130	104	68.8	99.3

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

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L664196-46	L664196-47	L664196-48	L664196-49	L664196-50
		Description					
		Sampled Date	23-JUL-08	23-JUL-08	22-JUL-08	23-JUL-08	23-JUL-08
		Sampled Time					
		Client ID	WAL-SC-14	WAL-SC-15	WAL-SC-DUP	TPE-SC-01	TPE-SC-02
Grouping	**Analyte**						
SOIL							
Physical Tests	pH (pH)		5.84	6.32	6.99	6.02	5.52
Organic / Inorganic Carbon	Total Organic Carbon (%)		13.6	8.7	9.9	6.6	4.5
Metals	Antimony (Sb) (mg/kg)		<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)		38.7	29.1	20.7	<5.0	14.0
	Barium (Ba) (mg/kg)		90.8	137	63.7	125	142
	Beryllium (Be) (mg/kg)		1.29	1.89	0.99	1.38	1.82
	Cadmium (Cd) (mg/kg)		<0.50	<0.50	<0.50	<0.50	<0.50
	Chromium (Cr) (mg/kg)		41.0	59.0	35.3	74.6	75.9
	Cobalt (Co) (mg/kg)		7.2	8.6	6.0	7.1	15.4
	Copper (Cu) (mg/kg)		117	177	81.0	44.5	47.6
	Lead (Pb) (mg/kg)		<30	41	<30	<30	<30
	Mercury (Hg) (mg/kg)		0.0861	0.0806	0.0534	0.0322	0.0314
	Molybdenum (Mo) (mg/kg)		8.4	10.7	<4.0	<4.0	5.5
	Nickel (Ni) (mg/kg)		45.0	55.3	32.7	51.3	62.5
	Selenium (Se) (mg/kg)		<4.0	<4.0	<2.0	<4.0	<2.0
	Silver (Ag) (mg/kg)		<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)		<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)		<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)		25.5	35.5	20.8	31.2	37.3
	Zinc (Zn) (mg/kg)		95.7	121	65.6	76.1	97.8

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

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L664196-51	L664196-52	L664196-53	L664196-54	L664196-55
	Description					
	Sampled Date	23-JUL-08	23-JUL-08	23-JUL-08	23-JUL-08	23-JUL-08
	Sampled Time					
	Client ID	TPE-SC-03	TPE-SC-04	TPE-SC-05	TPE-SC-06	TPE-SC-07
Grouping	**Analyte**					
SOIL						
Physical Tests	pH (pH)	5.97	5.97	5.89	5.97	6.22
Organic / Inorganic Carbon	Total Organic Carbon (%)	4.1	4.9	4.7	4.7	4.0
Metals	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	12.6	14.1	15.9	14.1	17.4
	Barium (Ba) (mg/kg)	132	117	126	115	102
	Beryllium (Be) (mg/kg)	1.85	1.70	1.79	1.78	1.71
	Cadmium (Cd) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Chromium (Cr) (mg/kg)	80.2	72.8	75.1	74.7	74.1
	Cobalt (Co) (mg/kg)	13.1	13.9	15.8	14.4	12.6
	Copper (Cu) (mg/kg)	48.6	49.0	49.8	49.0	49.3
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Mercury (Hg) (mg/kg)	0.0251	0.0288	0.0251	0.0261	0.0257
	Molybdenum (Mo) (mg/kg)	5.3	4.7	4.4	5.1	5.7
	Nickel (Ni) (mg/kg)	75.6	79.9	88.2	64.4	51.2
	Selenium (Se) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)	39.1	35.9	36.8	36.6	37.0
	Zinc (Zn) (mg/kg)	100	97.3	101	94.5	86.2

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

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L664196-56	L664196-57	L664196-58	L664196-59	L664196-60
		Description					
		Sampled Date	23-JUL-08	23-JUL-08	23-JUL-08	23-JUL-08	23-JUL-08
		Sampled Time					
		Client ID	TPE-SC-08	TPE-SC-09	TPE-SC-10	TPE-SC-11	TPE-SC-12
Grouping	**Analyte**						
SOIL							
Physical Tests	pH (pH)		6.01	5.47	5.85	5.46	5.78
Organic / Inorganic Carbon	Total Organic Carbon (%)		4.9	3.5	4.3	3.2	3.6
Metals	Antimony (Sb) (mg/kg)		<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)		15.4	14.6	26.7	46.3	14.6
	Barium (Ba) (mg/kg)		113	200	122	150	215
	Beryllium (Be) (mg/kg)		1.74	1.84	1.78	3.18	1.88
	Cadmium (Cd) (mg/kg)		<0.50	1.05	<0.50	<0.50	1.16
	Chromium (Cr) (mg/kg)		73.4	76.9	72.2	97.6	80.9
	Cobalt (Co) (mg/kg)		16.9	17.3	16.2	17.3	19.7
	Copper (Cu) (mg/kg)		47.1	65.7	55.7	111	75.8
	Lead (Pb) (mg/kg)		<30	<30	<30	<30	<30
	Mercury (Hg) (mg/kg)		0.0376	0.0337	0.0392	0.0318	0.0392
	Molybdenum (Mo) (mg/kg)		5.7	7.6	8.2	15.6	7.0
	Nickel (Ni) (mg/kg)		54.5	162	73.6	81.5	190
	Selenium (Se) (mg/kg)		<2.0	<2.0	<2.0	<2.0	<4.0
	Silver (Ag) (mg/kg)		<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)		<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)		<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)		37.1	40.4	39.0	54.3	42.7
	Zinc (Zn) (mg/kg)		89.2	126	92.1	152	145

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

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L664196-61	L664196-62	L664196-63	L664196-64	L664196-65
		Description					
		Sampled Date	23-JUL-08	23-JUL-08	23-JUL-08	23-JUL-08	24-JUL-08
		Sampled Time					
		Client ID	TPE-SC-13	TPE-SC-14	TPE-SC-15	TPE-SC-DUP	TPS-SC-01
Grouping	**Analyte**						
SOIL							
Physical Tests	pH (pH)		5.50	5.96	5.91	6.03	5.99
Organic / Inorganic Carbon	Total Organic Carbon (%)		3.9	3.9	6.0	5.1	5.0
Metals	Antimony (Sb) (mg/kg)		<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)		26.0	27.9	17.3	11.6	70.5
	Barium (Ba) (mg/kg)		223	206	122	109	114
	Beryllium (Be) (mg/kg)		1.81	1.62	1.88	1.71	1.65
	Cadmium (Cd) (mg/kg)		0.90	0.65	<0.50	<0.50	0.66
	Chromium (Cr) (mg/kg)		69.2	64.3	79.6	72.2	96.7
	Cobalt (Co) (mg/kg)		17.0	23.5	15.5	14.0	50.4
	Copper (Cu) (mg/kg)		74.8	58.1	61.7	46.1	81.0
	Lead (Pb) (mg/kg)		<30	<30	<30	<30	32
	Mercury (Hg) (mg/kg)		0.0576	0.0330	0.0378	0.0248	0.0511
	Molybdenum (Mo) (mg/kg)		9.7	7.8	5.1	4.3	11.0
	Nickel (Ni) (mg/kg)		165	151	82.9	61.1	115
	Selenium (Se) (mg/kg)		<4.0	<12	<4.0	<2.0	<2.0
	Silver (Ag) (mg/kg)		<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)		<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)		<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)		40.7	39.2	39.0	35.1	40.8
	Zinc (Zn) (mg/kg)		118	97.8	104	92.7	104

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

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L664196-66	L664196-67	L664196-68	L664196-69	L664196-70
	Description					
	Sampled Date	24-JUL-08	24-JUL-08	24-JUL-08	24-JUL-08	24-JUL-08
	Sampled Time					
	Client ID	TPS-SC-02	TPS-SC-03	TPS-SC-04	TPS-SC-05	TPS-SC-06
Grouping	**Analyte**					
SOIL						
Physical Tests	pH (pH)	6.05	5.36	5.95	5.94	5.82
Organic / Inorganic Carbon	Total Organic Carbon (%)	5.0	6.0	6.0	5.4	4.1
Metals	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	40.4	56.2	118	42.0	80.7
	Barium (Ba) (mg/kg)	124	108	149	152	110
	Beryllium (Be) (mg/kg)	1.65	1.35	1.28	1.48	1.70
	Cadmium (Cd) (mg/kg)	0.72	<0.50	0.83	0.87	0.65
	Chromium (Cr) (mg/kg)	102	76.6	72.3	89.3	95.6
	Cobalt (Co) (mg/kg)	35.6	26.0	52.7	68.7	32.5
	Copper (Cu) (mg/kg)	72.4	59.7	62.1	75.9	79.7
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Mercury (Hg) (mg/kg)	0.0367	0.0386	0.0426	0.0468	0.0334
	Molybdenum (Mo) (mg/kg)	7.1	6.5	13.0	7.2	9.8
	Nickel (Ni) (mg/kg)	116	91.2	155	162	102
	Selenium (Se) (mg/kg)	<2.0	<2.0	<6.0	<4.0	<2.0
	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)	41.4	36.1	35.5	38.2	41.2
	Zinc (Zn) (mg/kg)	104	90.1	85.6	106	91.0

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

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L664196-71	L664196-72	L664196-73	L664196-74	L664196-75
		Description					
		Sampled Date	24-JUL-08	24-JUL-08	24-JUL-08	24-JUL-08	24-JUL-08
		Sampled Time					
		Client ID	TPS-SC-07	TPS-SC-08	TPS-SC-09	TPS-SC-10	TPS-SC-11
Grouping	**Analyte**						
SOIL							
Physical Tests	pH (pH)		5.99	5.82	5.78	5.36	5.85
Organic / Inorganic Carbon	Total Organic Carbon (%)		5.2	5.0	5.5	4.8	6.1
Metals	Antimony (Sb) (mg/kg)		<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)		76.7	36.4	42.3	120	105
	Barium (Ba) (mg/kg)		95.0	124	95.5	109	100
	Beryllium (Be) (mg/kg)		1.38	1.52	1.32	1.54	1.19
	Cadmium (Cd) (mg/kg)		<0.50	0.92	0.61	<0.50	<0.50
	Chromium (Cr) (mg/kg)		82.7	100	88.2	100	66.1
	Cobalt (Co) (mg/kg)		61.2	49.7	31.6	21.6	28.8
	Copper (Cu) (mg/kg)		71.0	77.8	63.6	80.2	59.8
	Lead (Pb) (mg/kg)		<30	<30	<30	<30	<30
	Mercury (Hg) (mg/kg)		0.0401	0.0560	0.0444	0.0389	0.0448
	Molybdenum (Mo) (mg/kg)		9.6	7.1	7.9	9.9	10.3
	Nickel (Ni) (mg/kg)		88.7	137	88.4	85.7	77.6
	Selenium (Se) (mg/kg)		<2.0	<2.0	<2.0	<2.0	<2.0
	Silver (Ag) (mg/kg)		<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)		<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)		<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)		36.5	39.8	36.6	40.7	32.5
	Zinc (Zn) (mg/kg)		85.1	104	83.5	94.1	73.9

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

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L664196-76	L664196-77	L664196-78	L664196-79	L664196-80
	Description					
	Sampled Date	24-JUL-08	24-JUL-08	24-JUL-08	24-JUL-08	24-JUL-08
	Sampled Time					
	Client ID	TPS-SC-12	TPS-SC-13	TPS-SC-14	TPS-SC-15	TPS-SC-DUP
Grouping	**Analyte**					
SOIL						
Physical Tests	pH (pH)	5.73	5.76	5.85	5.86	5.84
Organic / Inorganic Carbon	Total Organic Carbon (%)	5.5	5.4	5.5	4.3	4.6
Metals	Antimony (Sb) (mg/kg)	<10	<10	<20	<10	<10
	Arsenic (As) (mg/kg)	23.5	24.4	420	24.7	27.2
	Barium (Ba) (mg/kg)	114	120	148	105	122
	Beryllium (Be) (mg/kg)	1.67	1.35	1.2	1.59	1.59
	Cadmium (Cd) (mg/kg)	<0.50	0.52	1.0	<0.50	0.76
	Chromium (Cr) (mg/kg)	107	95.1	72.0	114	108
	Cobalt (Co) (mg/kg)	12.6	48.1	37.6	21.8	32.3
	Copper (Cu) (mg/kg)	85.4	68.5	71.8	76.9	77.3
	Lead (Pb) (mg/kg)	31	<30	<60	<30	<30
	Mercury (Hg) (mg/kg)	0.0443	0.0440	0.0370	0.0276	0.0406
	Molybdenum (Mo) (mg/kg)	7.0	5.0	29.6	5.9	5.4
	Nickel (Ni) (mg/kg)	68.6	111	122	71.4	120
	Selenium (Se) (mg/kg)	<4.0	<2.0	<4.0	<4.0	<2.0
	Silver (Ag) (mg/kg)	<2.0	<2.0	<4.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<10	<5.0	<5.0
	Vanadium (V) (mg/kg)	40.3	38.0	19.4	41.3	41.9
	Zinc (Zn) (mg/kg)	102	87.7	77.0	89.0	102

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

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L664196-81	L664196-82	L664196-83	L664196-84	L664196-85
		Description					
		Sampled Date	24-JUL-08	24-JUL-08	24-JUL-08	24-JUL-08	24-JUL-08
		Sampled Time					
		Client ID	TPN-SC-01	TPN-SC-02	TPN-SC-03	TPN-SC-04	TPN-SC-05
Grouping	**Analyte**						
SOIL							
Physical Tests	pH (pH)		5.80	5.83	5.85	5.83	5.82
Organic / Inorganic Carbon	Total Organic Carbon (%)		5.6	4.8	5.3	5.4	4.8
Metals	Antimony (Sb) (mg/kg)		<20	<10	<10	<10	<10
	Arsenic (As) (mg/kg)		62	30.0	54.9	27.2	53.5
	Barium (Ba) (mg/kg)		115	93.6	123	100	138
	Beryllium (Be) (mg/kg)		<1.0	1.44	1.05	1.48	1.16
	Cadmium (Cd) (mg/kg)		<1.0	0.51	<0.50	0.96	0.86
	Chromium (Cr) (mg/kg)		74.2	106	79.4	106	82.8
	Cobalt (Co) (mg/kg)		54.0	21.3	32.8	23.4	44.8
	Copper (Cu) (mg/kg)		60.2	65.6	60.7	56.9	64.5
	Lead (Pb) (mg/kg)		<60	<30	<30	<30	<30
	Mercury (Hg) (mg/kg)		0.0332	0.0287	0.0425	0.0271	0.0362
	Molybdenum (Mo) (mg/kg)		11.3	5.5	6.7	4.5	7.3
	Nickel (Ni) (mg/kg)		118	82.4	96.7	130	184
	Selenium (Se) (mg/kg)		<4.0	<2.0	<2.0	<2.0	<4.0
	Silver (Ag) (mg/kg)		<4.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)		<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)		<10	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)		16.2	34.9	30.5	34.7	32.7
	Zinc (Zn) (mg/kg)		59.4	83.2	74.3	92.0	91.4

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

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L664196-86	L664196-87	L664196-88	L664196-89	L664196-90
	Description					
	Sampled Date	24-JUL-08	24-JUL-08	24-JUL-08	24-JUL-08	24-JUL-08
	Sampled Time					
	Client ID	TPN-SC-06	TPN-SC-07	TPN-SC-08	TPN-SC-09	TPN-SC-10
Grouping	**Analyte**					
SOIL						
Physical Tests	pH (pH)	5.84	5.89	5.88	5.94	5.93
Organic / Inorganic Carbon	Total Organic Carbon (%)	3.6	4.0	2.7	0.7	3.2
Metals	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	22.5	21.4	20.2	6.5	23.0
	Barium (Ba) (mg/kg)	102	84.8	83.7	27.8	97.2
	Beryllium (Be) (mg/kg)	1.63	1.33	1.26	<0.50	1.48
	Cadmium (Cd) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Chromium (Cr) (mg/kg)	136	115	116	41.5	129
	Cobalt (Co) (mg/kg)	18.7	17.3	13.8	11.6	16.5
	Copper (Cu) (mg/kg)	83.3	57.5	56.6	15.3	67.4
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Mercury (Hg) (mg/kg)	0.0198	0.0215	0.0194	0.0074	0.0210
	Molybdenum (Mo) (mg/kg)	5.0	<4.0	<4.0	<4.0	4.4
	Nickel (Ni) (mg/kg)	71.1	63.4	60.3	28.1	63.2
	Selenium (Se) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)	43.8	35.1	35.7	14.9	41.3
	Zinc (Zn) (mg/kg)	92.7	79.8	78.5	30.5	84.8

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

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L664196-91	L664196-92	L664196-93	L664196-94	L664196-95
	Description					
	Sampled Date	24-JUL-08	24-JUL-08	24-JUL-08	24-JUL-08	24-JUL-08
	Sampled Time					
	Client ID	TPN-SC-11	TPN-SC-12	TPN-SC-13	TPN-SC-14	TPN-SC-15
Grouping	**Analyte**					
SOIL						
Physical Tests	pH (pH)	5.87	5.86	5.86	5.95	5.82
Organic / Inorganic Carbon	Total Organic Carbon (%)	4.5	4.9	4.5	4.8	5.6
Metals	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	21.2	31.5	20.7	31.4	37.6
	Barium (Ba) (mg/kg)	87.1	111	87.6	101	80.1
	Beryllium (Be) (mg/kg)	1.25	1.20	1.30	1.18	1.22
	Cadmium (Cd) (mg/kg)	<0.50	0.54	<0.50	<0.50	<0.50
	Chromium (Cr) (mg/kg)	109	102	115	108	107
	Cobalt (Co) (mg/kg)	18.7	30.0	16.9	27.3	18.5
	Copper (Cu) (mg/kg)	60.8	61.4	61.8	61.8	61.5
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Mercury (Hg) (mg/kg)	0.0285	0.0355	0.0287	0.0291	0.0380
	Molybdenum (Mo) (mg/kg)	4.1	5.5	<4.0	5.6	5.6
	Nickel (Ni) (mg/kg)	73.8	106	66.1	85.5	71.9
	Selenium (Se) (mg/kg)	<2.0	<4.0	<2.0	<2.0	<4.0
	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)	34.4	34.6	35.6	35.0	35.8
	Zinc (Zn) (mg/kg)	78.1	83.6	77.8	79.1	74.9

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

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID: L664196-96 Description: Sampled Date: 24-JUL-08 Sampled Time: Client ID: TPN-SC-DUP	L664196-97 25-JUL-08 INUG-SC-01	L664196-98 25-JUL-08 INUG-SC-02	L664196-99 25-JUL-08 INUG-SC-03	L664196-100 25-JUL-08 INUG-SC-04
SOIL						
Physical Tests	pH (pH)	5.87	5.80	5.93	6.01	6.07
Organic / Inorganic Carbon	Total Organic Carbon (%)	4.5	4.5	4.9	4.8	4.5
Metals	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<20
	Arsenic (As) (mg/kg)	22.8	25.4	21.5	23.4	60
	Barium (Ba) (mg/kg)	96.0	122	104	118	107
	Beryllium (Be) (mg/kg)	1.36	1.44	1.39	1.19	1.1
	Cadmium (Cd) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<1.0
	Chromium (Cr) (mg/kg)	118	95.4	94.8	72.0	85.1
	Cobalt (Co) (mg/kg)	19.6	10.7	15.2	20.6	18.8
	Copper (Cu) (mg/kg)	65.3	49.9	46.9	40.2	48.7
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<60
	Mercury (Hg) (mg/kg)	0.0284	0.0336	0.0336	0.0402	0.0344
	Molybdenum (Mo) (mg/kg)	4.5	4.9	5.1	5.9	<8.0
	Nickel (Ni) (mg/kg)	89.1	72.3	75.7	82.5	70
	Selenium (Se) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<4.0
	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<4.0
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<10
	Vanadium (V) (mg/kg)	37.5	35.8	36.6	33.1	23.6
	Zinc (Zn) (mg/kg)	84.0	78.6	79.1	67.1	58.8

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

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L664196-101	L664196-102	L664196-103	L664196-104	L664196-105
		Description					
		Sampled Date	25-JUL-08	25-JUL-08	25-JUL-08	25-JUL-08	25-JUL-08
		Sampled Time					
		Client ID	INUG-SC-05	INUG-SC-06	INUG-SC-07	INUG-SC-08	INUG-SC-09
Grouping	**Analyte**						
SOIL							
Physical Tests	pH (pH)		5.80	5.85	5.96	5.95	6.15
Organic / Inorganic Carbon	Total Organic Carbon (%)		5.1	4.3	4.6	4.3	2.7
Metals	Antimony (Sb) (mg/kg)		<10	<10	<10	<20	<10
	Arsenic (As) (mg/kg)		9.7	11.1	49.7	115	8.8
	Barium (Ba) (mg/kg)		133	122	95.8	110	74.5
	Beryllium (Be) (mg/kg)		1.41	1.62	1.22	1.1	1.00
	Cadmium (Cd) (mg/kg)		<0.50	<0.50	<0.50	<1.0	<0.50
	Chromium (Cr) (mg/kg)		99.4	110	79.8	83.9	79.9
	Cobalt (Co) (mg/kg)		10.4	12.2	16.7	20.9	10.4
	Copper (Cu) (mg/kg)		48.5	54.0	40.3	48.2	30.1
	Lead (Pb) (mg/kg)		<30	<30	<30	<60	<30
	Mercury (Hg) (mg/kg)		0.0515	0.0360	0.0530	0.0410	0.0193
	Molybdenum (Mo) (mg/kg)		<4.0	4.1	6.5	10.6	<4.0
	Nickel (Ni) (mg/kg)		74.7	80.8	71.1	71	49.7
	Selenium (Se) (mg/kg)		<2.0	<2.0	<2.0	<4.0	<2.0
	Silver (Ag) (mg/kg)		<2.0	<2.0	<2.0	<4.0	<2.0
	Thallium (Tl) (mg/kg)		<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)		<5.0	<5.0	<5.0	<10	<5.0
	Vanadium (V) (mg/kg)		35.6	40.7	32.7	23.7	28.1
	Zinc (Zn) (mg/kg)		83.0	92.5	71.3	58.4	59.6

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

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L664196-106	L664196-107	L664196-108	L664196-109	L664196-110
	Description					
	Sampled Date	25-JUL-08	25-JUL-08	25-JUL-08	25-JUL-08	25-JUL-08
	Sampled Time					
	Client ID	INUG-SC-10	INUG-SC-11	INUG-SC-12	INUG-SC-13	INUG-SC-14
Grouping	**Analyte**					
SOIL						
Physical Tests	pH (pH)	5.98	5.98	6.06	5.98	5.54
Organic / Inorganic Carbon	Total Organic Carbon (%)	2.7	3.6	3.6	5.0	5.0
Metals	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	26.3	36.7	<5.0	31.7	26.5
	Barium (Ba) (mg/kg)	117	171	114	108	115
	Beryllium (Be) (mg/kg)	1.16	1.39	1.26	1.39	1.51
	Cadmium (Cd) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Chromium (Cr) (mg/kg)	67.8	86.1	91.0	91.0	96.4
	Cobalt (Co) (mg/kg)	25.0	47.2	9.2	12.7	16.1
	Copper (Cu) (mg/kg)	40.9	44.5	36.4	47.6	49.9
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Mercury (Hg) (mg/kg)	0.0440	0.0586	0.0313	0.0414	0.0462
	Molybdenum (Mo) (mg/kg)	5.8	7.2	<4.0	4.9	5.6
	Nickel (Ni) (mg/kg)	98.6	78.2	74.0	71.0	90.1
	Selenium (Se) (mg/kg)	<2.0	<6.0	<2.0	<2.0	<4.0
	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)	32.9	37.4	31.9	35.3	37.5
	Zinc (Zn) (mg/kg)	67.0	81.1	76.3	76.6	91.0

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

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L664196-111	L664196-112			
	Description					
	Sampled Date	25-JUL-08	25-JUL-08			
	Sampled Time					
	Client ID	INUG-SC-15	INUG-SC-DUP			
Grouping	**Analyte**					
SOIL						
Physical Tests	pH (pH)	5.97	5.95			
Organic / Inorganic Carbon	Total Organic Carbon (%)	5.1	7.1			
Metals	Antimony (Sb) (mg/kg)	<10	<10			
	Arsenic (As) (mg/kg)	29.6	18.9			
	Barium (Ba) (mg/kg)	99.5	100			
	Beryllium (Be) (mg/kg)	1.45	1.35			
	Cadmium (Cd) (mg/kg)	<0.50	<0.50			
	Chromium (Cr) (mg/kg)	89.6	94.3			
	Cobalt (Co) (mg/kg)	13.4	17.9			
	Copper (Cu) (mg/kg)	47.0	46.1			
	Lead (Pb) (mg/kg)	<30	<30			
	Mercury (Hg) (mg/kg)	0.0359	0.0414			
	Molybdenum (Mo) (mg/kg)	7.2	5.0			
	Nickel (Ni) (mg/kg)	64.1	66.8			
	Selenium (Se) (mg/kg)	<2.0	<2.0			
	Silver (Ag) (mg/kg)	<2.0	<2.0			
	Thallium (Tl) (mg/kg)	<1.0	<1.0			
	Tin (Sn) (mg/kg)	<5.0	<5.0			
	Vanadium (V) (mg/kg)	37.3	35.8			
	Zinc (Zn) (mg/kg)	71.4	76.4			

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

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L664196-113	L664196-114	L664196-115	L664196-116	L664196-117
	Description					
	Sampled Date	20-JUL-08	20-JUL-08	20-JUL-08	20-JUL-08	20-JUL-08
	Sampled Time					
	Client ID	2PL-SB-WQ-1M	2PL-SB-WQ-7M	2PL-NB-WQ-1M	2PL-NB-WQ-7M	2PL-MB-WQ-1M
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	20.0	20.0	20.1	20.1	20.5
	Hardness (as CaCO3) (mg/L)	7.89	7.85	7.98	8.01	7.87
	pH (pH)	7.10	7.13	7.15	7.14	7.13
	Total Suspended Solids (mg/L)	<3.0	<3.0	<3.0	<3.0	<3.0
	Total Dissolved Solids (mg/L)	<10	<10	13	<10	14
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	5.9	5.5	6.0	5.7	5.4
	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)	5.9	5.5	6.0	5.7	5.4
	Ammonia as N (mg/L)	0.030	<0.020	0.040	0.039	0.033
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	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)	0.089	0.065	0.084	0.079	0.068
	Ortho Phosphate as P (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	0.0011
	Total Phosphate as P (mg/L)	0.0046	0.0035	0.0021	0.0026	0.0031
	Sulfate (SO4) (mg/L)	1.83	1.83	1.84	1.84	1.86
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.64	1.61	1.68	1.66	1.64
	Total Organic Carbon (mg/L)	1.62	1.55	1.57	1.55	1.47
Total Metals	Aluminum (Al)-Total (mg/L)					
	Antimony (Sb)-Total (mg/L)					
	Arsenic (As)-Total (mg/L)					
	Barium (Ba)-Total (mg/L)					
	Beryllium (Be)-Total (mg/L)					
	Boron (B)-Total (mg/L)					
	Cadmium (Cd)-Total (mg/L)					
	Calcium (Ca)-Total (mg/L)					
	Chromium (Cr)-Total (mg/L)					
	Cobalt (Co)-Total (mg/L)					
	Copper (Cu)-Total (mg/L)					
	Iron (Fe)-Total (mg/L)					
	Lead (Pb)-Total (mg/L)					
	Lithium (Li)-Total (mg/L)					
	Magnesium (Mg)-Total (mg/L)					
	Manganese (Mn)-Total (mg/L)					
	Mercury (Hg)-Total (mg/L)					
	Molybdenum (Mo)-Total (mg/L)					
	Nickel (Ni)-Total (mg/L)					

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

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L664196-118	L664196-119	L664196-120	L664196-121	L664196-122
	Description					
	Sampled Date	20-JUL-08	20-JUL-08	20-JUL-08	20-JUL-08	20-JUL-08
	Sampled Time					
	Client ID	2PL-MB-WQ-7M	2PL-SB-WQ-1M	2PL-SB-WQ-7M	2PL-NB-WQ-1M	2PL-NB-WQ-7M
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	20.1				
	Hardness (as CaCO3) (mg/L)	7.94				
	pH (pH)	7.14				
	Total Suspended Solids (mg/L)	<3.0				
	Total Dissolved Solids (mg/L)	<10				
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	6.4				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0				
	Alkalinity, Total (as CaCO3) (mg/L)	6.4				
	Ammonia as N (mg/L)	0.059				
	Chloride (Cl) (mg/L)	<0.50				
	Nitrate (as N) (mg/L)	<0.0050				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	0.065				
	Ortho Phosphate as P (mg/L)	<0.0010				
	Total Phosphate as P (mg/L)	0.0024				
	Sulfate (SO4) (mg/L)	1.86				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.59				
	Total Organic Carbon (mg/L)	1.50				
Total Metals	Aluminum (Al)-Total (mg/L)					
	Antimony (Sb)-Total (mg/L)					
	Arsenic (As)-Total (mg/L)					
	Barium (Ba)-Total (mg/L)					
	Beryllium (Be)-Total (mg/L)					
	Boron (B)-Total (mg/L)					
	Cadmium (Cd)-Total (mg/L)					
	Calcium (Ca)-Total (mg/L)					
	Chromium (Cr)-Total (mg/L)					
	Cobalt (Co)-Total (mg/L)					
	Copper (Cu)-Total (mg/L)					
	Iron (Fe)-Total (mg/L)					
	Lead (Pb)-Total (mg/L)					
	Lithium (Li)-Total (mg/L)					
	Magnesium (Mg)-Total (mg/L)					
	Manganese (Mn)-Total (mg/L)					
	Mercury (Hg)-Total (mg/L)					
	Molybdenum (Mo)-Total (mg/L)					
	Nickel (Ni)-Total (mg/L)					

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

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID	L664196-123	L664196-124	L664196-125	L664196-126	L664196-127
		Description					
		Sampled Date	20-JUL-08	20-JUL-08	19-JUL-08	20-JUL-08	22-JUL-08
		Sampled Time					
		Client ID	2PL-MB-WQ-1M	2PL-MB-WQ-7M	SP	TE	WAL
WATER							
Physical Tests	Conductivity (uS/cm)				21.4	17.6	25.9
	Hardness (as CaCO3) (mg/L)				8.79	6.84	11.3
	pH (pH)				7.18	6.51	7.31
	Total Suspended Solids (mg/L)				<3.0	<3.0	<3.0
	Total Dissolved Solids (mg/L)				10	<10	17
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)				6.8	5.5	8.9
	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)				6.8	5.5	8.9
	Ammonia as N (mg/L)				0.045	0.052	0.020
	Chloride (Cl) (mg/L)				<0.50	<0.50	<0.50
	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)				0.137	0.097	0.124
	Ortho Phosphate as P (mg/L)				<0.0010	0.0010	0.0013
	Total Phosphate as P (mg/L)				0.0022	0.0022	0.0037
	Sulfate (SO4) (mg/L)				2.08	1.72	2.27
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)				1.72	1.65	2.34
	Total Organic Carbon (mg/L)				1.56	1.44	1.84
Total Metals	Aluminum (Al)-Total (mg/L)				0.0064	0.0085	<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)				2.31	1.74	3.07
	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)				0.73	0.61	0.87
	Manganese (Mn)-Total (mg/L)				0.00113	0.00119	0.00102
	Mercury (Hg)-Total (mg/L)				<0.000020	<0.000020	<0.000020
	Molybdenum (Mo)-Total (mg/L)				<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Total (mg/L)				<0.0010	<0.0010	<0.0010

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

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID: L664196-128	L664196-129	L664196-130	L664196-131	L664196-132
	Description					
	Sampled Date	23-JUL-08	24-JUL-08	24-JUL-08	25-JUL-08	
	Sampled Time					
	Client ID	TPE	TPS	TPN	INUG	DUP
WATER						
Physical Tests	Conductivity (uS/cm)	13.8	14.1	13.6	14.0	26.1
	Hardness (as CaCO3) (mg/L)	4.99	5.07	4.89	5.01	11.2
	pH (pH)	6.52	6.47	6.52	6.53	7.30
	Total Suspended Solids (mg/L)	<3.0	<3.0	<3.0	<3.0	<3.0
	Total Dissolved Solids (mg/L)	<10	<10	<10	<10	13
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	3.8	3.4	4.0	4.6	8.1
	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)	3.8	3.4	4.0	4.6	8.1
	Ammonia as N (mg/L)	0.046	0.064	0.028	0.058	0.021
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	0.60	<0.50
	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)	0.081	0.081	0.084	0.156	0.145
	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	0.0021	0.0021	0.0030
	Sulfate (SO4) (mg/L)	1.17	1.23	1.17	0.70	2.26
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.54	1.51	6.95	2.05	2.09
	Total Organic Carbon (mg/L)	1.31	1.41	1.30	1.82	1.93
Total Metals	Aluminum (Al)-Total (mg/L)	0.0083	<0.0050	<0.0050	0.0068	<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)	1.18	1.19	1.16	1.02	3.04
	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	0.031	<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)	0.49	0.51	0.49	0.60	0.87
	Manganese (Mn)-Total (mg/L)	0.00090	0.00059	0.00061	0.00181	0.00101
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	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

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

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L664196-133	L664196-134	L664196-135	L664196-136	L664196-137
	Description					
	Sampled Date	25-JUL-08	19-JUL-08	20-JUL-08	22-JUL-08	23-JUL-08
	Sampled Time					
	Client ID	EQBLK	SP	TE	WAL	TPE
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	<2.0				
	Hardness (as CaCO3) (mg/L)	<0.70				
	pH (pH)	5.62				
	Total Suspended Solids (mg/L)	<3.0				
	Total Dissolved Solids (mg/L)	<10				
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<2.0				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0				
	Alkalinity, Total (as CaCO3) (mg/L)	<2.0				
	Ammonia as N (mg/L)	<0.020				
	Chloride (Cl) (mg/L)	<0.50				
	Nitrate (as N) (mg/L)	<0.0050				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	<0.050				
	Ortho Phosphate as P (mg/L)	<0.0010				
	Total Phosphate as P (mg/L)	<0.0020				
	Sulfate (SO4) (mg/L)	<0.50				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	<0.50				
	Total Organic Carbon (mg/L)	<0.50				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0050				
	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)	<0.10				
	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)	<0.10				
	Manganese (Mn)-Total (mg/L)	<0.00030				
	Mercury (Hg)-Total (mg/L)	<0.000020				
	Molybdenum (Mo)-Total (mg/L)	<0.0010				
	Nickel (Ni)-Total (mg/L)	<0.0010				

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

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L664196-138	L664196-139	L664196-140	L664196-141	
	Description					
	Sampled Date	24-JUL-08	24-JUL-08	25-JUL-08		
	Sampled Time					
	Client ID	TPS	TPN	INUG	DUP	
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)					
	Hardness (as CaCO3) (mg/L)					
	pH (pH)					
	Total Suspended Solids (mg/L)					
	Total Dissolved Solids (mg/L)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)					
	Alkalinity, Carbonate (as CaCO3) (mg/L)					
	Alkalinity, Hydroxide (as CaCO3) (mg/L)					
	Alkalinity, Total (as CaCO3) (mg/L)					
	Ammonia as N (mg/L)					
	Chloride (Cl) (mg/L)					
	Nitrate (as N) (mg/L)					
	Nitrite (as N) (mg/L)					
	Total Kjeldahl Nitrogen (mg/L)					
	Ortho Phosphate as P (mg/L)					
	Total Phosphate as P (mg/L)					
	Sulfate (SO4) (mg/L)					
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)					
	Total Organic Carbon (mg/L)					
Total Metals	Aluminum (Al)-Total (mg/L)					
	Antimony (Sb)-Total (mg/L)					
	Arsenic (As)-Total (mg/L)					
	Barium (Ba)-Total (mg/L)					
	Beryllium (Be)-Total (mg/L)					
	Boron (B)-Total (mg/L)					
	Cadmium (Cd)-Total (mg/L)					
	Calcium (Ca)-Total (mg/L)					
	Chromium (Cr)-Total (mg/L)					
	Cobalt (Co)-Total (mg/L)					
	Copper (Cu)-Total (mg/L)					
	Iron (Fe)-Total (mg/L)					
	Lead (Pb)-Total (mg/L)					
	Lithium (Li)-Total (mg/L)					
	Magnesium (Mg)-Total (mg/L)					
	Manganese (Mn)-Total (mg/L)					
	Mercury (Hg)-Total (mg/L)					
	Molybdenum (Mo)-Total (mg/L)					
	Nickel (Ni)-Total (mg/L)					

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

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L664196-113	L664196-114	L664196-115	L664196-116	L664196-117
	Description					
	Sampled Date	20-JUL-08	20-JUL-08	20-JUL-08	20-JUL-08	20-JUL-08
	Sampled Time					
	Client ID	2PL-SB-WQ-1M	2PL-SB-WQ-7M	2PL-NB-WQ-1M	2PL-NB-WQ-7M	2PL-MB-WQ-1M
Grouping	**Analyte**					
WATER						
Total Metals	Potassium (K)-Total (mg/L)					
	Selenium (Se)-Total (mg/L)					
	Silver (Ag)-Total (mg/L)					
	Sodium (Na)-Total (mg/L)					
	Thallium (Tl)-Total (mg/L)					
	Tin (Sn)-Total (mg/L)					
	Titanium (Ti)-Total (mg/L)					
	Uranium (U)-Total (mg/L)					
	Vanadium (V)-Total (mg/L)					
	Zinc (Zn)-Total (mg/L)					
Dissolved Metals	Calcium (Ca)-Dissolved (mg/L)	2.00	2.00	2.06	2.07	2.02
	Magnesium (Mg)-Dissolved (mg/L)	0.71	0.69	0.69	0.69	0.69
Aggregate Organics	Oil and Grease (mg/L)					
Plant Pigments	Chlorophyll a (ug)					

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

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L664196-118	L664196-119	L664196-120	L664196-121	L664196-122
	Description					
	Sampled Date	20-JUL-08	20-JUL-08	20-JUL-08	20-JUL-08	20-JUL-08
	Sampled Time					
	Client ID	2PL-MB-WQ-7M	2PL-SB-WQ-1M	2PL-SB-WQ-7M	2PL-NB-WQ-1M	2PL-NB-WQ-7M
Grouping	**Analyte**					
WATER						
Total Metals	Potassium (K)-Total (mg/L)					
	Selenium (Se)-Total (mg/L)					
	Silver (Ag)-Total (mg/L)					
	Sodium (Na)-Total (mg/L)					
	Thallium (Tl)-Total (mg/L)					
	Tin (Sn)-Total (mg/L)					
	Titanium (Ti)-Total (mg/L)					
	Uranium (U)-Total (mg/L)					
	Vanadium (V)-Total (mg/L)					
	Zinc (Zn)-Total (mg/L)					
Dissolved Metals	Calcium (Ca)-Dissolved (mg/L)	2.05				
	Magnesium (Mg)-Dissolved (mg/L)	0.68				
Aggregate Organics	Oil and Grease (mg/L)					
Plant Pigments	Chlorophyll a (ug)		0.366	0.417	0.394	0.337

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

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L664196-123	L664196-124	L664196-125	L664196-126	L664196-127
	Description					
	Sampled Date	20-JUL-08	20-JUL-08	19-JUL-08	20-JUL-08	22-JUL-08
	Sampled Time					
	Client ID	2PL-MB-WQ-1M	2PL-MB-WQ-7M	SP	TE	WAL
Grouping	**Analyte**					
WATER						
Total Metals	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	Calcium (Ca)-Dissolved (mg/L)					
	Magnesium (Mg)-Dissolved (mg/L)					
Aggregate Organics	Oil and Grease (mg/L)			<5.0	<5.0	<5.0
Plant Pigments	Chlorophyll a (ug)	0.420	0.366			

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

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID: L664196-128 Description: Sampled Date: 23-JUL-08 Sampled Time: Client ID: TPE	L664196-129 24-JUL-08 TPS	L664196-130 24-JUL-08 TPN	L664196-131 25-JUL-08 INUG	L664196-132 DUP
WATER						
Total Metals	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	Calcium (Ca)-Dissolved (mg/L)					
	Magnesium (Mg)-Dissolved (mg/L)					
Aggregate Organics	Oil and Grease (mg/L)	<5.0	<5.0	<5.0	<5.0	<5.0
Plant Pigments	Chlorophyll a (ug)					

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

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L664196-133	L664196-134	L664196-135	L664196-136	L664196-137
	Description					
	Sampled Date	25-JUL-08	19-JUL-08	20-JUL-08	22-JUL-08	23-JUL-08
	Sampled Time					
	Client ID	EQBLK	SP	TE	WAL	TPE
Grouping	**Analyte**					
WATER						
Total Metals	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	Calcium (Ca)-Dissolved (mg/L)					
	Magnesium (Mg)-Dissolved (mg/L)					
Aggregate Organics	Oil and Grease (mg/L)	<5.0				
Plant Pigments	Chlorophyll a (ug)		0.336	0.309	0.557	0.398

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

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L664196-138	L664196-139	L664196-140	L664196-141	
	Description					
	Sampled Date	24-JUL-08	24-JUL-08	25-JUL-08		
	Sampled Time					
	Client ID	TPS	TPN	INUG	DUP	
Grouping	**Analyte**					
WATER						
Total Metals	Potassium (K)-Total (mg/L)					
	Selenium (Se)-Total (mg/L)					
	Silver (Ag)-Total (mg/L)					
	Sodium (Na)-Total (mg/L)					
	Thallium (Tl)-Total (mg/L)					
	Tin (Sn)-Total (mg/L)					
	Titanium (Ti)-Total (mg/L)					
	Uranium (U)-Total (mg/L)					
	Vanadium (V)-Total (mg/L)					
	Zinc (Zn)-Total (mg/L)					
Dissolved Metals	Calcium (Ca)-Dissolved (mg/L)					
	Magnesium (Mg)-Dissolved (mg/L)					
Aggregate Organics	Oil and Grease (mg/L)					
Plant Pigments	Chlorophyll a (ug)	0.394	0.363	0.506	0.585	

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

Reference Information

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-CL-IC-VA	Water	Chloride by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-NO2-IC-VA	Water	Nitrite by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-NO3-IC-VA	Water	Nitrate by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-SO4-IC-VA	Water	Sulfate by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

C-TOT-ORG-LECO-SK	Soil	Organic Carbon by combustion method	SSSA (1996) p. 973

Total Organic Carbon (C-TOT-ORG-LECO-SK, C-TOT-ORG-SK)

Total C and inorganic C are determined on separate samples. The total C is determined by combustion and thermal conductivity detection, while inorganic C is determined by weight lass after addition of hydrochloric acid. Organic C is calculated by the difference between these two determinations.

Reference for Total C:
Nelson, D.W. and Sommers, L.E. 1996. Total Carbon, organic carbon and organic matter. P. 961-1010 In: J.M. Bartels et al. (ed.) Methods of soil analysis: Part 3 Chemical methods. (3rd ed.) ASA and SSSA, Madison, WI. Book series no. 5

Reference for Inorganic C:
Loeppert, R.H. and Suarez, D.L. 1996. Gravimetric Method for Loss of Carbon Dioxide. P. 455-456 In: J.M. Bartels et al. (ed.) Methods of soil analysis: Part 3 Chemical methods. (3rd ed.) ASA and SSSA, Madison, WI. Book series no. 5

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)".

CHLOROA-VA	Water	Chlorophyll a by Fluorometer	APHA 10200 H. "Chlorophyll" and EPA 445

Chlorophyll and Pheopigments by Fluorometry analysis is carried out using procedures adapted from APHA Method 10200 H. "Chlorophyll" and USEPA Method 445. 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% aqueuos 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.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
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-CCME-CVAFS-VA	Soil	CVAFS Hg in Soil (CCME)	CCME

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by atomic fluorescence spectrophotometry (EPA Method 7000 series).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

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-CSR-FULL-ICP-VA	Soil	Metals in Soil by ICPOES (CSR SALM)	BCMELP CSR SALM METHOD 8

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

MET-DIS-ICP-VA	Water	Dissolved Metals in Water by ICPOES	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 procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

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).

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
NH3-SIE-VA	Water	Ammonia by SIE	APHA 4500-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.

OGG-SF-VA	Water	Oil & Grease by Gravimetric	BCMOE GRAVIMETRIC

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3510 & 9071, published by the United States Environmental Protection Agency (EPA), "Standard Methods for the Examination of Water and Wastewater", 20th ed., Method 5520, published by the American Public Health Association, and "BC Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials," 5th ed., published by the B.C. Ministry of Environment, Lands & Parks, 1994. The procedure involves an extraction of the entire water sample with hexane. This extract is then evaporated to dryness, and the residue weighed to determine Oil and Grease.

PH-1:2-VA	Soil	CSR pH by 1:2 Water Leach	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL

This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (10 mesh /2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.

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

PO4-DO-COL-VA	Water	Dissolved ortho Phosphate 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.

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.

TL-CSR-MS-VA	Soil	ICPMS Tl in Soil by CSR SALM	BCMELP CSR SALM Method 8

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by either hotplate or block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)

mobile in the environment.

TSS-VA	Water	Solids by Gravimetric	APHA 2540 D - GRAVIMETRIC

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.

** 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
SK	ALS LABORATORY GROUP - SASKATOON, SASKATCHEWAN, CANADA	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.

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ADDRESS:	PO /AFE:	
	Legal Site Description:	
PHONE: FAX:	QUOTE #: ALSEQ07-622	
Lab Work Order # (lab use only): L664196	SAMPLER (Initials): ML MT RT	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Total Metals	TOC	Grain Size	HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	SP - SC - 01	July 19/08		Sediment	X	X	X	N	N	1
	SP - SC - 02	↓		↓	X	X	X	↓	↓	↓
	SP - SC - 03				X	X	X			
	SP - SC - 04				X	X	X			
	SP - SC - 05				X	X	X			
	SP - SC - 06				X	X	X			
	SP - SC - 07				X	X	X			
	SP - SC - 08				X	X	X			
	SP - SC - 09				X	X	X			
	SP - SC - 10	↓		↓	X	X	X	↓	↓	↓

GUIDELINES / REGULATIONS	SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

Failure to complete all portions of this form may delay analysis. Please fill in this form *LEGIBLY*.

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RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	SAMPLE CONDITION (lab use only)	
	26/11/08		Aug 1/08 13:15	TEMPERATURE	SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO (If no provide details)
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	12/13/14	

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COC # C098411

REPORT TO:	REPORT FORMAT / DISTRIBUTION	SERVICE REQUESTED
COMPANY: See Page 1	STANDARD _____ OTHER _____	REGULAR SERVICE (DEFAULT)
CONTACT:	PDF _____ EXCEL _____ CUSTOM _____ FAX _____	RUSH SERVICE (2-3 DAYS)
ADDRESS:	EMAIL 1:	PRIORITY SERVICE (1 DAY or ASAP)
	EMAIL 2:	EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS
PHONE: FAX:		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? YES / NO	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	
COMPANY:	**CLIENT / PROJECT INFORMATION:**	
CONTACT:	JOB #:	
ADDRESS:	PO /AFE:	
	Legal Site Description:	
PHONE: FAX:	QUOTE #:	
Lab Work Order # (lab use only): L604196	SAMPLER (Initials):	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Total Metals	TOC	Grain Size	HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	SP-SC-11	July 19/08		Sediment	X	X	X	N	N	1
	SP-SC-12	↓		↓	X	X	X	↓	↓	↓
	SP-SC-13				X	X	X			
	SP-SC-14				X	X	X			
	SP-SC-15				X	X	X			
	SP-SC-DUP				X	X	X			
	TE*SC-01	July 20/08			X	X	X			
	TE-SC-02				X	X	X			
	TE-SC-03				X	X	X			
	TE-SC-04	↓		↓	X	X	X	↓	↓	↓

GUIDELINES / REGULATIONS	SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

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RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	SAMPLE CONDITION (lab use only)	
	26/7 11Am	AG	Aug 1/08 13:15	TEMPERATURE 12/13/14°C	SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO (If no provide details)
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:		

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COC # C098410

REPORT TO:	REPORT FORMAT / DISTRIBUTION	SERVICE REQUESTED
COMPANY:	STANDARD _____ OTHER _____	REGULAR SERVICE (DEFAULT)
CONTACT: See page 1	PDF _____ EXCEL _____ CUSTOM _____ FAX _____	RUSH SERVICE (2-3 DAYS)
ADDRESS:	EMAIL 1:	PRIORITY SERVICE (1 DAY or ASAP)
	EMAIL 2:	EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS
PHONE: FAX:		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? YES / NO	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	
COMPANY:	**CLIENT / PROJECT INFORMATION:**	
CONTACT:	JOB #:	
ADDRESS:	PO /AFE:	
	Legal Site Description:	
PHONE: FAX:	QUOTE #:	
Lab Work Order # (lab use only)	SAMPLER (Initials):	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Total Metals	TOC	Grain Size	HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	TE-SC-05	July 20/08		Sediment	X	X	X	N	N	1
	TE-SC-06	↓		↓	X	X	X	↓	↓	↓
	TE-SC-07				X	X	X			
	TE-SC-08				X	X	X			
	TE-SC-09				X	X	X			
	TE-SC-10				X	X	X			
	TE-SC-11				X	X	X			
	TE-SC-12				X	X	X			
	TE-SC-13				X	X	X			
	TE-SC-14	↓		↓	X	X	X	↓	↓	↓

GUIDELINES / REGULATIONS	SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

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RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	SAMPLE CONDITION (lab use only)	
	26/8 11am		Aug1/08 13:15	TEMPERATURE 12/13/14 °C	SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO (If no provide details)
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:		

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COC # C098395

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COMPANY: See Page 1	STANDARD _____ OTHER _____	REGULAR SERVICE (DEFAULT)
CONTACT:	PDF _____ EXCEL _____ CUSTOM _____ FAX _____	RUSH SERVICE (2-3 DAYS)
ADDRESS:	EMAIL 1:	PRIORITY SERVICE (1 DAY or ASAP)
	EMAIL 2:	EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS
PHONE: FAX:		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? YES / NO	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	
COMPANY:	**CLIENT / PROJECT INFORMATION:**	
CONTACT:	JOB #:	
ADDRESS:	PO /AFE:	
	Legal Site Description:	
PHONE: FAX:	QUOTE #:	
Lab Work Order # (lab use only): L664196		SAMPLER (Initials):

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Total Metals	TOC	Grain Size	HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	TE-SC-15	July 20/08		Sediment	X	X	X	N	N	1
	TE-SC-DUP	↓		↓	X	X	X	↓	↓	↓
	WAL-SC-01	July 22/08			X	X	X			
	WAL-SC-02	↓			X	X	X			
	WAL-SC-03				X	X	X			
	WAL-SC-04				X	X	X			
	WAL-SC-05				X	X	X			
	WAL-SC-06				X	X	X			
	WAL-SC-07	July 23/08			X	X	X			
	WAL-SC-08	↓		↓	X	X	X	↓	↓	↓

GUIDELINES / REGULATIONS	SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

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RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	SAMPLE CONDITION (lab use only)	
	26/7/11Am	AR	Aug 1/08 13:15	TEMPERATURE 12/13/14 ℃	SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO (If no provide details)
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:		

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CONTACT:	PDF _____ EXCEL _____ CUSTOM _____ FAX _____	RUSH SERVICE (2-3 DAYS)
ADDRESS:	EMAIL 1:	PRIORITY SERVICE (1 DAY or ASAP)
	EMAIL 2:	EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS
PHONE: FAX:		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? YES / NO	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	
COMPANY:	**CLIENT / PROJECT INFORMATION:**	
CONTACT:	JOB #:	
ADDRESS:	PO /AFE:	
	Legal Site Description:	
PHONE: FAX:	QUOTE #:	
Lab Work Order # (lab use only): L664196	SAMPLER (Initials):	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Total Metals	TOC	Grain Size	HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	WAL-SC-09	July 23/08		Sediment	X	X	X	N	N	1
	WAL-SC-10				X	X	X			
	WAL-SC-11				X	X	X			
	WAL-SC-12				X	X	X			
	WAL-SC-13				X	X	X			
	WAL-SC-14				X	X	X			
	WAL-SC-15				X	X	X			
	WAL-SC-DUP	July 23/08			X	X	X			
	TPE-SC-01	July 23/08			X	X	X			
	TPE-SC-02				X	X	X			

GUIDELINES / REGULATIONS	SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

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RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	SAMPLE CONDITION (lab use only)	
	26/7 1100		Aug 1/08 13:15	TEMPERATURE 12/13/14°C	SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO (If no provide details)
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:		

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CONTACT:	PDF ____ EXCEL ____ CUSTOM ____ FAX ____	RUSH SERVICE (2-3 DAYS)
ADDRESS:	EMAIL 1:	PRIORITY SERVICE (1 DAY or ASAP)
	EMAIL 2:	EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS
PHONE: FAX:		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? YES / NO	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	
COMPANY:	**CLIENT / PROJECT INFORMATION:**	
CONTACT:	JOB #:	
ADDRESS:	PO /AFE:	
	Legal Site Description:	
PHONE: FAX:	QUOTE #:	
Lab Work Order # (lab use only): L664196	SAMPLER (Initials):	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Total Metals	TOC	Grain Size	HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	TPE-SC-03	July 23/08		Sediment	X	X	X	N	N	1
	TPE-SC-04	↓		↓	X	X	X	↓	↓	↓
	TPE-SC-05				X	X	X			
	TPE-SC-06				X	X	X			
	TPE-SC-07				X	X	X			
	TPE-SC-08				X	X	X			
	TPE-SC-09				X	X	X			
	TPE-SC-10				X	X	X			
	TPE-SC-11				X	X	X			
	TPE-SC-12	↓		↓	X	X	X	↓	↓	↓

GUIDELINES / REGULATIONS	SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

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RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:
	26/8 1100		Aug 1/08 13:15
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:

SAMPLE CONDITION (lab use only)

TEMPERATURE	SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO (If no provide details)
12/13/14°C	

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REPORT TO:	REPORT FORMAT / DISTRIBUTION	SERVICE REQUESTED
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CONTACT:	PDF _____ EXCEL _____ CUSTOM _____ FAX _____	RUSH SERVICE (2-3 DAYS)
ADDRESS:	EMAIL 1:	PRIORITY SERVICE (1 DAY or ASAP)
	EMAIL 2:	EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS
PHONE: FAX:		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? YES / NO	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	
COMPANY:	**CLIENT / PROJECT INFORMATION:**	
CONTACT:	JOB #:	
ADDRESS:	PO /AFE:	
	Legal Site Description:	
PHONE: FAX:	QUOTE #:	
Lab Work Order # (lab use only): L664196	SAMPLER (Initials):	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Total Metals	TOC	Grain Size								HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	TPE-SC-13	July 23/08		Sediment	X	X	X								N	N	1
	TPE-SC-14				X	X	X										
	TPE-SC-15				X	X	X										
	TPE-SC-DUP				X	X	X										
	TPS-SC-01	July 24/08			X	X	X										
	TPS-SC-02				X	X	X										
	TPS-SC-03				X	X	X										
	TPS-SC-04				X	X	X										
	TPS-SC-05				X	X	X										
	TPS-SC-06.				X	X	X										

GUIDELINES / REGULATIONS	SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

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RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	SAMPLE CONDITION (lab use only)	
	26/8 1100		Aug 1/08 13:15	TEMPERATURE 12/13/14°C	SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO (If no provide details)
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:		

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REPORT TO:	REPORT FORMAT / DISTRIBUTION	SERVICE REQUESTED
COMPANY: See Page 1	STANDARD ____ OTHER ____	REGULAR SERVICE (DEFAULT)
CONTACT:	PDF ____ EXCEL ____ CUSTOM ____ FAX ____	RUSH SERVICE (2-3 DAYS)
ADDRESS:	EMAIL 1:	PRIORITY SERVICE (1 DAY or ASAP)
	EMAIL 2:	EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS
PHONE: FAX:		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? YES / NO	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	
COMPANY:	**CLIENT / PROJECT INFORMATION:**	
CONTACT:	JOB #:	
ADDRESS:	PO /AFE:	
	Legal Site Description:	
PHONE: FAX:	QUOTE #:	
Lab Work Order # (lab use only): L664196	SAMPLER (Initials):	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Total Metals	TOC	Grain Size								HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	TPS-SC-07	July 24/08		Sediment	X	X	X								N	N	1
	TPS-SC-08	↓		↓	X	X	X								↓	↓	↓
	TPS-SC-09				X	X	X										
	TPS-SC-10				X	X	X										
	TPS-SC-11				X	X	X										
	TPS-SC-12				X	X	X										
	TPS-SC-13				X	X	X										
	TPS-SC-14				X	X	X										
	TPS-SC-15				X	X	X										
	TPS-SC-DUP	↓		↓	X	X	X								↓	↓	↓

GUIDELINES / REGULATIONS	SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

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RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	SAMPLE CONDITION (lab use only)	
	26/Aug 1100		Aug/08 13:15	TEMPERATURE 12/13/14°C	SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO (If no provide details)
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:		

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REPORT TO:	REPORT FORMAT / DISTRIBUTION	SERVICE REQUESTED
COMPANY: See Page 1	STANDARD _____ OTHER _____	REGULAR SERVICE (DEFAULT)
CONTACT:	PDF _____ EXCEL _____ CUSTOM _____ FAX _____	RUSH SERVICE (2-3 DAYS)
ADDRESS:	EMAIL 1:	PRIORITY SERVICE (1 DAY or ASAP)
	EMAIL 2:	EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS
PHONE: FAX:		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? YES / NO	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	
COMPANY:	**CLIENT / PROJECT INFORMATION:**	
CONTACT:	JOB #:	
ADDRESS:	PO /AFE:	
	Legal Site Description:	
PHONE: FAX:	QUOTE #:	
Lab Work Order # (lab use only): L664196	SAMPLER (Initials):	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Total Metals	TOC	Grain Size	HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	TPN-SC-01	July 24/08		Sediment	X	X	X	N	N	1
	TPN-SC-02				X	X	X			
	TPN-SC-03				X	X	X			
	TPN-SC-04				X	X	X			
	TPN-SC-05				X	X	X			
	TPN-SC-06				X	X	X			
	TPN-SC-07				X	X	X			
	TPN-SC-08				X	X	X			
	TPN-SC-09				X	X	X			
	TPN-SC-10				X	X	X			

GUIDELINES / REGULATIONS	SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

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RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	SAMPLE CONDITION (lab use only)	
	26/8 1100		Aug1/08 13:15	TEMPERATURE 12/13/14 °C	SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO (If no provide details)
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:		

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COMPANY: See Page 1	STANDARD _____ OTHER _____	REGULAR SERVICE (DEFAULT)
CONTACT:	PDF _____ EXCEL _____ CUSTOM _____ FAX _____	RUSH SERVICE (2-3 DAYS)
ADDRESS:	EMAIL 1:	PRIORITY SERVICE (1 DAY or ASAP)
	EMAIL 2:	EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS
PHONE: FAX:		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? YES / NO	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	
COMPANY:	**CLIENT / PROJECT INFORMATION:**	
CONTACT:	JOB #:	
ADDRESS:	PO /AFE:	
	Legal Site Description:	
PHONE: FAX:	QUOTE #:	
Lab Work Order # (lab use only): L669196	SAMPLER (Initials):	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Total Metals	TOC	Grain Size	HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	TPN-SC-11	July 24/08		Sediment	X	X	X	N	N	1
	TPN-SC-12				X	X	X			
	TPN-SC-13				X	X	X			
	TPN-SC-14				X	X	X			
	TPN-SC-15				X	X	X			
	TPN-SC-DUP				X	X	X			
	INUG-SC-01	July 25/08			X	X	X			
	INUG-SC-02				X	X	X			
	INUG-SC-03				X	X	X			
	INUG-SC-04				X	X	X			

GUIDELINES / REGULATIONS	SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

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RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	SAMPLE CONDITION (lab use only)	
K Kuhn	26 Jul 11:00		Aug 1/08 13:18	TEMPERATURE 12/13/14°C	SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO (If no provide details)
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:		

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COMPANY: See Page 1	STANDARD _____ OTHER _____	REGULAR SERVICE (DEFAULT)
CONTACT:	PDF _____ EXCEL _____ CUSTOM _____ FAX _____	RUSH SERVICE (2-3 DAYS)
ADDRESS:	EMAIL 1:	PRIORITY SERVICE (1 DAY or ASAP)
	EMAIL 2:	EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS
PHONE: FAX:		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? YES / NO	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	
COMPANY:	**CLIENT / PROJECT INFORMATION:**	
CONTACT:	JOB #:	
ADDRESS:	PO /AFE:	
	Legal Site Description:	
PHONE: FAX:	QUOTE #:	
Lab Work Order # (lab use only)	SAMPLER (Initials):	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Total Metals	TOC	Grain Size	HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	INUG-SC-05	July 25/08		Sediment	X	X	X	N	N	1
	INUG-SC-06				X	X	X			
	INUG-SC-07				X	X	X			
	INUG-SC-08				X	X	X			
	INUG-SC-09				X	X	X			
	INUG-SC-10				X	X	X			
	INUG-SC-11				X	X	X			
	INUG-SC-12				X	X	X			
	INUG-SC-13				X	X	X			
	INUG-SC-14				X	X	X			

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 reverse page of the white report copy.

RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	SAMPLE CONDITION (lab use only)	
K Baker	26/7 1100		Aug1/08 13:15	TEMPERATURE 12/13/14°C	SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO (If no provide details)
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:		

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM

CANADA TOLL FREE 1-800-668-9878

www.alsenviro.com

COC # C098388

REPORT TO:	REPORT FORMAT / DISTRIBUTION	SERVICE REQUESTED
COMPANY: See Page 1	STANDARD _____ OTHER _____	REGULAR SERVICE (DEFAULT)
CONTACT:	PDF _____ EXCEL _____ CUSTOM _____ FAX _____	RUSH SERVICE (2-3 DAYS)
ADDRESS:	EMAIL 1:	PRIORITY SERVICE (1 DAY or ASAP)
	EMAIL 2:	EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS
PHONE: FAX:		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? YES / NO	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	
COMPANY:	**CLIENT / PROJECT INFORMATION:**	
CONTACT:	JOB #:	
ADDRESS:	PO /AFE:	
	Legal Site Description:	
PHONE: FAX:	QUOTE #:	
Lab Work Order # (lab use only): L6A196	SAMPLER (Initials):	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Total Metals	TOC	Grain Size	Conventionals *	TKN, Ammonia (+H2SO4) P	DOC (+HCl) F	TOC (+HCl) P	Chlorophyll a P	HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	INUG-SC-15	July 25/08		Sediment	X	X	X						N	N	1
	INUG-SC-DUP	↓		Sediment	X	X	X						N	N	1
113	2PL-SB-WQ-1m	July 20/08		Water				X	X	X	X	X			4
114	2PL-SB-WQ-7m							X	X	X	X	X			4
115	2PL-NB-WQ-1m							X	X	X	X	X			4
116	2PL-NB-WQ-3m							X	X	X	X	X			4
117	2PL-mB-WQ-1m							X	X	X	X	X			4
118	2PL-mB-WQ-7m	↓		↓				X	X	X	X	X	↓	↓	4

GUIDELINES / REGULATIONS

SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

* Conventionals & nitrate, nitrite, total phosphate, orthophosphate, bicarbonate, carbonate, hydroxide, Conductivity, hardness, Sulphate, Chloride, pH, TSS, TDS.

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RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:
K Heller	26/7 / 1100	Ah	Aug/08 13:15
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:

SAMPLE CONDITION (lab use only)

TEMPERATURE	SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO (If no provide details)
12/13/14°C	

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CONTACT: See Page 1	PDF _____ EXCEL _____ CUSTOM _____ FAX _____	RUSH SERVICE (2-3 DAYS)
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PHONE: FAX:		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? YES / NO	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	
COMPANY:	**CLIENT / PROJECT INFORMATION:**	
CONTACT:	JOB #:	
ADDRESS:	PO /AFE:	
	Legal Site Description:	
PHONE: FAX:	QUOTE #:	
Lab Work Order # (lab use only): L664196	SAMPLER (Initials):	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Chlorophyll-a (mg/m3)	HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
119	2 PL - SB - WQ - 1 m	July 20/08		Filter	X	N	N	1
120	2 PL - SB - WQ - 7 m	↓		↓	X	↓	↓	1
121	2 PL - NB - WQ - 1 m				X			1
122	2 PL - NB - WQ - 3 m				X			1
123	2 PL - MB - WQ - 1 m				X			1
124	2 PL - MB - WQ - 7 m	↓		↓	X	↓	↓	1

GUIDELINES / REGULATIONS	SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

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RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	SAMPLE CONDITION (lab use only)	
	26/8 1100		Aug 1/08 15:15	TEMPERATURE 12/13/14	SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO (If no provide details)
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:		

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COMPANY: See Page 1	STANDARD _____ OTHER _____	REGULAR SERVICE (DEFAULT)
CONTACT:	PDF _____ EXCEL _____ CUSTOM _____ FAX _____	RUSH SERVICE (2-3 DAYS)
ADDRESS:	EMAIL 1:	PRIORITY SERVICE (1 DAY or ASAP)
	EMAIL 2:	EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS
PHONE: FAX:		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? YES / NO	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	
COMPANY:	**CLIENT / PROJECT INFORMATION:**	
CONTACT:	JOB #:	
ADDRESS:	PO /AFE:	
	Legal Site Description:	
PHONE: FAX:	QUOTE #:	
Lab Work Order # (lab use only): L664196	SAMPLER (Initials):	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Conventionals*	Total Metals (+HNO3)	Oil+Grease (+H2SO4)	TKN, Ammonia (+H2SO4)	TOC (+HCl)	DOC (+HCl)	HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	SP	July 19/08		Water	X	X	X	X	X	X	N	N	7
	TE	July 20/08			X	X	X	X	X	X			7
	WAL	July 22/08			X	X	X	X	X	X			7
	TPE	July 23/08			X	X	X	X	X	X			7
	TPS	July 24/08			X	X	X	X	X	X			7
	TPN	July 24/08			X	X	X	X	X	X			7
	INUG	July 25/08			X	X	X	X	X	X			7
	DUP				X	X	X	X	X	X			7
	EQBLK	July 25/08		↓	X	X	X	X	X	X	↓	↓	7

GUIDELINES / REGULATIONS

SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

*Conventionals: nitrate, nitrite, total phosphate, orthophosphate, bicarbonate, carbonate, hydroxide, conductivity, hardness, Sulphate, Chloride, pH, TSS, TDS.

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RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	SAMPLE CONDITION (lab use only)	
K	26/7 1100.	AG	Aug1/08 13:15	TEMPERATURE 12/13/14 °C	SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO (If no provide details)
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:		

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Environmental Division

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COC # C098391

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PHONE: FAX:		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? YES / NO	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	
COMPANY:	CLIENT / PROJECT INFORMATION:	
CONTACT:	JOB #:	
ADDRESS:	PO /AFE:	
	Legal Site Description:	
PHONE: FAX:	QUOTE #:	
Lab Work Order # (lab use only): L664196	SAMPLER (Initials):	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Chlorophyll-a(+MgCO3) F	HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	SP	July 19 / 08		Filter	X	N	N	1
	TE	July 20 / 08			X			1
	WAL	July 22 / 08			X			1
	TPE	July 23 / 08			X			1
	TPS	July 24 / 08			X			1
	TPN	July 24 / 08			X			1
	INUG	July 25 / 08			X			1
	DUP				X			1

GUIDELINES / REGULATIONS	SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

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RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	SAMPLE CONDITION (lab use only)	
K Bolen	26/7 1100		Aug 1/08 13:45	TEMPERATURE 12/13/14°C	SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO (If no provide details)
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:		

Certificate of Analysis

AZIMUTH CONSULTING GROUP INC.

ATTN: RANDY BAKER

218 - 2902 WEST BROADWAY

VANCOUVER BC V6K 2G8

Reported On: 22-AUG-08 12:40 PM

Lab Work Order #: **L664191** **Date Received:** **01-AUG-08**

Project P.O. #:
Job Reference: MEADOW BANK
Legal Site Desc:
CofC Numbers: C098449

Other Information:

Comments: For some of the submitted water samples, the measured concentration of specific dissolved parameters is greater than the corresponding total parameters concentration. The explanation for these findings is one or a combination of the following:

- laboratory method variability;
- analytical bias introduced during sample filtration;
- analytical bias introduced during general handling, storage, transportation and/or analysis of the sample;
- sample grab bias - where separate grab samples are processed to produce total and dissolved samples;
- sample split bias - where total and dissolved parameters samples are produced from the same grab sample.

Natasha Markovic-M.

NATASHA MARKOVIC-MIROVIC
Account Manager

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L664191-1	L664191-2	L664191-3	L664191-4	L664191-5
	Description					
	Sampled Date	27-JUL-08	27-JUL-08	28-JUL-08	27-JUL-08	27-JUL-08
	Sampled Time					
	Client ID	BBD	BPJ	BAP	BBD	BPJ
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	802	426	266		
	Hardness (as CaCO3) (mg/L)	80.8	51.7	31.8		
	pH (pH)	7.20	7.22	7.23		
	Total Suspended Solids (mg/L)	<3.0	<3.0	<3.0		
	Total Dissolved Solids (mg/L)	434	222	135		
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	9.1	8.8	9.1		
	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)	9.1	8.8	9.1		
	Ammonia as N (mg/L)	0.029	0.045	0.022		
	Chloride (Cl) (mg/L)	216	110	65.4		
	Nitrate (as N) (mg/L)	0.0637	0.0385	0.0253		
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010		
	Total Kjeldahl Nitrogen (mg/L)	0.134	0.137	0.184		
	Ortho Phosphate as P (mg/L)	<0.0010	<0.0010	<0.0010		
	Total Phosphate as P (mg/L)	0.0055	0.0058	0.050		
	Sulfate (SO4) (mg/L)	30.5	15.5	9.37		
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	3.54	3.28	3.39		
	Total Organic Carbon (mg/L)	3.04	3.15	3.16		
Total Metals	Aluminum (Al)-Total (mg/L)	<0.010	0.0065	0.0094		
	Antimony (Sb)-Total (mg/L)	<0.0010	<0.00050	<0.00050		
	Arsenic (As)-Total (mg/L)	<0.0010	<0.00050	<0.00050		
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020		
	Beryllium (Be)-Total (mg/L)	<0.0020	<0.0010	<0.0010		
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10		
	Cadmium (Cd)-Total (mg/L)	<0.000034	<0.000017	<0.000017		
	Calcium (Ca)-Total (mg/L)	7.02	5.02	3.79		
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0010	<0.0010		
	Cobalt (Co)-Total (mg/L)	<0.00060	<0.00030	<0.00030		
	Copper (Cu)-Total (mg/L)	<0.0020	<0.0010	<0.0010		
	Iron (Fe)-Total (mg/L)	<0.030	<0.030	<0.030		
	Lead (Pb)-Total (mg/L)	<0.0010	<0.00050	<0.00050		
	Lithium (Li)-Total (mg/L)	<0.010	<0.0050	<0.0050		
	Magnesium (Mg)-Total (mg/L)	15.4	9.52	5.43		
	Manganese (Mn)-Total (mg/L)	0.00467	0.00328	0.00279		
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020		
	Molybdenum (Mo)-Total (mg/L)	<0.0020	<0.0010	<0.0010		
	Nickel (Ni)-Total (mg/L)	<0.0020	<0.0010	<0.0010		

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

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L664191-6	L664191-7	L664191-8		
	Description					
	Sampled Date	28-JUL-08	04-JUL-08	08-JUL-08		
	Sampled Time					
	Client ID	BAP	AZIMUTH-AE-08(TRAVEL BLK)	AZIMUTH-FISHOUT(TRAVEL BLK)		
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)		<2.0	<2.0		
	Hardness (as CaCO3) (mg/L)		<0.70			
	pH (pH)		5.54	5.63		
	Total Suspended Solids (mg/L)		<3.0	<3.0		
	Total Dissolved Solids (mg/L)		<10	<10		
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)		<2.0	<2.0		
	Alkalinity, Carbonate (as CaCO3) (mg/L)		<2.0	<2.0		
	Alkalinity, Hydroxide (as CaCO3) (mg/L)		<2.0	<2.0		
	Alkalinity, Total (as CaCO3) (mg/L)		<2.0	<2.0		
	Ammonia as N (mg/L)		<0.020	0.054		
	Chloride (Cl) (mg/L)		<0.50	<0.50		
	Nitrate (as N) (mg/L)		<0.0050	<0.0050		
	Nitrite (as N) (mg/L)		<0.0010	<0.0010		
	Total Kjeldahl Nitrogen (mg/L)		<0.050	0.055		
	Ortho Phosphate as P (mg/L)		<0.0010	<0.0010		
	Total Phosphate as P (mg/L)		<0.0020	<0.0020		
	Sulfate (SO4) (mg/L)		<0.50	<0.50		
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)					
	Total Organic Carbon (mg/L)		<0.50	<0.50		
Total Metals	Aluminum (Al)-Total (mg/L)		<0.0050			
	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)		<0.10			
	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)		<0.10			
	Manganese (Mn)-Total (mg/L)		<0.00030			
	Mercury (Hg)-Total (mg/L)		<0.000020			
	Molybdenum (Mo)-Total (mg/L)		<0.0010			
	Nickel (Ni)-Total (mg/L)		<0.0010			

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

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L664191-1	L664191-2	L664191-3	L664191-4	L664191-5
		Description					
		Sampled Date	27-JUL-08	27-JUL-08	28-JUL-08	27-JUL-08	27-JUL-08
		Sampled Time					
		Client ID	BBD	BPJ	BAP	BBD	BPJ
Grouping	**Analyte**						
WATER							
Total Metals	Potassium (K)-Total (mg/L)		4.8	3.0	<2.0		
	Selenium (Se)-Total (mg/L)		<0.0040	<0.0020	<0.0010		
	Silver (Ag)-Total (mg/L)		<0.000040	<0.000020	<0.000020		
	Sodium (Na)-Total (mg/L)		112	66.4	34.7		
	Thallium (Tl)-Total (mg/L)		<0.00040	<0.00020	<0.00020		
	Tin (Sn)-Total (mg/L)		<0.0010	<0.00050	<0.00050		
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	<0.010		
	Uranium (U)-Total (mg/L)		<0.00040	<0.00020	<0.00020		
	Vanadium (V)-Total (mg/L)		<0.0020	<0.0010	<0.0010		
	Zinc (Zn)-Total (mg/L)		<0.0050	<0.0050	<0.0050		
Aggregate Organics	Oil and Grease (mg/L)		<5.0	<5.0	<5.0		
Plant Pigments	Chlorophyll a (ug)					0.436	0.802

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

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L664191-6	L664191-7	L664191-8		
		Description					
		Sampled Date	28-JUL-08	04-JUL-08	08-JUL-08		
		Sampled Time					
		Client ID	BAP	AZIMUTH-AE-08(TRAVEL BLK)	AZIMUTH-FISHOUT(TRAVEL BLK)		
Grouping	**Analyte**						
WATER							
Total Metals	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			
Aggregate Organics	Oil and Grease (mg/L)						
Plant Pigments	Chlorophyll a (ug)		0.931				

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

Reference Information

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-CL-IC-VA	Water	Chloride by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-NO2-IC-VA	Water	Nitrite by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-NO3-IC-VA	Water	Nitrate by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-SO4-IC-VA	Water	Sulfate by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

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)".

CHLOROA-VA	Water	Chlorophyll a by Fluorometer	APHA 10200 H. "Chlorophyll" and EPA 445

Chlorophyll and Pheopigments by Fluorometry analysis is carried out using procedures adapted from APHA Method 10200 H. "Chlorophyll" and USEPA Method 445. 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% aqueuos 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-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).

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
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-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.

OGG-SF-VA	Water	Oil & Grease by Gravimetric	BCMOE GRAVIMETRIC

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3510 & 9071, published by the United States Environmental Protection Agency (EPA), "Standard Methods for the Examination of Water and Wastewater", 20th ed., Method 5520, published by the American Public Health Association, and "BC Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials," 5th ed., published by the B.C. Ministry of Environment, Lands & Parks, 1994. The procedure involves an extraction of the entire water sample with hexane. This extract is then evaporated to dryness, and the residue weighed to determine Oil and Grease.

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

PO4-DO-COL-VA	Water	Dissolved ortho Phosphate 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.

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.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
TSS-VA	Water	Solids by Gravimetric	APHA 2540 D - GRAVIMETRIC

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.

** 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.alsenviro.com

COC # C098449

Page 1 of 1

COMPANY:	AZIMUTH CONSULTING
CONTACT:	Randy Baker
ADDRESS:	218-2902 W. Broadway Vancouver, BC V6K 2G8
PHONE:	604-730-1220 FAX: 604-739-8511
INVOICE TO:	SAME AS REPORT ? (YES) NO
COMPANY:	
CONTACT:	
ADDRESS:	
PHONE:	FAX:
Lab Work Order # (lab use only)	L6604191

REPORT FORMAT / DISTRIBUTION

STANDARD ____ OTHER ____

PDF X EXCEL X CUSTOM ____ FAX ____

EMAIL 1: rbaker@azimuthgroup.ca

EMAIL 2: mmcconnell@azimuthgroup.ca

INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →

CLIENT / PROJECT INFORMATION:

JOB #:

PO /AFE:

Legal Site Description:

QUOTE #: ALSEQ07-627

SAMPLER (Initials): MLM & RT

SERVICE REQUESTED

- X REGULAR SERVICE (DEFAULT)
- RUSH SERVICE (2-3 DAYS)
- PRIORITY SERVICE (1 DAY or ASAP)
- EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS

ANALYSIS REQUEST

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Conventionals *	Oil + Grease (+ H_2SO_4) P	TKN, Ammonia (+ H_2SO_4) P	Total Metals (+ HNO_3) P	TOC (+ HCl) P	DOC (+ HCl) F P	Chlorophyll-a (+ $MgCO_3$) P					HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	BBD	July 27/08		Water	X	X	X	X	X	X						N	N	7
	BPJ	July 27/08			X	X	X	X	X	X						N	N	7
	BAP	July 28/08		↓	X	X	X	X	X	X						N	N	7
	BBD	July 27/08		Filter							X					N	N	1
	BPJ	July 27/08									X					N	N	1
	BAP	July 28/08		↓							X					N	N	1
	Azimuth-AE-08 (travel blk)	July 4/08		WATER	X		X	X	X							N	N	4
	Azimuth-FISHOUT (travel blk)	July 8/08		WATER	X		X		X							N	N	3

GUIDELINES / REGULATIONS

SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

* Conventionals: nitrate, nitrite, total phosphate, orthophosphate, bicarbonate, carbonate, ~~hydroxide~~, conductivity, hardness, sulphate, Chloride, pH, TSS, TDS

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 reverse page of the white report copy.

RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:
Marcel McConnell	July 29/08	Ala	Aug 1/08 13:09
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:

SAMPLE CONDITION (lab use only)

TEMPERATURE	SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO (If no provide details)
14/15/14°C	

REFER TO BACK PAGE FOR REGIONAL LOCATIONS AND SAMPLING INFORMATION

WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

GENF14.00

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Certificate of Analysis

AZIMUTH CONSULTING GROUP INC.

ATTN: RANDY BAKER

218 - 2902 WEST BROADWAY

VANCOUVER BC V6K 2G8

Reported On: 08-OCT-08 04:16 PM
Revision: 1

Lab Work Order #: **L678867** **Date Received:** **05-SEP-08**

Project P.O. #:
Job Reference: AEMP
Legal Site Desc:
CofC Numbers: C065416, C098458, C098459

Other Information:

Comments: ADDITIONAL 29-SEP-08 16:15 Please note the addition of sillicate and total metals analysis to sample 7.

The detection limits for some metals have been increased due to high levels of metals in the samples or interferences encountered during analysis.

The detection limits for some Polycyclic Aromatic Hydrocarbons (PAH) results have been increased for the samples reported due to interferences encountered during analysis.

For some of the submitted water samples, the measured concentration of specific dissolved parameters is greater than the corresponding total parameters concentration (DOC > TOC). The explanation for these findings is one or a combination of the following:
- laboratory method variability;
- field sampling method variability;
- bias introduced during general handling, storage, transportation and/or analysis of the sample;
- field sample grab bias - where separate grab samples are processed to produce total and dissolved samples;
- field sample split bias - where total and dissolved parameters samples are produced from the same grab sample.

For further clarification on any of the above information, please contact your ALS account manager.

Bryan Mark
Account Manager

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L678867-27				
		Description					
		Sampled Date					
		Sampled Time					
		Client ID	X CON				
Grouping	**Analyte**						
FILTER							
Metals	Aluminum (Al)-Total (ug)		<20				
	Antimony (Sb)-Total (ug)		<10				
	Arsenic (As)-Total (ug)		<10				
	Barium (Ba)-Total (ug)		2.46				
	Beryllium (Be)-Total (ug)		<0.30				
	Bismuth (Bi)-Total (ug)		<10				
	Cadmium (Cd)-Total (ug)		<0.50				
	Calcium (Ca)-Total (ug)		31.5				
	Chromium (Cr)-Total (ug)		7.24				
	Cobalt (Co)-Total (ug)		<0.50				
	Copper (Cu)-Total (ug)		1.07				
	Iron (Fe)-Total (ug)		52.0				
	Lead (Pb)-Total (ug)		<3.0				
	Lithium (Li)-Total (ug)		<0.50				
	Magnesium (Mg)-Total (ug)		10.1				
	Manganese (Mn)-Total (ug)		1.53				
	Molybdenum (Mo)-Total (ug)		<2.0				
	Nickel (Ni)-Total (ug)		3.9				
	Phosphorus (P)-Total (ug)		<20				
	Potassium (K)-Total (ug)		<100				
	Selenium (Se)-Total (ug)		<10				
	Silver (Ag)-Total (ug)		<0.50				
	Sodium (Na)-Total (ug)		120				
	Strontium (Sr)-Total (ug)		<0.30				
	Thallium (Tl)-Total (ug)		<10				
	Tin (Sn)-Total (ug)		<2.0				
	Titanium (Ti)-Total (ug)		<0.50				
	Vanadium (V)-Total (ug)		<2.0				
	Zinc (Zn)-Total (ug)		0.90				

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID: L678867-20	L678867-21	L678867-22	L678867-23	L678867-24
	Description					
	Sampled Date	16-AUG-08	17-AUG-08	18-AUG-08	19-AUG-08	20-AUG-08
	Sampled Time					
	Client ID	TPE	TPS	TPN	TE	INUG
SOIL						
Physical Tests	% Moisture (%)	87.7	85.6	82.3	83.6	82.7
	pH (pH)	6.20	6.04	6.13	6.03	5.98
Particle Size	% Gravel (>2mm) (%)	<1	<1	<1	<1	<1
	% Sand (2.0mm - 0.063mm) (%)	3	7	20	5	9
	% Silt (0.063mm - 4um) (%)	62	65	62	70	67
	% Clay (<4um) (%)	36	28	18	25	25
Organic / Inorganic Carbon	Total Organic Carbon (%)	5.0	4.5	3.1	3.7	4.2
Metals	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	25.5	26.4	20.8	19.1	145
	Barium (Ba) (mg/kg)	143	118	70.0	125	98.3
	Beryllium (Be) (mg/kg)	1.77	1.65	1.01	2.21	1.03
	Cadmium (Cd) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Chromium (Cr) (mg/kg)	76.8	111	105	57.3	87.9
	Cobalt (Co) (mg/kg)	17.9	23.4	16.5	12.4	15.2
	Copper (Cu) (mg/kg)	54.2	78.9	40.2	68.2	38.3
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Mercury (Hg) (mg/kg)	0.0253	0.0271	0.0142	0.0287	0.0329
	Molybdenum (Mo) (mg/kg)	5.9	5.4	<4.0	6.2	10.2
	Nickel (Ni) (mg/kg)	78.7	99.1	60.7	44.2	60.2
	Selenium (Se) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)	35.7	40.8	28.8	37.6	32.3
	Zinc (Zn) (mg/kg)	104	114	69.6	113	64.7
Aggregate Organics	Oil and Grease (mg/kg)	5070	3250	3170	1590	2380
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.13	<0.10	<0.092	<0.092	<0.086
	Acenaphthylene (mg/kg)	<0.16	<0.13	<0.12	<0.12	<0.11
	Anthracene (mg/kg)	<0.16	<0.13	<0.12	<0.12	<0.11
	Benz(a)anthracene (mg/kg)	<0.16	<0.13	<0.12	<0.12	<0.11
	Benzo(a)pyrene (mg/kg)	<0.16	<0.13	<0.12	<0.12	<0.11
	Benzo(b)fluoranthene (mg/kg)	<0.16	<0.13	<0.12	<0.12	<0.11
	Benzo(g,h,i)perylene (mg/kg)	<0.16	<0.13	<0.12	<0.12	<0.11
	Benzo(k)fluoranthene (mg/kg)	<0.16	<0.13	<0.12	<0.12	<0.11
	Chrysene (mg/kg)	<0.16	<0.13	<0.12	<0.12	<0.11
	Dibenz(a,h)anthracene (mg/kg)	<0.16	<0.13	<0.12	<0.12	<0.11
	Fluoranthene (mg/kg)	<0.16	<0.13	<0.12	<0.12	<0.11

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L678867-25	L678867-26			
		Description					
		Sampled Date	21-AUG-08				
		Sampled Time					
		Client ID	WAL	DUP			
Grouping	**Analyte**						
SOIL							
Physical Tests	% Moisture (%)		84.7	83.0			
	pH (pH)		6.34	6.11			
Particle Size	% Gravel (>2mm) (%)		<1	<1			
	% Sand (2.0mm - 0.063mm) (%)		10	18			
	% Silt (0.063mm - 4um) (%)		64	62			
	% Clay (<4um) (%)		27	20			
Organic / Inorganic Carbon	Total Organic Carbon (%)		4.9	3.0			
Metals	Antimony (Sb) (mg/kg)		<10	<10			
	Arsenic (As) (mg/kg)		50.2	17.3			
	Barium (Ba) (mg/kg)		132	76.9			
	Beryllium (Be) (mg/kg)		1.99	1.06			
	Cadmium (Cd) (mg/kg)		<0.50	<0.50			
	Chromium (Cr) (mg/kg)		61.2	108			
	Cobalt (Co) (mg/kg)		11.1	16.1			
	Copper (Cu) (mg/kg)		149	41.8			
	Lead (Pb) (mg/kg)		34	<30			
	Mercury (Hg) (mg/kg)		0.0360	0.0128			
	Molybdenum (Mo) (mg/kg)		8.6	<4.0			
	Nickel (Ni) (mg/kg)		58.0	66.7			
	Selenium (Se) (mg/kg)		<2.0	<2.0			
	Silver (Ag) (mg/kg)		<2.0	<2.0			
	Thallium (Tl) (mg/kg)		<1.0	<1.0			
	Tin (Sn) (mg/kg)		<5.0	<5.0			
	Vanadium (V) (mg/kg)		36.4	29.8			
	Zinc (Zn) (mg/kg)		125	73.9			
Aggregate Organics	Oil and Grease (mg/kg)		2880	2870			
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)		<0.040	<0.092			
	Acenaphthylene (mg/kg)		<0.050	<0.12			
	Anthracene (mg/kg)		<0.050	<0.12			
	Benz(a)anthracene (mg/kg)		<0.050	<0.12			
	Benzo(a)pyrene (mg/kg)		<0.050	<0.12			
	Benzo(b)fluoranthene (mg/kg)		<0.050	<0.12			
	Benzo(g,h,i)perylene (mg/kg)		<0.050	<0.12			
	Benzo(k)fluoranthene (mg/kg)		<0.050	<0.12			
	Chrysene (mg/kg)		<0.050	<0.12			
	Dibenz(a,h)anthracene (mg/kg)		<0.050	<0.12			
	Fluoranthene (mg/kg)		<0.050	<0.12			

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678867-20	L678867-21	L678867-22	L678867-23	L678867-24
	Description					
	Sampled Date	16-AUG-08	17-AUG-08	18-AUG-08	19-AUG-08	20-AUG-08
	Sampled Time					
	Client ID	TPE	TPS	TPN	TE	INUG
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Fluorene (mg/kg)	<0.16	<0.13	<0.12	<0.12	<0.11
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.16	<0.13	<0.12	<0.12	<0.11
	2-Methylnaphthalene (mg/kg)	<0.16	<0.13	<0.12	<0.12	<0.11
	Naphthalene (mg/kg)	<0.16	<0.13	<0.12	<0.12	<0.11
	Phenanthrene (mg/kg)	<0.80	<0.13	<0.12	<0.12	<0.11
	Pyrene (mg/kg)	<0.16	<0.13	<0.12	<0.12	<0.11
	Surrogate: d10-Acenaphthene (SS) (%)	93	95	93	92	91
	Surrogate: d12-Chrysene (SS) (%)	104	109	109	105	106
	Surrogate: d8-Naphthalene (SS) (%)	95	97	94	95	93
	Surrogate: d10-Phenanthrene (SS) (%)	95	100	96	95	94

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678867-25	L678867-26			
	Description					
	Sampled Date	21-AUG-08				
	Sampled Time					
	Client ID	WAL	DUP			
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Fluorene (mg/kg)	<0.050	<0.12			
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.050	<0.12			
	2-Methylnaphthalene (mg/kg)	<0.050	<0.12			
	Naphthalene (mg/kg)	<0.050	<0.12			
	Phenanthrene (mg/kg)	<0.50	<0.12			
	Pyrene (mg/kg)	<0.050	<0.12			
	Surrogate: d10-Acenaphthene (SS) (%)	92	89			
	Surrogate: d12-Chrysene (SS) (%)	103	99			
	Surrogate: d8-Naphthalene (SS) (%)	95	92			
	Surrogate: d10-Phenanthrene (SS) (%)	96	92			

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678867-1	L678867-2	L678867-3	L678867-4	L678867-5
	Description					
	Sampled Date	16-AUG-08	17-AUG-08	17-AUG-08	19-AUG-08	20-AUG-08
	Sampled Time					
	Client ID	TPE	TPS	TPN	TE	INUG
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	13.9	14.1	14.0	18.7	14.0
	Hardness (as CaCO3) (mg/L)	4.96	5.01	4.98	7.24	4.97
	pH (pH)	6.55	6.47	6.61	6.76	6.74
	Total Suspended Solids (mg/L)	<3.0	<3.0	<3.0	<3.0	<3.0
	Total Dissolved Solids (mg/L)	13	15	14	13	<10
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	5.0	4.2	3.9	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)	5.0	4.2	3.9	5.0	4.3
	Ammonia as N (mg/L)	<0.020	<0.020	0.023	<0.020	0.030
	Chloride (Cl) (mg/L)	<0.50	0.51	<0.50	<0.50	0.69
	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)	0.093	0.099	0.081	0.090	0.098
	Ortho Phosphate as P (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Phosphate as P (mg/L)	<0.0020	0.0022	0.0024	0.0030	0.0027
	Silicate (as SIO2) (mg/L)					
	Sulfate (SO4) (mg/L)	1.62	1.53	1.43	2.01	0.96
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.94	1.90	1.92	1.74	2.48
	Total Organic Carbon (mg/L)	1.35	1.33	1.31	1.44	1.80
Total Metals	Aluminum (Al)-Total (mg/L)	0.0074	<0.0050	<0.0050	0.0607	0.0060
	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)	1.14	1.15	1.14	1.80	0.99
	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	<0.030	<0.030	0.092	<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)	0.51	0.52	0.52	0.67	0.61
	Manganese (Mn)-Total (mg/L)	0.00097	0.00064	0.00061	0.00257	0.00193
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Molybdenum (Mo)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID: L678867-6 Description: Sampled Date: 21-AUG-08 Sampled Time: Client ID: WAL	L678867-7 22-AUG-08 SP	L678867-8 DUP	L678867-9 22-AUG-08 EQBLK	L678867-10 22-AUG-08 SP-D
WATER						
Physical Tests	Conductivity (uS/cm)	27.4	23.8	14.2	<2.0	
	Hardness (as CaCO3) (mg/L)	11.7	11.8	5.00		9.69
	pH (pH)	7.31	7.24	6.71	5.74	
	Total Suspended Solids (mg/L)	<3.0	10.7	<3.0	<3.0	
	Total Dissolved Solids (mg/L)	15	21	13	<10	
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	9.2	6.6	3.8	<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)	9.2	6.6	3.8	<2.0	
	Ammonia as N (mg/L)	0.021	<0.020	<0.020	<0.020	
	Chloride (Cl) (mg/L)	<0.50	<0.50	0.68	<0.50	
	Nitrate (as N) (mg/L)	<0.0050	0.0795	<0.0050	<0.0050	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	0.100	0.093	0.067	<0.050	
	Ortho Phosphate as P (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Total Phosphate as P (mg/L)	0.0025	0.0154	0.0035	<0.0020	
	Silicate (as SIO2) (mg/L)		<1.0			
	Sulfate (SO4) (mg/L)	2.64	2.49	0.88	<0.50	
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	2.06	1.75	1.93	0.76	
	Total Organic Carbon (mg/L)	1.86	1.43	1.84	<0.50	
Total Metals	Aluminum (Al)-Total (mg/L)	0.0053	1.17	0.0077		
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050		
	Arsenic (As)-Total (mg/L)	<0.00050	0.00054	<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)	3.14	2.68	0.99		
	Chromium (Cr)-Total (mg/L)	<0.0010	0.0039	<0.0010		
	Cobalt (Co)-Total (mg/L)	<0.00030	0.00065	<0.00030		
	Copper (Cu)-Total (mg/L)	<0.0010	0.0031	<0.0010		
	Iron (Fe)-Total (mg/L)	<0.030	1.31	<0.030		
	Lead (Pb)-Total (mg/L)	<0.00050	0.00087	<0.00050		
	Lithium (Li)-Total (mg/L)	<0.0050	<0.0050	<0.0050		
	Magnesium (Mg)-Total (mg/L)	0.93	1.24	0.62		
	Manganese (Mn)-Total (mg/L)	0.00136	0.0242	0.00201		
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020		
	Molybdenum (Mo)-Total (mg/L)	<0.0010	<0.0010	<0.0010		

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID: L678867-11 Description: Sampled Date: 22-AUG-08 Sampled Time: Client ID: EQBLK-D	Sample ID: L678867-12 Description: Sampled Date: 22-AUG-08 Sampled Time: Client ID: EQBLK-T	Sample ID: L678867-13 Description: Sampled Date: 16-AUG-08 Sampled Time: Client ID: TPE	Sample ID: L678867-14 Description: Sampled Date: 17-AUG-08 Sampled Time: Client ID: TPS	Sample ID: L678867-15 Description: Sampled Date: 17-AUG-08 Sampled Time: Client ID: TPN
WATER						
Physical Tests	Conductivity (uS/cm)					
	Hardness (as CaCO3) (mg/L)	<0.70	<0.70			
	pH (pH)					
	Total Suspended Solids (mg/L)					
	Total Dissolved Solids (mg/L)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)					
	Alkalinity, Carbonate (as CaCO3) (mg/L)					
	Alkalinity, Hydroxide (as CaCO3) (mg/L)					
	Alkalinity, Total (as CaCO3) (mg/L)					
	Ammonia as N (mg/L)					
	Chloride (Cl) (mg/L)					
	Nitrate (as N) (mg/L)					
	Nitrite (as N) (mg/L)					
	Total Kjeldahl Nitrogen (mg/L)					
	Ortho Phosphate as P (mg/L)					
	Total Phosphate as P (mg/L)					
	Silicate (as SIO2) (mg/L)					
	Sulfate (SO4) (mg/L)					
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)					
	Total Organic Carbon (mg/L)					
Total Metals	Aluminum (Al)-Total (mg/L)		<0.0050			
	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)		<0.10			
	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)		<0.10			
	Manganese (Mn)-Total (mg/L)		<0.00030			
	Mercury (Hg)-Total (mg/L)		<0.000020			
	Molybdenum (Mo)-Total (mg/L)		<0.0010			

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678867-16	L678867-17	L678867-18	L678867-19	L678867-28
	Description					
	Sampled Date	19-AUG-08	20-AUG-08	21-AUG-08	22-AUG-08	
	Sampled Time					
	Client ID	TE	INUG	WAL	SP	DUP
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)					
	Hardness (as CaCO3) (mg/L)					
	pH (pH)					
	Total Suspended Solids (mg/L)					
	Total Dissolved Solids (mg/L)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)					
	Alkalinity, Carbonate (as CaCO3) (mg/L)					
	Alkalinity, Hydroxide (as CaCO3) (mg/L)					
	Alkalinity, Total (as CaCO3) (mg/L)					
	Ammonia as N (mg/L)					
	Chloride (Cl) (mg/L)					
	Nitrate (as N) (mg/L)					
	Nitrite (as N) (mg/L)					
	Total Kjeldahl Nitrogen (mg/L)					
	Ortho Phosphate as P (mg/L)					
	Total Phosphate as P (mg/L)					
	Silicate (as SIO2) (mg/L)					
	Sulfate (SO4) (mg/L)					
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)					
	Total Organic Carbon (mg/L)					
Total Metals	Aluminum (Al)-Total (mg/L)					
	Antimony (Sb)-Total (mg/L)					
	Arsenic (As)-Total (mg/L)					
	Barium (Ba)-Total (mg/L)					
	Beryllium (Be)-Total (mg/L)					
	Boron (B)-Total (mg/L)					
	Cadmium (Cd)-Total (mg/L)					
	Calcium (Ca)-Total (mg/L)					
	Chromium (Cr)-Total (mg/L)					
	Cobalt (Co)-Total (mg/L)					
	Copper (Cu)-Total (mg/L)					
	Iron (Fe)-Total (mg/L)					
	Lead (Pb)-Total (mg/L)					
	Lithium (Li)-Total (mg/L)					
	Magnesium (Mg)-Total (mg/L)					
	Manganese (Mn)-Total (mg/L)					
	Mercury (Hg)-Total (mg/L)					
	Molybdenum (Mo)-Total (mg/L)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678867-29				
	Description					
	Sampled Date					
	Sampled Time					
	Client ID	TRAVEL BLANK				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	<2.0				
	Hardness (as CaCO3) (mg/L)	<0.70				
	pH (pH)	5.76				
	Total Suspended Solids (mg/L)	<3.0				
	Total Dissolved Solids (mg/L)	<10				
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<2.0				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0				
	Alkalinity, Total (as CaCO3) (mg/L)	<2.0				
	Ammonia as N (mg/L)					
	Chloride (Cl) (mg/L)	<0.50				
	Nitrate (as N) (mg/L)	<0.0050				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	<0.050				
	Ortho Phosphate as P (mg/L)	<0.0010				
	Total Phosphate as P (mg/L)	<0.0020				
	Silicate (as SIO2) (mg/L)					
	Sulfate (SO4) (mg/L)	<0.50				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)					
	Total Organic Carbon (mg/L)	<0.50				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0050				
	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)	<0.10				
	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)	<0.10				
	Manganese (Mn)-Total (mg/L)	<0.00030				
	Mercury (Hg)-Total (mg/L)	<0.000020				
	Molybdenum (Mo)-Total (mg/L)	<0.0010				

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678867-1	L678867-2	L678867-3	L678867-4	L678867-5
	Description					
	Sampled Date	16-AUG-08	17-AUG-08	17-AUG-08	19-AUG-08	20-AUG-08
	Sampled Time					
	Client ID	TPE	TPS	TPN	TE	INUG
Grouping	**Analyte**					
WATER						
Total Metals	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)					
	Antimony (Sb)-Dissolved (mg/L)					
	Arsenic (As)-Dissolved (mg/L)					
	Barium (Ba)-Dissolved (mg/L)					
	Beryllium (Be)-Dissolved (mg/L)					
	Boron (B)-Dissolved (mg/L)					
	Cadmium (Cd)-Dissolved (mg/L)					
	Calcium (Ca)-Dissolved (mg/L)					
	Chromium (Cr)-Dissolved (mg/L)					
	Cobalt (Co)-Dissolved (mg/L)					
	Copper (Cu)-Dissolved (mg/L)					
	Iron (Fe)-Dissolved (mg/L)					
	Lead (Pb)-Dissolved (mg/L)					
	Lithium (Li)-Dissolved (mg/L)					
	Magnesium (Mg)-Dissolved (mg/L)					
	Manganese (Mn)-Dissolved (mg/L)					
	Mercury (Hg)-Dissolved (mg/L)					
	Molybdenum (Mo)-Dissolved (mg/L)					
	Nickel (Ni)-Dissolved (mg/L)					
	Potassium (K)-Dissolved (mg/L)					
	Selenium (Se)-Dissolved (mg/L)					
	Silver (Ag)-Dissolved (mg/L)					
	Sodium (Na)-Dissolved (mg/L)					
	Thallium (Tl)-Dissolved (mg/L)					
	Tin (Sn)-Dissolved (mg/L)					
	Titanium (Ti)-Dissolved (mg/L)					
	Uranium (U)-Dissolved (mg/L)					
	Vanadium (V)-Dissolved (mg/L)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678867-6	L678867-7	L678867-8	L678867-9	L678867-10
	Description					
	Sampled Date	21-AUG-08	22-AUG-08		22-AUG-08	22-AUG-08
	Sampled Time					
	Client ID	WAL	SP	DUP	EQBLK	SP-D
Grouping	**Analyte**					
WATER						
Total Metals	Nickel (Ni)-Total (mg/L)	<0.0010	0.0027	<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	0.049	<0.010		
	Uranium (U)-Total (mg/L)	<0.00020	0.00056	<0.00020		
	Vanadium (V)-Total (mg/L)	<0.0010	0.0019	<0.0010		
	Zinc (Zn)-Total (mg/L)	<0.0050	0.0050	<0.0050		
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)					0.0121
	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)					2.59
	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)					0.79
	Manganese (Mn)-Dissolved (mg/L)					0.00158
	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

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L678867-11	L678867-12	L678867-13	L678867-14	L678867-15
		Description					
		Sampled Date	22-AUG-08	22-AUG-08	16-AUG-08	17-AUG-08	17-AUG-08
		Sampled Time					
		Client ID	EQBLK-D	EQBLK-T	TPE	TPS	TPN
Grouping	**Analyte**						
WATER							
Total Metals	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)		<0.10				
	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)		<0.10				
	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				

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678867-16	L678867-17	L678867-18	L678867-19	L678867-28
	Description					
	Sampled Date	19-AUG-08	20-AUG-08	21-AUG-08	22-AUG-08	
	Sampled Time					
	Client ID	TE	INUG	WAL	SP	DUP
Grouping	**Analyte**					
WATER						
Total Metals	Nickel (Ni)-Total (mg/L)					
	Potassium (K)-Total (mg/L)					
	Selenium (Se)-Total (mg/L)					
	Silver (Ag)-Total (mg/L)					
	Sodium (Na)-Total (mg/L)					
	Thallium (Tl)-Total (mg/L)					
	Tin (Sn)-Total (mg/L)					
	Titanium (Ti)-Total (mg/L)					
	Uranium (U)-Total (mg/L)					
	Vanadium (V)-Total (mg/L)					
	Zinc (Zn)-Total (mg/L)					
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)					
	Antimony (Sb)-Dissolved (mg/L)					
	Arsenic (As)-Dissolved (mg/L)					
	Barium (Ba)-Dissolved (mg/L)					
	Beryllium (Be)-Dissolved (mg/L)					
	Boron (B)-Dissolved (mg/L)					
	Cadmium (Cd)-Dissolved (mg/L)					
	Calcium (Ca)-Dissolved (mg/L)					
	Chromium (Cr)-Dissolved (mg/L)					
	Cobalt (Co)-Dissolved (mg/L)					
	Copper (Cu)-Dissolved (mg/L)					
	Iron (Fe)-Dissolved (mg/L)					
	Lead (Pb)-Dissolved (mg/L)					
	Lithium (Li)-Dissolved (mg/L)					
	Magnesium (Mg)-Dissolved (mg/L)					
	Manganese (Mn)-Dissolved (mg/L)					
	Mercury (Hg)-Dissolved (mg/L)					
	Molybdenum (Mo)-Dissolved (mg/L)					
	Nickel (Ni)-Dissolved (mg/L)					
	Potassium (K)-Dissolved (mg/L)					
	Selenium (Se)-Dissolved (mg/L)					
	Silver (Ag)-Dissolved (mg/L)					
	Sodium (Na)-Dissolved (mg/L)					
	Thallium (Tl)-Dissolved (mg/L)					
	Tin (Sn)-Dissolved (mg/L)					
	Titanium (Ti)-Dissolved (mg/L)					
	Uranium (U)-Dissolved (mg/L)					
	Vanadium (V)-Dissolved (mg/L)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678867-29				
	Description					
	Sampled Date					
	Sampled Time					
	Client ID	TRAVEL BLANK				
Grouping	**Analyte**					
WATER						
Total Metals	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)					
	Antimony (Sb)-Dissolved (mg/L)					
	Arsenic (As)-Dissolved (mg/L)					
	Barium (Ba)-Dissolved (mg/L)					
	Beryllium (Be)-Dissolved (mg/L)					
	Boron (B)-Dissolved (mg/L)					
	Cadmium (Cd)-Dissolved (mg/L)					
	Calcium (Ca)-Dissolved (mg/L)					
	Chromium (Cr)-Dissolved (mg/L)					
	Cobalt (Co)-Dissolved (mg/L)					
	Copper (Cu)-Dissolved (mg/L)					
	Iron (Fe)-Dissolved (mg/L)					
	Lead (Pb)-Dissolved (mg/L)					
	Lithium (Li)-Dissolved (mg/L)					
	Magnesium (Mg)-Dissolved (mg/L)					
	Manganese (Mn)-Dissolved (mg/L)					
	Mercury (Hg)-Dissolved (mg/L)					
	Molybdenum (Mo)-Dissolved (mg/L)					
	Nickel (Ni)-Dissolved (mg/L)					
	Potassium (K)-Dissolved (mg/L)					
	Selenium (Se)-Dissolved (mg/L)					
	Silver (Ag)-Dissolved (mg/L)					
	Sodium (Na)-Dissolved (mg/L)					
	Thallium (Tl)-Dissolved (mg/L)					
	Tin (Sn)-Dissolved (mg/L)					
	Titanium (Ti)-Dissolved (mg/L)					
	Uranium (U)-Dissolved (mg/L)					
	Vanadium (V)-Dissolved (mg/L)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678867-1	L678867-2	L678867-3	L678867-4	L678867-5
	Description					
	Sampled Date	16-AUG-08	17-AUG-08	17-AUG-08	19-AUG-08	20-AUG-08
	Sampled Time					
	Client ID	TPE	TPS	TPN	TE	INUG
Grouping	**Analyte**					
WATER						
Dissolved Metals	Zinc (Zn)-Dissolved (mg/L)					
Aggregate Organics	Oil and Grease (mg/L)	<5.0	<5.0	<5.0	<5.0	<5.0
Plant Pigments	Chlorophyll a (ug)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678867-6	L678867-7	L678867-8	L678867-9	L678867-10
	Description					
	Sampled Date	21-AUG-08	22-AUG-08		22-AUG-08	22-AUG-08
	Sampled Time					
	Client ID	WAL	SP	DUP	EQBLK	SP-D
Grouping	**Analyte**					
WATER						
Dissolved Metals	Zinc (Zn)-Dissolved (mg/L)					<0.0050
Aggregate Organics	Oil and Grease (mg/L)	<5.0	<5.0	<5.0	<5.0	
Plant Pigments	Chlorophyll a (ug)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678867-11	L678867-12	L678867-13	L678867-14	L678867-15
	Description					
	Sampled Date	22-AUG-08	22-AUG-08	16-AUG-08	17-AUG-08	17-AUG-08
	Sampled Time					
	Client ID	EQBLK-D	EQBLK-T	TPE	TPS	TPN
Grouping	**Analyte**					
WATER						
Dissolved Metals	Zinc (Zn)-Dissolved (mg/L)	<0.0050				
Aggregate Organics	Oil and Grease (mg/L)					
Plant Pigments	Chlorophyll a (ug)			0.398	0.327	0.337

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678867-16	L678867-17	L678867-18	L678867-19	L678867-28
	Description					
	Sampled Date	19-AUG-08	20-AUG-08	21-AUG-08	22-AUG-08	
	Sampled Time					
	Client ID	TE	INUG	WAL	SP	DUP
Grouping	**Analyte**					
WATER						
Dissolved Metals	Zinc (Zn)-Dissolved (mg/L)					
Aggregate Organics	Oil and Grease (mg/L)					
Plant Pigments	Chlorophyll a (ug)	0.595	0.616	0.659	0.139	0.632

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678867-29				
	Description					
	Sampled Date					
	Sampled Time					
	Client ID	TRAVEL BLANK				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Zinc (Zn)-Dissolved (mg/L)					
Aggregate Organics	Oil and Grease (mg/L)					
Plant Pigments	Chlorophyll a (ug)					

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-CL-IC-VA	Water	Chloride by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-NO2-IC-VA	Water	Nitrite by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-NO3-IC-VA	Water	Nitrate by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-SO4-IC-VA	Water	Sulfate by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

C-TOT-ORG-LECO-SK	Soil	Organic Carbon by combustion method	SSSA (1996) p. 973

Total Organic Carbon (C-TOT-ORG-LECO-SK, C-TOT-ORG-SK)

Total C and inorganic C are determined on separate samples. The total C is determined by combustion and thermal conductivity detection, while inorganic C is determined by weight lass after addition of hydrochloric acid. Organic C is calculated by the difference between these two determinations.

Reference for Total C:
Nelson, D.W. and Sommers, L.E. 1996. Total Carbon, organic carbon and organic matter. P. 961-1010 In: J.M. Bartels et al. (ed.) Methods of soil analysis: Part 3 Chemical methods. (3rd ed.) ASA and SSSA, Madison, WI. Book series no. 5

Reference for Inorganic C:
Loeppert, R.H. and Suarez, D.L. 1996. Gravimetric Method for Loss of Carbon Dioxide. P. 455-456 In: J.M. Bartels et al. (ed.) Methods of soil analysis: Part 3 Chemical methods. (3rd ed.) ASA and SSSA, Madison, WI. Book series no. 5

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)".

CHLOROA-VA	Water	Chlorophyll a by Fluorometer	APHA 10200 H. "Chlorophyll" and EPA 445

Chlorophyll and Pheopigments by Fluorometry analysis is carried out using procedures adapted from APHA Method 10200 H. "Chlorophyll" and

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)

USEPA Method 445. 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% aqueuos 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-CCME-CVAFS-VA Soil CVAFS Hg in Soil (CCME) CCME

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by atomic fluorescence spectrophotometry (EPA Method 7000 series).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

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-AR-UG-ICP-VA Filter Metals in Filter/Swab by ICPOES WCB 1051/OSHA ID-125G/EPA 6010B

This analysis is carried out using procedures adapted from WCB Methods 1051, published by the Workers' Compensation Board of British Columbia and/or OSHA Method ID-125G, published by the Occupational Safety and Health Administration, Salt Lake City, Utah. The procedure involves a hotplate or block digestion of the filter media or swab material, using a combination of nitric acid and hydrochloric acid. Instrumental analysis of the filter or swab extract is by inductively coupled plasma - optical emission spectrophotometry (EPA 6010B).

MET-CSR-FULL-ICP-VA Soil Metals in Soil by ICPOES (CSR SALM) BCMELP CSR SALM METHOD 8

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

MET-DIS-CCME-ICP-VA Water Diss. Metals in Water by ICPOES (CCME) EPA SW-846 3005A/6010B

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 - 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).

MOISTURE-VA Soil Moisture content ASTM METHOD D2794-00

This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.

MOISTURE-VA Soil ASTM METHOD D2794-00

This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.

NH3-SIE-VA Water Ammonia by SIE APHA 4500-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.

OG-TMB-VA Soil Oil & Grease in Soils by Tumbler NATM1100 V03 CCME PHC F2-F4G

A subsample of the sediment/soil is extracted with 1:1 hexane:acetone using a rotary extraction apparatus. The extract is analyzed gravimetrically.

Accuracy target values for Reference Materials used in this method are derived from averages of long-term method performance, as certified values do not exist for the reported parameters.

OGG-SF-VA Water Oil & Grease by Gravimetric BCMOE GRAVIMETRIC

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3510 & 9071, published by the United States Environmental Protection Agency (EPA), "Standard Methods for the Examination of Water and Wastewater", 20th ed., Method 5520, published by the American Public Health Association, and "BC Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials," 5th ed., published by the B.C. Ministry of Environment, Lands & Parks, 1994. The procedure involves an extraction of the entire water sample with hexane. This extract is then evaporated to dryness, and the residue weighed to determine Oil and Grease.

PAH-TUMB-H/A-MS-VA Soil PAH by Tumbler HEX/ACE with GCMS EPA METHODS 3570 & 8270.

Polycyclic Aromatic Hydrocarbons in Sediment/Soil
This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3570 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure uses a mechanical shaking technique to extract a subsample of the

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)

sediment/soil with a 1:1 mixture of hexane and acetone. The extract is then solvent exchanged to toluene. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation.

PH-1:2-VA	Soil	CSR pH by 1:2 Water Leach	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL

This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (10 mesh /2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.

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

PO4-DO-COL-VA	Water	Dissolved ortho Phosphate 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.

PSA-PIPET+GRAVEL-SK	Soil	Particle size - Sieve and Pipette	FORESTRY CANADA (1991) P. 46-48 MOD

Particle size analysis involves the measurement of the proportions of the various primary soil particle sizes (ie. clay < 0.004 mm, silt 0.004-0.063 mm, sand 0.063-2.0 mm and gravel > 2.0 mm). In this method, the gravel and sand portions are determined by sieving, while the clay portion is determined by sedimentation using Stokes Law, which relates the radius of the particles to the velocity of the sedimentation in water. Silt is calculated as 100% - (sand% + clay%)
Pretreatment of the soil with Calgon (sodium hexametaphosphate) is used to ensure the complete dispersion of the primary soil particles. Additional pretreatment may be necessary to remove cementing materials such as CaCO3 and organic matter.

Reference
Y.P. Kalra, and D.G. Maynard, 1991. Methods Manual For Forest Soil and Plant Analysis,Northwest Region. Forestry Canada (modified sand, silt and clay size ranges)

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.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
TL-CSR-MS-VA	Soil	ICPMS Tl in Soil by CSR SALM	BCMELP CSR SALM Method 8

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by either hotplate or block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

TSS-VA	Water	Solids by Gravimetric	APHA 2540 D - GRAVIMETRIC

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.

** 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
SK	ALS LABORATORY GROUP - SASKATOON, SASKATCHEWAN, CANADA	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.

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COC # C065416

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REPORT TO:	REPORT FORMAT / DISTRIBUTION	SERVICE REQUESTED
COMPANY: Azimuth Consulting	STANDARD ____ OTHER ____	✓ REGULAR SERVICE (DEFAULT)
CONTACT: Randy Baker	PDF ✓ EXCEL ✓ CUSTOM ____ FAX ____	✓ RUSH SERVICE (2-3 DAYS) (For TSS - 1L).
ADDRESS: 248-2963 W. Broadway Vancouver, BC, V6K 2G8	EMAIL 1: rbaker@azimuthgroup.ca	PRIORITY SERVICE (1 DAY or ASAP)
PHONE: 604-730-1220 FAX:	EMAIL 2: mmcconnell@azimuthgroup.ca	EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS
INVOICE TO: SAME AS REPORT ? (YES / NO)	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	ANALYSIS REQUEST
COMPANY:	CLIENT / PROJECT INFORMATION:	
CONTACT:	JOB #: AEMP	
ADDRESS:	PO /AFE:	
	Legal Site Description:	
PHONE: FAX:	QUOTE #: ALSEQ-07-622	
Lab Work Order # (lab use only): L678867	SAMPLER (Initials): MM RT	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Conventionals *	TKN, Ammonia (+H2SO4)	TOC (+HCl)	DOC (+HCl)	Total Metals (+HNO3)	Oil + Grease (+H2SO4)	TSS (1L plastic)	Total Metals (+HNO3)				HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	TPE	Aug. 16/08		Water	X	X	X	X	X	X						N	N	7
	TPS	Aug. 17/08			X	X	X	X	X	X								7
	TPN	Aug. 17/08			X	X	X	X	X	X								7
	TE	Aug. 19/08			X	X	X	X	X	X								7
	INUG	Aug. 20/08			X	X	X	X	X	X								7
	WAL	Aug. 21/08			X	X	X	X	X	X								7
	SP	Aug. 22/08			X	X	X	X	[redacted]	X	X							7
	DUP				X	X	X	X	X	X								7
	EQBLK	Aug. 22/08			X	X	X	X	[redacted]	X	X							7
	SP - D	Aug 22/08										X						1

GUIDELINES / REGULATIONS

SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

*Conventionals: conductivity, hardness, pH, TSS, TDS, nutrients (nitrate, nitrite, total phosphate, orthophosphate), Sulphate, Chloride, Alkalinity (bicarbonate, carbonate, hydroxide)

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 reverse page of the white report copy.

RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	SAMPLE CONDITION (lab use only)	
Wayne M Connell	Aug. 23/08	HD 08/09/05	11:00	TEMPERATURE: 13°	SAMPLES RECEIVED IN GOOD CONDITION (YES / NO) (If no provide details)
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:		

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM

CANADA TOLL FREE 1-800-668-9878

www.alsenviro.com

COC # C098459

REPORT TO:	REPORT FORMAT / DISTRIBUTION	SERVICE REQUESTED
COMPANY:	STANDARD ____ OTHER ____	✓ REGULAR SERVICE (DEFAULT)
CONTACT: See Last Page	PDF ____ EXCEL ____ CUSTOM ____ FAX ____	RUSH SERVICE (2-3 DAYS)
ADDRESS:	EMAIL 1:	PRIORITY SERVICE (1 DAY or ASAP)
	EMAIL 2:	EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS
PHONE: FAX:		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? YES / NO	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	F P F P P
COMPANY:	CLIENT / PROJECT INFORMATION:	Tekeal Metals (HNO3) / Total Metals (HNO3) / Chlorophyll-a (Methanol)
CONTACT:	JOB #: AEMP	
ADDRESS:	PO /AFE:	
	Legal Site Description:	
PHONE: FAX:	QUOTE #:	
Lab Work Order # (lab use only): L678867	SAMPLER (Initials):	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	SP-T	Aug. 22/08		Water	N	N	1
	EQBLK-D	"		↓			1
	EQBLK-T	"		↓			1
	TPE	Aug. 16/08		Filter			1
	TPS	Aug. 17/08		↓			1
	TPN	Aug. 17/08		↓			1
	TE	Aug. 19/08		↓			1
	INUG	Aug. 20/08		↓			1
	WAL	Aug. 21/08		↓			1
	SP	Aug. 22/08		↓			1

GUIDELINES / REGULATIONS	SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

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RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	SAMPLE CONDITION (lab use only)	
Maggie McConnell	Aug. 23/08	HD 08/09/05	10:59	TEMPERATURE: 13	SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO (If no provide details)
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:		

ALS Laboratory Group
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COC # C098458

REPORT TO:	REPORT FORMAT / DISTRIBUTION	SERVICE REQUESTED
COMPANY:	STANDARD ____ OTHER ____	✓ REGULAR SERVICE (DEFAULT)
CONTACT: See Page 1	PDF ____ EXCEL ____ CUSTOM ____ FAX ____	RUSH SERVICE (2-3 DAYS)
ADDRESS:	EMAIL 1:	PRIORITY SERVICE (1 DAY or ASAP)
	EMAIL 2:	EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS
PHONE: FAX:		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? YES / NO	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	
COMPANY:	CLIENT / PROJECT INFORMATION:	
CONTACT:	JOB #: AEMP	
ADDRESS:	PO /AFE:	
	Legal Site Description:	
PHONE: FAX:	QUOTE #:	
Lab Work Order # (lab use only): L678867	SAMPLER (Initials):	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Total Metals	PAHs	Oil + Grease	TOC	Grain Size	~~~	Chlorophyll-a (mg/L) F	Conventionals *	Total Metals (mg/L) F	TKN (+H2SO4) F	TOC (+HCl) F	HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	TPE	Aug-16/08		Sediment	X	X	X	X	X							N	N	3
	TPS	Aug. 17/08			X	X	X	X	X									
	TPN	Aug 18/08			X	X	X	X	X									
	TE	Aug. 19/08			X	X	X	X	X									
	INUG	Aug. 20/08			X	X	X	X	X									
	WAL	Aug. 21/08			X	X	X	X	X									
	DUP	"			X	X	X	X	X									
	X CON	"		Filter	X													1
	DUP	"		Filter							X							1
	Travel Blank (AE-08-AEMP)	Nov. 1/08		Water								X	X	X	X			4

GUIDELINES / REGULATIONS

SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

* Conventionals — See Page 1 for complete list

Failure to complete all portions of this form may delay analysis. Please fill in this form *LEGIBLY*.

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RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:
Marni McConnell	Aug.23/08	HD 08/05/09	10:59
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:

SAMPLE CONDITION (lab use only)

TEMPERATURE	SAMPLES RECEIVED IN GOOD CONDITION? YES / NO (If no provide details)
13	Y

Certificate of Analysis

AZIMUTH CONSULTING GROUP INC.

ATTN: RANDY BAKER

218 - 2902 WEST BROADWAY

VANCOUVER BC V6K 2G8

Reported On: 16-OCT-08 11:56 AM
Revision: 1

Lab Work Order #: L678018 **Date Received:** 04-SEP-08

Project P.O. #:
Job Reference: AEMP
Legal Site Desc:
CofC Numbers: C098448, C098450, C098451, C098452, C098453, C098471

Other Information:

Comments: ADDITIONAL 29-SEP-08 16:08
Please note: due to limited sample volume received for soil samples, only metals analysis could be performed.

For some of the submitted water samples, the measured concentration of specific dissolved parameters is greater than the corresponding total parameters concentration. The explanation for these findings is one or a combination of the following:
- laboratory method variability;
- field sampling method variability;
- bias introduced during general handling, storage, transportation and/or analysis of the sample;
- field sample grab bias - where separate grab samples are processed to produce total and dissolved samples;
- field sample split bias - where total and dissolved parameters samples are produced from the same grab sample.

For further clarification on any of the above information, please contact your ALS account manager.

Natasha Markovic-M.

NATASHA MARKOVIC-MIROVIC
Account Manager

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678018-7	L678018-8	L678018-9	L678018-10	L678018-11
	Description					
	Sampled Date	29-AUG-08	29-AUG-08	25-AUG-08	23-AUG-08	29-AUG-08
	Sampled Time					
	Client ID	BBD	BPJ	BAP	SP	BBD-SC-01
Grouping	**Analyte**					
SOIL						
Physical Tests	% Moisture (%)	35.6	63.3	37.5	84.2	
	pH (pH)	6.94	6.49	6.73	6.28	6.46
Particle Size	% Gravel (>2mm) (%)	<1	<1	3	<1	
	% Sand (2.0mm - 0.063mm) (%)	52	10	56	5	
	% Silt (0.063mm - 4um) (%)	44	80	38	72	
	% Clay (<4um) (%)	3	9	4	23	
Organic / Inorganic Carbon	Total Organic Carbon (%)	0.4	0.9	0.4	3.7	0.1
Metals	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	5.4	25.0	<5.0	29.2	<5.0
	Barium (Ba) (mg/kg)	64.2	160	308	136	25.9
	Beryllium (Be) (mg/kg)	<0.50	<0.50	<0.50	2.25	<0.50
	Cadmium (Cd) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Chromium (Cr) (mg/kg)	13.6	24.1	17.0	85.9	7.6
	Cobalt (Co) (mg/kg)	4.4	8.1	4.6	16.5	2.7
	Copper (Cu) (mg/kg)	7.3	11.3	4.8	95.7	2.8
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Mercury (Hg) (mg/kg)	<0.0050	0.0172	0.0058	0.0372	<0.0050
	Molybdenum (Mo) (mg/kg)	<4.0	<4.0	<4.0	7.1	<4.0
	Nickel (Ni) (mg/kg)	8.4	14.0	7.9	59.8	<5.0
	Selenium (Se) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)	16.5	27.0	25.2	45.6	8.9
	Zinc (Zn) (mg/kg)	26.1	45.2	22.5	125	15.8
Aggregate Organics	Oil and Grease (mg/kg)	<500	<500	<500	<500	
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.040	<0.040	<0.040	<0.040	
	Acenaphthylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	
	Anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	
	Benz(a)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	
	Benzo(a)pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	
	Benzo(b)fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	
	Benzo(g,h,i)perylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	
	Benzo(k)fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	
	Chrysene (mg/kg)	<0.050	<0.050	<0.050	<0.050	
	Dibenz(a,h)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	
	Fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678018-12	L678018-13	L678018-14	L678018-15	L678018-16
	Description					
	Sampled Date	29-AUG-08	29-AUG-08	29-AUG-08	29-AUG-08	29-AUG-08
	Sampled Time					
	Client ID	BBD-SC-02	BBD-SC-03	BBD-SC-04	BBD-SC-05	BBD-SC-06
Grouping	**Analyte**					
SOIL						
Physical Tests	% Moisture (%)					
	pH (pH)	6.16	6.33	6.35	5.49	5.89
Particle Size	% Gravel (>2mm) (%)					
	% Sand (2.0mm - 0.063mm) (%)					
	% Silt (0.063mm - 4um) (%)					
	% Clay (<4um) (%)					
Organic / Inorganic Carbon	Total Organic Carbon (%)	0.5	0.7	0.4	0.8	0.7
Metals	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	<5.0	5.6	<5.0	<5.0	8.0
	Barium (Ba) (mg/kg)	84.2	80.7	60.2	100	100
	Beryllium (Be) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Cadmium (Cd) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Chromium (Cr) (mg/kg)	14.6	13.2	11.6	19.6	16.6
	Cobalt (Co) (mg/kg)	4.3	4.9	3.9	5.6	5.3
	Copper (Cu) (mg/kg)	7.7	7.5	5.5	10.4	9.1
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Mercury (Hg) (mg/kg)	0.0074	0.0061	0.0053	0.0109	0.0081
	Molybdenum (Mo) (mg/kg)	<4.0	<4.0	<4.0	<4.0	<4.0
	Nickel (Ni) (mg/kg)	9.0	8.4	7.5	11.8	9.6
	Selenium (Se) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)	17.2	17.4	14.5	21.6	19.9
	Zinc (Zn) (mg/kg)	29.0	26.9	23.5	36.9	30.8
Aggregate Organics	Oil and Grease (mg/kg)					
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)					
	Acenaphthylene (mg/kg)					
	Anthracene (mg/kg)					
	Benz(a)anthracene (mg/kg)					
	Benzo(a)pyrene (mg/kg)					
	Benzo(b)fluoranthene (mg/kg)					
	Benzo(g,h,i)perylene (mg/kg)					
	Benzo(k)fluoranthene (mg/kg)					
	Chrysene (mg/kg)					
	Dibenz(a,h)anthracene (mg/kg)					
	Fluoranthene (mg/kg)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678018-17	L678018-18	L678018-19	L678018-20	L678018-21
	Description					
	Sampled Date	28-AUG-08	28-AUG-08	28-AUG-08	28-AUG-08	28-AUG-08
	Sampled Time					
	Client ID	BPJ-SC-01	BPJ-SC-02	BPJ-SC-03	BPJ-SC-04	BPJ-SC-05
Grouping	**Analyte**					
SOIL						
Physical Tests	% Moisture (%)					
	pH (pH)	6.11	5.99	6.30	6.46	6.45
Particle Size	% Gravel (>2mm) (%)					
	% Sand (2.0mm - 0.063mm) (%)					
	% Silt (0.063mm - 4um) (%)					
	% Clay (<4um) (%)					
Organic / Inorganic Carbon	Total Organic Carbon (%)	1.4	1.2	0.7	1.0	1.4
Metals	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	65.7	58.1	18.3	12.4	22.2
	Barium (Ba) (mg/kg)	214	242	142	150	168
	Beryllium (Be) (mg/kg)	<0.50	<0.50	0.51	<0.50	0.56
	Cadmium (Cd) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Chromium (Cr) (mg/kg)	24.1	23.4	24.4	22.0	23.1
	Cobalt (Co) (mg/kg)	8.8	10.4	8.5	8.4	11.7
	Copper (Cu) (mg/kg)	12.2	11.4	10.8	10.2	10.8
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Mercury (Hg) (mg/kg)	0.0203	0.0173	0.0166	0.0135	0.0191
	Molybdenum (Mo) (mg/kg)	<4.0	4.1	<4.0	<4.0	<4.0
	Nickel (Ni) (mg/kg)	12.9	13.9	14.4	14.3	15.4
	Selenium (Se) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)	26.9	26.5	27.3	24.9	26.9
	Zinc (Zn) (mg/kg)	44.7	44.4	47.2	44.2	46.7
Aggregate Organics	Oil and Grease (mg/kg)					
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)					
	Acenaphthylene (mg/kg)					
	Anthracene (mg/kg)					
	Benz(a)anthracene (mg/kg)					
	Benzo(a)pyrene (mg/kg)					
	Benzo(b)fluoranthene (mg/kg)					
	Benzo(g,h,i)perylene (mg/kg)					
	Benzo(k)fluoranthene (mg/kg)					
	Chrysene (mg/kg)					
	Dibenz(a,h)anthracene (mg/kg)					
	Fluoranthene (mg/kg)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678018-22	L678018-23	L678018-24	L678018-25	L678018-26
	Description					
	Sampled Date	28-AUG-08	28-AUG-08	28-AUG-08	28-AUG-08	28-AUG-08
	Sampled Time					
	Client ID	BPJ-SC-06	BPJ-SC-07	BPJ-SC-08	BPJ-SC-09	BPJ-SC-10
Grouping	**Analyte**					
SOIL						
Physical Tests	% Moisture (%)					
	pH (pH)	6.48	6.60	6.50	6.49	6.49
Particle Size	% Gravel (>2mm) (%)					
	% Sand (2.0mm - 0.063mm) (%)					
	% Silt (0.063mm - 4um) (%)					
	% Clay (<4um) (%)					
Organic / Inorganic Carbon	Total Organic Carbon (%)	1.3	1.6	1.3	1.1	1.3
Metals	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	15.9	10.4	20.6	18.0	44.3
	Barium (Ba) (mg/kg)	202	186	205	160	233
	Beryllium (Be) (mg/kg)	0.53	0.54	0.51	0.51	0.52
	Cadmium (Cd) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Chromium (Cr) (mg/kg)	24.8	25.6	25.1	24.7	24.6
	Cobalt (Co) (mg/kg)	10.3	10.0	10.1	9.4	10.3
	Copper (Cu) (mg/kg)	12.1	12.1	12.8	11.5	11.8
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Mercury (Hg) (mg/kg)	0.0244	0.0191	0.0191	0.0158	0.0190
	Molybdenum (Mo) (mg/kg)	<4.0	<4.0	<4.0	<4.0	<4.0
	Nickel (Ni) (mg/kg)	16.4	17.0	16.2	16.2	15.5
	Selenium (Se) (mg/kg)	<4.0	<2.0	<4.0	<2.0	<4.0
	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)	27.9	28.8	27.2	27.9	27.8
	Zinc (Zn) (mg/kg)	47.7	49.6	47.6	47.9	47.8
Aggregate Organics	Oil and Grease (mg/kg)					
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)					
	Acenaphthylene (mg/kg)					
	Anthracene (mg/kg)					
	Benz(a)anthracene (mg/kg)					
	Benzo(a)pyrene (mg/kg)					
	Benzo(b)fluoranthene (mg/kg)					
	Benzo(g,h,i)perylene (mg/kg)					
	Benzo(k)fluoranthene (mg/kg)					
	Chrysene (mg/kg)					
	Dibenz(a,h)anthracene (mg/kg)					
	Fluoranthene (mg/kg)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678018-27	L678018-28	L678018-29	L678018-30	L678018-31
	Description					
	Sampled Date	28-AUG-08	28-AUG-08	28-AUG-08	28-AUG-08	28-AUG-08
	Sampled Time					
	Client ID	BPJ-SC-11	BPJ-SC-12	BPJ-SC-13	BPJ-SC-14	BPJ-SC-15
Grouping	**Analyte**					
SOIL						
Physical Tests	% Moisture (%)					
	pH (pH)	6.40	6.54	6.45	6.64	6.53
Particle Size	% Gravel (>2mm) (%)					
	% Sand (2.0mm - 0.063mm) (%)					
	% Silt (0.063mm - 4um) (%)					
	% Clay (<4um) (%)					
Organic / Inorganic Carbon	Total Organic Carbon (%)	1.1	0.3	0.3	1.0	1.2
Metals	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	49.5	19.5	6.7	9.7	38.4
	Barium (Ba) (mg/kg)	196	83.6	119	115	179
	Beryllium (Be) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Cadmium (Cd) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Chromium (Cr) (mg/kg)	20.9	13.2	17.2	23.9	23.8
	Cobalt (Co) (mg/kg)	12.0	4.9	4.8	8.4	9.2
	Copper (Cu) (mg/kg)	10.5	5.3	6.6	10.2	12.1
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Mercury (Hg) (mg/kg)	0.0151	0.0052	<0.0050	0.0166	0.0189
	Molybdenum (Mo) (mg/kg)	5.5	<4.0	<4.0	<4.0	<4.0
	Nickel (Ni) (mg/kg)	12.5	8.0	9.7	15.0	15.1
	Selenium (Se) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)	25.0	18.9	27.9	26.6	26.2
	Zinc (Zn) (mg/kg)	42.0	25.5	28.7	45.4	46.5
Aggregate Organics	Oil and Grease (mg/kg)					
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)					
	Acenaphthylene (mg/kg)					
	Anthracene (mg/kg)					
	Benz(a)anthracene (mg/kg)					
	Benzo(a)pyrene (mg/kg)					
	Benzo(b)fluoranthene (mg/kg)					
	Benzo(g,h,i)perylene (mg/kg)					
	Benzo(k)fluoranthene (mg/kg)					
	Chrysene (mg/kg)					
	Dibenz(a,h)anthracene (mg/kg)					
	Fluoranthene (mg/kg)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678018-32	L678018-33	L678018-34	L678018-35	L678018-36
	Description					
	Sampled Date	28-AUG-08	25-AUG-08	25-AUG-08	25-AUG-08	25-AUG-08
	Sampled Time					
	Client ID	BPJ-SC-DUP	BAP-SC-01	BAP-SC-02	BAP-SC-03	BAP-SC-04
Grouping	**Analyte**					
SOIL						
Physical Tests	% Moisture (%)					
	pH (pH)	6.50	6.72	6.61	6.64	6.61
Particle Size	% Gravel (>2mm) (%)					
	% Sand (2.0mm - 0.063mm) (%)					
	% Silt (0.063mm - 4um) (%)					
	% Clay (<4um) (%)					
Organic / Inorganic Carbon	Total Organic Carbon (%)	1.2	0.5	0.4	0.4	0.4
Metals	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	10.4	<5.0	<5.0	<5.0	<5.0
	Barium (Ba) (mg/kg)	187	270	269	187	334
	Beryllium (Be) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Cadmium (Cd) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Chromium (Cr) (mg/kg)	23.5	15.9	16.8	15.5	14.8
	Cobalt (Co) (mg/kg)	9.7	4.6	4.8	4.1	4.3
	Copper (Cu) (mg/kg)	11.2	5.4	5.8	4.5	4.9
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Mercury (Hg) (mg/kg)	0.0175	0.0069	0.0055	0.0063	0.0059
	Molybdenum (Mo) (mg/kg)	<4.0	<4.0	<4.0	<4.0	<4.0
	Nickel (Ni) (mg/kg)	15.7	9.4	8.3	7.3	8.3
	Selenium (Se) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)	26.7	20.5	25.3	23.7	19.6
	Zinc (Zn) (mg/kg)	46.5	25.3	24.1	20.9	22.7
Aggregate Organics	Oil and Grease (mg/kg)					
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)					
	Acenaphthylene (mg/kg)					
	Anthracene (mg/kg)					
	Benz(a)anthracene (mg/kg)					
	Benzo(a)pyrene (mg/kg)					
	Benzo(b)fluoranthene (mg/kg)					
	Benzo(g,h,i)perylene (mg/kg)					
	Benzo(k)fluoranthene (mg/kg)					
	Chrysene (mg/kg)					
	Dibenz(a,h)anthracene (mg/kg)					
	Fluoranthene (mg/kg)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678018-37	L678018-38	L678018-39	L678018-40	L678018-41
	Description					
	Sampled Date	25-AUG-08	25-AUG-08	25-AUG-08	25-AUG-08	25-AUG-08
	Sampled Time					
	Client ID	BAP-SC-05	BAP-SC-06	BAP-SC-07	BAP-SC-08	BAP-SC-09
Grouping	**Analyte**					
SOIL						
Physical Tests	% Moisture (%)					
	pH (pH)	6.53	6.44	6.50	6.74	6.55
Particle Size	% Gravel (>2mm) (%)					
	% Sand (2.0mm - 0.063mm) (%)					
	% Silt (0.063mm - 4um) (%)					
	% Clay (<4um) (%)					
Organic / Inorganic Carbon	Total Organic Carbon (%)	0.5	0.9	0.6	0.4	0.6
Metals	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	<5.0	9.1	8.0	<5.0	5.9
	Barium (Ba) (mg/kg)	277	327	341	385	313
	Beryllium (Be) (mg/kg)	<0.50	0.53	<0.50	<0.50	<0.50
	Cadmium (Cd) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Chromium (Cr) (mg/kg)	17.3	23.9	18.1	16.2	16.6
	Cobalt (Co) (mg/kg)	5.5	6.7	5.5	4.8	5.7
	Copper (Cu) (mg/kg)	6.8	10.0	6.4	5.3	6.2
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Mercury (Hg) (mg/kg)	0.0092	0.0154	0.0090	0.0062	0.0095
	Molybdenum (Mo) (mg/kg)	<4.0	<4.0	<4.0	<4.0	<4.0
	Nickel (Ni) (mg/kg)	9.8	12.9	10.1	9.6	10.4
	Selenium (Se) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)	22.1	30.0	23.0	20.6	21.4
	Zinc (Zn) (mg/kg)	27.6	38.4	29.4	24.3	27.8
Aggregate Organics	Oil and Grease (mg/kg)					
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)					
	Acenaphthylene (mg/kg)					
	Anthracene (mg/kg)					
	Benz(a)anthracene (mg/kg)					
	Benzo(a)pyrene (mg/kg)					
	Benzo(b)fluoranthene (mg/kg)					
	Benzo(g,h,i)perylene (mg/kg)					
	Benzo(k)fluoranthene (mg/kg)					
	Chrysene (mg/kg)					
	Dibenz(a,h)anthracene (mg/kg)					
	Fluoranthene (mg/kg)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678018-42	L678018-43	L678018-44	L678018-45	L678018-46
	Description					
	Sampled Date	25-AUG-08	25-AUG-08	25-AUG-08	25-AUG-08	25-AUG-08
	Sampled Time					
	Client ID	BAP-SC-10	BAP-SC-11	BAP-SC-12	BAP-SC-13	BAP-SC-14
Grouping	**Analyte**					
SOIL						
Physical Tests	% Moisture (%)					
	pH (pH)	6.56	6.83	6.83	6.85	6.70
Particle Size	% Gravel (>2mm) (%)					
	% Sand (2.0mm - 0.063mm) (%)					
	% Silt (0.063mm - 4um) (%)					
	% Clay (<4um) (%)					
Organic / Inorganic Carbon	Total Organic Carbon (%)	0.5	0.4	0.3	0.4	0.5
Metals	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Barium (Ba) (mg/kg)	121	185	213	312	290
	Beryllium (Be) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Cadmium (Cd) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Chromium (Cr) (mg/kg)	16.7	13.9	18.8	17.7	17.4
	Cobalt (Co) (mg/kg)	5.2	3.7	4.5	4.3	4.6
	Copper (Cu) (mg/kg)	6.5	3.6	4.8	5.2	5.1
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Mercury (Hg) (mg/kg)	0.0094	<0.0050	0.0055	0.0053	0.0082
	Molybdenum (Mo) (mg/kg)	<4.0	<4.0	<4.0	<4.0	<4.0
	Nickel (Ni) (mg/kg)	9.8	7.8	11.2	9.6	8.9
	Selenium (Se) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)	20.1	15.9	17.7	21.1	20.7
	Zinc (Zn) (mg/kg)	27.8	18.4	23.6	20.6	24.0
Aggregate Organics	Oil and Grease (mg/kg)					
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)					
	Acenaphthylene (mg/kg)					
	Anthracene (mg/kg)					
	Benz(a)anthracene (mg/kg)					
	Benzo(a)pyrene (mg/kg)					
	Benzo(b)fluoranthene (mg/kg)					
	Benzo(g,h,i)perylene (mg/kg)					
	Benzo(k)fluoranthene (mg/kg)					
	Chrysene (mg/kg)					
	Dibenz(a,h)anthracene (mg/kg)					
	Fluoranthene (mg/kg)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678018-47	L678018-48			
	Description					
	Sampled Date	25-AUG-08	25-AUG-08			
	Sampled Time					
	Client ID	BAP-SC-15	BAP-SC-DUP			
Grouping	**Analyte**					
SOIL						
Physical Tests	% Moisture (%)					
	pH (pH)	6.78	6.73			
Particle Size	% Gravel (>2mm) (%)					
	% Sand (2.0mm - 0.063mm) (%)					
	% Silt (0.063mm - 4um) (%)					
	% Clay (<4um) (%)					
Organic / Inorganic Carbon	Total Organic Carbon (%)	0.3	0.3			
Metals	Antimony (Sb) (mg/kg)	<10	<10			
	Arsenic (As) (mg/kg)	<5.0	<5.0			
	Barium (Ba) (mg/kg)	281	255			
	Beryllium (Be) (mg/kg)	<0.50	<0.50			
	Cadmium (Cd) (mg/kg)	<0.50	<0.50			
	Chromium (Cr) (mg/kg)	16.0	17.2			
	Cobalt (Co) (mg/kg)	3.9	4.2			
	Copper (Cu) (mg/kg)	4.3	4.3			
	Lead (Pb) (mg/kg)	<30	<30			
	Mercury (Hg) (mg/kg)	<0.0050	0.0062			
	Molybdenum (Mo) (mg/kg)	<4.0	<4.0			
	Nickel (Ni) (mg/kg)	9.3	9.2			
	Selenium (Se) (mg/kg)	<2.0	<2.0			
	Silver (Ag) (mg/kg)	<2.0	<2.0			
	Thallium (Tl) (mg/kg)	<1.0	<1.0			
	Tin (Sn) (mg/kg)	<5.0	<5.0			
	Vanadium (V) (mg/kg)	16.3	17.8			
	Zinc (Zn) (mg/kg)	20.4	21.4			
Aggregate Organics	Oil and Grease (mg/kg)					
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)					
	Acenaphthylene (mg/kg)					
	Anthracene (mg/kg)					
	Benz(a)anthracene (mg/kg)					
	Benzo(a)pyrene (mg/kg)					
	Benzo(b)fluoranthene (mg/kg)					
	Benzo(g,h,i)perylene (mg/kg)					
	Benzo(k)fluoranthene (mg/kg)					
	Chrysene (mg/kg)					
	Dibenz(a,h)anthracene (mg/kg)					
	Fluoranthene (mg/kg)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678018-7	L678018-8	L678018-9	L678018-10	L678018-11
	Description					
	Sampled Date	29-AUG-08	29-AUG-08	25-AUG-08	23-AUG-08	29-AUG-08
	Sampled Time					
	Client ID	BBD	BPJ	BAP	SP	BBD-SC-01
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Fluorene (mg/kg)	<0.050	<0.050	<0.050	<0.050	
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	
	2-Methylnaphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	
	Naphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	
	Phenanthrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	
	Pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	
	Surrogate: d10-Acenaphthene (SS) (%)	94	94	98	93	
	Surrogate: d12-Chrysene (SS) (%)	88	87	91	95	
	Surrogate: d8-Naphthalene (SS) (%)	90	92	93	99	
	Surrogate: d10-Phenanthrene (SS) (%)	94	93	97	105	

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	Sample ID	L678018-12	L678018-13	L678018-14	L678018-15	L678018-16
	Description					
	Sampled Date	29-AUG-08	29-AUG-08	29-AUG-08	29-AUG-08	29-AUG-08
	Sampled Time					
	Client ID	BBD-SC-02	BBD-SC-03	BBD-SC-04	BBD-SC-05	BBD-SC-06
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Fluorene (mg/kg)					
	Indeno(1,2,3-c,d)pyrene (mg/kg)					
	2-Methylnaphthalene (mg/kg)					
	Naphthalene (mg/kg)					
	Phenanthrene (mg/kg)					
	Pyrene (mg/kg)					
	Surrogate: d10-Acenaphthene (SS) (%)					
	Surrogate: d12-Chrysene (SS) (%)					
	Surrogate: d8-Naphthalene (SS) (%)					
	Surrogate: d10-Phenanthrene (SS) (%)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678018-17	L678018-18	L678018-19	L678018-20	L678018-21
	Description					
	Sampled Date	28-AUG-08	28-AUG-08	28-AUG-08	28-AUG-08	28-AUG-08
	Sampled Time					
	Client ID	BPJ-SC-01	BPJ-SC-02	BPJ-SC-03	BPJ-SC-04	BPJ-SC-05
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Fluorene (mg/kg)					
	Indeno(1,2,3-c,d)pyrene (mg/kg)					
	2-Methylnaphthalene (mg/kg)					
	Naphthalene (mg/kg)					
	Phenanthrene (mg/kg)					
	Pyrene (mg/kg)					
	Surrogate: d10-Acenaphthene (SS) (%)					
	Surrogate: d12-Chrysene (SS) (%)					
	Surrogate: d8-Naphthalene (SS) (%)					
	Surrogate: d10-Phenanthrene (SS) (%)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678018-22	L678018-23	L678018-24	L678018-25	L678018-26
	Description					
	Sampled Date	28-AUG-08	28-AUG-08	28-AUG-08	28-AUG-08	28-AUG-08
	Sampled Time					
	Client ID	BPJ-SC-06	BPJ-SC-07	BPJ-SC-08	BPJ-SC-09	BPJ-SC-10
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Fluorene (mg/kg)					
	Indeno(1,2,3-c,d)pyrene (mg/kg)					
	2-Methylnaphthalene (mg/kg)					
	Naphthalene (mg/kg)					
	Phenanthrene (mg/kg)					
	Pyrene (mg/kg)					
	Surrogate: d10-Acenaphthene (SS) (%)					
	Surrogate: d12-Chrysene (SS) (%)					
	Surrogate: d8-Naphthalene (SS) (%)					
	Surrogate: d10-Phenanthrene (SS) (%)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678018-27	L678018-28	L678018-29	L678018-30	L678018-31
	Description					
	Sampled Date	28-AUG-08	28-AUG-08	28-AUG-08	28-AUG-08	28-AUG-08
	Sampled Time					
	Client ID	BPJ-SC-11	BPJ-SC-12	BPJ-SC-13	BPJ-SC-14	BPJ-SC-15
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Fluorene (mg/kg)					
	Indeno(1,2,3-c,d)pyrene (mg/kg)					
	2-Methylnaphthalene (mg/kg)					
	Naphthalene (mg/kg)					
	Phenanthrene (mg/kg)					
	Pyrene (mg/kg)					
	Surrogate: d10-Acenaphthene (SS) (%)					
	Surrogate: d12-Chrysene (SS) (%)					
	Surrogate: d8-Naphthalene (SS) (%)					
	Surrogate: d10-Phenanthrene (SS) (%)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678018-32	L678018-33	L678018-34	L678018-35	L678018-36
	Description					
	Sampled Date	28-AUG-08	25-AUG-08	25-AUG-08	25-AUG-08	25-AUG-08
	Sampled Time					
	Client ID	BPJ-SC-DUP	BAP-SC-01	BAP-SC-02	BAP-SC-03	BAP-SC-04
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Fluorene (mg/kg)					
	Indeno(1,2,3-c,d)pyrene (mg/kg)					
	2-Methylnaphthalene (mg/kg)					
	Naphthalene (mg/kg)					
	Phenanthrene (mg/kg)					
	Pyrene (mg/kg)					
	Surrogate: d10-Acenaphthene (SS) (%)					
	Surrogate: d12-Chrysene (SS) (%)					
	Surrogate: d8-Naphthalene (SS) (%)					
	Surrogate: d10-Phenanthrene (SS) (%)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678018-37	L678018-38	L678018-39	L678018-40	L678018-41
	Description					
	Sampled Date	25-AUG-08	25-AUG-08	25-AUG-08	25-AUG-08	25-AUG-08
	Sampled Time					
	Client ID	BAP-SC-05	BAP-SC-06	BAP-SC-07	BAP-SC-08	BAP-SC-09
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Fluorene (mg/kg)					
	Indeno(1,2,3-c,d)pyrene (mg/kg)					
	2-Methylnaphthalene (mg/kg)					
	Naphthalene (mg/kg)					
	Phenanthrene (mg/kg)					
	Pyrene (mg/kg)					
	Surrogate: d10-Acenaphthene (SS) (%)					
	Surrogate: d12-Chrysene (SS) (%)					
	Surrogate: d8-Naphthalene (SS) (%)					
	Surrogate: d10-Phenanthrene (SS) (%)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678018-42	L678018-43	L678018-44	L678018-45	L678018-46
	Description					
	Sampled Date	25-AUG-08	25-AUG-08	25-AUG-08	25-AUG-08	25-AUG-08
	Sampled Time					
	Client ID	BAP-SC-10	BAP-SC-11	BAP-SC-12	BAP-SC-13	BAP-SC-14
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Fluorene (mg/kg)					
	Indeno(1,2,3-c,d)pyrene (mg/kg)					
	2-Methylnaphthalene (mg/kg)					
	Naphthalene (mg/kg)					
	Phenanthrene (mg/kg)					
	Pyrene (mg/kg)					
	Surrogate: d10-Acenaphthene (SS) (%)					
	Surrogate: d12-Chrysene (SS) (%)					
	Surrogate: d8-Naphthalene (SS) (%)					
	Surrogate: d10-Phenanthrene (SS) (%)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678018-47	L678018-48			
	Description					
	Sampled Date	25-AUG-08	25-AUG-08			
	Sampled Time					
	Client ID	BAP-SC-15	BAP-SC-DUP			
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Fluorene (mg/kg)					
	Indeno(1,2,3-c,d)pyrene (mg/kg)					
	2-Methylnaphthalene (mg/kg)					
	Naphthalene (mg/kg)					
	Phenanthrene (mg/kg)					
	Pyrene (mg/kg)					
	Surrogate: d10-Acenaphthene (SS) (%)					
	Surrogate: d12-Chrysene (SS) (%)					
	Surrogate: d8-Naphthalene (SS) (%)					
	Surrogate: d10-Phenanthrene (SS) (%)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678018-1	L678018-2	L678018-3	L678018-4	L678018-5
	Description					
	Sampled Date	28-AUG-08	28-AUG-08	25-AUG-08	28-AUG-08	28-AUG-08
	Sampled Time					
	Client ID	BBD	BPJ	BAP	BBD	BPJ
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	25.2	135	323		
	Hardness (as CaCO3) (mg/L)	16.8	18.7	33.3		
	pH (pH)	7.83	7.74	7.64		
	Total Suspended Solids (mg/L)	<3.0	<3.0	<3.0		
	Total Dissolved Solids (mg/L)	13	71	177		
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	8.2	8.1	8.0		
	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)	8.2	8.1	8.0		
	Ammonia as N (mg/L)	<0.020	0.024	0.021		
	Chloride (Cl) (mg/L)	1.50	30.7	81.4		
	Nitrate (as N) (mg/L)	0.0082	0.0083	0.0147		
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010		
	Total Kjeldahl Nitrogen (mg/L)	0.268	0.239	0.187		
	Ortho Phosphate as P (mg/L)	<0.0010	<0.0010	<0.0010		
	Total Phosphate as P (mg/L)	0.0068	0.0093	0.0032		
	Sulfate (SO4) (mg/L)	0.68	4.60	11.7		
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	3.54	3.42	3.40		
	Total Organic Carbon (mg/L)	3.28	3.16	2.92		
Total Metals	Aluminum (Al)-Total (mg/L)	0.140	0.0354	0.0057		
	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)	<0.060	<0.060	<0.060		
	Beryllium (Be)-Total (mg/L)	<0.0010	<0.0010	<0.0010		
	Boron (B)-Total (mg/L)	<0.30	<0.30	<0.30		
	Cadmium (Cd)-Total (mg/L)	<0.000017	<0.000017	<0.000017		
	Calcium (Ca)-Total (mg/L)	4.95	2.90	3.75		
	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)	<0.090	<0.090	<0.090		
	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)	1.07	2.79	5.81		
	Manganese (Mn)-Total (mg/L)	0.0104	0.00507	0.00169		
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020		
	Molybdenum (Mo)-Total (mg/L)	<0.0010	<0.0010	<0.0010		
	Nickel (Ni)-Total (mg/L)	<0.0010	<0.0010	<0.0010		

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678018-6				
	Description					
	Sampled Date	25-AUG-08				
	Sampled Time					
	Client ID	BAP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)					
	Hardness (as CaCO3) (mg/L)					
	pH (pH)					
	Total Suspended Solids (mg/L)					
	Total Dissolved Solids (mg/L)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)					
	Alkalinity, Carbonate (as CaCO3) (mg/L)					
	Alkalinity, Hydroxide (as CaCO3) (mg/L)					
	Alkalinity, Total (as CaCO3) (mg/L)					
	Ammonia as N (mg/L)					
	Chloride (Cl) (mg/L)					
	Nitrate (as N) (mg/L)					
	Nitrite (as N) (mg/L)					
	Total Kjeldahl Nitrogen (mg/L)					
	Ortho Phosphate as P (mg/L)					
	Total Phosphate as P (mg/L)					
	Sulfate (SO4) (mg/L)					
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)					
	Total Organic Carbon (mg/L)					
Total Metals	Aluminum (Al)-Total (mg/L)					
	Antimony (Sb)-Total (mg/L)					
	Arsenic (As)-Total (mg/L)					
	Barium (Ba)-Total (mg/L)					
	Beryllium (Be)-Total (mg/L)					
	Boron (B)-Total (mg/L)					
	Cadmium (Cd)-Total (mg/L)					
	Calcium (Ca)-Total (mg/L)					
	Chromium (Cr)-Total (mg/L)					
	Cobalt (Co)-Total (mg/L)					
	Copper (Cu)-Total (mg/L)					
	Iron (Fe)-Total (mg/L)					
	Lead (Pb)-Total (mg/L)					
	Lithium (Li)-Total (mg/L)					
	Magnesium (Mg)-Total (mg/L)					
	Manganese (Mn)-Total (mg/L)					
	Mercury (Hg)-Total (mg/L)					
	Molybdenum (Mo)-Total (mg/L)					
	Nickel (Ni)-Total (mg/L)					

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L678018-1	L678018-2	L678018-3	L678018-4	L678018-5
		Description					
		Sampled Date	28-AUG-08	28-AUG-08	25-AUG-08	28-AUG-08	28-AUG-08
		Sampled Time					
		Client ID	BBD	BPJ	BAP	BBD	BPJ
Grouping	**Analyte**						
WATER							
Total Metals	Potassium (K)-Total (mg/L)		<6.0	<6.0	<6.0		
	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)		<6.0	15.8	42.2		
	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)		<0.030	<0.030	<0.030		
	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)		<0.015	<0.015	<0.015		
Aggregate Organics	Oil and Grease (mg/L)		<5.0	<5.0	<5.0		
Plant Pigments	Chlorophyll a (ug)					1.34	1.76

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678018-6				
	Description					
	Sampled Date	25-AUG-08				
	Sampled Time					
	Client ID	BAP				
Grouping	**Analyte**					
WATER						
Total Metals	Potassium (K)-Total (mg/L)					
	Selenium (Se)-Total (mg/L)					
	Silver (Ag)-Total (mg/L)					
	Sodium (Na)-Total (mg/L)					
	Thallium (Tl)-Total (mg/L)					
	Tin (Sn)-Total (mg/L)					
	Titanium (Ti)-Total (mg/L)					
	Uranium (U)-Total (mg/L)					
	Vanadium (V)-Total (mg/L)					
	Zinc (Zn)-Total (mg/L)					
Aggregate Organics	Oil and Grease (mg/L)					
Plant Pigments	Chlorophyll a (ug)	1.04				

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-CL-IC-VA	Water	Chloride by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-NO2-IC-VA	Water	Nitrite by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-NO3-IC-VA	Water	Nitrate by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-SO4-IC-VA	Water	Sulfate by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

C-TOT-ORG-LECO-SK	Soil	Organic Carbon by combustion method	SSSA (1996) p. 973

Total Organic Carbon (C-TOT-ORG-LECO-SK, C-TOT-ORG-SK)

Total C and inorganic C are determined on separate samples. The total C is determined by combustion and thermal conductivity detection, while inorganic C is determined by weight lass after addition of hydrochloric acid. Organic C is calculated by the difference between these two determinations.

Reference for Total C:
Nelson, D.W. and Sommers, L.E. 1996. Total Carbon, organic carbon and organic matter. P. 961-1010 In: J.M. Bartels et al. (ed.) Methods of soil analysis: Part 3 Chemical methods. (3rd ed.) ASA and SSSA, Madison, WI. Book series no. 5

Reference for Inorganic C:
Loeppert, R.H. and Suarez, D.L. 1996. Gravimetric Method for Loss of Carbon Dioxide. P. 455-456 In: J.M. Bartels et al. (ed.) Methods of soil analysis: Part 3 Chemical methods. (3rd ed.) ASA and SSSA, Madison, WI. Book series no. 5

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)".

CHLOROA-VA	Water	Chlorophyll a by Fluorometer	APHA 10200 H. "Chlorophyll" and EPA 445

Chlorophyll and Pheopigments by Fluorometry analysis is carried out using procedures adapted from APHA Method 10200 H. "Chlorophyll" and

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)

USEPA Method 445. 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% aqueuos 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-CCME-CVAFS-VA Soil CVAFS Hg in Soil (CCME) CCME

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by atomic fluorescence spectrophotometry (EPA Method 7000 series).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

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-CSR-FULL-ICP-VA Soil Metals in Soil by ICPOES (CSR SALM) BCMELP CSR SALM METHOD 8

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

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).

MOISTURE-VA Soil Moisture content ASTM METHOD D2794-00

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)

This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.

MOISTURE-VA Soil ASTM METHOD D2794-00

This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.

NH3-SIE-VA Water Ammonia by SIE APHA 4500-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.

OG-TMB-VA Soil Oil & Grease in Soils by Tumbler NATM1100 V03 CCME PHC F2-F4G

A subsample of the sediment/soil is extracted with 1:1 hexane:acetone using a rotary extraction apparatus. The extract is analyzed gravimetrically.

Accuracy target values for Reference Materials used in this method are derived from averages of long-term method performance, as certified values do not exist for the reported parameters.

OGG-SF-VA Water Oil & Grease by Gravimetric BCMOE GRAVIMETRIC

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3510 & 9071, published by the United States Environmental Protection Agency (EPA), "Standard Methods for the Examination of Water and Wastewater", 20th ed., Method 5520, published by the American Public Health Association, and "BC Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials," 5th ed., published by the B.C. Ministry of Environment, Lands & Parks, 1994. The procedure involves an extraction of the entire water sample with hexane. This extract is then evaporated to dryness, and the residue weighed to determine Oil and Grease.

PAH-TUMB-H/A-MS-VA Soil PAH by Tumbler HEX/ACE with GCMS EPA METHODS 3570 & 8270.

Polycyclic Aromatic Hydrocarbons in Sediment/Soil
This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3570 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure uses a mechanical shaking technique to extract a subsample of the sediment/soil with a 1:1 mixture of hexane and acetone. The extract is then solvent exchanged to toluene. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation.

PH-1:2-VA Soil CSR pH by 1:2 Water Leach BC WLAP METHOD: PH, ELECTROMETRIC, SOIL

This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (10 mesh /2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.

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 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.

PSA-PIPET+GRAVEL-SK Soil Particle size - Sieve and Pipette FORESTRY CANADA (1991) P. 46-48 MOD

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)

Particle size analysis involves the measurement of the proportions of the various primary soil particle sizes (ie. clay < 0.004 mm, silt 0.004-0.063 mm, sand 0.063-2.0 mm and gravel > 2.0 mm). In this method, the gravel and sand portions are determined by sieving, while the clay portion is determined by sedimentation using Stokes Law, which relates the radius of the particles to the velocity of the sedimentation in water. Silt is calculated as 100% - (sand% + clay%)
Pretreatment of the soil with Calgon (sodium hexametaphosphate) is used to ensure the complete dispersion of the primary soil particles. Additional pretreatment may be necessary to remove cementing materials such as CaCO3 and organic matter.

Reference
Y.P. Kalra, and D.G. Maynard, 1991. Methods Manual For Forest Soil and Plant Analysis,Northwest Region. Forestry Canada (modified sand, silt and clay size ranges)

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.

TL-CSR-MS-VA	Soil	ICPMS Tl in Soil by CSR SALM	BCMELP CSR SALM Method 8

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by either hotplate or block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

TSS-VA	Water	Solids by Gravimetric	APHA 2540 D - GRAVIMETRIC

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.

** 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
SK	ALS LABORATORY GROUP - SASKATOON, SASKATCHEWAN, CANADA	VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)

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.

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PHONE: FAX:	QUOTE #: ALSEQ-07-1622	
Lab Work Order # (lab use only): L678018	SAMPLER (Initials):	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Conventionals*	TKN, Ammonia (+H2SO4)	TOC (+HCl)	DOC (+HCl)	Total Metals (+HNO3)	Oil + Grease (+H2SO4)	Chlorophyll-a (+MgCO3)	Total Metals	PAHs	Oil + Grease	TOC + Grain Size	HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	BBD	Aug. 28/08		Water	X	X	X	X	X	X								7
	BPJ	Aug. 28/08		"	X	X	X	X	X	X								7
	BAP	Aug. 25/08		"	X	X	X	X	X	X								7
	BBD	Aug. 28/08		Filter							X							1
	BPJ	Aug. 28/08		"							X							1
	BAP	Aug. 25/08		"	X						X							1
	BBD	Aug. 29/08		Sediment								X	X	X	X			3
	BPJ	Aug. 28/08		"								X	X	X	X			3
	BAP	Aug. 25/08		"								X	X	X	X			3
	SP	Aug. 23/08		"								X	X	X	X			3

GUIDELINES / REGULATIONS

SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

*Conventionals: conductivity, hardness, pH, TSS, TDS, nutrients (nitrate, nitrite, total phosphate, orthophosphate), sulphate, chloride, alkalinity (bicarbonate, carbonate, hydroxide)

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 reverse page of the white report copy.

RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	SAMPLE CONDITION (lab use only)
Maxine McConnell	Aug. 29/08	[illegible]	29/08 9:29	TEMPERATURE: 12 — SAMPLES RECEIVED IN GOOD CONDITION ? (YES) NO (If no provide details)
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM

CANADA TOLL FREE 1-800-668-9878

www.alsenviro.com

COC # C098448

REPORT TO:	REPORT FORMAT / DISTRIBUTION	SERVICE REQUESTED
COMPANY: See Page 1	STANDARD ____ OTHER ____	REGULAR SERVICE (DEFAULT)
CONTACT:	PDF ____ EXCEL ____ CUSTOM ____ FAX ____	RUSH SERVICE (2-3 DAYS)
ADDRESS:	EMAIL 1:	PRIORITY SERVICE (1 DAY or ASAP)
	EMAIL 2:	EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS
PHONE: FAX:		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? YES / NO	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	
COMPANY:	CLIENT / PROJECT INFORMATION:	
CONTACT:	JOB #:	
ADDRESS:	PO /AFE:	
	Legal Site Description:	
PHONE: FAX:	QUOTE #:	
Lab Work Order # (lab use only)	SAMPLER (Initials):	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Total Metals	TOC	Grain Size	HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	BBD-SC-01	Aug.29/08		Sediment	X	X	X	N	N	1
	BBD-SC-02	"			X	X	X			
	BBD-SC-03	"			X	X	X			
	BBD-SC-04	"			X	X	X			
	BBD-SC-05	"			X	X	X			
	BBD-SC-06	"			X	X	X			
	~~BBD-SC-07~~									
	~~BBD-SC-08~~									
	~~BBD-SC-09~~									
	~~BBD-SC-10~~									

GUIDELINES / REGULATIONS	SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

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RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	SAMPLE CONDITION (lab use only)
Maggie M Connell.	Aug.29/08	ZR	Sept 3/08 9:25	TEMPERATURE 12 / SAMPLES RECEIVED IN GOOD CONDITION ? (YES) / NO (if no provide details)
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM

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COC # C098450

REPORT TO:	REPORT FORMAT / DISTRIBUTION	SERVICE REQUESTED
COMPANY: See Page 1	STANDARD ____ OTHER ____	REGULAR SERVICE (DEFAULT)
CONTACT:	PDF ____ EXCEL ____ CUSTOM ____ FAX ____	RUSH SERVICE (2-3 DAYS)
ADDRESS:	EMAIL 1:	PRIORITY SERVICE (1 DAY or ASAP)
	EMAIL 2:	EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS
PHONE: FAX:		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? YES / NO	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	
COMPANY:	CLIENT / PROJECT INFORMATION:	
CONTACT:	JOB #:	
ADDRESS:	PO /AFE:	
	Legal Site Description:	
PHONE: FAX:	QUOTE #:	
Lab Work Order # (lab use only)	SAMPLER (Initials):	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Total Metal	TOC	Grain Size								HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	~~BBD SC 11~~			Sediment											N	N	1
	~~BBD-SC-12~~																
	~~BBD-SC-13~~																
	~~BBD-SC-14~~																
	~~BBD-SC-15~~																
	~~BBD-SC-DUP~~																
	BPJ-SC-01	~~Aug 28~~ Aug 27/08			X	X	X										
	BPJ-SC-02	Aug. 28/08			X	X	X										
	BPJ-SC-03	"			X	X	X										
	BPJ-SC-04	"			X	X	X										

GUIDELINES / REGULATIONS	SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

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RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	SAMPLE CONDITION (lab use only)	
Marvin Comeau	Aug 29/08	ZH	Sept 3/08 9:29	TEMPERATURE 12	SAMPLES RECEIVED IN GOOD CONDITION ? (YES) / NO (If no provide details)
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:		

REFER TO BACK PAGE FOR REGIONAL LOCATIONS AND SAMPLING INFORMATION

WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

GENF14.00

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM

CANADA TOLL FREE 1-800-668-9878

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COC # C098451

REPORT TO:	REPORT FORMAT / DISTRIBUTION	SERVICE REQUESTED
COMPANY: See Page 1	STANDARD ____ OTHER ____	REGULAR SERVICE (DEFAULT)
CONTACT:	PDF ____ EXCEL ____ CUSTOM ____ FAX ____	RUSH SERVICE (2-3 DAYS)
ADDRESS:	EMAIL 1:	PRIORITY SERVICE (1 DAY or ASAP)
	EMAIL 2:	EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS
PHONE: FAX:		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? YES / NO	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	
COMPANY:	CLIENT / PROJECT INFORMATION:	
CONTACT:	JOB #:	
ADDRESS:	PO /AFE:	
	Legal Site Description:	
PHONE: FAX:	QUOTE #:	
Lab Work Order # (lab use only)	SAMPLER (Initials):	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Total Metals	TOC	Grain Size	HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	BPJ-SC-05	Aug. 28/08		Sediment	X	X	X	N	N	1
	BPJ-SC-06	"			X	X	X			
	BPJ-SC-07	"			X	X	X			
	BPJ-SC-08	"			X	X	X			
	BPJ-SC-09	"			X	X	X			
	BPJ-SC-10	"			X	X	X			
	BPJ-SC-11	"			X	X	X			
	BPJ-SC-12	"			X	X	X			
	BPJ-SC-13	"			X	X	X			
	BPJ-SC-14	"			X	X	X			

GUIDELINES / REGULATIONS	SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

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RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	SAMPLE CONDITION (lab use only)	
Maggie M Cameron	Aug. 29/08	ZH	SEPT 3/08 9:29	TEMPERATURE 12	SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO (If no provide details)
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:		

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM

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COC # C098452

REPORT TO:	REPORT FORMAT / DISTRIBUTION	SERVICE REQUESTED
COMPANY: See Page 1	STANDARD ____ OTHER ____	REGULAR SERVICE (DEFAULT)
CONTACT:	PDF ____ EXCEL ____ CUSTOM ____ FAX ____	RUSH SERVICE (2-3 DAYS)
ADDRESS:	EMAIL 1:	PRIORITY SERVICE (1 DAY or ASAP)
	EMAIL 2:	EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS
PHONE: FAX:		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? YES / NO	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	
COMPANY:	CLIENT / PROJECT INFORMATION:	
CONTACT:	JOB #:	
ADDRESS:	PO /AFE:	
	Legal Site Description:	
PHONE: FAX:	QUOTE #:	
Lab Work Order # (lab use only)	SAMPLER (Initials):	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Total Metals	TOC	Grain Size	HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	BPJ-SC-15	Aug. 28/08		Sediment	X	X	X	N	N	1
	BPJ-SC-DUP	Aug. 28/08			X	X	X			
	BAP-SC-01	Aug. 25/08			X	X	X			
	BAP-SC-02	"			X	X	X			
	BAP-SC-03	"			X	X	X			
	BAP-SC-04	"			X	X	X			
	BAP-SC-05	"			X	X	X			
	BAP-SC-06	"			X	X	X			
	BAP-SC-07	"			X	X	X			
	BAP-SC-08	"			X	X	X			

GUIDELINES / REGULATIONS	SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

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RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:
Maseri M'Lomer	Aug 29/08	ZH	SEP 3 08 9:30
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:

SAMPLE CONDITION (lab use only)

TEMPERATURE	SAMPLES RECEIVED IN GOOD CONDITION ? (YES) NO (If no provide details)
12	

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM

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COC # C098453

REPORT TO:	REPORT FORMAT / DISTRIBUTION	SERVICE REQUESTED
COMPANY: Sea Bird	STANDARD ____ OTHER ____	REGULAR SERVICE (DEFAULT)
CONTACT:	PDF ____ EXCEL ____ CUSTOM ____ FAX ____	RUSH SERVICE (2-3 DAYS)
ADDRESS:	EMAIL 1:	PRIORITY SERVICE (1 DAY or ASAP)
	EMAIL 2:	EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS
PHONE: FAX:		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? YES / NO	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	
COMPANY:	CLIENT / PROJECT INFORMATION:	
CONTACT:	JOB #:	
ADDRESS:	PO /AFE:	
	Legal Site Description:	
PHONE: FAX:	QUOTE #:	
Lab Work Order # (lab use only)	SAMPLER (Initials):	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Total Metals	TOC	Grain Size	HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	BAP-SC-09	Aug.25/08		Sediment	X	X	X	N	N	1
	BAP-SC-10	"			X	X	X			
	BAP-SC-11	"			X	X	X			
	BAP-SC-12	"			X	X	X			
	BAP-SC-13	"			X	X	X			
	BAP-SC-14	"			X	X	X			
	BAP-SC-15	"			X	X	X			
	BAP-SC-DUP	"			X	X	X			

GUIDELINES / REGULATIONS	SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

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RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:
Marie Monnier	Aug.29/08.	ZH	Sept.3,08 9:30
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:

SAMPLE CONDITION (lab use only)

TEMPERATURE	SAMPLES RECEIVED IN GOOD CONDITION ? (YES) NO (If no provide details)
12	

Certificate of Analysis

AZIMUTH CONSULTING GROUP INC.

ATTN: RANDY BAKER

218 - 2902 WEST BROADWAY

VANCOUVER BC V6K 2G8

Reported On: 28-OCT-08 11:48 AM
Revision: 2

Lab Work Order #: **L687229** **Date Received:** **24-SEP-08**

Project P.O. #:
Job Reference: AEMP
Legal Site Desc:
CofC Numbers:

Other Information:

Comments: Please note: travel blank results were confirmed by re-analysis.

Bryan Mark
Account Manager

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L687229-1	L687229-2	L687229-3	L687229-4	L687229-5
	Description					
	Sampled Date	18-SEP-08	18-SEP-08	18-SEP-08	18-SEP-08	18-SEP-08
	Sampled Time					
	Client ID	TPE	TPS	TPN-1	TPN-2	TPN-3
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	16.4	13.6	13.6	13.6	13.5
	Hardness (as CaCO3) (mg/L)	5.57	5.07	5.10	5.08	5.11
	pH (pH)	6.75	6.83	6.81	6.79	6.83
	Total Suspended Solids (mg/L)	<3.0	<3.0	<3.0	<3.0	3.1
	Total Dissolved Solids (mg/L)	15	<10	<10	<10	<10
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	3.8	3.9	3.7	3.7	3.8
	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)	3.8	3.9	3.7	3.7	3.8
	Ammonia as N (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	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)	0.069	<0.050	0.055	0.066	0.087
	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	0.0042	<0.0020	<0.0020
	Sulfate (SO4) (mg/L)	1.22	1.22	1.21	1.20	1.22
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.75	1.64	1.50	1.50	1.45
	Total Organic Carbon (mg/L)	1.44	1.35	1.36	1.32	1.33
Total Metals	Aluminum (Al)-Total (mg/L)	0.0142	0.0097	0.0081	0.0083	0.0070
	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)	1.30	1.15	1.17	1.15	1.16
	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	<0.030	<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)	0.57	0.54	0.53	0.53	0.54
	Manganese (Mn)-Total (mg/L)	0.00102	0.00078	0.00073	0.00069	0.00067
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	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

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L687229-6	L687229-7	L687229-8	L687229-9	L687229-10
	Description					
	Sampled Date	18-SEP-08	17-SEP-08	15-SEP-08	25-AUG-08	18-SEP-08
	Sampled Time					
	Client ID	TPN-4	SP	TE-SEPT	TRAVEL BLANK	TPE
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	13.5	25.5	23.4	<2.0	
	Hardness (as CaCO3) (mg/L)	5.12	10.8	9.85	<0.70	
	pH (pH)	6.77	7.15	7.11	5.37	
	Total Suspended Solids (mg/L)	<3.0	3.6	3.1	<3.0	
	Total Dissolved Solids (mg/L)	<10	13	10	<10	
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	4.0	7.9	7.3	<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)	4.0	7.9	7.3	<2.0	
	Ammonia as N (mg/L)	<0.020	<0.020	<0.020	0.026	
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	
	Nitrate (as N) (mg/L)	<0.0050	0.0289	0.0211	<0.0050	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	0.053	0.100	0.089	<0.050	
	Ortho Phosphate as P (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Total Phosphate as P (mg/L)	0.0022	0.0064	0.0056	<0.0020	
	Sulfate (SO4) (mg/L)	1.22	2.14	1.95	<0.50	
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.47	2.01	1.90		
	Total Organic Carbon (mg/L)	1.36	1.61	1.64	<0.50	
Total Metals	Aluminum (Al)-Total (mg/L)	0.0079	0.336	0.389	<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)	1.16	2.70	2.41	<0.10	
	Chromium (Cr)-Total (mg/L)	<0.0010	0.0011	0.0013	<0.0010	
	Cobalt (Co)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	
	Copper (Cu)-Total (mg/L)	<0.0010	0.0017	0.0016	<0.0010	
	Iron (Fe)-Total (mg/L)	<0.030	0.369	0.430	<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)	0.54	0.99	0.93	<0.10	
	Manganese (Mn)-Total (mg/L)	0.00066	0.00757	0.00801	<0.00030	
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	
	Molybdenum (Mo)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Nickel (Ni)-Total (mg/L)	<0.0010	0.0010	0.0011	<0.0010	

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L687229-11	L687229-12	L687229-13	L687229-14	L687229-15
	Description					
	Sampled Date	18-SEP-08	18-SEP-08	18-SEP-08	18-SEP-08	18-SEP-08
	Sampled Time					
	Client ID	TPS	TPN-1	TPN-2	TPN-3	TPN-4
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)					
	Hardness (as CaCO3) (mg/L)					
	pH (pH)					
	Total Suspended Solids (mg/L)					
	Total Dissolved Solids (mg/L)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)					
	Alkalinity, Carbonate (as CaCO3) (mg/L)					
	Alkalinity, Hydroxide (as CaCO3) (mg/L)					
	Alkalinity, Total (as CaCO3) (mg/L)					
	Ammonia as N (mg/L)					
	Chloride (Cl) (mg/L)					
	Nitrate (as N) (mg/L)					
	Nitrite (as N) (mg/L)					
	Total Kjeldahl Nitrogen (mg/L)					
	Ortho Phosphate as P (mg/L)					
	Total Phosphate as P (mg/L)					
	Sulfate (SO4) (mg/L)					
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)					
	Total Organic Carbon (mg/L)					
Total Metals	Aluminum (Al)-Total (mg/L)					
	Antimony (Sb)-Total (mg/L)					
	Arsenic (As)-Total (mg/L)					
	Barium (Ba)-Total (mg/L)					
	Beryllium (Be)-Total (mg/L)					
	Boron (B)-Total (mg/L)					
	Cadmium (Cd)-Total (mg/L)					
	Calcium (Ca)-Total (mg/L)					
	Chromium (Cr)-Total (mg/L)					
	Cobalt (Co)-Total (mg/L)					
	Copper (Cu)-Total (mg/L)					
	Iron (Fe)-Total (mg/L)					
	Lead (Pb)-Total (mg/L)					
	Lithium (Li)-Total (mg/L)					
	Magnesium (Mg)-Total (mg/L)					
	Manganese (Mn)-Total (mg/L)					
	Mercury (Hg)-Total (mg/L)					
	Molybdenum (Mo)-Total (mg/L)					
	Nickel (Ni)-Total (mg/L)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L687229-16	L687229-17			
	Description					
	Sampled Date	17-SEP-08	15-SEP-08			
	Sampled Time					
	Client ID	SP	TE-SEPT			
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)					
	Hardness (as CaCO3) (mg/L)					
	pH (pH)					
	Total Suspended Solids (mg/L)					
	Total Dissolved Solids (mg/L)					
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)					
	Alkalinity, Carbonate (as CaCO3) (mg/L)					
	Alkalinity, Hydroxide (as CaCO3) (mg/L)					
	Alkalinity, Total (as CaCO3) (mg/L)					
	Ammonia as N (mg/L)					
	Chloride (Cl) (mg/L)					
	Nitrate (as N) (mg/L)					
	Nitrite (as N) (mg/L)					
	Total Kjeldahl Nitrogen (mg/L)					
	Ortho Phosphate as P (mg/L)					
	Total Phosphate as P (mg/L)					
	Sulfate (SO4) (mg/L)					
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)					
	Total Organic Carbon (mg/L)					
Total Metals	Aluminum (Al)-Total (mg/L)					
	Antimony (Sb)-Total (mg/L)					
	Arsenic (As)-Total (mg/L)					
	Barium (Ba)-Total (mg/L)					
	Beryllium (Be)-Total (mg/L)					
	Boron (B)-Total (mg/L)					
	Cadmium (Cd)-Total (mg/L)					
	Calcium (Ca)-Total (mg/L)					
	Chromium (Cr)-Total (mg/L)					
	Cobalt (Co)-Total (mg/L)					
	Copper (Cu)-Total (mg/L)					
	Iron (Fe)-Total (mg/L)					
	Lead (Pb)-Total (mg/L)					
	Lithium (Li)-Total (mg/L)					
	Magnesium (Mg)-Total (mg/L)					
	Manganese (Mn)-Total (mg/L)					
	Mercury (Hg)-Total (mg/L)					
	Molybdenum (Mo)-Total (mg/L)					
	Nickel (Ni)-Total (mg/L)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L687229-1	L687229-2	L687229-3	L687229-4	L687229-5
	Description					
	Sampled Date	18-SEP-08	18-SEP-08	18-SEP-08	18-SEP-08	18-SEP-08
	Sampled Time					
	Client ID	TPE	TPS	TPN-1	TPN-2	TPN-3
Grouping	**Analyte**					
WATER						
Total Metals	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
Aggregate Organics	Oil and Grease (mg/L)	<5.0	<5.0	<5.0	<5.0	<5.0
Plant Pigments	Chlorophyll a (ug)					

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L687229-6	L687229-7	L687229-8	L687229-9	L687229-10
	Description					
	Sampled Date	18-SEP-08	17-SEP-08	15-SEP-08	25-AUG-08	18-SEP-08
	Sampled Time					
	Client ID	TPN-4	SP	TE-SEPT	TRAVEL BLANK	TPE
Grouping	**Analyte**					
WATER						
Total Metals	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	0.013	0.016	<0.010	
	Uranium (U)-Total (mg/L)	<0.00020	0.00022	0.00025	<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	
Aggregate Organics	Oil and Grease (mg/L)	<5.0	<5.0	<5.0		
Plant Pigments	Chlorophyll a (ug)					0.708

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L687229-11	L687229-12	L687229-13	L687229-14	L687229-15
		Description					
		Sampled Date	18-SEP-08	18-SEP-08	18-SEP-08	18-SEP-08	18-SEP-08
		Sampled Time					
		Client ID	TPS	TPN-1	TPN-2	TPN-3	TPN-4
Grouping	**Analyte**						
WATER							
Total Metals	Potassium (K)-Total (mg/L)						
	Selenium (Se)-Total (mg/L)						
	Silver (Ag)-Total (mg/L)						
	Sodium (Na)-Total (mg/L)						
	Thallium (Tl)-Total (mg/L)						
	Tin (Sn)-Total (mg/L)						
	Titanium (Ti)-Total (mg/L)						
	Uranium (U)-Total (mg/L)						
	Vanadium (V)-Total (mg/L)						
	Zinc (Zn)-Total (mg/L)						
Aggregate Organics	Oil and Grease (mg/L)						
Plant Pigments	Chlorophyll a (ug)		0.595	0.573	0.526	0.495	0.515

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L687229-16	L687229-17			
	Description					
	Sampled Date	17-SEP-08	15-SEP-08			
	Sampled Time					
	Client ID	SP	TE-SEPT			
Grouping	**Analyte**					
WATER						
Total Metals	Potassium (K)-Total (mg/L)					
	Selenium (Se)-Total (mg/L)					
	Silver (Ag)-Total (mg/L)					
	Sodium (Na)-Total (mg/L)					
	Thallium (Tl)-Total (mg/L)					
	Tin (Sn)-Total (mg/L)					
	Titanium (Ti)-Total (mg/L)					
	Uranium (U)-Total (mg/L)					
	Vanadium (V)-Total (mg/L)					
	Zinc (Zn)-Total (mg/L)					
Aggregate Organics	Oil and Grease (mg/L)					
Plant Pigments	Chlorophyll a (ug)	0.327	0.557			

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-CL-IC-VA	Water	Chloride by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-NO2-IC-VA	Water	Nitrite by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-NO3-IC-VA	Water	Nitrate by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-SO4-IC-VA	Water	Sulfate by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

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)".

CHLOROA-VA	Water	Chlorophyll a by Fluorometer	APHA 10200 H. "Chlorophyll" and EPA 445

Chlorophyll and Pheopigments by Fluorometry analysis is carried out using procedures adapted from APHA Method 10200 H. "Chlorophyll" and USEPA Method 445. 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% aqueuos 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-TOT-CCME-CVAFS-VA	Water	Total Mercury in Water by CVAFS (CCME)	EPA 245.7

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 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-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-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.

OGG-SF-VA	Water	Oil & Grease by Gravimetric	BCMOE GRAVIMETRIC

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3510 & 9071, published by the United States Environmental Protection Agency (EPA), "Standard Methods for the Examination of Water and Wastewater", 20th ed., Method 5520, published by the American Public Health Association, and "BC Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials," 5th ed., published by the B.C. Ministry of Environment, Lands & Parks, 1994. The procedure involves an extraction of the entire water sample with hexane. This extract is then evaporated to dryness, and the residue weighed to determine Oil and Grease.

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

PO4-DO-COL-VA	Water	Dissolved ortho Phosphate 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.

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.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
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-VA	Water	Total Suspended Solids by Gravimetric	APHA 2540 D - GRAVIMETRIC

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.

** 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 Environmental
excellence in analytical testing

1988 Triumph Street, **Vancouver**, BC Canada V5L 1K5
Tel: 604-253-4188 Toll Free: 1-800-665-0243 Fax: 604-253-6700

#2 -21 Highfield Circle SE, **Calgary**, AB Canada T2G 5N6
Tel: 403-214-5431 Toll Free: 1-866-722-6231 Fax: 403-214-5430

www.alsenviro.com

L687729

CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM

PAGE 1 OF 2

SEND REPORT TO:					
COMPANY:	Azimuth Consulting Group Inc.				
ADDRESS:	218-2902 West Broadway				
CITY:	Vancouver	PROV: BC	POSTAL CODE:	V6K 2G8	
CONTACT:	R. Baker, M. McConnell		TELEPHONE:		
PROJECT NAME/#:	AEMP		SAMPLER:	MM, WS	
ALSE QUOTE #:	ALSEQ-07-622		ALSE CONTACT:	Natasha Marcovic-Mirovic	
REPORT FORMAT:			INVOICE FORMAT:		
(●) Hardcopy ( ) Fax #:			(●) Hardcopy ( ) Fax #:		
( ) E-mail Specify file type:	Excel & pdf		( ) E-mail (pdf format)		
E-mail Address:			E-mail Address:		
(●) Routine Turn Around.					
( ) Rush (Surcharges May Apply)	Specify Due Date:		Time:		

SEND INVOICE TO: (complete if different from Report To at left)						Require copy of Report? (✓) Yes ( ) No
COMPANY:		CONTACT:				
ADDRESS:		P.O. #:				
CITY:	PROV:	POSTAL CODE:		TEL:		

ANALYSIS REQUESTED:

Conventionals: conductivity, hardness, pH, TSS, TDS, nutrients(nitrate, nitrite, total phosphate, orthophosphate), sulphate, chloride, alkalinity(bicarbonate, carbonate, hydroxide).

FOR LAB USE ONLY	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YY-MM-DD	Time	MATRIX	Conventionals **	TKN, Ammonia (pres. w/ H_2SO_4)	Total Metals (pres. w/ HNO_3)	Oil&Grease (pres. w/ H_2SO_4)	TOC (pres. w/ HCl)	DOC (filtered & pres. w/ HCl)	Chlorophyll-a (pres. w/ $MgCO_3$)	NOTES (sample specific comments, due dates, etc.)
	TPE	08-09-18		water	x	x	x	x	x	x		7 containers
	TPS	08-09-18		water	x	x	x	x	x	x		7 containers
	TPN-1	08-09-18		water	x	x	x	x	x	x		7 containers
	TPN-2	08-09-18		water	x	x	x	x	x	x		7 containers
	TPN-3	08-09-18		water	x	x	x	x	x	x		7 containers
	TPN-4	08-09-18		water	x	x	x	x	x	x		7 containers
	SP	08-09-17		water	x	x	x	x	x	x		7 containers
	TE - Sept	08-09-15		water	x	x	x	x	x	x		7 container
	Travel Blank (AE-08 AEMP)	08-09-25		water	x	x	x		x			4 containers
	TPE	08-09-18		filter							x	1 container (1L filt.)
	TPS	08-09-18		filter							x	1 container (1L filt.)
	TPN-1	08-09-18		filter							x	1 container (1L filt.)
	TPN-2	08-09-18		filter							x	1 container (1L filt.)
	TPN-3	08-09-18		filter							x	1 container (1L filt.)
	TPN-4	08-09-18		filter							x	1 container (1L filt.)
	SP	08-09-17		filter							x	1 container (500ml filt.)

RELINQUISHED BY:				RECEIVED BY: HD	
NAME:	Maggie McConnell	DATE:	Sept.20 2008	DATE:	08/09/24
OF:	Azimuth Consulting Group Inc.	TIME:		TIME:	3:11
NAME:		DATE:		DATE:	
OF:		TIME:		OF: ALS Environmental	TIME:

Special Instructions / Comments (billing details, QC reporting, etc.):

FOR LAB USE ONLY Cooler Seal Intact? Yes___ No___ N/A___ Sample Temperature: 7 °C Frozen? Yes___ No✓ Cooling Method? Icepack✓ Ice___ None___

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Tel: 403-214-5431 Toll Free: 1-866-722-6231 Fax: 403-214-5430

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CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM

SEND REPORT TO:

COMPANY:	Azimuth Consulting Group Inc.				
ADDRESS:	218-2902 West Broadway				
CITY:	Vancouver	PROV: BC	POSTAL CODE:	V6K 2G8	
CONTACT:	R. Baker, M. McConnell		TELEPHONE:		
PROJECT NAME/#:	AEMP		SAMPLER:	MM, WS	
ALSE QUOTE #:	ALSEQ-07-622		ALSE CONTACT:	Natasha Marcovic-Mirovic	

REPORT FORMAT: ◉ Hardcopy ○ Fax #: ○ E-mail Specify file type: Excel & pdf
E-mail Address:

INVOICE FORMAT: ◉ Hardcopy ○ Fax #: ○ E-mail (pdf format)
E-mail Address:

◉ Routine Turn Around
○ Rush (Surcharges May Apply) Specify Due Date: Time:

SEND INVOICE TO: (complete if different from Report To at left) Require copy of Report? ☑ Yes ☐ No

COMPANY:		CONTACT:			
ADDRESS:		P.O. #:			
CITY:	PROV:	POSTAL CODE:		TEL:	

ANALYSIS REQUESTED:

****Conventionals**: conductivity, hardness, pH, TSS, TDS, nutrients(nitrate, nitrite, total phosphate, orthophosphate), sulphate, chloride, alkalinity(bicarbonate, carbonate, hydroxide).

	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YY-MM-DD	Time	MATRIX	Conventionals **	TKN, Ammonia (pres. w/ H_2SO_4)	Total Metals (pres. w/ HNO_3)	Oil&Grease (pres. w/ H_2SO_4)	TOC (pres. w/ HCl)	DOC (filtered & pres. w/ HCl)	Chlorophyll-a (pres. w/ $MgCO_3$)	NOTES (sample specific comments, due dates, etc.)
FOR LAB USE ONLY	TE-Sept.	08-09-15		filter							x	1 container (500ml filt.)

RELINQUISHED BY:

NAME:	Maggie McConnell	DATE:	Sept.20 2008
OF:	Azimuth Consulting Group Inc.	TIME:	
NAME:		DATE:	
OF:		TIME:	

RECEIVED BY:

NAME:		DATE:	3:11 08/09/24
OF:		TIME:	
NAME:		DATE:	
OF:	ALS Environmental	TIME:	

Special Instructions / Comments (billing details, QC reporting, etc.):

FOR LAB USE ONLY Cooler Seal Intact? Yes___ No___ N/A✓ Sample Temperature: 7 °C Frozen? Yes___ No✓ Cooling Method? Icepacks✓ Ice___ None___

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Certificate of Analysis

AZIMUTH CONSULTING GROUP INC.

ATTN: RANDY BAKER

218 - 2902 WEST BROADWAY

VANCOUVER BC V6K 2G8

Reported On: 28-OCT-08 11:50 AM

Lab Work Order #: L688731 **Date Received:** 29-SEP-08

Project P.O. #:
Job Reference: AEMP
Legal Site Desc:
CofC Numbers:

Other Information:

Comments: The detection limits for some metals have been increased due to high levels of metals in the samples or interferences encountered during analysis.

Please note: the analysis for sample "Travel Blank" was confirmed by re-analysis. Our corresponding backup blank (kept in house) was analyzed and results were below calcium detection limit.

Bryan Mark
Account Manager

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID: L688731-1	L688731-2	L688731-3	L688731-4	L688731-5
	Description					
	Sampled Date	21-SEP-08	21-SEP-08	21-SEP-08	21-SEP-08	21-SEP-08
	Sampled Time					
	Client ID	BBD	BPJ	BAP	DUP	BBD
WATER						
Physical Tests	Conductivity (uS/cm)	660	624	581	586	
	Hardness (as CaCO3) (mg/L)	67.7	64.5	60.6	59.1	
	pH (pH)	7.09	7.13	7.11	7.13	
	Total Suspended Solids (mg/L)	<3.0	<3.0	<3.0	<3.0	
	Total Dissolved Solids (mg/L)	345	329	302	303	
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	5.8	9.3	9.2	8.8	
	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)	5.8	9.3	9.2	8.8	
	Ammonia as N (mg/L)	<0.020	<0.020	<0.020	<0.020	
	Chloride (Cl) (mg/L)	173	163	151	150	
	Nitrate (as N) (mg/L)	0.0356	0.0328	0.0286	0.0286	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	0.0010	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	0.138	0.142	0.135	0.156	
	Ortho Phosphate as P (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Total Phosphate as P (mg/L)	0.0072	0.0075	0.0075	0.0070	
	Sulfate (SO4) (mg/L)	25.2	23.8	21.9	21.9	
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	3.48	3.29	3.44	3.40	
	Total Organic Carbon (mg/L)	3.11	3.13	3.18	3.18	
Total Metals	Aluminum (Al)-Total (mg/L)	0.0053	<0.0050	0.0074	0.0055	
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Arsenic (As)-Total (mg/L)	<0.00070	<0.00060	<0.00070	<0.00060	
	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)	6.13	5.89	6.15	5.52	
	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	<0.030	<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)	12.7	12.1	11.0	11.0	
	Manganese (Mn)-Total (mg/L)	0.00266	0.00209	0.00241	0.00182	
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	
	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	

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L688731-6	L688731-7	L688731-8	L688731-9	
	Description					
	Sampled Date	21-SEP-08	21-SEP-08	21-SEP-08	02-SEP-08	
	Sampled Time					
	Client ID	BPJ	BAP	DUP	TRAVEL BLANK (AZIMUTH)	
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)				<2.0	
	Hardness (as CaCO3) (mg/L)				1.24	
	pH (pH)				5.54	
	Total Suspended Solids (mg/L)				<3.0	
	Total Dissolved Solids (mg/L)				<10	
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)				<2.0	
	Alkalinity, Carbonate (as CaCO3) (mg/L)				<2.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)				<2.0	
	Alkalinity, Total (as CaCO3) (mg/L)				<2.0	
	Ammonia as N (mg/L)				<0.020	
	Chloride (Cl) (mg/L)				<0.50	
	Nitrate (as N) (mg/L)				<0.0050	
	Nitrite (as N) (mg/L)				<0.0010	
	Total Kjeldahl Nitrogen (mg/L)				<0.050	
	Ortho Phosphate as P (mg/L)				<0.0010	
	Total Phosphate as P (mg/L)				<0.0020	
	Sulfate (SO4) (mg/L)				<0.50	
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)					
	Total Organic Carbon (mg/L)				<0.50	
Total Metals	Aluminum (Al)-Total (mg/L)				<0.0050	
	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)				0.50	
	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)				<0.10	
	Manganese (Mn)-Total (mg/L)				<0.00030	
	Mercury (Hg)-Total (mg/L)				<0.000020	
	Molybdenum (Mo)-Total (mg/L)				<0.0010	
	Nickel (Ni)-Total (mg/L)				<0.0010	

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L688731-1	L688731-2	L688731-3	L688731-4	L688731-5
		Description					
		Sampled Date	21-SEP-08	21-SEP-08	21-SEP-08	21-SEP-08	21-SEP-08
		Sampled Time					
		Client ID	BBD	BPJ	BAP	DUP	BBD
Grouping	**Analyte**						
WATER							
Total Metals	Potassium (K)-Total (mg/L)		4.1	3.9	3.6	3.6	
	Selenium (Se)-Total (mg/L)		<0.0030	<0.0030	<0.0030	<0.0030	
	Silver (Ag)-Total (mg/L)		<0.000020	<0.000020	<0.000020	<0.000020	
	Sodium (Na)-Total (mg/L)		98.5	94.4	83.8	85.5	
	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	
Aggregate Organics	Oil and Grease (mg/L)		<5.0	<5.0	<5.0	<5.0	
Plant Pigments	Chlorophyll a (ug)						0.938

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L688731-6	L688731-7	L688731-8	L688731-9	
		Description					
		Sampled Date	21-SEP-08	21-SEP-08	21-SEP-08	02-SEP-08	
		Sampled Time					
		Client ID	BPJ	BAP	DUP	TRAVEL BLANK (AZIMUTH)	
Grouping	**Analyte**						
WATER							
Total Metals	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	
Aggregate Organics	Oil and Grease (mg/L)						
Plant Pigments	Chlorophyll a (ug)		0.847	0.965	0.938		

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-CL-IC-VA	Water	Chloride by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-NO2-IC-VA	Water	Nitrite by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-NO3-IC-VA	Water	Nitrate by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-SO4-IC-VA	Water	Sulfate by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

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)".

CHLOROA-VA	Water	Chlorophyll a by Fluorometer	APHA 10200 H. "Chlorophyll" and EPA 445

Chlorophyll and Pheopigments by Fluorometry analysis is carried out using procedures adapted from APHA Method 10200 H. "Chlorophyll" and USEPA Method 445. 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% aqueuos 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-TOT-CCME-CVAFS-VA	Water	Total Mercury in Water by CVAFS (CCME)	EPA 245.7

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 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-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-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.

OGG-SF-VA	Water	Oil & Grease by Gravimetric	BCMOE GRAVIMETRIC

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3510 & 9071, published by the United States Environmental Protection Agency (EPA), "Standard Methods for the Examination of Water and Wastewater", 20th ed., Method 5520, published by the American Public Health Association, and "BC Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials," 5th ed., published by the B.C. Ministry of Environment, Lands & Parks, 1994. The procedure involves an extraction of the entire water sample with hexane. This extract is then evaporated to dryness, and the residue weighed to determine Oil and Grease.

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

PO4-DO-COL-VA	Water	Dissolved ortho Phosphate 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.

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.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
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-VA	Water	Total Suspended Solids by Gravimetric	APHA 2540 D - GRAVIMETRIC

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.

** 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.

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L688731

CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM

PAGE 1 OF 1

SEND REPORT TO:

COMPANY: Azimuth Consulting Group Inc.
ADDRESS: 218-2902 West Broadway
CITY: Vancouver PROV: BC POSTAL CODE: V6K 2G8
CONTACT: R. Baker, M. McConnell TELEPHONE: 604-730-1220
PROJECT NAME/#: AEMP SAMPLER: MM, WS
ALSE QUOTE #: ALSEQ-07-622 ALSE CONTACT: Natasha Marcovic-Mirovic

REPORT FORMAT:
(●) Hardcopy ( ) Fax #:
( ) E-mail Specify file type: Excel & pdf
E-mail Address:

INVOICE FORMAT:
(●) Hardcopy ( ) Fax #:
( ) E-mail (pdf format)
E-mail Address:

(●) Routine Turn Around
( ) Rush (Surcharges May Apply) Specify Due Date: Time:

SEND INVOICE TO: (complete if different from Report To at left)

Require copy of Report? [✓] Yes [ ] No

COMPANY: CONTACT:
ADDRESS: P.O. #:
CITY: PROV: POSTAL CODE: TEL:

ANALYSIS REQUESTED:

**Conventionals: conductivity, hardness, pH, TSS, TDS, nutrients(nitrate, nitrite, total phosphate, orthophosphate), sulphate, chloride, alkalinity(bicarbonate, carbonate, hydroxide).

	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YY-MM-DD	Time	MATRIX	Conventionals **	TKN, Ammonia (pres. w/ H_2SO_4)	Total Metals (pres. w/ HNO_3)	Oil&Grease (pres. w/ H_2SO_4)	TOC (pres. w/ HCl)	DOC (filtered & pres. w/ HCl)		Chlorophyll-a (pres. w/ $MgCO_3$)							NOTES (sample specific comments, due dates, etc.)
	BBD	08-09-21		water	x	x	x	x	x	x									7 containers
	BPJ	"		water	x	x	x	x	x	x									7 containers
	BAP	"		water	x	x	x	x	x	x									7 containers
	DUP	—		water	x	x	x	x	x	x									7 containers
	BBD	"		filter								x							1 container (1L)
	BPJ	"		filter								x							1 container (1L)
	BAP	"		filter								x							1 container (1L)
	DUP	—		filter								x							1 container (1L)
	Travel Blank (Azimuth)	08-09-02		water	x	x	x		x										4 containers

FOR LAB USE ONLY

RELINQUISHED BY:

NAME: Maggie McConnell DATE: Sept. 22/08
OF: Azimuth Consulting Group Inc. TIME:
NAME: Maggie McConnell DATE:
OF: TIME:

RECEIVED BY:

NAME: HD DATE: 08/09/29
OF: TIME: 1:50
NAME: DATE:
OF: ALS Environmental TIME:

Special Instructions / Comments (billing details, QC reporting, etc.):

FOR LAB USE ONLY Cooler Seal Intact? Yes___ No✓ N/A___ Sample Temperature: 13 °C Frozen? Yes___ No✓ Cooling Method? Icepacks✓ Ice___ None___