Site C Clean Energy Project

Methylmercury Monitoring Plan (MMP) Implementation: 2022 Report

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Methylmercury Monitoring Plan (MMP) Implementation:

2022 Report

Prepared for:

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EXECUTIVE SUMMARY

Azimuth Consulting Group Inc. (Azimuth) has prepared this report on behalf of BC Hydro to document the 2022 implementation of Site C's Methylmercury Monitoring Plan (MMP). While baseline monitoring started more than a decade ago, 2022 was the first event expressly following the development of the MMP and the first event conducted in a single year.

Reservoir creation is known to temporarily increase fish mercury concentrations due to increased production of methylmercury caused by the inundation of terrestrial soils. The MMP[1] was developed to address methylmercury-related conditions in the provincial Environmental Assessment Certificate (EAC) and Federal Decision Statement (FDS) issued for the Site C Clean Energy Project (the Project). MMP development was a collaborative effort involving Indigenous Nations, Health Authorities, BC Hydro, and Azimuth through the Site C Methylmercury Subcommittee.

The objectives of the MMP are to:

- Monitor changes in methylmercury concentrations in fish prior to Project effects (baseline conditions) and after reservoir formation during Project operations;
- Work with Indigenous Nations to plan and implement the MMP; and
- Work with Health Authorities to effectively communicate fish consumption guidance for people eating fish caught in the Site C reservoir and downstream of the Project in the Peace River.

The MMP has three main components:

1. *Core* program;
2. *Indigenous Community Sampling Program (ICSP); and*
3. *Fish Consumption* program.

Ultimately, these three components are combined to help manage mercury-related health risks from eating fish affected by the Project. Key results for the 2022 MMP program are provided below.

[1] The MMP can be downloaded here: *https://www.sitecproject.com/sites/default/files/site-c-methylmercury-monitoring-plan.pdf*

Core Program

The foundation of the MMP. This component has the mandate of characterizing mercury in fish and supporting media and tracking changes over time and space in relation to Site C. The Core program focuses on six target fish species: Bull Trout, Walleye, Rainbow Trout, Mountain Whitefish, Longnose Sucker, and Redside Shiner. Sampling is conducted in the mainstem of the Peace River, extending from Peace Canyon Dam past the Project and down through Many Islands, Alberta. In addition to fish, the Core program includes mercury-focused sampling of supporting media including surface water, porewater, sediments, benthic invertebrates, and zooplankton to help understand how changes in the food web might be affecting fish mercury concentrations.

The 2022 event provided an opportunity to test MMP methods and to collect additional data prior to reservoir creation. Current plans are to fill the Site C reservoir in the late summer of 2024 becoming operational in December 2024. Once Site C is operational, the MMP will be conducted annually through 2034, then every five years thereafter until fish mercury concentrations stabilize.

Mercury in Supporting Media

The full complement of supporting media (surface water, porewater, sediments, benthic invertebrates, and zooplankton)[2] was sampled in 2022 to characterize mercury-related conditions prior to filling the reservoir. These 2022 results were compared to historical data and will be important in characterizing future changes related to reservoir formation.

Mercury in Fish

In 2022, tissue mercury samples were collected from 622 fish, the vast majority from the six targeted species. Combined with other fish mercury data collected since 2008 to characterize conditions prior to reservoir creation, 1,973 fish mercury samples were included in the analysis

[2] Supporting media sampling involved chemical analysis of mercury and parameters influencing mercury cycling and uptake into the food chain. Five components were investigated: surface water which is typically very low in mercury, but is expected to increase with reservoir formation; sediment and porewater representing the matrix where mercury methylating bacteria reside; and, benthic invertebrates and zooplankton which are a key link in the food chain between bacteria and fish.

representing three time periods: 2008–2010, 2017–2021, and 2022[3]. Overall, fish mercury concentrations in 2022 were similar to the 2017–2021 period. The 2022 data were used to develop updated fish consumption guidance for the Peace River between Peace Canyon Dam and Many Islands, Alberta (**Table ES-1**).

Indigenous Community Sampling Program

This Indigenous-implemented component is complementary to the Core program with inclusion of fish species and/or locations of particular interest to Indigenous Communities but that are not included in the Core MMP. The ICSP is coordinated by Azimuth, but all sampling is conducted by trained Indigenous Community Champions. There are three main objectives of the ICSP:

- Test the levels of mercury in fish species/locations that people eat, but that are not monitored in the Core MMP;
- Provide opportunities for Indigenous Nations to participate in monitoring changes to the environment from the Project; and
- Improve food security and food sovereignty for Indigenous Nations by building skills and knowledge related to methylmercury in fish.

Training

Three sessions were conducted in 2022 at the Northern Lights College in Fort St. John to train Community Champions. These sessions included a presentation to help participants better understand methylmercury in aquatic environments and what changes occur when reservoirs are created. It also provided an overview of the MMP. Following the presentation, hands-on training sessions were provided that demonstrated how to collect a fish tissue sample. Trained participants were provided with a 'fish kit' containing all the tools needed to collect fish tissue for mercury samples. A total of 31 participants from the 13 Indigenous communities potentially affected by the Project took part in the 2022 training sessions.

[3] The 2022 data are the first fish mercury data collected following the MMP; while we do not expect to see meaningful changes relative to the 2017-2021 time period, 2022 was treated as a stand-alone event to match the year-specific approach that will be used once Site C is in the operations phase (i.e., after reservoir filling). Given that we have observed temporal changes in fish mercury concentrations since the baseline period (Azimuth 2021), treating 2022 as a discrete year provides an up-to-date characterization of conditions prior to reservoir filling. That said, there were no meaningful differences between the two time periods, so the 2022 data could be amalgamated with the 2017-2021 data if needed in the future.

Sampling

In 2022, Community Champions from Dene Tha', Doig River, and Saulteau First Nation collected 33 fish samples. Samples came from Moberly Lake (26), the Peace-Smoky River confluence (4), and Williston reservoir (3). Eight species of fish were collected, including three MMP target species (Walleye, Mountain Whitefish, and Longnose Sucker) and five non-target species (Northern Pike, Burbot, Lake Whitefish, Lake Trout, and White Sucker).

Mercury concentrations in the 2022 ICSP fish broadly followed size related trends observed in the broader MMP with larger older fish tissue containing high concentrations. Insectivorous species such as Rainbow Trout and Mountain Whitefish had lower mercury levels, while piscivorous species higher in the food web, such as Walleye, Burbot, and Northern Pike, had higher mercury concentrations.

Fish Consumption Program

This component of the MMP focuses on understanding how much fish Indigenous and non-Indigenous people in the Peace Region eat. Two strategies are being used to collect this information: (1) analyzing information from existing sources, and (2) collecting new data.

Existing Data on Baseline Consumption

This task started in 2022 and focused on extracting information from two main sources:

First Nations, Food, Nutrition, and Environment Study (FNFNES). This study looked at the traditional diet of adult Indigenous people living on reserves south of 60^{o} latitude in Canada. Six of the 13 Indigenous Nations potentially affected by the Project participated in the study.

Country Foods Harvest Questionnaires. As part of the Site C environmental assessment process, data on harvest and consumption of traditional foods, including fish, was collected in 2010 and 2011 for the Duncans First Nation and Horse Lake First Nation.

These two studies provide useful data to characterize baseline fish consumption for the Project. However, three key limitations were identified: the data are now over a decade old, targeted adults only, and only included wild-caught fish. Consequently, efforts were also made to collect new data on baseline consumption that also included information on how much fish are eaten by children and how much fish from stores or restaurants people eat.

New Data on Baseline Consumption

This task started in 2022 and involved two activities:

- Designing and implementing a creel survey fish consumption questionnaire; and

- Having discussions with Indigenous Nations to determine interest in participating in a baseline fish consumption survey.

Creel Survey Fish Consumption Questionnaire. This Azimuth-designed survey was conducted on the Peace River.

A questionnaire on how much fish people eat was administered by Aski Reclamation Inc. and LGL Ltd. from July 2022 through June 2023 as part of a broader survey on fish under the Peace River Creel Survey (Mon-2, Task 2c of the FAHMFP). The interviews occurred from Peace Canyon Dam to Many Islands, Alberta. Nearly a hundred fish consumption questionnaires were completed.

Discussions with Indigenous Nations. Indigenous Nations were provided information on MMP baseline fish consumption at a variety of occasions, including meetings of the Site C Environmental Forum, the Site C Methylmercury Subcommittee, and at Quarterly Project Update meetings with individual Nations. Four Nations expressed interest in participating in a process to provide new data on baseline fish consumption: Blueberry River First Nation, Halfway River First Nation, McLeod Lake Indian Band, and Saulteau First Nations. Follow-up discussions regarding the timing and format of data collection continued into 2023.

Baseline Fish Consumption Data Analyses and Reporting

It is anticipated that collecting and analyzing the baseline fish consumption data will be completed in 2024, and a stand-alone report on fish consumption during the baseline period will subsequently be issued.

Figure ES1-1. 2022 MMP fish consumption guidance

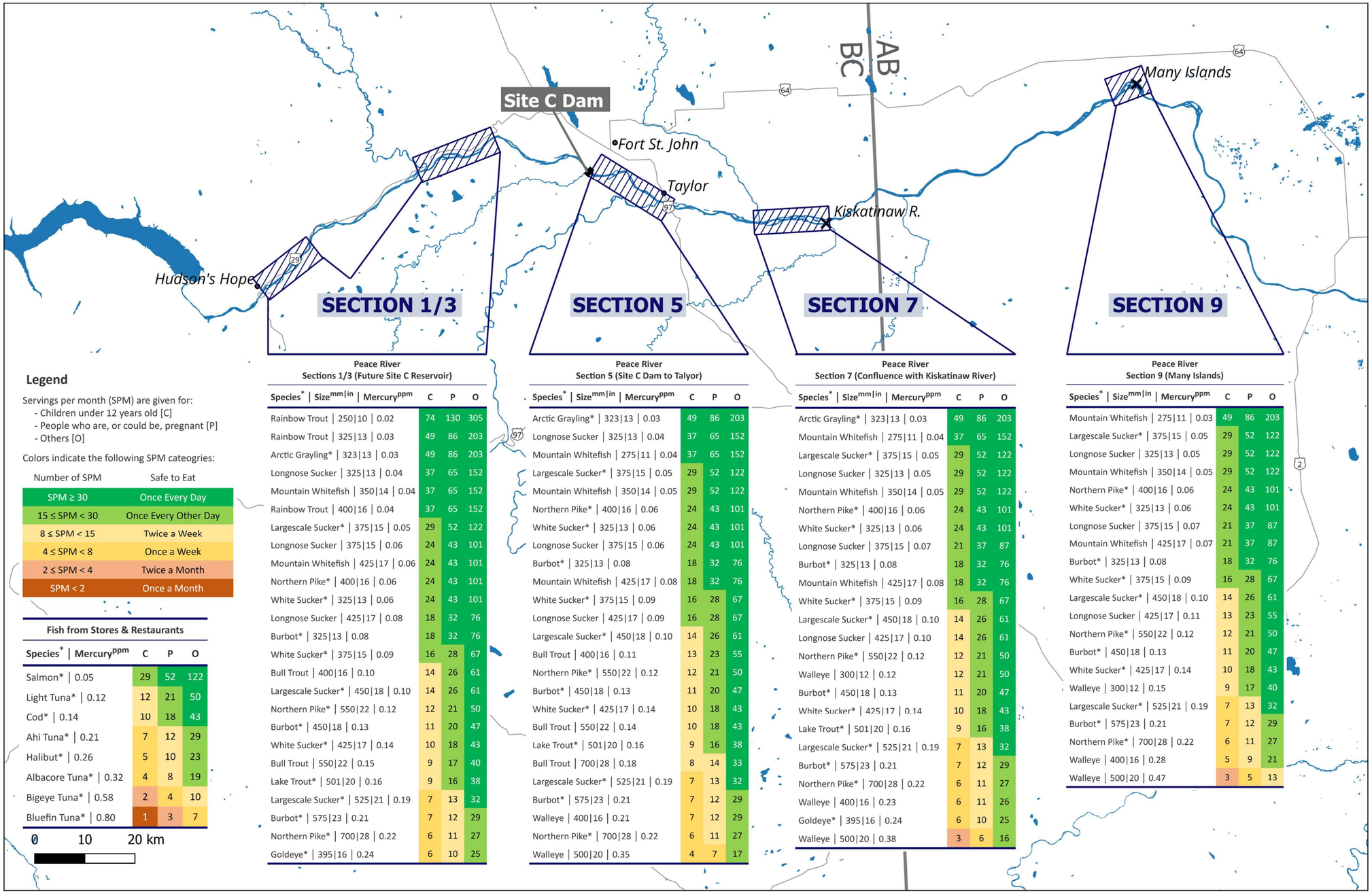


TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ACKNOWLEDGEMENTS

We acknowledge this research was conducted on the traditional territory of Treaty 8 First Nations of Dunne Zaa, Cree, and Tse'khene cultural descent.

The report was written by Gary Mann, Norm Healey, Mehdi Aqdam, Ian McIvor, Clare Kilgour, and Thomas Smith from Azimuth Consulting Group Inc. Supporting statistical analyses were conducted by Mehdi Aqdam with input from Gary Mann and Brian Pyper. Development of fish consumption guidance was led by Norm Healey with support from Mehdi Aqdam and input from Gary Mann. Ian McIvor coordinated the Indigenous Community Sampling Program (ICSP) and led the 2022 reporting effort. Lynne Graham edited the report.

We gratefully acknowledge the following support:

- Dave Hunter, Nich Burnett and Brent Mossop (BC Hydro) commissioned this work, provided input into the statistical analyses and reviewed and provided helpful comments on the draft report.
- Site C's Methylmercury Subcommittee provided input on the development of the Methylmercury Monitoring Plan (MMP) and on the 2022 implementation of the plan through discussions on results.
- Dustin Ford, Demitria Burgoon, and the rest of the team at WSP Canada Inc. that conducted the Peace River Large Fish Indexing Survey (Mon-2, Task 2a) under the Site C Fisheries and Aquatic Habitat Monitoring and Follow-up Program (FAHMFP), which has provided the bulk of the fish samples analyzed for mercury since 2017. Dustin also built the database used to house the MMP fish and invertebrate dataset.
- Kevin Ganshorn (Ecofish Research Ltd) and Patrick Beaupre (Aski Reclamation) led the team responsible for sampling surface water, porewater, sediment, benthic invertebrates, and zooplankton in 2022 for the MMP; this sampling was conducted in conjunction with FAHMFP Mon-8/9 surface water and sediment monitoring. Ecofish is housing the MMP chemistry data for surface water, porewater, and sediment.

ACRONYMS

BB	Burbot
BT	Bull Trout
C	Carbon
CSU	Largescale Sucker
DOC	Dissolved Organic Carbon
DQOs	Data Quality Objectives
EAC	Environmental Assessment Certificate
EIS	Environmental Impact Statement
FAHMFP	Fisheries and Aquatic Habitat Monitoring Follow-up Program
FDS	Federal Decision Statement
GE	Goldeye
GR	Arctic Grayling
Hg	Mercury
ICSP	Indigenous Community Sampling Program
LOI	Loss on Ignition
LSU	Longnose Sucker
LT	Lake Trout
MDL	Method Detection Limit
MeHg	Methylmercury
MMP	Methylmercury Monitoring Program
MW	Mountain Whitefish
N	Nitrogen
NP	Northern Pike
pTDI	Provisional Tolerable Daily Intake
QC	Quality control
RB	Rainbow Trout
RPD	Relative Percent Difference
RSC	Redside Shiner
SIA	Stable Isotope Analysis
THg	Total Mercury
TIC	Total Inorganic Carbon
TOC	Total Organic Carbon
TSS	Total Suspended Solids
WP	Walleye
WSU	White Sucker
$\delta^{13}C$	Carbon Stable Isotope Ratios
$\delta^{15}N$	Nitrogen Stable Isotope Ratios
%MeHg	Percent methylmercury

1 INTRODUCTION

Azimuth Consulting Group Inc. (Azimuth) prepared this report on behalf of BC Hydro to document the results of the 2022 implementation of the Methylmercury Monitoring Plan (MMP; see **Section 1.2** below for more information).

1.1 Background

Azimuth has been working with BC Hydro since 2009 to help address concerns regarding potential changes in mercury concentrations in fish from the the Site C Clean Energy Project ("the Project"). Reservoir creation is known to temporarily increase fish methylmercury concentrations (Schetagne and Therien 2013; Bodaly et al. 2007) which is why it was identified as a technical focus area in the environmental impact statement (EIS) for the Project (BC Hydro 2013).

To support the EIS, Azimuth:

- Characterized mercury in the aquatic environment[4];
- Developed predictions of the magnitude, timing, and extent of future changes in fish mercury levels expected with reservoir creation; and
- Estimated health risks from eating fish.

1.2 Methylmercury Monitoring Plan (MMP)

Azimuth worked with BC Hydro in collaboration with the Site C Methylmercury Subcommittee to develop the MMP for Site C (BC Hydro 2022; see text box). The Methylmercury Subcommittee, established in March 2020, supports the Site C Environmental Forum and includes:

- Representatives from five of the Indigenous Nationsaffected by the Project;
- Representatives from First Nations Health Authority and Northern Health;
- Representatives from BC Hydro; and
- Technical specialists from Azimuth.

In addition, the Subcommittee includes guest members from Health Canada, BC Ministry of Health, and Alberta Health.

[4] Sampling targeted total mercury and methylmercury in surface water, sediment, porewater, zooplankton, benthic invertebrates, and fish.

The purpose of the Methylmercury Subcommittee is to:

- Address questions regarding methylmercury and human health asked by Indigenous Nations and Health Authorities;
- Collaboratively develop the MMP for the Project, incorporating local knowledge, Traditional Knowledge, and cultural values important to Indigenous Nations;
- Support information sharing about methylmercury;
- Support the development of approaches/tools to effectively communicate information about methylmercury and health risks associated with consuming fish to Indigenous Nations and Health Authorities;
- Support the communication of this information to the broader Environmental Forum and community members; and
- Support implementation of the MMP.

Methylmercury Monitoring Plan (MMP)

The MMP addresses methylmercury-related conditions in the Environmental Assessment Certificate (EAC) and Federal Decision Statement (FDS) issued to the Project.

The MMP was a collaborative effort involving Indigenous Nations, Health Authorities, BC Hydro, and Azimuth through the Site C Methylmercury Subcommittee.

The objectives of the MMP are to:

• Monitor methylmercury concentrations in fish prior to Project effects (baseline conditions) and changes after reservoir formation, during Project operations;

• Work with Indigenous Nations to plan and implement the MMP; and

• Work with Health Authorities to effectively communicate fish consumption guidance for people who eat fish caught in the Site C reservoir and downstream of the Project in the Peace River.

The complete MMP is available here: https://www.sitecproject.com/sites/default/files/site-c-methylmercury-monitoring-plan.pdf

The MMP includes background information on mercury (Hg) in aquatic ecosystems, including reservoirs, and a summary of the Site C EIS predictions for methylmercury in fish (BC Hydro 2022; link in text box).

The MMP has three main components:

1. **Core program.** The Core program is the foundation of the MMP. Its mandate is to characterize mercury present in fish and supporting media and to track changes over time and space. Sampling is conducted in conjunction with sampling under the Site C Fisheries and Aquatic Habitat Monitoring and Follow-up Program (FAHMFP, BC Hydro 2015).
2. **Indigenous Community Sampling Program (ISCP).** This Indigenous-implemented component is complementary to the Core program in that fish species and/or locations of particular interest

to Indigenous Communities are sampled. The ICSP is coordinated by Azimuth, but all sampling is conducted by trained Community Champions.

3. **Fish Consumption Program.** This component focuses on understanding fish consumption behaviour, i.e., how much fish is consumed, what species are consumed, and where were they caught. Consumption behaviour is recorded by age and gender for Indigenous and non-Indigenous consumers.

These three components are later combined to help manage mercury-related health risks related to eating fish affected by the Project.

1.3 Objectives

The objectives of this 2022 MMP Annual Report are to:

- Summarize available data for mercury in supporting media (surface water, porewater, sediment, zooplankton, and benthic invertebrates) and highlight the Core MMP results for 2022 (**Section 3**);
- Summarize available fish data for tissue mercury and stable isotope, with an emphasis on characterizing length-mercury relationships and highlighting the Core MMP results for 2022 (**Section 4**);
- Provide an overview of the 2022 ICSP (**Section 5**);
- Provide updated fish consumption guidance based on the 2022 MMP results (**Section 6**); and
- Report 2022 MMP activities related to characterizing baseline fish consumption (**Section 7**).

2 SITE C PHASING AND MMP SAMPLING LOCATIONS

2.1 Site C Development Phasing

Project construction started in summer 2015 and is expected to be completed in 2024. The MMP describes the expected changes in methylmercury concentrations in the environment that are associated with key stages of Project development. These predicted changes for a given phase are based on the degree of flooding of terrestrial habitat. When soils are flooded and bacteria decompose the organic matter, methylmercury production increases as a by-product of the bacterial decomposition. The expected changes for key development phases/sub-phases are as follows:

- **Construction: Pre-Diversion (fall 2015 to fall 2020).** Peace River water level changes will be natural, so no changes would be expected.
- **Construction: River Diversion (fall 2020 to late summer 2024 [planned]).** Diversion of the Peace River around the dam site started in fall 2020. Water level rises created a headpond upstream of the dam construction site, with the potential to extend up to 18 km upstream during high-water events. However, the overall potential for meaningful increases in methylmercury production during this period is low, because (1) most of the land inundated by the diversion headpond was routinely under water during high flow events that occurred prior to river diversion, and (2) the duration for which these areas are inundated during river diversion has been limited.
- **Construction: Reservoir Filling (summer 2024 to winter 2025).** Reservoir filling is expected to take about four months to complete; it is currently scheduled for late summer 2024. During this time, water levels will rise between 0.3 m and 3 m a day until the reservoir is 52 m deep close to the dam, 36 m deep at the Halfway River, and 18 m deep near Hudson's Hope. At this stage, as terrestrial habitat within the reservoir footprint becomes inundated, we expect methylmercury production to start ramping up, leading to initial increases in methylmercury concentrations, particularly in flood-zone sediments (including porewater) and surface water.
- **Operations (starting winter 2025).** When filled, the average width of the reservoir will be two to three times that of the current Peace River. The 83 km long reservoir will have a total surface area of 9,330 ha, of which 5,550 ha will be newly inundated terrestrial habitat. Increased methylmercury production will lead to the onset of higher bioaccumulation into the food web.

  One factor that could moderate methylmercury production in newly flooded areas is high rates of sediment deposition related to bank erosion occurring during and post reservoir filling as described in the EIS (BC Hydro 2013, Vol. 2: App. I). Because information regarding this phenomenon in existing reservoirs is lacking (BC Hydro 2013, Vol. 2: App. J3), sediment

deposition due to bank erosion was not explicitly considered in the mercury modelling; however, model test runs showed that high sedimentation of largely inorganic material had the potential to considerably reduce methylmercury production and diminish predicted increases in fish mercury concentrations. Ongoing monitoring should help to gain insights into how this plays out. Either way, we expect to see increases in methylmercury throughout the ecosystem; it is only the magnitude of change that could be reduced.

As described in the MMP (BC Hydro 2022), fish mercury concentrations are expected to increase by an average of three to four times current levels (characterized in **Section 4**) within five to eight years after filling the reservoir. After that, they are expected to gradually return to levels similar to natural lakes and rivers in the region by 20 to 30 years after reservoir creation (BC Hydro 2013, Vol. 2: Sec. 11.9). Downstream in the Peace River, possibly as far as Many Islands, Alberta, fish mercury concentrations were predicted to double, on average, before returning to a new baseline level (BC Hydro 2013, Vol. 2: Sec. 11.9).

In summary, while Project construction began in fall 2015, none of the activities conducted to date resulted in flooding significant amounts of the terrestrial habitat planned to be eventually covered by the reservoir footprint. Consequently, we do not anticipate seeing meaningful Project-related changes to methylmercury concentrations in water, sediment (including porewater), zooplankton, benthic invertebrates, or fish through 2022.

2.2 Sampling Locations

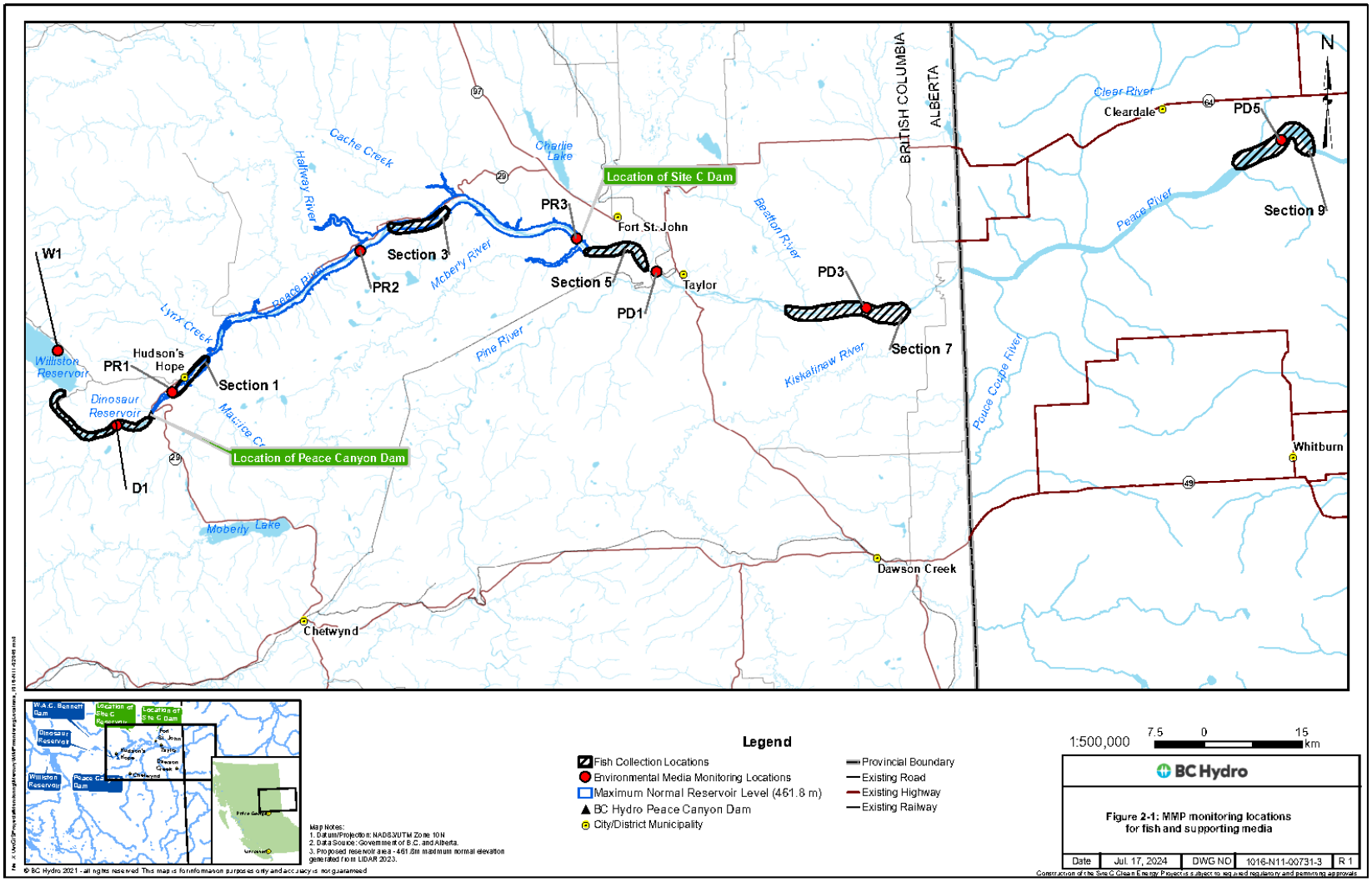
The geographic area of the Core MMP extends for more than 200 river km from the Peace Canyon Dam to the Many Islands area of Alberta (**Figure 2-1**). Core MMP sampling locations for fish and supporting media (surface water, porewater, sediment, zooplankton, and benthic invertebrates) are described in **Table 2-1**. Most of these stations have a monitoring history extending to the early baseline period. When presenting the baseline data in **Sections 3** and **4**, notable deviations in station names or locations will be documented.

Table 2-1. Core MMP sampling locations on the Peace River for fish and supporting media

Study Area	General Location	Fish Sampling Areas			Supporting Media Sampling Areas	
		Name (Section #)	Description	River Km Extent (kms from WAC Bennet Dam)	Name (ID)	Description
Site C Reservoir	Peace-Canyon dam at upstream terminus and Site C dam at downstream terminus.	Upper Site C* (Section 1)	Downstream end of Peace River Canyon to Lynx Creek confluence	25.0 to 34.0	Upper Site C (PR1)	Near the community of Hudson's Hope
		Mid - Lower Site C* (Section 3)	Halfway River confluence to Cache Creek confluence	65.8 to 82.1	Mid Site C (PR2)	Immediately upstream of Halfway River confleence
					Lower Site C (PR3)	Immediately upstream of Moberly River confluence
Site C Dam	-	-	-		-	-
Peace River Downstream	Immediately downstream of Site C dam.	Site C Tailrace (Section 5)	Moberly River confluence to CN Railway bridge	105.0 to 117.7	Site C Tailrace (PD1)	Downstream of Site C dam, immediately upstream of Pine River confluence
	Approximately 45 km downstream of Site C dam.	Beatton-Kiskatinaw (Section 7)	Beatton River confluence to Kiskatinaw River confluence	140.0 to 158.0	Beatton-Kiskatinaw (PD3)	Downstream of confluence with Beatton River but upstream of the Kiskatinaw River confluence
	Approximately 120 km downstream of Site C dam.	Many Islands (Section 9)	Many Islands Park area	217.0 to 231.0	Many Islands (PD5)	In the vicinity of Many Islands, AB. Expected downstream terminus of Project-related mercury impacts.

Notes: * After the Site C reservoir is created, Sections 1 and 3 will be combined.

Figure 2-1. Baseline monitoring locations for fish and supporting media



3 SUPPORTING MEDIA

This section summarizes the 2022 Core MMP supporting media results and puts them into context with available historical data. Supporting media consist of surface water, porewater, sediments, benthic invertebrates, and zooplankton. A data quality assessment for 2022 is included in **Appendix A**.

3.1 Overview of Available Data

The first mercury-focused investigation of surface water, porewater, sediments, zooplankton, and benthic invertebrates conducted in the region was done in 2000 and 2001 in the Williston reservoir (Baker et al. 2002). While the study is not directly applicable to the Peace River, it provides some useful historical context for the total mercury and methylmercury amounts in these supporting media.

Similar to fish, baseline sampling related to mercury for the Project was started in 2010/2011 to support the EIS. These efforts were holistic (i.e., included all supporting media types mentioned above), and they focused on the Peace River. When baseline monitoring resumed under the FAHMFP in 2016 (BC Hydro 2015), water and sediment were sampled for mercury. In 2022, the first full MMP event was conducted; it included surface water, sediment, porewater, zooplankton, and benthic invertebrates.

Details of data collected under the MMP and other historical data are provided in the following sections.

3.1.1 MMP Supporting Media Data

The 2022 event was the first monitoring cycle conducted under the MMP (BC Hydro 2022). An overview of the 2022 program is presented in **Table 3-1** (locations shown in **Figure 2-1**). The Core MMP program focuses primarily on total mercury and methylmercury, as well as other analytes known to influence methylation or bioaccumulation. Media-specific ancillary analytes that are potentially important in understanding mercury patterns in the ecosystem are tracked as supplemental information. In addition to the MMP-specific events, we were able to expand the supplemental dataset by including data from the Site C reservoir and Peace River Water and Sediment Quality Monitoring Program (Mon-8/9 of the FAHMFP). More details regarding the program and supplemental data are provided in **Appendix B**.

The supporting media sampling in 2022 was conducted by Ecofish Research Ltd. (Ecofish) and Aski Reclamation LP (Aski) in conjunction with Mon-8/9. Note that two other sampling locations were included in 2022 for surface water and zooplankton, to obtain additional baseline information on background watershed mercury dynamics:

- **Williston reservoir (W1)** upstream of the WAC Bennett Dam. Surface water samples were collected at both shallow (S; 0.2 m) and deep (D; 5 m) depths; and
- **Dinosaur reservoir (D1)** upstream of Peace Canyon Dam. Surface water samples were collected at both shallow (S; 0.2 m) and deep (D; 5 m) depths.

To make certain results easier to present, the MMP and non-MMP sampling stations were grouped based on their locations:

- **Reservoirs.** The Williston and Dinosaur locations;
- **Peace River Upstream.** Locations between Peace Canyon Dam and Site C;
- **Peace River Downstream.** Locations downstream of Site C to Many Islands, Alberta.

Table 3-1. Overview of 2022 sampling of Core MMP supporting media

Media Type	Locations	Timing
Surface Water	W1*, D1*, PR1, PR2, PR3, PD1, PD3, and PD5	Two events: Aug 20-23 Oct 16-24
Porewater	PR1, PR2, PR3, PD1, PD3, and PD5	One event: Aug 20-23
Sediment	PR1, PR2, PR3, PD1, PD3, and PD5	One event: Aug 17-26
Benthic Invertebrates	PR1, PR2, PR3, PD1, PD3, and PD5	One event: Deploy Aug 3-5 Retrieve Sep 26 - Oct 1
Zooplankton	W1*, D1*, PR1	Two events: Aug 20-23 Oct 16-24[2]

Notes: * = non-MMP locations; 2 = no PR1 sample

3.1.2 Historical Supporting Media Data

Several efforts to sample environmental media were conducted as part of Site C-related monitoring programs over the baseline period (from 2010 to 2022). For this analysis, data from these programs that relates to surface water, porewater, sediment, benthic invertebrates, and zooplankton have been compiled to provide a holistic view of baseline conditions in the Peace River.

The specific years of data included in the analysis for each medium are listed below in **Table 3-2**.

Table 3-2. Historical supporting media data relevant to the MMP.

Year	Media Sampled	Data Source
2019	Surface water, sediment	Saulteau EBA 2020
2018	Surface water, sediment	Saulteau EBA 2019
2017	Surface water, sediment	Saulteau EBA 2018
2016	Surface water, sediment	Saulteau EBA 2017
2011	Benthic Invertebrates	Azimuth 2012
2010	Surface water, sediment, benthic invertebrates, zooplankton	Azimuth 2011
2001	Surface water, porewater, sediment, benthic invertebrates, zooplankton	Baker et al. 2002
2000	Surface water, porewater, sediment, benthic invertebrates, zooplankton	Baker et al. 2002

3.2 Surface Water

3.2.1 Overview

Why Sample Surface Water?

Surface water typically has very low concentrations of total mercury and methylmercury. But following reservoir filling, concentrations are expected to rise, temporarily.

Increases in mercury and methylmercury concentrations in the water can be important for their uptake into the food chain in the Site C reservoir and downstream in the Peace River.

In addition to total mercury and methylmercury concentrations in water, other water quality analytes such as pH, sulphate, total and dissolved organic carbon, and total suspended solids (TSS) can impact concentrations of methylmercury in biota.

The MMP tracks changes in total mercury and methylmercury (filtered and unfiltered) in water to better understand how creating the reservoir will change the processes that contribute to the concentrations of mercury seen in fish. Most water quality studies refer to concentrations in unfiltered samples as "total" (e.g., total iron concentrations) and in filtered samples as "dissolved" (e.g., dissolved zinc concentrations). However, because we already use "total" to refer to the sum of all forms of mercury in a sample (i.e., total mercury), we will explicitly use the terminology "unfiltered" to refer to refer to the *sum* of the dissolved and particulate-bound mercury and "filtered" to refer to dissolved mercury (i.e., for either total mercury or total methylmercury). All total mercury and methylmercury concentrations for surface water in this MMP report are presented in ng/L (parts per trillion).

Collectively, surface water quality analyses provide insights into the forms of mercury present in water and whether the total mercury and methylmercury are predominantly bound to particulates (particulate-bound phase) or dissolved in the water (dissolved phase). In addition to their absolute concentrations, the relative amount of methylmercury to total mercury is a useful way to track mercury changes over time. It is calculated as follows: percent methylmercury = 100 * [MeHg]/[THg], where [] denotes filtered concentration, MeHg = methylmercury and THg = total mercury. Filtered samples directly provide results for the dissolved phase, while subtracting filtered concentrations from unfiltered concentrations provides results for particulate-bound mercury. Dissolved-phase methylmercury is considered the most available for bioaccumulation into the food web.

In addition to total mercury and methylmercury, the MMP targets a number of other water quality analytes known to influence mercury methylation or bioaccumulation (primary analytes; **Table 3-3**). In the interest of keeping this report readable, we focus on pH (In Situ), dissolved organic carbon (DOC),

and total suspended solids (TSS) in this section; the results of the other mercury-related secondary analytes are presented in **Appendix B**.

In 2022, surface water sampling for the MMP was conducted in August and October (**Table 3-1**; locations shown in **Figure 2-1**). Methods for surface water sampling and analysis for the Core MMP are described in **Appendix B**.

As noted in **Section 3.1.1**, Mon-8/9 results from the following non-MMP sampling stations and events in the mainstem of the Peace River were included when relevant (see Table 1 in Ganshorn et al. 2023 for full details):

- **Peace Canyon (PC1).** Mainstem of the Peace River downstream of Peace Canyon Dam;
- **Peace Downstream (PD2).** Downstream of the Pine River and upstream of the Beatton River; and
- **Peace Downstream (PD4).** Downstream of the Alces River and upstream of the Pouce Coupe River.

We also plotted key water quality data for tributaries monitored under Mon-8/9, although it was not part of the MMP. The purpose was to document current and past data for tributary inputs of total mercury and methylmercury to the Peace River, both upstream and downstream of the Project. Similar to the other ancillary analytes in **Table 3-3**, this supplemental data is provided in **Appendix B.** Data were available for the following tributaries:

- **Halfway River (HD) and Moberly River (MD).** Downstream sites on two tributaries discharging in the Peace River upstream of the Project; and
- **Pine River (PINE), Beatton River (BEA), Kiskatinaw River (KR), and Pouce Coupe River (POUCE).** Sites on tributaries discharging into the Peace River downstream of the Project.

3.2.2 2022 Data Quality Assessment

Data quality for the 2022 surface water program was assessed as described in **Appendix A**. Overall, data met the data quality objectives of the MMP.

3.2.3 2022 Results for Surface Water

The 2022 results for the primary mercury-related surface water quality analytes are described in the paragraphs below and presented in **Figure 3-1**. The points in this plot are coloured by project phase: green (indicating Baseline|Reference) for the reservoirs group, and purple (indicating Construction

phase) for both the upstream and downstream Peace River groups. Note that "x" represents samples with concentrations below laboratory reporting limits (MDL), the lowest concentration measurable by the laboratory.

Total mercury concentrations (filtered and unfiltered). Total mercury concentrations showed a strong seasonal pattern, with the highest concentrations occurring in the June event and tracking TSS. Unfiltered total mercury concentrations reached approximately 30 ng/L in that event but were generally less than 1 ng/L. Filtered total mercury concentrations were less than 2 ng/L in the June event and < 0.5 ng/L for the August and October events. Concentrations of both unfiltered and filtered total mercury progressively increased from Williston and Dinosaur, through the Peace River Upstream and the Peace River Downstream locations.

Methylmercury concentrations (both filtered and unfiltered). Methylmercury concentrations were generally less than 0.05 ng/L, but were higher at the three most downstream stations (PD3, PD4, and PD5) where they peaked around 0.25 ng/L in unfiltered samples and just above 0.05 ng/L in filtered samples.

Percent methylmercury. The percent mercury ranged from 1 to 4 %.

TSS, DOC, pH (In Situ). The data for ancillary analytes also show some seasonality, with TSS and DOC showing similar patterns of peaks in the first event followed by much lower concentrations later in the summer. pH (In Situ) generally ranged from 7.7 to 8.2 and appeared slightly higher at the Peace River Downstream stations. Like total mercury, above, TSS concentrations progressively increased downstream, and concentrations peaked over 300 mg/L. Results for DOC were generally between 2 and 5 mg/L, but peaked over 10 mg/L at the most downstream stations (PD4 and PD5) in the June event.

3.2.4 Temporal Trends for Surface Water

Temporal trends for the primary mercury-related surface water quality analytes are presented in **Figure** 3-2. Amalgamating data into spatial groups makes it easier to visualize general spatial-temporal patterns in the data. This will become even more helpful once water quality related to mercury changes after reservoir filling starts later in 2024. There do not appear to be substantial changes in total mercury or methylmercury in the Peace River Upstream group between the Baseline phase (2010 to 2012) and Construction phase (2016 to 2022 and ongoing).

These results are consistent with the low potential for meaningful changes in methylmercury concentrations in surface water associated with river diversion and dam construction described in **Section 2.1**.

3.2.5 Tables and Figures

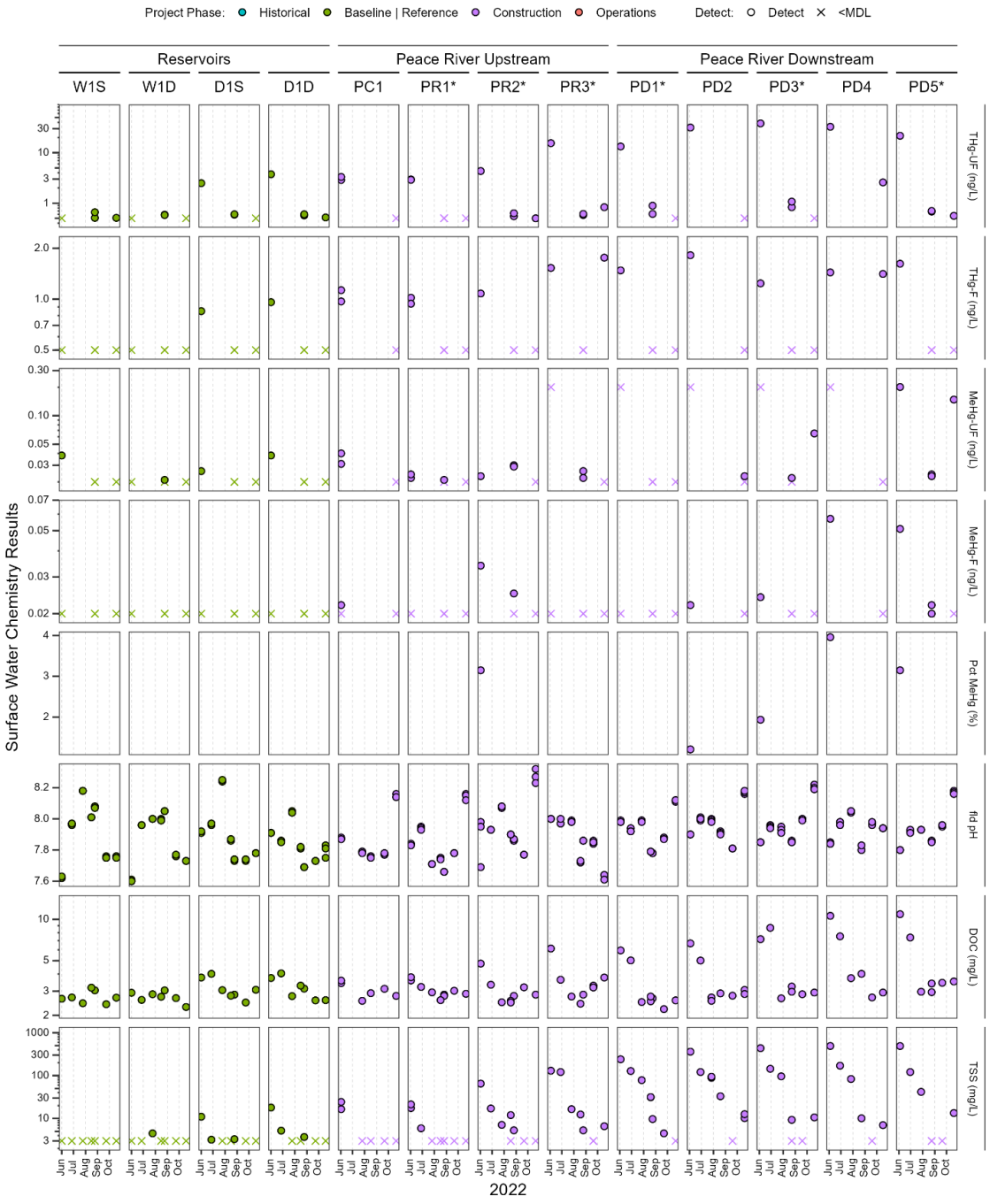
Table 3-3. Overview of MMP surface water quality analytes

Analyte	Abbreviated Name	Units	MDL	Data Type[1]
Metals				
Total Mercury - Filtered	THg-F	ng/L	0.5	1°
Total Mercury - Unfiltered	THg-UF	ng/L	0.5	1°
Calcium (Ca) - Dissolved	Ca	mg/L	0.05	2°
Magnesium (Mg) - Dissolved	Mg	mg/L	0.005	2°
Speciated Metals				
Methylmercury - Filtered	MeHg-F	ng/L	0.02	1°
Methylmercury - Unfiltered	MeHg-UF	ng/L	0.02	1°
Physical Tests				
Total Suspended Solids	TSS	mg/L	3	1°
pH (In Situ)	fld pH	-	0.1	1°
pH (lab)	lab pH	-	0.1	2°
Specific Conductivity (In Situ)	Cond	µS/cm	2	2°
Alkalinity, Total (as CaCO3)	Alk-Tot	mg/L	1	2°
Anions and Nutrients				
Chloride (Cl)	Cl	mg/L	0.5	2°
Sulfate (SO4)	SO4	mg/L	0.3	2°
Fluoride (F)	F	mg/L	0.02	2°
Nitrate (as N)	NO3-N	mg/L	0.005	2°
Nitrite (as N)	NO2-N	mg/L	0.001	2°
Organic / Inorganic Carbon				
Dissolved Organic Carbon	DOC	mg/L	0.5	1°

Notes: 1° = primary analyte; 2° = secondary analyte.

Figure 3-1. Results for key mercury-related surface water quality analytes, by station and station group in 2022, for reservoir and Peace River locations

Site C MMP stations noted with asterisk (*); log scale for all analytes except Pct MeHg and fld pH



Note: For reservoir samples, station names ending in "S" were collected at the surface, while station names ending in "D" were collected at depth. MDL = Method Detection Limit

Figure 3-2. Temporal trends for key mercury-related surface water quality analytes, by station group, for reservoir and Peace River locations

Log scale for all analytes except Pct MeHg and fld pH

3.3 Porewater

3.3.1 Overview

The MMP targets total mercury and methylmercury in porewater. The purpose is to track changes related to developing the Site C reservoir to better understand the underlying processes that ultimately affect fish mercury concentrations. As the reservoir has not yet been filled, sampling conducted to date (**Section 3.1**) provides some indication of spatial and temporal patterns in porewater mercury concentrations prior to Site C.

Why Sample Porewater?

Porewater is the water that fills the spaces between particles of sediment at the bottom of lakes, reservoirs, rivers, and oceans. As water levels rise during reservoir filling, terrestrial soils rich in organic matter will be submerged, leading to higher production of methylmercury, created as a by-product of bacterial decomposition of the organic matter. While this may occur after filling the reservoir, there is also the possibility that erosion of the river banks during and after filling could bury the low-lying agricultural and forest soils, which have high mercury methylation potential, under sloughed bank material that is low in organic matter. Burying the terrestrial soils could substantially lower mercury methylation rates, which could lead to lower magnitude changes in methylmercury concentrations in porewater and throughout the food web.

Similar to surface water, we are also tracking other analytes in porewater that can affect the production or bioavailability of methylmercury. A full list of MMP analytes for porewater is provided in **Table 3-4**, including their shortened names for plotting. In addition to including total mercury, methylmercury and percent methylmercury (see **Section 3.2**) in this section, pH (lab), chloride, sulphate, DOC, and TSS are also discussed (primary analytes). Tables and plots for the other MMP secondary analytes in are provided in **Appendix B**.

In 2022, sediment porewater samples were collected from each of the six Core MMP sampling stations (see **Section 2.2**) between August 19 and 26. Methods for sampling and analysis are described in **Appendix B,** and an overview of the process is shown in **Figure 3-3**. Because sediment was filtered to extract the porewater, there are no results for unfiltered samples.

3.3.2 2022 Data Quality Assessment

Data quality for the 2022 porewater sampling was assessed as described in **Appendix A**. All analyte/QC sample types were considered to have met their respective data quality objectives (DQOs), except for methylmercury in the field duplicate. The methylmercury field duplicate showed higher variability than specified in the DQO (RPD ≤ 45 %). While this result could be due to small-scale differences in conditions

in the sediments at a particular location, the porewater analyses confirmed the presence of suspended solids (TSS) in about half the samples. As discussed for surface water, the presence of TSS can influence concentrations of both total mercury and methylmercury. We are working with the sampling team (Ecofish/Aski) to better understand this issue, with the aim of improving methods for the next event. As discussed in **Section A.3.3.2 of Appendix A**, the 2022 porewater methylmercury data received a "cautionary" flag that will follow these data from now on (e.g., the flag will allow future analyses relying on these data to identify that there was an issue that warranted cautious interpretation of results). This contrasts with an "unreliable" flag, which is given to data that are clearly wrong.

3.3.3 2022 Results for Porewater

The 2022 results for the primary mercury-related porewater quality analytes are presented in **Figure** 3-4. Total mercury concentrations (filtered) ranged from < 5 ng/L to 11.3 ng/L, generally declining from upstream to downstream. Methylmercury concentrations (filtered) ranged from 0.17 to 0.93 ng/L, with no apparent spatial patterns (note that the 2022 methylmercury data were flagged as cautionary). Percent methylmercury ranged between 2 and 10 %. Results for the ancillary analytes showed no clear spatial trends. Observed values were as follows:

- pH (lab) was slightly basic, ranging from 8.2 to 8.4;
- Chloride ranged from 0.78 to 10.8 mg/L;
- Sulphate ranged from 6.5 to 74 mg/L;
- DOC ranged from 11.1 to 23.8 mg/L; and
- TSS ranged from < 3 to 10.1 mg/L.

3.3.4 Temporal Trends for Porewater

Temporal trends for the primary mercury-related surface water quality analytes are presented **Figure** 3-5. Porewater data for the Peace River are only available for 2022, thereby precluding an assessment of temporal patterns. To put the 2022 results into perspective, some historical data for Williston reservoir from 2000/2001 (Baker et al. 2002) are provided for context. For total mercury, methylmercury, and percent methylmercury, the 2022 MMP results were generally consistent with the historical results for Williston reservoir.

3.3.5 Tables and Figures

Table 3-4. Overview of MMP porewater quality analytes

Analyte	Abbreviated Name	Units	MDL	Data Type[1]
Metals				
Total Mercury - Filtered	THg-F	ng/L	0.5	1°
Calcium (Ca) - Dissolved	Ca	mg/L	0.05	2°
Magnesium (Mg) - Dissolved	Mg	mg/L	0.005	2°
Speciated Metals				
Methylmercury - Filtered	MeHg-F	ng/L	0.02	1°
Physical Tests				
Total Suspended Solids	TSS	mg/L	3	1°
pH (lab)	lab pH	-	0.1	1°
Conductivity (lab)	Cond	µS/cm	2	2°
Alkalinity, Total (as CaCO3)	Alk-Tot	mg/L	1	2°
Anions and Nutrients				
Chloride (Cl)	Cl	mg/L	0.5	1°
Sulfate (SO4)	SO4	mg/L	0.3	1°
Fluoride (F)	F	mg/L	0.02	2°
Nitrate (as N)	NO3-N	mg/L	0.005	2°
Nitrite (as N)	NO2-N	mg/L	0.001	2°
Organic / Inorganic Carbon				
Dissolved Organic Carbon	DOC	mg/L	0.5	1°

Notes: 1° = primary analyte; 2° = secondary analyte.

Figure 3-3. Porewater sampling overview

(A) take grab sample, (B) homogenize, (C) transfer to filtration unit and filter, and (D) extracted porewater

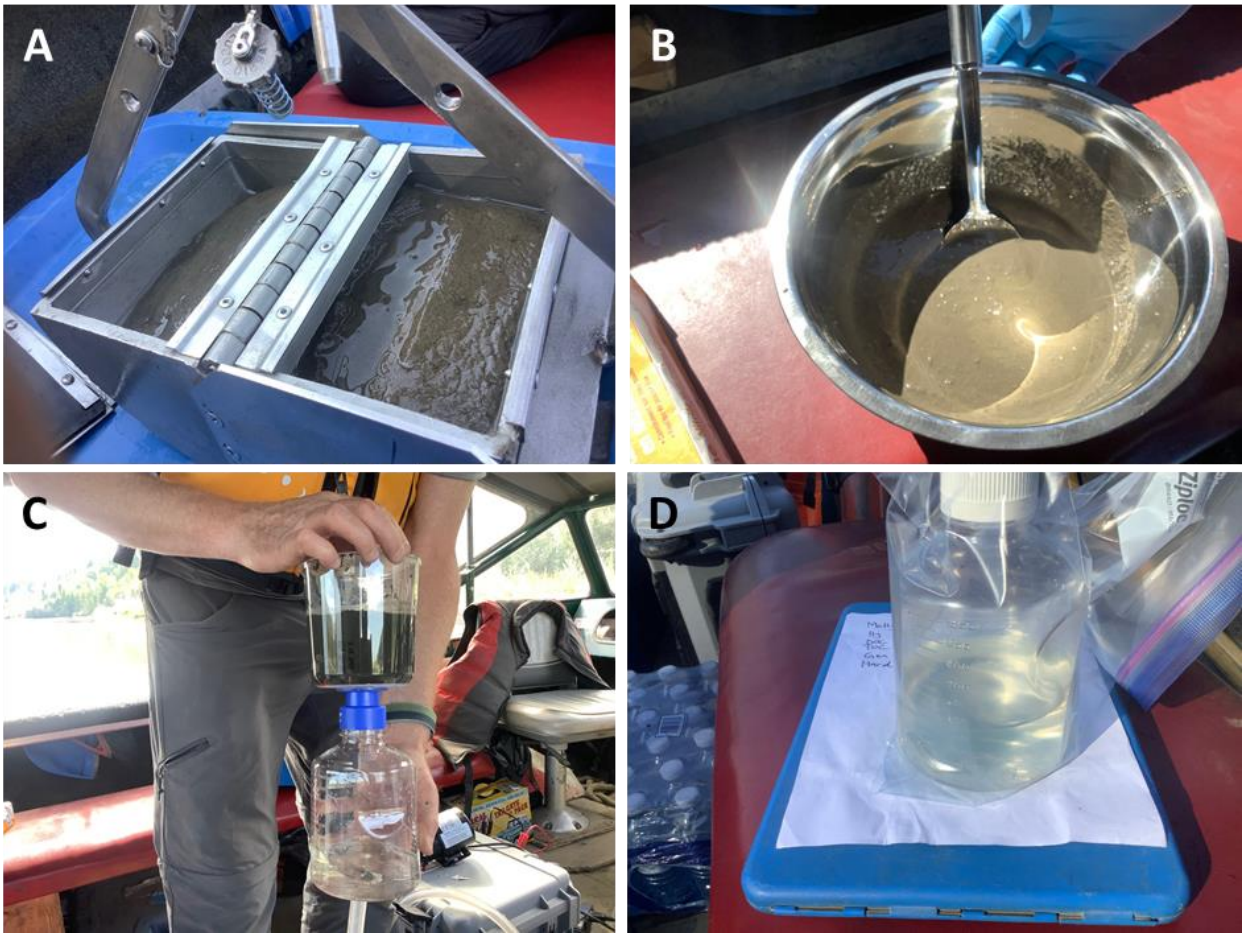
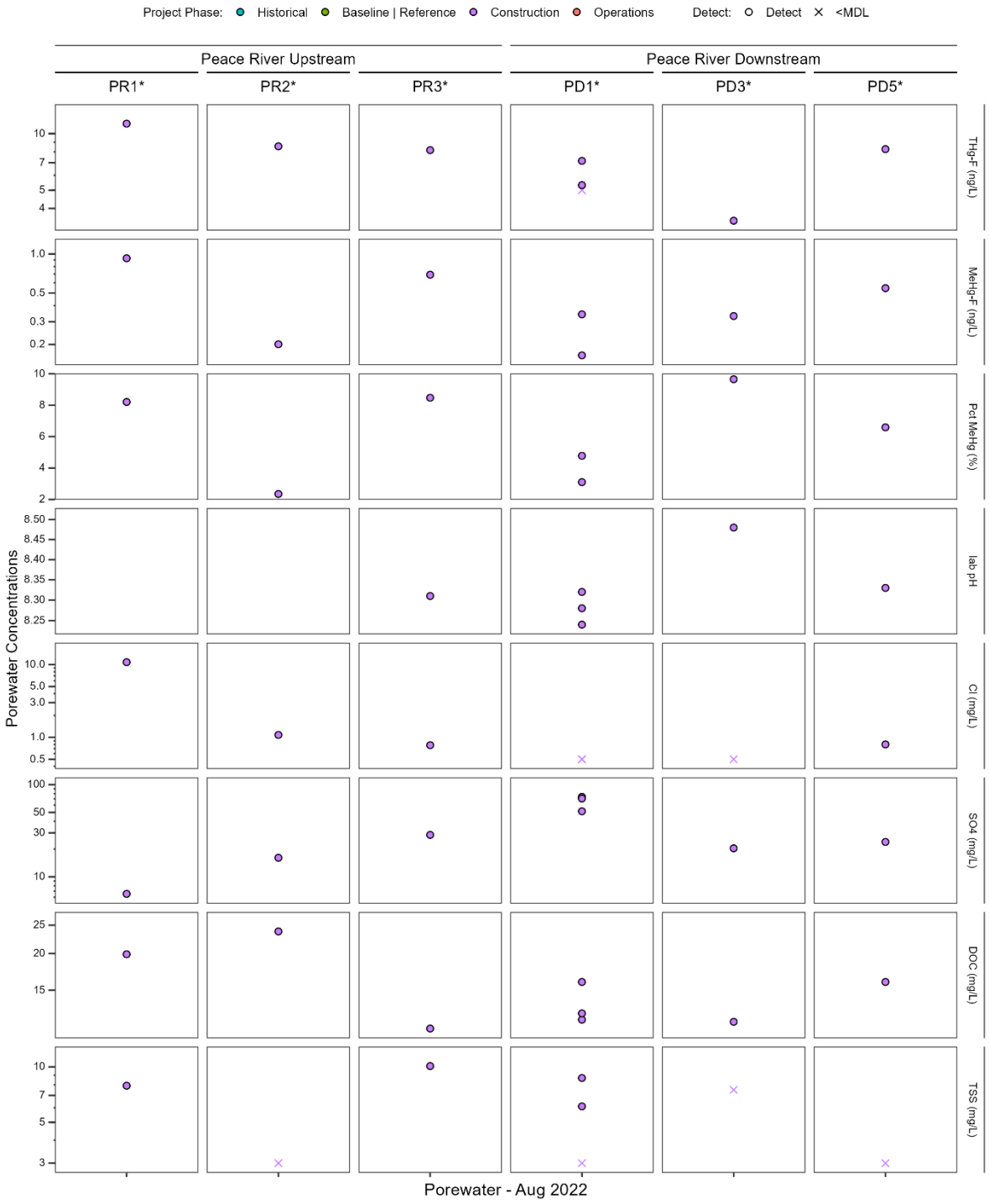
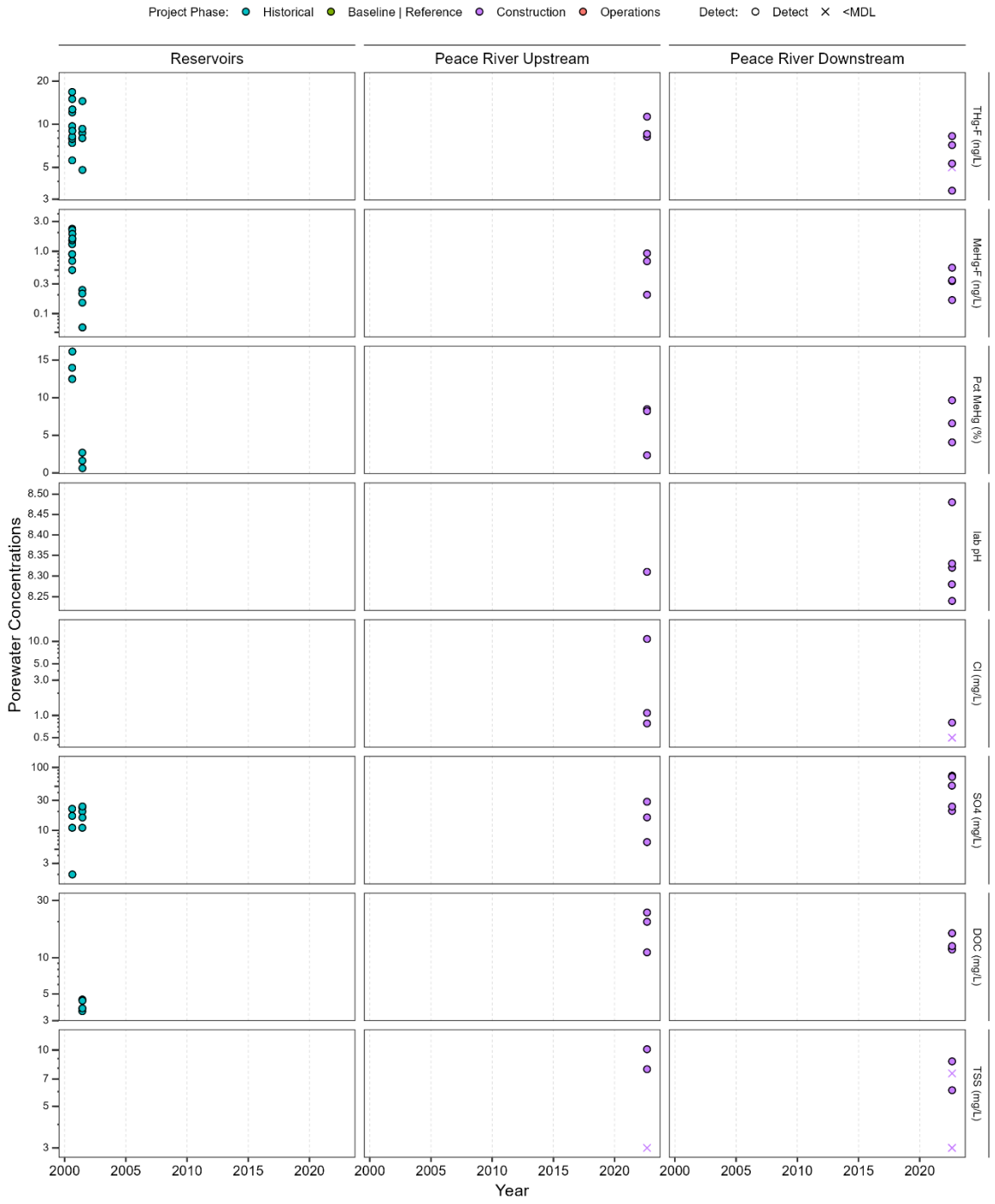


Figure 3-4. Results for key mercury-related porewater quality analytes, by station and station group, in 2022, for Peace River locations



Note: Log scale used for all analytes except Pct MeHg and lab pH.

Figure 3-5. Temporal trends for key mercury-related porewater quality analytes, by station group, for reservoir and Peace River locations



Note: Log scale used for all analytes except Pct MeHg and lab pH.

3.4 Sediment

3.4.1 Overview

Why Sample Sediment?

Freshly inundated terrestrial soils can be a major source of methylmercury in new reservoirs. In Site C, there is also the potential for significant bank erosion to occur both during and after reservoir filling. If this occurs, low-lying agricultural and forest soils (i.e., habitats with high mercury methylation potential) could be buried under sloughed bank material, which could limit methylmercury production in these areas. Tracking total mercury and methylmercury concentrations in sediment will help better understand how these areas are influencing fish mercury concentrations in the Peace River.

The Peace River is predominantly an erosional environment where strong currents prevent finer sediments from depositing on the river bottom. Some areas are protected from faster flowing water and finer sediments deposit there, but most of the river bottom consists of coarser material like gravels and cobbles. Locations where deposition occurs have been targeted to characterize total mercury and methylmercury concentrations in sediments prior to reservoir filling. Future sampling will also focus on newly flooded reservoir areas with high mercury methylation potential.

In addition to total mercury, methylmercury, and percent methylmercury (see **Section 3.2**), pH (lab), loss on ignition (LOI), total organic carbon (TOC), total inorganic carbon (TIC), and particle size were included because they may influence mercury bioavailability (see **Table 3-5** for more information, including their shortened names for plotting). Note that total mercury and methylmercury concentrations in sediments in this MMP report are presented as µg/kg (parts per billion) on a dry weight basis (dw). Sediment particle size results are reported as clay, silt, sand, and gravel in units of percent (%) according to the Wentworth scale (Wentworth 1922). To simplify interpretation, the clay and silt fractions may be collectively referred to as “fines.”

In 2022, sediment chemistry samples were collected between August 19 and 26 from each of the six Core MMP sampling stations (see **Section 2.2**). In addition, data from non-MMP stations and events (October 2022) targeted by Mon-8/9 were included for context. Note that the detection limit for total mercury was higher, and methylmercury was not included in the non-MMP event. Sediment sampling and analysis methods for the Core MMP are described in **Appendix B**.

Similar to surface water quality, we also plotted key sediment quality results for tributaries monitored as part of Mon-8/9. The purpose was to document current and past data for tributary inputs of total

mercury and methylmercury to the Peace River, both upstream and downstream of the Project. These results are provided in **Appendix B**.

3.4.2 2022 Data Quality Assessment

Data quality for the 2022 sediment sampling was assessed as described in **Appendix A**. Overall, data met the data quality objectives of the MMP.

3.4.3 2022 Results for Sediments

The 2022 results for sediment quality are presented in **Figure 3-6**. Total mercury concentrations ranged between 40 and 65 µg/kg and did not show any obvious spatial patterns. Methylmercury concentrations were generally < 1 µg/kg and percent methylmercury (only calculated when both total mercury and methylmercury were detected in a sample) was < 1.3 %. Organic carbon content, as indicated by both LOI and TOC, was generally low (< 2.5 %).

Sediment particle size was finer (i.e., more clay and silt) at the two upstream reservoir stations (**Figure 3-7**). In the Peace River, sediments were fairly fine (40 to 60 % fines), except for PC1 (< 20 % fines) and PD2 (< 35 % fines), which both consisted of coarser sediment.

3.4.4 Temporal Trends for Sediments

Temporal trends for sediment quality are presented in **Figure 3-8**. Total mercury concentrations were generally between 20 and 100 µg/kg and show no obvious temporal or spatial patterns. Methylmercury measurements were more limited but, where available, concentrations were typically < 1 µg/kg. The 2022 results for the ancillary analytes were fairly consistent with historical data, where those were available.

Temporal trends for sediment particle size are shown in **Figure 3-9**. The results show some variability with station groups over time (e.g., coarser sediments in 2019 for both the reservoirs and Peace River Upstream groups). This likely reflects the challenge of finding consistent material for sampling over time and space. For the most part, sediment particle sizes were fairly similar for the Peace River groups (40 to 60 % fines).

3.4.5 Tables and Figures

Table 3-5. Overview of MMP sediment quality analytes

Analyte	Abbreviated Name	Units	MDL
Metals			
Total Mercury	THg	µg/kg	5
Speciated Metals			
Methylmercury	MeHg	µg/kg	0.05
Physical Tests			
pH (lab)	lab pH	-	0.1
Loss on Ignition	LOC	%	1
Organic / Inorganic Carbon			
Total Inorganic Carbon	TIC	%	0.05
Total Organic Carbon	TOC	%	0.05
Particle Size			
% Gravel (>2 mm)	% Gravel (>2 mm)	%	1
% Sand (0.063 mm - 2.0 mm)	% Sand (0.063 mm - 2.0 mm)	%	1
% Silt (0.004 mm - 0.063 mm)	% Silt (0.004 mm - 0.063 mm)	%	1
% Clay (<4 µm)	% Clay (<4 µm)	%	1

Figure 3-6. Results for key mercury-related sediment quality analytes, by station and station groups, for reservoir and Peace River locations in 2022

Site C MMP stations noted with an asterisk (*); log scale used for total mercury and methylmercury

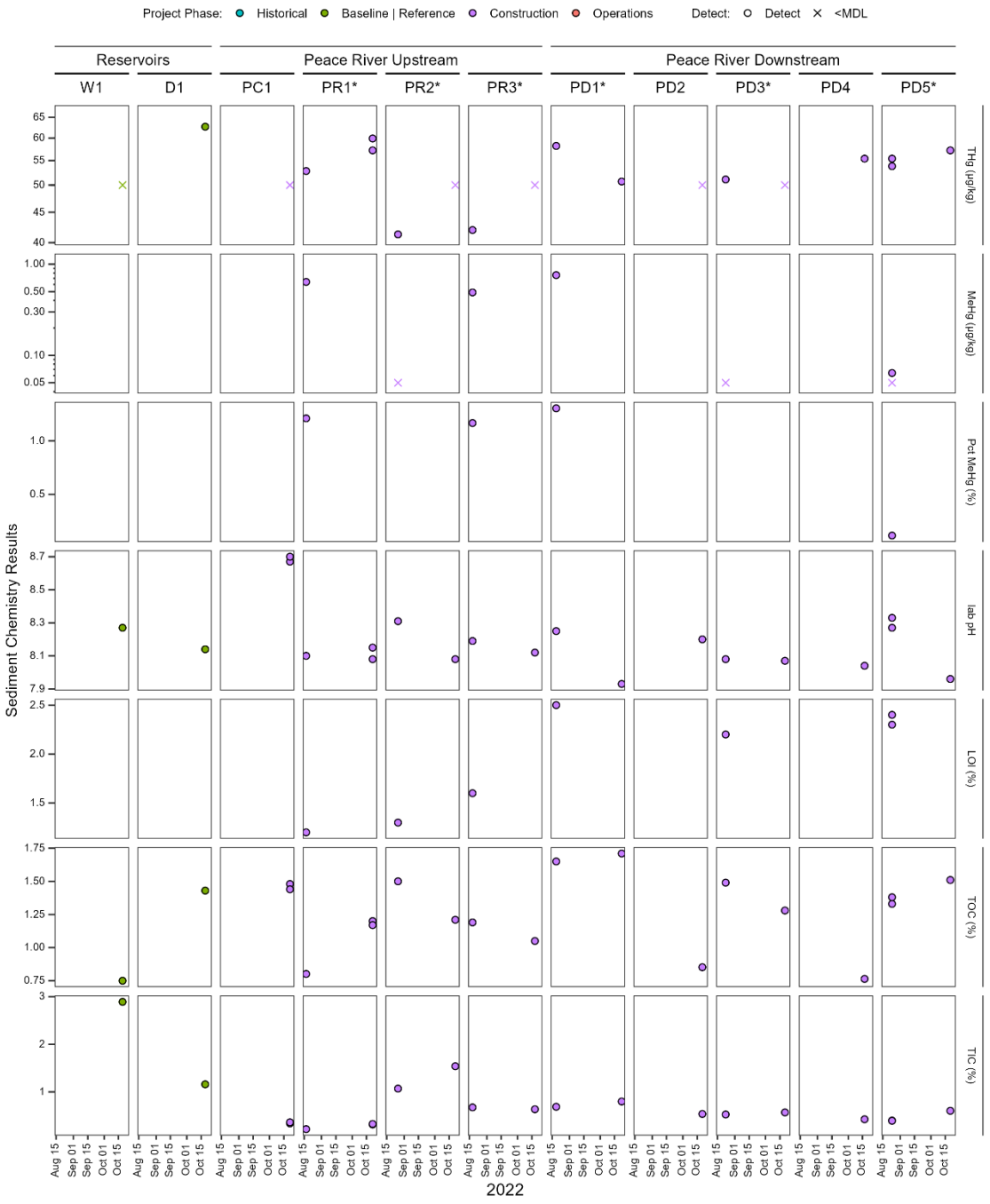


Figure 3-7. Sediment particle size fractions by station and station groups in 2022, for reservoir and mainstem Peace River locations

Site C MMP stations noted with an asterisk (*)

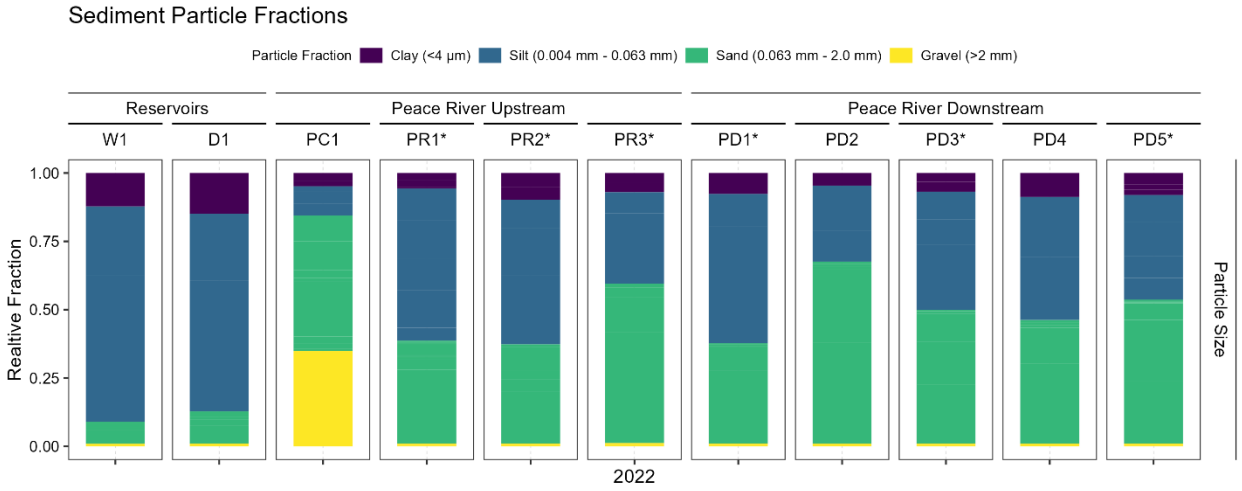


Figure 3-8. Temporal trends in key mercury-related sediment quality analytes, by station group, for reservoir and mainstem Peace River locations

Log scale used for total mercury and methylmercury

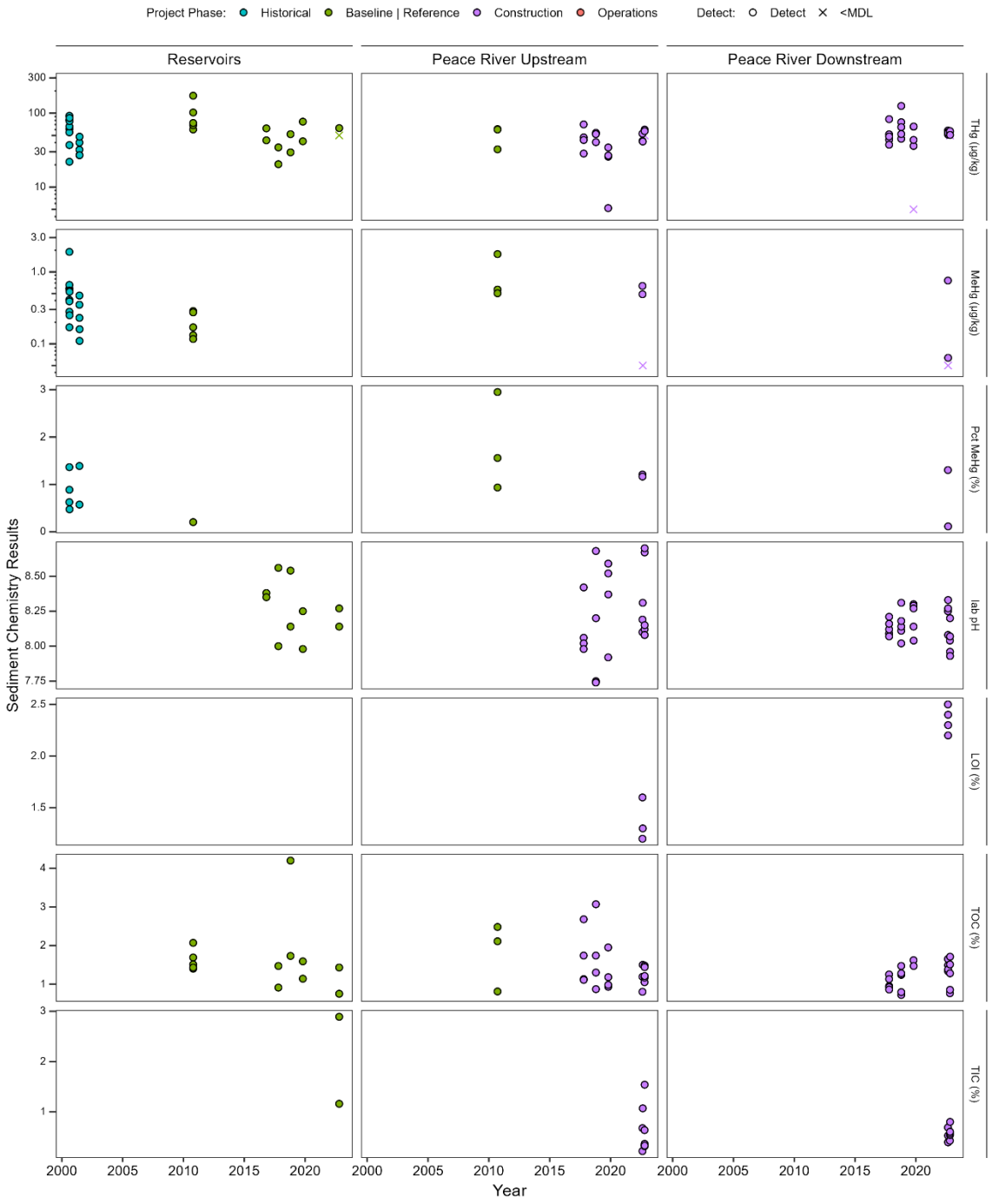
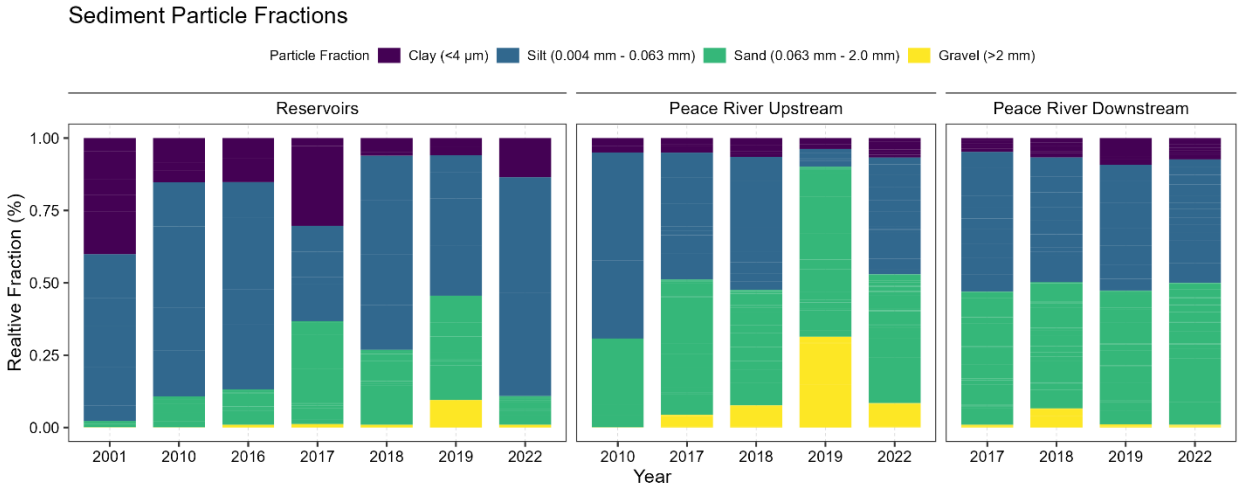


Figure 3-9. Temporal trends in sediment particle size fractions, by station group for reservoir and mainstem Peace River locations



3.5 Benthic Invertebrates

3.5.1 Overview

Benthic (bottom-dwelling) organisms live primarily in or on the bottom substrate. Many are the larvae of flying insects such as caddisflies, mayflies, midges, and dragonflies. Monitoring methylmercury concentrations in different groups of benthic invertebrates and at different locations over time will help us to better understand how changes at the base of the benthic food web might be contributing to fish mercury concentrations.

Why Sample Benthic Invertebrates?

Benthic invertebrates are aquatic organisms residing in the bottom substrate of a water body (infauna) or on it (epifauna). They are a key food chain component of the aquatic food web and are an important food group for many fish species, including juveniles of piscivorous (fish-eating) fish species.

As benthic invertebrates colonize freshly inundated terrestrial soils, they may be exposed to higher methylmercury levels in their food (e.g., bacteria, algae, or other invertebrates), leading to increases in their tissue methylmercury concentrations. In turn, tissue methylmercury concentrations of the fish feeding on these invertebrates would also start to increase, but more slowly due to their much larger size. Therefore, benthic invertebrates will likely be an important pathway from higher methylmercury production in the newly flooded habitat through the food chain to predatory fish.

Analytes for benthic invertebrate tissue samples are listed in **Table 3-6**. In addition to total mercury, methylmercury, and moisture content, the MMP also targets stable isotopes of nitrogen (N) and carbon (C) to provide complementary information on feeding ecology. Differences in stable N isotopes provide insights into where an organism is feeding in the food web (e.g., if it is an algae-eating bug or something bigger that eats algae-eating bugs). Differences in stable C isotopes help to identify where the food energy is coming from (e.g., originating from benthic bottom dwelling algae, pelagic [water column] phytoplankton, or terrestrial inputs). These measurements are also collected for fish (see **Section 4**) to help build an understanding of the food web and its influence on tissue mercury concentrations. Results of the stable isotopes analysis are provided in **Appendix B**.

In 2022, benthic invertebrate samples were collected from each of the six Core MMP sampling stations (see **Section 2.2**), using rock baskets. An overview of the process is shown in **Figure 3-10**. The baskets were filled with cobbles sized 5 to 10 cm (length of longest axis) and placed in early August. The baskets were retrieved in late September/early October after nearly two months in the river. They were then opened in a water-filled bucket, and the basket and cobbles were scrubbed to remove any attached algae and invertebrates. After removing the cleaned basket and rocks, the water mixture was sieved to

make picking out the invertebrates easier. The invertebrates were then sorted into groups based on taxonomy and/or size (e.g., big caddisflies, little caddisflies, mayflies) and placed in a sample vial. More details on methods of sampling and analysis are provided in **Appendix B**.

3.5.2 2022 Data Quality Assessment

Data quality for the 2022 benthic invertebrate tissue sampling was assessed as described in **Appendix A**. Data met the data quality objectives of the MMP for all analytes except for the nitrogen stable isotope analysis. For nitrogen ($\delta^{15}N$), field duplicate quality control (QC) results showed high variability for similar organisms collected from the same location. As $\delta^{15}N$ values provide insights into how high in a food web an organism is feeding (its trophic level), the high variability reduces our ability to make strong conclusions about potential changes in the trophic level of benthic invertebrates that may occur after the reservoir is created. Consequently, the 2022 $\delta^{15}N$ results for benthic invertebrates will be assigned a cautionary flag in the Site C MMP Database, so that any future analyses will be able to take their status into account. More details are provided in **Section A.3.3.4 in Appendix A**.

3.5.3 2022 Results for Benthic Invertebrates

The 2022 results for benthic invertebrate tissue chemistry are presented in **Figure 3-11.** Point colours highlight the different taxonomic groups making up the samples in **Figure 3-12**. A summary of taxonomic groups sampled at each station, including a key to the invertebrate class codes, is provided in **Table 3-7**.

Total mercury concentrations were highest (75 ng/g dw) in caddisfly larvae (*Trichoptera*) at the upstream-most station, PR1. Most other taxa-station combinations were fairly similar, ranging between 15 and 40 ng/g dw across the other stations. Methylmercury concentrations were also highest (12.7 ng/g dw) in bigger caddisfly larvae from PR1, and concentrations show a general decreasing trend moving downstream. Percent methylmercury was highest at PR2 (20.7% in bigger caddisfly larvae) and lowest (4% in smaller caddisfly larvae) at PR1; PD5 had the lowest percent methylmercury overall.

3.5.4 Temporal Trends for Benthic Invertebrates

Amalgamating data into spatial groups makes it easier to visualize general spatial-temporal patterns in the data, and this will become even more helpful once mercury concentrations begin to increase after filling the reservoir in fall 2024. Mercury concentrations in benthic invertebrates in 2022 were generally lower than observed in previous years. While the data are still somewhat limited, these results are consistent with the low potential for meaningful changes in methylmercury concentrations in the Peace River associated with river diversion and dam construction (**Section 2.1**).

Temporal trends for the primary mercury-related benthic invertebrate tissue chemistry analytes are presented **Figure 3-13**.

3.5.5 Tables and Figures

Table 3-6. Overview of MMP tissue quality analytes for benthic invertebrates

Analyte	Abbreviated Name	Units	MDL
Metals			
Total Mercury	THg	ng/g dw	5
Speciated Metals			
Methylmercury	MeHg	ng/g dw	5
Physical Tests			
Moisture	%Moist	%	2
Stable Isotope Analysis			
Nitrogen	$\delta^{15}N$	‰	-
Carbon	$\delta^{13}C$	‰	-

Notes: Units and MDL converted to ng/g (ppb). MDLs shown are targets; actual MDLs may vary. No MDLs for SIA.

Table 3-7. Benthic invertebrate tissue sample numbers by type and station for 2022

Code	Type	PR1*	PR2*	PR3*	PD1*	PD3*	PD5*
M	Miscellaneous	1	-	1	-	-	-
TB	Trichoptera Big	1	1	1	3	1	1
TS	Trichoptera Small	1	2	1	3	1	2
P	Plecoptera	-	1	-	-	-	-
TT	Trichoptera Tiny	-	2	-	-	-	-
TC	Trichoptera from Casings	-	-	1	1	2	1
E	Ephemeroptera	-	-	-	1	1	1
PB	Plecoptera Big	-	-	-	3	1	-
PS	Plecoptera Small	-	-	-	1	-	-

Note: MMP stations shown with an asterisk (*)

Figure 3-10. Benthic invertebrate sampling overview

(A) rock baskets ready for deployment, (B) retrieved rock basket, (C) collecting all debris off rocks, (D) sorting debris to find invertebrates, (E) sorting invertebrates, and (F) sample vials ready for the cooler

Figure 3-11. Results for key mercury-related benthic invertebrate tissue quality analytes, by station and station group, for reservoir and Peace River locations in 2022

Site C MMP stations noted with an asterisk (*); Log scale used for total mercury and methylmercury

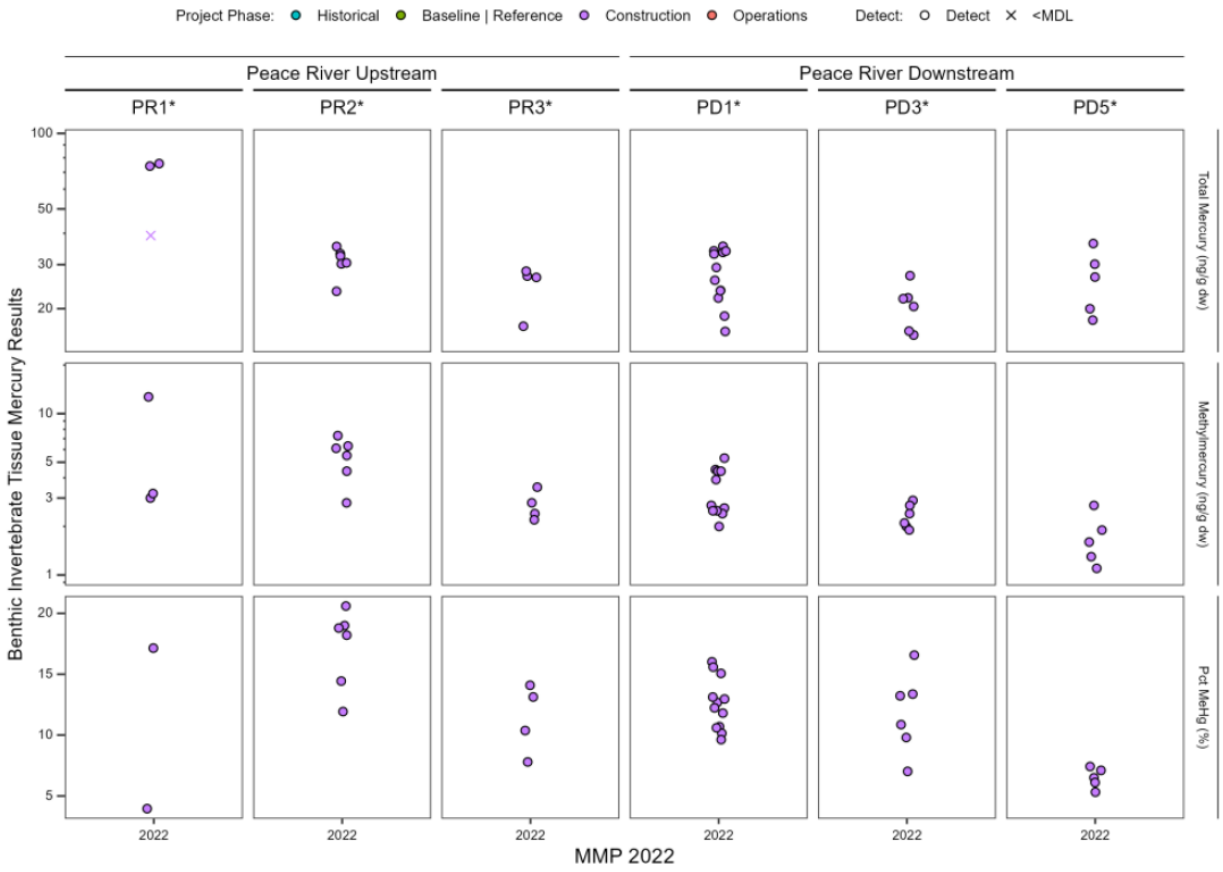
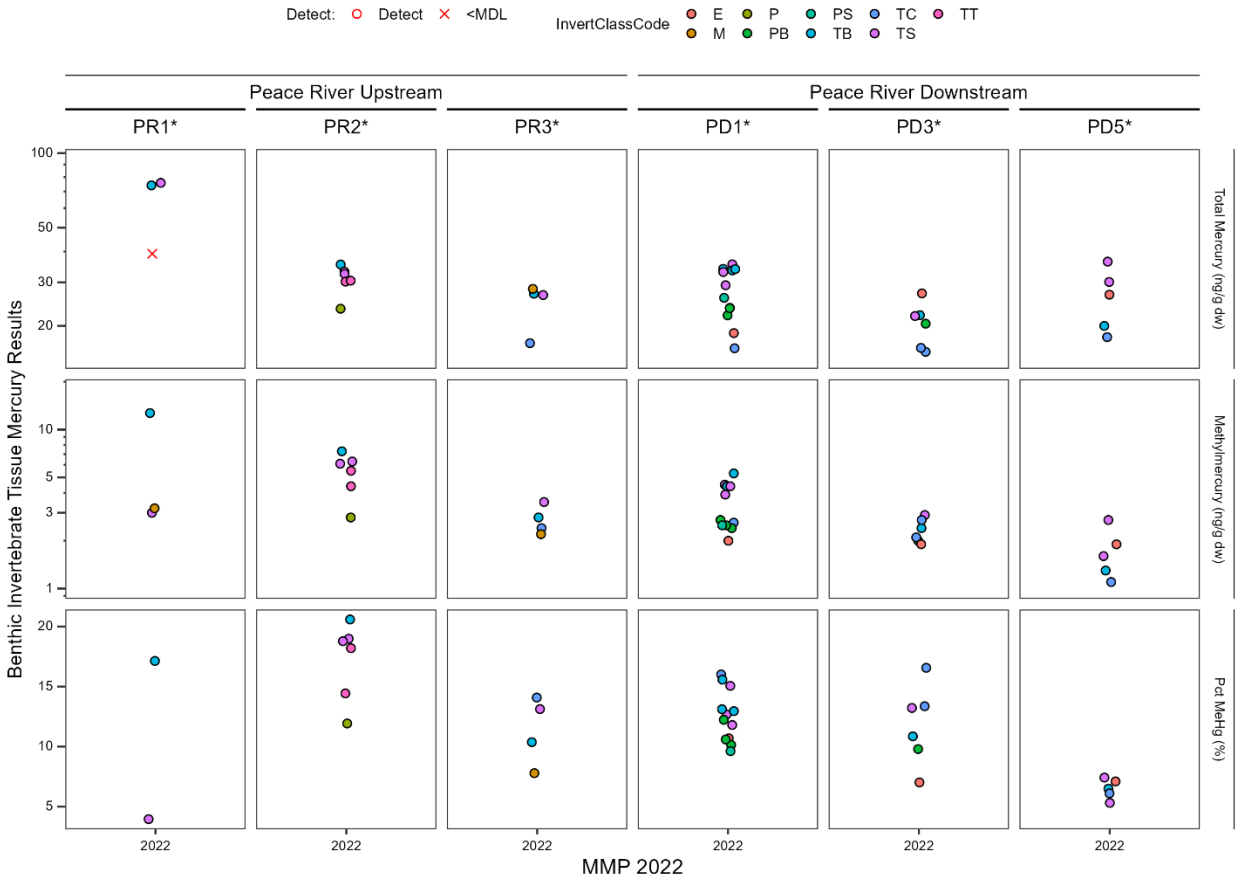


Figure 3-12. Results for key mercury-related benthic invertebrate tissue quality analytes, by station and station group, for reservoir and Peace River locations in 2022, highlighting taxonomic groups

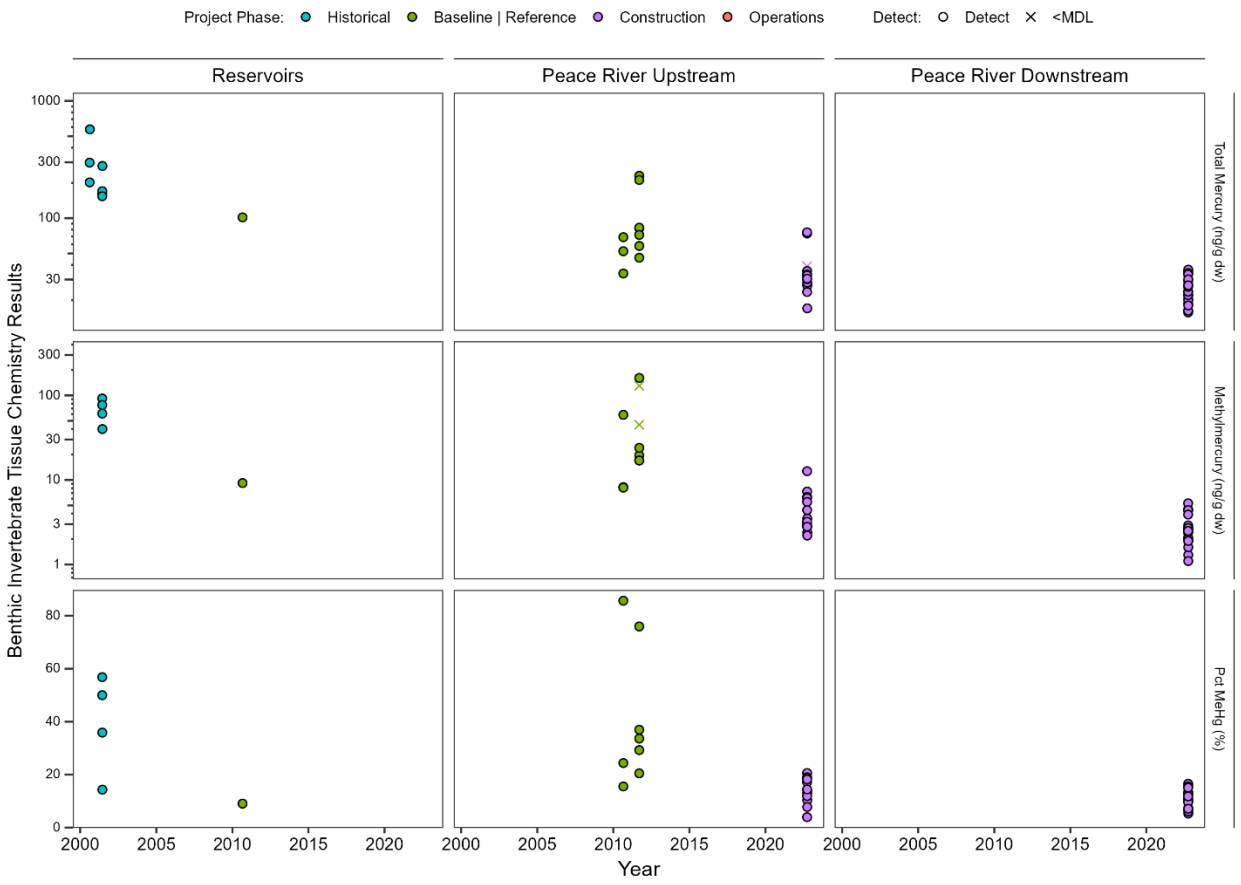
Site C MMP stations noted with an asterisk (*); log scale used for total mercury and methylmercury



Invertebrate class codes listed in **Table 3-7**.

Figure 3-13. Temporal trends in key mercury-related benthic invertebrate tissue quality analytes, by station group, for reservoir and mainstem Peace River locations

Log scale used for total mercury and methylmercury



3.6 Zooplankton

3.6.1 Overview

Zooplankton densities in the Peace River are currently low and contribute little to fish diets (BC Hydro 2013, Vol. 2: App. P [Part 1]). However, after the reservoir is created, they are expected to be substantially more abundant and will be the cornerstone of the pelagic (water-column based) food chain. Changes in methylmercury concentrations in surface water will drive increases in methylmercury concentrations in zooplankton. Consequently, they are included in the MMP to help us to better understand the processes responsible for changes in fish mercury concentrations after the reservoir is filled.

Why Sample Zooplankton?

Zooplankton are aquatic invertebrates that live in the water column. In freshwater, they are mainly found in lakes and ponds. They can be found in rivers and streams, particularly downstream of lakes, but, generally, they do not survive well in faster flowing environments.

The water residency time in the Site C reservoir is expected to be 23 days, which is potentially sufficient time to support a zooplankton community within the reservoir. While sampling will also be conducted in the tailrace area (immediately below the dam), zooplankton density is expected to decrease rapidly downstream of the dam, so sampling will not be conducted at locations further downstream.

Zooplankton are an important component of the pelagic (water-column based) food chain. Tracking changes in their tissue mercury concentrations will help to better understand the evolution of fish mercury concentrations after the reservoir is created.

Analytes for zooplankton tissue samples are the same as for benthic invertebrates (see **Table 3-8**). While the MMP targets total mercury, methylmercury, and moisture content, it also targets stable isotopes of nitrogen (N) and carbon (C) to provide complementary information on feeding ecology (see **Section 3.5** for more information). These measurements are also collected in fish (**Section 4**) to help build an understanding of the food web and its influence on tissue mercury concentrations.

In 2022, zooplankton samples were collected from the Upper Site C (PR1) Core MMP station and two non-MMP stations (Williston reservoir [W1] and Dinosaur reservoir [D1]). The reservoir stations were added to better characterize baseline conditions. Samples were collected in August and October at the same times/locations as surface water sampling. They were collected by towing a zooplankton net through the water. Details on methods used for sampling and analysis are provided in **Appendix B**.

3.6.2 2022 Data Quality Assessment

Data quality for the 2022 zooplankton tissue sampling was assessed as described in **Appendix A**. Overall, data met the data quality objectives of the MMP.

3.6.3 2022 Results for Zooplankton

The 2022 results for zooplankton tissue chemistry are presented in **Figure 3-14**. Total mercury concentrations were slightly higher (120 ng/g dw) at PR1 in August. Concentrations generally ranged between 50 and 100 ng/g dw in zooplankton samples from Williston reservoir (W1) and Dinosaur reservoir (D1). One sample from October had the lowest (22.1 ng/g dw) concentrations of total mercury. Methylmercury was only detected in two of eight samples. Concentrations were highest (25.4 ng/g dw) in Dinosaur reservoir (D1) in one of the August event samples; the other sample in that event was not detected (MDL 1 ng/g dw). Percent methylmercury (only calculated when both total mercury and methylmercury were detected in a sample) ranged from 1.6 to 25.7 %.

3.6.1 Temporal Trends for Zooplankton

Temporal trends for the primary mercury-related zooplankton tissue chemistry analytes are presented in **Figure 3-15**. Mercury concentrations in benthic invertebrates in 2022 were generally consistent with previous years. While the data are still somewhat limited, these results are consistent with the low potential for meaningful changes in methylmercury concentrations in the Peace River associated with river diversion and dam construction (**Section 2.1**).

3.6.2 Tables and Figures

Table 3-8. Overview of MMP tissue quality analytes for zooplankton

Analyte	Abbreviated Name	Units	MDL
Metals			
Total Mercury	THg	ng/g dw	5
Speciated Metals			
Methylmercury	MeHg	ng/g dw	5
Physical Tests			
Moisture	%Moist	%	2
Stable Isotope Analysis			
Nitrogen	$\delta^{15}N$	‰	-
Carbon	$\delta^{13}C$	‰	-

Notes: Units and MDL converted to ng/g (ppb). MDLs shown are targets; actual MDLs may vary. No MDLs for SIA.

Figure 3-14. Results for key mercury-related zooplankton tissue quality analytes, by station and station group, for reservoir and Peace River locations, in 2022

Site C MMP stations noted with an asterisk (*); log scale used for total mercury and methylmercury

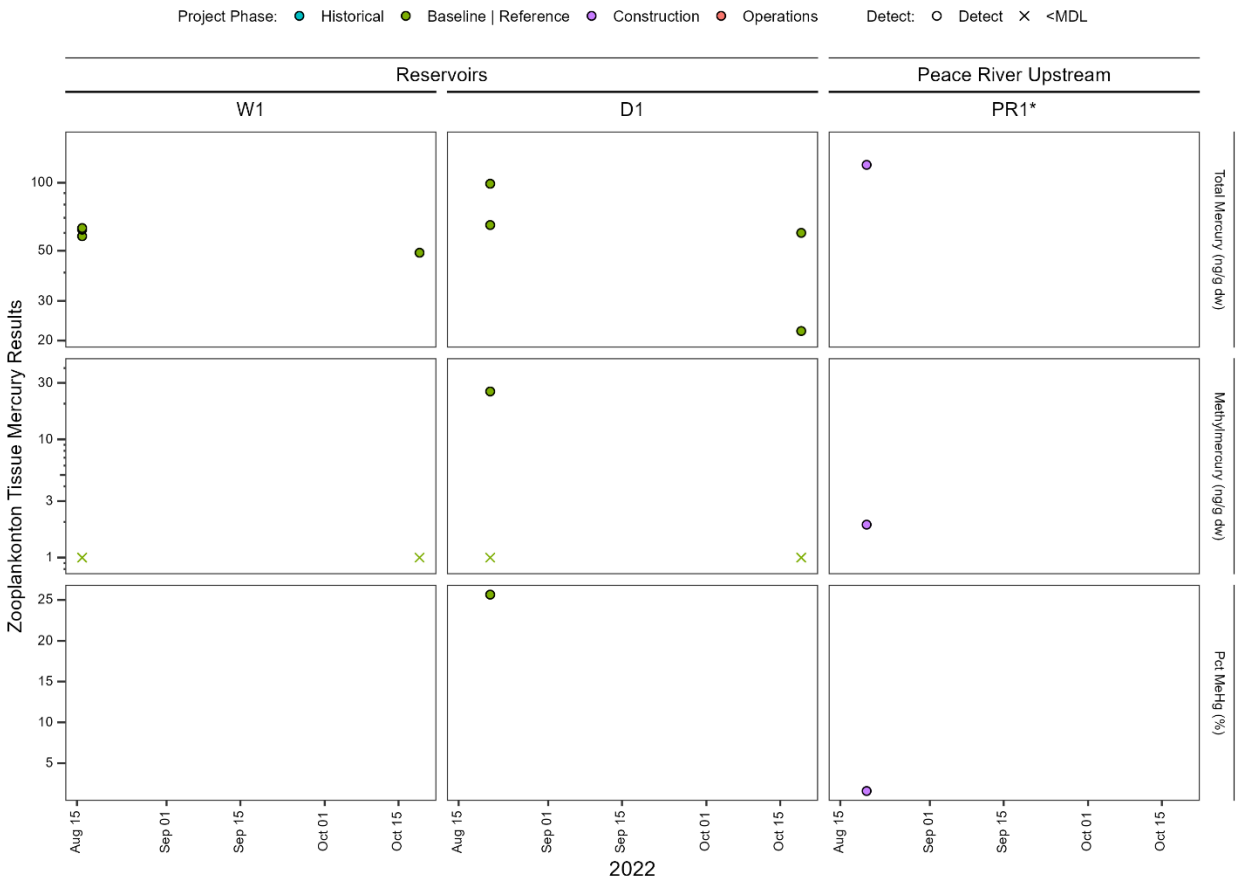
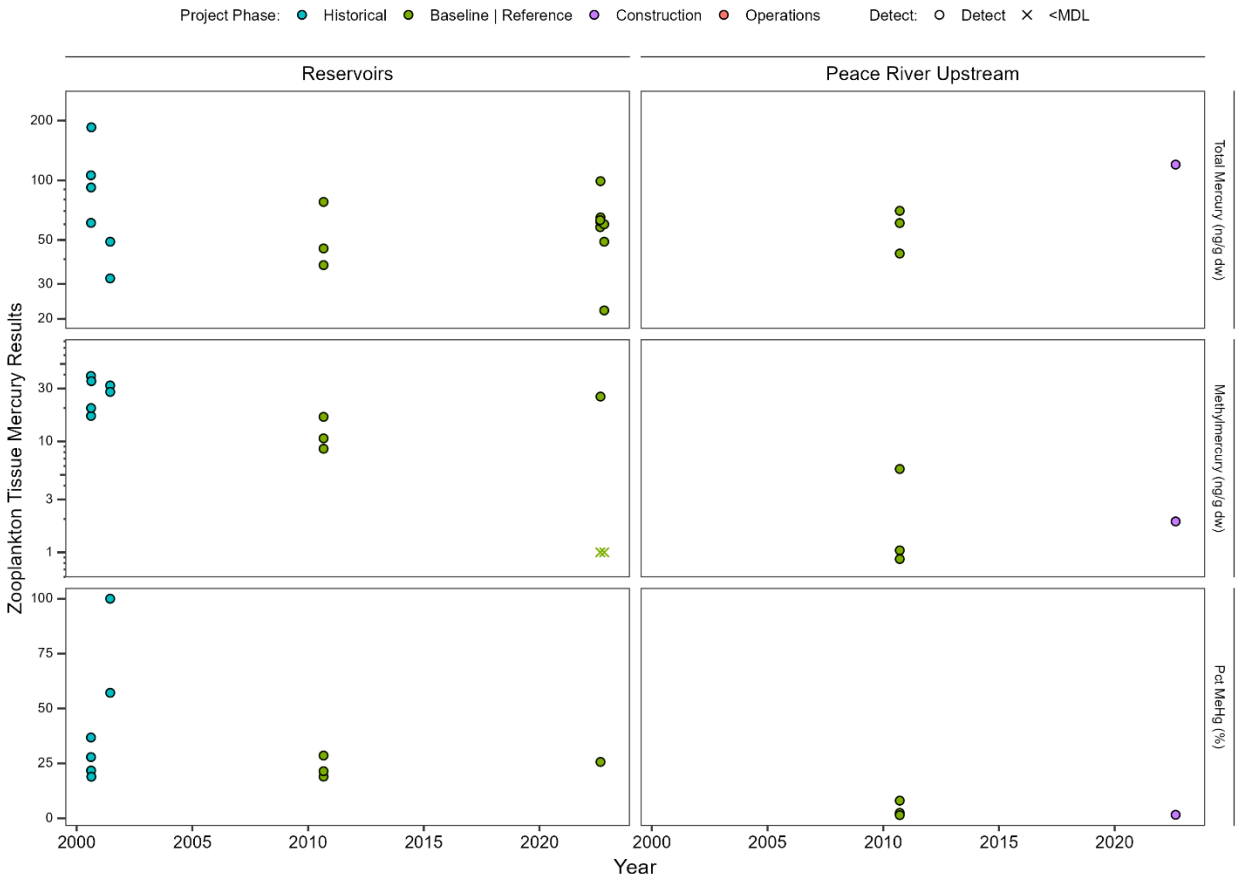


Figure 3-15. Temporal trends in key mercury-related zooplankton tissue quality analytes, by station group, for reservoir and mainstem Peace River locations

Log scale used for total mercury and methylmercury



4 FISH

The MMP is designed to characterize fish mercury concentrations in the mainstem of the Peace River as they evolve over time in relation to the construction and operation of the Project. The inundation of terrestrial habitat is expected to increase mercury methylation rates for a decade or so, leading to temporary increases in methylmercury concentrations throughout the aquatic food chain after the reservoir is created.

Why Sample Fish?

*Fish are the primary focus of the MMP. As noted in **Section 1.1** (and described further in the MMP [BC Hydro 2022]), reservoir creation is known to temporarily increase fish mercury concentrations. Actively monitoring fish mercury concentrations as they evolve at Site C, both within and downstream of the reservoir in the Peace River, will enable us to provide information on how much fish is safe for people to eat.*

Mercury is found in all fish, but concentrations can vary substantially both among and within species. Species typically feeding lower in the food web, like Rainbow Trout or Mountain Whitefish, generally have lower tissue mercury concentrations than long-lived predatory species that feed predominantly on other fish, such as Bull Trout and Walleye. Further, within many species, tissue mercury concentrations typically increase as fish get older/bigger. Consequently, it is important to take size into consideration when tracking changes in tissue mercury concentrations over space and time to avoid bias due to discrepancies in the sizes of fish caught. The MMP handles this by trying to sample a range of fish sizes during each event and at each location and by reporting tissue mercury concentration estimates for one or more specific sizes for each species/event/location. These specific sizes are often called "standardized"' sizes, and they were selected to be consistent with fish mercury studies in the region (e.g., Williston-Dinosaur study; Azimuth 2019) and be informative for the Project.

The Core MMP tracks total mercury in six targeted fish species at a series of locations extending from Peace Canyon Dam to Many Islands, Alberta (**Section 2.2**). The six species targeted in the MMP (see text box) were selected based on their falling into at least one of the following categories:

- Top predators – selected because they are expected to have the highest mercury concentrations;
- Key prey species – selected because, while they are expected to have lower mercury concentrations, targeting them will assist with tracking the progression of mercury changes through the food web;
- Species is present in sufficient numbers, based on its current and potential future distribution – selected because sufficient numbers of a species need to be present to efficiently catch enough fish to characterize tissue mercury concentrations; and
- Species is important to Indigenous harvesters and/or recreational fishers.

What Species Does the MMP Target?

Bull Trout *(Salvelinus confluentus) – top predator; abundant above and below Site C Dam; consumed by people*

Walleye *(Sander vitreus) – top predator; abundant below Site C Dam; consumed by people*

Rainbow Trout *(Oncorhynchus mykiss) – invertebrate-eating; abundant upstream of Site C Dam; consumed by people*

Mountain Whitefish *(Prosopium williamsoni) – invertebrate-eating; abundant; important prey species; infrequently consumed by people*

Longnose Sucker *(Catostomus Catostomus) – invertebrate-eating; abundant; important prey species; infrequently consumed by people*

Redside Shiner *(Richardsonius balteatus) – invertebrate-eating; abundant; small-bodied fish; important prey species; not consumed by people*

More information on the six target fish species is provided in the MMP (BC Hydro 2022).

Analytes for fish tissue samples are listed in **Table 4-1**. In addition to total mercury, methylmercury, and moisture content, the MMP also targets stable isotopes of nitrogen (N) and carbon (C) to provide complementary information on feeding ecology. Differences in stable N isotopes provide insights into where an organism is feeding in the food web (e.g., if it is an algae-eating bug or something bigger that eats algae-eating bugs). Differences in stable C isotopes help to identify where the food energy is coming from (e.g., originating from benthic [bottom dwelling] algae, pelagic [water column] phytoplankton, or terrestrial inputs).

Table 4-1. Overview of MMP fish tissue quality analytes and other key metrics

Analyte	Abbreviated Name	Units	MDL
Metals			
Total Mercury	THg	ng/g dw	5
Speciated Metals			
Methylmercury	MeHg	ng/g dw	5
Physical Tests			
Moisture	%Moist	%	2
Stable Isotope Analysis			
Nitrogen	$\delta^{15}N$	‰	-
Carbon	$\delta^{13}C$	‰	-
Morphometrics			
Fork Length	FL	mm	-
Weight	Wt	g	-
Aging			
Age	Age	yr	-

Notes: Units and MDL converted to ng/g (ppb). MDLs shown are targets; actual MDLs may vary. No MDLs for SIA.

4.1 Data Overview

Baseline fish mercury sampling for Site C initially started in 2010/2011 to support the EIS. Subsequently, monitoring was continued from 2017 to 2020, with samples being collected by the team conducting the Peace River Large Fish Indexing Survey (Mon-2, Task 2a of the FAHMFP; BC Hydro 2015). Fish mercury data through 2020 were then analyzed to update our understanding of baseline conditions (Azimuth 2021). A key finding was that tissue mercury concentrations for most species had approximately doubled between the early period (2010–2011) and the more recent period (2017–2020). Reservoir filling had not yet occurred, so the change is not related to the development of Site C. Three possible factors were identified as potential causes of the observed increase in fish tissue mercury concentrations: climate change, forest fires, and/or logging activity.

Mercury Measurements in Fish

Mercury can exist in several forms in the environment. These include elemental mercury (metallic; liquid "quicksilver" at 20 °C), inorganic mercury compounds such as cinnabar (HgS), and organic mercury compounds such as methylmercury (CH_3Hg).

In fish tissue, most mercury is present as methylmercury (Bloom 1992). Measuring methylmercury directly is considerably more expensive than measuring total mercury, which includes methylmercury. Consequently, most fish mercury studies rely on total mercury measurements and assume that it is all present as methylmercury.

In this document, unless specified otherwise, both "total mercury" and "mercury" are assumed to refer to methylmercury in the context of fish tissue.

Additional limited sampling was conducted in 2021, primarily to improve the baseline data set for Bull Trout. Samples were collected under the Site C Contingent Boat Electrofishing Program conducted immediately downstream of the Project to support the Project's Upstream Fish Passage Program.

One of the outcomes of the analysis of the 2010–2020 baseline fish mercury data was a recommendation to undertake a full MMP sampling event in a single year before the reservoir is created. The main rationale was two-fold: (1) to provide an opportunity to implement a full, single-year sampling event using the MMP methodology (i.e., to make sure that there are no unforeseen issues) and (2) to improve the baseline fish mercury dataset.

4.1.1 MMP Fish Data

The 2022 event was the first monitoring cycle conducted under the MMP (BC Hydro 2022). An overview of the 2022 program is presented in **Table 4-2** (locations shown in **Figure 2-1**). The Core MMP program focuses primarily on total mercury, but it also includes stable isotope analysis (SIA) to provide supporting information on feeding preferences. In addition, methylmercury analyses were conducted on a subset of the 2022 Core MMP tissue chemistry samples to obtain baseline information on how much of the total mercury measured in fish is in the form of methylmercury. A data quality assessment of the 2022 MMP data is provided in **Appendix A**.

MMP fish tissue sampling in 2022 was conducted by WSP Canada Inc. in conjunction with Mon-2, Task 2a of the FAHMFP.

Table 4-2. Species/location combinations for fish sampling in the 2022 MMP

		Site C Reservoir	Peace River Downstream		
Target Species	**Sampling Details**	**Site C Reservoir (Section 1 and 3)**	**Site C Tailrace (Section 5)**	**Beatton-Kiskatinaw (Section 7)**	**Many Islands (Section 9)**
Bull trout	sampling year target 35 samples/event target fish length: 250 - 600+ mm	✓	x	x	x
Rainbow Trout	sampling year target 35 samples/event target fish length: 250 - 500 mm	✓	x	x	x
Mountain whitefish	sampling year target 35 samples/event target fish length: 250 - 500 mm	✓	✓	✓	✓
Longnose sucker	sampling year target 35 samples/event target fish length: 250 - 500 mm	✓	✓	✓	✓
Redside shiner	sampling year target 35 samples/event target fish length: 60 - 120 mm	✓	✓	✓	✓
Walleye	sampling year target 35 samples/event target fish length: 250 - 600+ mm	x	x	✓	✓

4.1.2 Historical Fish Data

Fish mercury data collected since 2008 have been integrated into the Site C MMP fish mercury database to provide temporal context (**Table 4-3**). Sampling locations (**Figure 2-1**) have remained constant across the entire period.

A data quality assessment of the 2010 through 2020 was conducted by Azimuth (2021); the assessment of data quality for 2021 and 2022 in **Appendix A**.

Table 4-3. Historical fish mercury data relevant to the MMP

Year	Report	Citation
2021	This report	This report
2017 to 2020	*Site C Clean Energy Project. Baseline Peace River (2010 – 2020)*	Azimuth 2021
2010 to 2011	*Site C Clean Energy Project. 2010 & 2011 Status of Mercury in Benthic Invertebrates and Fish – Peace River and Dinosaur Reservoir*	Azimuth 2012
2008	*Site C Fisheries Studies – Mercury Levels in Peace River Fish Tissue – Data Report 2008*	Mainstream 2009

4.1.3 Summary of the Integrated Fish Dataset

Collectively, the 2022 MMP and historical data are referred to as the Core MMP dataset or, simply, as the dataset.

Time Periods

Azimuth's initial statistical analysis of the 2010 to 2020 data supported grouping data into two time periods: 2010–2011 and 2017–2020 (Azimuth 2021). Since that analysis, slightly earlier data (from 2008) were identified, which helped to improve characterizing length-mercury relationships for Bull Trout and Mountain Whitefish for that period; these 2008 data were grouped with the 2010–2011 data. The 2021 data were collected to help fill some data gaps in the 2017–2020 dataset, so these datasets were grouped together (i.e., 2017–2021).

The 2022 data are the first fish mercury data collected following the MMP; while we do not expect to see meaningful changes relative to the 2017-2021 time period, 2022 was treated as a stand-alone event to match the year-specific approach that will be used once Site C is in the operations phase (i.e., after reservoir filling). Given that we have observed temporal changes in fish mercury concentrations since the baseline period (Azimuth 2021), treating 2022 as a discrete year provides an up-to-date characterization of conditions prior to reservoir filling. That said, both the 2017-2021 and 2022 data represent conditions prior to reservoir filling, so if these analyses presented herein show no meaningful difference between the data, then the 2022 data could be amalgamated with the 2017-2021 data if needed in the future. In summary, the analyses presented herein refer to three time periods: 2008–2011, 2017–2021, and 2022.

Locations

The MMP (BC Hydro 2022) provides details on fish sampling locations both before and after reservoir inundation. The locations include Sections 1, 3, 5, 7, and 9[5] of the Peace River. The main difference is that after the Site C reservoir has been created Sections 1 and 3 will be amalgamated. Even though reservoir filling has not yet occurred, we grouped Sections 1 and 3 in our analyses to match how the data will be analyzed during operation of the Project.

Coarse Outlier Screening

This initial screening was conducted to identify gross outliers in the Core MMP dataset. The process focused on three key relationships: length vs weight, nitrogen stable isotope ratios vs mercury concentrations, and length vs mercury concentrations. Note that these relationships were examined for each target species without considering time period or sampling location. Two types of outliers were identified: High Residual points (studentized residuals ≥ 4) and High Leverage points (Cook's distance ≥ 0.5). Based on this, 20 fish were excluded from further analysis (see **Section 1.1** in **Appendix C** for details).

Summary of Core MMP Samples, Fish Mercury, and Feeding Relationships

The Core MMP dataset has data for 1,973 fish mercury samples across 13 species. Total mercury sample numbers for the Core MMP dataset are provided for each species by time period (**Table 4-4**) and location (**Table 4-5**). In addition to the six target MMP species, there are tissue mercury data for Burbot

[5] Historical data are also available for Sections 6 and 8, but these sampling areas were not included in the MMP due to limited data.

(BB), Largescale Sucker (CSU), Goldeye (GE), Arctic Grayling (GR), Lake Trout (LT), Northern Pike (NP), and White Sucker (WSU)[6]. Note that a single Kokanee data point (captured in Section 1 in 2021) was excluded from the analysis.

Total mercury concentrations ranged from 0.009 to 0.99 mg/kg ww across the dataset. Results for each species are presented in **Figure 4-1**. This plot does not take fish size into consideration, but does show relative differences in tissue mercury concentrations among species. Walleye generally have the highest mercury concentrations, but Bull Trout, Burbot, Goldeye, and Northern Pike are also relatively high compared to species such as Rainbow Trout, Redside Shiner, and Arctic Grayling. These latter species feed lower in the food chain and have the lowest tissue mercury concentrations among the sampled species.

Stable isotope results provide insights into general feeding relationships across species. Results from the MMP target species by time period and location are provided in **Figure 4-2**. Higher $\delta^{15}N$ values mean that a species is feeding higher in the food chain. Consequently, it is not surprising that species with higher $\delta^{15}N$ values also, generally, had higher total mercury concentrations (see plots showing key mercury-related data for target species in **Appendix C**). Stable isotope results for these species and other species not targeted by the MMP in the Peace River are reported elsewhere (Golder 2021).

[6] Non-MMP species were retained in the Core MMP dataset if they had five or more tissue mercury data points across all years/locations. The -- only species excluded on this basis was Kokanee, which had a single data point (from Section 1 in 2021).

Table 4-4. Core MMP sample numbers by species and time period

	Target Species*						Non-target Species†							
Year	BT	LSU	MW	RB	RSC	WP	BB	CSU	GE	GR	LT	NP	WSU	Total
Period: 2008-2011														
2008	28	-	67	-	-	-	-	-	-	-	-	-	-	**95**
2010	15	10	17	-	11	-	-	-	-	-	-	-	-	**53**
2011	6	31	32	10	-	6	-	-	3	-	-	-	-	**88**
Sub-total	49	41	116	10	11	6	-	-	3	-	-	-	-	**236**
Period: 2017-2021														
2017	53	91	74	25	1	51	2	-	3	1	-	7	-	**308**
2018	57	93	87	22	-	42	5	-	-	-	1	18	-	**325**
2019	13	16	54	-	-	9	12	-	14	3	2	9	-	**132**
2020	4	25	41	12	-	21	2	-	4	-	1	10	-	**120**
2021	73	25	31	9	-	15	1	25	5	-	2	18	26	**230**
Sub-total	200	250	287	68	1	138	22	25	26	4	6	62	26	**1115**
Period: 2022														
2022	70	164	129	23	144	88	-	-	1	3	-	-	-	**622**
Total	**319**	**455**	**532**	**101**	**156**	**232**	**22**	**25**	**30**	**7**	**6**	**62**	**26**	**1973**

* MMP Target Species include: BT (Bull Trout), LSU (Longnose Sucker), MW (Mountain Whitefish), RB (Rainbow Trout), RSC (Redside Shiner), and WP (Walleye).

† MMP Non-arget Species include: BB (Burbot), CSU (Largescale Sucker), GE (Goldeye), GR (Arctic Grayling), LT (Lake Trout), NP (Northern Pike), and WSU (White Sucker).

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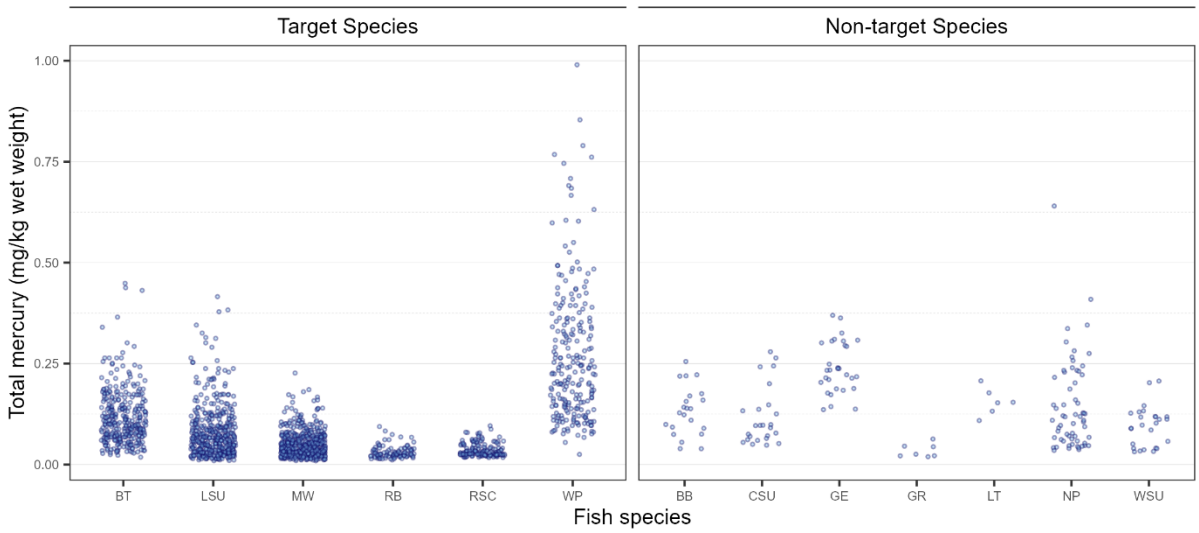
Table 4-5. Core MMP sample numbers by species and location

	Target Species*						Non-target Species†							
Section	BT	LSU	MW	RB	RSC	WP	BB	CSU	GE	GR	LT	NP	WSU	Total
Zone: Site C														
Sections 1/3	149	139	219	95	36	-	1	11	-	4	4	6	7	**671**
Zone: Downstream														
Section 5	149	100	120	5	50	65	4	5	-	2	1	33	5	**539**
Section 7	21	96	87	1	34	86	5	5	4	1	1	17	7	**365**
Section 9	-	120	106	-	36	81	12	4	26	-	-	6	7	**398**
Total	**319**	**455**	**532**	**101**	**156**	**232**	**22**	**25**	**30**	**7**	**6**	**62**	**26**	**1973**

* MMP Target Species include: BT (Bull Trout), LSU (Longnose Sucker), MW (Mountain Whitefish), RB (Rainbow Trout), RSC (Redside Shiner), and WP (Walleye).

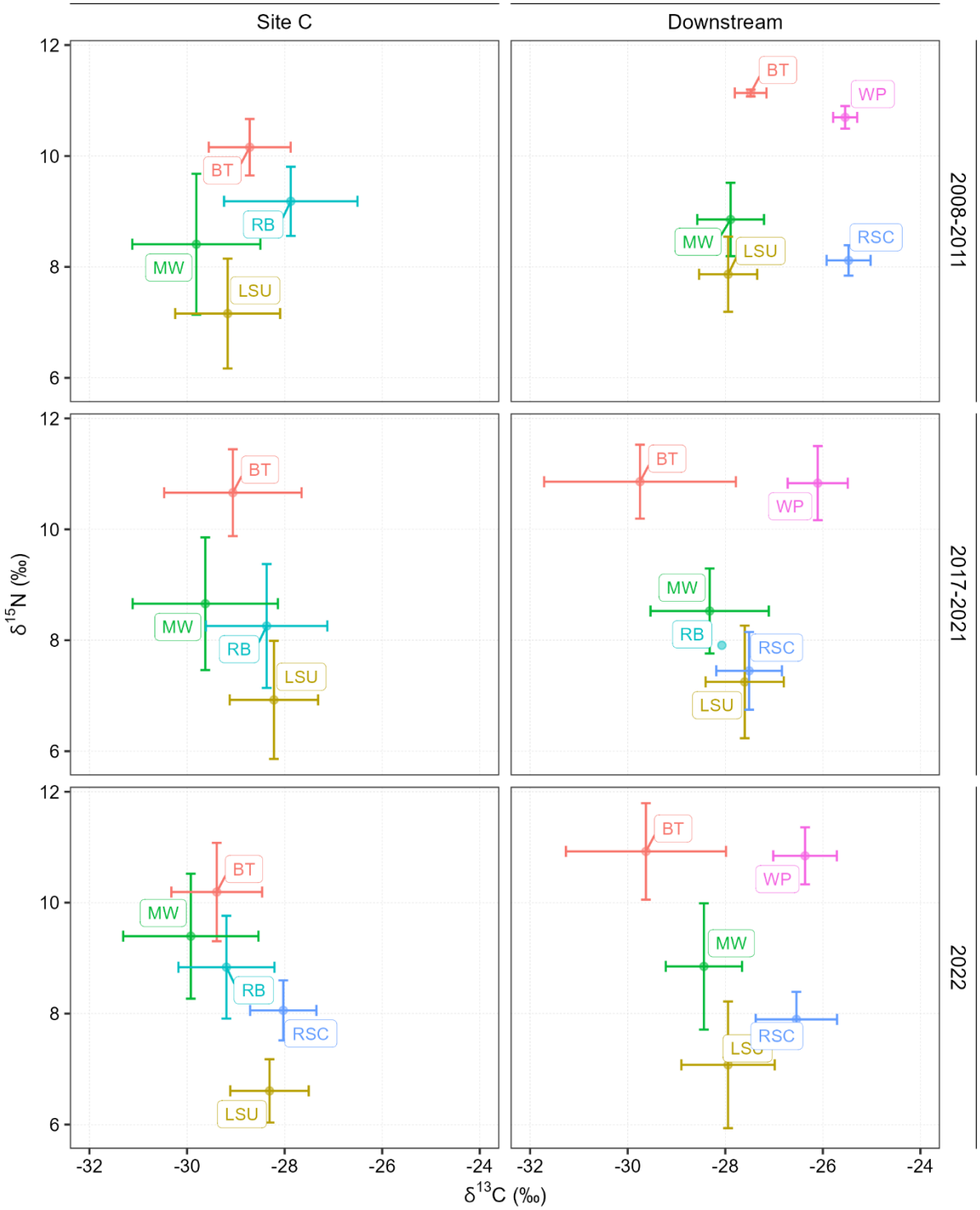
† MMP Non-arget Species include: BB (Burbot), CSU (Largescale Sucker), GE (Goldeye), GR (Arctic Grayling), LT (Lake Trout), NP (Northern Pike), and WSU (White Sucker).

Figure 4-1. Total mercury concentrations in MMP fish tissue samples by species



See notes from **Table 4-4** for fish species abbreviation key.

Figure 4-2. Stable isotope results for MMP target species, by time period and location



See notes from **Table 4-4** for fish species abbreviation key.

4.2 Analysis Overview

Detailed analysis of the Core MMP dataset through 2022 is provided in **Appendix C**. Key elements of that process were as follows:

Data Overview. *Catch* refers to the fish that were caught, sampled for mercury analysis, and which passed the coarse outlier screen. The catch and data summary presents the sample size, mean and range for length, weight, condition[7], age, mercury concentration and the stable isotopes $\delta^{13}C$ and $\delta^{15}N$ (see **Appendix C**).

General Mercury Relationships. Length, weight, age and feeding preferences can all influence fish mercury concentrations. Plots are used to explore the following key relationships:

- *Length-Weight.* The length-weight relationship shows how weight increases as fish get longer. This relationship is usually "strong" in that the range of observed weights for a given fish length is narrow relative to the other relationships. Consequently, this plot is useful for identifying outliers such as incorrectly entered data or unhealthy fish (see **Appendix C**).
- *Age-Length.* Age-length relationships show how fish length increases as fish get older. These relationships are typically variable and show a wide range of length values for each age. This variability makes it harder to identify outliers, but the plots can still provide useful insights into growth patterns and how they influence mercury concentrations (see **Appendix C**).
- *Length-Mercury.* Length-mercury is the typical mercury relationship because concentrations increase as fish length increases. Length is simple to measure and highly repeatable, so measurement error tends to be low. Mercury concentrations are also positively correlated to weight and age, but measurement error for both those variables relative to length is higher (e.g., being off by a year for age would be a 100% error for a one-year-old fish, and the time since a fish's last meal can influence weight). This makes weight and age correlations less useful than length, particularly for comparing patterns over time or space (presented in following sections and in **Appendix C**).
- *Length-$\delta^{15}N$.* Fish are known to change their diet as they get bigger, because their larger size enables them to feed at higher trophic positions (see **Appendix C**).

[7] Condition is a measure of the weight of a fish relative to its length. It is calculated as (weight/length^3 x 100) and is represented by the letter K. Fis-h with higher condition weigh more for their size than fish with lower condition.

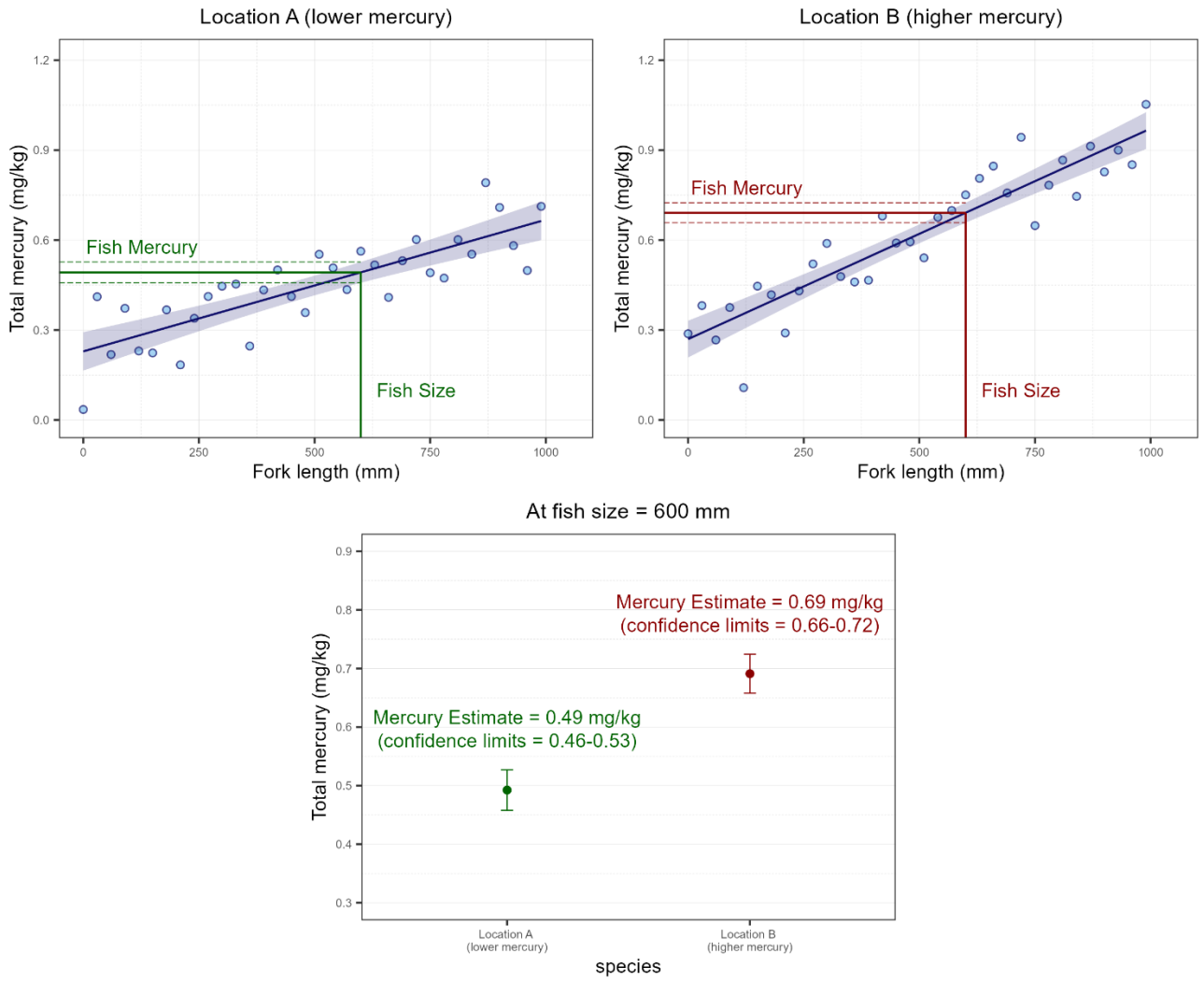
- *δ^{15}N-Mercury.* δ^{15}N values increase as the position of a fish in the food chain (trophic position) increases . This relationship essentially shows how feeding preferences affect mercury concentrations in fish tissue. The expectation is for higher tissue mercury concentrations in fish that feed higher in the food chain (see **Appendix C**).

Length-Mercury Relationships (for target species only). As discussed previously, when looking at patterns in fish mercury concentrations over time or space it is important to consider fish size (length); failing to do so can lead to biased results. The approach we used to characterize (or "model") the length-mercury relationships is presented in detail in **Appendix C**. An example of the process using hypothetical data to compare fish mercury concentrations in one species between two locations, one with lower tissue mercury concentrations and the other higher, is shown in **Figure 4-3.** The process is as follows:

- The *upper panels* show the length-mercury relationship for a single species at two locations for a single time period. The points are the raw data (i.e., total mercury concentration and fork length for each fish). The solid blue line is the best estimate of the relationship, and the lighter blue shaded areas are the 95% confidence limits of that estimate. The more closely that the best estimate fits the data, the closer the confidence limits will be to the best estimate.
- The *upper panels* also show how the length-mercury relationship relates to the estimate of mercury concentration for a 600 mm fish for each location. Start at 600 mm on the x axis and move up (shown with a vertical green line for Location A and a red line for Location B) until you intersect the best fit (solid) line, then move horizontally (green horizontal line for Location A and a red line for Location B) to the y axis to find the corresponding best estimate mercury concentration for that fish size. The same process applies to the lower and upper confidence limits (shown as dashed green or red lines for Locations A or B, respectively).
- The *lower panel* compares the tissue mercury concentration estimates (square box) and 95% confidence limits (vertical lines) for a 600-mm fish for Location A (green) and Location B (red).

H-ighlights of the analyses for target species are presented in the following sections.

Figure 4-3. Example of length-mercury relationship characterization and deriving mercury concentration estimates for a 600 mm fish using a hypothetical dataset



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4.3 Mercury in Target Fish Species

4.3.1 Bull Trout

Total mercury sample numbers for Bull Trout by fish size class, location, and time period are summarized in **T-able 4-6**. Only 4 fish were collected in 2008–2011 from Section 5 of the Peace River. For the 2017–2021 and 2022 time periods, the fish sampled in Sections 1 to 3 were generally smaller than those sampled in Section 5. Given that Bull Trout caught in the Peace River are considered to primarily come from the Halfway River population, this is most likely due to the timing of sampling (late summer/fall) relative to the timing of fish movements in the river (e.g., returning to the Halfway River to spawn in the fall).

Raw data and fitted length-mercury relationships for Bull Trout by location and time period are shown in **Figure 4-4**. These relationships were used to estimate tissue mercury concentrations and their associated 95% confidence limits for each location/time period combination, for up to three sizes of Bull Trout (400 mm, 550 mm, and 700 mm; **Figure 4-5**). Location/time period/size combinations were not provided if there were no underlying data to support them (e.g., all sizes from Section 5 in 2010–2011).

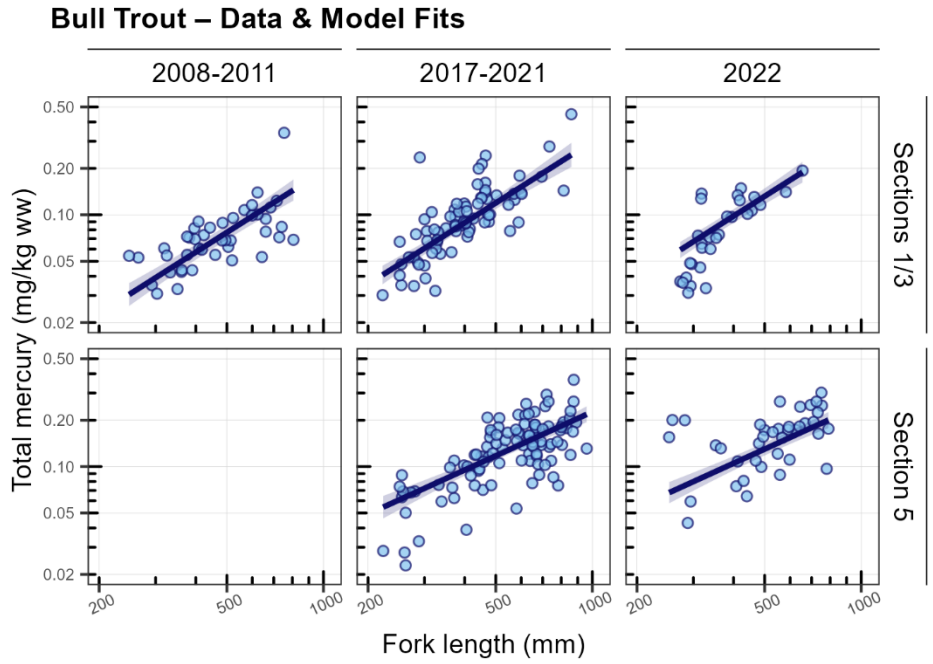
The results show a clear increase between the 2008–2011 and 2017–2021 time periods for all three sizes. Tissue mercury concentrations were marginally higher in 2022 than in 2017–2021.

Updated fish consumption guidance based on the 2022 results for Bull Trout is provided in **Section 6.2**.

T-able 4-6. Bull Trout total mercury sample numbers by size class, location, and time period

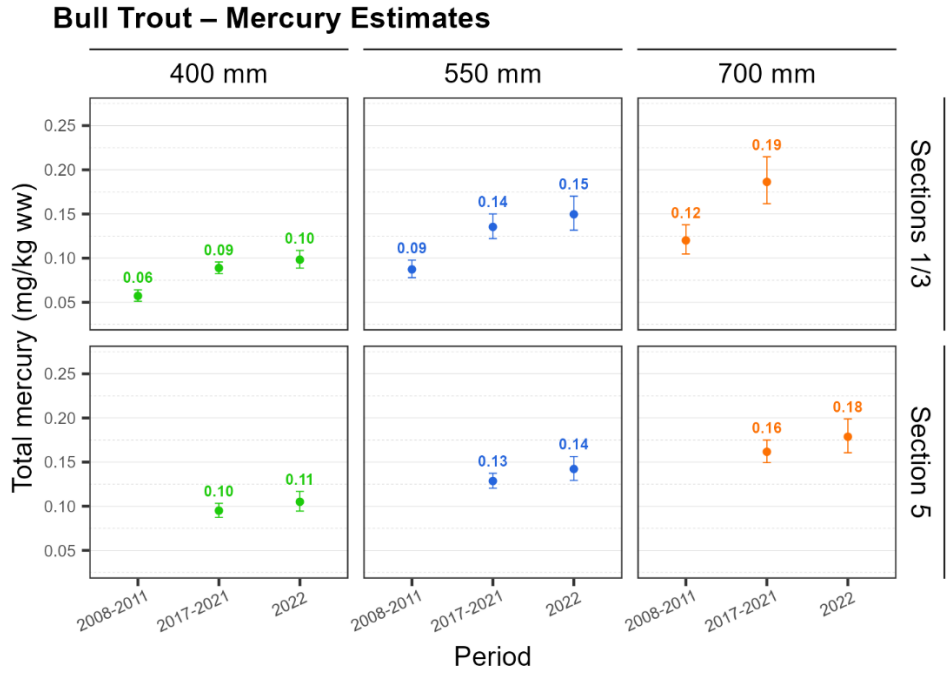
Bull Trout – Size Classes (fork length in mm)									
Location/Period	**200-300**	**300-400**	**400-500**	**500-600**	**600-700**	**700-800**	**800-900**	**900-1000**	**Total**
Sections 1/3									
2008-2011	3	13	9	7	6	4	1	-	**43**
2017-2021	14	25	25	8	2	1	2	-	**77**
2022	7	13	7	1	1	-	-	-	**29**
Section 5									
2008-2011	2	1	-	1	-	-	-	-	**4**
2017-2021	11	7	19	14	29	13	11	1	**105**
2022	5	3	10	9	5	8	-	-	**40**

Figure 4-4. Length-mercury plots showing final model fits (and ±95% confidence intervals) for Bull Trout



Axis scaling: x-axis = log10; y-axis = log10.

Figure 4-5. Estimates of mercury concentrations (±95% confidence intervals) in select sizes of Bull Trout using the best model



4.3.2 Walleye

Total mercury sample numbers for Walleye by fish size class, location and time period are summarized in **Table 4-7**. The only samples collected in 2008–2011 were from Section 7 (six fish only) of the Peace River. The remaining location/time period combinations generally had 21 or more mercury samples. The 300 to 400 mm and 400 to 500 mm size classes were the most represented in the dataset, followed by the 200 to 300 mm size class.

Raw data and fitted length-mercury relationships for Walleye by location and time period are shown in **Figure 4-6**. These relationships were used to estimate tissue mercury concentrations and their associated 95% confidence limits for each location/time period combination, for up to three sizes of Walleye (300 mm, 400 mm, and 500 mm; **Figure 4-7)**; location/time period/size combinations were not provided if there were no underlying data to support them (e.g., all sizes from Sections 5 and 9 in 2008–2011).

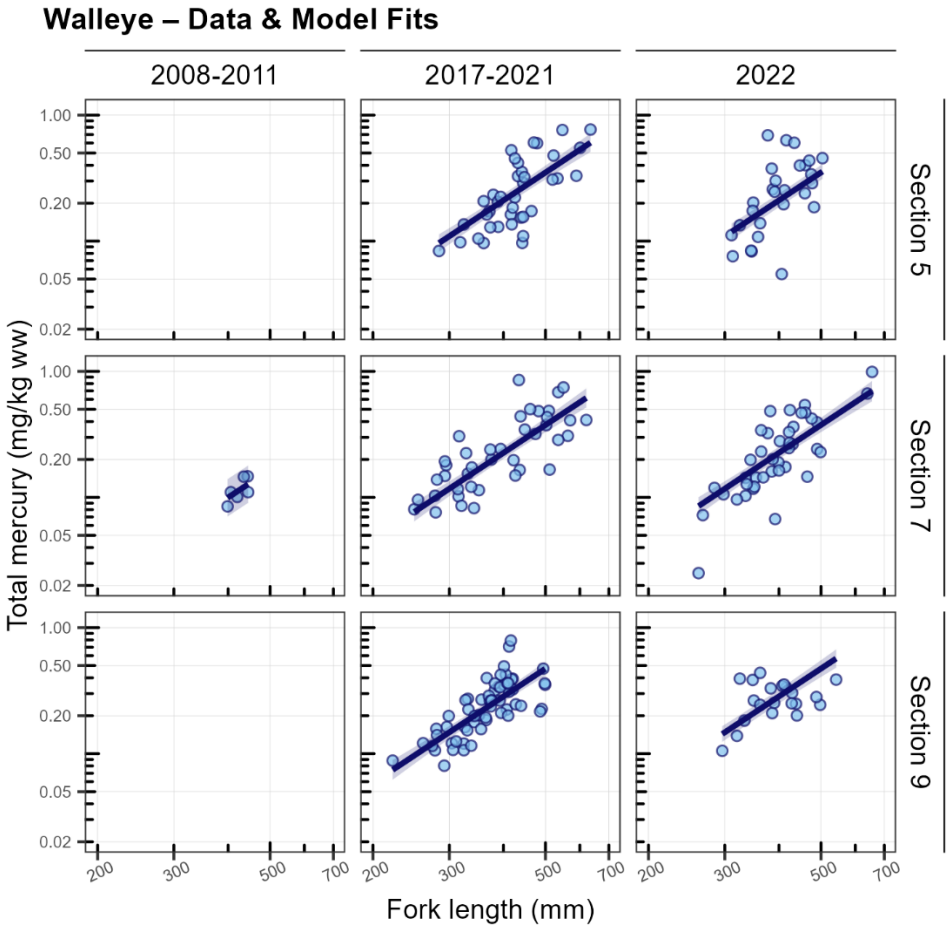
The results for 400 mm Walleye from Section 7 show a clear increase between the 2008–2011 and 2017–2021 time periods. There was no change observed in tissue mercury concentrations between 2017–2021 and 2022.

Updated fish consumption guidance based on the 2022 results for Walleye is provided in **Section 6.2**.

Table 4-7. Walleye total mercury sample numbers by size class, location, and time period

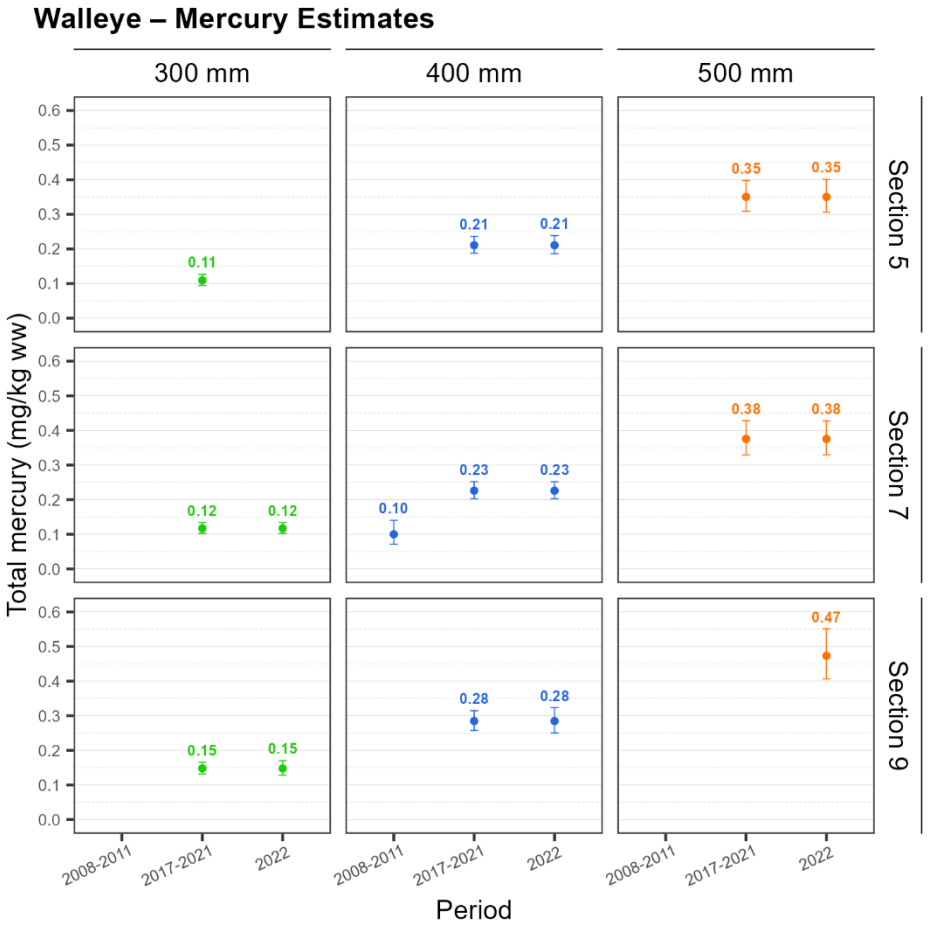
Walleye – Size Classes (fork length in mm)						
Location/Period	**200-300**	**300-400**	**400-500**	**500-600**	**600-700**	**Total**
Section 5						
2017-2021	1	12	18	5	2	**38**
2022	-	14	12	1	-	**27**
Section 7						
2008-2011	-	1	5	-	-	**6**
2017-2021	8	13	9	9	1	**40**
2022	4	18	16	-	2	**40**
Section 9						
2017-2021	9	31	20	-	-	**60**
2022	1	10	9	1	-	**21**

Figure 4-6. Length-mercury plots showing final model fits (and ±95% confidence intervals) for Walleye



Axis scaling: x-axis = log10; y-axis = log10.

Figure 4-7. Estimates of mercury concentrations (±95% confidence intervals) in select sizes of Walleye using the best model



4.3.3 Rainbow Trout

Total mercury sample numbers for Rainbow Trout by fish size class, location, and time period are summarized in **Table 4-8**. All samples were from Sections 1 and 3 of the Peace River. The 200 to 300 mm and 300 to 400 mm size classes were the most represented in the dataset, followed by the 400 to 500 mm size class.

Raw data and fitted length-mercury relationships for Rainbow Trout by location and time period are shown in **Figure 4-8**. These relationships were used to estimate tissue mercury concentrations and their associated 95% confidence limits for each location/time period combination for up to three sizes of Rainbow Trout (250 mm, 325 mm, and 400 mm; **Figure 4-9)**.

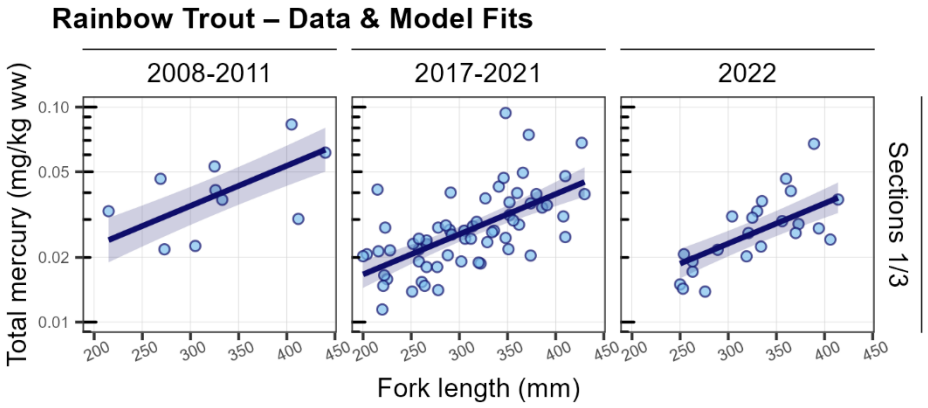
The results for Rainbow Trout show a decrease in tissue mercury concentrations in 2017–2021 and 2022 relative to 2010–2011; this result may be due to the relatively low sample size in 2008–2011. There was essentially no change in Rainbow Trout tissue mercury concentrations observed between the 2008–2011, 2017–2021, and 2022 time periods.

Updated fish consumption guidance based on the 2022 results for Rainbow Trout is provided in **Section 6.2**.

Table 4-8. Rainbow Trout total mercury sample numbers by size class, location, and time period

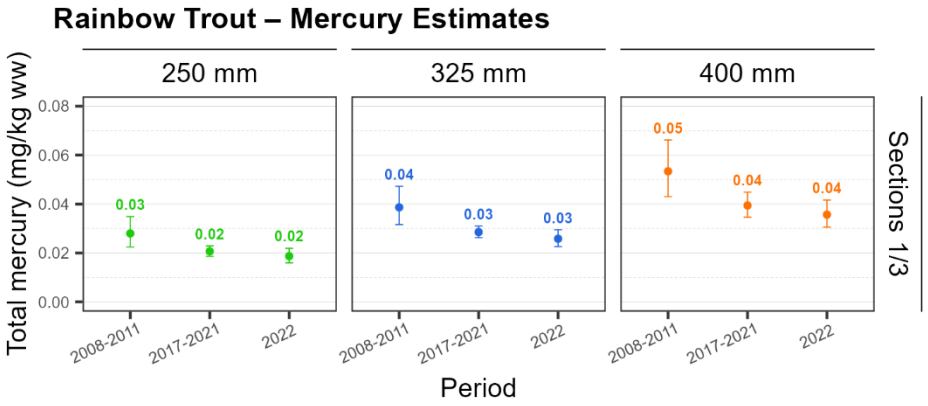
Rainbow Trout – Size Classes (fork length in mm)					
Location/Period	**100-200**	**200-300**	**300-400**	**400-500**	**Total**
Sections 1/3					
2008-2011	-	3	4	3	**10**
2017-2021	1	27	29	5	**62**
2022	-	7	14	2	**23**

Figure 4-8. Length-mercury plots showing final model fits (and ±95% confidence intervals) for Rainbow Trout



Axis scaling: x-axis = none; y-axis = log10.

Figure 4-9. Estimates of mercury concentrations (±95% confidence intervals) in select sizes of Rainbow Trout using the best model



4.3.4 Mountain Whitefish

Total mercury sample numbers for Mountain Whitefish by fish size class, location, and time period are summarized in **Table 4-9**. Overall, Mountain Whitefish are fairly well distributed across all sections. There were no samples collected in 2010–2011 from Sections 5 and 9 of the Peace River. Most Mountain Whitefish sampled were in the 200 to 300 mm and 300 to 400 mm size classes, with the 400 to 500 mm size class being the next most represented.

Raw data and fitted length-mercury relationships for Mountain Whitefish by location and time period are shown in **Figure 4-10**. These relationships were used to estimate tissue mercury concentrations and their associated 95% confidence limits for each location/time period combination for up to three sizes of Mountain Whitefish (275 mm, 350 mm and 425 mm**; Figure 4-11**); location/time period/size combinations were not provided if there were no underlying data to support them (e.g., all sizes at Sections 5 and 9 in 2008–2011).

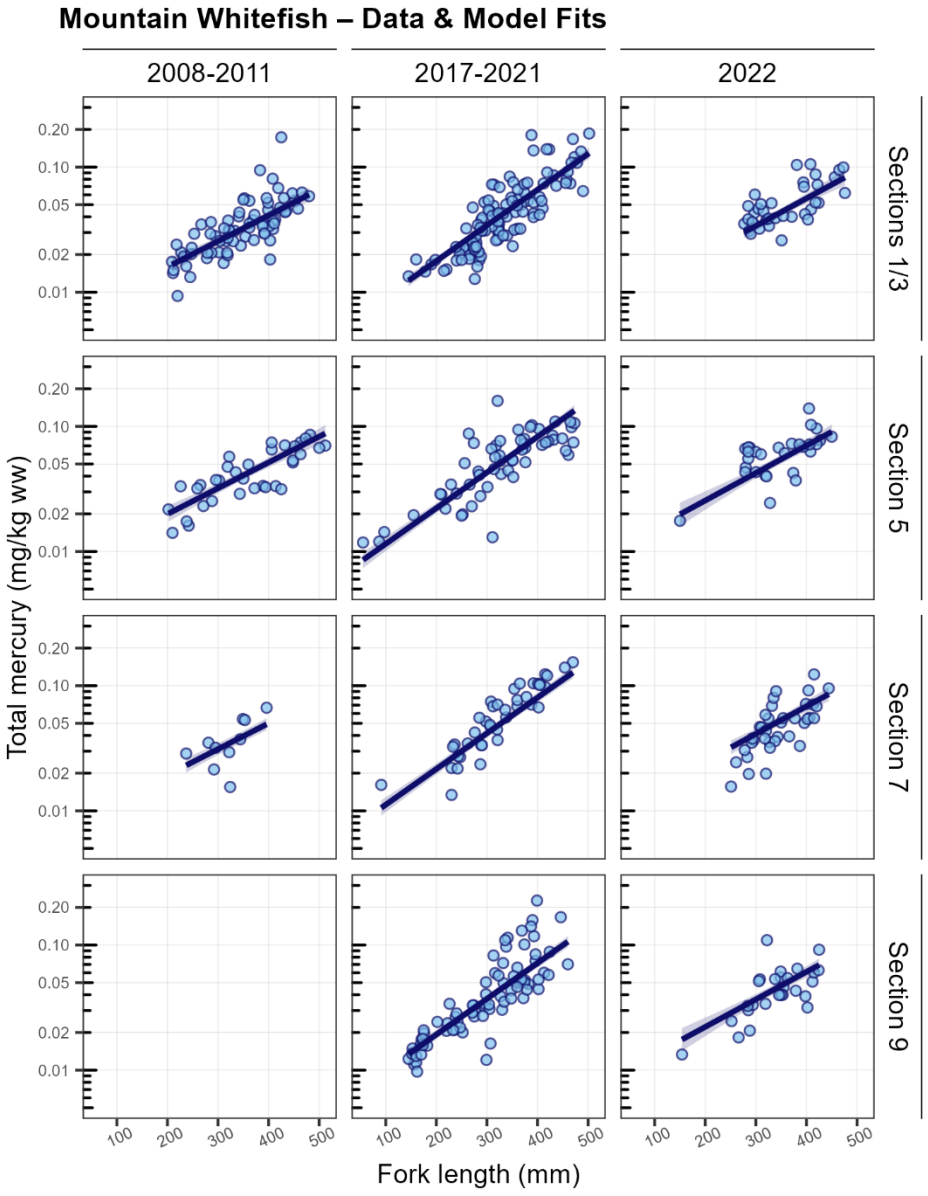
The results show a clear increase between the 2008–2011 and 2017–2021 time periods for all three sizes. Tissue mercury concentrations were marginally lower in 2022 than in 2017–2021.

Updated fish consumption guidance based on the 2022 results for Mountain Whitefish is provided in **Section 6.2**.

Table 4-9. Mountain Whitefish total mercury sample numbers by size class, location, and time period

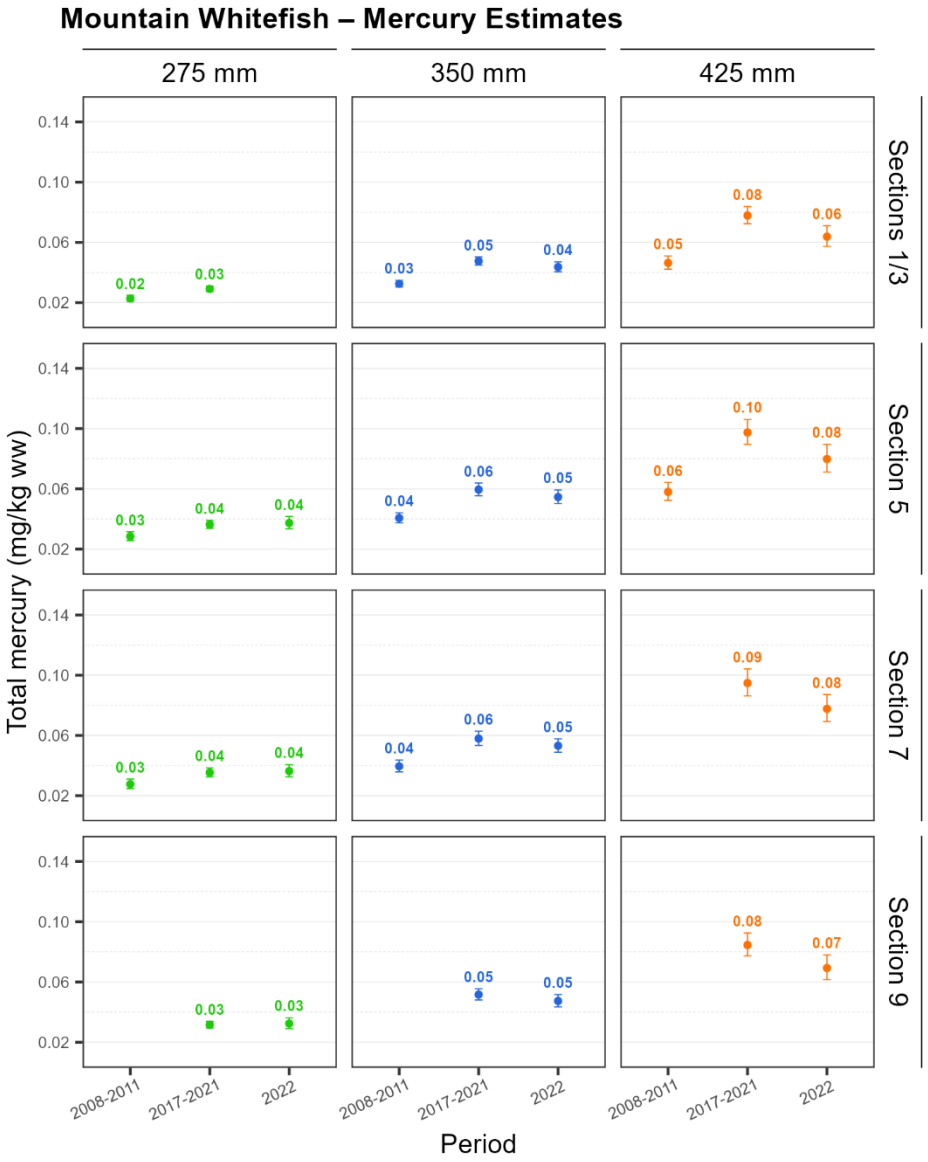
Mountain Whitefish – Size Classes (fork length in mm)							
Location/Period	**0-100**	**100-200**	**200-300**	**300-400**	**400-500**	**500-600**	**Total**
Sections 1/3							
2008-2011	-	-	19	33	20	-	**72**
2017-2021	-	5	36	48	21	1	**111**
2022	-	-	9	16	11	-	**36**
Section 5							
2008-2011	-	-	10	10	13	1	**34**
2017-2021	3	1	15	24	14	-	**57**
2022	-	1	9	11	8	-	**29**
Section 7							
2008-2011	-	-	4	6	-	-	**10**
2017-2021	1	-	14	16	9	-	**40**
2022	-	-	8	21	8	-	**37**
Section 9							
2017-2021	-	15	22	35	7	-	**79**
2022	-	1	6	15	5	-	**27**

Figure 4-10. Length-mercury plots showing final model fits (and ±95% confidence intervals) for Mountain Whitefish



Axis scaling: x-axis = none; y-axis = log10.

Figure 4-11. Estimates of mercury concentrations (±95% confidence intervals) in select sizes of Mountain Whitefish using the best model



4.3.5 Longnose Sucker

Total mercury sample numbers for Longnose Sucker by fish size class, location, and time period are summarized in **Table 4-10**. Overall, Longnose Sucker are fairly well distributed across all sections. There were no samples collected in 2008–2011 from Sections 5 and 9 of the Peace River. Most Longnose Sucker sampled were in the 200 to 300 mm, 300 to 400 mm, and 400 to 500 mm size classes.

R-aw data and fitted length-mercury relationships for Longnose Sucker by location and time period are shown in **Figure 4-12.** These relationships were used to estimate tissue mercury concentrations and their associated 95% confidence limits for each location/time period combination for up to three sizes of Longnose Sucker (325 mm, 375 mm and 425 mm**; Figure 4-13**); location/time period/size combinations were not provided if there were no underlying data to support them (e.g., all sizes at Sections 5 and 9 in 2008-2011).

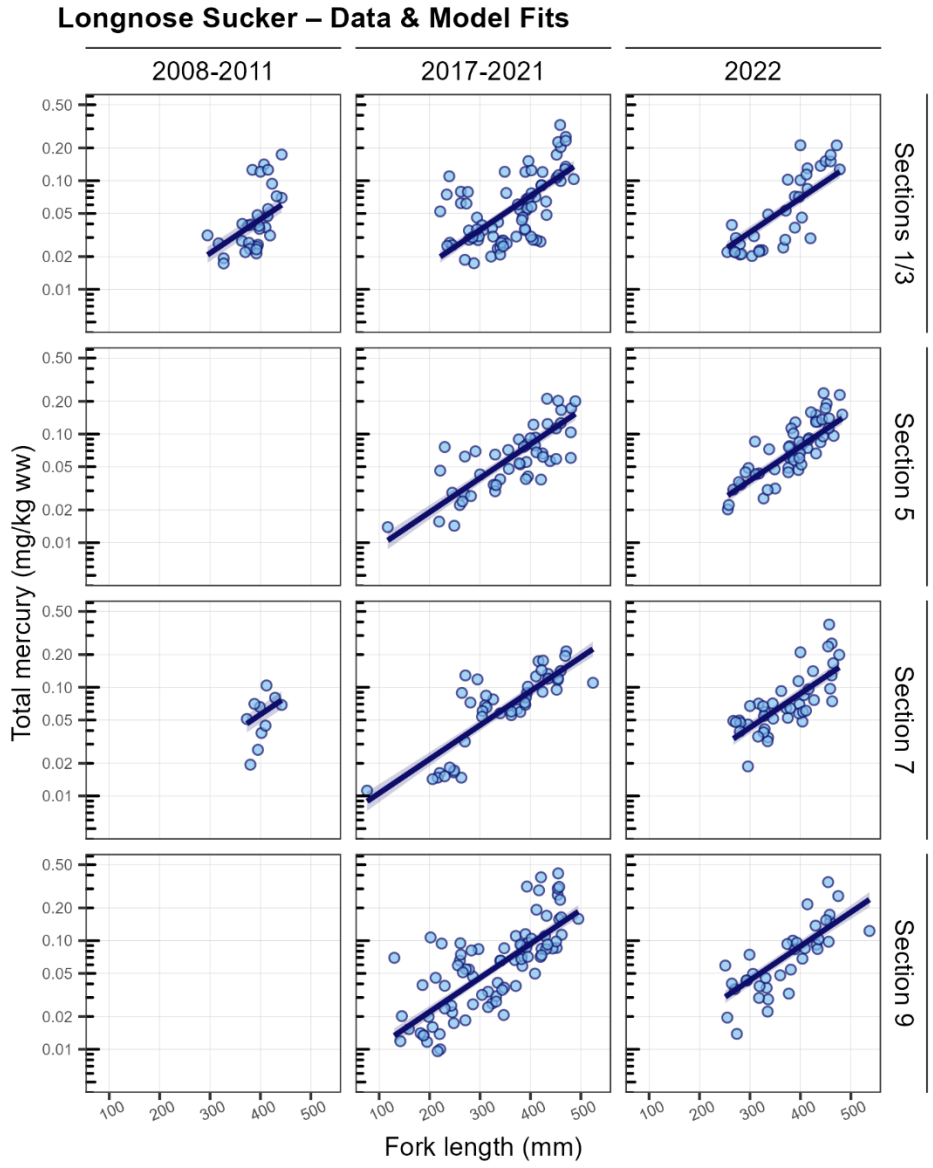
The results show an increase between the 2008–2011 and 2017–2021 time periods for all three sizes. Tissue mercury concentrations were marginally lower in 2022 than in 2017–2021.

Updated fish consumption guidance based on the 2022 results is provided in **Section 6.2**.

Table 4-10. Longnose Sucker total mercury sample numbers by size class, location, and time period

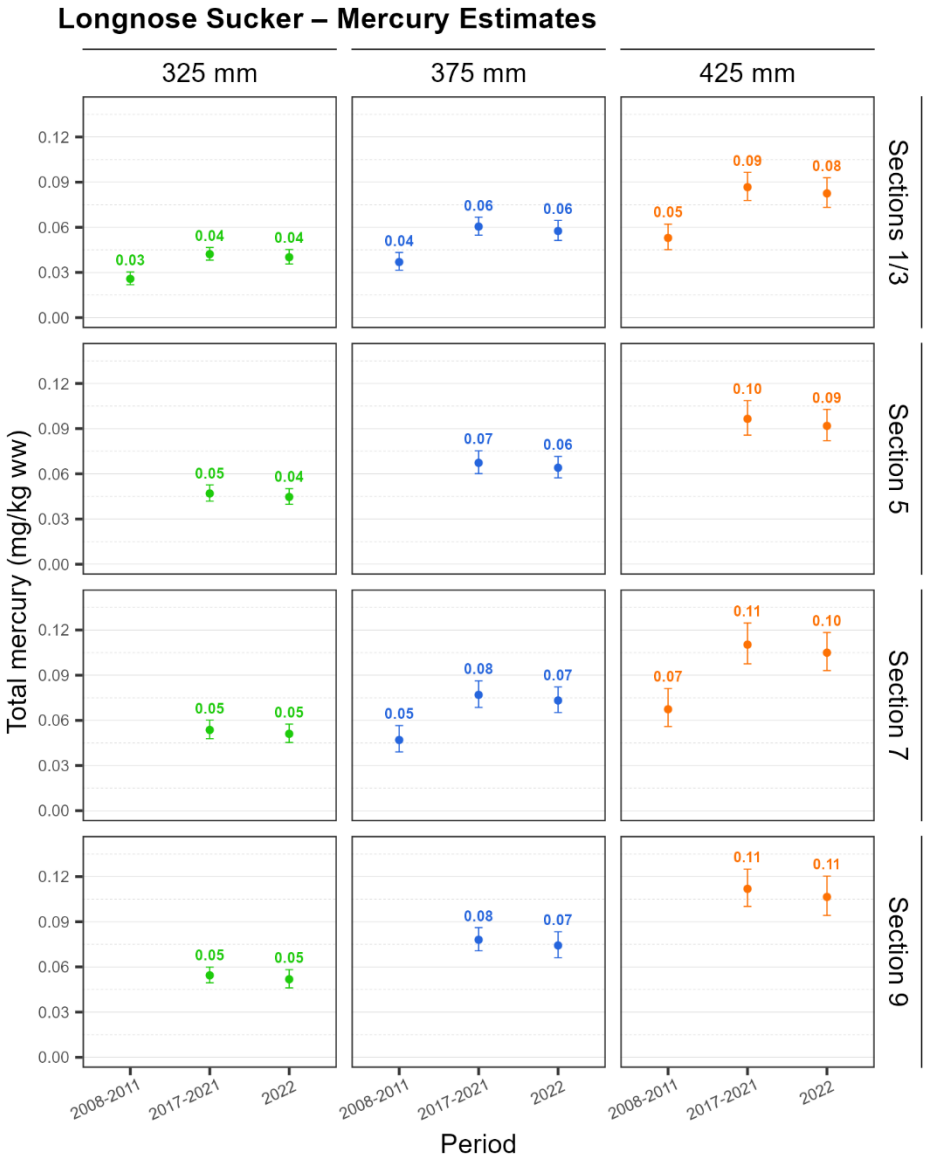
Longnose Sucker – Size Classes (fork length in mm)							
Location/Period	**0-100**	**100-200**	**200-300**	**300-400**	**400-500**	**500-600**	**Total**
Sections 1/3							
2008-2011	-	-	1	20	10	-	**31**
2017-2021	-	-	20	29	25	-	**74**
2022	-	-	8	15	11	-	**34**
Section 5							
2017-2021	-	1	12	16	19	-	**48**
2022	-	-	7	23	22	-	**52**
Section 7							
2008-2011	-	-	-	5	5	-	**10**
2017-2021	1	-	13	16	13	1	**44**
2022	-	-	8	19	15	-	**42**
Section 9							
2017-2021	-	10	24	26	24	-	**84**
2022	-	-	8	14	13	1	**36**

Figure 4-12. Length-mercury plots showing final model fits (and ±95% confidence intervals) for Longnose Sucker



Axis scaling: x-axis = none; y-axis = log10.

Figure 4-13. Estimates of mercury concentrations (±95% confidence intervals) in select sizes of Longnose Sucker using the best model



4.3.6 Redside Shiner

Total mercury sample numbers for Redside Shiner by fish size class, location, and time period are summarized in **Table 4-11**. In addition, there were some methylmercury samples from Section 5 (six fish) and Section 7 (four fish) in the 2017–2021 time period. Sampling prior to 2022 was fairly limited. Consequently, for 2022 the results were initially looked at only for spatial patterns across the sections.

Raw data and fitted length-mercury relationships for Redside Shiner by location are shown in **Figure** 4-14. These relationships were used to estimate tissue mercury concentrations and their associated 95% confidence limits for each location for three sizes of Redside Shiner (75 mm, 85 mm, and 95 mm; **Figure 4-15**). Overall, total mercury concentrations were low and fairly similar across sizes and locations. Total mercury concentrations increased slightly across the three sizes but, generally, they decreased slightly from Sections 1 and 3 through Section 9.

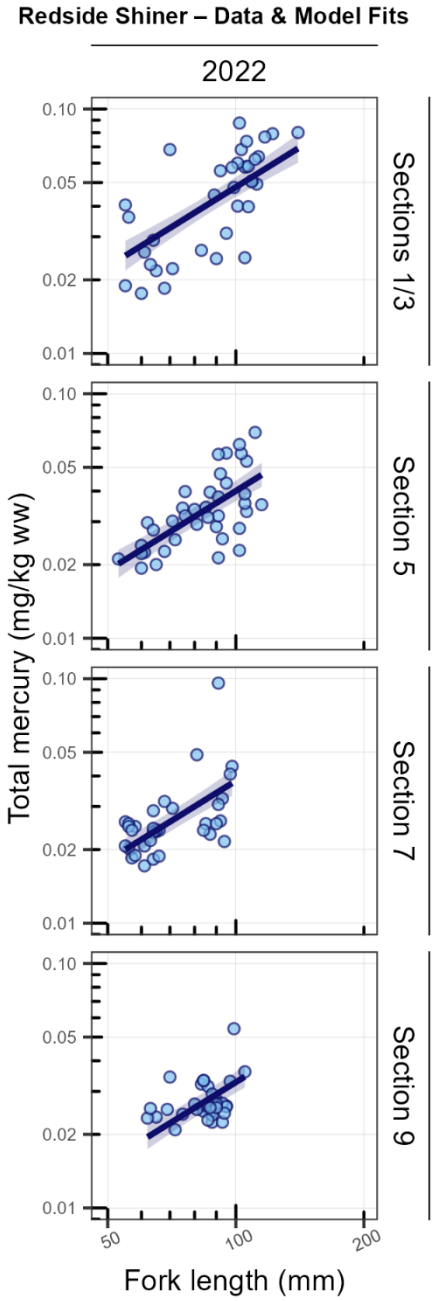
Raw data for total mercury and methylmercury (where total mercury not available) by location and time period for Redside Shiner are shown in **Figure 4-16**. Only Section 5 had data for each time period. Given the limited data, mean mercury concentrations (and associated 95% confidence intervals) were calculated for each time period rather than trying to fit a length-mercury relationship (**Figure 4-17**). The results are variable and do not show any clear temporal trends.

This species was included in the MMP to monitor mercury concentrations in key forage fish. As there is no information to suggest they are harvested for consumption, no fish consumption guidance is provided in **Section 6.2**.

Table 4-11. Redside Shiner total mercury sample numbers by size class, location, and time period

Redside Shiner – Size Classes (fork length in mm)			
Location/Period	**50-100**	**100-150**	**Total**
Sections 1/3			
2022	18	18	**36**
Section 5			
2008-2011	7	4	**11**
2017-2021	1	-	**1**
2022	28	10	**38**
Section 7			
2017-2021	-	-	**-**
2022	34	-	**34**
Section 9			
2022	35	1	**36**

Figure 4-14. Length-mercury plots showing final model fits (and ±95% confidence intervals) for Redside Shiner, for 2022 only



Axis scaling: x-axis = log10; y-axis = log10.

Figure 4-15. Estimates of mercury concentrations (±95% confidence intervals) for select sizes of Redside Shiner using the best model

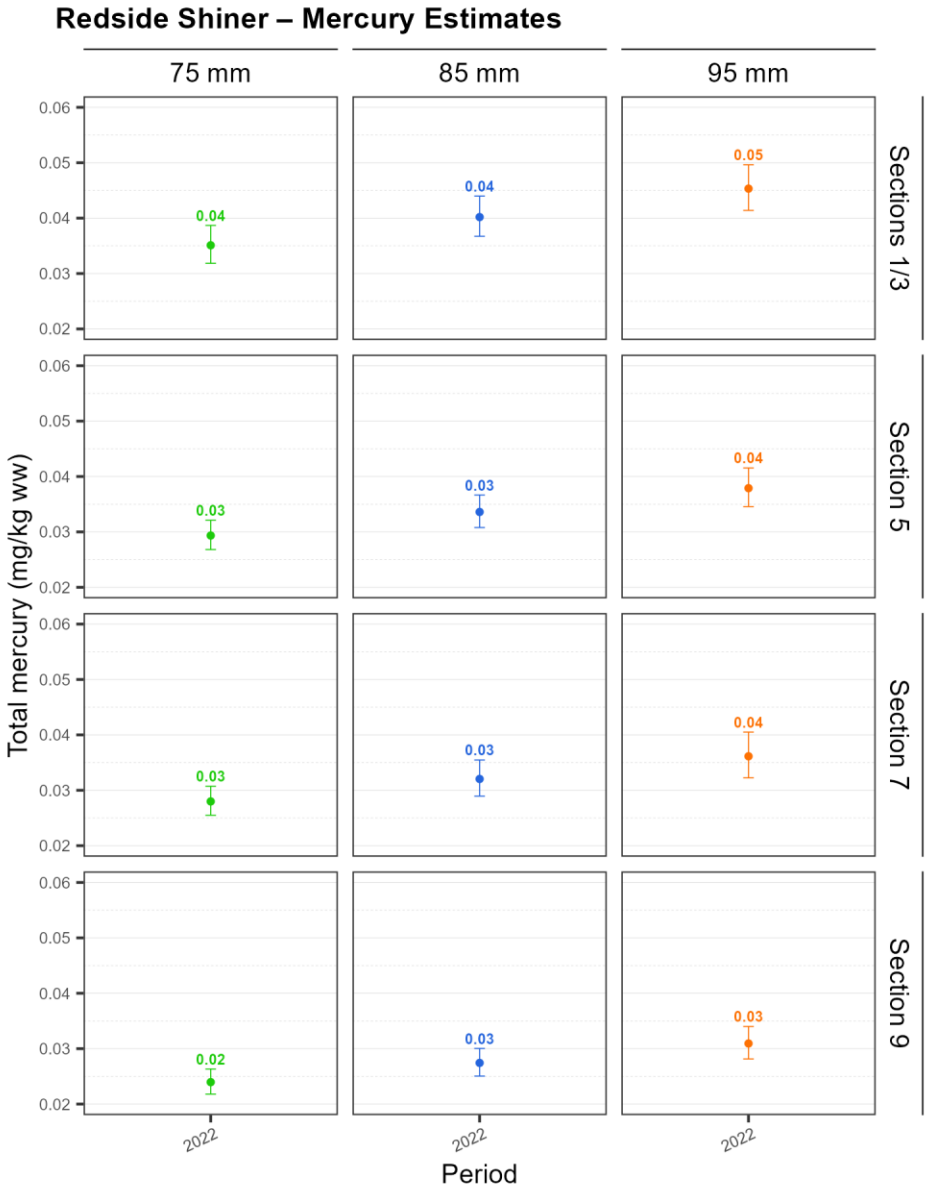


Figure 4-16. Length-mercury plots of raw data for Redside Shiner across location and time period

Blue circles represent total mercury concentrations and red circles represent methylmercury concentrations.

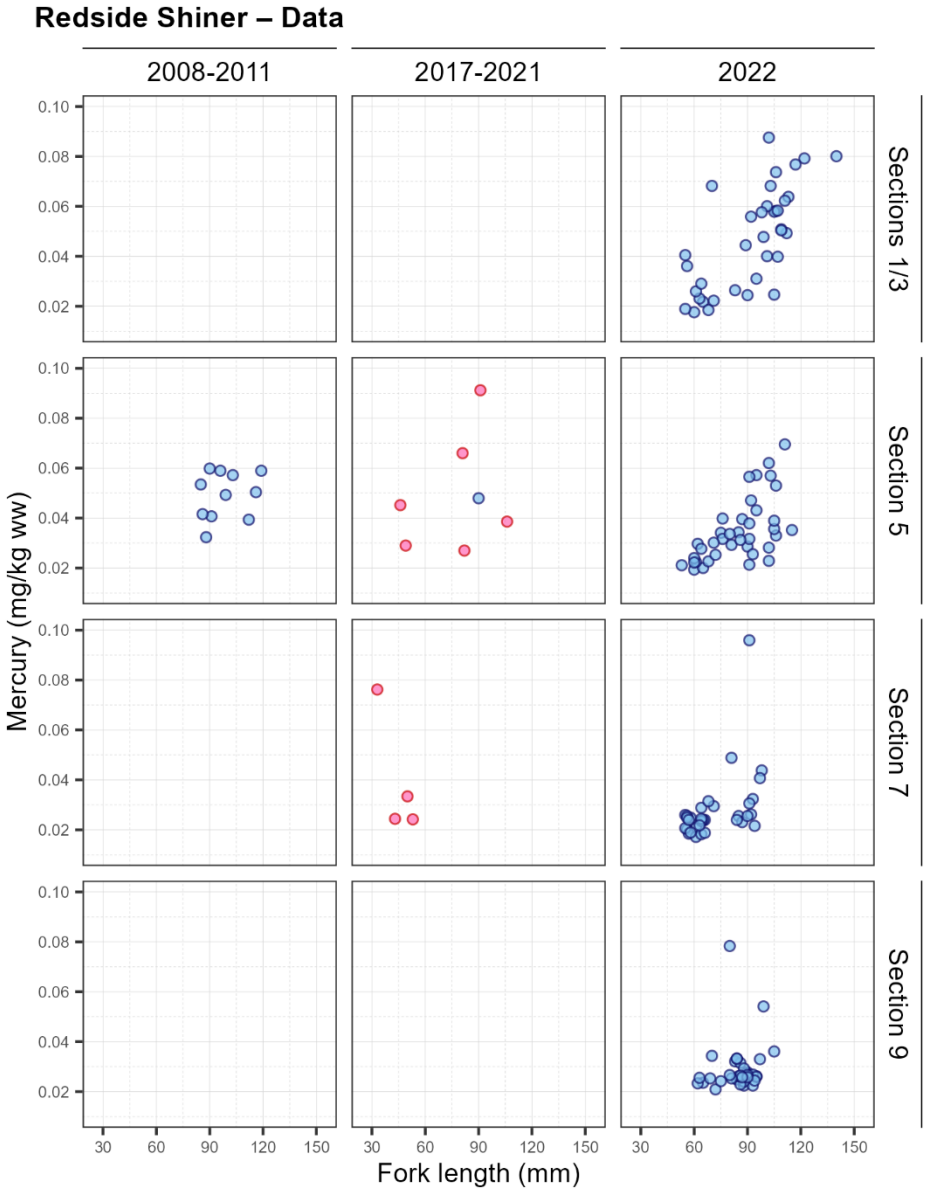
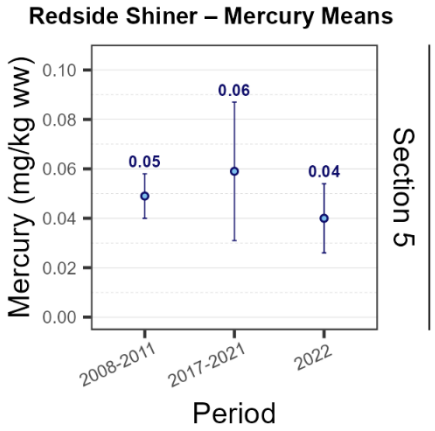


Figure 4-17. Averages (± standard deviations) of combined total mercury and methylmercury concentrations in Redside Shiner across time



4.4 Methylmercury vs Total Mercury in Fish

4.4.1 Overview

As described in **Section 4.1**, mercury (Hg) is typically measured in fish as concentrations of total mercury (THg), an analytical reporting convention for the sum of all readily digested and oxidized mercury forms. This convention is often used in fish mercury studies because: (1) direct analysis of methylmercury is more challenging and expensive, and (2) the vast majority (~95%) of mercury in fish is assumed to be methylmercury (Bloom 1992).

More recent evidence suggests that percent methylmercury (%MeHg; the ratio of methylmercury to total mercury concentrations) can vary in fish muscle tissues (Lescord et al. 2018; Aqdam et al. 2023). Although percent methylmercury in fish can be influenced by a variety of factors (e.g., fish size, trophic ecology, tissue proximate composition [i.e., lipid to protein content], and assimilation efficiency of mercury forms), they tend to be higher in larger and older individuals of piscivorous species (i.e., fish-eating fish). Consequently, relying on total mercury measurements as a proxy for methylmercury is likely to be accurate for species with the highest methylmercury concentrations (i.e., those posing the greatest health risks) and potentially overestimated for individuals or species with lower total mercury concentrations (i.e., which pose low health risks).

Similar to other fish mercury studies, the Site C MMP measures total mercury concentrations in fish, assuming that they represent methylmercury concentrations in fish. As part of our efforts to characterize baseline conditions prior to filling the Site C reservoir, we wanted to document the accuracy of the assumption. To that end, we analyzed both total mercury and methylmercury on a subset of fish collected in the 2022 Core MMP and ICSP events. While this study was not intended to fully explain variability in percent methylmercury among fish species or individuals, we also did look at a number of factors including species, fish size, trophic level (indicated by nitrogen stable isotope ratios; $\delta^{15}N$), and carbon source (indicated by carbon stable isotope ratios; $\delta^{13}C$) to reflect potential cause-effect relationships between variability of percent methylmercury and the ecological characteristics of fish.

Data quality is assessed as described in **Appendix A**. Detailed methods and analyses for this study are reported in **Appendix D**.

4.4.2 Results

Total Mercury versus Methylmercury

The relationships between total mercury and methylmercury concentrations in target species are depicted in **Figure 4-18**. There were positive, and statistically significant, relationships between concentrations of total mercury and methylmercury in fish muscle tissues both within each and among

all target species. These results indicate that concentrations of methylmercury indeed increase with increasing concentrations of total mercury in fish muscle tissues.

Descriptive statistics of percent methylmercury are summarized in **Table 4-12**. Among the six MMP target species, percent methylmercury ranged from 77% (Arctic Grayling and Rainbow Trout) to over 100% (Lake Trout, Redside Shiner, and White Sucker). While percent methylmercury should not exceed 100% in theory, values greater than 100% may reflect the realities of the underlying laboratory analyses. As a parameter that is harder to measure, methylmercury has relatively higher laboratory variability compared to total mercury, which can lead to percent methylmercury values greater than 100% as observed elsewhere (Lescord et al. 2018; Aqdam et al. 2023).

In order to better understand results of percent methylmercury, we leveraged the results of the data quality assessment (**Appendix A**) to compare variability between total mercury measurements and methylmercury measurements. The results support the contention that methylmercury analyses are inherently more variable than total mercury analyses. Relative percent differences between sample and duplicates were two to three times higher for methylmercury than total mercury (**Figure 4-18**). Particularly when drawing insights from individual sample results, high variability in laboratory results of methylmercury could thus potentially lead to spurious inferences. Based on the overall relationship shown in **Figure 4-18**, 82% of total mercury concentrations in muscle tissues across all target species is in the form of methylmercury.

Variability in Percent Methylmercury

We found no significant relationships between percent methylmercury and fish size, nitrogen isotopic ratios, or carbon isotopic ratios in the analyzed samples (see **Appendix D**). Concentrations of total mercury, and by proxy methylmercury, generally increase with increasing fish size, nitrogen isotopic ratios representing trophic ecology, and carbon isotopic ratios representing energy pathways (see "Key mercury-related data" plots for target species in **Appendix C** and Lescord et al., 2018). These increases in total mercury, or methylmercury, concentrations are often associated with accumulation of mercury over time in fish tissues and magnification of mercury with successive trophic transfer through aquatic food webs. As discussed in detail in **Appendix D**, it is possible that any relationship between %MeHg and these fish ecological factors could have been obscured due to the higher variability observed in methylmercury measurements relative total mercury measurements (i.e., low signal relative to noise).

4.4.3 Conclusions

Key conclusions were:

- There is a strong, positive relationship between paired total mercury and methylmercury concentrations, indicating that concentrations of methylmercury increased as concentrations of total mercury increased.

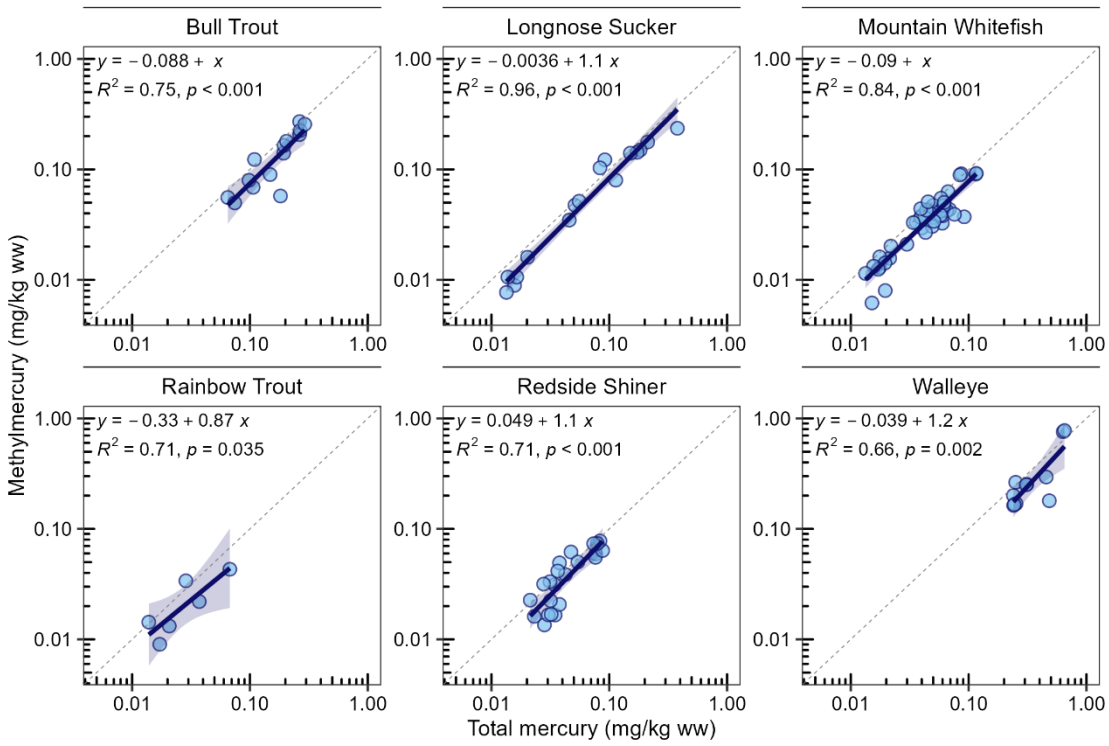
- Percent methylmercury varies substantially both within and among species, but there were no clear relationships between percent methylmercury and fish size, $\delta^{15}N$, or $\delta^{13}C$. It is possible that differences observed are due to the differential variability in the analyses, as laboratory and field duplicates indicated variability of methylmercury measures is 2 to 3 times higher than total mercury measures.

4.4.4 Tables and Figures

Table 4-12. Species-specific descriptive statistics of percent MeHg in fish muscle tissue samples

Descriptive Statistics of %MeHg						
Name	**count**	**minimum**	**maximum**	**median**	**mean**	**std.dev.**
Arctic Grayling	9	61.18	102.16	68.99	76.73	16.96
Bull Trout	14	31.60	112.47	82.72	78.61	19.45
Burbot	6	67.74	119.41	74.80	87.32	25.04
Lake Trout	6	113.86	128.97	121.46	121.39	6.60
Lake Whitefish	4	93.47	97.31	95.29	95.34	2.08
Longnose Sucker	16	56.75	133.09	80.48	82.92	21.34
Mountain Whitefish	48	40.53	112.36	77.65	79.01	17.54
Northern Pike	12	81.72	106.34	92.62	93.86	7.90
Rainbow Trout	6	52.56	118.46	63.84	76.87	27.11
Redside Shiner	22	47.84	130.66	90.92	85.59	25.48
Walleye	11	37.14	119.26	81.09	81.30	25.01
White Sucker	2	101.92	102.14	102.03	102.03	0.16

Figure 4-18. Total mercury – methylmercury relationships within (top plots) and across (bottom plot) target species



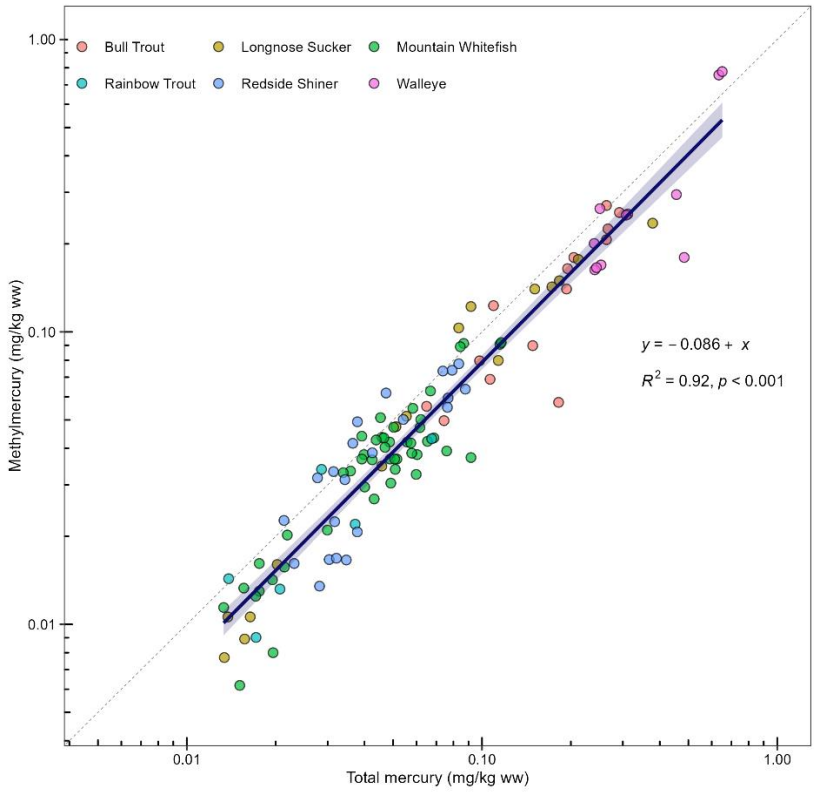
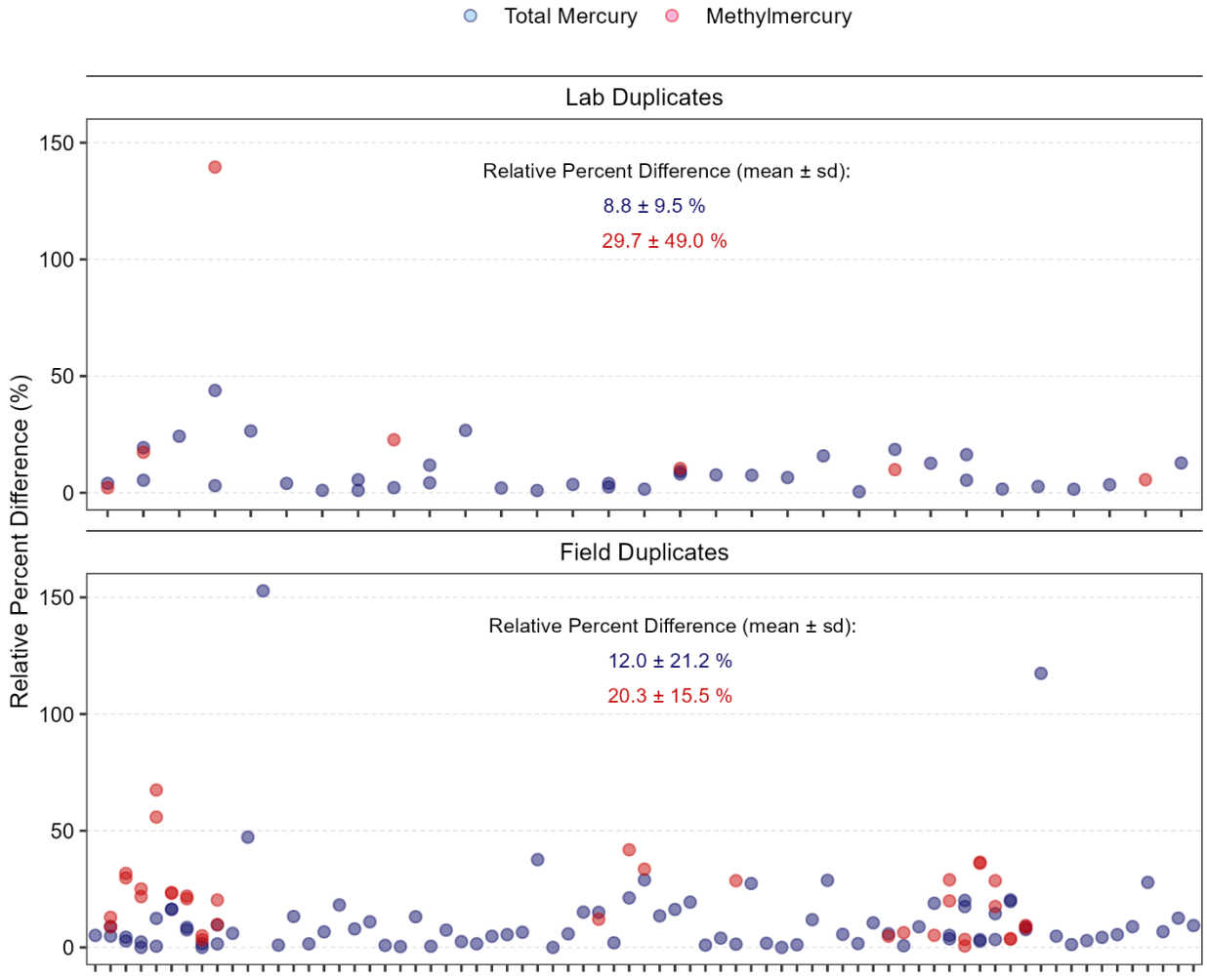


Figure 4-19. Comparison of variability of total mercury and methylmercury concentrations in laboratory and field duplicate samples.



5 INDIGENOUS COMMUNITY SAMPLING PROGRAM

5.1 Overview

The Indigenous Community Sampling Program (ICSP) is a methylmercury monitoring program implemented by Indigenous community members who collect tissue samples from fish caught for consumption.

The ICSP has three main objectives. They are to:

- Test the levels of methylmercury in fish that people eat, but which are not monitored in the Core MMP;
- Provide opportunities for Indigenous Peoples to participate in monitoring changes to the environment arising from the Project; and
- Improve food security and food sovereignty for Indigenous Peoples by building skills and knowledge related to methylmercury in fish.

To implement these objectives, training was provided within communities or at the Northern Lights College in Fort St. John. Training sessions provided a presentation that introduces methylmercury, described the effect of reservoirs on methylmercury production, and outlined the MMP. Following the presentation, a hands-on training session was provided to demonstrate how to collect a fish tissue sample. Trained community members, known as Community Champions, were provided with "Fish Kits" containing all the tools needed to collect tissue samples from fish caught in their communities. Community Champions were compensated per sample. They were responsible for recording data (species, fork length, catch location, etc.) on standardized datasheets, collecting photographs of the fish associated with each sample, collecting the tissue sample, storing samples in a freezer, transporting samples to ALS Canada Ltd (ALS) at the end of the season, and communicating with Azimuth staff.

A brochure outlining the ICSP, its role, and how it fits into the broader MMP is provided in **Appendix E**. This publication is produced annually to communicate the findings of the program from the previous season.

5.2 2022 ICSP Results

In 2022, Community Champions from Doig River, Dene Tha', and Saulteau First Nations collected 33 fish samples from three primary locations:

- Williston reservoir (3 fish);
- Peace River near the Smoky River confluence (4 fish); and

- Moberly Lake (26 fish).

The samples collected included fish from eight species, including three MMP target species (WP, MW, LSU) and five non-target species (NP, BB, LW, LT, WSU).

The concentrations of mercury in the 2022 ICSP fish broadly followed the size-related trends observed in Core MMP, with larger older fish tissue containing high concentrations. Insectivorous species such as Rainbow Trout and Mountain Whitefish had lower mercury levels, while piscivorous species higher in the food web, such as Walleye, Burbot, and Northern Pike, had higher mercury concentrations.

More detailed species-specific length-mercury results, along with consumption guidance, are provided in the 2022 ICSP Brochure (**Appendix E**).

6 FISH CONSUMPTION GUIDANCE

This section of the MMP report provides information on how frequently people can eat fish sampled under the MMP without exceeding Health Canada's guidance on safe levels of exposure to methylmercury. To help put the consumption guidance for fish from the Peace River into context, fish consumption guidance for some types of fish sold in stores and restaurants in Canada is also provided.

6.1 Methods

The methods used to calculate the fish consumption guidance were based on the approach presented in Appendix B of the MMP (BC Hydro 2022) and are described in detail in **Appendix F** of this report. The approach is summarized below.

Health Canada sets the amount of methylmercury that a person can be orally exposed to on a daily basis for their lifetime without unacceptable risk of harm. These values are known as provisional tolerable daily intakes[8].

The maximum number of servings of a particular type of fish (i.e., species, size, location) that can be eaten in a month without exceeding Health Canada's provisional tolerable daily intakes (pTDI) for methylmercury were calculated for three groups: (1) children younger than 12 years old; (2) people who are, or could be pregnant; and (3) others. The calculations were made using the following input variables:

- **The body weight of the person eating the fish.** These input values were based on default average body weights for Canadians, recommended by Health Canada;
- **The average serving size of fish.** These input values were based on either
  - Default average serving sizes of fish that Health Canada recommends for Canadians, or
  - The average serving size of fish eaten by adult Indigenous people living on reserve in British Columbia, as reported by the First Nations Food, Nutrition, and Environment Study;

[8] The provisional tolerable daily intake (pTDI) of methylmercury for the general population recommended by Health Canada is 0.47 micrograms of methylmercury per kilogram body weight per day (µg/kg/d). The provisional tolerable daily intake of methylmercury for people who are, or could be, pregnant and for children less than 12 years of age recommended by Health Canada is 0.2 µg/kg/d. A microgram is a millionth of a gram.

- **The average concentration of methylmercury in fish.** The source of these input values varied depending on the type of fish. Estimates of the average concentrations of methylmercury in Core MMP target fish species were based on detailed modelling of location and species-specific length-mercury relationships from the 2022 MMP sample data. Estimates of the average concentrations of methylmercury in MMP non-target fish were derived either from "generic" models of length-mercury relationships based on pooled Peace River sample data (i.e., all locations and years) or arithmetic means of the concentration of mercury in all samples for a species (i.e., all locations, years, and lengths). Arithmetic means were used in cases where a model of a relationship between length and mercury could not be fit to the data.

Fish consumption guidance was not calculated for Redside Shiner because it was assumed people do not regularly eat this species.

6.2 Results

The maximum number of servings of a particular type of fish (i.e., species, size, location) that can be eaten in a month without exceeding Health Canada's provisional tolerable daily intakes for methylmercury are presented in **Figure 6-1**.

In the guidance tables, fish are listed in increasing order of the concentration of methylmercury they contain. People can eat a particular fish, *or any fish listed above it in the guidance table*, at the indicated frequency (servings per month).

6.3 Discussion and Future Direction of MMP Fish Consumption Guidance

The fish consumption guidance presented in this 2022 MMP report is consistent with the methods for communicating fish consumption guidance described in the MMP (BC Hydro 2022). However, there are some limitations to this approach.

Ideally, the MMP fish consumption guidance should be:

- Accurate;
- Easy for the public to access and understand; and
- Allow people to eat as much fish as possible, without exceeding their pTDI.

However, the current approach to MMP fish consumption guidance is not optimized to meet these objectives. This is discussed below.

6.3.1 Limitations to the Current Approach to MMP Fish Consumption Guidance

As concentrations of methylmercury in fish start to change once the Site C reservoir is created, it will be important to ensure that people base their fish consumption decisions on the most current estimates of

mercury concentrations in fish and the associated consumption guidance. Using hard-copy consumption guidance tables not only creates challenges with version control but also creates a risk that inaccurate, out-of-date guidance could be circulating in the public domain.

Research on baseline fish consumption indicates that most people who regularly eat fish tend to eat more than one type of fish (MMP baseline fish consumption report, in preparation). And for people who eat more than one type of fish, the current guidance format is not optimal. If they eat more than one type of fish, their maximum recommended rate of fish consumption according to the current guidance approach is based on the fish they eat that has the highest mercury concentration. Consequently, if a person eats a mix of low mercury fish and high mercury fish, their consumption of the lower mercury fish is unnecessarily restricted.

Another issue is that there is a risk people could misinterpret the consumption guidance tables and think that they can safely eat the indicated servings per month for *each* type of fish. This could result in their being exposed to doses of methylmercury greater than their provisional tolerable daily intake.

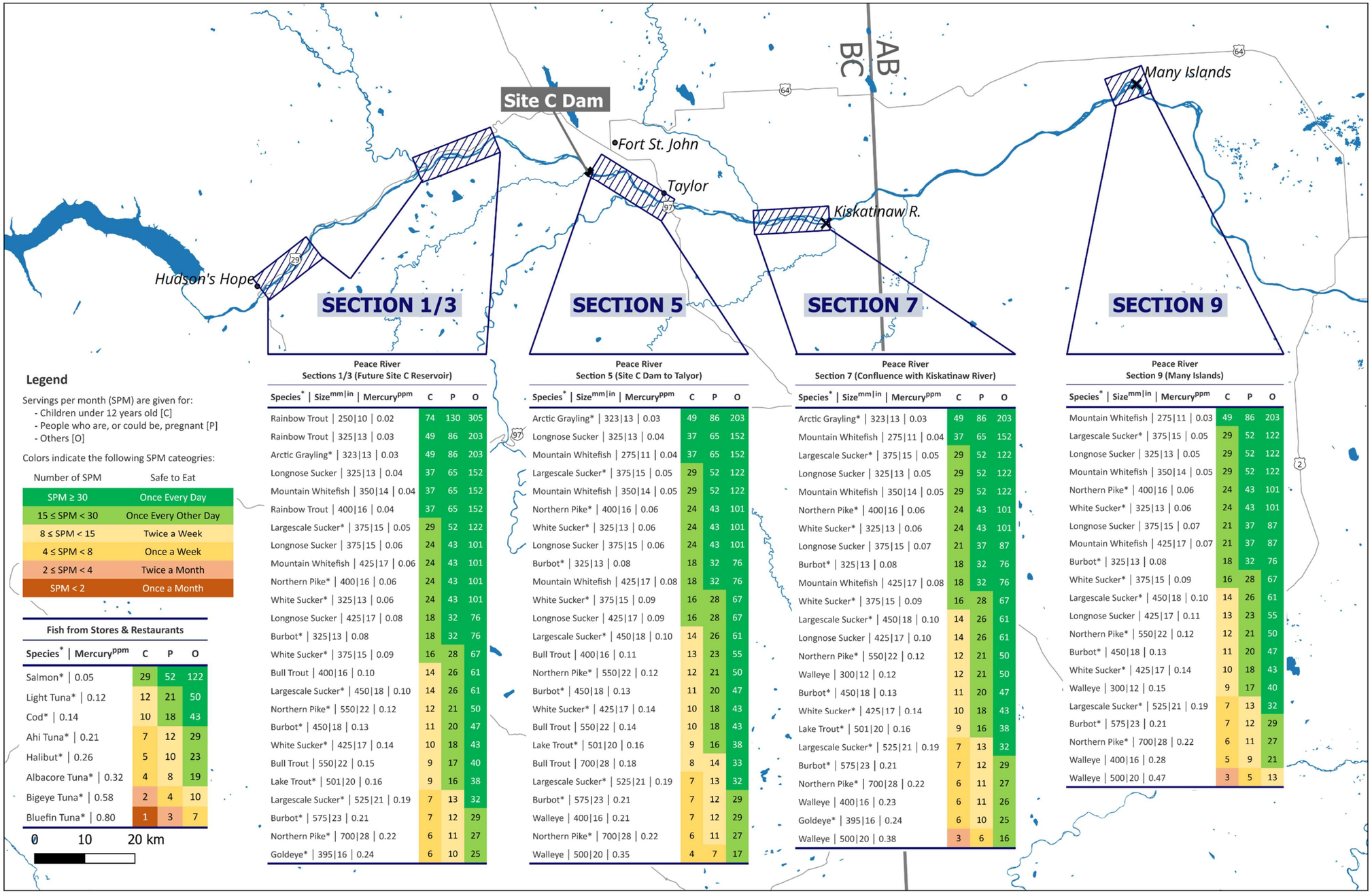
6.3.2 Option to Improve MMP Fish Consumption Guidance

Providing the MMP fish consumption guidance in an on-line format would address some of the limitations with the current approach. For example, the guidance could be provided through an app (e.g., Shinny app) that could be accessed by any internet-enabled device (e.g., computer, tablet, or smart phone). Providing the MMP fish consumption guidance in an on-line digital format such as this:

- Could provide real-time, customized fish consumption guidance that is accurate to the user's own serving size, age, and gender, and it would optimize the fish consumption guidance for people that eat more than one type of fish (i.e., does not unnecessarily limit rates of fish consumption);
- Could be updated with current estimates of concentrations of methylmercury in fish as soon as new data are available (i.e., it would mitigate the risk of out-of-date, inaccurate guidance in public circulation); and
- Removes the need for the public to remember the guidance, because they can refer to the app whenever they need to.

Developement of an MMP fish consumption guidance app as an alternative or complimentary approach to the MMP fish consumption guidance tables will be discussed as an option with Indigenous Nations and Health Authorities at a future Site C Methylmercury Subcommittee meeting.

Figure 6-1. 2022 MMP fish consumption guidance



Fish from Stores & Restaurants

Species* | Mercury ppm	C	P	O
Salmon* | 0.05	29	52	122
Light Tuna* | 0.12	12	21	50
Cod* | 0.14	10	18	43
Ahi Tuna* | 0.21	7	12	29
Halibut* | 0.26	5	10	23
Albacore Tuna* | 0.32	4	8	19
Bigeye Tuna* | 0.58	2	4	10
Bluefin Tuna* | 0.80	1	3	7

Peace River Sections 1/3 (Future Site C Reservoir)

Species* | Size mm|in | Mercury ppm	C	P	O
Rainbow Trout | 250|10 | 0.02	74	130	305
Rainbow Trout | 325|13 | 0.03	49	86	203
Arctic Grayling* | 323|13 | 0.03	49	86	203
Longnose Sucker | 325|13 | 0.04	37	65	152
Mountain Whitefish | 350|14 | 0.04	37	65	152
Rainbow Trout | 400|16 | 0.04	37	65	152
Largescale Sucker* | 375|15 | 0.05	29	52	122
Longnose Sucker | 375|15 | 0.06	24	43	101
Mountain Whitefish | 425|17 | 0.06	24	43	101
Northern Pike* | 400|16 | 0.06	24	43	101
White Sucker* | 325|13 | 0.06	24	43	101
Longnose Sucker | 425|17 | 0.08	18	32	76
Burbot* | 325|13 | 0.08	18	32	76
White Sucker* | 375|15 | 0.09	16	28	67
Bull Trout | 400|16 | 0.10	14	26	61
Largescale Sucker* | 450|18 | 0.10	14	26	61
Northern Pike* | 550|22 | 0.12	12	21	50
Burbot* | 450|18 | 0.13	11	20	47
White Sucker* | 425|17 | 0.14	10	18	43
Bull Trout | 550|22 | 0.15	9	17	40
Lake Trout* | 501|20 | 0.16	9	16	38
Largescale Sucker* | 525|21 | 0.19	7	13	32
Burbot* | 575|23 | 0.21	7	12	29
Northern Pike* | 700|28 | 0.22	6	11	27
Goldeye* | 395|16 | 0.24	6	10	25

Peace River Section 5 (Site C Dam to Talyor)

Species* | Size mm|in | Mercury ppm	C	P	O
Arctic Grayling* | 323|13 | 0.03	49	86	203
Longnose Sucker | 325|13 | 0.04	37	65	152
Mountain Whitefish | 275|11 | 0.04	37	65	152
Largescale Sucker* | 375|15 | 0.05	29	52	122
Mountain Whitefish | 350|14 | 0.05	29	52	122
Northern Pike* | 400|16 | 0.06	24	43	101
White Sucker* | 325|13 | 0.06	24	43	101
Longnose Sucker | 375|15 | 0.06	24	43	101
Burbot* | 325|13 | 0.08	18	32	76
Mountain Whitefish | 425|17 | 0.08	18	32	76
White Sucker* | 375|15 | 0.09	16	28	67
Longnose Sucker | 425|17 | 0.09	16	28	67
Largescale Sucker* | 450|18 | 0.10	14	26	61
Bull Trout | 400|16 | 0.11	13	23	55
Northern Pike* | 550|22 | 0.12	12	21	50
Burbot* | 450|18 | 0.13	11	20	47
White Sucker* | 425|17 | 0.14	10	18	43
Bull Trout | 550|22 | 0.14	10	18	43
Lake Trout* | 501|20 | 0.16	9	16	38
Bull Trout | 700|28 | 0.18	8	14	33
Largescale Sucker* | 525|21 | 0.19	7	13	32
Burbot* | 575|23 | 0.21	7	12	29
Walleye | 400|16 | 0.21	7	12	29
Northern Pike* | 700|28 | 0.22	6	11	27
Walleye | 500|20 | 0.35	4	7	17

Peace River Section 7 (Confluence with Kiskatinaw River)

Species* | Size mm|in | Mercury ppm	C	P	O
Arctic Grayling* | 323|13 | 0.03	49	86	203
Mountain Whitefish | 275|11 | 0.04	37	65	152
Largescale Sucker* | 375|15 | 0.05	29	52	122
Longnose Sucker | 325|13 | 0.05	29	52	122
Mountain Whitefish | 350|14 | 0.05	29	52	122
Northern Pike* | 400|16 | 0.06	24	43	101
White Sucker* | 325|13 | 0.06	24	43	101
Longnose Sucker | 375|15 | 0.07	21	37	87
Burbot* | 325|13 | 0.08	18	32	76
Mountain Whitefish | 425|17 | 0.08	18	32	76
White Sucker* | 375|15 | 0.09	16	28	67
Largescale Sucker* | 450|18 | 0.10	14	26	61
Longnose Sucker | 425|17 | 0.10	14	26	61
Northern Pike* | 550|22 | 0.12	12	21	50
Walleye | 300|12 | 0.12	12	21	50
Burbot* | 450|18 | 0.13	11	20	47
White Sucker* | 425|17 | 0.14	10	18	43
Lake Trout* | 501|20 | 0.16	9	16	38
Largescale Sucker* | 525|21 | 0.19	7	13	32
Burbot* | 575|23 | 0.21	7	12	29
Northern Pike* | 700|28 | 0.22	6	11	27
Walleye | 400|16 | 0.23	6	11	26
Goldeye* | 395|16 | 0.24	6	10	25
Walleye | 500|20 | 0.38	3	6	16

Peace River Section 9 (Many Islands)

Species* | Size mm|in | Mercury ppm	C	P	O
Mountain Whitefish | 275|11 | 0.03	49	86	203
Largescale Sucker* | 375|15 | 0.05	29	52	122
Longnose Sucker | 325|13 | 0.05	29	52	122
Mountain Whitefish | 350|14 | 0.05	29	52	122
Northern Pike* | 400|16 | 0.06	24	43	101
White Sucker* | 325|13 | 0.06	24	43	101
Longnose Sucker | 375|15 | 0.07	21	37	87
Mountain Whitefish | 425|17 | 0.07	21	37	87
Burbot* | 325|13 | 0.08	18	32	76
White Sucker* | 375|15 | 0.09	16	28	67
Largescale Sucker* | 450|18 | 0.10	14	26	61
Longnose Sucker | 425|17 | 0.11	13	23	55
Northern Pike* | 550|22 | 0.12	12	21	50
Burbot* | 450|18 | 0.13	11	20	47
White Sucker* | 425|17 | 0.14	10	18	43
Walleye | 300|12 | 0.15	9	17	40
Largescale Sucker* | 525|21 | 0.19	7	13	32
Burbot* | 575|23 | 0.21	7	12	29
Northern Pike* | 700|28 | 0.22	6	11	27
Walleye | 400|16 | 0.28	5	9	21
Walleye | 500|20 | 0.47	3	5	13

7 BASELINE FISH CONSUMPTION

The B.C. Environmental Assessment Certificate and the Federal Decision Statement require BC Hydro to collect information on how much fish Indigenous and non-Indigenous people in the Project area eat. These requirements are addressed by the plans described in Section 7.0 Fish Consumption Program of the MMP (BC Hydro 2022), which include collecting data on how much fish people eat during baseline and operational periods. The activities undertaken in 2022 to collect information on baseline fish consumption are described below.

The approach to collect information on baseline fish consumption is described in detail in Section 7.0 of the MMP. The approach included two strategies:

- Estimating how much fish people eat using existing sources of data on fish consumption; and
- Collecting new data on fish consumption.

Activities under both strategies were undertaken in 2022.

7.1 Existing Data on Baseline Fish Consumption

Analysis of existing data sources on fish consumption began in 2022. Data on how much fish people eat were extracted from the First Nations, Food, Nutrition, and Environment Study and from Country Foods Harvest Questionnaires.

First Nations, Food, Nutrition, and Environment Study. The First Nations, Food, Nutrition, and Environment Study (FNFNES) was a study of the traditional diet of adult Indigenous people living on reserves south of 60 degrees latitude in Canada. Of the 13 Indigenous Nations potentially affected by the Project, the following six Indigenous Nations participated in either the Alberta (Chan et al. 2016) or British Columbia (Chan et al. 2011) FNFNES regional studies (**Figure 7-1**):

1. Dene Tha' First Nation participated in the Alberta regional study in 2013;
2. Fort Nelson First Nation participated in the British Columbia regional study in 2008–2009;
3. Prophet River First Nation participated in the British Columbia regional study in 2008–2009;
4. Horse Lake First Nation participated in the Alberta regional study in 2013;
5. Doig River First Nation participated in the British Columbia regional study in 2008–2009; and
6. Saulteau First Nations participated in the British Columbia regional study in 2008–2009.

Figure 7-1. Indigenous Nations in British Columbia and Alberta that participated in the First Nations Food, Nutrition, and Environment Study

Six Nations in the vicinity of the Site C Clean Energy Project are highlighted.

The FNFNES collected data on the traditional diets of Indigenous adults living on reserve. The FNFNES used two methods, a food frequency questionnaire and a 24-hour dietary recall. Both are established, validated methods used in nutrition research. Dietary data were collected through household interviews conducted in the fall. To calculate fish intake rates, data from the food frequency questionnaire on the frequency of fish consumption were integrated with serving size information from the 24-hour dietary recall.

Two of the research scientists from the FNFNES, dietician Karen Fediuk and statistician Peter Berti, work for Reciprocity Research Inc. Azimuth subcontracted analyses of the FNFNES data to Reciprocity Research Inc. Analyses of the FNFNES data started in 2022 and extended into 2023.

Country Foods Harvest Questionnaires. Data on harvest and consumption of traditional foods, including fish, were available for adults of the Duncans First Nation and Horse Lake First Nation. These data were collected in 2010 and 2011 as an adjunct to Traditional Land Use Surveys that were conducted as part of the Environmental Impact Statement for the Project. BC Hydro provided Azimuth with the raw data from the Horse Lake First Nation and Duncans First Nation Country Foods Harvest Questionnaires. Azimuth subcontracted analysis of the Duncans First Nation and Horse Lake First Nation Country Foods Harvest Questionnaire data to Reciprocity Research Inc. Analyses of the Country Foods Harvest Questionnaire data started in 2022 and extended into 2023.

Limitations of Existing Baseline Fish Consumption Data

The MMP sought to minimize demands on Indigenous Nations, and for baseline fish consumption it relied on existing information. The existing information, however, had some important limitations. These included:

- The data were approximately 10 years old;
- The data were for adults only and did not include information on how much fish children eat; and
- The data were for wild-caught fish only; they did not include information on how much fish from stores or restaurants people eat.

Because of these limitations, efforts were also made to collect new data on baseline fish consumption.

7.2 New Data on Baseline Fish Consumption

Collecting new data on baseline fish consumption was started in 2022. This involved two activities:

- Designing and implementing a creel survey fish consumption questionnaire; and
- Having discussions with Indigenous Nations to determine interest in participating in a baseline fish consumption survey.

These activities are described in more detail below.

7.2.1 Creel Survey Fish Consumption Questionnaire

Aski Reclamation Inc. and LGL Ltd. conducted a creel survey on the Peace River from July 2022 to June 2023. The Peace River Creel Survey (Mon-2, Task 2c of the FAHMFP; BC Hydro 2015) included interviews with anglers at locations on the Peace River between Peace Canyon dam and Many Islands, Alberta.

Azimuth, in collaboration with Karen Fediuk (Reciprocity Research Inc.), designed a fish consumption questionnaire to be administered during the creel interviews with anglers. The creel survey fish consumption questionnaire was in the format of a food frequency questionnaire and included questions on how often people eat fish from the Peace River, other wild-caught fish, and fish from stores and restaurants. The creel survey fish consumption questionnaire also included questions on the average amount of fish people eat in a meal.

In June 2022, Azimuth provided training to technicians from Aski Reclamation Inc. that included background information on methylmercury in fish and the creel survey fish consumption questionnaire. Technicians from Aski Reclamation Inc. began implementing the creel survey fish consumption questionnaire in July 2022. Forty creel survey fish consumption questionnaires were completed during creel survey interviews conducted in July, August, and September 2022. An additional 57 creel survey fish consumption questionnaires were completed in the spring of 2023.

Responses to the creel survey fish consumption questionnaires provide information on the rates at which interviewees and members of their households consume fish. Data from the creel survey fish consumption questionnaires will be analyzed and reported at a future date.

7.2.2 Discussions with Indigenous Nations

Indigenous Nations were briefed on the reasons for collecting new data on baseline fish consumption and invited to participate. Discussions with Indigenous Nations on this topic occurred on the following occasions:

- May 2022 Methylmercury Subcommittee meeting;
- October 2022 Environmental Forum meeting;
- October 2022 Doig River First Nation community open house;
- November 2022 Saulteau First Nations community dinner; and
- 2022 fourth quarter Quarterly Project Update meetings.

By the end of 2022, the following Nations expressed interest in participating in a process to provide new data on baseline fish consumption:

- Blueberry River First Nation;
- Halfway River First Nation;
- McLeod Lake Indian Band; and
- Saulteau First Nations.

Follow-up discussions with the Nations listed above regarding the timing and format of data collection continued into 2023.

7.3 Baseline Fish Consumption Data Analyses and Reporting

It is anticipated that collecting and analyzing the baseline fish consumption data will be completed in a future year, and a stand-alone report on fish consumption during the baseline period will be issued .

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APPENDICES

APPENDIX A: DATA QUALITY ASSESSMENT (2021-2022)

TABLE OF CONTENTS

TABLES

APPENDICES

A.1 INTRODUCTION

A.1.1 Quality Assurance/Quality Control

A Quality Assurance/Quality Control (QA/QC) program helps to ensure that the chemical and biological data collected for the Site C MMP are representative of the material or populations being sampled, are of known quality, have sufficient laboratory precision to be highly repeatable, are properly documented, and are scientifically defensible.

- *Quality Assurance* (QA) are the practices employed (e.g., use of experienced field staff, Standard Operating Procedures [SOPs], field data sheets, and certified laboratories) to collect scientifically defensible data meeting data quality objectives (DQOs).
- *Quality Control* (QC) are the measures taken to verify that the specific DQOs (e.g., limits for bias and precision) are met. QC measures can be based in the field (e.g., field duplicates, equipment blanks, and travel blanks) or laboratory (e.g., laboratory duplicates, method blanks, certified reference materials [RM], and laboratory standards).

The Site C MMP fish mercury data collection to-date has been integrated into other monitoring programs (e.g., FAHMFP Mon-2). Data quality of MMP-related data from 2010 though 2020 has already been assessed (Azimuth 2021). This appendix includes data from 2021 and 2022. An overview of the QA/QC workflow for the MMP is provided in **Table A1-1**.

The data quality assessment evaluated each component of the MMP dataset, which is comprised of the following key data:

- *Fish morphometrics* (i.e., size and shape) – measured in the field and limited to length and weight.
- *Tissue chemistry* –focusing on mercury, methylmercury, and moisture; analyzed in an analytical laboratory using tissue samples. Tissue preferentially obtained using non-destructive techniques (Baker et al. 2004).
- *Tissue stable isotopes analysis (SIA)* – typically limited to carbon and nitrogen only; analyzed in an analytical laboratory using a tissue sample. Tissue preferentially obtained using non-destructive techniques (Baker et al. 2004).
- *Fish age* – a combination of methods, including capture history and aging structures (otoliths [destructive], fin rays [non-destructive] and scales [non-destructive]). Where available capture history and aging results are used together to refine age estimates (Golder and Gazey 2018, 2019, 2020; Golder 2020, 2022; WSP 2023).

- *Supporting media* – samples of surface water, porewater, sediment, and invertebrate tissue collected in locations associated with fish sampling using a range of techniques (surface water sampling, Ponar/Ekman dredge, zooplankton tows).

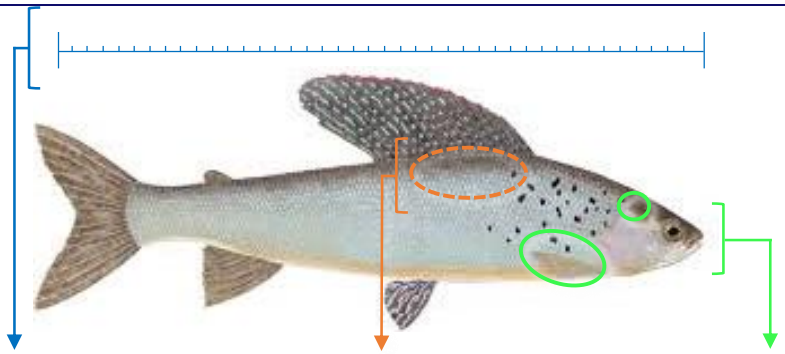
For each data type, QA/QC assessment methods and findings are presented to demonstrate that the chemical and biological data collected meet the data quality needs of the Site C MMP.

A.1.2 Document Structure

The remainder of this document is structured as follows:

- *Quality Assurance* (**Section A.2**) – outlining the practices employed to ensure data quality including data recording (field datasheets), standard operating procedures, and sample integrity.
- *Quality Control* (**Section A.3**) – reporting on the quantitative findings from QC samples used to verify that Data Quality Objectives (DQOs) are met.
    - *QC Methods and Data Quality Objectives* (**Section A.3.1**) – describing the methods used in QC assessment including a detailed listing of all DQOs.
    - *Fish QC Results* (**Section A.3.2**) – reporting QC results for fish morphometrics, tissue chemistry, tissue stable isotope analysis, and fish age analysis.
    - *Supporting Media QC Results* (**Section A.3.3**) – reporting QC results for each supporting media (surface water, porewater, sediment, invertebrate tissue).

Table A1-1. Summary of QA/QC workflow for baseline Site C mercury and supporting data.



Workflow	Morphometrics	Tissue Analysis		Age Analysis
	Length (L) & Weight (W)	**Mercury (Hg)**	**Stable Isotope Analysis (SIA)**	**Aging Structures**
Field[1]	Electronic entry with QA features built in.	Field duplicate samples	Field duplicate samples	Age structure collected: Finray (GR, GE, MW, RB), Scales (GE, NP, LT, BT, WP).[2] Otoliths where fish succumbed to sampling only.
Laboratory	n/a	Laboratory QC (ALS): laboratory duplicates, lab control samples, method blanks and certified reference materials.	Laboratory QC (SINLAB): laboratory duplicates, secondary standards and check standards.	Two experienced Golder personnel independently age each structure. Aging methods evaluated annually and adjusted based on QC results.
Database	Electronic entry completed in the field.	Direct electronic import from laboratory reports.	Direct electronic import from laboratory reports.	Direct electronic import.
Statistical Analysis	L vs W in coarse outlier assessment.	L vs Hg & δ15N vs Hg in coarse outlier assessment.	δ15N vs Hg in coarse outlier assessment.	None, less precise measurement than length

Note:

[1] Field sampling conducted by Golder (now WSP).

[2] Species Codes: BT = Bull Trout, MW = Mountain Whitefish, RB = Rainbow Trout, LSU = Longnose Sucker, RSC = Redside Shiner, WP = Walleye, GE = Goldeye.

A.2 QUALITY ASSURANCE

Careful collection, documentation and handling of all samples and data, regardless of media, data type, or frequency is a key component of QA on a field program. For all data sources, field programs were carried out by experienced field crews that follow standard field procedures. Below is an assessment of the QA component of the Site C baseline fish mercury data.

Field Datasheets

As of 2015[1], BC Hydro implemented a system of electronic entry of all field data, which has a number of benefits from a data quality perspective. 1) there is no extra data-handling required as is the case with field hard copy to office electronic copy transcription. 2) the Fisheries and Aquatic Habitat Monitoring and Follow-up Program (FAHFMP) database has built-in QC features. For example, a warning prompt if the fish body condition measure is outside an acceptable range. For further information see the FAHMFP study design document (BC Hydro 2015).

Standard Operating Procedures (SOPs)

Tissue sampling methods for mercury and SIA for both the early and recent MMP baseline periods were based on Baker et al. (2004). A brief synopsis of these procedures is as follows:

Samples of dorsal muscle tissue are acquired from all fish. Fish captured alive are anesthetized, biopsied, then released alive. Tissue plugs (one to two for mercury and one for SIA) are collected from anaesthetized fish using single-use tissue biopsy sampler. The tissue samples are placed into sterile, individually-labeled vials, kept on ice, and frozen at the end of the field day. Note that for fish that succumb to capture, a combination of biopsy and/or fillet samples may be collected depending on the needs of the program; inadvertent mortalities are generally used to collect QC samples to minimize the stress of collecting additional biopsy samples on live fish.

Details on ageing structure collection methods are provided in the annual FAMHFP reports (WSP 2023).

Sample Integrity

Sample shipping and handling integrity QA involved documenting any issues with the sample submission across all sampling components (e.g., fish tissue, surface water, porewater, sediment, invertebrate tissue). ALS reports concerns surrounding sample submission as “Sample Integrity” issues in the Sample

[1] While the FAHMFP has been collecting data since 2015, mercury data collection under this program began in 2017.

Receipt Confirmation (SRC) email after the samples were received. Sample integrity issues are typically noted for two reasons: samples were damaged during transport or the recommended hold time for a particular parameter was exceeded prior to analysis. SINLAB reports concerns with samples submitted for SIA via email; typical issues identified are discrepancies between the chain-of-custody (CoC) form and the sample containers.

No samples were reported damaged by the laboratories. Hold time exceedances occurred in several supporting media samples:

- Surface water: pH (0.25 h), nitrite (3 days)
- Porewater: pH (0.25 h), nitrite (3 days)
- Sediment: TOC (3 days)

Sample integrity issues do not necessarily mean the data were unusable; rather, this information is meant to help the client make an informed decision on how to proceed with analysis and interpret the results.

Certified Laboratories

Shipments of samples to the analytical laboratories were accompanied by CoC forms detailing sample identification, reporting requirements, and sample handling information. CoC forms not only inform the laboratory of sample details, they also help ensure that sample handling instructions are followed, sample hold-times are met, and that all samples are accounted for.

Tissue, Water and Sediment (Chemistry) Analysis

All tissue analyses for mercury and moisture along with water and sediment analyses for various parameters has been conducted by ALS Environmental (ALS), a CALA-accredited laboratory in Burnaby, BC. The BC environmental laboratory QA/QC procedures are detailed in Austin (2020).

Carbon and Nitrogen Stable Isotopes Analysis (SIA)

All SIA analyses were completed by the University of New Brunswick's (UNB) Stable Isotopes in Nature laboratory (SINLAB). SINLAB was established in 1999 as part of UNB's Canadian Rivers Institute. They specialize in SIA in environmental samples to support academic, private sector and government researchers.

Age Analysis

Golder (now WSP) has conducted all the fish ageing for the MMP. QA/QC procedures for all MMP baseline data sources included independent verification of individual fish age estimates by two or more experienced practitioners for each aging structure sample.

To continually increase the accuracy of ages assigned using aging structures, specifically fin rays, ageing methods are modified relative to previous study years based on lessons learned on this project and on best practices as published in the literature. Aging methods, including changes, are described in the annual FAHFMP Mon-2, Task 2a reports, the most recent of which is particularly thorough (WSP 2023).

Generalizing across species, the hierarchy of the quality of aging methods is: encounter history & years at-large > otoliths > fin rays > scales (WSP 2023). However, rather than assign a qualitative value to the data (i.e., good, moderate, poor), the MMP Database instead provides the method that was used for ageing, thereby leaving the decision of whether or not to include the ages in an analysis up to the user (i.e., does the user consider fin rays, as an example, to be accurate enough for their purposes).

To date, the MMP has utilized age and weight data as supporting variables, not as primary variables like length, in the assessment of size-mercury relationships in fish. For this reason, all age data have been deemed acceptable for the MMP assessments and included in analysis, recognizing that there is known bias in subsets of the data. To ensure full transparency for future MMP data assessments involving fish age, aging data and aging methods have been carefully documented in the MMP database.

A.3 QUALITY CONTROL

This section provides a summary of QC methods outlining quality control samples and the data quality objectives (DQOs) used to evaluate them. QC results are then reported for fish tissue and supporting media (surface water, porewater, sediment, and invertebrate tissue). Any DQO failures are highlighted, followed by an overall statement of data quality for each of the five main data types.

A.3.1 QC Methods and Data Quality Objectives

Quality control (QC) refers to the formal goals, called data quality objectives (DQOs), that are used to assess data quality, the statistical assessment of data quality, and the remedial measures taken whenever DQOs are not met. DQOs are evaluated through analysis of QC-specific samples that are either collected in the field (field QC samples) or are part of internal QC assessments conducted by certified laboratories (laboratory QC samples).

Field and laboratory QC sample types can be generally categorized as follows:

- Duplicate samples: Field Duplicates (FD) or Laboratory Duplicates (LD)
- Blank samples: Equipment Blanks (EB), Travel Blanks (TB), or Matrix Blanks (MB)
- Positive control QC samples: Matrix Spikes (MS), Laboratory Control Samples (LCS), Certified Reference Material (RM), Secondary Standards & Check Standards (Standards).

Some QC samples only apply to specific media (e.g., Travel Blanks for surface water and porewater only), while others apply to all media (e.g., Field Duplicates).

The level of confidence in the laboratory results is assessed by comparing the QC sample results to DQOs. The DQOs for field and laboratory QC samples are specific to each analyte and type of QC sample and are based on long-term method performance and/or prescribed in the reference methods. It is important to note that DQOs are a guide to data quality. Ultimately, the assessment of overall data quality is made by integrating across all QC results to make a professional judgement decision on the usability of the data for the project. For example, a single DQO does not necessarily mean that the underlying data are unusable for the project. Rather, QC failures are examined on a case-by-case basis to determine their significance. Depending on the situation, assessed data will fall into one of these categories:

- *No issues* – all QC samples meet DQOs
- *Minor issues* – majority of QC samples meet DQOs, but there are infrequent, low-magnitude QC failures that are unlikely to affect overall data usability. Care should be taken not to place too much emphasis on individual results, but general spatial or temporal patterns should be robust.

- *Moderate issues* – frequency or magnitude of QC failures is such that there is sufficient uncertainty in the results that they are considered usable, but that caution should be used when making conclusions regarding low to moderate magnitude temporal or spatial patterns. These data receive a '**cautionary**' QC flag that is permanently associated with the data to allow their easy identification in future analyses.
- *Major issues* – frequency and/or magnitude of QC failures is such that the results are deemed unusable. These data are considered unusable, receive an '**unreliable'** QC flag, and are excluded from future analyses.

DQOs for all QC samples utilized in the Site C MMP are discussed in detail below and are summarized in **Table A3-2** and **Table A3-3**.

DQOs for Duplicate QC Samples (FD and LD)

Chemical Analysis (ALS)

Results of the field and laboratory duplicates are assessed by measuring the relative percent difference (RPD) and comparing results to predefined DQOs. The RPD is the percent difference between original and duplicate measurements and is a measure of precision by the laboratory and the magnitude of variability between original and duplicate samples. In the case of field duplicates, an added level of variability may be attributed to sampling procedures but may also be attributed to natural conditions (i.e., spatial heterogeneity in the sampling media). The equation used to calculate the RPD is as follows:

$$RPD = \frac{(A - B)}{\left(\frac{A + B}{2}\right)} x\ 100$$

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

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. The DQOs for laboratory duplicates are parameter specific. The DQO for methylmercury in water is an RPD between laboratory duplicate samples of less than 30%. DQOs for other parameters are lower (e.g., 20% for metals, 15% for dissolved organic carbon, 10% for alkalinity species, and 5% for conductivity). To account for higher variability in low concentration laboratory duplicates, an RPD DQO exceedances only applies when the absolute difference between duplicate pairs is greater than 2 times the detection limit (denoted by "DIFF"; **Table A3-2** and **Table A3-3**). In certain cases, comparisons of duplicate samples will receive a `not-determined` qualifier when detection limits are not the same (**Table A3-1**).

For the field duplicates, the DQOs were defined as 1.5 times the laboratory RPD DQOs from ALS for chemistry analysis. This approach is consistent with guidance from CCME (2016). Use of 1.5-times multiplier for the field duplicates accounts for the fact that field duplicates are inherently more variable

compared to laboratory duplicates. If ALS did not report an RPD limit for a particular analyte, the DQO was set to an RPD of 40%. This multiplier also applies to absolute difference calculations such that RPD DQO exceedances only apply when the absolute difference (DIFF) between duplicate pairs is greater than 3 times the detection limit (DL).

Procedures followed for all potential combinations of sample and duplicate outcomes are outlined in **Table A3-1**.

Table A3-1. Procedure used to determine whether duplicates samples receive a `not-determined` qualifier or are assessed normally.

Cases		DL Comparison	Outcome			Comment
Samp	Dup		DIFF	RPD	Final	
< Target DL	< Target DL	Identical and low	0	0	Pass	-
< Target DL	< Higher DL	Different	NA	Value	Pass (RPD pass) or ND (RPD fail)	Can't calculate DIFFx due to different DLs
Detect	< Target DL	Identical	Value	Value	Normal	-
Detect	< Higher DL	Different	NA	Value	Pass (RPD pass) or ND (RPD fail)	Can't calculate DIFFx due to different DLs
Detect	Detect	Different	NA	Value	Pass (RPD pass) or ND (RPD fail)	Can't calculate DIFFx due to different DLs
Detect	Detect	Identical	Value	Value	Normal	-

Note: 'DL' = detection limit, 'ND' = not determined, 'DIFFx' = detection limit standardized difference, 'RPD' = relative percentage difference.

Stable Isotope Analysis (SINLAB)

SINLAB uses absolute differences between laboratory duplicate results as a QC check. It is generally expected that laboratory duplicates will be within 1‰ of each other; they are generally re-analyzed if there are larger discrepancies between results (Nakamoto pers. comm. 2022). However, the laboratory does not use this as a strict DQO, but rather to flag it for potential methodological issues, as reproducibility from replicate analysis of unknown samples is often driven by study design and preparation of the sample (e.g., homogenization).

Generally, FD DQO values are set at 1.5x higher than those used for laboratory; however, as SINLAB does not provide formal laboratory duplicates DQOs, FD DQOs were not developed in advance for SIA. Rather, FD for SIA were evaluated following the same approach as laboratory duplicates (absolute difference), with consideration as to how they provide insights into laboratory precision.

DQOs for Blank QC Samples (EB, TB, MB)

For field travel blanks and equipment blanks, the DQO is analyte concentrations below the DLs. In cases where analytes are detected, the relevance of these concentrations is assessed by comparison to the concentrations found in regular samples:

- *Sample result < DL* – no flag
- *Sample result >5 x the concentration detected in the blank QC sample* – no flag
- *Sample result <5 x blank QC sample and sample results consistent with historical data* – cautionary flag
- *Sample result <5 x blank QC sample and sample results unrepresentative of historical data* – unreliable flag

For laboratory matrix blanks, the DQO is also analyte concentrations below DLs. In cases where analytes are detected, two qualifiers are used by ALS to identify sample results that are still deemed reliable:

- *"B" qualifier* - associated sample results which were less than DL or greater than 5 x blank levels are considered reliable
- *"MB" qualifier* - DLs were adjusted for samples with positive hits below 5 x blank levels.

DQOs for Positive Control QC Samples (MS, LCS, RM, Standards)

Chemical Analysis (ALS)

For matrix spikes, laboratory control samples, and reference material the DQO is 100% recovery, plus or minus a certain percentage (generally ± 10 to 30% depending on the analyte).

Stable Isotope Analysis (SINLAB)

SINLAB provides an Interpretation Guide (**Appendix A1**) which includes expected values (mean ± SD) for both secondary and check standards. Although SINLAB conducts this assessment internally, Azimuth has double checked results of the secondary and check standard runs to ensure that their mean ± SD overlaps with that of expected values.

Other QC targets

QC Sample frequency

The target number of QC samples analyzed relative to the total number of samples is outlined in **Table A3-2** and **Table A3-3**. Following guidance from the *BC Field Sampling Manual* (BC Gov, 2013), the target frequency of FD is one every 10 samples (10%), while the frequency of EB and TB varies, but is generally once every sampling event. In chemical analyses conducted by ALS, the frequency for LD, MB, MS, LCS, and RM is 1 in 20 (5%), For SINLAB, the recommended number of samples run in duplicate is 1 in 25 (4%; SINLAB 2023), while Secondary Standards and Check Standards are run at a frequency of 1 to 9%.

Detection Limit (DL) targets

Target detection limits (DL) may not be met for a range of reasons, most commonly due to dilution requirements (high dissolved solids/electrical conductivity), insufficient sample mass, or sample matrix

effects (chemical interference, colour, turbidity). ALS identifies these instances and the adjusted detection limit is assessed for potential implication to the interpretation of results.

Table A3-2. Summary of field quality control (QC) samples and the associated data quality objectives (DQO) specific to laboratory and media type.

QC Sample Group	Quality Control Sample	Sample Description	Media	Laboratory Analysis	Frequency Target	Data Quality Objectives (DQO)
Field	Field Duplicate (FD)	FD provide insights into (a) variability in field conditions and (b) the precision of laboratory analyses. Duplicate samples are collected from the same location and treated independently through the sampling and analysis process.	All media	Chemistry (ALS)	1 in 10	RPD < 1.5 x Lab DQO *IF* DIFF > 3 x DL Same methods as lab duplicates (i.e., DQO and DIFF; see below for more details), but using 1.5x lab duplicate RPD and 3x DL for DIFF, reflecting higher field variability in field samples. Analytes are flagged if both the RPD and DIFF exceed targets. Cases where the detection limits varied between the sample and duplicate are considered "ND" (not determined).
				Stable isotopes (SINLAB)	1 in 10	|SAMP - DUP| ≤ 1‰ No formal DQO. As a QC check, absolute differences between the original and duplicate samples were compared to 1‰ as a guide.
	Equipment Blank (EB)	These samples are analyzed to assess cross contamination in the sampling equipment that could lead to elevated concentrations or false positive data. These samples are comprised of analyte-free deionized water passed through the sampling equipment.	Surface water Porewater Sediment	Chemistry (ALS)	1 per sampling event	Blank < DL *OR* Result > 5 x Blank conc. *OR* Result < DL. Blank conc. is <DL, or the associated sample result is >5x the concentration detected in the blank, or associated sample result is < DL. If associated result is < 5x blank conc. and is consistent with historical results = cautionary flag; unrepresentative of historical = unreliable flag.
	Travel Blank (TB)	Analyzed to verify the “analyte-free” status of the deionized water within the TB sample bottles. Provided by the laboratory and taken into the field unopened. TB assess possible contamination caused by the sample bottles, and cross-contamination from shipping/storage or at the laboratory.	Surface water Porewater			

Note: DL = Detection Limit; RPD = Relative Percent Difference; DQO = Data Quality Objective.

Table A3-3. Summary of laboratory quality control (QC) samples and the associated data quality objectives (DQO) specific to laboratory and media type.

QC Sample Group	Quality Control Sample	Sample Description	Media	Laboratory Analysis	Frequency Target	Data Quality Objectives (DQO)
Laboratory	Lab Duplicate (LD)	Aliquots taken from the samples and run through part (post digestion) or all (from the sample bottle) of the laboratory analytical process. Laboratory duplicates provide an estimate of the precision of the analytical method (reproducibility).	All media	Chemistry (ALS)	1 in 20	(RPD < Lab DQO) *IF* (DIFF > 2 x DL) Two methods are used to compare measurements from original and duplicate samples: relative percent difference (RPD) between duplicates and absolute difference (DIFF) between duplicates. RPD DQO limits are set by the lab for each parameter and the threshold for DIFF is 2x DL. Analytes are flagged if both the RPD and the DIFF exceed targets. Cases where the detection limits varied between the sample and duplicate are considered "ND" (not determined).
				Stable isotopes (SINLAB)	1 in 25	|SAMP - DUP| ≤ 1‰ No formal DQO, used as QC check. Absolute differences of original sample and duplicate should not exceed 1‰.
	Matrix Blank (MB)[1]	An analyte-free matrix used to assess background interference or contamination that exists in the lab environment and reagents that could lead to elevated concentrations and false positive data.	All media	Chemistry (ALS)	1 in 20	Blank < DL Blank conc. is <DL. If blank exceeds DLs, two qualifiers are used by ALS to identify sample results that are still deemed reliable.[1]
	Matrix Spike (MS)	These samples involve the analysis of actual samples, to which a known amount of method analytes are added in amounts high enough that the spikes are clearly discernible relative to existing concentrations. These samples provide insights into the degree that the sample matrix could interfere with analyses.	Surface water Porewater Sediment	Chemistry (ALS)	1 in 20	100% Recovery ± 10 to 40% Recovery (measured concentration of parameter in actual sample, relative to spiked amount) should be +/- 30% for most analytes and +/- 40% for MeHg. Cases where the spiked amount is not sufficiently high relative to concentrations already in the sample are considered "ND" (not determined).
	Lab Control Sample (LCS)	Samples of known concentration which undergo processing identical to that carried out for test samples. These samples provide an estimate of the accuracy of the analytical method.	All media	Chemistry (ALS)	1 in 20	100% Recovery ± 10 to 30% Results (measured concentration of parameter in reference material, relative to spiked amount) should typically be within +/- 20% for most analytes and +/- 30% for MeHg.
	Certified Reference Material (RM)	Homogenous material with known and well-established analyte concentrations. RM are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix.	Tissue (fish & invertebrate) Sediment	Chemistry (ALS)	1 in 20	100% Recovery ± 30% Results (measured concentration of parameter in reference material, relative to spiked amount) +/- 30% for Hg and MeHg.
	Secondary Standards & Check Standards	Secondary standards are SINLAB's internal working standards calibrated against International Atomic Energy Agency (IAEA) primary standards. Check standards are commercially available standards analyzed in each SINLAB sample batch to assess analytical accuracy.	Tissue (fish & invertebrate)	Stable isotopes (SINLAB)	1 to 9%	Within mean ± SD of expected value. See SINLAB Interpretation Guide (Appendix A1) for expected values.

Note: DL = Detection Limit; RPD = Relative Percent Difference; DQO = Data Quality Objective.

[1] Two qualifiers are used by ALS if MB exceed DQOs (MB Result > DL): "B" qualifier - associated sample results which were less than DL or greater than 5 x blank levels were considered reliable; "MB" qualifier - DLs were adjusted for samples with positive hits below 5x blank levels.

A.3.2 Fish QC Results

A.3.2.1 Fish ID and Morphometrics

Fish identification and morphometric data for the Site C MMP are comprised of species, maturity, body length, and body weight measurements.

Field QC

Fish identification and morphometric data were recorded directly into an electronic database in the field. This electronic system included instantaneous QC checks of length and weight by calculating condition (K) and comparing the results for each fish to expected norms.

Laboratory QC

There is no laboratory QC component for these data.

Overall QC Assessment

These data meet the data quality needs of the MMP.

A.3.2.2 Tissue Chemistry

Field QC

Field Duplicates (FD)

Field QC results for 2021 and 2022 are summarized in **Table A3-4**. A total of 104 FD samples were analyzed: 94 were for fish tissue (73 for total mercury [70% of total] and 21 for methylmercury [20% of total]) and 10 were for invertebrate tissue (5 for total mercury and 5 for methylmercury [10% of total samples for both]). FD were explicitly included in both the 2021 and 2022 events for the MMP, but none were collected for the ICSP (note that FD will be added to the ICSP in 2023). The frequency of FD for mercury in fish tissue (presented as a percentage) was slightly below the target (1 in 10) across years, with 8% of samples for 2022 and 4% of samples in 2021 (not a formal MMP event). There were no FD fails for total mercury (0%) and one fail for methylmercury (4.8%); two FD for total mercury were not determined ('ND') due to detection limit differences. Overall, the FD results indicate that both total mercury and methylmercury results generally meet their respective accuracy-based DQOs.

Laboratory QC

ALS' laboratory QC results are summarized in **Table A3-6**; details on each QC sample type and their respective results are described below:

- *Laboratory Duplicates (LD)* – Forty-three LD samples were analyzed, 33 for total mercury and 7 for methylmercury (**Table A3-6**). Regarding fish tissue, the target frequency for LD was exceeded for methylmercury (9%) and slightly lower than the target for mercury (3%). For invertebrate tissue, the target frequency for LD was met for mercury (5%) and slightly lower for methylmercury (2%). All total mercury LD samples met the DQO except for two that were not determined due to different detection limits (**Table A3-7**). For methylmercury, one of 7 LD samples (14%) failed to meet the DQO (**Table A3-7**). These results indicate good reproducibility for total mercury, but suggest some caution be used in the interpretation of individual sample results involving methylmercury (see Overall QC Assessment for more information).
- *Laboratory Control Samples (LCS)* – One hundred sixty-three (140 for total mercury; 23 for methylmercury) LCS samples were analyzed (**Table A3-6**). Only one of 140 of total mercury LCS samples (0.7%), and none of the methylmercury LCS samples (0%), failed to meet the DQO (**Table A3-8**). Note that the one LCS failure for total mercury was only marginally outside the 80 to 120% recovery range; the measured value was barely less than the 80% lower recovery cutoff and rounded up to 80% (**Table A3-8**). Overall, these results indicate good accuracy in ALS' mercury or methylmercury analyses relative to their internal reference standards.
- *Matrix Blanks (MB)* – None of the 163 MB samples (140 for total mercury; 23 for methylmercury) contained detectable amounts of total mercury or methylmercury (**Table A3-6**), suggesting that the sensitivity of the analytical instruments were set appropriately.
- *Certified Reference Materials or Reference Materials (RM)* – All 163 RM samples (140 for total mercury; 23 for methylmercury) met the DQOs (**Table A3-6**). These results confirm the accuracy of ALS' tissue mercury or methylmercury analyses.

Overall QC Assessment

Overall, the results of the 636 mercury-related field and laboratory QC checks conducted on the 2021 and 2022 tissue chemistry samples indicate that the DQOs for the Site C MMP were generally met. Results for total mercury were very good, with only one marginal LCS failure across all QC sample types. Methylmercury showed more mixed results, with higher DQO failure results for duplicates (4.8% for FD and 14% for LD) relative to MB (0%), LCS (0%) and RM (0%). The contrasting QC results for methylmercury warrant caution in the interpretation of individual sample results, but are reliable when interpreting overall trends. The QC results verify that the total mercury and methylmercury tissue chemistry results meet the data quality needs of the MMP.

A.3.2.3 Tissue Stable Isotopes

Field QC

Field Duplicates (FD)

Field QC results across year, program, and tissue type for stable isotopes are provided in **Table A3-9**. FD tissue samples were run for $\delta^{13}C$ (104 total; 96 fish; 8 invertebrates) and $\delta^{15}N$ (104 total; 96 fish; 8 invertebrates). The minimum target for FD frequency (10% as a percentage) was met for invertebrate tissue (21%) and was slightly below for fish tissue (9%). Absolute differences were higher than 1‰ for 10 of 104 $\delta^{13}C$ samples (9.6%) and for 5 of 104 $\delta^{15}N$ samples (4.8%) (**Table A3-10**). For perspective, an absolute difference of 1.5 ‰ on a sample result of -30‰ would represent a 5% difference. Results for invertebrates showed that 37.5% of FD samples had absolute differences greater than 1‰ for both $\delta^{13}C$ and $\delta^{15}N$ (i.e., 3 of 8). The much higher result for the invertebrate tissue FD is likely the result of compositing a number of organisms for each sample type.

Laboratory QC

Laboratory Duplicates (LD)

There was a total of 141 laboratory duplicate samples across years, programs, and tissue types (**Table A3-11**). The target for LD frequency (4% as a percentage) was met for both fish and invertebrate tissue (7% for fish and 5% for invertebrates). Absolute differences from only one laboratory duplicate exceeded 1‰ in comparison to the original run, with a difference only slightly in exceedance (i.e., 1.4 ‰; **Table A3-12**). The high number of laboratory duplicates that met DQOs (99 %) suggest results from the stable isotope analysis provided precise results.

Secondary Standards and Check Standards (Standards)

Results for secondary and check standards were all within their respective expected range (**Table A3-13**). This indicates that these results are calibrated to the international scale and that there was analytical accuracy between runs.

Overall QC Assessment

SIA data are used in the MMP to provide ecological context to the tissue mercury results. They can provide high-level insights into why tissue mercury concentrations might be different among species, locations or time periods, or help to understand the results for individual fish (e.g., those with different feeding strategies than their cohorts).

The QC results were fairly good overall. The results for fish had some elevated FD results for $\delta^{13}C$, but not they were generally minor. The biggest concern was the results for the benthic invertebrate tissue samples, which had elevated FDs for both $\delta^{13}C$ and $\delta^{15}N$. While the $\delta^{13}C$ FD differences were on the

order of 10% (i.e., the absolute difference between the sample and the duplicate was approximately 10% of the measured value in the sample), the $\delta^{15}N$ FDs were quite a bit higher (e.g., 50% or more). Note that the lack of issues with the LDs suggests that despite careful sorting of the individuals by order and size, there may have still be unnoticed differences (e.g., in feeding preferences) that lead to inadvertent bias between the samples and the duplicates. However, while that could explain the results, it does not correct the issue.

Consequently, the results for fish (both $\delta^{13}C$ and $\delta^{15}N$) and the $\delta^{13}C$ results for benthic invertebrates can be relied on in their supportive role in the MMP. However, the $\delta^{15}N$ results for benthic invertebrates will receive a 'cautionary flag' that will be added to the Site C MMP Database.

A.3.2.4 Fish Age

Field QC

For information on the age data field QC procedure, see each program's reports (Golder 2022, WSP 2023)

Laboratory QC

For information on the age data field QC procedure, see each program's reports (Golder 2022, WSP 2023)

Overall QC Assessment

The relative variability of fish age data is typically much higher than either fish length or weight. Golder (now WSP) has introduced methods meant to improve the accuracy and precision of estimates, but not to a level where the results would be similar to fish length from a measurement variability perspective. As discussed in **Section A.2** (see Age Analysis), the magnitude of variability, and hence confidence in the aging results, depends on the aging structures used.

Age is used in the MMP to help inform fish growth rates, which can affect tissue mercury concentrations (e.g., faster growing fish tend to "dilute" tissue mercury concentrations relative to slower growing fish). While fish mercury programs are usually limited to the ages of fish sampled in the program, the MMP has the added benefit of the full FAHMFP dataset to make inferences about different growth rates among locations, populations or time periods. In addition, both the MMP and FAHMFP databases include a field identifying the aging structure used, providing a means of understanding the degree of confidence associated with each age estimate.

Overall, the aging data meets the needs of the MMP.

A.3.2.5 Tissue Chemistry QC Tables

Table A3-4. Summary of mercury-related tissue chemistry field quality control results for the Site C MMP dataset, 2021 and 2022.

Events: 2021 to 2022						
Year	**Program**	**Type**	**Analyte**	**Pass**	**Fail**	**ND**
Field Duplicate						
2021	Pre-MMP	Fish	Mercury	11	0	1
2022	MMP	Fish	Mercury	60	0	1
2022	MMP	Fish	Methylmercury	20	1	0
2022	MMP	Inverts	Mercury	5	0	0
2022	MMP	Inverts	Methylmercury	5	0	0

Note: 'ND' = not determined.

Table A3-5. Details for mercury-related tissue chemistry field duplicate samples not explicitly meeting data quality objectives for the Site C MMP dataset, 2021 and 2022.

Events: 2021 to 2022										
Year	**Group**	**Analyte**	**Species**	**Units**	**DL**	**Samp**	**Dup**	**RPD**	**DIFFx**	**FD.QC**
Field Duplicate										
2022	44	Mercury	Walleye	mg/kg dwt	0.019	0.345	2.58	152.8	NA	ND
2021	1	Mercury	Mountain Whitefish	mg/kg wwt	0.0029	0.16	0.0416	117.5	NA	ND
2022	34	Methylmercury	Mountain Whitefish	µg/kg dwt	5	56.7	28.1	67.5	5.7	Fail

Note: `DL` = detection limit, `RPD` = relative percentage difference, `DIFFx` = detection limit standardized difference, FD.QC = QC outcome for FD, `ND` = not determined, 'Samp' = sample result, 'Dup' = " duplicate result, `dwt` = dry weight, and `wwt` = wet weight.

Table A3-6. Summary of mercury-related tissue chemistry laboratory quality control results for the Site C MMP dataset, 2021 and 2022.

Events: 2021 to 2022															
Year	**Program**	**Type**	**Analyte**	**Pass**	**Fail**	**ND**	**Pass**	**Fail**	**ND**	**Pass**	**Fail**	**ND**	**Pass**	**Fail**	**ND**
					LD			*LCS*			*MB*			*RM*	
2021	ICSP	Fish	Mercury	1	0	0	1	0	0	1	0	0	1	0	0
2021	Pre-MMP	Fish	Mercury	3	0	0	28	1	0	29	0	0	29	0	0
2022	ICSP	Fish	Mercury	2	0	0	4	0	0	4	0	0	4	0	0
2022	ICSP	Fish	Methylmercury	2	0	0	4	0	0	4	0	0	4	0	0
2022	MMP	Fish	Mercury	26	0	1	101	0	0	101	0	0	101	0	0
2022	MMP	Fish	Methylmercury	4	1	0	15	0	0	15	0	0	15	0	0
2022	MMP	Inverts	Mercury	1	0	1	5	0	0	5	0	0	5	0	0
2022	MMP	Inverts	Methylmercury	1	0	0	4	0	0	4	0	0	4	0	0

Note: 'LB' = Laboratory Blanks, 'LCS' = Laboratory Control Samples, 'MB' = Matrix Blanks, and 'RM' = Certified Reference Materials), 'ND' = not determined.

Table A3-7. Details for mercury-related tissue chemistry laboratory duplicates not explicitly meeting data quality objectives for the Site C MMP, 2021 and 2022.

Events: 2021 to 2022							
Year	**Program**	**Type**	**Reference**	**Analyte**	**RPD**	**DIFFx**	**LD.QC**
Laboratory Duplicate							
2022	MMP	Fish	FJ2203438-099	Mercury (Hg)-Total	43.8	NA	ND
2022	MMP	Fish	FJ2203438-099	Methylmercury (as MeHg)	139.6	4.6	Fail
2022	MMP	Inverts	FJ2203485-040	Mercury (Hg)-Total	41.5	NA	ND

Note: `RPD` = relative percentage difference, `DIFFx` = detection limit standardized difference, and LD.QC = QC outcome for LD, 'ND' = not determined.

Table A3-8. Details for mercury-related tissue chemistry laboratory control samples not explicitly meeting data quality objectives for the Site C MMP dataset, 2021 and 2022.

Events: 2021 to 2022								
Year	**Program**	**Type**	**ALSQC ID**	**QC Lot**	**Analyte**	**Percent**	**Limit**	**LCS.QC**
Laboratory Control Sample								
2021	Pre-MMP	Fish	QC-MRG2-444219002	444219	Mercury	80*	80-120	Fail

Note: 'ND' = not determined, LCS.QC = QC outcome for laboratory control sample, and*= value slightly lower than 80% (so QC fail) but rounded up for table.

Table A3-9. Summary of stable-isotope-related tissue chemistry field duplicate quality control results for the Site C MMP dataset, 2021 and 2022.

Events: 2021 to 2022						
Year	Program	Type	Sample Type	Stable Isotope	Absolute Difference (‰)	
					≤ 1	> 1
Field Duplicate						
2021	MMP	Fish	Biopsy Plug	d13C	22	4
2021	MMP	Fish	Biopsy Plug	d15N	26	0
2021	MMP	Fish	Fillet	d13C	10	0
2021	MMP	Fish	Fillet	d15N	10	0
2022	MMP	Fish	Biopsy Plug	d13C	29	2
2022	MMP	Fish	Biopsy Plug	d15N	30	1
2022	MMP	Fish	Fillet	d13C	28	1
2022	MMP	Fish	Fillet	d15N	28	1
2022	MMP	Inverts	Invertebrate	d13C	5	3
2022	MMP	Inverts	Invertebrate	d15N	5	3

Table A3-10. Details for stable-isotope-related tissue chemistry field duplicate quality control not explicitly meeting data quality objectives for the Site C MMP, 2021 and 2022.

Events: 2021 to 2022										
Sample Type	**Year**	**Program**	**Type**	**Workorder**	**SI**	**Samp Label Name**	**Samp**	**Dup Label Name**	**Dup**	**Absolute Difference (‰)**
Field Duplicate										
Biopsy Plug	2021	MMP	Fish	22GOLD 001-318	d13C	SIA-2021-039	-29.3	SIA-2021-117	-28	1.31
Biopsy Plug	2021	MMP	Fish	22GOLD 001-318	d13C	SIA-2021-091	-30.5	SIA-2021-121	-32.2	1.66
Biopsy Plug	2021	MMP	Fish	22GOLD 001-318	d13C	SIA-2021-128	-27.5	SIA-2021-114	-28.7	1.11
Biopsy Plug	2021	MMP	Fish	22GOLD 001-318	d13C	SIA-2021-101	-28.8	SIA-2021-119	-30.6	1.78
Biopsy Plug	2022	MMP	Fish	22GOLD 319-926	d13C	SIA-2022-4114	-29.1	SIA-2022-4299	-30.9	1.8
Biopsy Plug	2022	MMP	Fish	22GOLD 319-926	d13C	SIA-2022-4220	-29	SIA-2022-4221	-27.1	1.84
Biopsy Plug	2022	MMP	Fish	22GOLD 319-926	d15N	SIA-2022-4114	7.9	SIA-2022-4299	10.5	2.56
Fillet	2022	MMP	Fish	23AZ 034-169	d13C	Hg-2022-3397	-28.7	Hg-2022-3398	-32.5	3.81
Fillet	2022	MMP	Fish	23AZ 034-169	d15N	Hg-2022-3397	8	Hg-2022-3398	10.6	2.61
Invertebrate	2022	MMP	Inverts	23AZ 034-169	d13C	PR2-TT-A	-31.6	PR2-TT-B	-29.3	2.28
Invertebrate	2022	MMP	Inverts	23AZ 034-169	d13C	PD1-PB-A	-32.5	PD1-PB-B	-28.8	3.74
Invertebrate	2022	MMP	Inverts	23AZ 034-169	d13C	PD1-PB-A	-32.5	PD1-PB-C	-28.9	3.66
Invertebrate	2022	MMP	Inverts	23AZ 034-169	d15N	PR2-TT-A	7	PR2-TT-B	3.2	3.81
Invertebrate	2022	MMP	Inverts	23AZ 034-169	d15N	PD1-PB-A	7	PD1-PB-B	2.4	4.58
Invertebrate	2022	MMP	Inverts	23AZ 034-169	d15N	PD1-PB-A	7	PD1-PB-C	2.5	4.49

Note: 'SI' = stable isotope.

Table A3-11. Summary of laboratory duplicate quality control results for the Site C baseline stable Isotope dataset, 2021 and 2022.

Events: 2021 to 2022					
Year	Program	Type	Stable Isotope	Absolute Difference (‰)	
				≤ 1	> 1
Laboratory Duplicate					
2021	ICSP	Fish	d13C	1	0
2021	ICSP	Fish	d15N	1	0
2021	MMP	Fish	d13C	20	1
2021	MMP	Fish	d15N	18	0
2022	ICSP	Fish	d13C	2	0
2022	ICSP	Fish	d15N	2	0
2022	MMP	Fish	d13C	46	0
2022	MMP	Fish	d15N	46	0
2022	MMP	Inverts	d13C	2	0
2022	MMP	Inverts	d15N	2	0

Table A3-12. Details for laboratory duplicate quality control not meeting data quality objectives for the Site C baseline stable isotope dataset, 2021 and 2022.

Events: 2021 to 2022								
SINLAB ID	Year	Program	Workorder	Type	Stable Isotope	Samp	Dup	Absolute Difference
Laboratory Duplicate								
22GOLD 001	2021	MMP	22GOLD 001-318	Fish	d13C	-30.7	-32	1.4

Note: 'Samp' = sample result, 'Dup' = duplicate result.

Table A3-13. Summary of laboratory standard quality control results for the Site C baseline stable Isotope dataset, 2021 and 2022.

Events: 2021 to 2022							
Year	**Program**	**Type**	**Workorder**	**Standard**	**SI**	**Pass**	**Fail**
Laboratory Standard							
2021	ICSP	Fish	21LAB 264-282	Check standards	d13C	2	0
2021	ICSP	Fish	21LAB 264-282	Check standards	d15N	2	0
2021	ICSP	Fish	21LAB 264-282	Secondary standards	d13C	3	0
2021	ICSP	Fish	21LAB 264-282	Secondary standards	d15N	3	0
2021	MMP	Fish	22GOLD 001-318	Check standards	d13C	2	0
2021	MMP	Fish	22GOLD 001-318	Check standards	d15N	2	0
2021	MMP	Fish	22GOLD 001-318	Secondary standards	d13C	3	0
2021	MMP	Fish	22GOLD 001-318	Secondary standards	d15N	3	0
2022	MMP	Fish	22GOLD 319-926	Check standards	d13C	2	0
2022	MMP	Fish	22GOLD 319-926	Check standards	d15N	2	0
2022	MMP	Fish	22GOLD 319-926	Secondary standards	d13C	3	0
2022	MMP	Fish	22GOLD 319-926	Secondary standards	d15N	3	0
2022	ICSP	Fish	23AZ 001-033	Check standards	d13C	2	0
2022	ICSP	Fish	23AZ 001-033	Check standards	d15N	2	0
2022	ICSP	Fish	23AZ 001-033	Secondary standards	d13C	3	0
2022	ICSP	Fish	23AZ 001-033	Secondary standards	d15N	3	0
2022	MMP	Inverts and Fish	23AZ 034-169	Check standards	d13C	2	0
2022	MMP	Inverts and Fish	23AZ 034-169	Check standards	d15N	2	0
2022	MMP	Inverts and Fish	23AZ 034-169	Secondary standards	d13C	3	0
2022	MMP	Inverts and Fish	23AZ 034-169	Secondary standards	d15N	3	0

Note: 'SI' = stable isotope.

A.3.3 Supporting Media QC Results

A.3.3.1 Surface Water

Core MMP surface water sampling focuses on the primary and supplemental MMP parameters (**Table 3-3 in the Main Report**) during the August and October sampling events. The QC assessment screened the 2022 MMP surface water results against each of the DQOs outlined in **Section A.3.1**.

Surface water sampling in 2022 occurred at eight stations along the Peace River from the Williston Reservoir downstream to Many Islands, AB (W1, D1, PR1, PR2, PR3, PD1, PD3, PD5). All of the surface water field and laboratory QC sample results met the DQO requirements in 2022 (**Table A3-14**), including QC sample frequency and DL targets. Details of the results are provided below.

Field QC

Across the 23 surface water samples collected, there were 12 Field Duplicates (FD), an Equipment Blank (EB), and three Travel Blanks (TB) collected for QC evaluation. No DQO failures occurred for any of the parameters and all QC sample frequency targets were met. **Table A3-15** and **Table A3-16**.

Laboratory QC

Laboratory QC results compared to DQOs for Laboratory Duplicates (LD), Laboratory Control Samples (LCS), Matrix Spikes (MS), and Matrix Blanks (MB) from 2022 are outlined in **Table A3-14**. No DQO failures occurred in any of the laboratory QC samples. A detailed summary of the laboratory QC evaluation for mercury parameters is provided in **Table A3-17** and **Table A3-18**.

There were 20 MS results from 2022 where a “not determined” result occurred (**Table A3-19**). These occurrences do not indicate a QC failure, but rather that the spiked amount was not sufficiently high relative to the concentration in the sample.

Overall QC Assessment

Across the 594 DQO checks on the primary and supplementary parameters analyzed for each of the field and laboratory QC samples, no DQO failures occurred (**Table A3-14**). The QC results confirm the accuracy of the surface water analyses and meet the data quality needs of the MMP.

Surface Water QC Tables

Table A3-14. Surface water field and laboratory QC sample results compared to DQOs across all parameters.

Event(s): 2022.08, 2022.09, 2022.10			
	Pass	**Fail**	**ND**
Field			
Field Duplicate	71	0	0
Equipment Blank	2	0	0
Travel Blank	16	0	0
Laboratory			
Lab Duplicate	128	0	0
Lab Control Sample	143	0	0
Matrix Spike	80	0	20
Matrix Blank	134	0	0
Sum	574	0	20

Note: 'ND' = not determined.

Table A3-15. Summary of surface water field duplicates for mercury parameters in 2022.

Analyte	Max RPD	RPD Limit	Pass	Fail
Field Duplicate (FD)				
Mercury, dissolved	0%	30%	12	0
Mercury, total	37.3%[1]	30%	12	0
Methylmercury (as MeHg), dissolved	22.2%	45%	12	0
Methylmercury (as MeHg), total	16.7%	45%	12	0

Note:

'RPD' = Relative Percent Difference; 'Max RPD' = maximum across all duplicate-sample comparisons.

[1] Absolute difference < 3x: RPD DQO exceedances only apply if absolute differences between duplicates is 3 x DL.

Table A3-16. Summary of surface water field blanks for mercury parameters in 2022.

Analyte	Result (ng/L)	DL (ng/L)	Pass	Fail
Equipment Blank (EB)				
Mercury, total	<0.5	0.5	1	0
Methylmercury (as MeHg), total	<0.02	0.02	1	0
Travel Blank (TB)				
Mercury, total	<0.5	0.5	3	0
Methylmercury (as MeHg), total	<0.02	0.02	3	0

Note: 'DL' = Detection Limit.

Table A3-17. Summary of surface water laboratory duplicates for mercury parameters in 2022.

Analyte	Max RPD	RPD Limit	Pass	Fail
Laboratory Duplicate (LD)				
Mercury, dissolved	7.4%	20%	8	0
Mercury, total	11.6%	20%	8	0
Methylmercury (as MeHg), dissolved	26.8%	30%	9	0
Methylmercury (as MeHg), total	2.2%	30%	12	0

Note: 'RPD' = Relative Percent Difference; 'Max RPD' = maximum across all duplicate-sample comparisons.

Table A3-18. Summary of surface water laboratory LCS, MB, and MS results for mercury parameters in 2022.

Analyte	Recovery (%)	Limits	Pass	Fail	ND
Laboratory Control Sample (LCS)					
Mercury, dissolved	100-107	80-120	8	0	-
Mercury, total	100-115	80-120	8	0	-
Methylmercury (as MeHg), dissolved	74-89	70-130	9	0	-
Methylmercury (as MeHg), total	76-93	70-130	15	0	-
Matrix Blank (MB)					
Mercury, dissolved	0	DL	8	0	-
Mercury, total	0	DL	8	0	-
Methylmercury (as MeHg), dissolved	0	DL	9	0	-
Methylmercury (as MeHg), total	0	DL	15	0	-
Matrix Spike (MS)					
Mercury, dissolved	91-105	70-130	8	0	0
Mercury, total	99-100	70-130	8	0	0
Methylmercury (as MeHg), dissolved	61-86	60-140	8	0	0
Methylmercury (as MeHg), total	69-86	60-140	12	0	0

Note: 'ND' = not determined; 'DL' = Detection Limit; 'Limits' = the percent recovery range which passes DQOs.

Table A3-19. Surface water parameters where matrix spike results were not determined (ND).

QC Lot	Analyte	ALS QC ID[1]	ID Name	Samp Type
624673	Nitrate (as N)	Anonymous	NA	NA
624762	Calcium, dissolved	Anonymous	NA	NA
624762	Magnesium, dissolved	Anonymous	NA	NA
622631	Calcium, dissolved	Anonymous	NA	NA
622631	Magnesium, dissolved	Anonymous	NA	NA
624762	Calcium, dissolved	Anonymous	NA	NA
624762	Magnesium, dissolved	Anonymous	NA	NA
632979	Calcium, dissolved	Anonymous	NA	NA
632979	Magnesium, dissolved	Anonymous	NA	NA
631727	Calcium, dissolved	Anonymous	NA	NA
706622	Chloride	Anonymous	NA	NA
706621	Sulfate (as SO4)	Anonymous	NA	NA
712298	Calcium, dissolved	Anonymous	NA	NA
712298	Magnesium, dissolved	Anonymous	NA	NA
712946	Calcium, dissolved	Anonymous	NA	NA
712946	Magnesium, dissolved	Anonymous	NA	NA
718309	Calcium, dissolved	PR1	Upper Site C	Sample
718309	Magnesium, dissolved	PR1	Upper Site C	Sample
720452	Calcium, dissolved	Anonymous	NA	NA
720452	Magnesium, dissolved	Anonymous	NA	NA

Note:

[1] ALS QC ID listing of 'Anonymous' indicates QC sample from another client used.

A.3.3.2 Porewater

Core MMP primary and supplementary porewater parameters are outlined in **Table 3-4 in the Main Report**. The QC assessment examined the results for these parameters from field and laboratory QC samples which were evaluated against each of the DQOs outlined in **Section A.3.1**.

Seven porewater samples were collected in 2022 along the Peace River from the Site C Tailrace downstream to Many Islands, AB. All of the porewater field and laboratory QC sample results met the DQO requirements in 2022 with the exception of methylmercury within a field duplicate from station PD1 and a laboratory duplicate for pH (**Table A3-20**). All QC sample frequency targets were met, however, there were a number of porewater samples where methylmercury DLs were raised from 0.02 to 0.04 ng/L; these changes did not impact the results. Details of the QC evaluation are provided below.

Field QC

Field Duplicates (FD)

One FD was collected for porewater, corresponding to approximately 14% of the total number of porewater samples (n=7). Of the 20 parameters analyzed, only methylmercury failed to meet the DQO (**Table A3-21**).

The porewater FD (PD1-B) that exceeded DQOs was collected from a sediment sample in tandem with sample PD1-A. Although the two sediment samples were collected at the same sampling station, Ponar sampling collects sediment off the bottom over a spatial scale that can range up to 10s of meters depending on water depth and boat movement and could cause heterogeneity in sampling results. Despite this, the porewater analyses confirmed the presence of suspended solids (TSS) in the PD1-B FD (8.7 mg/L) which is unusual for a filtered sample. TSS concentrations were also elevated above DLs in samples PD1-A (collected with PD1-B on August 24) and PR1 (collected on August 26).

While only one FD was collected for porewater, 12 were collected for surface water (**Table A3-15**) with no DQO failures for any of the mercury parameters. Additionally, no porewater laboratory duplicates failed to meet the DQOs for the mercury parameters. These findings indicate field sampling (TSS present in sample), rather than low precision in the laboratory analysis, is likely responsible for the single FD DQO failure.

Equipment Blanks (EB) and Travel Blanks (TB)

All mercury parameters measured in the EB (mercury parameters were not measured in the TB) met the DQOs (**Table A3-22**), however nitrate was detected in the EB and failed the DQO as the corresponding sample concentration was <5 x the concentration detected in the blank (**Table A3-23**). This data point was given a cautionary flag as the sample result only marginally exceeded the detection limit. Nitrate in 2023 field blank QC samples will be observed closely. All QC sample frequency targets were met for field blanks.

Laboratory QC

Laboratory Duplicates (LD)

Across the 71 LD DQO checks conducted in 2022 on the porewater parameters, no failures occurred for any of the mercury parameters (**Table A3-24**). In one travel blank LD, pH was flagged (**Table A3-25**), though it did still meet the ALS DQO since the pH was measured in water of low ionic strength (QDO = +/- 1 pH unit where EC<200 µS).

Laboratory Control Samples (LCS), Matrix Blanks (MB), and Matrix Spikes (MS)

All LCS, MB, and MS samples met the DQOs and all QC sample frequency targets were met (**Table A3-20**). A detailed summary of the number of laboratory QC samples is provided in **Table A3-26**. Sixteen MS samples from 2022 were "not determined" for calcium, DOC, magnesium, nitrate, and sulfate. These occurrences do not indicate a QC failure, but rather that the spiked amount was not sufficiently high relative to the concentration in the sample.

Overall QC Assessment

All analyte/QC sample types were considered to have met their respective DQOs except for methylmercury in the field duplicate and nitrate in the field blank. The methylmercury field duplicate showed higher variability than specified in the data quality objective (RPD ≤ 45 %). While this result could be due to small-scale differences in conditions in the sediments at a particular location, the porewater analyses confirmed the presence of suspended solids (TSS) in about half the samples (**Section 3.3.3 in the Main Report**). As discussed for surface water, the presence of TSS can influence concentrations of both total mercury and methylmercury; Azimuth is working with the sampling team (Ecofish/Aski) to better understand this issue with the aim of improving methods for the next event.

Regardless of the underlying reason why, the field duplicate results for methylmercury indicate the potential for moderately high variability in the porewater methylmercury data. Consequently, given that the results do not appear anomalous relative to other porewater data collected in the watershed, a 'cautionary' QC flag will be applied to these data (see details on QC flags in **Section A.3.1**). This means that the 2022 porewater methylmercury data will be clearly marked so that future interpretation of trends considers the variability of the 2022 porewater methylmercury data.

The detection of nitrate in the EB is considered minor since the concentration was only marginally above the detection limit. Nitrate in porewater has been given a cautionary flag and will be observed closely in 2023 field blank QC samples.

Porewater QC Tables

Table A3-20. Porewater laboratory and field QC sample results compared to DQOs across all parameters.

Event: 2022.08 | Date(s): Aug 2022			
	Pass	Fail	ND
Field			
Field Duplicate	12	**1**	0
Equipment Blank	11	**1**	0
Travel Blank	7	0	0
Laboratory			
Lab Duplicate	70	**1**	0
Lab Control Sample	71	0	0
Matrix Spike	39	0	16
Matrix Blank	66	0	0
Sum	276	**3**	16

Note: 'ND' = not determined.

Table A3-21. Summary of porewater field duplicates for mercury parameters in 2022.

Analyte	Max RPD[1]	RPD Limit	Pass	Fail
Field Duplicate (FD)				
Mercury, dissolved	29.5%	30%	1	0
Methylmercury (as MeHg), dissolved	69.8%	45%	0	**1**[1]

Note:

'RPD' = Relative Percent Difference (DQO = RPD < 1.5 x Laboratory Duplicate DQO). RPD DQO exceedances only apply if absolute differences between duplicates is 3 x DL (**Section A.3.1**).

[1] PD1-B taken as duplicate of sample PD1-A (ALS workorder: FJ2202312_0).

Table A3-22. Summary of porewater field blanks for mercury parameters in 2022.

Analyte	Result (ng/L)	DL (ng/L)	Pass	Fail
Equipment Blank (EB)				
Mercury, dissolved	<0.50	0.5	1	0
Methylmercury (as MeHg), total	<0.02	0.02	1	0

Note:

'DL' = Detection Limit.

No mercury parameters were analyzed in the travel blank.

Table A3-23. Porewater parameters not meeting field blank DQOs.

Event: 2022.08 | Date(s): Aug 2022					
QC Lot	**Blank Type**	**Analyte**	**Results**	**DL**	**FB QC**
621464	EB	Nitrate (as N)	0.0095	0.005	Fail

Table A3-24. Summary of porewater laboratory duplicates for mercury parameters in 2022.

Analyte	Max RPD	RPD Limit	Pass	Fail
Laboratory Duplicate (LD)				
Mercury, dissolved	7.0	20	5	0
Methylmercury (as MeHg), dissolved	12.2	30	5	0

Note: 'RPD' = Relative Percent Difference; 'Max RPD' = maximum across all duplicate-sample comparisons.

Table A3-25. Porewater parameters not meeting laboratory duplicate DQOs.

Event: 2022.08 | Date(s): Aug 2022					
ALS Work Order	**QC Lot**	**Analyte**	**RPD[1]**	**DIFFx[2]**	**LD QC**
FJ2202370_0	628287	pH	6.1%	3.6	Fail[3]

Note:

[1] 'RPD' = Relative Percent Difference (DQO = RPD < 1.5 x Laboratory Duplicate DQO; **Section A.3.1**).

[2] 'DIFFx' = absolute difference: RPD DQO exceedances only apply if absolute differences between duplicates is 2 x DL (**Section A.3.1**).

[3] pH was measured in water of low ionic strength (QDO = +/- 1 pH unit where EC<200 µS) and passed ALS DQOs.

Table A3-26. Summary of porewater laboratory LCS, MB, and MS results for mercury parameters in 2022.

Analyte	Recovery (%)	Limits	Pass	Fail	ND
Laboratory Control Sample (LCS)					
Mercury, dissolved	98-101	80-120	5	0	-
Methylmercury (as MeHg), dissolved	77-89	70-130	5	0	-
Matrix Blank (MB)					
Mercury, dissolved	0	DL	5	0	-
Methylmercury (as MeHg), dissolved	0	DL	5	0	-
Matrix Spike (MS)					
Mercury, dissolved	88-100	70-130	5	0	0
Methylmercury (as MeHg), dissolved	71-86	60-140	5	0	0

Note: 'ND' = not determined; 'DL' = Detection Limit; 'Limits' = the percent recovery range which passes DQOs.

A.3.3.3 Sediment

The QC assessment for sediment examined the results from field and laboratory QC samples for the parameters outlined in **Table 3-5 in the Main Report**. Each parameter was compared to the DQOs outlined in **Section A.3.1**.

Six sediment samples were collected in 2022 along the Peace River from the Site C Tailrace downstream to Many Islands, AB. All of the sediment field and laboratory QC sample results met the DQO requirements in 2022, with the exception of TOC within a field equipment blank from station PD3 (**Table A3-27**). All QC sample frequency targets were met, however, there were a number of sediment samples where TOC and organic matter content DLs were raised marginally which had no affect on results. Details of the results are provided below.

Field QC

Across the 6 sediment samples there was a single field duplicate (FD) and an equipment blank (EB) collected for QC evaluation (**Table A3-28** and **Table A3-29**). No DQO failures occurred except for total organic carbon (TOC), which was detected in an equipment blank (PD3-FB). The FB results marginally exceeded the DL and was deemed inconsequential to result interpretation when compared to the 10-fold higher TOC concentrations recovered in the corresponding sample (10.2 versus 0.77 mg/L in PD3 and PD3-FB respectively).

Laboratory QC

Laboratory QC results compared to DQOs for laboratory duplicates (LD), laboratory control samples (LCS), matrix blanks (MB), and certified reference material (RM) from 2022 are outlined in **Table A3-27**. No DQO failures occurred in any of the laboratory QC samples. A detailed summary of the laboratory QC results is provided for LDs (**Table A3-30**) and for LCS, MB and RM (**Table A3-31**).

There was a single TOC matrix spike from 2022 where a “not determined” result occurred indicating that the spiked amount was not sufficiently high relative to the concentration in the sample.

Overall QC Assessment

Across the 118 field and laboratory QC checks, a single DQO failure occurred in an EB which did not affect the interpretation of results. The QC results confirm the accuracy of the sediment analyses and meet the data quality needs of the MMP.

Sediment QC Tables

Table A3-27. Sediment laboratory and field QC sample results compared to DQOs across all parameters for MMP.

Event: 2022.08 | Date(s): Aug 2022			
	Pass	Fail	ND
Field			
Field Duplicate	12	0	0
Equipment Blank	1	**1**	0
Laboratory			
Lab Duplicate	38	0	0
Lab Control Sample	32	0	0
Matrix Spike	1	0	1
Matrix Blank	32	0	0
Sum	116	**1**	1

Note: 'ND' = not determined.

Table A3-28. Summary of sediment field duplicates for mercury parameters in 2022.

Analyte	Max RPD	RPD Limit	Pass	Fail
Field Duplicate (FD)				
Mercury, dissolved	2.9%	60%	1	0
Methylmercury (as MeHg), dissolved	24.6%	45%	1	0

Note: 'RPD' = Relative Percent Difference; 'Max RPD' = maximum across all duplicate-sample comparisons.

Table A3-29. Summary of results from sediment field blanks in 2022.

Analyte	Result	DL	Pass	Fail
Equipment Blank (EB)				
Carbon, total organic [TOC]	0.7 mg/L	0.5 mg/L	0	**1**
Mercury, total	5 ng/L	5 ng/L	1	0

Note: 'DL'= Detection Limit.

Table A3-30. Summary of sediment laboratory duplicates for mercury parameters in 2022.

Analyte	Max RPD	RPD Limit	Pass	Fail
Laboratory Duplicate (LD)				
Mercury	3.2%	20%	6	0
Methylmercury (as MeHg)	4.1%	30%	6	0

Note: 'RPD' = Relative Percent Difference; 'Max RPD' = maximum across all duplicate-sample comparisons.

Table A3-31. Summary of sediment laboratory LCS, MB, and RM results for mercury parameters in 2022.

Analyte	Recovery (%)	Limits	Pass	Fail	ND
Laboratory Control Sample (LCS)					
Mercury	100-108	80-120	6	0	-
Methylmercury (as MeHg)	98-104	70-130	6	0	-
Matrix Blank (MB)					
Mercury	0	DL	6	0	-
Methylmercury (as MeHg)	0	DL	6	0	-
Certified Reference Material (RM)					
Mercury	98-102	70-130	6	0	0
Methylmercury (as MeHg)	96-106	70-130	6	0	0

Note: 'ND' = not determined; 'DL' = Detection Limit; 'Limits' = the percent recovery range which passes DQOs.

A.3.3.4 Benthic Invertebrate & Zooplankton Tissue

Benthic invertebrate and zooplankton tissue chemistry results were assessed along with the fish tissue samples (**Section A.3.2**); results are presented below. The QC assessment focused only on total mercury, methylmercury, and SIA.

Field QC

Field QC samples (FDs) for invertebrate tissue met their DQOs (**Table A3-4**). See **Section A.3.2.2** for additional details.

FDs for stable isotope data are provided in **Table A3-9**. Three of 8 field duplicate samples did not meet their DQOs for both $\delta^{13}C$ and $\delta^{15}N$ (**Table A3-10**), with all three being benthic invertebrates. Absolute differences for $\delta^{15}N$ were generally higher (3.81-4.49 ‰) compared to $\delta^{13}C$ (2.28-3.66‰). Further, measured values of $\delta^{15}N$ were much lower than $\delta^{13}C$, so the relative differences were much higher for $\delta^{15}N$. These samples were collected using benthic invertebrate baskets and differences are likely explained by differences in species composition within each sample, as $\delta^{15}N$ is an indicator of trophic level of an organism and $\delta^{13}C$ is an indicator of source of energy for a given food chain. See **Section A.3.2.3** for additional details.

Laboratory QC

Results for laboratory QC samples for chemistry data can be found in **Table A3-6**. All laboratory QC samples for invertebrate tissue (i.e., laboratory duplicates, laboratory control samples, matrix blanks, and controlled reference materials) met their DQOs (**Table A3-6**). See **Section A.3.2.2** for additional details.

Results for laboratory QC samples for stable isotope data showed that all laboratory duplicate samples for invertebrate tissue met their DQOs (**Table A3-11**). Secondary and check standards met their DQOs for all batches run (**Table A3-13**). See **Section A.3.2.3** for additional details.

General QC Assessment

A total of 30 field and laboratory QC checks related to tissue mercury or methylmercury were conducted in 2022. All laboratory and field QC samples met their DQOs. These results suggest that QA protocols facilitated effective collection, handling, and preparation samples. Overall, the QC results verify that the accuracy and precision of tissue mercury analyses meet the data quality needs of the MMP.

A total of 20 field and laboratory QC checks related to tissue stable isotope analysis were conducted in 2022. All laboratory QC samples met their DQOs; however, 37.5% of field QC samples did not meet their DQOs. While the $\delta^{13}C$ deviations from the DQOs were relatively minor, the $\delta^{15}N$ deviations were substantial. The latter was likely caused by variation in species composition between the original sample and the duplicate. Regardless of the underlying reason, the 2022 $\delta^{15}N$ results for benthic invertebrates

warrant a ‘cautionary flag’ in the Site C MMP Database; while we will still use the results, they will be identified in as cautionary when included in any future analyses.

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APPENDIX A1: SINLAB INTERPRETATION GUIDE

SINLAB INTERPRETATION GUIDE

For further information please visit our website:
https://www.isotopeecology.com/

Instrumentation

Continuous Flow-Isotope Ratio Mass Spectrometry (CF-IRMS) is used for stable isotope analysis of $\delta^{13}C$, $\delta^{15}N$ and $\delta^{2}H$. The SINLAB currently operates the following mass spectrometer/conflo combinations:

- Delta^{Plus} XP – Conflo III
- Delta V Plus – Conflo IV

(All manufactured by Thermo Finnigan; Bremen, Germany)

Carbon & Nitrogen Methodology

Dried, ground and homogeneous samples are weighed into tin capsules and analyzed for $\delta^{13}C$ and $\delta^{15}N$ by an Elemental Analyzer (EA) coupled to one of the IRMS/Conflo combinations listed above. Samples are introduced into the EA by an autosampler where complete combustion occurs in the presence of oxygen to generate CO_2 and nitrogen oxide (N_xO_x) gases. Combustion occurs in a quartz tube filled with chromium oxide and silvered cobaltous oxide. A second quartz tube filled with fine copper wire is used for the reduction of nitrogen oxides (N_xO_x) to N_2 gas. Gas Chromatography (GC) is used to separate CO2 and N2 peaks with helium as a carrier gas. A water trap of magnesium perchlorate & silica chips is located before the GC column to remove water.

The SINLAB currently utilizes two elemental analyzers for $\delta^{13}C$ and $\delta^{15}N$ analyses.

Elemental Analyzer	Autosampler	Combustion Temperature	Reduction Temperature	GC Length	GC Temperature
CE NC2500 (Carlo Erba; Milan, Italy)	PN150	1050ºC	650ºC	4m	50ºC
Costech 4010 (Costech; California, USA)	Zero Blank	1000ºC	650ºC	3m	40ºC

Stable isotope measurements are reported as isotope delta δ in parts per thousand (‰) relative to the international standard: Vienna Pee Dee Belemnite (VPDB) for carbon, and atmospheric air (AIR) for nitrogen. Isotope values are normalized using secondary standards: USGS61, BLS, and MLS for animal tissues; and CMS, SPS, SPL and EPS for sediments and plant material. All of these standards were calibrated against IAEA standards. See below for standard descriptions.

Hydrogen Methodology

Samples are weighed into silver capsules and loaded into a Costech Zeroblank autosampler. Samples are converted to hydrogen (H_2) gas by pyrolysis using a Thermo-Finnigan High Temperature Conversion Elemental Analyzer (TC/EA). Pyrolysis occurs in a ceramic tube lined with a glassy carbon reactor and filled with glassy carbon chips at a temperature of 1400ºC. Helium is used as the carrier gas and a 1.5m GC column held at 100ºC separates H_2 sample gas and other interfering gases produced

Stable-hydrogen isotope (δ^2H) measurements for keratin tissues are normalized to the international standard VSMOW (Vienna Standard Mean Ocean Water). We determine the non-exchangeable δ^2H of samples using the comparative equilibration approach (Wassenaar and Hobson 2003) with two secondary keratin standards (EC1 and EC2). These standards were previously calibrated to account for the H exchangeability between the H atoms of ambient water vapor and tissues (Wassenaar and Hobson 2000, 2003). This technique requires that samples along with these standards of known H isotope ratios are left to exchange with local atmospheric hydrogen for 72 hours prior to analysis. See below for standard descriptions.

Standards

Secondary Standards – These are SINLAB working standards used to bring data to the international scale. They are calibrated against and traceable to IAEA primary standards (CH6, CH7, N1, and N2). These standards are subjected to round robin testing for verification as a part of our QA/QC protocol. Values below- used as check standards within a run

USGS61 = commercially available pure compound (caffeine)
$\delta^2H_{(VSMOW)}$ = 96.9 ‰ +/- 0.9
$\delta^{13}C_{(VPDB)}$ = –35.05‰ +/- 0.04
$\delta^{15}N_{(AIR)}$ = -2.87 ‰ +/- 0.04

BLS = Bovine Liver Standard developed by SINLAB
$\delta^{13}C_{(VPDB)}$ = –18.76 ‰ +/- 0.14
$\delta^{15}N_{(AIR)}$ = 7.17 ‰ +/- 0.17

MLS = Muskellunge muscle standard developed by SINLAB
$\delta^{13}C_{(VPDB)}$ = –22.30 ‰ +/- 0.18
$\delta^{15}N_{(AIR)}$ = 14.00 ‰ +/- 0.11

CMS = Corn Meal Standard developed by SINLAB
$\delta^{13}C_{(VPDB)}$ = –13.25 ‰ +/- 0.11
$\delta^{15}N_{(AIR)}$ = 4.42 ‰ +/- 0.12

EPS = Ephedra Plant Standard developed by SINLAB
$\delta^{13}C_{(VPDB)}$ = -30.96 ‰ +/- 0.09
$\delta^{15}N_{(AIR)}$ = 0.35 ‰ +/- 0.12

SPL = Spirulina standard developed by SINLAB
$\delta^{13}C_{(VPDB)}$ = -24.97 ‰ +/- 0.12
$\delta^{15}N_{(AIR)}$ = 12.94 ‰ +/- 0.09

SPS = Seaweed plant standard developed by SINLAB
$\delta^{13}C_{(VPDB)}$ = -28.40 ‰ +/- 0.10
$\delta^{15}N_{(AIR)}$ = 21.10 ‰ +/- 0.10

EC1 = caribou hoof keratin standard- Environment Canada, Saskatoon, Canada
$\delta^{2}H_{(VSMOW)}$ = –197.00 ‰ +/- 1.8
$\delta^{18}O_{(VSMOW)}$ = 2.40 ‰ +/- 0.6

EC2 = kudu horn keratin standard - Environment Canada, Saskatoon, Canada
$\delta^{2}H_{(VSMOW)}$ = –54.10 ‰ +/- 0.6
$\delta^{18}O_{(VSMOW)}$ = 21.20 ‰ +/- 0.6

KERATIN STANDARD = Keratin powder purchased from Spectrum. B/N SJ1400
$\delta^{2}H_{(VSMOW)}$ = –121.60 ‰ +/- 2.0
$\delta^{18}O_{(VSMOW)}$ = 10.60 ‰ +/- 0.6

THS = Topi horn keratin standard developed by SINLAB, $\delta^{18}O$ unverified
$\delta^{2}H_{(VSMOW)}$ = –40.60 ‰ +/- 2.0
$\delta^{18}O_{(VSMOW)}$ = 20.28 ‰ +/- 0.6 (unverified)

Check Standards – These standards are analyzed in each analytical run as part of SINLAB's QA/QC protocol to assess the analytical accuracy.

ACETANILIDE = commercially available pure compound
Batch 2880 (Feb 2010 – Apr 2011) - $\delta^{13}C_{(VPDB)}$ = –27.87 ‰ +/- 0.12
$\delta^{15}N_{(AIR)}$ = –2.05 ‰ +/- 0.13

Batch 149699 (Apr 2011-Aug 2012) - $\delta^{13}C_{(VPDB)}$ = –31.59 ‰ +/- 0.12
$\delta^{15}N_{(AIR)}$ = –2.32 ‰ +/- 0.23

Costech (Aug 2012 – July 2020) - $\delta^{13}C_{(VPDB)}$ = –33.81 ‰ +/- 0.14
$\delta^{15}N_{(AIR)}$ = –0.92 ‰ +/- 0.23

Batch 317490 (July 2020 – Present) - $\delta^{13}C_{(VPDB)}$ = –26.54 ‰ +/- 0.06
$\delta^{15}N_{(AIR)}$ = –5.09 ‰ +/- 0.37

NICOTINAMIDE = commercially available pure compound
Batch 237264 (Mar 2018 – Present) - $\delta^{13}C_{(VPDB)}$ = –32.50 ‰ +/-0.1
$\delta^{15}N_{(AIR)}$ = –2.00 ‰ +/- 0.1

BENZOIC ACID = commercially available pure compound, $\delta^{18}O$ unverified
HEKAtech (Feb 2010 – Present) $\delta^{2}H_{(VSMOW)}$ = -76‰ +/- 2.0 (unverified)
$\delta^{18}O_{(VSMOW)}$ = 25.7‰ +/- 0.6 (unverified)

N2 = ammonium sulfate – Primary standard certified by IAEA.
$\delta^{15}N_{(AIR)}$ = 20.3 ‰ +/- 0.14

CH7 = polyethylene foil – Primary standard certified by IAEA.
$\delta^{13}C_{(VPDB)}$ = –32.2 ‰ +/- 0.1
$\delta^{2}H_{(VSMOW)}$ = 100.3 ‰ +/- 2.0

PROTEIN = casein – Certified by Elemental Microanalysis Ltd.
$\delta^{13}C_{(VPDB)}$ = –26.98 ‰ +/- 0.13
$\delta^{15}N_{(AIR)}$ = 5.94 ‰ +/- 0.08

HIGH ORGANIC SEDIMENT = Certified by Elemental Microanalysis Ltd.
$\delta^{13}C_{(VPDB)}$ = –26.27 ‰ +/- 0.15
$\delta^{15}N_{(AIR)}$ = 4.42 ‰ +/- 0.2

SORGHUM FLOUR = Certified by Elemental Microanalysis Ltd.
$\delta^{13}C_{(VPDB)}$ = –13.68 ‰ +/- 0.19
$\delta^{15}N_{(AIR)}$ = 1.58 ‰ +/- 0.15

PEACH LEAF = NIST 1547 peach leaves - not certified
$\delta^{13}C_{(VPDB)}$ = –26.17 ‰ +/- 0.08
$\delta^{15}N_{(AIR)}$ = 1.94 ‰ +/- 0.12

ATS = Atlantic salmon standard developed by SINLAB
$\delta^{2}H_{(VSMOW)}$ = –113.8 ‰ +/- 2.0
$\delta^{18}O_{(VSMOW)}$ = 17.50 ‰ +/- 0.6 (unverified)

LAT = Lake trout standard developed by SINLAB, $\delta^{18}O$ unverified
$\delta^{2}H_{(VSMOW)}$ = –165.60 ‰ +/- 2.0
$\delta^{18}O_{(VSMOW)}$ = 4.70 ‰ +/- 0.6 (unverified)

Column Headings

CLIENT ID = ID code assigned to sample by the client.

SINLAB ID = ID code assigned to the client's samples; starting with the year, each client is given a two or three letter identifier and samples numbered sequentially; ex, 15ABC 001.

Date = date sample was analyzed.

Position = position in the analytical run for that particular day; samples are weighed into 96-well ELISA trays, a typical animal tissue run will consist of approximately 73 samples, 22 standards, and 1 blank.

Weight = weight of the tissue analyzed; animal tissues are weighed at 1.000 ± 0.100 milligrams and plant tissues are weighed at 3.100 ± 0.100 milligrams for C and N isotope analysis. Keratin tissues are weighed at 0.200 ± 0.020mg for H isotope analysis.

CO2 ampl = the relative amount of CO_2 gas measured by the mass spectrometer in volts (V), a function of the weight of tissue used and the total amount of carbon (%C) it contains.

N2 ampl = the relative amount of N_2 gas measured by the mass spectrometer in volts (V), a function of the weight of tissue used and the total amount of nitrogen (%N) it contains.

H2 ampl = the relative amount of H_2 gas measured by the mass spectrometer in volts (V), a function of the weight of tissue used and the total amount of hydrogen (%H) it contains.

δ^{13}C = the relative isotope ratio difference between the sample and the international standard (VPDB) according to the formula:

$\delta^{13}C = [(R_{sample}/R_{standard})-1]*1000$ where R is the isotopic ratio of the heavy to light ($^{13}C/^{12}C$)

δ^{15}N = the relative isotope ratio difference between the sample and the international standard (AIR) according to the formula:

$\delta^{15}N = [(R_{sample}/R_{standard})-1]*1000$ where R is the isotopic ratio of the heavy to light ($^{15}N/^{14}N$)

δ^{2}H = the relative isotope ratio difference between the sample and the international standard (VSMOW) according to the formula:

$\delta^{2}H = [(R_{sample}/R_{standard})-1]*1000$ where R is the isotopic ratio of the heavy to light ($^{2}H/^{1}H$)

%C = percent of carbon in the sample by weight; calculated with NICOTINIMIDE for animals and ACETANILIDE for plants

%N = percent of nitrogen in the sample by weight; calculated with NICOTINIMIDE for animals and ACETANILIDE for plants

C/N = ratio of carbon to nitrogen in the sample; simple division of %C by %N.

%H= percent of hydrogen in the sample by weight; calculated with BENZOIC ACID

***%O*=** percent of oxygen in the sample by weight; calculated with BENZOIC ACID

Comment Codes

NR = no repeat; not enough sample tissue to allow another analysis

No drop = equipment malfunction wherein autosampler fails to turn; often leads to a "double-up" with the following sample

Double-up = two samples drop together

LR = lipid-rich. Samples may contain high lipid content according to the C/N ratio (Logan et al. 2008)

Whole bug = individual analyzed without grinding

1/4, 1/8, 1/16, 1/32 = indicates the size of a filter paper sample that was cut into a "pie-slice" for analysis

Scraped from paper = filtered material was scraped from the top of filter rather than analyzed as a "pie slice"

LE = Lipid extracted, a common technique to remove lipids from tissues such as liver, eggs, and muscle of some fishes. Lipids have different $\delta^{13}C$ than proteins and carbohydrates.

AT = Acid treated, a common technique to remove carbonates (that have different $\delta^{13}C$ values than organic tissues) from organisms such as crustaceans.

Colours

Gray shading = repeated sample as part of regular QA/QC routine (four of every 73 samples)
Red text = highlights low amplitude peaks or a poor repeat

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APPENDIX B: SUPPORTING MEDIA SUPPLEMENTAL INFORMATION

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

B.1 INTRODUCTION

This appendix provides additional details on the methods of the 2022 Core MMP supporting media sampling program (**Section 3 in the Main Report**), as well as reporting additional data in supplementary tables and figures. The appendix is organized as follows:

- Surface water quality (**Section B.2**)
- Porewater quality (**Section B.3**)
- Sediment quality (**Section B.4**)
- Benthic invertebrate tissue (**Section B.5**)
- Zooplankton tissue (**Section B.6**)

As mentioned in **Section 3.1.1 of the Main Report**, all sampling was conducted by Ecofish Research Ltd (Ecofish) and Aski Reclamation LP (Aski) in conjunction with the FAHFMP Mon-8/9 water and sediment quality program.

B.2 SURFACE WATER QUALITY

B.2.1 Methods

B.2.1.1 Sampling

Water samples can be collected by a variety of methods. In 2022, MMP samples were collected from a boat using a peristaltic equipped with silicone intake and outlet tubes. Filtration, where appropriate (e.g., for dissolved parameters), was conducted in the field using an in-line 0.45 µm filter. Water samples were collected from surface water only (0.2 m), except at the reservoir stations where deeper (5 m) samples were also collected.

2022 surface water sampling protocols were generally consistent with methods used in previous years of sampling for the program. These protocols were based on those provided in the BC Field Sampling Manual (Gov BC, 2013), but are modified to reflect current practices for mercury-related analytes. Information for other analytes, and for more description on general sampling methods, are provided in the 2022 FAHFMP Mon-8/9 (Ganshorn et al., 2023).

Low-level mercury sampling is typically conducted using ultra-clean techniques to avoid cross-contamination of samples. The 'clean hands / dirty hands' technique (e.g., US EPA Method 1669) is conducted as follows:

- Sample containers should be labelled and double-bagged in a clean area in advance of the sampling trip.
- Upon arrival at the sampling site, one member of the two-person sampling team is designated as "dirty hands"; the second member is designated as "clean hands". All operations involving contact with the sample bottle and the transfer of the sample from the collection vessel to the sample bottle are handled by the individual designated as "clean hands". "Dirty hands" is responsible for preparation of the sample, and for all other activities that do not involve direct contact with the sample or sample container (e.g., opening the two bags to provide "clean hands" with direct access to the sampling bottle).
- "Dirty hands" deploys the sampler overboard within a water mass not affected by the presence of the boat or samplers, collects the sample and brings it on board the boat.
- "Clean hands" opens sample bottle and rinses it with sample water prior to filling and recapping. The same procedure is followed to collect a filtered sample. "Dirty hands" handles the filter apparatus while "clean hands" handles the bottle to be filled. If additional filtered samples (e.g., for other metals, anions) are to be taken the same procedure is followed for additional bottles.
- "Dirty hands" secures the water collection device for storage between samples.

- Water samples are preserved as necessary and placed on ice in a cooler. Until ready for shipping, samples are stored in a cooler or refrigerator.
- When shipping samples, samples should be appropriately packed with ice packs to maintain optimum temperature and wrapped to prevent breakage. A Chain of Custody form should accompany all shipments

Details on sampling containers, field filtering and sample preservation for mercury-related analytes is provided in **Table B2-1**.

Table B2-1. Sampling information for total mercury and methylmercury in surface water.

Parameter	Target Volume	Container	Field Filtering / Preservative	MDL
Metals				
Total Mercury - Filtered	40 ml	40 ml glass vial	0.45 µm / None	0.5 ng/L
Total Mercury - Unfiltered			None / None	
Speciated Metals				
Methylmercury - Filtered	125 ml	125 ml amber glass (or Teflon)	0.45 µm / HCl	0.02 ng/L
Methylmercury - Unfiltered			None / HCl	

B.2.1.2 Laboratory Analyses

Surface water samples collected in the 2022 program were analyzed by ALS. See **Appendix B1** for the ALS reports.

B.2.2 Data Tables

The 2022 MMP surface water data are tabulated in **Table B2-2**, Surface water quality results for 2022.

Table B2-2. Surface water quality results for 2022.

		Date	2022-08-25	2022-08-25	2022-08-25	2022-08-25	2022-08-25	2022-08-25	2022-08-25	2022-08-25	2022-08-26	2022-08-26	2022-08-26	2022-08-26	2022-08-26	2022-08-25	2022-08-25	2022-08-24	2022-08-24	2022-08-23	2022-08-23	2022-08-24	2022-08-24
		ALS Sample ID	FJ2202327-007	FJ2202327-008	FJ2202327-009	FJ2202327-010	FJ2202327-003	FJ2202327-004	FJ2202327-005	FJ2202327-006	FJ2202360-001	FJ2202360-003	FJ2202360-002	FJ2202360-004	FJ2202360-005	FJ2202327-001	FJ2202327-002	FJ2202315-002	FJ2202315-003	FJ2202286-001	FJ2202286-002	FJ2202315-004	FJ2202315-005
		Site Type	Reservoirs	Reservoirs	Reservoirs	Reservoirs	Reservoirs	Reservoirs	Reservoirs	Reservoirs	Peace River Upstream	Peace River Upstream	Peace River Upstream	Peace River Upstream	Peace River Upstream	Peace River Upstream	Peace River Upstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream
		Location	Williston Shallow (W1S)	Williston Shallow (W1S)	Williston Deep (W1D)	Williston Deep (W1D)	Dinosaur Shallow (D1S)	Dinosaur Shallow (D1S)	Dinosaur Deep (D1D)	Dinosaur Deep (D1D)	Upper Site C (PR1*)	Upper Site C (PR1*)	Upper Site C (PR1*)	Mid Site C (PR2*)	Mid Site C (PR2*)	Lower Site C (PR3*)	Lower Site C (PR3*)	Site C Tailrace (PD1*)	Site C Tailrace (PD1*)	Beatton-Kiskatinaw (PD3*)	Beatton-Kiskatinaw (PD3*)	Many Islands (PD5*)	Many Islands (PD5*)
		Replicate	W1-Shallow-A	W1-Shallow-B	W1-Deep-A	W1-Deep-B	D1-Shallow-A	D1-Shallow-B	D1-Deep-A	D1-Deep-B	PR1-A	PR1-C	PR1-B	PR2-A	PR2-B	PR3-A	PR3-B	PD1-A	PD1-B	PD3-A	PD3-B	PD5-A	PD5-B
Analyte	**Units**	**MDL**																					
Alk-Tot	**mg/L**	1	79.6	-	78.3	-	81.7	-	80.1	-	82	82.7	-	82.1	-	81	-	86.9	-	88.3	-	91.8	-
Ca-F	**mg/L**	0.05	25.6	-	26.3	-	27.4	-	27.4	-	26.7	26.2	-	26	-	26.6	-	30.1	-	28.8	-	31	-
DOC	**mg/L**	0.5	3.04	-	3.04	-	2.83	-	3.13	-	2.83	2.77	-	2.77	-	2.83	-	2.66	-	3.24	-	3.41	-
lab pH	**--**	0.1	7.86	-	7.85	-	7.78	-	7.82	-	7.95	7.97	-	7.98	-	8.12	-	8.18	-	8.17	-	8.17	-
TSS	**mg/L**	3	<3	-	<3	-	3.3	-	3.7	-	<3	<3	-	5.3	-	5.3	-	9.7	-	9.3	-	<3	-
NO3-N	**mg/L**	0.01	0.0396	-	0.0398	-	0.0756	-	0.0775	-	0.0771	0.078	-	0.0711	-	0.0675	-	0.0656	-	0.0576	-	0.0497	-
NO2-N	**mg/L**	0	<0.001	-	<0.001	-	0.0024	-	0.0016	-	0.0014	0.0014	-	<0.001	-	<0.001	-	0.002	-	0.0018	-	0.0011	-
SO4	**mg/L**	0.3	11.9	-	11.9	-	13.4	-	13.3	-	13.1	13.1	-	13.2	-	13.9	-	14.5	-	15.3	-	14.8	-
Cl	**mg/L**	0.5	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-
F	**mg/L**	0.02	0.033	-	0.034	-	0.035	-	0.035	-	0.038	0.037	-	0.037	-	0.038	-	0.044	-	0.044	-	0.043	-
Mg-F	**mg/L**	0.01	6.22	-	6.01	-	6.13	-	6.48	-	5.81	6.13	-	6.15	-	6.5	-	7.05	-	6.88	-	7.37	-
THg-F	**ng/L**	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MeHg-UF	**ng/L**	0.02	<0.02	<0.02	0.021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.021	0.03	0.029	0.022	0.026	<0.02	<0.02	<0.02	0.022	0.024	0.023

Table B2-2 continued

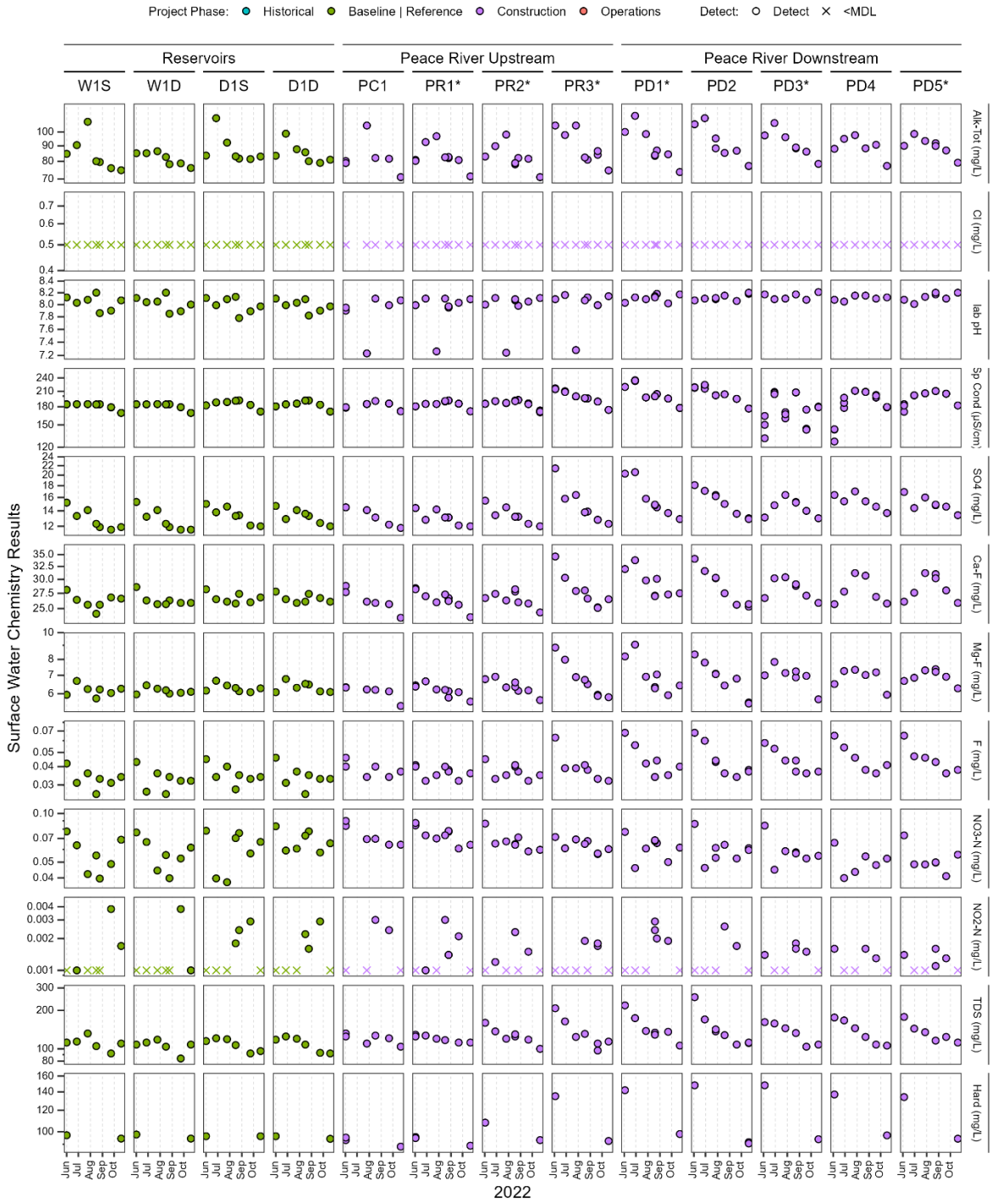
	Date	2022-10-19	2022-10-19	2022-10-19	2022-10-19	2022-10-21	2022-10-21	2022-10-21	2022-10-18	2022-10-22	2022-10-20	2022-10-20	2022-10-20	2022-10-17	2022-10-20
	ALS Sample ID	FJ2202978-001	FJ2202978-002	FJ2202978-003	FJ2202978-004	FJ2203009-001	FJ2203009-002	FJ2203009-003	FJ2202956-001	FJ2203012-001	FJ2202994-001	FJ2202994-002	FJ2202994-004	FJ2202949-004	FJ2202994-003
	Site Type	Reservoirs	Reservoirs	Reservoirs	Reservoirs	Peace River Upstream	Peace River Upstream	Peace River Upstream	Peace River Upstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream
	Location	Williston Shallow (W1S)	Williston Deep (W1D)	Dinosaur Shallow (D1S)	Dinosaur Deep (D1D)	Peace Canyon (PC1)	Upper Site C (PR1*)	Mid Site C (PR2*)	Lower Site C (PR3*)	Site C Tailrace (PD1*)	Pine-Beatton (PD2)	Pine-Beatton (PD2)	Beatton-Kiskatinaw (PD3*)	Alces-Pouce Coupe (PD4)	Many Islands (PD5*)
	Replicate	W1-Shallow-A	W1-Deep-A	D1-Shallow-A	D1-Deep-A	PC1-A	PR1-A	PR2-A	PR3-A	PD1-A	PD2-A	PD2-B	PD3-A	PD4-A	PD5-A
Analyte	**Units**	**MDL**													
Alk-Tot	**mg/L**	1	74.8	76.1	83	81	71	71.4	71	74.7	73.8	77.2	77.3	78.5	77.3	79.2
Ca-F	**mg/L**	0.05	26.6	25.9	26.8	26.1	23.6	23.7	24.4	26.5	27.5	25.3	25.7	25.9	25.8	25.9
DOC	**mg/L**	0.5	2.69	2.3	3.07	2.58	2.77	2.87	2.83	3.77	2.57	3.06	2.86	2.93	2.93	3.53
lab pH	**--**	0.1	8.07	8	7.97	7.97	8.07	8.09	8.11	8.14	8.17	8.18	8.2	8.21	8.12	8.2
TSS	**mg/L**	3	<3	<3	<3	<3	<3	<3	<3	6.6	<3	10.2	12.6	10.6	7	13.4
NO3-N	**mg/L**	0.01	0.0688	0.0615	0.0667	0.0654	0.0641	0.064	0.0596	0.0602	0.0615	0.061	0.0594	0.0547	0.0526	0.0556
NO2-N	**mg/L**	0	0.0017	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
SO4	**mg/L**	0.3	11.9	11.6	12	12	11.8	12	12	12.3	12.9	13	12.9	13	13.7	13.4
Cl	**mg/L**	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
F	**mg/L**	0.02	0.034	0.032	0.034	0.033	0.037	0.036	0.035	0.032	0.04	0.038	0.037	0.037	0.041	0.038
Mg-F	**mg/L**	0.01	6.26	6.1	6.28	6.09	5.42	5.62	5.69	5.83	6.43	5.58	5.53	5.73	5.95	6.28
THg-F	**ng/L**	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.76	<0.5	<0.5	<0.5	<0.5	1.41	<0.5
MeHg-UF	**ng/L**	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.023	0.065	<0.02	0.148

B.2.3 Supplemental Results

Additional figures for primary (tributaries only) and secondary (tributaries and reservoirs/Peace River) surface water parameters, including results for non-MMP stations, are provided below:

- 2022 results for reservoir and Peace River stations (**Figure B2-1**).
- Temporal trends for reservoir and Peace River (**Figure B2-2**).
- 2022 results for primary analytes in tributary stations (**Figure B2-3**).
- 2022 results for secondary analytes in tributary stations (**Figure B2-4**).
- Temporal trends for primary analytes in tributary stations (**Figure B2-5**).
- Temporal trends for secondary analytes in tributary stations (**Figure B2-6**).

Figure B2-1. Results for other mercury-related surface water quality parameters by station and station group in 2022 for Reservoir and main-stem Peace River locations. Site C MMP stations noted with an asterisk (*). Log scale used for all parameters.



Note: For Reservoir samples, station names ending in “S” were collected at the surface, while station names ending in “D” were collected at depth.

Figure B2-2. Temporal trends of other mercury-related surface water quality parameters by station and station group for Reservoir and main-stem Peace River locations. Log scale used for all parameters.

Figure B2-3. Results for key mercury-related surface water quality parameters by station and station group in 2022 for Peace River Tributaries. Log scale used for all parameters except Pct MeHg and pH.

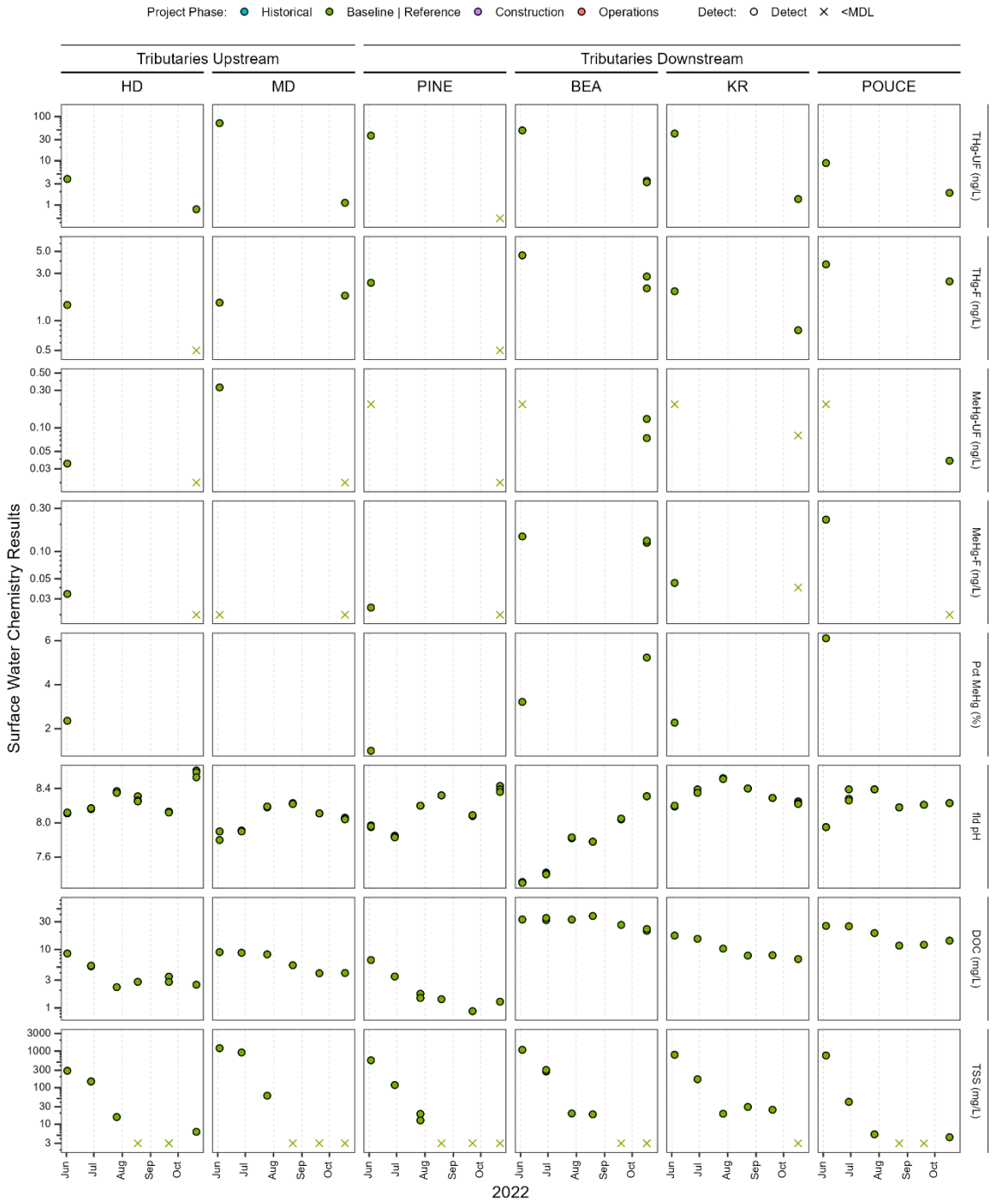


Figure B2-4. Results for secondary surface water quality parameters by station and station group in 2022 for Peace River Tributaries. Log scale used for all parameters.

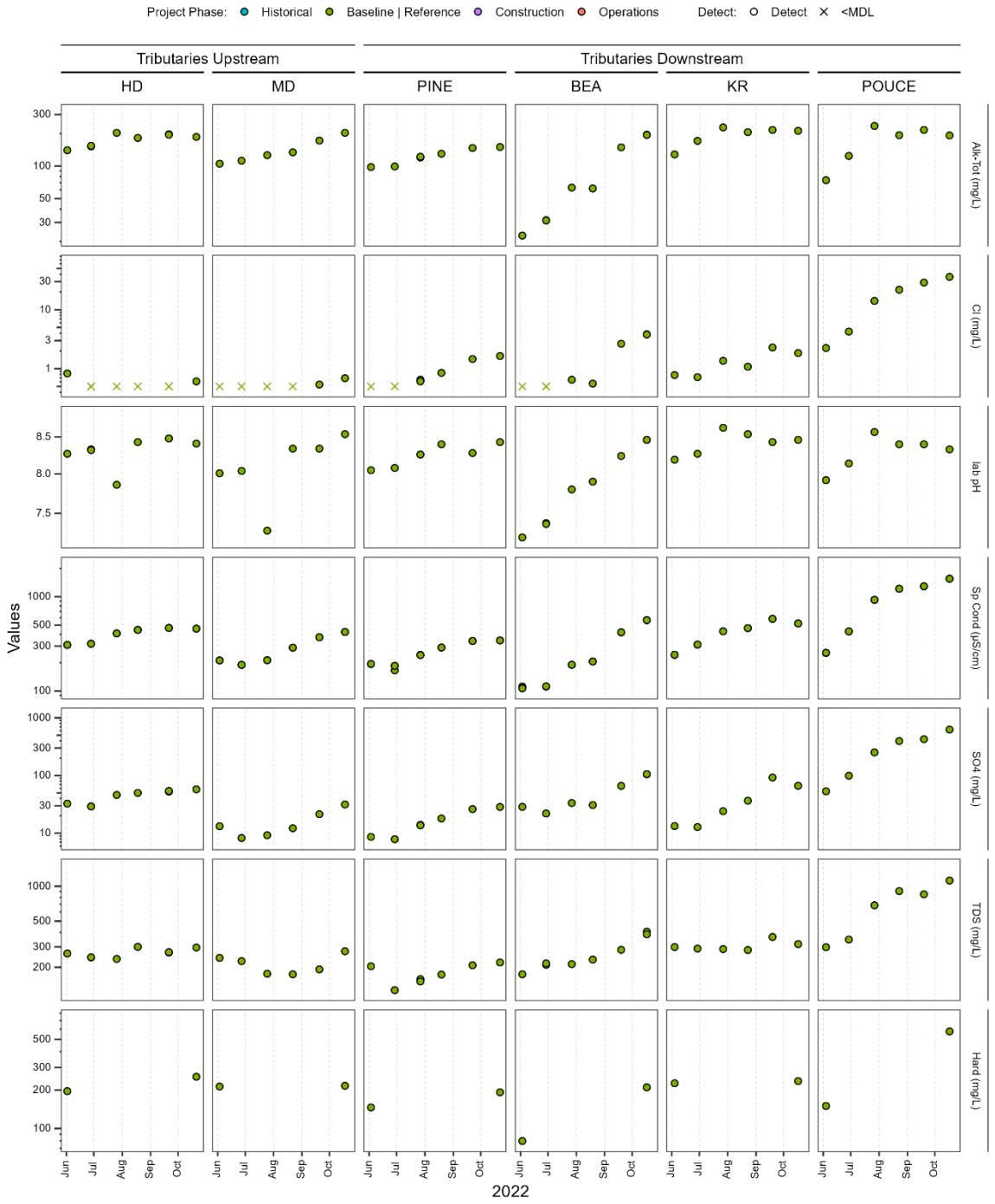


Figure B2-5. Temporal trends in key mercury-related surface water quality parameters by station group for Peace River tributaries. Log scale used for all parameters except Pct MeHg and pH.

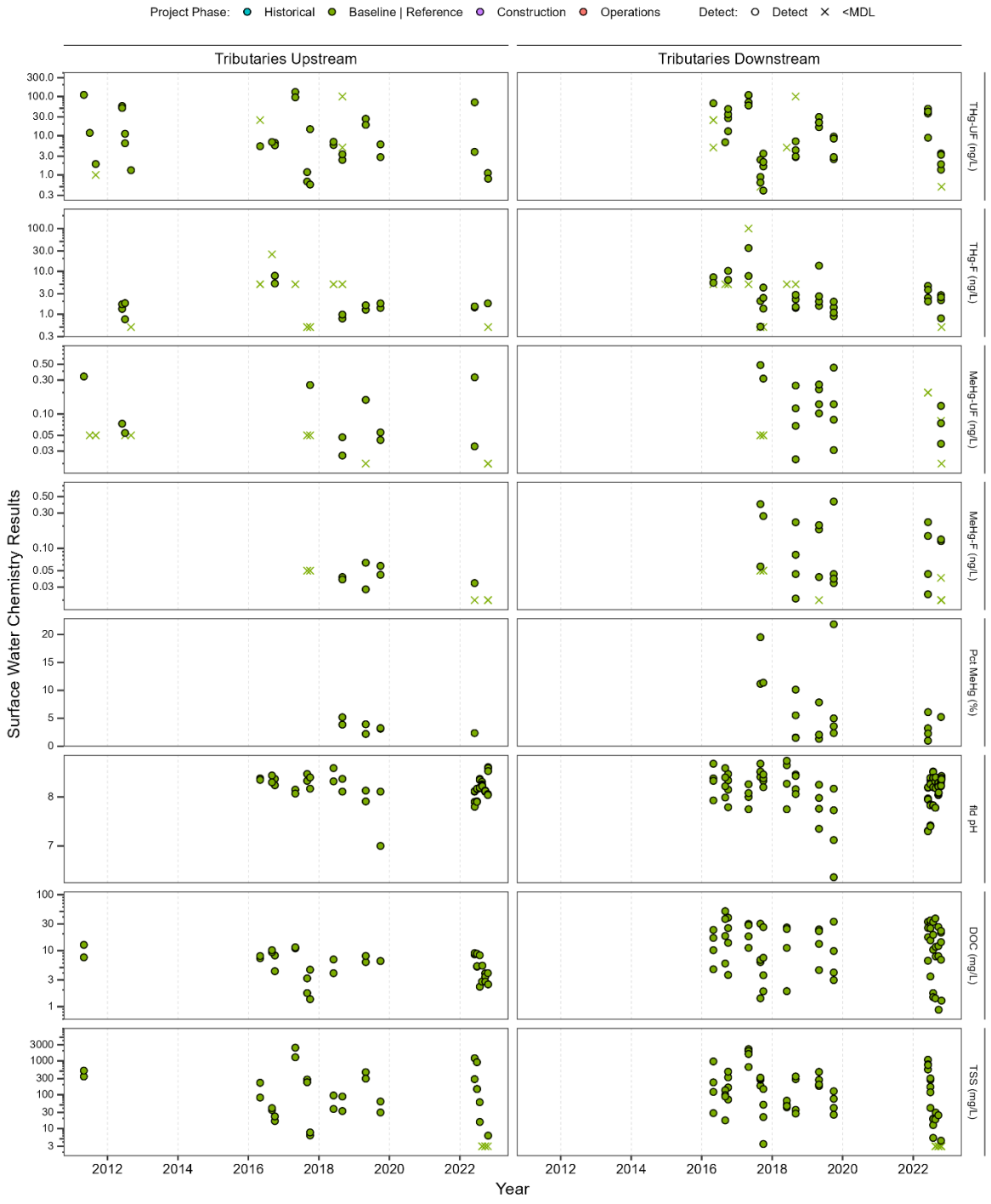
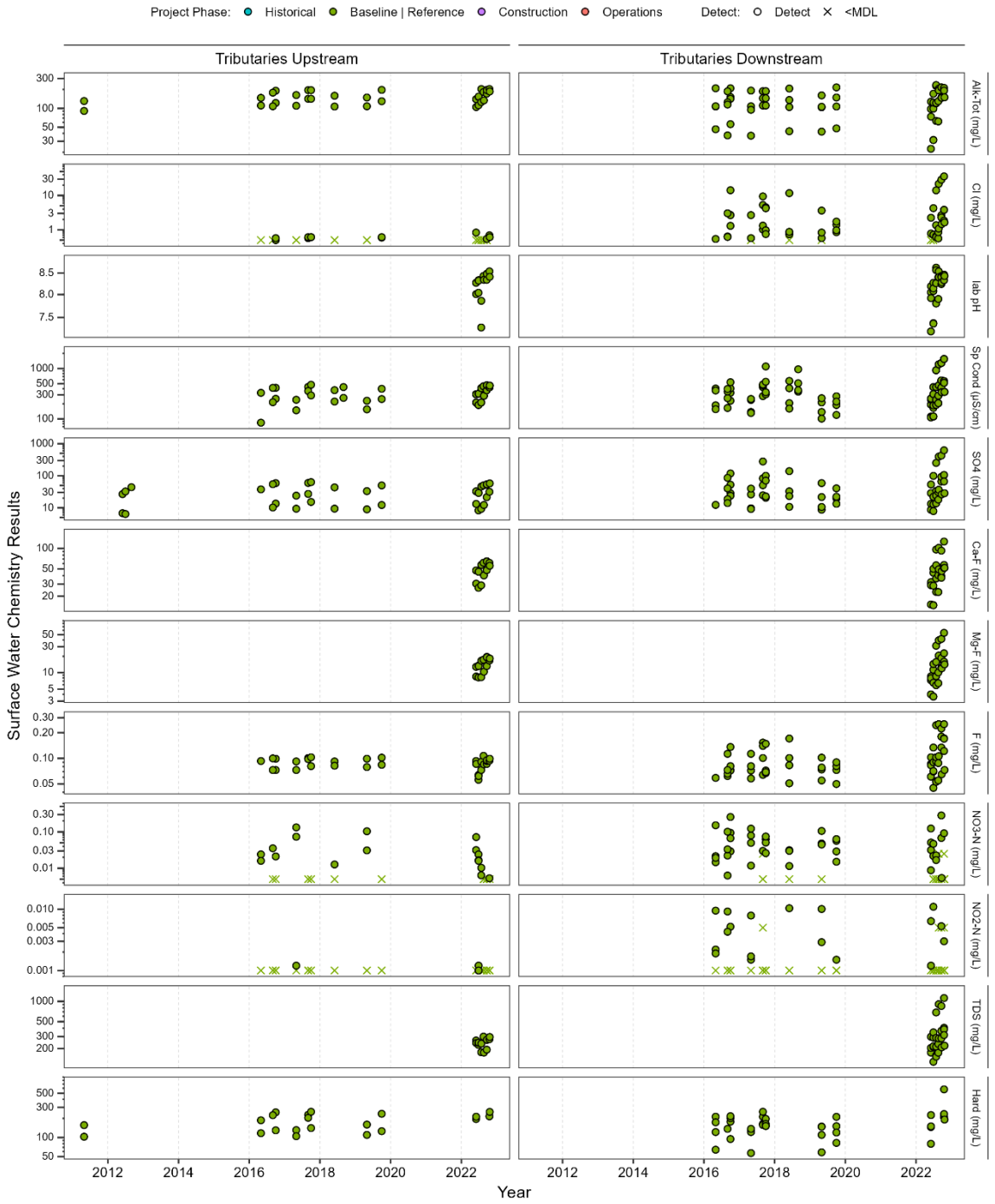


Figure B2-6. Temporal trends in secondary surface water quality parameters by station group for Peace River tributaries.



B.3 POREWATER QUALITY

B.3.1 Methods

B.3.1.1 Sampling

Sediment sampling methods are described in **Section B.4.1.1**; these methods assume that a good grab sample of sediment has been obtained. These methods work best on finer sediments (e.g., silt/clay); they will not likely work well in sandy sediments or in highly reduced (anoxic) sediments with high porewater concentrations of manganese and iron.

To minimize the potential for cross-contamination, the "clean hands/dirty hands" procedure is applied too (principles described in **Section B.2.1.1**). Porewater is extracted from sediments using vacuum filtration (hand or powered) and a Nalgene® disposable, sterile filtration unit (e.g., #167-0045, 0.45 µm filter, 1000 ml capacity). The upper 0 to 5 cm of sediment is removed from the grab and placed into the top of the filtration device with minimal disturbance. Once full, vacuum pressure is applied until filtration is complete. The resulting porewater is handled as per surface water (**Section B.2.1.1**).

Details on sample containers, field filtering and sample preservation for mercury-related analytes is provided in **Table B3-1**.

Table B3-1. Sampling information for total mercury and methylmercury in porewater.

Parameter	Target Volume	Container	Field Filtering / Preservative	MDL
Metals				
Total Mercury - Filtered	40 ml	40ml glass vial	0.45 µm / None	0.5 ng/L
Speciated Metals				
Methylmercury - Filtered	125 ml	125mL amber glass (or Teflon)	0.45 µm / HCl	0.02 ng/L

B.3.1.2 Laboratory Analyses

Porewater samples collected in the 2022 program were analyzed by ALS. See **Appendix B2** for the ALS reports.

B.3.2 Data Tables

The 2022 MMP porewater data are tabulated in **Table B3-2**, Porewater quality results for 2022.

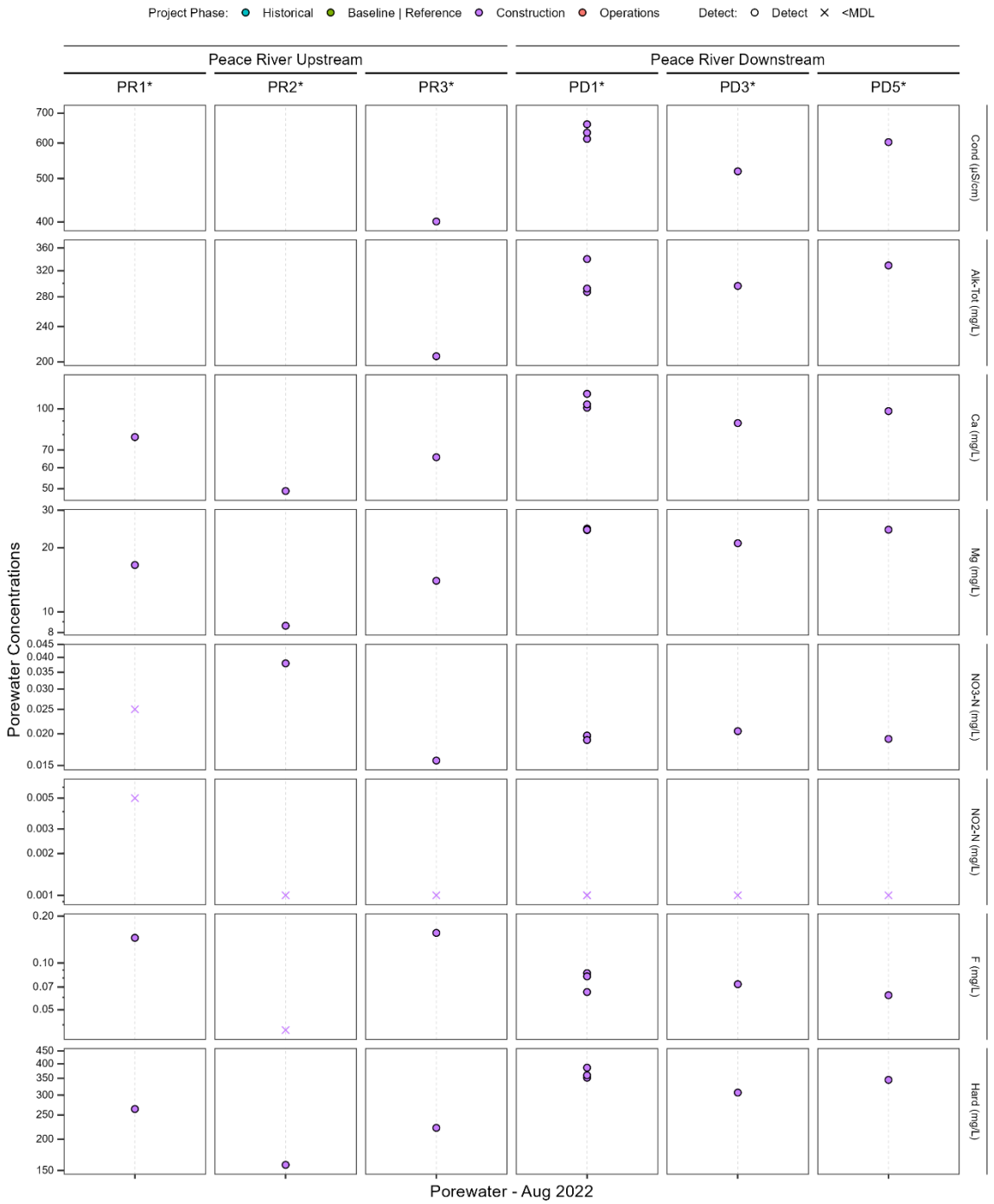
Table B3-2. Porewater quality results for 2022.

		Date	2022-08-26	2022-08-26	2022-08-25	2022-08-19	2022-08-24	2022-08-24	2022-08-23	2022-08-24
		ALS Sample ID	FJ2202370-001	FJ2202370-002	FJ2202328-001	FJ2202226-001	FJ2202312-001	FJ2202312-004	FJ2202288-001	FJ2202312-003
		Site Type	Peace River Upstream	Peace River Upstream	Peace River Upstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream
		Location	Upper Site C (PR1*)	Mid Site C (PR2*)	Lower Site C (PR3*)	Site C Tailrace (PD1*)	Site C Tailrace (PD1*)	Site C Tailrace (PD1*)	Beatton-Kiskatinaw (PD3*)	Many Islands (PD5*)
		Replicate	PR1-A	PR2-A	PR3-A	PD1-A	PD1-A	PD1-B	PD3-A	PD5-A
Analyte	**Units**	**MDL**								
Alk-Tot	**mg/L**	1	NA	NA	206	340	287	292	296	329
Cond	**µS/cm**	2	NA	NA	401	661	613	633	519	603
Ca	**mg/L**	0.05	78.3	49	65.7	114	101	104	88.4	98.1
DOC	**mg/L**	0.5	19.9	23.8	11.1	11.9	12.5	16	11.7	16
Hard	**mg/L**	0.6	264	158	222	386	352	360	307	345
lab pH	**--**	0.1	NA	NA	8.31	8.28	8.24	8.32	8.48	8.33
TSS	**mg/L**	3-7.5	7.9	<3	10.1	<3	6.1	8.7	<7.5	<3
NO3-N	**mg/L**	0.005-0.025	<0.025	0.0379	0.0157	0.0196	0.0197	0.0189	0.0205	0.0191
NO2-N	**mg/L**	0.001-0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
SO4	**mg/L**	0.3-1.5	6.53	16.1	28.5	51.4	73.8	70.7	20.4	23.9
Cl	**mg/L**	0.5-2.5	10.8	1.08	0.78	<0.5	<0.5	<0.5	<0.5	0.8
F	**mg/L**	0.02-0.1	0.145	<0.037	0.156	0.065	0.086	0.082	0.073	0.062
Mg	**mg/L**	0.005	16.6	8.61	14	24.6	24.2	24.3	21	24.3
THg-F	**ng/L**	0.5-5	11.3	8.56	8.17	<5	5.32	7.16	3.44	8.27
MeHg-F	**ng/L**	0.02-0.04	0.927	0.201	0.692	NA	0.165	0.342	0.332	0.545

B.3.3 Supplemental Results

Secondary analytes for porewater chemistry are shown in **Figure B3-1**. While historical data were available for the primary analytes (**Section 3.3.4 in the Main Report**), none were available for the secondary analytes.

Figure B3-1. Results for secondary porewater quality parameters by station and station group in 2022 for Reservoir and main-stem Peace River locations. Site C MMP stations noted with an asterisk (*). Log scale used for all parameters.



Note: For Reservoir samples, station names ending in "S" were collected at the surface, while station names ending in "D" were collected at depth.

B.4 SEDIMENT QUALITY

B.4.1 Methods

B.4.1.1 Sampling

Sediment sampling protocols used in 2022 were consistent with methods used in previous years of sampling for the program. These protocols were based on those provided in the BC Field Sampling Manual (Gov BC, 2013) and are described in more detail in the 2022 report for FAHMFP Mon-8/9 (Ganshorn et al., 2023).

Details on sampling containers, field filtering and sample preservation for mercury-related analytes in sediment is provided in **Table B4-1**.

Table B4-1. Sampling information for total mercury and methylmercury in sediment.

Parameter	Target Volume	Container	Preservative	MDL
Metals				
Total Mercury	125 ml	125 ml glass	None	5 ng/g dw
Speciated Metals				
Methylmercury				0.05 ng/g dw

B.4.1.2 Laboratory Analyses

Sediment samples collected in the 2022 program were analyzed by ALS. See **Appendix B3** for the ALS reports.

B.4.2 Data Tables

The 2022 MMP sediment quality data are tabulated in **Table B4-2**, Sediment quality results for 2022.

Table B4-2. Sediment quality results for 2022.

		Date	2022-08-17	2022-08-26	2022-08-18	2022-08-19	2022-08-23	2022-08-24	2022-08-24
		ALS Sample ID	FJ2202206-001	FJ2202371-001	FJ2202202-002	FJ2202228-001	FJ2202311-001	FJ2202314-002	FJ2202314-003
		Site Type	Peace River Upstream	Peace River Upstream	Peace River Upstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream
		Location	Upper Site C (PR1*)	Mid Site C (PR2*)	Lower Site C (PR3*)	Site C Tailrace (PD1*)	Beatton-Kiskatinaw (PD3*)	Many Islands (PD5*)	Many Islands (PD5*)
		Replicate	PR1	PR2	PR3	PD1	PD3	PD5-A	PD5-B
Analyte	**Units**	**MDL**							
TIC	**%**	0.05	0.219	1.07	0.676	0.688	0.527	0.4	0.394
TOC	**%**	0.118-0.283	0.801	1.5	1.19	1.65	1.49	1.33	1.38
lab pH	**--**	0.1	8.1	8.31	8.19	8.25	8.08	8.27	8.33
MeHg	**µg/kg**	0.05	0.639	<0.05	0.49	0.759	<0.05	0.064	<0.05
THg	**µg/kg**	5	52.8	41.3	42	58.2	51.1	55.4	53.8
Clay	**<4 µm**	1	1.9	9.5	6.6	8.6	7.3	6	6
Silt	**0.004 - 0.063 mm**	1	14.5	51.7	34	62.7	48.5	24.4	24.8
Sand	**0.063 - 2.0 mm**	1	83.6	38.8	59.4	28.7	44.2	69.6	69.2
Gravel	**>2 mm**	1	<1	<1	<1	<1	<1	<1	<1

B.4.3 Supplemental Results

Results for tributary stations are provided for 2022 (**Figure B4-1**) and across years (**Figure B4-2**).

Figure B4-1. Results for key mercury-related sediment quality parameters by station and station groups in 2022 for Peace River Tributaries. Log scale used for THg.

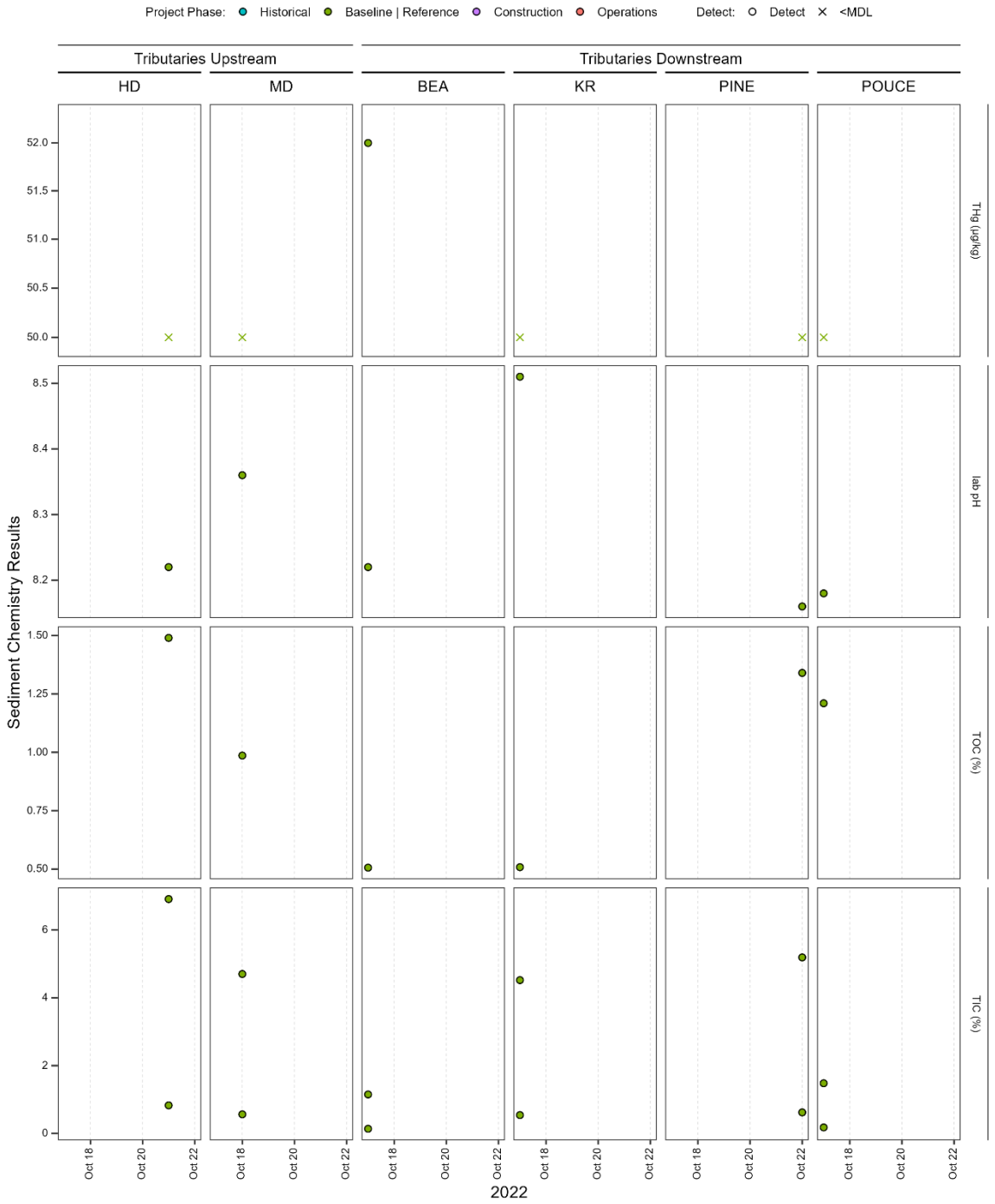
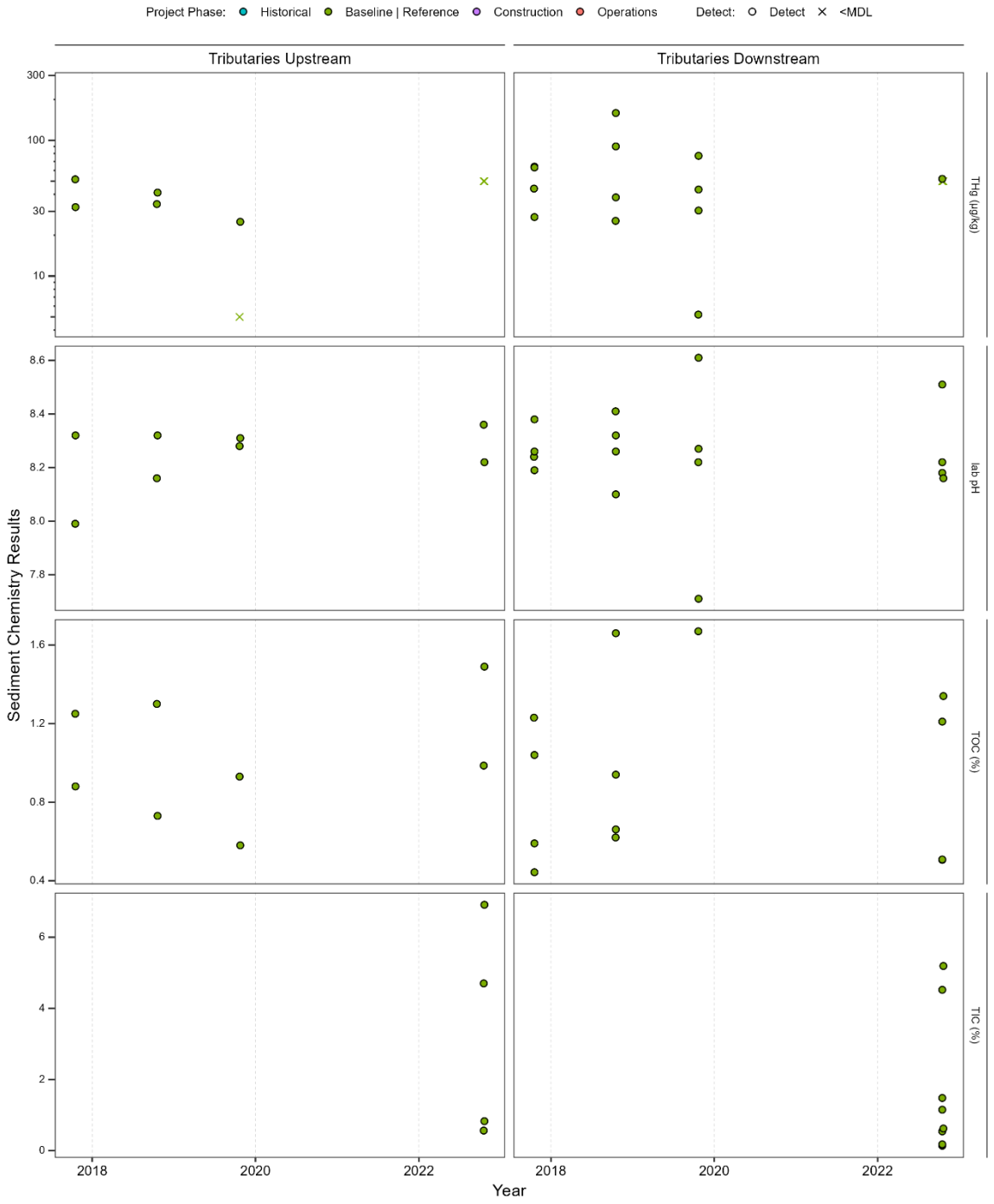


Figure B4-2. Temporal trends in key mercury-related sediment quality parameters by station groups for Peace River Tributaries. Log scale used for THg.



B.5 BENTHIC INVERTEBRATE TISSUE

B.5.1 Methods

B.5.1.1 Sampling

Artificial substrates (rock baskets) were used to collect benthic invertebrates for tissue sampling. Methods were summarized in **Section 3.5.1 of the Main Report**. Additional details are provided below:

- Baskets were deployed in early August and retrieved in late September.
- Baskets were installed such that each site contained four replicate baskets. They were originally intended to be treated as true replicates. However, recovery of invertebrates was variable, so all baskets were processed first.
- After the invertebrates were collected, allocation to individual samples was conducted following a few basic principles:
  - Where sufficient organisms were available, individual taxa were sampled (by size if possible). For example, larger Trichoptera were pooled together if enough were present.
  - Where sufficient numbers were present, field duplicate samples were collected. See **Appendix A** for details for the 2022 program.
  - Composite samples were used when insufficient numbers of individual taxa were present to make a discrete sample.

Details on sampling containers, field filtering and sample preservation for mercury-related analytes in sediment is provided in **Table B5-1**.

Table B5-1. Sampling information for total mercury and methylmercury in benthic invertebrate tissue.

Parameter	Target Volume	Container	Preservative	MDL
Metals				
Total Mercury	Ideal: 5 to 10 g ww Acceptable: 2 to 4 g ww	Vial or Whirlpack bag	None	5 ng/g dw
Speciated Metals				
Methylmercury				
Stable Isotopes Analysis				
C & N	1 g ww	Vial or Whirlpack bag		NA

B.5.1.2 Laboratory Analyses

Benthic invertebrate tissue samples collected in the 2022 program were analyzed for chemistry parameters by ALS, and for stable isotope analysis (SIA) by SINLab. See **Appendix B5** for the ALS reports and **Appendix B6** for the SINLab reports.

B.5.2 Data Tables

The 2022 MMP benthic invertebrate tissue data are tabulated in **Table B5-2**, Benthic invertebrate tissue quality results for 2022.

Table B5-2. Benthic invertebrate tissue quality results for 2022.

Upper Site C (PR1) to Mid Site C (PR2) to Lower Site C (PR3)

		Date	26-Sep-22	26-Sep-22	26-Sep-22	27-Sep-22	27-Sep-22	27-Sep-22	27-Sep-22	27-Sep-22	27-Sep-22	30-Sep-22	30-Sep-22	30-Sep-22	30-Sep-22
		ALS Sample ID	FJ2203485-003	FJ2203485-001	FJ2203485-002	FJ2203485-004	FJ2203485-005	FJ2203485-006	FJ2203485-007	FJ2203485-008	FJ2203485-009	FJ2203485-031	FJ2203485-028	FJ2203485-030	FJ2203485-029
		Site Type	Peace River Upstream	Peace River Upstream	Peace River Upstream	Peace River Upstream	Peace River Upstream	Peace River Upstream	Peace River Upstream	Peace River Upstream	Peace River Upstream	Peace River Upstream	Peace River Upstream	Peace River Upstream	Peace River Upstream
		Location	Upper Site C (PR1*)	Upper Site C (PR1*)	Upper Site C (PR1*)	Mid Site C (PR2*)	Mid Site C (PR2*)	Mid Site C (PR2*)	Mid Site C (PR2*)	Mid Site C (PR2*)	Mid Site C (PR2*)	Lower Site C (PR3*)	Lower Site C (PR3*)	Lower Site C (PR3*)	Lower Site C (PR3*)
		Client Sample ID	PR1-M	PR1-TB	PR1-TS	PR2-P	PR2-TB	PR2-TS-A	PR2-TS-B	PR2-TT-A	PR2-TT-B	PR3-M	PR3-TB	PR3-TC	PR3-TS
Analyte	**Units**	**MDL**													
Mercury	**µg/kg dw**	1 - 38.9	<38.9	74.1	75.8	23.5	35.4	33.2	32.5	30.2	30.5	28.2	27	17	26.7
Methylmercury	**µg/kg dw**	1 - 90.9	33.7	57.7	16.9	13.1	30.8	30.3	26.4	19.8	16.4	16.8	17.2	13.2	13

Site C Tailrace (PD1)

		Date	28-Sep-22	28-Sep-22	28-Sep-22	28-Sep-22	28-Sep-22	28-Sep-22	28-Sep-22	28-Sep-22	28-Sep-22	28-Sep-22	28-Sep-22	28-Sep-22	
		ALS Sample ID	FJ2203485-021	FJ2203485-010	FJ2203485-011	FJ2203485-012	FJ2203485-013	FJ2203485-014	FJ2203485-015	FJ2203485-016	FJ2203485-020	FJ2203485-017	FJ2203485-018	FJ2203485-019	
		Site Type	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	
		Location	Site C Tailrace (PD1*)	Site C Tailrace (PD1*)	Site C Tailrace (PD1*)	Site C Tailrace (PD1*)	Site C Tailrace (PD1*)	Site C Tailrace (PD1*)	Site C Tailrace (PD1*)	Site C Tailrace (PD1*)	Site C Tailrace (PD1*)	Site C Tailrace (PD1*)	Site C Tailrace (PD1*)	Site C Tailrace (PD1*)	
		Client Sample ID	PD1-E	PD1-PB-A	PD1-PB-B	PD1-PB-C	PD1-PS	PD1-TB-A	PD1-TB-B	PD1-TB-C	PD1-TC-	PD1-TS-A	PD1-TS-B	PD1-TS-C	
Analyte	**Units**	**MDL**													
Mercury	**µg/kg dw**	1 - 38.9	18.7	23.7	22.1	23.6	26	33.5	34	34	16.2	29.2	33	35.5	
Methylmercury	**µg/kg dw**	1 - 90.9	16.3	9.2	9.3	8.8	12.3	26.8	20.5	27.3	9.6	16.5	16.7	15.4	

Beatton-Kiskatinaw (PD3) to Many Islands (PD5)

		Date	29-Sep-22	29-Sep-22	29-Sep-22	29-Sep-22	29-Sep-22	29-Sep-22	01-Oct-22	01-Oct-22	01-Oct-22	01-Oct-22	01-Oct-22
		ALS Sample ID	FJ2203485-027	FJ2203485-022	FJ2203485-023	FJ2203485-025	FJ2203485-026	FJ2203485-024	FJ2203485-036	FJ2203485-032	FJ2203485-035	FJ2203485-033	FJ2203485-034
		Site Type	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream	Peace River Downstream
		Location	Beatton-Kiskatinaw (PD3*)	Beatton-Kiskatinaw (PD3*)	Beatton-Kiskatinaw (PD3*)	Beatton-Kiskatinaw (PD3*)	Beatton-Kiskatinaw (PD3*)	Beatton-Kiskatinaw (PD3*)	Many Islands (PD5*)	Many Islands (PD5*)	Many Islands (PD5*)	Many Islands (PD5*)	Many Islands (PD5*)
		Client Sample ID	PD3-E	PD3-PB	PD3-TB	PD3-TC-A	PD3-TC-B	PD3-TS	PD5-E	PD5-TB	PD5-TC	PD5-TS-A	PD5-TS-B
Analyte	**Units**	**MDL**											
Mercury	**µg/kg dw**	1 - 38.9	27.1	20.4	22.1	15.7	16.3	21.9	26.8	20	18	36.4	30.1
Methylmercury	**µg/kg dw**	1 - 90.9	9.9	8.3	12.6	8	7.5	12.7	12.1	7.9	5	11.3	9.6

B.5.3 Supplemental Results

Results for stable isotopes analysis of benthic invertebrate tissue are provided in the following figures:

- 2022 results by project phase (**Figure B5-1**).
- 2022 results by taxonomic group (**Figure B5-2**).
- Historical data by project phase (**Figure B5-3**).

Figure B5-1. Results for benthic invertebrate tissue stable isotopes analysis by station and station group for Reservoir and Peace River locations in 2022. Site C MMP stations noted with an asterisk (*).

Figure B5-2. Results for benthic invertebrate tissue stable isotopes analysis by station and station group for Reservoir and Peace River locations in 2022 highlighting taxonomic group. Site C MMP stations noted with an asterisk (*).

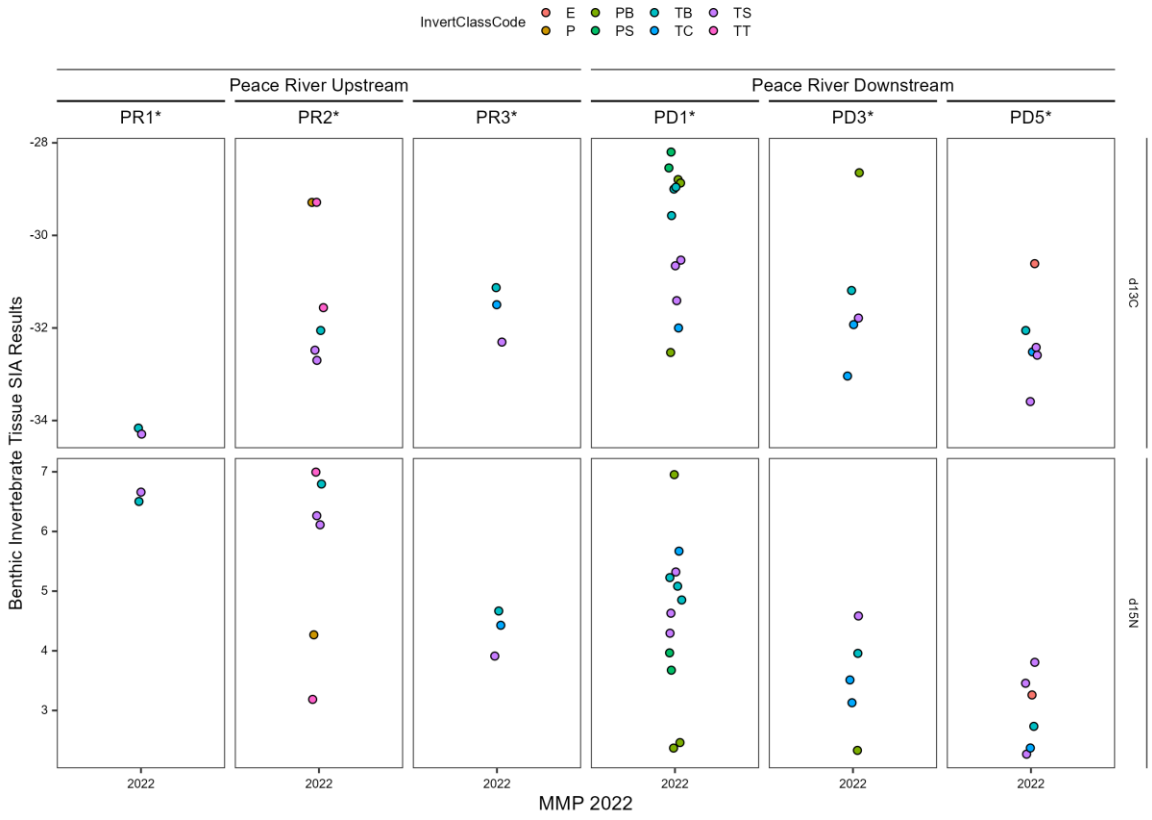
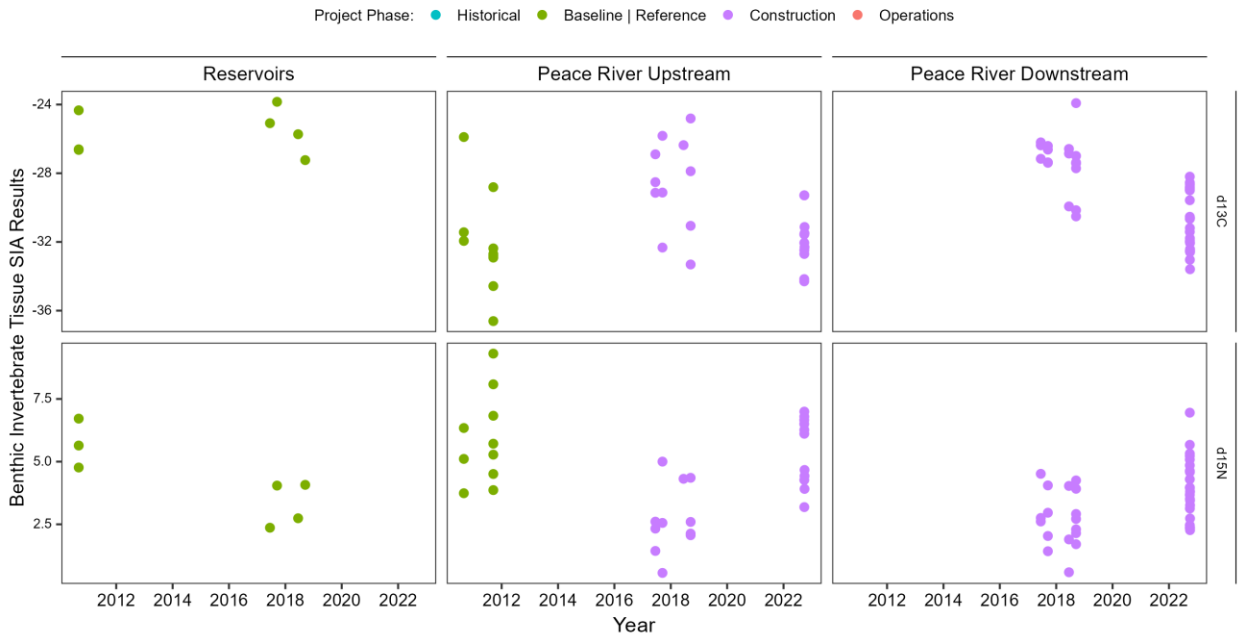


Figure B5-3. Temporal trends in benthic invertebrate tissue stable isotopes analysis by station and station group for Reservoir and Peace River locations in 2022. Site C MMP stations noted with an asterisk (*).



B.6 ZOOPLANKTON TISSUE

B.6.1 Methods

B.6.1.1 Sampling

Zooplankton were sampled in conjunction with surface water. Samples were collected by towing a Wisconsin-style zooplankton net (diameter, mesh, net length) approximately 20 to 50 cm below the surface behind a moving boat, or by holding it against the flow of the river. Where the collected sample was visually confirmed to contain primarily zooplankton, the net was rinsed and then emptied directly into amber glass bottles (this container type was not specified, but is fine) for mercury analyses and HDPE scintillation vials for stable isotope analysis. However, when samples were primarily didymo (the invasive diatom *Didymosphenia geminata*), or other unwanted organisms (e.g., chironomids, mayfly nymphs), the sample was passed through a five-stage filter (4000, 2000, 500, 250, and 125 µm mesh) to facilitate isolating the zooplankton. Larger zooplankton were retained on the 500 µm sieve, and smaller zooplankton were retained on the 250 and 125 µm sieves. Each of these sieves was placed in a water-filled tray to manually separate out the desired sample organisms before transferring the sample to the appropriate sample containers.

Details on sampling containers, field filtering and sample preservation for mercury-related analytes in sediment is provided in **Table B5-1**.

Table B6-1. Sampling information for total mercury and methylmercury in zooplankton tissue.

Parameter	Target Volume	Container	Preservative	MDL
Metals				
Total Mercury	Ideal: 5 to 10 g ww Acceptable: 2 to 4 g ww	Vial or Whirlpack bag	None	5 ng/g dw
Speciated Metals				
Methylmercury				
Stable Isotopes Analysis				
C & N	1 g ww	Vial or Whirlpack bag		NA

B.6.1.2 Laboratory Analyses

Zooplankton tissue samples collected in the 2022 program were analyzed for chemistry parameters by ALS, and for stable isotope analysis (SIA) by SINLAB. See **Appendix B7** for the ALS reports and **Appendix B8** for the SINLAB reports.

B.6.2 Data Tables

The 2022 MMP benthic invertebrate tissue data are tabulated in **Table B6-2**, Zooplankton tissue quality results for 2022.

Table B6-2. Zooplankton tissue quality results for 2022.

		Date	19-Oct-22	16-Aug-22	16-Aug-22	16-Aug-22	21-Aug-22	19-Oct-22	19-Oct-22	21-Aug-22	20-Aug-22
		ALS Sample ID	FJ2203485-041	FJ2203485-038	FJ2203485-044	FJ2203485-039	FJ2203485-040	FJ2203485-042	FJ2203485-043	FJ2203485-045	FJ2203485-037
		Site Type	Reservoir	Reservoir	Reservoir	Reservoir	Reservoir	Reservoir	Reservoir	Reservoir	Peace River Upstream
		Location	Williston Shallow (W1)	Williston Shallow (W1)	Williston Shallow (W1)	Williston Shallow (W1)	Dinosaur Shallow (D1)	Dinosaur Shallow (D1)	Dinosaur Shallow (D1)	Dinosaur Shallow (D1)	Upper Site C (PR1*)
		Client Sample ID	W1-Shallow-Z	W1-Shallow-Z-A	W1-Shallow-Z-A-DUP	W1-Shallow-Z-B	D1-Shallow-Z	D1-Shallow-Z-A	D1-Shallow-Z-B	D1-Shallow-Z-DUP	PR1-Z
Analyte	**Units**	**MDL**									
Mercury	**µg/kg dw**	1 - 38.9	49	58	63	62	65	60	22.1	99	120
Methylmercury	**µg/kg dw**	1 - 90.9	<38.5	<83.3	NA	<90.9	<30.3	<76.9	<14.7	25.4	90.5

B.6.3 Supplemental Results

Results for stable isotopes analysis of zooplankton tissue are provided in the following figures:

- 2022 results by project phase (**Figure B6-1**).
- Historical data by project phase (**Figure B6-2**).

Figure B6-1. Results for zooplankton tissue stable isotopes analysis by station and station group for Reservoir and Peace River locations in 2022. Site C MMP stations noted with an asterisk (*).

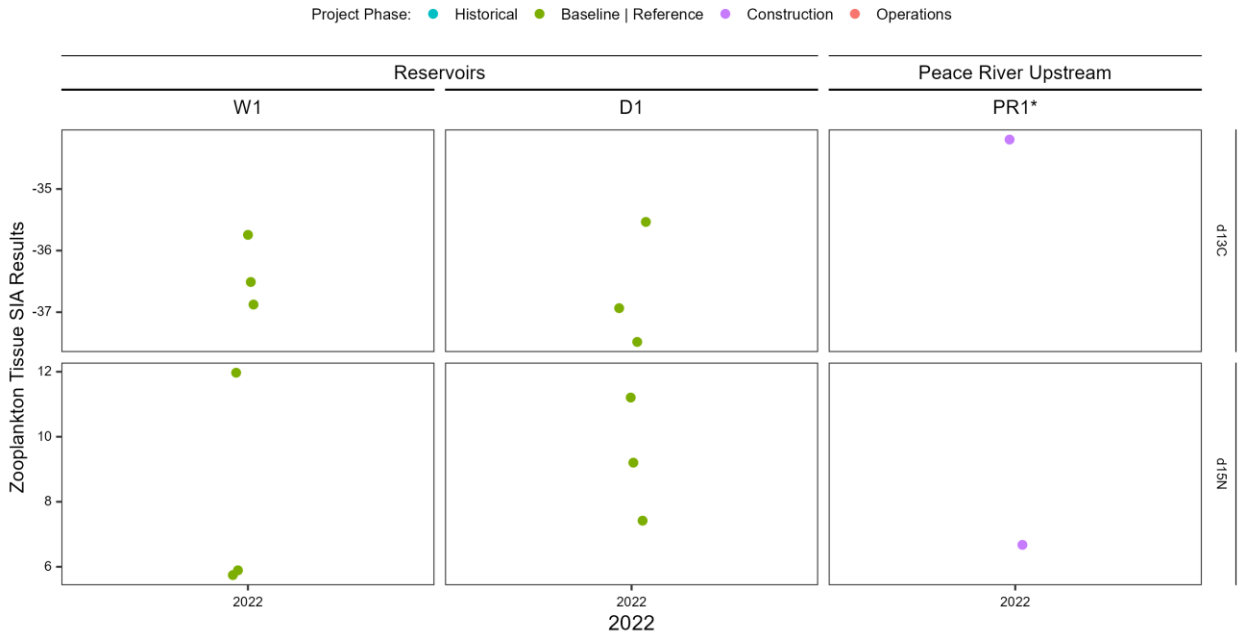
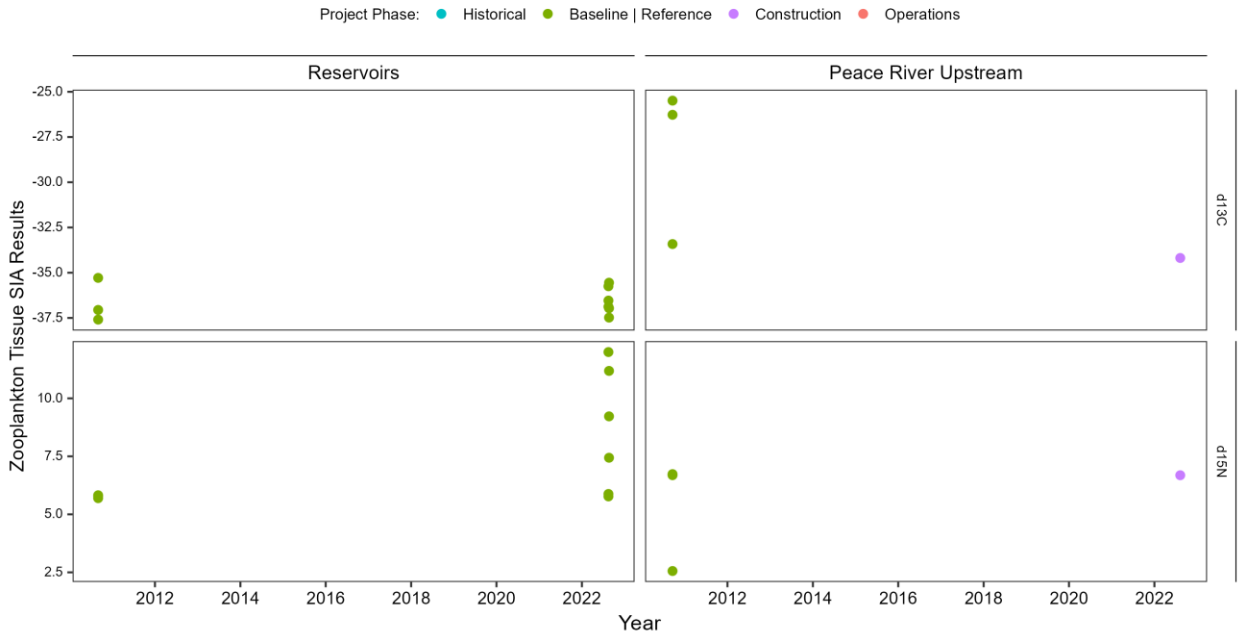


Figure B6-2. Temporal trends in zooplankton tissue stable isotopes analysis by station group for Reservoir and Peace River locations.



B.7 REFERENCES

Ganshorn, K., Philibert, R., Suzanne, C., and Doucet, C. 2023. Site C Clean Energy Project, Site C Reservoir (Mon-8) and Peace River (Mon-9) Water and Sediment Quality Monitoring Program Task 2a – Water and Sediment Quality, Construction Year 8 (2022). Consultant's report prepared for BC Hydro by Ecofish Research Ltd. and Aski Reclamation LP., September 8, 2023.

Gov BC (Government of British Columbia). 2013. Ambient Freshwater and Effluent Sampling, Field Sampling Manual. Part E, Water and Wastewater Sampling.

Gov BC. 2020. Ambient Freshwater and Effluent Sampling, Field Sampling Manual. Part D2, Sediment Sampling.

APPENDIX B1: SURFACE WATER CHEMISTRY ALS REPORTS

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202155**	Page	: 1 of 4
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 600 Comox Road Courtenay BC Canada V9N3P6	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 16-Aug-2022 12:55
PO	: 1200-25.03.02	Date Analysis Commenced	: 17-Aug-2022
C-O-C number	: 2022-Aug-MON8/9-Day 1	Issue Date	: 09-Sep-2022 16:54
Sampler	: ----		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Amber Montgomery	Account Manager Assistant	Administration, Calgary, Alberta
Anshim Anshim	Lab Assistant	Metals, Burnaby, British Columbia
Anthony Calero	Supervisor - Inorganic	Inorganics, Calgary, Alberta
Elke Tabora		Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Parker Sgarbossa	Laboratory Analyst	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sara Niroomand		Inorganics, Calgary, Alberta
Vladka Stamenova	Analyst	Inorganics, Calgary, Alberta

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
%	percent
µg/sample	micrograms per sample
µS/cm	Microsiemens per centimetre
CU	colour units (1 CU = 1 mg/L Pt)
L	litres
meq/L	milliequivalents per litre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: W1-Shallow	W1-Deep	D1-Shallow	D1-Deep	Travel Blank
					Client sampling date / time: 16-Aug-2022 08:35	16-Aug-2022 07:50	16-Aug-2022 11:00	16-Aug-2022 10:20	16-Aug-2022
					FJ2202155-001	FJ2202155-002	FJ2202155-003	FJ2202155-004	FJ2202155-005
					Result	Result	Result	Result	Result
Sample Preparation									
volume filtered	----	EF870B	0.001	L	0.070	0.070	0.070	0.070	0.070
Physical Tests									
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	80.1	82.7	83.1	85.7	----
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	80.1	82.7	83.1	85.7	----
colour, true	----	E329	5.0	CU	6.9	7.1	8.6	6.9	----
conductivity	----	E100	2.0	µS/cm	166	166	174	167	----
hardness (as CaCO3), dissolved	----	EC100	0.50	mg/L	84.2	89.6	90.4	92.0	----
pH	----	E108	0.10	pH units	8.20	8.20	8.13	8.09	----
solids, total dissolved [TDS]	----	E162	10	mg/L	105	104	107	108	----
solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	<3.0	<3.0	----
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0140	0.0075	0.0064	0.0056	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	----
fluoride	16984-48-8	E235.F	0.020	mg/L	0.026	0.026	0.028	0.026	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.072	0.131	<0.050	<0.050	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0550	0.0553	0.0704	0.0729	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0.0018	0.0022	----
nitrogen, total	7727-37-9	EC368	0.050	mg/L	0.127	0.186	0.072	0.075	----
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0053	0.0045	0.0045	0.0053	----
phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	----
silicate (as SiO2)	7631-86-9	E392	0.50	mg/L	4.28	4.28	4.48	4.46	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	12.3	12.3	13.3	13.6	----
Organic / Inorganic Carbon									
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	3.18	2.73	2.78	3.29	----
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	3.08	2.90	3.10	2.82	----
Ion Balance									

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: W1-Shallow	W1-Deep	D1-Shallow	D1-Deep	Travel Blank
					Client sampling date / time: 16-Aug-2022 08:35	16-Aug-2022 07:50	16-Aug-2022 11:00	16-Aug-2022 10:20	16-Aug-2022
					FJ2202155-001	FJ2202155-002	FJ2202155-003	FJ2202155-004	FJ2202155-005
					Result	Result	Result	Result	Result
Ion Balance									
anion sum	----	EC101	0.10	meq/L	1.86	1.91	1.94	2.00	----
cation sum	----	EC101	0.10	meq/L	1.74	1.85	1.87	1.90	----
ion balance (APHA)	----	EC101	0.010	%	3.33	1.60	1.84	2.56	----
Dissolved Metals									
calcium, dissolved	7440-70-2	E421	0.050	mg/L	24.2	25.7	25.8	26.1	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	5.77	6.18	6.30	6.52	----
dissolved metals filtration location	----	EP421	-	-	Laboratory	Laboratory	Laboratory	Laboratory	----
Plant Pigments									
chlorophyll a	479-61-8	E870B	0.0020	µg/sample	0.0724	0.0862	0.0256	0.0323	<0.0020

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202155**	Page	: 1 of 20
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 600 Comox Road Courtenay BC Canada V9N3P6	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 16-Aug-2022 12:55
PO	: 1200-25.03.02	Issue Date	: 09-Sep-2022 16:54
C-O-C number	: 2022-Aug-MON8/9-Day 1		
Sampler	: ----		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
D1-Deep	E298	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
D1-Shallow	E298	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
W1-Deep	E298	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
W1-Shallow	E298	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
D1-Deep	E235.Cl	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
D1-Shallow	E235.Cl	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
W1-Deep	E235.Cl	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE W1-Shallow	E235.Cl	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE D1-Deep	E378-U	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE D1-Shallow	E378-U	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE W1-Deep	E378-U	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE W1-Shallow	E378-U	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	3 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE D1-Deep	E235.F	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE D1-Shallow	E235.F	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE W1-Deep	E235.F	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE W1-Shallow	E235.F	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE D1-Deep	E235.NO3-L	16-Aug-2022	17-Aug-2022	3 days	1 days	✓	17-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE D1-Shallow	E235.NO3-L	16-Aug-2022	17-Aug-2022	3 days	1 days	✓	17-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE W1-Deep	E235.NO3-L	16-Aug-2022	17-Aug-2022	3 days	1 days	✓	17-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE W1-Shallow	E235.NO3-L	16-Aug-2022	17-Aug-2022	3 days	1 days	✓	17-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE D1-Deep	E235.NO2-L	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE D1-Shallow	E235.NO2-L	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE W1-Deep	E235.NO2-L	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE W1-Shallow	E235.NO2-L	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	3 days	1 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE D1-Deep	E392	16-Aug-2022	----	----	----		19-Aug-2022	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE D1-Shallow	E392	16-Aug-2022	----	----	----		19-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE W1-Deep	E392	16-Aug-2022	----	----	----		19-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE W1-Shallow	E392	16-Aug-2022	----	----	----		19-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE D1-Deep	E235.SO4	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE D1-Shallow	E235.SO4	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE W1-Deep	E235.SO4	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE W1-Shallow	E235.SO4	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) D1-Deep	E375-T	16-Aug-2022	17-Aug-2022	----	----		18-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) D1-Shallow	E375-T	16-Aug-2022	17-Aug-2022	----	----		18-Aug-2022	28 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
W1-Deep	E375-T	16-Aug-2022	17-Aug-2022	----	----		18-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
W1-Shallow	E375-T	16-Aug-2022	17-Aug-2022	----	----		18-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
D1-Deep	E318	16-Aug-2022	20-Aug-2022	----	----		20-Aug-2022	28 days	4 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
D1-Shallow	E318	16-Aug-2022	20-Aug-2022	----	----		20-Aug-2022	28 days	4 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
W1-Deep	E318	16-Aug-2022	20-Aug-2022	----	----		20-Aug-2022	28 days	4 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
W1-Shallow	E318	16-Aug-2022	20-Aug-2022	----	----		20-Aug-2022	28 days	4 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
D1-Deep	E372-U	16-Aug-2022	17-Aug-2022	----	----		19-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
D1-Shallow	E372-U	16-Aug-2022	17-Aug-2022	----	----		19-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
W1-Deep	E372-U	16-Aug-2022	17-Aug-2022	----	----		19-Aug-2022	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
W1-Shallow	E372-U	16-Aug-2022	17-Aug-2022	----	----		19-Aug-2022	28 days	3 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
D1-Shallow	E421	16-Aug-2022	22-Aug-2022	----	----		23-Aug-2022	180 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
D1-Deep	E421	16-Aug-2022	22-Aug-2022	----	----		23-Aug-2022	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
W1-Deep	E421	16-Aug-2022	22-Aug-2022	----	----		23-Aug-2022	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
W1-Shallow	E421	16-Aug-2022	22-Aug-2022	----	----		23-Aug-2022	180 days	8 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
D1-Deep	E358-L	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
D1-Shallow	E358-L	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
W1-Deep	E358-L	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
W1-Shallow	E358-L	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
D1-Deep	E355-L	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
D1-Shallow	E355-L	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
W1-Deep	E355-L	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
W1-Shallow	E355-L	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
D1-Deep	E290	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	14 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
D1-Shallow	E290	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	14 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
W1-Deep	E290	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	14 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
W1-Shallow	E290	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	14 days	1 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE										
D1-Deep	E329	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	3 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE D1-Shallow	E329	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	3 days	1 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE W1-Deep	E329	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	3 days	1 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE W1-Shallow	E329	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	3 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE D1-Deep	E100	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE D1-Shallow	E100	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE W1-Deep	E100	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE W1-Shallow	E100	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	28 days	1 days	✓
Physical Tests : pH by Meter										
HDPE D1-Deep	E108	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	0.25 hrs	0.26 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE D1-Shallow	E108	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	0.25 hrs	0.26 hrs	× EHTR-FM

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE W1-Deep	E108	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	0.25 hrs	0.26 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE W1-Shallow	E108	16-Aug-2022	17-Aug-2022	----	----		17-Aug-2022	0.25 hrs	0.26 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE D1-Deep	E162	16-Aug-2022	----	----	----		19-Aug-2022	7 days	3 days	✓
Physical Tests : TDS by Gravimetry										
HDPE D1-Shallow	E162	16-Aug-2022	----	----	----		19-Aug-2022	7 days	3 days	✓
Physical Tests : TDS by Gravimetry										
HDPE W1-Deep	E162	16-Aug-2022	----	----	----		19-Aug-2022	7 days	3 days	✓
Physical Tests : TDS by Gravimetry										
HDPE W1-Shallow	E162	16-Aug-2022	----	----	----		19-Aug-2022	7 days	3 days	✓
Physical Tests : TSS by Gravimetry										
HDPE D1-Deep	E160	16-Aug-2022	----	----	----		19-Aug-2022	7 days	3 days	✓
Physical Tests : TSS by Gravimetry										
HDPE D1-Shallow	E160	16-Aug-2022	----	----	----		19-Aug-2022	7 days	3 days	✓
Physical Tests : TSS by Gravimetry										
HDPE W1-Deep	E160	16-Aug-2022	----	----	----		19-Aug-2022	7 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TSS by Gravimetry										
HDPE										
W1-Shallow	E160	16-Aug-2022	----	----	----		19-Aug-2022	7 days	3 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Support Lab Filtered µg)										
Opaque HDPE tube										
D1-Deep	E870B	16-Aug-2022	20-Aug-2022	28 days	4 days	✓	20-Aug-2022	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Support Lab Filtered µg)										
Opaque HDPE tube										
D1-Shallow	E870B	16-Aug-2022	20-Aug-2022	28 days	4 days	✓	20-Aug-2022	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Support Lab Filtered µg)										
Opaque HDPE tube										
Travel Blank	E870B	16-Aug-2022	20-Aug-2022	28 days	4 days	✓	20-Aug-2022	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Support Lab Filtered µg)										
Opaque HDPE tube										
W1-Deep	E870B	16-Aug-2022	20-Aug-2022	28 days	4 days	✓	20-Aug-2022	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Support Lab Filtered µg)										
Opaque HDPE tube										
W1-Shallow	E870B	16-Aug-2022	20-Aug-2022	28 days	4 days	✓	20-Aug-2022	28 days	0 days	✓
Sample Preparation : Chlorophyll-a Filtration by Support Laboratory										
Opaque HDPE										
D1-Shallow	EF870B	16-Aug-2022	----	----	----		17-Aug-2022	48 hrs	28 hrs	✓
Sample Preparation : Chlorophyll-a Filtration by Support Laboratory										
Opaque HDPE										
D1-Deep	EF870B	16-Aug-2022	----	----	----		17-Aug-2022	48 hrs	29 hrs	✓
Sample Preparation : Chlorophyll-a Filtration by Support Laboratory										
Opaque HDPE										
Travel Blank	EF870B	16-Aug-2022	----	----	----		17-Aug-2022	48 hrs	30 hrs	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Sample Preparation : Chlorophyll-a Filtration by Support Laboratory										
Opaque HDPE										
W1-Shallow	EF870B	16-Aug-2022	----	----	----		17-Aug-2022	48 hrs	30 hrs	✓
Sample Preparation : Chlorophyll-a Filtration by Support Laboratory										
Opaque HDPE										
W1-Deep	EF870B	16-Aug-2022	----	----	----		17-Aug-2022	48 hrs	31 hrs	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	606476	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	605988	1	8	12.5	5.0	✓
Chloride in Water by IC	E235.Cl	606388	1	8	12.5	5.0	✓
Chlorophyll-a by Fluorometry (Support Lab Filtered µg)	E870B	611401	1	15	6.6	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	606734	1	10	10.0	5.0	✓
Conductivity in Water	E100	606474	1	15	6.6	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	613855	1	4	25.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	605853	1	8	12.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	606247	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	606387	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	606384	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	606386	1	20	5.0	5.0	✓
pH by Meter	E108	606475	1	20	5.0	5.0	✓
Reactive Silica by Colourimetry	E392	610871	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	606385	1	8	12.5	5.0	✓
TDS by Gravimetry	E162	609058	1	14	7.1	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	606192	1	17	5.8	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	608825	1	19	5.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	605854	1	8	12.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	606507	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	609064	1	17	5.8	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	606476	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	605988	1	8	12.5	5.0	✓
Chloride in Water by IC	E235.Cl	606388	1	8	12.5	5.0	✓
Chlorophyll-a by Fluorometry (Support Lab Filtered µg)	E870B	611401	1	15	6.6	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	606734	1	10	10.0	5.0	✓
Conductivity in Water	E100	606474	1	15	6.6	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	613855	1	4	25.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	605853	1	8	12.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	606247	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	606387	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	606384	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	606386	1	20	5.0	5.0	✓
pH by Meter	E108	606475	1	20	5.0	5.0	✓
Reactive Silica by Colourimetry	E392	610871	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	606385	1	8	12.5	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
TDS by Gravimetry	E162	609058	1	14	7.1	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	606192	1	17	5.8	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	608825	1	19	5.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	605854	1	8	12.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	606507	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	609064	1	17	5.8	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	606476	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	605988	1	8	12.5	5.0	✓
Chloride in Water by IC	E235.Cl	606388	1	8	12.5	5.0	✓
Chlorophyll-a by Fluorometry (Support Lab Filtered µg)	E870B	611401	1	15	6.6	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	606734	1	10	10.0	5.0	✓
Conductivity in Water	E100	606474	1	15	6.6	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	613855	1	4	25.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	605853	1	8	12.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	606247	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	606387	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	606384	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	606386	1	20	5.0	5.0	✓
Reactive Silica by Colourimetry	E392	610871	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	606385	1	8	12.5	5.0	✓
TDS by Gravimetry	E162	609058	1	14	7.1	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	606192	1	17	5.8	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	608825	1	19	5.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	605854	1	8	12.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	606507	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	609064	1	17	5.8	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	605988	1	8	12.5	5.0	✓
Chloride in Water by IC	E235.Cl	606388	1	8	12.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	613855	1	4	25.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	605853	1	8	12.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	606247	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	606387	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	606384	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	606386	1	20	5.0	5.0	✓
Reactive Silica by Colourimetry	E392	610871	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	606385	1	8	12.5	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	606192	1	17	5.8	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	608825	1	19	5.2	5.0	✓

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Matrix Spikes (MS) - Continued							
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	605854	1	8	12.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	606507	1	20	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Calgary - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Calgary - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Calgary - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 Calgary - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Calgary - Environmental	Water	APHA 2320 B (mod)	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.
Ammonia by Fluorescence	E298 Calgary - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Calgary - Environmental	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Colour (True) by Spectrometer (5 CU)	E329 Calgary - Environmental	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Calgary - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Calgary - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U Calgary - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T Calgary - Environmental	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U Calgary - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Reactive Silica by Colourimetry	E392 Vancouver - Environmental	Water	APHA 4500-SiO_2 E (mod)	Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method using a discrete analyzer. Method Limitation: Arsenic (5+) above 100 mg/L is a negative interference on this test
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Chlorophyll-a by Fluorometry (Support Lab Filtered µg)	E870B Vancouver - Environmental	Water	EPA 445.0 (mod)	Chlorophyll-a is determined by solvent extraction followed with analysis by fluorometry using the non-acidification procedure. Sampling volume not provided by client.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 Calgary - Environmental	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
Total Nitrogen (calculation)	EC368 Calgary - Environmental	Water	BC MOE LABORATORY MANUAL (2005)	Total Nitrogen is a calculated parameter. Total Nitrogen = Total Kjeldahl Nitrogen + [Nitrate and Nitrite (as N)].
Chlorophyll-a Filtration by Support Laboratory	EF870B Calgary - Environmental	Water	EPA 445.0 (mod)	Filtration for chlorophyll-a analysis

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Calgary - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 Calgary - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Total Organic Carbon by Combustion	EP355 Calgary - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 Calgary - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Phosphorus in water	EP372 Calgary - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 Calgary - Environmental	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Chlorophyll-a Extraction	EP870 Vancouver - Environmental	Water	EPA 445.0 (mod)	Chlorophyll-a solvent extraction.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Chlorophyll-a Extraction (Support Lab Filtered)	EP870B Vancouver - Environmental	Water	EPA 445.0 (mod)	Chlorophyll-a solvent extraction.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **FJ2202155**	Page	: 1 of 10
Client	: Ecofish Research Ltd	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 600 Comox Road Courtenay BC Canada V9N3P6	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 16-Aug-2022 12:55
PO	: 1200-25.03.02	Date Analysis Commenced	: 17-Aug-2022
C-O-C number	: 2022-Aug-MON8/9-Day 1	Issue Date	: 09-Sep-2022 16:54
Sampler	: ----		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
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Anshim Anshim	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Anthony Calero	Supervisor - Inorganic	Calgary Inorganics, Calgary, Alberta
Elke Tabora		Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
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Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Parker Sgarbossa	Laboratory Analyst	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sara Niroomand		Calgary Inorganics, Calgary, Alberta
Vladka Stamenova	Analyst	Calgary Inorganics, Calgary, Alberta

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 606474)											
CG2210901-004	Anonymous	conductivity	----	E100	2.0	µS/cm	333	335	0.599%	10%	----
Physical Tests (QC Lot: 606475)											
CG2210901-004	Anonymous	pH	----	E108	0.10	pH units	8.77	8.79	0.228%	4%	----
Physical Tests (QC Lot: 606476)											
CG2210901-004	Anonymous	alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	136	141	3.75%	20%	----
		alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	16.0	17.2	7.23%	20%	----
		alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	8.0	8.6	0.6	Diff <2x LOR	----
		alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	152	158	4.12%	20%	----
Physical Tests (QC Lot: 606734)											
CG2210845-001	Anonymous	colour, true	----	E329	5.0	CU	<5.0	<5.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 609058)											
CG2210948-002	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	185	180	6	Diff <2x LOR	----
Physical Tests (QC Lot: 609064)											
FJ2202148-002	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	61.3	55.3	10.3%	20%	----
Anions and Nutrients (QC Lot: 605988)											
FJ2202151-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	2.50	mg/L	39.6	39.3	0.586%	20%	----
Anions and Nutrients (QC Lot: 606192)											
EO2206470-012	Anonymous	phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	0.0251	0.0251	0.240%	20%	----
Anions and Nutrients (QC Lot: 606247)											
CG2210887-015	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0100	mg/L	0.122	0.119	2.62%	20%	----
Anions and Nutrients (QC Lot: 606384)											
FJ2202154-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0730	0.0702	3.91%	20%	----
Anions and Nutrients (QC Lot: 606385)											
FJ2202154-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	13.4	13.4	0.00593%	20%	----
Anions and Nutrients (QC Lot: 606386)											
FJ2202154-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0018	0.0018	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 606387)											
FJ2202154-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.030	0.026	0.004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 606388)											
FJ2202154-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 606507)											
FJ2202155-001	W1-Shallow	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0053	0.0045	0.0008	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 608825)											
CG2210871-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	4.00	mg/L	44.3	44.1	0.366%	20%	----
Anions and Nutrients (QC Lot: 610871)											
FJ2202155-001	W1-Shallow	silicate (as SiO2)	7631-86-9	E392	0.50	mg/L	4.28	4.28	0.009	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 605853)											
FJ2202154-001	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.96	2.70	0.25	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 605854)											
FJ2202154-001	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	3.04	2.72	0.32	Diff <2x LOR	----
Dissolved Metals (QC Lot: 613855)											
FJ2202155-001	W1-Shallow	calcium, dissolved	7440-70-2	E421	0.050	mg/L	24.2	25.9	6.70%	20%	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	5.77	6.58	13.1%	20%	----
Plant Pigments (QC Lot: 611401)											
EO2206520-001	Anonymous	chlorophyll a	479-61-8	E870B	0.0020	µg/sample	1.01	0.876	14.1%	30%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 606474)						
conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 606476)						
alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 606734)						
colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 609058)						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 609064)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 605988)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 606192)						
phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 606247)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 606384)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 606385)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 606386)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 606387)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 606388)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 606507)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 608825)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 610871)						
silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 605853)						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 605854)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 613855)						
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Plant Pigments (QCLot: 611401)						
chlorophyll a	479-61-8	E870B	0.002	µg/sample	<0.0020	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 606474)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	101	90.0	110	----
Physical Tests (QCLot: 606475)									
pH	----	E108	----	pH units	7 pH units	100	98.6	101	----
Physical Tests (QCLot: 606476)									
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	229 mg/L	105	75.0	125	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	102	85.0	115	----
Physical Tests (QCLot: 606734)									
colour, true	----	E329	5	CU	100 CU	101	85.0	115	----
Physical Tests (QCLot: 609058)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	95.6	85.0	115	----
Physical Tests (QCLot: 609064)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	89.8	85.0	115	----
Anions and Nutrients (QCLot: 605988)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	105	85.0	115	----
Anions and Nutrients (QCLot: 606192)									
phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	8.02 mg/L	103	80.0	120	----
Anions and Nutrients (QCLot: 606247)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.02 mg/L	102	80.0	120	----
Anions and Nutrients (QCLot: 606384)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 606385)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	109	90.0	110	----
Anions and Nutrients (QCLot: 606386)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.2	90.0	110	----
Anions and Nutrients (QCLot: 606387)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	99.5	90.0	110	----
Anions and Nutrients (QCLot: 606388)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.7	90.0	110	----
Anions and Nutrients (QCLot: 606507)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	8.02 mg/L	107	80.0	120	----
Anions and Nutrients (QCLot: 608825)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	101	75.0	125	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 610871)									
silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	10 mg/L	98.0	85.0	115	----
Organic / Inorganic Carbon (QCLot: 605853)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	93.5	80.0	120	----
Organic / Inorganic Carbon (QCLot: 605854)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	98.2	80.0	120	----
Dissolved Metals (QCLot: 613855)									
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	93.2	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	108	80.0	120	----
Plant Pigments (QCLot: 611401)									
chlorophyll a	479-61-8	E870B	0.002	µg/sample	1 µg/sample	92.2	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 605988)										
FJ2202152-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0966 mg/L	0.1 mg/L	96.6	75.0	125	----
Anions and Nutrients (QCLot: 606192)										
EO2206470-013	Anonymous	phosphorus, total dissolved	7723-14-0	E375-T	0.0680 mg/L	0.0676 mg/L	100	70.0	130	----
Anions and Nutrients (QCLot: 606247)										
CG2210887-016	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0496 mg/L	0.05 mg/L	99.1	70.0	130	----
Anions and Nutrients (QCLot: 606384)										
FJ2202154-003	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.46 mg/L	2.5 mg/L	98.6	75.0	125	----
Anions and Nutrients (QCLot: 606385)										
FJ2202154-003	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	107 mg/L	100 mg/L	107	75.0	125	----
Anions and Nutrients (QCLot: 606386)										
FJ2202154-003	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.466 mg/L	0.5 mg/L	93.2	75.0	125	----
Anions and Nutrients (QCLot: 606387)										
FJ2202154-003	Anonymous	fluoride	16984-48-8	E235.F	0.886 mg/L	1 mg/L	88.6	75.0	125	----
Anions and Nutrients (QCLot: 606388)										
FJ2202154-003	Anonymous	chloride	16887-00-6	E235.Cl	98.3 mg/L	100 mg/L	98.3	75.0	125	----
Anions and Nutrients (QCLot: 606507)										
FJ2202155-002	W1-Deep	phosphorus, total	7723-14-0	E372-U	0.0598 mg/L	0.0676 mg/L	88.5	70.0	130	----
Anions and Nutrients (QCLot: 608825)										
CG2210893-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	ND mg/L	2.5 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 610871)										
FJ2202155-002	W1-Deep	silicate (as SiO2)	7631-86-9	E392	10.4 mg/L	10 mg/L	104	75.0	125	----
Organic / Inorganic Carbon (QCLot: 605853)										
FJ2202154-001	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	5.05 mg/L	5 mg/L	101	70.0	130	----
Organic / Inorganic Carbon (QCLot: 605854)										
FJ2202154-001	Anonymous	carbon, total organic [TOC]	----	E355-L	5.12 mg/L	5 mg/L	102	70.0	130	----
Dissolved Metals (QCLot: 613855)										
FJ2202155-002	W1-Deep	calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 2022-Aug-MON8/9- Day 1

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Page of

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Leah Hull
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Reports / Recipients	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Merge QC/QCI Reports with COA	☑ YES ☐ NO ☐ N/A
☑ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	lhull@ecofishresearch.com
Email 2	tkasubuchi@ecofishresearch.com
Email 3	waterqualitylabdata@ecofishresearch.com

Invoice Recipients	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	accountspayable@ecofishresearch.com
Email 2	

Turnaround Time (TAT) Requested
☑ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests
Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm
For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Project Information	
ALS Account # / Quote #:	VA22-ECOF100-004
Job #:	Surface water MON8/9- no metals
PO / AFE:	1200-25.03.02
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (ALS use only):

ALS Contact: Sneha Sansare Sampler: Pat Beaupre

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Alk., Ec, pH, TDS, TSS, Anions, Si, diss ortho P, colour, pH (F)	Chlorophyll-a by fluorometry (F)	DOC, Total dissolved P (F/P)	Hardness (F/P)	NH3, Total Kjeldahl, Nitrogen, Total N, TOC, Total P (P)	IONBALANCE-BC-CL	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	W1-Shallow	16 AUG 22	08:35	Water	5	R	R	R	R	R	R			
	W1-Deep	16 AUG 22	07:50	Water	5	R	R	R	R	R	R			
	D1-Shallow	16 AUG 22	11:00	Water	5	R	R	R	R	R	R			
	D1-Deep	16 AUG 22	10:20	Water	5	R	R	R	R	R	R			
	Travel Blank	–	–	Water	1		R							

Fort St. John
Work Order Reference
FJ2202155

Telephone: +1 250 261 5517

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	Please send Azimuth a copy of the data in their EDD format:
Are samples for human consumption/ use? ☐ YES ☑ NO	qmann@azimuthgroup.ca imcivor@azimuthgroup.ca
	Add. for report: csuzanne@ecofishresearch.com,kganshorn@ecofishresearch.com

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
2.7							

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by:	Date: Aug 16, 2022	Time:	Received by:	Date: 8-16-22	Time: 12:48	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202201**	Page	: 1 of 4
Amendment	: **1**		
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 18-Aug-2022 18:38
PO	: 1200-25.03.02	Date Analysis Commenced	: 21-Aug-2022
C-O-C number	: 2022-Aug-MON8/9- Day 2	Issue Date	: 06-Jun-2023 14:37
Sampler	: Kevin Ganshorn, PD		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Cindy Tang	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Erin Sanchez		Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.
Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
µS/cm	microsiemens per centimetre
CU	colour units (1 cu = 1 mg/l pt)
meq/L	milliequivalents per litre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Accreditation

Accreditation	*Description*	*Laboratory*	*Address*
A	CALA ISO/IEC 17025:2017	VA Vancouver - Environmental	8081 Lougheed Highway, Burnaby, British Columbia

Applicable accreditations are indicated in the Method/Lab column as superscripts.

Workorder Comments

Amendment (6/6/2023): This report has been amended as a result of a request to change sample identification numbers (IDs) received by ALS from Sarah Kennedy on 6/6/2023. All analysis results are as per the previous report.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID: PR3	PR2-A	PR2-B	HD	----
						Client sampling date / time: 18-Aug-2022 10:20	18-Aug-2022 14:15	18-Aug-2022 14:15	18-Aug-2022 16:50	----
						FJ2202201-001	FJ2202201-002	FJ2202201-003	FJ2202201-004	--------
						Result	Result	Result	Result	----
Physical Tests										
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	A	1.0	mg/L	82.4	78.2	79.0	171	----
Alkalinity, carbonate (as CaCO3)	----	E290/VA	A	1.0	mg/L	<1.0	<1.0	<1.0	10.2	----
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	A	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
Alkalinity, phenolphthalein (as CaCO3)	----	E290/VA	A	1.0	mg/L	<1.0	<1.0	<1.0	5.1	----
Alkalinity, total (as CaCO3)	----	E290/VA	A	1.0	mg/L	82.4	78.2	79.0	182	----
Colour, true	----	E329/VA	A	5.0	CU	6.0	5.9	5.5	5.5	----
Conductivity	----	E100/VA	A	2.0	µS/cm	187	185	184	421	----
Hardness (as CaCO3), dissolved	----	EC100/VA		0.60	mg/L	97.7	95.6	97.6	225	----
pH	----	E108/VA	A	0.10	pH units	8.07	8.07	8.09	8.43	----
Solids, total dissolved [TDS]	----	E162/VA	A	10	mg/L	131	125	130	300	----
Solids, total suspended [TSS]	----	E160/VA	A	3.0	mg/L	12.4	12.0	<3.0	<3.0	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/VA	A	0.0050	mg/L	0.0102	<0.0050	0.0055	<0.0050	----
Chloride	16887-00-6	E235.Cl/VA	A	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	----
Fluoride	16984-48-8	E235.F/VA	A	0.020	mg/L	0.041	0.040	0.041	0.107	----
Kjeldahl nitrogen, total [TKN]	----	E318/VA	A	0.050	mg/L	0.074	0.074	0.083	0.106	----
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	A	0.0050	mg/L	0.0648	0.0647	0.0640	<0.0050	----
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	A	0.0010	mg/L	0.0019	0.0023	0.0023	<0.0010	----
Nitrogen, total	7727-37-9	E366/VA	A	0.030	mg/L	0.141	0.141	0.140	0.081	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/VA	A	0.0010	mg/L	<0.0010	<0.0010	<0.0010	0.0013	----
Phosphorus, total	7723-14-0	E372-U/VA	A	0.0020	mg/L	0.0095	0.0108	0.0116	0.0320	----
Phosphorus, total dissolved	7723-14-0	E375-T/VA	A	0.0020	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	----
Silicate (as SiO2)	7631-86-9	E392/VA	A	0.50	mg/L	4.38	4.38	4.38	3.86	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	A	0.30	mg/L	13.8	13.2	13.2	50.0	----
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/VA	A	0.50	mg/L	2.43	2.55	2.48	2.80	----
Carbon, total organic [TOC]	----	E355-L/VA	A	0.50	mg/L	2.84	2.69	2.97	2.71	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	PR3	PR2-A	PR2-B	HD	----
						Client sampling date / time	18-Aug-2022 10:20	18-Aug-2022 14:15	18-Aug-2022 14:15	18-Aug-2022 16:50	----
							FJ2202201-001	FJ2202201-002	FJ2202201-003	FJ2202201-004	--------
							Result	Result	Result	Result	----
Ion Balance											
Anion sum	----	EC101/VA		0.10	meq/L		1.94	1.84	1.86	4.68	----
Cation sum	----	EC101/VA		0.10	meq/L		2.01	1.97	2.01	4.64	----
Ion balance (APHA)	----	EC101/VA		0.010	%		1.77	3.41	3.88	0.429	----
Dissolved Metals											
Calcium, dissolved	7440-70-2	E421/VA	A	0.050	mg/L		28.0	27.8	28.2	61.7	----
Magnesium, dissolved	7439-95-4	E421/VA	A	0.0050	mg/L		6.74	6.36	6.60	17.3	----
Dissolved metals filtration location	----	EP421/VA		-	-		Laboratory	Laboratory	Laboratory	Laboratory	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202201**	Page	: 1 of 19
Amendment	: **1**		
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 18-Aug-2022 18:38
PO	: 1200-25.03.02	Issue Date	: 06-Jun-2023 14:37
C-O-C number	: 2022-Aug-MON8/9- Day 2		
Sampler	: Kevin Ganshorn, PD		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) HD	E298	18-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PR2-A	E298	18-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PR2-B	E298	18-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PR3	E298	18-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE HD	E235.Cl	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PR2-A	E235.Cl	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PR2-B	E235.Cl	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	28 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE PR3	E235.Cl	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	28 days	4 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE HD	E378-U	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	3 days	4 days	× EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PR2-A	E378-U	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	3 days	4 days	× EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PR2-B	E378-U	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	3 days	4 days	× EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PR3	E378-U	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	3 days	4 days	× EHT
Anions and Nutrients : Fluoride in Water by IC										
HDPE HD	E235.F	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PR2-A	E235.F	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PR2-B	E235.F	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	28 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE PR3	E235.F	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	28 days	4 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE HD	E235.NO3-L	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	3 days	4 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PR2-A	E235.NO3-L	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	3 days	4 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PR2-B	E235.NO3-L	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	3 days	4 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PR3	E235.NO3-L	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	3 days	4 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE HD	E235.NO2-L	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	3 days	4 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PR2-A	E235.NO2-L	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	3 days	4 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PR2-B	E235.NO2-L	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	3 days	4 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PR3	E235.NO2-L	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	3 days	4 days	× EHT

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE HD	E392	18-Aug-2022	----	----	----		23-Aug-2022	28 days	5 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PR2-A	E392	18-Aug-2022	----	----	----		23-Aug-2022	28 days	5 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PR2-B	E392	18-Aug-2022	----	----	----		23-Aug-2022	28 days	5 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PR3	E392	18-Aug-2022	----	----	----		23-Aug-2022	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE HD	E235.SO4	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	28 days	4 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PR2-A	E235.SO4	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	28 days	4 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PR2-B	E235.SO4	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	28 days	4 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PR3	E235.SO4	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	28 days	4 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) HD	E375-T	18-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	8 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PR2-A	E375-T	18-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PR2-B	E375-T	18-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PR3	E375-T	18-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) HD	E318	18-Aug-2022	25-Aug-2022	----	----		29-Aug-2022	28 days	11 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PR2-A	E318	18-Aug-2022	25-Aug-2022	----	----		29-Aug-2022	28 days	11 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PR2-B	E318	18-Aug-2022	25-Aug-2022	----	----		29-Aug-2022	28 days	11 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PR3	E318	18-Aug-2022	25-Aug-2022	----	----		29-Aug-2022	28 days	11 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) HD	E366	18-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) PR2-A	E366	18-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	8 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) PR2-B	E366	18-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) PR3	E366	18-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) HD	E372-U	18-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PR2-A	E372-U	18-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PR2-B	E372-U	18-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PR3	E372-U	18-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) HD	E421	18-Aug-2022	22-Aug-2022	----	----		22-Aug-2022	180 days	4 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PR2-A	E421	18-Aug-2022	22-Aug-2022	----	----		22-Aug-2022	180 days	4 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PR2-B	E421	18-Aug-2022	22-Aug-2022	----	----		22-Aug-2022	180 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PR3	E421	18-Aug-2022	22-Aug-2022	----	----		22-Aug-2022	180 days	4 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) HD	E358-L	18-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PR2-A	E358-L	18-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PR2-B	E358-L	18-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PR3	E358-L	18-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) HD	E355-L	18-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PR2-A	E355-L	18-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PR2-B	E355-L	18-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PR3	E355-L	18-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE HD	E290	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PR2-A	E290	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PR2-B	E290	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PR3	E290	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	14 days	4 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE HD	E329	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	3 days	4 days	× EHT
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PR2-A	E329	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	3 days	4 days	× EHT
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PR2-B	E329	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	3 days	4 days	× EHT
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PR3	E329	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	3 days	4 days	× EHT
Physical Tests : Conductivity in Water										
HDPE HD	E100	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	28 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE PR2-A	E100	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE PR2-B	E100	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE PR3	E100	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	28 days	4 days	✓
Physical Tests : pH by Meter										
HDPE HD	E108	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	0.25 hrs	18.25 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PR2-A	E108	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	0.25 hrs	18.25 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PR2-B	E108	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	0.25 hrs	18.25 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PR3	E108	18-Aug-2022	21-Aug-2022	----	----		22-Aug-2022	0.25 hrs	18.25 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE HD	E162	18-Aug-2022	----	----	----		25-Aug-2022	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE PR2-A	E162	18-Aug-2022	----	----	----		25-Aug-2022	7 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TDS by Gravimetry										
HDPE PR2-B	E162	18-Aug-2022	----	----	----		25-Aug-2022	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE PR3	E162	18-Aug-2022	----	----	----		25-Aug-2022	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE HD	E160	18-Aug-2022	----	----	----		25-Aug-2022	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PR2-A	E160	18-Aug-2022	----	----	----		25-Aug-2022	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PR2-B	E160	18-Aug-2022	----	----	----		25-Aug-2022	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PR3	E160	18-Aug-2022	----	----	----		25-Aug-2022	7 days	7 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	612174	1	8	12.5	5.0	✓
Ammonia by Fluorescence	E298	618206	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	612177	1	19	5.2	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	612183	1	5	20.0	5.0	✓
Conductivity in Water	E100	612175	1	18	5.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	613090	1	8	12.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	618202	1	15	6.6	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	612184	1	13	7.6	5.0	✓
Fluoride in Water by IC	E235.F	612176	1	9	11.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	612178	1	11	9.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	612179	1	19	5.2	5.0	✓
pH by Meter	E108	612173	1	18	5.5	5.0	✓
Reactive Silica by Colourimetry	E392	615320	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	612180	1	14	7.1	5.0	✓
TDS by Gravimetry	E162	619264	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	618207	1	4	25.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	618201	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	618204	1	7	14.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	618203	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	618205	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	619261	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	612174	1	8	12.5	5.0	✓
Ammonia by Fluorescence	E298	618206	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	612177	1	19	5.2	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	612183	1	5	20.0	5.0	✓
Conductivity in Water	E100	612175	1	18	5.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	613090	1	8	12.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	618202	1	15	6.6	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	612184	1	13	7.6	5.0	✓
Fluoride in Water by IC	E235.F	612176	1	9	11.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	612178	1	11	9.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	612179	1	19	5.2	5.0	✓
pH by Meter	E108	612173	1	18	5.5	5.0	✓
Reactive Silica by Colourimetry	E392	615320	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	612180	1	14	7.1	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
TDS by Gravimetry	E162	619264	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	618207	1	4	25.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	618201	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	618204	1	7	14.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	618203	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	618205	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	619261	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	612174	1	8	12.5	5.0	✓
Ammonia by Fluorescence	E298	618206	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	612177	1	19	5.2	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	612183	1	5	20.0	5.0	✓
Conductivity in Water	E100	612175	1	18	5.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	613090	1	8	12.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	618202	1	15	6.6	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	612184	1	13	7.6	5.0	✓
Fluoride in Water by IC	E235.F	612176	1	9	11.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	612178	1	11	9.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	612179	1	19	5.2	5.0	✓
Reactive Silica by Colourimetry	E392	615320	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	612180	1	14	7.1	5.0	✓
TDS by Gravimetry	E162	619264	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	618207	1	4	25.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	618201	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	618204	1	7	14.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	618203	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	618205	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	619261	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	618206	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	612177	1	19	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	613090	1	8	12.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	618202	1	15	6.6	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	612184	1	13	7.6	5.0	✓
Fluoride in Water by IC	E235.F	612176	1	9	11.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	612178	1	11	9.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	612179	1	19	5.2	5.0	✓
Reactive Silica by Colourimetry	E392	615320	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	612180	1	14	7.1	5.0	✓

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Matrix Spikes (MS) - Continued							
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	618207	1	4	25.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	618201	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	618204	1	7	14.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	618203	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	618205	1	20	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	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.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Vancouver - Environmental	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).
Colour (True) by Spectrometer (5 CU)	E329 Vancouver - Environmental	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U Vancouver - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Reactive Silica by Colourimetry	E392 Vancouver - Environmental	Water	APHA 4500-SiO2 E (mod)	Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method using a discrete analyzer. Method Limitation: Arsenic (5+) above 100 mg/L is a negative interference on this test
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 Vancouver - Environmental	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 Vancouver - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

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QUALITY CONTROL REPORT

Work Order	: **FJ2202201**	Page	: 1 of 10
Amendment	: **1**		
Client	: Ecofish Research Ltd	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	:	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 18-Aug-2022 18:38
PO	: 1200-25.03.02	Date Analysis Commenced	: 21-Aug-2022
C-O-C number	: 2022-Aug-MON8/9- Day 2	Issue Date	: 06-Jun-2023 14:37
Sampler	: Kevin Ganshorn, BD 250 334 3042		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Cindy Tang	Team Leader - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Erin Sanchez		Vancouver Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 612173)											
FJ2202201-001	PR3	pH	----	E108	0.10	pH units	8.07	8.05	0.248%	4%	----
Physical Tests (QC Lot: 612174)											
FJ2202201-001	PR3	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	82.4	81.6	0.976%	20%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	82.4	81.6	0.976%	20%	----
Physical Tests (QC Lot: 612175)											
FJ2202201-001	PR3	Conductivity	----	E100	2.0	µS/cm	187	188	0.427%	10%	----
Physical Tests (QC Lot: 612183)											
FJ2202201-001	PR3	Colour, true	----	E329	5.0	CU	6.0	5.6	0.3	Diff <2x LOR	----
Physical Tests (QC Lot: 619261)											
FJ2202201-001	PR3	Solids, total suspended [TSS]	----	E160	3.0	mg/L	12.4	12.8	0.4	Diff <2x LOR	----
Physical Tests (QC Lot: 619264)											
FJ2202201-001	PR3	Solids, total dissolved [TDS]	----	E162	13	mg/L	131	124	6	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 612176)											
VA22B9308-001	Anonymous	Fluoride	16984-48-8	E235.F	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 612177)											
VA22B9308-001	Anonymous	Chloride	16887-00-6	E235.Cl	2.50	mg/L	42.9	42.8	0.326%	20%	----
Anions and Nutrients (QC Lot: 612178)											
VA22B9308-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	<0.0250	0.0257	0.0007	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 612179)											
VA22B9308-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	0.0284	0.0290	0.0006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 612180)											
VA22B9308-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	18.6	18.8	0.647%	20%	----
Anions and Nutrients (QC Lot: 612184)											
FJ2202201-001	PR3	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 615320)											
CG2211043-001	Anonymous	Silicate (as SiO2)	7631-86-9	E392	5.00	mg/L	37.4	36.9	0.54	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 618201)											
FJ2202201-001	PR3	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.074	0.080	0.006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 618204)											
FJ2202201-001	PR3	Nitrogen, total	7727-37-9	E366	0.030	mg/L	0.141	0.144	0.003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 618205)											
FJ2202201-001	PR3	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0095	0.0095	0.00006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 618206)											
FJ2202201-001	PR3	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0102	0.0103	0.00005	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 618207)											
FJ2202201-001	PR3	Phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 618202)											
FJ2202201-001	PR3	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.43	2.56	0.13	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 618203)											
FJ2202201-001	PR3	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	2.84	2.71	0.13	Diff <2x LOR	----
Dissolved Metals (QC Lot: 613090)											
CG2210819-009	Anonymous	Calcium, dissolved	7440-70-2	E421	0.100	mg/L	488	498	2.20%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0100	mg/L	248	253	2.14%	20%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 612174)						
Alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 612175)						
Conductivity	----	E100	1	µS/cm	1.2	----
Physical Tests (QCLot: 612183)						
Colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 619261)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 619264)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 612176)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 612177)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 612178)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 612179)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 612180)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 612184)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 615320)						
Silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 618201)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 618204)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 618205)						

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 618205) - continued						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 618206)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 618207)						
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----
Organic / Inorganic Carbon (QCLot: 618202)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 618203)						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 613090)						
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 612173)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 612174)									
Alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	229 mg/L	106	75.0	125	----
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	102	85.0	115	----
Physical Tests (QCLot: 612175)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	97.6	90.0	110	----
Physical Tests (QCLot: 612183)									
Colour, true	----	E329	5	CU	100 CU	104	85.0	115	----
Physical Tests (QCLot: 619261)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	98.0	85.0	115	----
Physical Tests (QCLot: 619264)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	113	85.0	115	----
Anions and Nutrients (QCLot: 612176)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	95.4	90.0	110	----
Anions and Nutrients (QCLot: 612177)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	96.1	90.0	110	----
Anions and Nutrients (QCLot: 612178)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	96.5	90.0	110	----
Anions and Nutrients (QCLot: 612179)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	94.9	90.0	110	----
Anions and Nutrients (QCLot: 612180)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	97.2	90.0	110	----
Anions and Nutrients (QCLot: 612184)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	105	80.0	120	----
Anions and Nutrients (QCLot: 615320)									
Silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	10 mg/L	98.5	85.0	115	----
Anions and Nutrients (QCLot: 618201)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	98.2	75.0	125	----
Anions and Nutrients (QCLot: 618204)									
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 618205)									

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 618205) - continued									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	89.2	80.0	120	----
Anions and Nutrients (QCLot: 618206)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	98.4	85.0	115	----
Anions and Nutrients (QCLot: 618207)									
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.05 mg/L	91.6	80.0	120	----
Organic / Inorganic Carbon (QCLot: 618202)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	96.8	80.0	120	----
Organic / Inorganic Carbon (QCLot: 618203)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	99.2	80.0	120	----
Dissolved Metals (QCLot: 613090)									
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	98.0	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	104	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 612176)										
FJ2202200-003	Anonymous	Fluoride	16984-48-8	E235.F	0.996 mg/L	1 mg/L	99.6	75.0	125	----
Anions and Nutrients (QCLot: 612177)										
FJ2202200-003	Anonymous	Chloride	16887-00-6	E235.Cl	99.8 mg/L	100 mg/L	99.8	75.0	125	----
Anions and Nutrients (QCLot: 612178)										
FJ2202200-003	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.52 mg/L	2.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 612179)										
FJ2202200-003	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.489 mg/L	0.5 mg/L	97.9	75.0	125	----
Anions and Nutrients (QCLot: 612180)										
FJ2202200-003	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	100 mg/L	100 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 612184)										
FJ2202201-002	PR2-A	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0300 mg/L	0.03 mg/L	99.9	70.0	130	----
Anions and Nutrients (QCLot: 615320)										
CG2211043-002	Anonymous	Silicate (as SiO2)	7631-86-9	E392	101 mg/L	100 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 618201)										
FJ2202201-002	PR2-A	Kjeldahl nitrogen, total [TKN]	----	E318	2.56 mg/L	2.5 mg/L	102	70.0	130	----
Anions and Nutrients (QCLot: 618204)										
FJ2202201-002	PR2-A	Nitrogen, total	7727-37-9	E366	0.394 mg/L	0.4 mg/L	98.6	70.0	130	----
Anions and Nutrients (QCLot: 618205)										
FJ2202201-002	PR2-A	Phosphorus, total	7723-14-0	E372-U	0.0457 mg/L	0.05 mg/L	91.4	70.0	130	----
Anions and Nutrients (QCLot: 618206)										
FJ2202201-002	PR2-A	Ammonia, total (as N)	7664-41-7	E298	0.0937 mg/L	0.1 mg/L	93.7	75.0	125	----
Anions and Nutrients (QCLot: 618207)										
FJ2202201-002	PR2-A	Phosphorus, total dissolved	7723-14-0	E375-T	0.0456 mg/L	0.05 mg/L	91.3	70.0	130	----
Organic / Inorganic Carbon (QCLot: 618202)										
FJ2202201-002	PR2-A	Carbon, dissolved organic [DOC]	----	E358-L	5.26 mg/L	5 mg/L	105	70.0	130	----
Organic / Inorganic Carbon (QCLot: 618203)										
FJ2202201-002	PR2-A	Carbon, total organic [TOC]	----	E355-L	5.05 mg/L	5 mg/L	101	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 613090)										
FJ2202200-001	Anonymous	Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 2022-Aug-MON8/9- Day 2

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Page of

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Leah Hull
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Project Information

ALS Account # / Quote #:	VA22-ECOF100-004
Job #:	Surface water MON8/9- no metals
PO / AFE:	1200-25.03.02
LSD:	

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A

☑ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax	lhull@ecofishresearch.com
Email 2	tkasubuchi@ecofishresearch.com
Email 3	waterqualitylabdata@ecofishresearch.com

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax	accountspayable@ecofishresearch.com
Email 2	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

ALS Lab Work Order # (ALS use only): FJ2202201

Contact: Sneha Sansare Sampler: Pat Beaupre

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Alk., Ec, pH, TDS, TSS, Anions, Si, diss ortho P, colour, pH (F/P)	DOC, Total dissolved P (F)	Hardness (P)	NH3, Total Kjeldahl Nitrogen, Total N, TOC, Total P (P)	IONBALANCE-BC-CL	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	~~PR1~~			~~Water~~	~~4~~	R	R	R	R	R			
	~~PR3~~ PR32-81	18 AUG 22	10:20	Water	4	R	R	R	R	R			
	PR2-A	18 AUG 22	14:15	Water	4	R	R	R	R	R			
	PR2-B	18 AUG 22	14:15	Water	4	R	R	R	R	R			
	HD	18 AUG 22	16:50	Water	4	R	R	R	R	R			

Fort St. John Work Order Reference FJ2202201

Telephone : +1 250 261 5517

FJAE Shipping & Receiving
Call Out ___ Expedite
___ Priority
1 # of Coolers Air
___ # of Carboys ___ Ground

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Please send Azimuth a copy of the data in their EDD format:

gmann@azimuthgroup.ca imcivor@azimuthgroup.ca

Add. for report: csuzanne@ecofishresearch.com,kganshorn@ecofishresearch.com

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
9.2				17.6			

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
	Aug 18, 2022	

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
	Aug 18/22	18:15

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
	Aug 19 2022	6:46

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202203**	Page	: 1 of 4
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 600 Comox Road Courtenay BC Canada V9N3P6	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 18-Aug-2022 07:50
PO	: 1200-25.03.02	Date Analysis Commenced	: 20-Aug-2022
C-O-C number	: 2022-Aug-MON8/9-Day 2	Issue Date	: 14-Sep-2022 16:39
Sampler	: PB		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Anshim Anshim	Lab Assistant	Metals, Burnaby, British Columbia
Cindy Tang	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Courtney Cox	Analsyt	Inorganics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
%	percent
µS/cm	Microsiemens per centimetre
CU	colour units (1 CU = 1 mg/L Pt)
meq/L	milliequivalents per litre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: PR1	PC1	----	----	----
					Client sampling date / time: 17-Aug-2022 10:55	17-Aug-2022 09:55	----	----	----
					FJ2202203-001	FJ2202203-002	--------	--------	--------
					Result	Result	----	----	----
Physical Tests									
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	82.5	82.1	----	----	----
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	----	----	----
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	----	----	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	----	----	----
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	82.5	82.1	----	----	----
colour, true	----	E329	5.0	CU	6.9	6.6	----	----	----
conductivity	----	E100	2.0	µS/cm	177	177	----	----	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	93.7	90.2	----	----	----
pH	----	E108	0.10	pH units	8.10	8.10	----	----	----
solids, total dissolved [TDS]	----	E162	10	mg/L	117	127	----	----	----
solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	----	----	----
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0146	0.0160	----	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	----	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L	0.040	0.040	----	----	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.090	0.088	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0733	0.0697	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0030	0.0030	----	----	----
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.174	0.182	----	----	----
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	----	----	----
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0039	0.0035	----	----	----
phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	<0.0020	<0.0020	----	----	----
silicate (as SiO2)	7631-86-9	E392	0.50	mg/L	4.51	4.51	----	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	13.1	13.1	----	----	----
Organic / Inorganic Carbon									
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.58	2.90	----	----	----
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	2.72	3.01	----	----	----
Ion Balance									
anion sum	----	EC101	0.10	meq/L	1.93	1.92	----	----	----
cation sum	----	EC101	0.10	meq/L	1.93	1.86	----	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

					Client sample ID	PR1	PC1	----	----	----
					Client sampling date / time	17-Aug-2022 10:55	17-Aug-2022 09:55	----	----	----
Analyte	CAS Number	Method	LOR	Unit		FJ2202203-001	FJ2202203-002	--------	--------	--------
						Result	Result	----	----	----
Ion Balance										
ion balance (APHA)	----	EC101	0.010	%		<0.010	1.59	----	----	----
Dissolved Metals										
calcium, dissolved	7440-70-2	E421	0.050	mg/L		27.3	25.9	----	----	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		6.20	6.20	----	----	----
dissolved metals filtration location	----	EP421	-	-		Laboratory	Laboratory	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202203**	Page	: 1 of 14
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 600 Comox Road Courtenay BC Canada V9N3P6	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 18-Aug-2022 07:50
PO	: 1200-25.03.02	Issue Date	: 14-Sep-2022 16:39
C-O-C number	: 2022-Aug-MON8/9-Day 2		
Sampler	: PB		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PC1	E298	17-Aug-2022	24-Aug-2022	----	----		25-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PR1	E298	17-Aug-2022	24-Aug-2022	----	----		25-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PC1	E235.Cl	17-Aug-2022	22-Aug-2022	----	----		22-Aug-2022	28 days	5 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PR1	E235.Cl	17-Aug-2022	22-Aug-2022	----	----		22-Aug-2022	28 days	5 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PC1	E378-U	17-Aug-2022	22-Aug-2022	----	----		22-Aug-2022	3 days	5 days	× EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PR1	E378-U	17-Aug-2022	22-Aug-2022	----	----		22-Aug-2022	3 days	5 days	× EHT
Anions and Nutrients : Fluoride in Water by IC										
HDPE PC1	E235.F	17-Aug-2022	22-Aug-2022	----	----		22-Aug-2022	28 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE PR1	E235.F	17-Aug-2022	22-Aug-2022	----	----		22-Aug-2022	28 days	5 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PC1	E235.NO3-L	17-Aug-2022	22-Aug-2022	3 days	5 days	× EHT	22-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PR1	E235.NO3-L	17-Aug-2022	22-Aug-2022	3 days	5 days	× EHT	22-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PC1	E235.NO2-L	17-Aug-2022	22-Aug-2022	----	----		22-Aug-2022	3 days	5 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PR1	E235.NO2-L	17-Aug-2022	22-Aug-2022	----	----		22-Aug-2022	3 days	5 days	× EHT
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PC1	E392	17-Aug-2022	----	----	----		23-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PR1	E392	17-Aug-2022	----	----	----		23-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PC1	E235.SO4	17-Aug-2022	22-Aug-2022	----	----		22-Aug-2022	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PR1	E235.SO4	17-Aug-2022	22-Aug-2022	----	----		22-Aug-2022	28 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PC1	E375-T	17-Aug-2022	24-Aug-2022	----	----		26-Aug-2022	28 days	9 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PR1	E375-T	17-Aug-2022	24-Aug-2022	----	----		26-Aug-2022	28 days	9 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PC1	E318	17-Aug-2022	24-Aug-2022	----	----		27-Aug-2022	28 days	10 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PR1	E318	17-Aug-2022	24-Aug-2022	----	----		27-Aug-2022	28 days	10 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) PC1	E366	17-Aug-2022	24-Aug-2022	----	----		25-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) PR1	E366	17-Aug-2022	24-Aug-2022	----	----		25-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PC1	E372-U	17-Aug-2022	24-Aug-2022	----	----		26-Aug-2022	28 days	9 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PR1	E372-U	17-Aug-2022	24-Aug-2022	----	----		26-Aug-2022	28 days	9 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PC1	E421	17-Aug-2022	20-Aug-2022	----	----		21-Aug-2022	180 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PR1	E421	17-Aug-2022	20-Aug-2022	----	----		21-Aug-2022	180 days	4 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PC1	E358-L	17-Aug-2022	24-Aug-2022	----	----		24-Aug-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PR1	E358-L	17-Aug-2022	24-Aug-2022	----	----		24-Aug-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PC1	E355-L	17-Aug-2022	24-Aug-2022	----	----		24-Aug-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PR1	E355-L	17-Aug-2022	24-Aug-2022	----	----		24-Aug-2022	28 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PC1	E290	17-Aug-2022	22-Aug-2022	----	----		22-Aug-2022	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PR1	E290	17-Aug-2022	22-Aug-2022	----	----		22-Aug-2022	14 days	5 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PC1	E329	17-Aug-2022	22-Aug-2022	----	----		22-Aug-2022	3 days	5 days	× EHT
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PR1	E329	17-Aug-2022	22-Aug-2022	----	----		22-Aug-2022	3 days	5 days	× EHT

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE PC1	E100	17-Aug-2022	22-Aug-2022	----	----		22-Aug-2022	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE PR1	E100	17-Aug-2022	22-Aug-2022	----	----		22-Aug-2022	28 days	5 days	✓
Physical Tests : pH by Meter										
HDPE PC1	E108	17-Aug-2022	22-Aug-2022	----	----		22-Aug-2022	0.25 hrs	5.25 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PR1	E108	17-Aug-2022	22-Aug-2022	----	----		22-Aug-2022	0.25 hrs	5.25 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE PC1	E162	17-Aug-2022	----	----	----		22-Aug-2022	7 days	5 days	✓
Physical Tests : TDS by Gravimetry										
HDPE PR1	E162	17-Aug-2022	----	----	----		22-Aug-2022	7 days	5 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PC1	E160	17-Aug-2022	----	----	----		22-Aug-2022	7 days	5 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PR1	E160	17-Aug-2022	----	----	----		22-Aug-2022	7 days	5 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	612898	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	616255	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	612907	1	14	7.1	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	612914	1	7	14.2	5.0	✓
Conductivity in Water	E100	612900	1	14	7.1	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	611357	1	14	7.1	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	616094	1	4	25.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	612902	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	612906	1	13	7.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	612904	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	612905	1	17	5.8	5.0	✓
pH by Meter	E108	612899	1	15	6.6	5.0	✓
Reactive Silica by Colourimetry	E392	615321	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	612903	1	13	7.6	5.0	✓
TDS by Gravimetry	E162	613629	1	9	11.1	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	616097	1	4	25.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	616091	1	18	5.5	5.0	✓
Total Nitrogen by Colourimetry	E366	616253	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	616095	1	4	25.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	616254	1	6	16.6	5.0	✓
TSS by Gravimetry	E160	613630	1	9	11.1	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	612898	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	616255	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	612907	1	14	7.1	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	612914	1	7	14.2	5.0	✓
Conductivity in Water	E100	612900	1	14	7.1	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	611357	1	14	7.1	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	616094	1	4	25.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	612902	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	612906	1	13	7.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	612904	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	612905	1	17	5.8	5.0	✓
pH by Meter	E108	612899	1	15	6.6	5.0	✓
Reactive Silica by Colourimetry	E392	615321	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	612903	1	13	7.6	5.0	✓
TDS by Gravimetry	E162	613629	1	9	11.1	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	616097	1	4	25.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	616091	1	18	5.5	5.0	✓
Total Nitrogen by Colourimetry	E366	616253	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	616095	1	4	25.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	616254	1	6	16.6	5.0	✓
TSS by Gravimetry	E160	613630	1	9	11.1	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	612898	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	616255	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	612907	1	14	7.1	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	612914	1	7	14.2	5.0	✓
Conductivity in Water	E100	612900	1	14	7.1	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	611357	1	14	7.1	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	616094	1	4	25.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	612902	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	612906	1	13	7.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	612904	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	612905	1	17	5.8	5.0	✓
Reactive Silica by Colourimetry	E392	615321	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	612903	1	13	7.6	5.0	✓
TDS by Gravimetry	E162	613629	1	9	11.1	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	616097	1	4	25.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	616091	1	18	5.5	5.0	✓
Total Nitrogen by Colourimetry	E366	616253	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	616095	1	4	25.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	616254	1	6	16.6	5.0	✓
TSS by Gravimetry	E160	613630	1	9	11.1	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	616255	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	612907	1	14	7.1	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	611357	1	14	7.1	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	616094	1	4	25.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	612902	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	612906	1	13	7.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	612904	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	612905	1	17	5.8	5.0	✓
Reactive Silica by Colourimetry	E392	615321	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	612903	1	13	7.6	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	616097	1	4	25.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	616091	1	18	5.5	5.0	✓

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Matrix Spikes (MS) - Continued							
Total Nitrogen by Colourimetry	E366	616253	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	616095	1	4	25.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	616254	1	6	16.6	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Vancouver - Environmental	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).
Colour (True) by Spectrometer (5 CU)	E329 Vancouver - Environmental	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U Vancouver - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Reactive Silica by Colourimetry	E392 Vancouver - Environmental	Water	APHA 4500-SiO2 E (mod)	Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method using a discrete analyzer. Method Limitation: Arsenic (5+) above 100 mg/L is a negative interference on this test
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 Vancouver - Environmental	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 Vancouver - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for Dissolved Phosphorus in water	EP375 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

QUALITY CONTROL REPORT

Work Order	: **FJ2202203**	Page	: 1 of 10
Client	: Ecofish Research Ltd	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 600 Comox Road Courtenay BC Canada V9N3P6	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 18-Aug-2022 07:50
PO	: 1200-25.03.02	Date Analysis Commenced	: 20-Aug-2022
C-O-C number	: 2022-Aug-MON8/9-Day 2	Issue Date	: 14-Sep-2022 16:39
Sampler	: PB		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Anshim Anshim	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Cindy Tang	Team Leader - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Courtney Cox	Analsyt	Vancouver Inorganics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Vancouver Inorganics, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 612898)											
FJ2202203-001	PR1	alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	82.5	81.8	0.852%	20%	----
		alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	82.5	81.8	0.852%	20%	----
Physical Tests (QC Lot: 612899)											
FJ2202203-001	PR1	pH	----	E108	0.10	pH units	8.10	8.04	0.743%	4%	----
Physical Tests (QC Lot: 612900)											
FJ2202203-001	PR1	conductivity	----	E100	2.0	µS/cm	177	178	0.788%	10%	----
Physical Tests (QC Lot: 612914)											
FJ2202188-001	Anonymous	colour, true	----	E329	5.0	CU	<5.0	<5.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 613629)											
FJ2202203-001	PR1	solids, total dissolved [TDS]	----	E162	13	mg/L	117	120	2	Diff <2x LOR	----
Physical Tests (QC Lot: 613630)											
FJ2202203-001	PR1	solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 612902)											
FJ2202184-006	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 612903)											
FJ2202184-006	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	82.6	82.7	0.0580%	20%	----
Anions and Nutrients (QC Lot: 612904)											
FJ2202184-006	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.144	0.144	0.290%	20%	----
Anions and Nutrients (QC Lot: 612905)											
FJ2202184-006	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 612906)											
FJ2202184-006	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.084	0.082	0.002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 612907)											
FJ2202184-006	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	0.72	0.72	0.006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 615321)											
FJ2202203-001	PR1	silicate (as SiO2)	7631-86-9	E392	0.50	mg/L	4.51	4.47	0.04	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 616091)											
FJ2202203-001	PR1	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.090	0.090	0.0006	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 616097)											
FJ2202203-001	PR1	phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 616253)											
FJ2202203-001	PR1	nitrogen, total	7727-37-9	E366	0.030	mg/L	0.174	0.183	0.009	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 616254)											
FJ2202203-001	PR1	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0039	0.0037	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 616255)											
FJ2202203-001	PR1	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0146	0.0126	0.0020	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 616094)											
FJ2202203-001	PR1	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.58	2.87	0.29	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 616095)											
FJ2202203-001	PR1	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	2.72	2.75	0.04	Diff <2x LOR	----
Dissolved Metals (QC Lot: 611357)											
VA22B9406-001	Anonymous	calcium, dissolved	7440-70-2	E421	0.250	mg/L	99.7	100	0.670%	20%	----
		magnesium, dissolved	7439-95-4	E421	0.0250	mg/L	40.8	40.2	1.35%	20%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 612898)						
alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	1.2	----
alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	1.2	----
Physical Tests (QCLot: 612900)						
conductivity	----	E100	1	µS/cm	1.5	----
Physical Tests (QCLot: 612914)						
colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 613629)						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 613630)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 612902)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 612903)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 612904)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 612905)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 612906)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 612907)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 615321)						
silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 616091)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 616097)						
phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 616253)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 616254)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 616255)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Organic / Inorganic Carbon (QCLot: 616094)						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 616095)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 611357)						
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 612898)									
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	229 mg/L	100	75.0	125	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	108	85.0	115	----
Physical Tests (QCLot: 612899)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 612900)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.6	90.0	110	----
Physical Tests (QCLot: 612914)									
colour, true	----	E329	5	CU	100 CU	104	85.0	115	----
Physical Tests (QCLot: 613629)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	105	85.0	115	----
Physical Tests (QCLot: 613630)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	96.0	85.0	115	----
Anions and Nutrients (QCLot: 612902)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	103	80.0	120	----
Anions and Nutrients (QCLot: 612903)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	97.2	90.0	110	----
Anions and Nutrients (QCLot: 612904)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	96.6	90.0	110	----
Anions and Nutrients (QCLot: 612905)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	95.2	90.0	110	----
Anions and Nutrients (QCLot: 612906)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	95.9	90.0	110	----
Anions and Nutrients (QCLot: 612907)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	96.1	90.0	110	----
Anions and Nutrients (QCLot: 615321)									
silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	10 mg/L	99.0	85.0	115	----
Anions and Nutrients (QCLot: 616091)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	88.5	75.0	125	----
Anions and Nutrients (QCLot: 616097)									
phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.05 mg/L	90.7	80.0	120	----
Anions and Nutrients (QCLot: 616253)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	104	75.0	125	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 616254)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	87.1	80.0	120	----
Anions and Nutrients (QCLot: 616255)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	103	85.0	115	----
Organic / Inorganic Carbon (QCLot: 616094)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	103	80.0	120	----
Organic / Inorganic Carbon (QCLot: 616095)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	105	80.0	120	----
Dissolved Metals (QCLot: 611357)									
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	102	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	100	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 612902)										
FJ2202184-007	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0293 mg/L	0.03 mg/L	97.8	70.0	130	----
Anions and Nutrients (QCLot: 612903)										
FJ2202184-007	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	99.5 mg/L	100 mg/L	99.5	75.0	125	----
Anions and Nutrients (QCLot: 612904)										
FJ2202184-007	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.42 mg/L	2.5 mg/L	96.7	75.0	125	----
Anions and Nutrients (QCLot: 612905)										
FJ2202184-007	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.460 mg/L	0.5 mg/L	92.0	75.0	125	----
Anions and Nutrients (QCLot: 612906)										
FJ2202184-007	Anonymous	fluoride	16984-48-8	E235.F	0.916 mg/L	1 mg/L	91.6	75.0	125	----
Anions and Nutrients (QCLot: 612907)										
FJ2202184-007	Anonymous	chloride	16887-00-6	E235.Cl	95.6 mg/L	100 mg/L	95.6	75.0	125	----
Anions and Nutrients (QCLot: 615321)										
FJ2202203-002	PC1	silicate (as SiO2)	7631-86-9	E392	9.98 mg/L	10 mg/L	99.8	75.0	125	----
Anions and Nutrients (QCLot: 616091)										
FJ2202203-002	PC1	Kjeldahl nitrogen, total [TKN]	----	E318	2.31 mg/L	2.5 mg/L	92.3	70.0	130	----
Anions and Nutrients (QCLot: 616097)										
FJ2202203-002	PC1	phosphorus, total dissolved	7723-14-0	E375-T	0.0466 mg/L	0.05 mg/L	93.2	70.0	130	----
Anions and Nutrients (QCLot: 616253)										
FJ2202203-002	PC1	nitrogen, total	7727-37-9	E366	0.410 mg/L	0.4 mg/L	103	70.0	130	----
Anions and Nutrients (QCLot: 616254)										
FJ2202203-002	PC1	phosphorus, total	7723-14-0	E372-U	0.0469 mg/L	0.05 mg/L	93.9	70.0	130	----
Anions and Nutrients (QCLot: 616255)										
FJ2202203-002	PC1	ammonia, total (as N)	7664-41-7	E298	0.112 mg/L	0.1 mg/L	112	75.0	125	----
Organic / Inorganic Carbon (QCLot: 616094)										
FJ2202203-002	PC1	carbon, dissolved organic [DOC]	----	E358-L	5.12 mg/L	5 mg/L	102	70.0	130	----
Organic / Inorganic Carbon (QCLot: 616095)										
FJ2202203-002	PC1	carbon, total organic [TOC]	----	E355-L	4.82 mg/L	5 mg/L	96.3	70.0	130	----
Dissolved Metals (QCLot: 611357)										

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 611357) - continued										
FJ2202203-002	PC1	calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 2022-Aug-MON8/9- Day 2

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Page of

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Leah Hull
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A

☑ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: lhull@ecofishresearch.com

Email 2: tkasubuchi@ecofishresearch.com

Email 3: waterqualitylabdata@ecofishresearch.com

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: accountspayable@ecofishresearch.com

Email 2:

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 1 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 2 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 3 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA22-ECOF100-004	AFE/Cost Center:	PO#:
Job #:	Surface water MON8/9- no metals	Major/Minor Code:	Routing Code:
PO / AFE:	1200-25.03.02	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (ALS use only):		ALS Contact: Sneha Sansare	Sampler: Pat Beaupre

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Alk., Ec, pH, TDS, TSS, Anions, Si, diss ortho P, colour, pH	DOC, Total dissolved P (F/P)	Hardness (F)	NH3, Total Kjeldahl Nitrogen, Total N, TOC, Total P (P)	IONBALANCE-BC-CL	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	PR1	17 AUG 22	10:55	Water	4	R	R	R	R	R		
	PC1	17 AUG 22	09:55	Water	4	R	R	R	R	R		
	~~PR2~~			~~Water~~	~~4~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~		
	~~PR3~~			~~Water~~	~~4~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~		
	~~PR4~~			Water	~~4~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~		
	QA - 291			~~Water~~	4	R	R	R	R	R		

Environmental Division
Fort St. John
Work Order Reference
FJ2202203

Telephone : +1 250 261 5517

FJAE Shipping & Receiving
___ Call Out ___ Expedite
___ Priority
1 # of Coolers ✓ Air
___ # of Carboys ___ Ground

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Please send Azimuth a copy of the data in their EDD format:

gmann@azimuthgroup.ca imcivor@azimuthgroup.ca

Add. for report: csuzanne@ecofishresearch.com,kganshorn@ecofishresearch.com

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☑ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
7.1							4.2

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by:	Date: 18 AUG 2022	Time:	Received by:	Date: Aug 19/22	Time: 750	Received by:	Date: 8/18	Time: 4pm

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202227**	Page	: 1 of 4
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 19-Aug-2022 15:54
PO	: 1200-25.03.02	Date Analysis Commenced	: 24-Aug-2022
C-O-C number	: 2022-Aug-MON8/9-Day3	Issue Date	: 14-Sep-2022 16:42
Sampler	: PD		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
%	percent
µS/cm	Microsiemens per centimetre
CU	colour units (1 CU = 1 mg/L Pt)
meq/L	milliequivalents per litre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BEA	PD2	PINE	PD1-A	PD1-B
					Client sampling date / time	[19-Aug-2022]	[19-Aug-2022]	[19-Aug-2022]	[19-Aug-2022]	[19-Aug-2022]
						FJ2202227-001	FJ2202227-002	FJ2202227-003	FJ2202227-004	FJ2202227-005
						Result	Result	Result	Result	Result
Physical Tests										
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L		62.0	85.3	123	83.4	83.9
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L		<1.0	<1.0	6.8	<1.0	<1.0
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L		<1.0	<1.0	3.4	<1.0	<1.0
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		62.0	85.3	130	83.4	83.9
colour, true	----	E329	5.0	CU		226	5.8	<5.0	5.3	5.5
conductivity	----	E100	2.0	µS/cm		192	194	270	190	189
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		83.8	95.1	143	93.8	93.3
pH	----	E108	0.10	pH units		7.90	8.15	8.40	8.14	8.12
solids, total dissolved [TDS]	----	E162	10	mg/L		233	128	173	134	129
solids, total suspended [TSS]	----	E160	3.0	mg/L		18.6	33.0	<3.0	31.2	31.6
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L		0.0110	<0.0050	<0.0050	0.0112	0.0064
chloride	16887-00-6	E235.Cl	0.50	mg/L		0.56	<0.50	0.85	<0.50	<0.50
fluoride	16984-48-8	E235.F	0.020	mg/L		0.088	0.036	0.055	0.034	0.034
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L		1.05	0.124	0.057	0.134	0.113
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		<0.0050	0.0640	<0.0050	0.0674	0.0683
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		<0.0010	0.0026	<0.0010	0.0029	0.0024
nitrogen, total	7727-37-9	E366	0.030	mg/L		0.815	0.156	0.063	0.163	0.158
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L		0.0120	<0.0010	<0.0010	<0.0010	<0.0010
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L		0.0735	0.0335	0.0079	0.0412	0.0401
phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L		0.0230	0.0023	<0.0020	0.0021	<0.0020
silicate (as SiO2)	7631-86-9	E392	0.50	mg/L		6.39	4.26	1.97	4.37	4.36
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		30.8	15.0	18.0	14.8	14.9
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L		37.6	2.89	1.41	2.53	2.74
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		37.3	2.86	1.31	2.48	2.66
Ion Balance										
anion sum	----	EC101	0.10	meq/L		1.90	2.02	3.00	1.98	1.99
cation sum	----	EC101	0.10	meq/L		2.21	1.97	2.99	1.94	1.93
ion balance (APHA)	----	EC101	0.010	%		7.54	1.25	0.167	1.02	1.53

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BEA	PD2	PINE	PD1-A	PD1-B
					Client sampling date / time	[19-Aug-2022]	[19-Aug-2022]	[19-Aug-2022]	[19-Aug-2022]	[19-Aug-2022]
						FJ2202227-001	FJ2202227-002	FJ2202227-003	FJ2202227-004	FJ2202227-005
						Result	Result	Result	Result	Result
Dissolved Metals										
calcium, dissolved	7440-70-2	E421	0.050	mg/L		23.0	27.5	40.5	27.1	27.0
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		6.40	6.43	10.1	6.35	6.28
dissolved metals filtration location	----	EP421	-	-		Laboratory	Laboratory	Laboratory	Laboratory	Laboratory

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202227**	Page	: 1 of 22
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 19-Aug-2022 15:54
PO	: 1200-25.03.02	Issue Date	: 14-Sep-2022 16:42
C-O-C number	: 2022-Aug-MON8/9-Day3		
Sampler	: PD		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
BEA	E298	19-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
PD1-A	E298	19-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
PD1-B	E298	19-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
PD2	E298	19-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
PINE	E298	19-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
BEA	E235.Cl	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
PD1-A	E235.Cl	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE PD1-B	E235.Cl	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PD2	E235.Cl	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PINE	E235.Cl	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE BEA	E378-U	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	6 days	× EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PD1-A	E378-U	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	6 days	× EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PD1-B	E378-U	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	6 days	× EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PD2	E378-U	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	6 days	× EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PINE	E378-U	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	6 days	× EHT

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE BEA	E235.F	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PD1-A	E235.F	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PD1-B	E235.F	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PD2	E235.F	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PINE	E235.F	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE BEA	E235.NO3-L	19-Aug-2022	25-Aug-2022	3 days	6 days	× EHT	25-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PD1-A	E235.NO3-L	19-Aug-2022	25-Aug-2022	3 days	6 days	× EHT	25-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PD1-B	E235.NO3-L	19-Aug-2022	25-Aug-2022	3 days	6 days	× EHT	25-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PD2	E235.NO3-L	19-Aug-2022	25-Aug-2022	3 days	6 days	× EHT	25-Aug-2022	3 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PINE	E235.NO3-L	19-Aug-2022	25-Aug-2022	3 days	6 days	× EHT	25-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE BEA	E235.NO2-L	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	6 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PD1-A	E235.NO2-L	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	6 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PD1-B	E235.NO2-L	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	6 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PD2	E235.NO2-L	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	6 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PINE	E235.NO2-L	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	6 days	× EHT
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE BEA	E392	19-Aug-2022	----	----	----		25-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PD1-A	E392	19-Aug-2022	----	----	----		25-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PD1-B	E392	19-Aug-2022	----	----	----		25-Aug-2022	28 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PD2	E392	19-Aug-2022	----	----	----		25-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PINE	E392	19-Aug-2022	----	----	----		25-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE BEA	E235.SO4	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PD1-A	E235.SO4	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PD1-B	E235.SO4	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PD2	E235.SO4	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PINE	E235.SO4	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) BEA	E375-T	19-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PD1-A	E375-T	19-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
PD1-B	E375-T	19-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
PD2	E375-T	19-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
PINE	E375-T	19-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
BEA	E318	19-Aug-2022	25-Aug-2022	----	----		29-Aug-2022	28 days	10 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
PD1-A	E318	19-Aug-2022	25-Aug-2022	----	----		29-Aug-2022	28 days	10 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
PD1-B	E318	19-Aug-2022	25-Aug-2022	----	----		29-Aug-2022	28 days	10 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
PD2	E318	19-Aug-2022	25-Aug-2022	----	----		29-Aug-2022	28 days	10 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
PINE	E318	19-Aug-2022	25-Aug-2022	----	----		29-Aug-2022	28 days	10 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
BEA	E366	19-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) PD1-A	E366	19-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) PD1-B	E366	19-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) PD2	E366	19-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) PINE	E366	19-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) BEA	E372-U	19-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PD1-A	E372-U	19-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PD1-B	E372-U	19-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PD2	E372-U	19-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PINE	E372-U	19-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	28 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) BEA	E421	19-Aug-2022	24-Aug-2022	----	----		25-Aug-2022	180 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PD1-A	E421	19-Aug-2022	24-Aug-2022	----	----		25-Aug-2022	180 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PD1-B	E421	19-Aug-2022	24-Aug-2022	----	----		25-Aug-2022	180 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PD2	E421	19-Aug-2022	24-Aug-2022	----	----		25-Aug-2022	180 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PINE	E421	19-Aug-2022	24-Aug-2022	----	----		25-Aug-2022	180 days	7 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) BEA	E358-L	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PD1-A	E358-L	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PD1-B	E358-L	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PD2	E358-L	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PINE	E358-L	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) BEA	E355-L	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PD1-A	E355-L	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PD1-B	E355-L	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PD2	E355-L	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PINE	E355-L	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE BEA	E290	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PD1-A	E290	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PD1-B	E290	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	14 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE PD2	E290	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PINE	E290	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	14 days	6 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE BEA	E329	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	6 days	× EHT
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PD1-A	E329	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	6 days	× EHT
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PD1-B	E329	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	6 days	× EHT
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PD2	E329	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	6 days	× EHT
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PINE	E329	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	6 days	× EHT
Physical Tests : Conductivity in Water										
HDPE BEA	E100	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE PD1-A	E100	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE PD1-B	E100	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE PD2	E100	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE PINE	E100	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Physical Tests : pH by Meter										
HDPE BEA	E108	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	0.25 hrs	0.58 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PD1-A	E108	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	0.25 hrs	0.58 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PD1-B	E108	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	0.25 hrs	0.58 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PD2	E108	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	0.25 hrs	0.58 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PINE	E108	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	0.25 hrs	0.58 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE BEA	E162	19-Aug-2022	----	----	----		25-Aug-2022	7 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TDS by Gravimetry										
HDPE PD1-A	E162	19-Aug-2022	----	----	----		25-Aug-2022	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE PD1-B	E162	19-Aug-2022	----	----	----		25-Aug-2022	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE PD2	E162	19-Aug-2022	----	----	----		25-Aug-2022	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE PINE	E162	19-Aug-2022	----	----	----		25-Aug-2022	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE BEA	E160	19-Aug-2022	----	----	----		25-Aug-2022	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PD1-A	E160	19-Aug-2022	----	----	----		25-Aug-2022	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PD1-B	E160	19-Aug-2022	----	----	----		25-Aug-2022	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PD2	E160	19-Aug-2022	----	----	----		25-Aug-2022	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PINE	E160	19-Aug-2022	----	----	----		25-Aug-2022	7 days	7 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	618211	1	6	16.6	5.0	✓
Ammonia by Fluorescence	E298	618244	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	618216	1	8	12.5	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	618213	1	11	9.0	5.0	✓
Conductivity in Water	E100	618212	1	12	8.3	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	616443	1	7	14.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	618245	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	618214	1	8	12.5	5.0	✓
Fluoride in Water by IC	E235.F	618215	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	618217	1	8	12.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	618218	1	8	12.5	5.0	✓
pH by Meter	E108	618210	1	13	7.6	5.0	✓
Reactive Silica by Colourimetry	E392	619371	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	618219	1	8	12.5	5.0	✓
TDS by Gravimetry	E162	619264	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	618243	1	9	11.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	618239	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	618241	1	9	11.1	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	618240	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	618242	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	619261	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	618211	1	6	16.6	5.0	✓
Ammonia by Fluorescence	E298	618244	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	618216	1	8	12.5	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	618213	1	11	9.0	5.0	✓
Conductivity in Water	E100	618212	1	12	8.3	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	616443	1	7	14.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	618245	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	618214	1	8	12.5	5.0	✓
Fluoride in Water by IC	E235.F	618215	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	618217	1	8	12.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	618218	1	8	12.5	5.0	✓
pH by Meter	E108	618210	1	13	7.6	5.0	✓
Reactive Silica by Colourimetry	E392	619371	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	618219	1	8	12.5	5.0	✓
TDS by Gravimetry	E162	619264	1	20	5.0	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	618243	1	9	11.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	618239	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	618241	1	9	11.1	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	618240	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	618242	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	619261	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	618211	1	6	16.6	5.0	✓
Ammonia by Fluorescence	E298	618244	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	618216	1	8	12.5	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	618213	1	11	9.0	5.0	✓
Conductivity in Water	E100	618212	1	12	8.3	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	616443	1	7	14.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	618245	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	618214	1	8	12.5	5.0	✓
Fluoride in Water by IC	E235.F	618215	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	618217	1	8	12.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	618218	1	8	12.5	5.0	✓
Reactive Silica by Colourimetry	E392	619371	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	618219	1	8	12.5	5.0	✓
TDS by Gravimetry	E162	619264	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	618243	1	9	11.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	618239	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	618241	1	9	11.1	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	618240	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	618242	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	619261	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	618244	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	618216	1	8	12.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	616443	1	7	14.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	618245	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	618214	1	8	12.5	5.0	✓
Fluoride in Water by IC	E235.F	618215	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	618217	1	8	12.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	618218	1	8	12.5	5.0	✓
Reactive Silica by Colourimetry	E392	619371	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	618219	1	8	12.5	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	618243	1	9	11.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	618239	1	20	5.0	5.0	✓

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Matrix Spikes (MS) - Continued							
Total Nitrogen by Colourimetry	E366	618241	1	9	11.1	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	618240	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	618242	1	20	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Vancouver - Environmental	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).
Colour (True) by Spectrometer (5 CU)	E329 Vancouver - Environmental	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U Vancouver - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Reactive Silica by Colourimetry	E392 Vancouver - Environmental	Water	APHA 4500-SiO2 E (mod)	Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method using a discrete analyzer. Method Limitation: Arsenic (5+) above 100 mg/L is a negative interference on this test
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 Vancouver - Environmental	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 Vancouver - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for Dissolved Phosphorus in water	EP375 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **FJ2202227**	Page	: 1 of 10
Client	: Ecofish Research Ltd	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 19-Aug-2022 15:54
PO	: 1200-25.03.02	Date Analysis Commenced	: 24-Aug-2022
C-O-C number	: 2022-Aug-MON8/9-Day3	Issue Date	: 14-Sep-2022 16:42
Sampler	: PD		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angelo Salandanan	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 618210)											
FJ2202227-001	BEA	pH	----	E108	0.10	pH units	7.90	7.88	0.253%	4%	----
Physical Tests (QC Lot: 618211)											
FJ2202227-001	BEA	alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	62.0	61.6	0.647%	20%	----
		alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	62.0	61.6	0.647%	20%	----
Physical Tests (QC Lot: 618212)											
FJ2202227-001	BEA	conductivity	----	E100	2.0	µS/cm	192	191	0.887%	10%	----
Physical Tests (QC Lot: 618213)											
FJ2202227-001	BEA	colour, true	----	E329	50.0	CU	226	236	9.8	Diff <2x LOR	----
Physical Tests (QC Lot: 619261)											
FJ2202201-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	12.4	12.8	0.4	Diff <2x LOR	----
Physical Tests (QC Lot: 619264)											
FJ2202201-001	Anonymous	solids, total dissolved [TDS]	----	E162	13	mg/L	131	124	6	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 618214)											
FJ2202227-001	BEA	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0120	0.0128	6.57%	20%	----
Anions and Nutrients (QC Lot: 618215)											
FJ2202226-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.065	0.068	0.003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 618216)											
FJ2202226-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 618217)											
FJ2202226-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0196	0.0184	0.0011	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 618218)											
FJ2202226-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 618219)											
FJ2202226-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	51.4	51.4	0.0366%	20%	----
Anions and Nutrients (QC Lot: 618239)											
FJ2202227-001	BEA	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	1.05	0.952	9.95%	20%	----
Anions and Nutrients (QC Lot: 618241)											
FJ2202227-001	BEA	nitrogen, total	7727-37-9	E366	0.030	mg/L	0.815	0.826	1.38%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 618242)											
FJ2202227-001	BEA	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0735	0.0797	8.12%	20%	----
Anions and Nutrients (QC Lot: 618243)											
FJ2202227-001	BEA	phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	0.0230	0.0224	2.64%	20%	----
Anions and Nutrients (QC Lot: 618244)											
FJ2202227-001	BEA	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0110	0.0100	0.0009	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 619371)											
FJ2202227-001	BEA	silicate (as SiO2)	7631-86-9	E392	0.50	mg/L	6.39	6.38	0.142%	20%	----
Organic / Inorganic Carbon (QC Lot: 618240)											
FJ2202227-001	BEA	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	37.3	40.4	7.98%	20%	----
Organic / Inorganic Carbon (QC Lot: 618245)											
FJ2202227-001	BEA	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	37.6	39.7	5.31%	20%	----
Dissolved Metals (QC Lot: 616443)											
FJ2202227-002	PD2	calcium, dissolved	7440-70-2	E421	0.050	mg/L	27.5	29.1	5.69%	20%	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	6.43	6.68	3.84%	20%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 618211)						
alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 618212)						
conductivity	----	E100	1	µS/cm	1.0	----
Physical Tests (QCLot: 618213)						
colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 619261)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 619264)						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 618214)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 618215)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 618216)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 618217)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 618218)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 618219)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 618239)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 618241)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 618242)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 618243)						
phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 618244)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 619371)						
silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 618240)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 618245)						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 616443)						
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 618210)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 618211)									
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	229 mg/L	109	75.0	125	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	110	85.0	115	----
Physical Tests (QCLot: 618212)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	98.8	90.0	110	----
Physical Tests (QCLot: 618213)									
colour, true	----	E329	5	CU	100 CU	104	85.0	115	----
Physical Tests (QCLot: 619261)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	98.0	85.0	115	----
Physical Tests (QCLot: 619264)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	113	85.0	115	----
Anions and Nutrients (QCLot: 618214)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	102	80.0	120	----
Anions and Nutrients (QCLot: 618215)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	99.0	90.0	110	----
Anions and Nutrients (QCLot: 618216)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 618217)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 618218)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.5	90.0	110	----
Anions and Nutrients (QCLot: 618219)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 618239)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	98.4	75.0	125	----
Anions and Nutrients (QCLot: 618241)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 618242)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	92.6	80.0	120	----
Anions and Nutrients (QCLot: 618243)									
phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.05 mg/L	87.3	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 618244)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	95.4	85.0	115	----
Anions and Nutrients (QCLot: 619371)									
silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	10 mg/L	101	85.0	115	----
Organic / Inorganic Carbon (QCLot: 618240)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	105	80.0	120	----
Organic / Inorganic Carbon (QCLot: 618245)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	103	80.0	120	----
Dissolved Metals (QCLot: 616443)									
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	98.2	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	95.9	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 618214)										
FJ2202227-002	PD2	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0277 mg/L	0.03 mg/L	92.5	70.0	130	----
Anions and Nutrients (QCLot: 618215)										
VA22B9818-001	Anonymous	fluoride	16984-48-8	E235.F	1.02 mg/L	1 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 618216)										
VA22B9818-001	Anonymous	chloride	16887-00-6	E235.Cl	105 mg/L	100 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 618217)										
VA22B9818-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.62 mg/L	2.5 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 618218)										
VA22B9818-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.512 mg/L	0.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 618219)										
VA22B9818-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	106 mg/L	100 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 618239)										
FJ2202227-002	PD2	Kjeldahl nitrogen, total [TKN]	----	E318	2.65 mg/L	2.5 mg/L	106	70.0	130	----
Anions and Nutrients (QCLot: 618241)										
FJ2202227-002	PD2	nitrogen, total	7727-37-9	E366	0.404 mg/L	0.4 mg/L	101	70.0	130	----
Anions and Nutrients (QCLot: 618242)										
FJ2202227-002	PD2	phosphorus, total	7723-14-0	E372-U	0.0465 mg/L	0.05 mg/L	93.0	70.0	130	----
Anions and Nutrients (QCLot: 618243)										
FJ2202227-002	PD2	phosphorus, total dissolved	7723-14-0	E375-T	0.0456 mg/L	0.05 mg/L	91.3	70.0	130	----
Anions and Nutrients (QCLot: 618244)										
FJ2202227-002	PD2	ammonia, total (as N)	7664-41-7	E298	0.104 mg/L	0.1 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 619371)										
FJ2202227-002	PD2	silicate (as SiO2)	7631-86-9	E392	9.46 mg/L	10 mg/L	94.6	75.0	125	----
Organic / Inorganic Carbon (QCLot: 618240)										
FJ2202227-002	PD2	carbon, total organic [TOC]	----	E355-L	4.91 mg/L	5 mg/L	98.3	70.0	130	----
Organic / Inorganic Carbon (QCLot: 618245)										
FJ2202227-002	PD2	carbon, dissolved organic [DOC]	----	E358-L	5.41 mg/L	5 mg/L	108	70.0	130	----
Dissolved Metals (QCLot: 616443)										

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 616443) - continued										
FJ2202227-003	PINE	calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 2022-Aug-MON8/9- Day 3

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Page of

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Leah Hull
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Reports / Recipients	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Merge QC/QCI Reports with COA	☑ YES ☐ NO ☐ N/A
☑ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	lhull@ecofishresearch.com
Email 2	tkasubuchi@ecofishresearch.com
Email 3	waterqualitylabdata@ecofishresearch.com

Invoice Recipients	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	accountspayable@ecofishresearch.com
Email 2	

Turnaround Time (TAT) Requested
☑ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests
Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm
For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Project Information	
ALS Account # / Quote #:	VA22-ECOF100-004
Job #:	Surface water MON8/9- no metals
PO / AFE:	1200-25.03.02
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (ALS use only):

ALS Contact: Sneha Sansare **Sampler:** Pat Beaupre

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Alk., Ec, pH, TDS, TSS, Anions, Si, diss ortho P, colour, pH	DOC, Total dissolved P	Hardness	NH3, Total Kjeldahl, Nitrogen, Total N, TOC, Total P	IONBALANCE-BC-CL	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
						F/P	F	F	P				
	BEA			Water	4	R	R	R	R	R			
	PD2			Water	4	R	R	R	R	R			
	PINE			Water	4	R	R	R	R	R			
	PD1-A			Water	4	R	R	R	R	R			
	PD1-B			Water	4	R	R	R	R	R			
	~~PR-2.01~~			~~Water~~	~~4~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~			
	~~MB~~			~~Water~~	~~4~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~			
	~~MB-FD~~			~~Water~~	~~4~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~			

Telephone : +1 250 261 5517

Fort St. John
Work Order Reference
FJ2202227

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	Please send Azimuth a copy of the data in their EDD format:
Are samples for human consumption/ use? ☐ YES ☑ NO	gmann@azimuthgroup.ca imcivor@azimuthgroup.ca
	Add. for report: csuzanne@ecofishresearch.com,kganshorn@ecofishresearch.com

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
12.3							

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by: Kevin Ganshorn	Date: Aug 19 2022	Time: 15:45	Received by:	Date: Aug 19, 22	Time: 3:45	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY AUG 2020 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form.**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202273**	Page	: 1 of 4
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 22-Aug-2022 16:49
PO	: 1200-25.03.02	Date Analysis Commenced	: 24-Aug-2022
C-O-C number	: ----	Issue Date	: 09-Sep-2022 17:45
Sampler	: ----		
Site	: Site C RSEM Water Quality Monitoring		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Erin Sanchez		Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Inorganics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
%	percent
µS/cm	Microsiemens per centimetre
CU	colour units (1 CU = 1 mg/L Pt)
meq/L	milliequivalents per litre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: MD	----	----	----	----
					Client sampling date / time: 22-Aug-2022 16:00	----	----	----	----
					FJ2202273-001	--------	--------	--------	--------
					Result	----	----	----	----
Physical Tests									
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	128	----	----	----	----
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	5.4	----	----	----	----
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	----	----	----	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	2.7	----	----	----	----
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	134	----	----	----	----
colour, true	----	E329	5.0	CU	13.5	----	----	----	----
conductivity	----	E100	2.0	µS/cm	260	----	----	----	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	143	----	----	----	----
pH	----	E108	0.10	pH units	8.34	----	----	----	----
solids, total dissolved [TDS]	----	E162	10	mg/L	174	----	----	----	----
solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	----	----	----	----
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0050	----	----	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	----	----	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L	0.085	----	----	----	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.157	----	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	----	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	----	----	----	----
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.158	----	----	----	----
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	----	----	----	----
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0150	----	----	----	----
phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	0.0023	----	----	----	----
silicate (as SiO2)	7631-86-9	E392	0.50	mg/L	3.08	----	----	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	12.2	----	----	----	----
Organic / Inorganic Carbon									
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	5.40	----	----	----	----
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	5.51	----	----	----	----
Ion Balance									
anion sum	----	EC101	0.10	meq/L	2.94	----	----	----	----
cation sum	----	EC101	0.10	meq/L	3.03	----	----	----	----

Analytical Results

Sub-Matrix: **Water** (Matrix: **Water**)					Client sample ID	**MD**	----	----	----	----
					Client sampling date / time	22-Aug-2022 16:00	----	----	----	----
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*		**FJ2202273-001**	--------	--------	--------	--------
						Result	----	----	----	----
Ion Balance										
ion balance (APHA)	----	EC101	0.010	%		1.51	----	----	----	----
Dissolved Metals										
calcium, dissolved	7440-70-2	E421	0.050	mg/L		40.2	----	----	----	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		10.4	----	----	----	----
dissolved metals filtration location	----	EP421	-	-		Laboratory	----	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202273**	Page	: 1 of 12
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 22-Aug-2022 16:49
PO	: 1200-25.03.02	Issue Date	: 09-Sep-2022 17:45
C-O-C number	: ----		
Sampler	: ----		
Site	: Site C RSEM Water Quality Monitoring		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
MD	E298	22-Aug-2022	26-Aug-2022	----	----		26-Aug-2022	28 days	5 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
MD	E235.Cl	22-Aug-2022	24-Aug-2022	----	----		24-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE										
MD	E378-U	22-Aug-2022	24-Aug-2022	----	----		25-Aug-2022	3 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
MD	E235.F	22-Aug-2022	24-Aug-2022	----	----		24-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
MD	E235.NO3-L	22-Aug-2022	24-Aug-2022	3 days	2 days	✓	24-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
MD	E235.NO2-L	22-Aug-2022	24-Aug-2022	----	----		24-Aug-2022	3 days	2 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE										
MD	E392	22-Aug-2022	----	----	----		25-Aug-2022	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MD	E235.SO4	22-Aug-2022	24-Aug-2022	----	----		24-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
MD	E375-T	22-Aug-2022	26-Aug-2022	----	----		27-Aug-2022	28 days	5 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
MD	E318	22-Aug-2022	26-Aug-2022	----	----		29-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
MD	E366	22-Aug-2022	26-Aug-2022	----	----		29-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
MD	E372-U	22-Aug-2022	26-Aug-2022	----	----		27-Aug-2022	28 days	5 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
MD	E421	22-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	180 days	3 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
MD	E358-L	22-Aug-2022	26-Aug-2022	----	----		26-Aug-2022	28 days	4 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
MD	E355-L	22-Aug-2022	26-Aug-2022	----	----		26-Aug-2022	28 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
MD	E290	22-Aug-2022	24-Aug-2022	----	----		25-Aug-2022	14 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE MD	E329	22-Aug-2022	24-Aug-2022	----	----		25-Aug-2022	3 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE MD	E100	22-Aug-2022	24-Aug-2022	----	----		25-Aug-2022	28 days	2 days	✓
Physical Tests : pH by Meter										
HDPE MD	E108	22-Aug-2022	24-Aug-2022	----	----		25-Aug-2022	0.25 hrs	8.25 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE MD	E162	22-Aug-2022	----	----	----		26-Aug-2022	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE MD	E160	22-Aug-2022	----	----	----		26-Aug-2022	7 days	4 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	617303	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	620019	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	617306	1	20	5.0	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	617312	1	1	100.0	5.0	✓
Conductivity in Water	E100	617304	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	618257	1	18	5.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	620015	1	19	5.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	617311	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	617305	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	617308	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	617309	1	16	6.2	5.0	✓
pH by Meter	E108	617302	1	20	5.0	5.0	✓
Reactive Silica by Colourimetry	E392	619371	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	617310	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	620318	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	620018	1	7	14.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	620013	1	6	16.6	5.0	✓
Total Nitrogen by Colourimetry	E366	620017	1	7	14.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	620016	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	620014	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	620308	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	617303	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	620019	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	617306	1	20	5.0	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	617312	1	1	100.0	5.0	✓
Conductivity in Water	E100	617304	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	618257	1	18	5.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	620015	1	19	5.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	617311	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	617305	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	617308	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	617309	1	16	6.2	5.0	✓
pH by Meter	E108	617302	1	20	5.0	5.0	✓
Reactive Silica by Colourimetry	E392	619371	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	617310	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	620318	1	20	5.0	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	620018	1	7	14.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	620013	1	6	16.6	5.0	✓
Total Nitrogen by Colourimetry	E366	620017	1	7	14.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	620016	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	620014	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	620308	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	617303	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	620019	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	617306	1	20	5.0	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	617312	1	1	100.0	5.0	✓
Conductivity in Water	E100	617304	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	618257	1	18	5.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	620015	1	19	5.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	617311	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	617305	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	617308	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	617309	1	16	6.2	5.0	✓
Reactive Silica by Colourimetry	E392	619371	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	617310	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	620318	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	620018	1	7	14.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	620013	1	6	16.6	5.0	✓
Total Nitrogen by Colourimetry	E366	620017	1	7	14.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	620016	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	620014	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	620308	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	620019	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	617306	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	618257	1	18	5.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	620015	1	19	5.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	617311	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	617305	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	617308	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	617309	1	16	6.2	5.0	✓
Reactive Silica by Colourimetry	E392	619371	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	617310	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	620018	1	7	14.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	620013	1	6	16.6	5.0	✓

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Matrix Spikes (MS) - Continued							
Total Nitrogen by Colourimetry	E366	620017	1	7	14.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	620016	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	620014	1	19	5.2	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Vancouver - Environmental	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).
Colour (True) by Spectrometer (5 CU)	E329 Vancouver - Environmental	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U Vancouver - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Reactive Silica by Colourimetry	E392 Vancouver - Environmental	Water	APHA 4500-SiO2 E (mod)	Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method using a discrete analyzer. Method Limitation: Arsenic (5+) above 100 mg/L is a negative interference on this test
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 Vancouver - Environmental	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 Vancouver - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for Dissolved Phosphorus in water	EP375 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

QUALITY CONTROL REPORT

Work Order	: **FJ2202273**	Page	: 1 of 10
Client	: Ecofish Research Ltd	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 22-Aug-2022 16:49
PO	: 1200-25.03.02	Date Analysis Commenced	: 24-Aug-2022
C-O-C number	: ----	Issue Date	: 09-Sep-2022 17:45
Sampler	: ----		
Site	: Site C RSEM Water Quality Monitoring		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Erin Sanchez		Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Inorganics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 617302)											
FJ2202261-019	Anonymous	pH	----	E108	0.10	pH units	8.30	8.31	0.120%	4%	----
Physical Tests (QC Lot: 617303)											
FJ2202261-019	Anonymous	alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	171	171	0.409%	20%	----
		alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	5.0	5.0	0	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	2.5	2.5	0	Diff <2x LOR	----
		alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	176	176	0.398%	20%	----
Physical Tests (QC Lot: 617304)											
FJ2202261-019	Anonymous	conductivity	----	E100	2.0	µS/cm	1010	1010	0.297%	10%	----
Physical Tests (QC Lot: 617312)											
FJ2202273-001	MD	colour, true	----	E329	5.0	CU	13.5	14.0	0.5	Diff <2x LOR	----
Physical Tests (QC Lot: 620308)											
FJ2202240-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 620318)											
FJ2202240-001	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	222	217	2.50%	20%	----
Anions and Nutrients (QC Lot: 617305)											
FJ2202261-017	Anonymous	fluoride	16984-48-8	E235.F	0.100	mg/L	0.133	0.129	0.005	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 617306)											
FJ2202261-017	Anonymous	chloride	16887-00-6	E235.Cl	2.50	mg/L	<2.50	<2.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 617308)											
FJ2202261-017	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	1.85	1.83	1.03%	20%	----
Anions and Nutrients (QC Lot: 617309)											
FJ2202261-017	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	0.0078	0.0066	0.0013	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 617310)											
FJ2202261-017	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	218	215	1.09%	20%	----
Anions and Nutrients (QC Lot: 617311)											
FJ2202261-017	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 619371)											
FJ2202227-001	Anonymous	silicate (as SiO2)	7631-86-9	E392	0.50	mg/L	6.39	6.38	0.142%	20%	----
Anions and Nutrients (QC Lot: 620013)											
VA22B9516-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.159	0.158	0.002	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 620014)											
FJ2202261-017	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0233	0.0228	2.30%	20%	----
Anions and Nutrients (QC Lot: 620017)											
FJ2202259-004	Anonymous	nitrogen, total	7727-37-9	E366	0.030	mg/L	1.47	1.45	1.59%	20%	----
Anions and Nutrients (QC Lot: 620018)											
FJ2202259-004	Anonymous	phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	0.0340	0.0335	1.42%	20%	----
Anions and Nutrients (QC Lot: 620019)											
FJ2202259-004	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.165	0.164	0.621%	20%	----
Organic / Inorganic Carbon (QC Lot: 620015)											
FJ2202259-004	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.31	2.29	0.02	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 620016)											
FJ2202259-004	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	1.84	2.00	0.16	Diff <2x LOR	----
Dissolved Metals (QC Lot: 618257)											
VA22B9691-001	Anonymous	calcium, dissolved	7440-70-2	E421	0.250	mg/L	277	276	0.627%	20%	----
		magnesium, dissolved	7439-95-4	E421	0.0250	mg/L	46.0	46.5	1.12%	20%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 617303)						
alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 617304)						
conductivity	----	E100	1	µS/cm	1.2	----
Physical Tests (QCLot: 617312)						
colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 620308)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 620318)						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 617305)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 617306)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 617308)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 617309)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 617310)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 617311)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 619371)						
silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 620013)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 620014)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 620017)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 620018)						
phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 620019)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Organic / Inorganic Carbon (QCLot: 620015)						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 620016)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 618257)						
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 617302)									
pH	----	E108	----	pH units	7 pH units	99.7	98.0	102	----
Physical Tests (QCLot: 617303)									
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	229 mg/L	113	75.0	125	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	108	85.0	115	----
Physical Tests (QCLot: 617304)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.4	90.0	110	----
Physical Tests (QCLot: 617312)									
colour, true	----	E329	5	CU	100 CU	103	85.0	115	----
Physical Tests (QCLot: 620308)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	95.0	85.0	115	----
Physical Tests (QCLot: 620318)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 617305)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	94.6	90.0	110	----
Anions and Nutrients (QCLot: 617306)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	97.4	90.0	110	----
Anions and Nutrients (QCLot: 617308)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	98.1	90.0	110	----
Anions and Nutrients (QCLot: 617309)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	95.0	90.0	110	----
Anions and Nutrients (QCLot: 617310)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	99.0	90.0	110	----
Anions and Nutrients (QCLot: 617311)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	92.3	80.0	120	----
Anions and Nutrients (QCLot: 619371)									
silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	10 mg/L	101	85.0	115	----
Anions and Nutrients (QCLot: 620013)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	93.4	75.0	125	----
Anions and Nutrients (QCLot: 620014)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	90.5	80.0	120	----
Anions and Nutrients (QCLot: 620017)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	104	75.0	125	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 620018)									
phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.05 mg/L	93.0	80.0	120	----
Anions and Nutrients (QCLot: 620019)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	100	85.0	115	----
Organic / Inorganic Carbon (QCLot: 620015)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	100	80.0	120	----
Organic / Inorganic Carbon (QCLot: 620016)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	106	80.0	120	----
Dissolved Metals (QCLot: 618257)									
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	102	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	102	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 617305)										
FJ2202261-018	Anonymous	fluoride	16984-48-8	E235.F	0.987 mg/L	1 mg/L	98.7	75.0	125	----
Anions and Nutrients (QCLot: 617306)										
FJ2202261-018	Anonymous	chloride	16887-00-6	E235.Cl	102 mg/L	100 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 617308)										
FJ2202261-018	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.54 mg/L	2.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 617309)										
FJ2202261-018	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.500 mg/L	0.5 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 617310)										
FJ2202261-018	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	100 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 617311)										
FJ2202261-018	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0336 mg/L	0.03 mg/L	112	70.0	130	----
Anions and Nutrients (QCLot: 619371)										
FJ2202227-002	Anonymous	silicate (as SiO2)	7631-86-9	E392	9.46 mg/L	10 mg/L	94.6	75.0	125	----
Anions and Nutrients (QCLot: 620013)										
FJ2202273-001	MD	Kjeldahl nitrogen, total [TKN]	----	E318	2.46 mg/L	2.5 mg/L	98.6	70.0	130	----
Anions and Nutrients (QCLot: 620014)										
FJ2202259-004	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0482 mg/L	0.05 mg/L	96.4	70.0	130	----
Anions and Nutrients (QCLot: 620017)										
FJ2202261-017	Anonymous	nitrogen, total	7727-37-9	E366	ND mg/L	0.4 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 620018)										
FJ2202261-017	Anonymous	phosphorus, total dissolved	7723-14-0	E375-T	0.0476 mg/L	0.05 mg/L	95.3	70.0	130	----
Anions and Nutrients (QCLot: 620019)										
FJ2202261-017	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0950 mg/L	0.1 mg/L	95.0	75.0	125	----
Organic / Inorganic Carbon (QCLot: 620015)										
FJ2202261-017	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	4.87 mg/L	5 mg/L	97.3	70.0	130	----
Organic / Inorganic Carbon (QCLot: 620016)										
FJ2202261-017	Anonymous	carbon, total organic [TOC]	----	E355-L	5.45 mg/L	5 mg/L	109	70.0	130	----
Dissolved Metals (QCLot: 618257)										

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 618257) - continued										
VA22B9691-002	Anonymous	calcium, dissolved	7440-70-2	E421	ND mg/L	8 mg/L	ND	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	2 mg/L	ND	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 2022-Aug-MON8/9- Day 3

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Page of

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Leah Hull
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Reports / Recipients	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Merge QC/QCI Reports with COA	☑ YES ☐ NO ☐ N/A
☑ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	lhull@ecofishresearch.com
Email 2	tkasubuchi@ecofishresearch.com
Email 3	waterquality/abdata@ecofishresearch.com

Invoice Recipients	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	accountspayable@ecofishresearch.com
Email 2	

Project Information	
ALS Account # / Quote #:	VA22-ECOF100-004
Job #:	Surface water MON8/9- no metals
PO / AFE:	1200-25.03.02
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

ALS Lab Work Order # (ALS use only):

ALS Contact: Sneha Sansare Sampler: Pat Beaupre

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINER	Alk., Ec, pH, TDS, TSS, Anions, SI, diss ortho P, colour, pH (F/P)	DOC, Total dissolved P (F)	Hardness (P)	NH3, Total Kjeldahl Nitrogen, Total N, TOC, Total P (P)	IONBALANCE-BC-CL (P)	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	~~BEA~~			Water	4	R	R	R	R	R			
	~~PD2~~			Water	4	R	R	R	R	R			
	~~PINE~~			Water	4	R	R	R	R	R			
	~~PD1-A~~			Water	4	R	R	R	R	R			
	~~PD1-B~~			Water	4	R	R	R	R	R			
	~~PR-2.81~~			Water	4	R	R	R	R	R			
	MD	22-Aug-22	16:00	Water	4	R	R	R	R	R			
	~~MD-FB~~			Water	4	R	R	R	R	R			

Fort St. John
Work Order Reference
FJ2202273

Telephone : +1 250 261 5517

FJAE Shipping & Receiving
Mail Out — Expedite
Priority
1 # of Coolers ✓ Air
# of Carboys — Ground

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	Please send Azimuth a copy of the data in their EDD format:
Are samples for human consumption/ use? ☐ YES ☑ NO	gmann@azimuthgroup.ca imcivor@azimuthgroup.ca
	Add. for report: csuzanne@ecofishresearch.com,kganshorn@ecofishresearch.com

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
1.2.3					

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by: BRM	Date: 22-Aug-2022	Time: 16:45	Received by:	Date: 8-22-22	Time: 9:43	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form.**

Chain of Custody (COC) / Analytical Request Form

COC Number: 2022-Aug-MON8/9- Day 3

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Page of

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Leah Hull
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Project Information

ALS Account # / Quote #:	VA22-ECOF100-004
Job #:	Surface water MON8/9- no metals
PO / AFE:	1200-25.03.02
LSD:	

ALS Lab Work Order # (ALS use only):

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A

☑ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: lhull@ecofishresearch.com

Email 2: tkasubuchi@ecofishresearch.com

Email 3: waterqualitylabdata@ecofishresearch.com

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: accountspayable@ecofishresearch.com

Email 2:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#

Major/Minor Code: Routing Code:

Requisitioner:

Location:

ALS Contact: Sneha Sansare **Sampler:** Pat Beaupre

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINER	Alk., Ec, pH, TDS, TSS, Anions, Si, diss ortho P, colour, pH (F/P)	DOC, Total dissolved P (F)	Hardness (P)	NH3, Total Kjeldahl Nitrogen, Total N, TOC, Total P (P)	IONBALANCE-BC-CL (P)	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	~~BEA~~			Water	4	R	R	R	R	R			
	~~PD2~~			Water	4	R	R	R	R	R			
	~~PINE~~			Water	4	R	R	R	R	R			
	~~PD1-A~~			Water	4	R	R	R	R	R			
	~~PD1-B~~			Water	4	R	R	R	R	R			
	~~PR-2.81~~			Water	4	R	R	R	R	R			
	MD	22-Aug-22	16:00	Water	4	R	R	R	R	R			
	~~MD-FB~~			Water	4	R	R	R	R	R			

Fort St. John
Work Order Reference
FJ2202273

Telephone : +1 250 261 5517

FJAE Shipping & Receiving
Expedite
Call Out
Priority
Air
1 # of Coolers
Ground
# of Carboys

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Please send Azimuth a copy of the data in their EDD format:

gmann@azimuthgroup.ca imcivor@azimuthgroup.ca

Add. for report: csuzanne@ecofishresearch.com,kganshorn@ecofishresearch.com

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☒ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C			
						8

SHIPMENT RELEASE (client use)

Released by: BRM Date: 22-Aug-2022 Time: 16:45

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by: Date: Time:

FINAL SHIPMENT RECEPTION (ALS use only)

Received by: Date: 8/23 Time: 3:40p

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form.**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202286**	Page	: 1 of 4
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Site C MMP - Surface Water	Date Samples Received	: 23-Aug-2022 18:36
PO	: 1200-25.03.05	Date Analysis Commenced	: 29-Aug-2022
C-O-C number	: 2022Aug Water MMP	Issue Date	: 16-Sep-2022 17:05
Sampler	: KG		
Site	: Site C RSEM Water Quality Monitoring		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Hamideh Moradi	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Inorganics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
%	percent
µS/cm	Microsiemens per centimetre
meq/L	milliequivalents per litre
mg/L	milligrams per litre
ng/L	nanograms per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	PD3-A	PD3-B	----	----	----
					Client sampling date / time	23-Aug-2022 13:20	23-Aug-2022 13:20	----	----	----
						FJ2202286-001	FJ2202286-002	--------	--------	--------
						Result	Result	----	----	----
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		88.3	----	----	----	----
conductivity	----	E100	2.0	µS/cm		201	----	----	----	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		100	----	----	----	----
pH	----	E108	0.10	pH units		8.17	----	----	----	----
solids, total suspended [TSS]	----	E160	3.0	mg/L		9.3	----	----	----	----
Anions and Nutrients										
chloride	16887-00-6	E235.Cl	0.50	mg/L		<0.50	----	----	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L		0.044	----	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		0.0576	----	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		0.0018	----	----	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		15.3	----	----	----	----
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L		3.24	----	----	----	----
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		2.92	----	----	----	----
Ion Balance										
anion sum	----	EC101	0.10	meq/L		2.09	----	----	----	----
cation sum	----	EC101	0.10	meq/L		2.07	----	----	----	----
ion balance (APHA)	----	EC101	0.010	%		0.481	----	----	----	----
Total Metals										
mercury, total	7439-97-6	E508-L	0.50	ng/L		0.83	1.07	----	----	----
Dissolved Metals										
mercury, dissolved	7439-97-6	E509-L	0.50	ng/L		<0.50	<0.50	----	----	----
calcium, dissolved	7440-70-2	E421	0.050	mg/L		28.8	----	----	----	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		6.88	----	----	----	----
dissolved MeHg filtration location	----	EP537	-	-		Field	Field	----	----	----
dissolved mercury filtration location	----	EP509-L	-	-		Field	Field	----	----	----
dissolved metals filtration location	----	EP421	-	-		Laboratory	----	----	----	----
Speciated Metals										
methylmercury (as MeHg), total	22967-92-6	E536	0.020	ng/L		<0.020	0.022	----	----	----
methylmercury (as MeHg), dissolved	22967-92-6	E537	0.020	ng/L		<0.020	<0.020	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202286**	Page	: 1 of 10
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Site C MMP - Surface Water	Date Samples Received	: 23-Aug-2022 18:36
PO	: 1200-25.03.05	Issue Date	: 16-Sep-2022 17:05
C-O-C number	: 2022Aug Water MMP		
Sampler	: KG		
Site	: Site C RSEM Water Quality Monitoring		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE PD3-A	E235.Cl	23-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PD3-A	E235.F	23-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PD3-A	E235.NO3-L	23-Aug-2022	30-Aug-2022	3 days	7 days	✗ EHT	30-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PD3-A	E235.NO2-L	23-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	3 days	7 days	✗ EHT
Anions and Nutrients : Sulfate in Water by IC										
HDPE PD3-A	E235.SO4	23-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	7 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) PD3-A	E509-L	23-Aug-2022	31-Aug-2022	----	----		31-Aug-2022	28 days	8 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) PD3-B	E509-L	23-Aug-2022	31-Aug-2022	----	----		31-Aug-2022	28 days	8 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PD3-A	E421	23-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	180 days	7 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PD3-A	E358-L	23-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	9 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PD3-A	E355-L	23-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	9 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PD3-A	E290	23-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	14 days	7 days	✓
Physical Tests : Conductivity in Water										
HDPE PD3-A	E100	23-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	7 days	✓
Physical Tests : pH by Meter										
HDPE PD3-A	E108	23-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	0.25 hrs	3.25 hrs	× EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE PD3-A	E160	23-Aug-2022	----	----	----		29-Aug-2022	7 days	6 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PD3-A	E537	23-Aug-2022	02-Sep-2022	180 days	10 days	✓	07-Sep-2022	180 days	5 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PD3-B	E537	23-Aug-2022	02-Sep-2022	180 days	10 days	✓	07-Sep-2022	180 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) PD3-A	E536	23-Aug-2022	02-Sep-2022	----	----		07-Sep-2022	180 days	15 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) PD3-B	E536	23-Aug-2022	02-Sep-2022	----	----		07-Sep-2022	180 days	15 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) PD3-A	E508-L	23-Aug-2022	30-Aug-2022	28 days	7 days	✓	30-Aug-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) PD3-B	E508-L	23-Aug-2022	30-Aug-2022	28 days	7 days	✓	30-Aug-2022	28 days	0 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	624669	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	624672	1	12	8.3	5.0	✓
Conductivity in Water	E100	624670	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	626630	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	624762	1	18	5.5	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	627800	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	628134	1	18	5.5	5.0	✓
Fluoride in Water by IC	E235.F	624671	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	624673	1	11	9.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	624674	1	12	8.3	5.0	✓
pH by Meter	E108	624668	1	18	5.5	5.0	✓
Sulfate in Water by IC	E235.SO4	624675	1	15	6.6	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	625824	1	14	7.1	5.0	✓
Total Methylmercury in Water by GCAFS	E536	630059	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	628135	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	624063	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	624669	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	624672	1	12	8.3	5.0	✓
Conductivity in Water	E100	624670	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	626630	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	624762	1	18	5.5	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	627800	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	628134	1	18	5.5	5.0	✓
Fluoride in Water by IC	E235.F	624671	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	624673	1	11	9.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	624674	1	12	8.3	5.0	✓
pH by Meter	E108	624668	1	18	5.5	5.0	✓
Sulfate in Water by IC	E235.SO4	624675	1	15	6.6	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	625824	1	14	7.1	5.0	✓
Total Methylmercury in Water by GCAFS	E536	630059	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	628135	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	624063	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	624669	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	624672	1	12	8.3	5.0	✓
Conductivity in Water	E100	624670	1	14	7.1	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	626630	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	624762	1	18	5.5	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	627800	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	628134	1	18	5.5	5.0	✓
Fluoride in Water by IC	E235.F	624671	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	624673	1	11	9.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	624674	1	12	8.3	5.0	✓
Sulfate in Water by IC	E235.SO4	624675	1	15	6.6	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	625824	1	14	7.1	5.0	✓
Total Methylmercury in Water by GCAFS	E536	630059	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	628135	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	624063	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Chloride in Water by IC	E235.Cl	624672	1	12	8.3	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	626630	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	624762	1	18	5.5	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	627800	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	628134	1	18	5.5	5.0	✓
Fluoride in Water by IC	E235.F	624671	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	624673	1	11	9.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	624674	1	12	8.3	5.0	✓
Sulfate in Water by IC	E235.SO4	624675	1	15	6.6	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	625824	1	14	7.1	5.0	✓
Total Methylmercury in Water by GCAFS	E536	630059	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	628135	1	19	5.2	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L Vancouver - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAFS.
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAFS.
Total Methylmercury in Water by GCAFS	E536 Vancouver - Environmental	Water	EPA 1630 (mod)	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Methylmercury in Water by GCAFS	E537 Vancouver - Environmental	Water	EPA 1630 (mod)	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	“Hardness (as $CaCO_3$), dissolved” is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. “Total Hardness” refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ion Balance using Dissolved Metals	EC101 Vancouver - Environmental	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 Vancouver - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration (Low Level)	EP509-L Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
Total Methylmercury Water Preparation	EP536 Vancouver - Environmental	Water	EPA 1630	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Methylmercury Water Preparation	EP537 Vancouver - Environmental	Water	EPA 1630	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **FJ2202286**	Page	: 1 of 10
Client	: Ecofish Research Ltd	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Site C MMP - Surface Water	Date Samples Received	: 23-Aug-2022 18:36
PO	: 1200-25.03.05	Date Analysis Commenced	: 29-Aug-2022
C-O-C number	: 2022Aug Water MMP	Issue Date	: 16-Sep-2022 17:05
Sampler	: KG		
Site	: Site C RSEM Water Quality Monitoring		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angelo Salandanan	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Hamideh Moradi	Analyst	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Inorganics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 624063)											
FJ2202286-001	PD3-A	solids, total suspended [TSS]	----	E160	3.0	mg/L	9.3	9.3	0	Diff <2x LOR	----
Physical Tests (QC Lot: 624668)											
KS2203157-001	Anonymous	pH	----	E108	0.10	pH units	8.35	8.35	0.0958%	4%	----
Physical Tests (QC Lot: 624669)											
KS2203157-001	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	214	212	0.845%	20%	----
Physical Tests (QC Lot: 624670)											
KS2203157-001	Anonymous	conductivity	----	E100	2.0	µS/cm	2060	2070	0.484%	10%	----
Anions and Nutrients (QC Lot: 624671)											
FJ2202325-001	Anonymous	fluoride	16984-48-8	E235.F	0.100	mg/L	0.104	0.107	0.003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 624672)											
FJ2202325-001	Anonymous	chloride	16887-00-6	E235.Cl	2.50	mg/L	9.34	9.28	0.06	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 624673)											
FJ2202325-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.0330	0.0327	0.0004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 624674)											
FJ2202325-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	0.0085	0.0082	0.0003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 624675)											
FJ2202325-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	173	172	0.321%	20%	----
Organic / Inorganic Carbon (QC Lot: 628134)											
FJ2202286-001	PD3-A	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	3.24	3.12	0.12	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 628135)											
FJ2202286-001	PD3-A	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	2.92	2.78	0.14	Diff <2x LOR	----
Total Metals (QC Lot: 625824)											
FC2201915-001	Anonymous	mercury, total	7439-97-6	E508-L	5.00	ng/L	6.82	7.66	0.84	Diff <2x LOR	----
Dissolved Metals (QC Lot: 624762)											
VA22C0108-001	Anonymous	calcium, dissolved	7440-70-2	E421	0.500	mg/L	206	209	1.59%	20%	----
		magnesium, dissolved	7439-95-4	E421	0.0500	mg/L	56.8	55.2	2.84%	20%	----
Dissolved Metals (QC Lot: 626630)											
FC2201927-001	Anonymous	mercury, dissolved	7439-97-6	E509-L	0.50	ng/L	<0.50	<0.50	0	Diff <2x LOR	----
Speciated Metals (QC Lot: 627800)											
FC2201977-001	Anonymous	methylmercury (as MeHg), dissolved	22967-92-6	E537	0.000020	µg/L	0.000126	0.000143	12.2%	30%	----
Speciated Metals (QC Lot: 630059)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Speciated Metals (QC Lot: 630059) - continued											
FC2201977-001	Anonymous	methylmercury (as MeHg), total	22967-92-6	E536	0.000020	µg/L	0.000091	0.000089	0.000002	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 624063)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 624669)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 624670)						
conductivity	----	E100	1	µS/cm	<1.0	----
Anions and Nutrients (QCLot: 624671)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 624672)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 624673)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 624674)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 624675)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Organic / Inorganic Carbon (QCLot: 628134)						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 628135)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 625824)						
mercury, total	7439-97-6	E508-L	0.5	ng/L	<0.50	----
Dissolved Metals (QCLot: 624762)						
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Dissolved Metals (QCLot: 626630)						
mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	<0.50	----
Speciated Metals (QCLot: 627800)						
methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 630059)						
methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	<0.000020	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 624063)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	96.8	85.0	115	----
Physical Tests (QCLot: 624668)									
pH	----	E108	----	pH units	7 pH units	100.0	98.0	102	----
Physical Tests (QCLot: 624669)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	110	85.0	115	----
Physical Tests (QCLot: 624670)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	101	90.0	110	----
Anions and Nutrients (QCLot: 624671)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	94.7	90.0	110	----
Anions and Nutrients (QCLot: 624672)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	98.9	90.0	110	----
Anions and Nutrients (QCLot: 624673)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.6	90.0	110	----
Anions and Nutrients (QCLot: 624674)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	98.2	90.0	110	----
Anions and Nutrients (QCLot: 624675)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	103	90.0	110	----
Organic / Inorganic Carbon (QCLot: 628134)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	99.8	80.0	120	----
Organic / Inorganic Carbon (QCLot: 628135)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	103	80.0	120	----
Total Metals (QCLot: 625824)									
mercury, total	7439-97-6	E508-L	0.5	ng/L	5 ng/L	108	80.0	120	----
Dissolved Metals (QCLot: 624762)									
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	97.2	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	102	80.0	120	----
mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	5 ng/L	107	80.0	120	----
Speciated Metals (QCLot: 627800)									
methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	0.0025 µg/L	89.2	70.0	130	----
Speciated Metals (QCLot: 630059)									

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Speciated Metals (QCLot: 630059) - continued									
methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	0.0025 µg/L	76.1	70.0	130	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 624671)										
KS2203157-001	Anonymous	fluoride	16984-48-8	E235.F	19.8 mg/L	20 mg/L	99.1	75.0	125	----
Anions and Nutrients (QCLot: 624672)										
KS2203157-001	Anonymous	chloride	16887-00-6	E235.Cl	1990 mg/L	2000 mg/L	99.6	75.0	125	----
Anions and Nutrients (QCLot: 624673)										
KS2203157-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	ND mg/L	50 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 624674)										
KS2203157-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	9.88 mg/L	10 mg/L	98.8	75.0	125	----
Anions and Nutrients (QCLot: 624675)										
KS2203157-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	2050 mg/L	2000 mg/L	102	75.0	125	----
Organic / Inorganic Carbon (QCLot: 628134)										
FJ2202315-002	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	5.44 mg/L	5 mg/L	109	70.0	130	----
Organic / Inorganic Carbon (QCLot: 628135)										
FJ2202315-002	Anonymous	carbon, total organic [TOC]	----	E355-L	5.13 mg/L	5 mg/L	103	70.0	130	----
Total Metals (QCLot: 625824)										
FC2201915-002	Anonymous	mercury, total	7439-97-6	E508-L	58.7 ng/L	50 ng/L	117	70.0	130	----
Dissolved Metals (QCLot: 624762)										
KS2203131-001	Anonymous	calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
Dissolved Metals (QCLot: 626630)										
FC2201927-002	Anonymous	mercury, dissolved	7439-97-6	E509-L	4.56 ng/L	5 ng/L	91.1	70.0	130	----
Speciated Metals (QCLot: 627800)										
FJ2202286-001	PD3-A	methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00214 µg/L	0.0025 µg/L	85.6	60.0	140	----
Speciated Metals (QCLot: 630059)										
FJ2202286-001	PD3-A	methylmercury (as MeHg), total	22967-92-6	E536	0.00172 µg/L	0.0025 µg/L	68.8	60.0	140	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: COC #: 2022AUG WATER MMP

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Leah Hull
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To ☐YES ☑NO
	Copy of Invoice with Report ☐YES ☑NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Report Format / Distribution

Select Report Format: ☑PDF ☑EXCEL ☑EDD (DIGITAL)
Quality Control (QC) Report with Report ☑YES ☐NO
☑Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑EMAIL ☐MAIL ☐FAX
Email 1 or Fax: lhull@ecofishresearch.com, kganshorn@ecofishres
Email 2: tkasubuchi@ecofishresearch.com
Email 3: waterqualitylabdata@ecofishresearch.com

Invoice Distribution

Select Invoice Distribution: ☑EMAIL ☐MAIL ☐FAX
Email 1 or Fax: accountspayable@ecofishresearch.com
Email 2:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#:
Major/Minor Code: Routing Code:
Requisitioner:
Location:

Project Information

ALS Account # / Quote #: VA22-ECOF100-004 (MMP Surface Water)
Job #: Site C MMP - Surface Water
PO / AFE: 1200-25.03.05
LSD:

ALS Lab Work Order # (lab use only)

ALS Contact: Sneha Sansare Sampler: Kevin Ganshorn

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Methylmercury in Water by GCAFS (0.02 ng/L) F/P	Dissolved Methylmercury in Water by GCAFS (0.02 ng/L) F/P	Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ng/L) P	Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ng/L) F/P	General (Anions, Cond., Total Alk, pH, TSS)	TOC P	Hardness F	DOC F/P	IONBALANCE-BG-CL					Number of Containers
	~~PR1-A~~			Water	R	R	R	R	R	R	R	R	R					8
	~~PR1-B~~			Water	R	R	R	R										4
	~~PR1-C~~			Water	R	R	R	R	R	R	R	R	R					8
	~~PR2-A~~			Water	R	R	R	R	R	R	R	R	R					8
	~~PR2-A-FB~~			Water	R	R	R	R										4
	~~PR2-B~~			Water	R	R	R	R										4
	~~PR2-B-FB~~			Water	R	R	R	R	R	R	R	R	R					8
	~~PR2-S1-A~~			Water	R	R	R	R										4
	~~PR2-S1-B~~			Water	R	R	R	R	R	R	R	R	R					8
	~~PD1-A~~			Water	R	R	R	R										4
	~~PD1-B~~			Water	R	R	R	R	R	R	R	R	R					8
	PD3-A	23-AUG-22	13:20	Water	R	R	R	R										4
	PD3-B	23-AUG-22	13:20	Water	R	R	R	R	R	R	R	R	R					8
	~~PD5-A~~			Water	R	R	R	R										4
	~~PD5-B~~			Water	R	R	R	R	R	R	R	R	R					8
	~~D1-Shallow-A~~			Water	R	R	R	R										4
	~~D1-Shallow-B~~			Water	R	R	R	R	R	R	R	R	R					8
	~~D1-Deep-A~~			Water	R	R	R	R										4
	~~D1-Deep-B~~			Water	R	R	R	R	R	R	R	R	R					8
	~~W1-Shallow-A~~			Water	R	R	R	R										4
	~~W1-Shallow-B~~			Water	R	R	R	R	R	R	R	R	R					8
	~~W1-Deep-A~~			Water	R	R	R	R										4
	~~W1-Deep-B~~			Water	R	R	R	R										2
	~~Travel Blank~~			Water	R	R	R	R										2

FJAE Shipping & Receiving
Call Out ___ Expedite ___ Priority
___ # of Coolers ___ Air
___ # of Carboys ___ Ground
ort St. John
Work Order Reference
FJ2202286
lephone : +1 250 261 5517

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐YES ☑NO
Are samples for human drinking water use? ☐YES ☑NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Please send Azimuth a copy of the data in their EDD format:
gmann@azimuthgroup.ca imcivor@azimuthgroup.ca

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
9.0					

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: Aug 23, 2022	Time:	Received by:	Date: 8-23-22	Time: 16:36	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: COC #: 2022AUG SED

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Azimuth Consulting Group Inc.
Contact:	Ian McIvor
Phone:	604-730-1220
	Company address below will appear on the final report
Street:	2902 West Broadway
City/Province:	Vancouver
Postal Code:	V6K 2G8
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Azimuth Consulting Group Inc.
Contact:	Gary Mann

Report Format / Distribution	
Select Report Format:	☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	gmann@azimuthgroup.ca
Email 2	imcivor@azimuthgroup.ca
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	gmann@azimuthgroup.ca
Email 2	imcivor@azimuthgroup.ca

Project Information	
ALS Account # / Quote #:	Q75925
Job #:	Site C MMP - Sediment
PO / AFE:	BCH-22-01
LSD:	
ALS Lab Work Order # (lab use only)	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Contact: Sneha Sansare Sampler: Kevin Ganshorn

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Mercury (DL 0.005 mg/kg ww)	Methylmercury (DL 0.05 ng/kg WW)	Particle Size (Pipette + gravel)	TC, TIC, TOC in soil	pH by meter (1:2 Soil: water extraction)	Loss on Ignition at 375 degrees	Moisture Content by Gravimetry	Number of Containers
	~~PR1~~			Sediment	R	R	R	R	R	R	R	2
	~~PR2~~			Sediment	R	R	R	R	R	R	R	2
	~~PR2S~~			Sediment	R	R	R	R	R	R	R	2
	~~PD1~~			Sediment	R	R	R	R	R	R	R	2
	PD3	23 AUG 22		Sediment	R	R	R	R	R	R	R	2
	~~PD3-FD~~			Sediment	R	R	R	R	R	R	R	2
	~~PD5-A~~			Sediment	R	R	R	R	R	R	R	2
	~~PD5-B~~			Sediment	R	R	R	R	R	R	R	2

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Please reference VA22-ECOF100-004 (MMP Sediment) for parameters/detection limits

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
9.0C					

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: Aug 23, 2022	Time:	Received by:	Date: 8-23-22	Time: 636	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY OCTOBER 2015 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: COC #: 2022AUG WATER MMP

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Leah Hull
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To ☐YES ☑NO
	Copy of Invoice with Report ☐YES ☑NO
Company:	Ecofish Research Ltd
Contact:	accountspayable@ecofishresearch.com

Report Format / Distribution	
Select Report Format:	☑PDF ☑EXCEL ☑EDD (DIGITAL)
Quality Control (QC) Report with Report	☑YES ☐NO
☑Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑EMAIL ☐MAIL ☐FAX
Email 1 or Fax	thull@ecofishresearch.com, kganshorn@ecofishres
Email 2	tkasubuchi@ecofishresearch.com
Email 3	waterqualitylabdata@ecofishresearch.com
Invoice Distribution	
Select Invoice Distribution:	☑EMAIL ☐MAIL ☐FAX
Email 1 or Fax	accountspayable@ecofishresearch.com
Email 2	

Project Information	
ALS Account # / Quote #: VA22-ECOF100-004 (MMP Surface Water)	
Job #:	Site C MMP - Surface Water
PO / AFE:	1200-25.03.05
LSD:	
ALS Lab Work Order # (lab use only)	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	
ALS Contact: Sneha Sansare	Sampler: Kevin Ganshorn

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	P Total Methylmercury in Water by GCAFS (0.02 ng/L)	F/P Dissolved Methylmercury in Water by GCAFS (0.02 ng/L)	P Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ng/L)	F/P Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ng/L)	General (Anions, Cond., Total Alk, pH, TSS)	P TOC	F Hardness	F/P DOC	IONBALANCE-BC-CL					Number of Containers
	~~PR1-A~~			Water	R	R	R	R	R	R	R	R	R					8
	~~PR1-B~~			Water	R	R	R	R										4
	~~PR1-C~~			Water	R	R	R	R	R	R	R	R	R					8
	PR2-A			Water	R	R	R	R	R	R	R	R	R					8
	~~PR2-A FB~~			Water	R	R	R	R										4
	~~PR2-B~~			Water	R	R	R	R										4
	~~PR2-51-A~~			Water	R	R	R	R	R	R	R	R	R					8
	~~PR2-51-B~~			Water	R	R	R	R										4
	~~PR4-A~~			Water	R	R	R	R	R	R	R	R	R					8
	~~PR4-B~~			Water	R	R	R	R										4
	PD3-A		-23-AUG-22	13:20	Water	R	R	R	R	R	R	R	R	R					8
	PD3-B		-23-AUG-22	13:20	Water	R	R	R	R										4
	~~PD5-A~~			Water	R	R	R	R	R	R	R	R	R					8
	~~PD5-B~~			Water	R	R	R	R										4
	~~D1-Shallow-A~~			Water	R	R	R	R	R	R	R	R	R					8
	~~D1-Shallow-B~~			Water	R	R	R	R										4
	~~D1-Deep-A~~			Water	R	R	R	R	R	R	R	R	R					8
	~~D1-Deep-B~~			Water	R	R	R	R										4
	~~W1-Shallow-A~~			Water	R	R	R	R	R	R	R	R	R					8
	~~W1-Shallow-B~~			Water	R	R	R	R										4
	~~W1-Deep-A~~			Water	R	R	R	R	R	R	R	R	R					8
	~~W1-Deep-B~~			Water	R	R	R	R										4
	~~Travel Blank~~			Water	R		R	W										2

FJAE Shipping & Receiving
Call Out ___ Expedite ___ Priority
# of Coolers ___ Air
# of Carboys ___ Ground
Work Order Reference FJ2202286
ort St. John
ephone : + 1 250 261 5517

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐YES ☑NO

Are samples for human drinking water use? ☐YES ☑NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Please send Azimuth a copy of the data in their EDD format:

gmann@azimuthgroup.ca imcivor@azimuthgroup.ca

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C	
9.0 C			2

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: Aug 23, 2022	Time:	Received by:	Date: 8-23-22	Time: 6:30	Received by:	Date: 8/24	Time: 6pm

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202287**	Page	: 1 of 4
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 23-Aug-2022 18:54
PO	: 1200-25.03.02	Date Analysis Commenced	: 25-Aug-2022
C-O-C number	: 2022-Aug-Mon8/9-Day 4	Issue Date	: 09-Sep-2022 17:47
Sampler	: PD		
Site	: Site C RSEM Water Quality Monitoring		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Erin Sanchez		Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Inorganics, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
%	percent
µS/cm	Microsiemens per centimetre
CU	colour units (1 CU = 1 mg/L Pt)
meq/L	milliequivalents per litre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	*Description*
DLDS	*Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.*

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: Pouce	PD4	KR	PD3	----
					Client sampling date / time: 23-Aug-2022 10:05	23-Aug-2022 10:55	23-Aug-2022 12:40	23-Aug-2022 13:20	----
					FJ2202287-001	FJ2202287-002	FJ2202287-003	FJ2202287-004	--------
					Result	Result	Result	Result	----
Physical Tests									
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	184	88.3	192	88.9	----
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	9.0	<1.0	14.2	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	4.5	<1.0	7.1	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	193	88.3	206	88.9	----
colour, true	----	E329	5.0	CU	13.9	10.6	10.2	6.0	----
conductivity	----	E100	2.0	µS/cm	1100	192	420	192	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	416	106	208	102	----
pH	----	E108	0.10	pH units	8.40	8.15	8.54	8.17	----
solids, total dissolved [TDS]	----	E162	10	mg/L	908	124	282	133	----
solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	10.1	29.7	<3.0	----
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0183	<0.0050	0.0052	<0.0050	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	21.8	<0.50	1.08	<0.50	----
fluoride	16984-48-8	E235.F	0.020	mg/L	0.252	0.038	0.106	0.037	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.530	0.077	0.324	0.080	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0250 DLDS	0.0543	<0.0050	0.0566	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0050 DLDS	0.0016	<0.0010	0.0016	----
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.523	0.145	0.301	0.136	----
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0120	0.0128	0.0222	0.0109	----
phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	0.0045	<0.0020	<0.0020	<0.0020	----
silicate (as SiO2)	7631-86-9	E392	0.50	mg/L	0.60	4.20	2.83	4.20	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	396	15.4	36.6	15.2	----
Organic / Inorganic Carbon									
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	11.7	4.01	7.89	2.97	----
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	12.1	3.40	8.28	2.89	----
Ion Balance									
anion sum	----	EC101	0.10	meq/L	12.7	2.09	4.91	2.10	----
cation sum	----	EC101	0.10	meq/L	13.2	2.19	5.16	2.12	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: Pouce	PD4	KR	PD3	----
					Client sampling date / time: 23-Aug-2022 10:05	23-Aug-2022 10:55	23-Aug-2022 12:40	23-Aug-2022 13:20	----
					FJ2202287-001	**FJ2202287-002**	**FJ2202287-003**	**FJ2202287-004**	--------
					Result	Result	Result	Result	----
Ion Balance									
ion balance (APHA)	----	EC101	0.010	%	1.93	2.34	2.48	0.474	----
Dissolved Metals									
calcium, dissolved	7440-70-2	E421	0.050	mg/L	102	30.7	49.5	29.1	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	39.3	7.02	20.6	7.24	----
dissolved metals filtration location	----	EP421	-	-	Laboratory	Laboratory	Laboratory	Laboratory	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202287**	Page	: 1 of 19
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 23-Aug-2022 18:54
PO	: 1200-25.03.02	Issue Date	: 09-Sep-2022 17:47
C-O-C number	: 2022-Aug-Mon8/9-Day 4		
Sampler	: PD		
Site	: Site C RSEM Water Quality Monitoring		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
KR	E298	23-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
PD3	E298	23-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
PD4	E298	23-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Pouce	E298	23-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
KR	E235.Cl	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
PD3	E235.Cl	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
PD4	E235.Cl	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE Pouce	E235.Cl	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE KR	E378-U	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PD3	E378-U	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PD4	E378-U	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE Pouce	E378-U	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE KR	E235.F	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PD3	E235.F	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PD4	E235.F	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Pouce	E235.F	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE KR	E235.NO3-L	23-Aug-2022	25-Aug-2022	3 days	2 days	✓	25-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PD3	E235.NO3-L	23-Aug-2022	25-Aug-2022	3 days	2 days	✓	25-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PD4	E235.NO3-L	23-Aug-2022	25-Aug-2022	3 days	2 days	✓	25-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Pouce	E235.NO3-L	23-Aug-2022	25-Aug-2022	3 days	2 days	✓	25-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE KR	E235.NO2-L	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PD3	E235.NO2-L	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PD4	E235.NO2-L	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Pouce	E235.NO2-L	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	2 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE KR	E392	23-Aug-2022	----	----	----		25-Aug-2022	28 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PD3	E392	23-Aug-2022	----	----	----		25-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PD4	E392	23-Aug-2022	----	----	----		25-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE Pouce	E392	23-Aug-2022	----	----	----		25-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE KR	E235.SO4	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PD3	E235.SO4	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PD4	E235.SO4	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Pouce	E235.SO4	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) KR	E375-T	23-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PD3	E375-T	23-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	8 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PD4	E375-T	23-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) Pouce	E375-T	23-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) KR	E318	23-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	9 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PD3	E318	23-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	9 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PD4	E318	23-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	9 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Pouce	E318	23-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	9 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) KR	E366	23-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) PD3	E366	23-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) PD4	E366	23-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	8 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Pouce	E366	23-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
KR	E372-U	23-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
PD3	E372-U	23-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
PD4	E372-U	23-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
Pouce	E372-U	23-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
KR	E421	23-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	180 days	3 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
PD3	E421	23-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	180 days	3 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
PD4	E421	23-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	180 days	3 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
Pouce	E421	23-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	180 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) KR	E358-L	23-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PD3	E358-L	23-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PD4	E358-L	23-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Pouce	E358-L	23-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) KR	E355-L	23-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PD3	E355-L	23-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PD4	E355-L	23-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) Pouce	E355-L	23-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE KR	E290	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	14 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE PD3	E290	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PD4	E290	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Pouce	E290	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	14 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE KR	E329	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PD3	E329	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PD4	E329	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE Pouce	E329	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE KR	E100	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE PD3	E100	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE PD4	E100	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE Pouce	E100	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	2 days	✓
Physical Tests : pH by Meter										
HDPE KR	E108	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	0.25 hrs	3.25 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PD3	E108	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	0.25 hrs	3.25 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PD4	E108	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	0.25 hrs	3.25 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Pouce	E108	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	0.25 hrs	3.25 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE KR	E162	23-Aug-2022	----	----	----		29-Aug-2022	7 days	6 days	✓
Physical Tests : TDS by Gravimetry										
HDPE PD3	E162	23-Aug-2022	----	----	----		29-Aug-2022	7 days	6 days	✓
Physical Tests : TDS by Gravimetry										
HDPE PD4	E162	23-Aug-2022	----	----	----		29-Aug-2022	7 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TDS by Gravimetry										
HDPE Pouce	E162	23-Aug-2022	----	----	----		29-Aug-2022	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE KR	E160	23-Aug-2022	----	----	----		29-Aug-2022	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PD3	E160	23-Aug-2022	----	----	----		29-Aug-2022	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PD4	E160	23-Aug-2022	----	----	----		29-Aug-2022	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Pouce	E160	23-Aug-2022	----	----	----		29-Aug-2022	7 days	6 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	617797	1	8	12.5	5.0	✓
Ammonia by Fluorescence	E298	624165	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	617801	1	19	5.2	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	617808	1	6	16.6	5.0	✓
Conductivity in Water	E100	617798	1	17	5.8	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	618486	1	13	7.6	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	624168	1	12	8.3	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	617807	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	617800	1	9	11.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	617802	1	11	9.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	617803	1	18	5.5	5.0	✓
pH by Meter	E108	617796	1	17	5.8	5.0	✓
Reactive Silica by Colourimetry	E392	619371	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	617804	1	19	5.2	5.0	✓
TDS by Gravimetry	E162	623212	2	40	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	624170	1	4	25.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	624166	1	17	5.8	5.0	✓
Total Nitrogen by Colourimetry	E366	624169	1	5	20.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	624167	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	624164	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	623197	2	40	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	617797	1	8	12.5	5.0	✓
Ammonia by Fluorescence	E298	624165	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	617801	1	19	5.2	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	617808	1	6	16.6	5.0	✓
Conductivity in Water	E100	617798	1	17	5.8	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	618486	1	13	7.6	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	624168	1	12	8.3	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	617807	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	617800	1	9	11.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	617802	1	11	9.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	617803	1	18	5.5	5.0	✓
pH by Meter	E108	617796	1	17	5.8	5.0	✓
Reactive Silica by Colourimetry	E392	619371	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	617804	1	19	5.2	5.0	✓
TDS by Gravimetry	E162	623212	2	40	5.0	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	624170	1	4	25.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	624166	1	17	5.8	5.0	✓
Total Nitrogen by Colourimetry	E366	624169	1	5	20.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	624167	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	624164	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	623197	2	40	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	617797	1	8	12.5	5.0	✓
Ammonia by Fluorescence	E298	624165	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	617801	1	19	5.2	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	617808	1	6	16.6	5.0	✓
Conductivity in Water	E100	617798	1	17	5.8	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	618486	1	13	7.6	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	624168	1	12	8.3	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	617807	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	617800	1	9	11.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	617802	1	11	9.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	617803	1	18	5.5	5.0	✓
Reactive Silica by Colourimetry	E392	619371	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	617804	1	19	5.2	5.0	✓
TDS by Gravimetry	E162	623212	2	40	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	624170	1	4	25.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	624166	1	17	5.8	5.0	✓
Total Nitrogen by Colourimetry	E366	624169	1	5	20.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	624167	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	624164	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	623197	2	40	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	624165	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	617801	1	19	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	618486	1	13	7.6	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	624168	1	12	8.3	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	617807	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	617800	1	9	11.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	617802	1	11	9.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	617803	1	18	5.5	5.0	✓
Reactive Silica by Colourimetry	E392	619371	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	617804	1	19	5.2	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	624170	1	4	25.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	624166	1	17	5.8	5.0	✓

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Matrix Spikes (MS) - Continued							
Total Nitrogen by Colourimetry	E366	624169	1	5	20.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	624167	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	624164	1	19	5.2	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Vancouver - Environmental	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).
Colour (True) by Spectrometer (5 CU)	E329 Vancouver - Environmental	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U Vancouver - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Reactive Silica by Colourimetry	E392 Vancouver - Environmental	Water	APHA 4500-SiO2 E (mod)	Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method using a discrete analyzer. Method Limitation: Arsenic (5+) above 100 mg/L is a negative interference on this test
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 Vancouver - Environmental	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 Vancouver - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for Dissolved Phosphorus in water	EP375 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

QUALITY CONTROL REPORT

Work Order	: **FJ2202287**	Page	: 1 of 10
Client	: Ecofish Research Ltd	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 23-Aug-2022 18:54
PO	: 1200-25.03.02	Date Analysis Commenced	: 25-Aug-2022
C-O-C number	: 2022-Aug-Mon8/9-Day 4	Issue Date	: 09-Sep-2022 17:47
Sampler	: PD		
Site	: Site C RSEM Water Quality Monitoring		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Erin Sanchez		Vancouver Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Vancouver Inorganics, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Vancouver Inorganics, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 617796)											
FJ2202287-001	Pouce	pH	----	E108	0.10	pH units	8.40	8.40	0.00%	4%	----
Physical Tests (QC Lot: 617797)											
FJ2202287-001	Pouce	alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	184	184	0.380%	20%	----
		alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	9.0	8.4	0.6	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	4.5	4.2	0.3	Diff <2x LOR	----
		alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	193	193	0.0519%	20%	----
Physical Tests (QC Lot: 617798)											
FJ2202287-001	Pouce	conductivity	----	E100	2.0	µS/cm	1100	1090	0.548%	10%	----
Physical Tests (QC Lot: 617808)											
FJ2202287-001	Pouce	colour, true	----	E329	5.0	CU	13.9	15.3	1.4	Diff <2x LOR	----
Physical Tests (QC Lot: 623197)											
FJ2202287-002	PD4	solids, total suspended [TSS]	----	E160	3.0	mg/L	10.1	11.5	1.4	Diff <2x LOR	----
Physical Tests (QC Lot: 623212)											
FJ2202287-002	PD4	solids, total dissolved [TDS]	----	E162	13	mg/L	124	128	4	Diff <2x LOR	----
Physical Tests (QC Lot: 623501)											
FJ2202299-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 623508)											
FJ2202299-001	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	571	589	3.19%	20%	----
Anions and Nutrients (QC Lot: 617800)											
VA22B9769-001	Anonymous	fluoride	16984-48-8	E235.F	0.200	mg/L	<0.200	<0.200	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 617801)											
VA22B9769-001	Anonymous	chloride	16887-00-6	E235.Cl	5.00	mg/L	377	376	0.236%	20%	----
Anions and Nutrients (QC Lot: 617802)											
VA22B9769-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0500	mg/L	2.50	2.48	0.862%	20%	----
Anions and Nutrients (QC Lot: 617803)											
VA22B9769-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0100	mg/L	0.0102	<0.0100	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 617804)											
VA22B9769-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	3.00	mg/L	116	115	0.394%	20%	----
Anions and Nutrients (QC Lot: 617807)											
FJ2202287-001	Pouce	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 619371)											
FJ2202227-001	Anonymous	silicate (as SiO2)	7631-86-9	E392	0.50	mg/L	6.39	6.38	0.142%	20%	----
Anions and Nutrients (QC Lot: 624164)											
FJ2202287-001	Pouce	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0120	0.0123	0.0003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 624165)											
FJ2202287-001	Pouce	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0183	0.0194	0.0010	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 624166)											
FJ2202287-001	Pouce	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.530	0.514	3.08%	20%	----
Anions and Nutrients (QC Lot: 624169)											
FJ2202287-001	Pouce	nitrogen, total	7727-37-9	E366	0.030	mg/L	0.523	0.532	1.70%	20%	----
Anions and Nutrients (QC Lot: 624170)											
FJ2202287-001	Pouce	phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	0.0045	0.0047	0.0002	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 624167)											
FJ2202287-001	Pouce	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	12.1	12.4	2.70%	20%	----
Organic / Inorganic Carbon (QC Lot: 624168)											
FJ2202287-001	Pouce	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	11.7	12.2	4.81%	20%	----
Dissolved Metals (QC Lot: 618486)											
FJ2202295-001	Anonymous	calcium, dissolved	7440-70-2	E421	0.050	mg/L	34.9	36.0	3.28%	20%	----
		magnesium, dissolved	7439-95-4	E421	0.100	mg/L	7.69	7.91	2.83%	20%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 617797)						
alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	1.4	----
alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	1.4	----
Physical Tests (QCLot: 617798)						
conductivity	----	E100	1	µS/cm	1.4	----
Physical Tests (QCLot: 617808)						
colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 623197)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 623212)						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 623501)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 623508)						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 617800)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 617801)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 617802)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 617803)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 617804)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 617807)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 619371)						
silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 624164)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 624165)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 624166)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 624169)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 624170)						
phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----
Organic / Inorganic Carbon (QCLot: 624167)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 624168)						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 618486)						
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 617796)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 617797)									
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	229 mg/L	103	75.0	125	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	108	85.0	115	----
Physical Tests (QCLot: 617798)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	96.5	90.0	110	----
Physical Tests (QCLot: 617808)									
colour, true	----	E329	5	CU	100 CU	103	85.0	115	----
Physical Tests (QCLot: 623197)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	91.5	85.0	115	----
Physical Tests (QCLot: 623212)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	109	85.0	115	----
Physical Tests (QCLot: 623501)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	104	85.0	115	----
Physical Tests (QCLot: 623508)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	105	85.0	115	----
Anions and Nutrients (QCLot: 617800)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	96.7	90.0	110	----
Anions and Nutrients (QCLot: 617801)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 617802)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 617803)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	97.6	90.0	110	----
Anions and Nutrients (QCLot: 617804)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 617807)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	102	80.0	120	----
Anions and Nutrients (QCLot: 619371)									
silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	10 mg/L	101	85.0	115	----
Anions and Nutrients (QCLot: 624164)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	91.2	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 624165)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	101	85.0	115	----
Anions and Nutrients (QCLot: 624166)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	99.2	75.0	125	----
Anions and Nutrients (QCLot: 624169)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 624170)									
phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.05 mg/L	91.5	80.0	120	----
Organic / Inorganic Carbon (QCLot: 624167)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	98.5	80.0	120	----
Organic / Inorganic Carbon (QCLot: 624168)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	103	80.0	120	----
Dissolved Metals (QCLot: 618486)									
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	100	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	99.9	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 617800)										
VA22B9819-001	Anonymous	fluoride	16984-48-8	E235.F	0.998 mg/L	1 mg/L	99.8	75.0	125	----
Anions and Nutrients (QCLot: 617801)										
VA22B9819-001	Anonymous	chloride	16887-00-6	E235.Cl	105 mg/L	100 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 617802)										
VA22B9819-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.65 mg/L	2.5 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 617803)										
VA22B9819-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.495 mg/L	0.5 mg/L	99.0	75.0	125	----
Anions and Nutrients (QCLot: 617804)										
VA22B9819-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	107 mg/L	100 mg/L	107	75.0	125	----
Anions and Nutrients (QCLot: 617807)										
FJ2202287-002	PD4	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0296 mg/L	0.03 mg/L	98.6	70.0	130	----
Anions and Nutrients (QCLot: 619371)										
FJ2202227-002	Anonymous	silicate (as SiO2)	7631-86-9	E392	9.46 mg/L	10 mg/L	94.6	75.0	125	----
Anions and Nutrients (QCLot: 624164)										
FJ2202287-002	PD4	phosphorus, total	7723-14-0	E372-U	0.0488 mg/L	0.05 mg/L	97.6	70.0	130	----
Anions and Nutrients (QCLot: 624165)										
FJ2202287-002	PD4	ammonia, total (as N)	7664-41-7	E298	0.102 mg/L	0.1 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 624166)										
FJ2202287-002	PD4	Kjeldahl nitrogen, total [TKN]	----	E318	2.58 mg/L	2.5 mg/L	103	70.0	130	----
Anions and Nutrients (QCLot: 624169)										
FJ2202287-002	PD4	nitrogen, total	7727-37-9	E366	0.407 mg/L	0.4 mg/L	102	70.0	130	----
Anions and Nutrients (QCLot: 624170)										
FJ2202287-002	PD4	phosphorus, total dissolved	7723-14-0	E375-T	0.0482 mg/L	0.05 mg/L	96.4	70.0	130	----
Organic / Inorganic Carbon (QCLot: 624167)										
FJ2202287-002	PD4	carbon, total organic [TOC]	----	E355-L	5.19 mg/L	5 mg/L	104	70.0	130	----
Organic / Inorganic Carbon (QCLot: 624168)										
FJ2202287-002	PD4	carbon, dissolved organic [DOC]	----	E358-L	4.16 mg/L	5 mg/L	83.3	70.0	130	----
Dissolved Metals (QCLot: 618486)										

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 618486) - continued										
VA22B9732-001	Anonymous	calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 2022-Aug-MON8/9- Day 4

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Page of

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Leah Hull
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A
☑ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: lhull@ecofishresearch.com
Email 2: tkasubuchi@ecofishresearch.com
Email 3: waterqualitylabdata@ecofishresearch.com

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: accountspayable@ecofishresearch.com
Email 2:

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Date and Time Required for all E&P TATs:

For all tests with rush TATs requested, please contact your AM to confirm availability.

Project Information

ALS Account # / Quote #:	VA22-ECOF100-004
Job #:	Surface water MON8/9- no metals
PO / AFE:	1200-25.03.02
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (ALS use only):

ALS Contact: Sneha Sansare Sampler: Pat Beaupre

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINER	Alk., Ec, pH, TDS, TSS, Anions, Si, diss ortho P, colour, pH	DOC, Total dissolved P (F/P)	Hardness (F/P)	NH3, Total Kjeldahl, Nitrogen, Total N, TOC, Total P (P)	IONBALANCE-BC-CL	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	~~PD5~~			~~Water~~	~~4~~ R	R	R	R	R	R			
	POUCE	23-AUG-22	10:05	Water	4	R	R	R	R	R			
	PD4	23-AUG-22	10:55	Water	4	R	R	R	R	R			
	KR	23-AUG-22	12:40	Water	4	R	R	R	R	R			
	PD3	23-AUG-22	13:20	Water	4	R	R	R	R	R			
	~~Travel Blank~~			~~Water~~	~~2~~ R				~~P~~ R				

FJAE Shipping & Receiving
___ Call Out ___ Expedite
___ Priority
1 # of Coolers ___ Air
___ # of Carboys ___ Ground

Fort St. John
Work Order Reference
FJ2202287

Telephone : +1 250 261 5517

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO
Are samples for human consumption/ use? ☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Please send Azimuth a copy of the data in their EDD format:

gmann@azimuthgroup.ca imcivor@azimuthgroup.ca

Add. for report: csuzanne@ecofishresearch.com,kganshorn@ecofishresearch.com

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED
Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO
Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
4.0							

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
	Aug 23, 2022	

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
	8-23-22	16:45

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Chain of Custody (COC) / Analytical Request Form

COC Number: 2022-Aug-MON8/9- Day 4

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Page of

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Leah Hull
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Project Information	
ALS Account # / Quote #:	VA22-ECOF100-004
Job #:	Surface water MON8/9- no metals
PO / AFE:	1200-25.03.02
LSD:	
ALS Lab Work Order # (ALS use only):	

Reports / Recipients	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Merge QC/QCI Reports with COA	☑ YES ☐ NO ☐ N/A
☑ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	lhull@ecofishresearch.com
Email 2	tkasubuchi@ecofishresearch.com
Email 3	waterqualitylabdata@ecofishresearch.com

Invoice Recipients	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	accountspayable@ecofishresearch.com
Email 2	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Contact: Sneha Sansare Sampler: Pat Beaupre

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Alk., Ec, pH, TDS, TSS, Anions, Si, diss ortho P, colour, pH (F/P)	DOC, Total dissolved P (F/P)	Hardness (F/P)	NH3, Total Kjeldahl, Nitrogen, Total N, TOC, Total P (P)	IONBALANCE-BC-CL	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	~~PD5~~			~~Water~~	~~4~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~			
	POUCE	23-AUG-22	10:05	Water	4	R	R	R	R	R			
	PD4	23-AUG-22	10:55	Water	4	R	R	R	R	R			
	KR	23-AUG-22	12:40	Water	4	R	R	R	R	R			
	PD3	23-AUG-22	13:20	Water	4	R	R	R	R	R			
	~~Travel Blank~~			~~Water~~	~~2~~	~~R~~			~~R~~				

FJAE Shipping & Receiving
___ Call Out ___ Expedite
___ Priority
1 # of Coolers ___ Air
___ # of Carboys ___ Ground

Fort St. John
Work Order Reference
FJ2202287

Telephone : +1 250 261 5517

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Please send Azimuth a copy of the data in their EDD format:

gmann@azimuthgroup.ca imcivor@azimuthgroup.ca

Add. for report: csuzanne@ecofishresearch.com,kganshorn@ecofishresearch.com

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
9.0 C							2

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by:	Date: Aug 23, 2022	Time:	Received by:	Date: 8-23-22	Time: 16:40	Received by:	Date: 8/24	Time: 0900

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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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 back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202313**	Page	: 1 of 4
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 25-Aug-2022 08:07
PO	: 1200-25.03.02	Date Analysis Commenced	: 27-Aug-2022
C-O-C number	: 2022-Aug-Mon8/9-Day 4	Issue Date	: 09-Sep-2022 17:48
Sampler	: PB		
Site	: Site C RSEM Water Quality Monitoring		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Cindy Tang	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
%	percent
µS/cm	Microsiemens per centimetre
CU	colour units (1 CU = 1 mg/L Pt)
meq/L	milliequivalents per litre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	*Description*
RRV	*Reported result verified by repeat analysis.*

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: PD5	MD-FB	Travel Blank	----	----
					Client sampling date / time: 24-Aug-2022 08:55	24-Aug-2022 12:00	[24-Aug-2022]	----	----
					FJ2202313-001	FJ2202313-002	FJ2202313-003	--------	--------
					Result	Result	Result	----	----
Physical Tests									
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	89.9	1.0	<1.0	----	----
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	----	----
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	----	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	----	----
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	89.9	1.0	<1.0	----	----
colour, true	----	E329	5.0	CU	6.8	<5.0	<5.0	----	----
conductivity	----	E100	2.0	µS/cm	193	<2.0	<2.0	----	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	105	<0.60	----	----	----
pH	----	E108	0.10	pH units	8.20	5.69	5.59	----	----
solids, total dissolved [TDS]	----	E162	10	mg/L	116	<10	<10	----	----
solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	<3.0	----	----
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0.0071 RRV	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	<0.50	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L	0.043	<0.020	<0.020	----	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.094	<0.050	<0.050	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0499	<0.0050	<0.0050	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0016	<0.0010	<0.0010	----	----
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.155	<0.030	<0.030	----	----
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0017	<0.0010	<0.0010	----	----
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0114	<0.0020	<0.0020	----	----
phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	<0.0020	<0.0020	----	----	----
silicate (as SiO2)	7631-86-9	E392	0.50	mg/L	4.17	<0.50	<0.50	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	14.9	<0.30	<0.30	----	----
Organic / Inorganic Carbon									
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.95	<0.50	----	----	----
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	3.09	<0.50	<0.50	----	----
Ion Balance									
anion sum	----	EC101	0.10	meq/L	2.11	<0.10	----	----	----
cation sum	----	EC101	0.10	meq/L	2.18	<0.10	----	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: PD5	MD-FB	Travel Blank	----	----
					Client sampling date / time: 24-Aug-2022 08:55	24-Aug-2022 12:00	[24-Aug-2022]	----	----
					FJ2202313-001	FJ2202313-002	FJ2202313-003	--------	--------
					Result	Result	Result	----	----
Ion Balance									
ion balance (APHA)	----	EC101	0.010	%	1.63	<0.010	----	----	----
Dissolved Metals									
calcium, dissolved	7440-70-2	E421	0.050	mg/L	30.2	<0.050	----	----	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	7.21	<0.0050	----	----	----
dissolved metals filtration location	----	EP421	-	-	Laboratory	Laboratory	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202313**	Page	: 1 of 16
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
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Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 25-Aug-2022 08:07
PO	: 1200-25.03.02	Issue Date	: 09-Sep-2022 17:49
C-O-C number	: 2022-Aug-Mon8/9-Day 4		
Sampler	: PB		
Site	: Site C RSEM Water Quality Monitoring		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MD-FB	E298	24-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PD5	E298	24-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Travel Blank	E298	24-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	8 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MD-FB	E235.Cl	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PD5	E235.Cl	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Travel Blank	E235.Cl	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE MD-FB	E378-U	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	3 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PD5	E378-U	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE Travel Blank	E378-U	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	3 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE MD-FB	E235.F	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PD5	E235.F	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Travel Blank	E235.F	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MD-FB	E235.NO3-L	24-Aug-2022	27-Aug-2022	3 days	3 days	✓	27-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PD5	E235.NO3-L	24-Aug-2022	27-Aug-2022	3 days	3 days	✓	27-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Travel Blank	E235.NO3-L	24-Aug-2022	27-Aug-2022	3 days	3 days	✓	27-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MD-FB	E235.NO2-L	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	3 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PD5	E235.NO2-L	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Travel Blank	E235.NO2-L	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	3 days	3 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE MD-FB	E392	24-Aug-2022	----	----	----		31-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PD5	E392	24-Aug-2022	----	----	----		31-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE Travel Blank	E392	24-Aug-2022	----	----	----		31-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE MD-FB	E235.SO4	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PD5	E235.SO4	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Travel Blank	E235.SO4	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) MD-FB	E375-T	24-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
PD5	E375-T	24-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
MD-FB	E318	24-Aug-2022	30-Aug-2022	----	----		01-Sep-2022	28 days	8 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
PD5	E318	24-Aug-2022	30-Aug-2022	----	----		01-Sep-2022	28 days	8 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
Travel Blank	E318	24-Aug-2022	01-Sep-2022	----	----		02-Sep-2022	28 days	9 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
MD-FB	E366	24-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
PD5	E366	24-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Travel Blank	E366	24-Aug-2022	01-Sep-2022	----	----		02-Sep-2022	28 days	9 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
MD-FB	E372-U	24-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
PD5	E372-U	24-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
Travel Blank	E372-U	24-Aug-2022	01-Sep-2022	----	----		02-Sep-2022	28 days	9 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
MD-FB	E421	24-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	180 days	6 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
PD5	E421	24-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	180 days	6 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
MD-FB	E358-L	24-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	6 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
PD5	E358-L	24-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	6 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
MD-FB	E355-L	24-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	6 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
PD5	E355-L	24-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	6 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
Travel Blank	E355-L	24-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	8 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
MD-FB	E290	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	14 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE PD5	E290	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	14 days	3 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Travel Blank	E290	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	14 days	3 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE MD-FB	E329	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	3 days	3 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PD5	E329	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	3 days	3 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE Travel Blank	E329	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	3 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE MD-FB	E100	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE PD5	E100	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE Travel Blank	E100	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Physical Tests : pH by Meter										
HDPE MD-FB	E108	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	0.25 hrs	7.25 hrs	× EHTR-FM

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE PD5	E108	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	0.25 hrs	7.25 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Travel Blank	E108	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	0.25 hrs	7.25 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE MD-FB	E162	24-Aug-2022	----	----	----		31-Aug-2022	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE PD5	E162	24-Aug-2022	----	----	----		30-Aug-2022	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE Travel Blank	E162	24-Aug-2022	----	----	----		30-Aug-2022	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE MD-FB	E160	24-Aug-2022	----	----	----		31-Aug-2022	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PD5	E160	24-Aug-2022	----	----	----		30-Aug-2022	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Travel Blank	E160	24-Aug-2022	----	----	----		30-Aug-2022	7 days	7 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	621468	1	8	12.5	5.0	✓
Ammonia by Fluorescence	E298	624520	2	37	5.4	5.0	✓
Chloride in Water by IC	E235.Cl	621462	1	12	8.3	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	621470	1	3	33.3	5.0	✓
Conductivity in Water	E100	621469	1	8	12.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	622631	1	10	10.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	624515	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	621460	1	10	10.0	5.0	✓
Fluoride in Water by IC	E235.F	621461	1	12	8.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	621464	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	621465	1	12	8.3	5.0	✓
pH by Meter	E108	621467	1	8	12.5	5.0	✓
Reactive Silica by Colourimetry	E392	627591	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	621466	1	12	8.3	5.0	✓
TDS by Gravimetry	E162	626133	2	39	5.1	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	624519	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	624514	2	18	11.1	5.0	✓
Total Nitrogen by Colourimetry	E366	624517	2	30	6.6	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	624516	2	23	8.7	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	624518	2	29	6.9	5.0	✓
TSS by Gravimetry	E160	626137	2	39	5.1	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	621468	1	8	12.5	5.0	✓
Ammonia by Fluorescence	E298	624520	2	37	5.4	5.0	✓
Chloride in Water by IC	E235.Cl	621462	1	12	8.3	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	621470	1	3	33.3	5.0	✓
Conductivity in Water	E100	621469	1	8	12.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	622631	1	10	10.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	624515	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	621460	1	10	10.0	5.0	✓
Fluoride in Water by IC	E235.F	621461	1	12	8.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	621464	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	621465	1	12	8.3	5.0	✓
pH by Meter	E108	621467	1	8	12.5	5.0	✓
Reactive Silica by Colourimetry	E392	627591	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	621466	1	12	8.3	5.0	✓
TDS by Gravimetry	E162	626133	2	39	5.1	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	624519	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	624514	2	18	11.1	5.0	✓
Total Nitrogen by Colourimetry	E366	624517	2	30	6.6	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	624516	2	23	8.7	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	624518	2	29	6.9	5.0	✓
TSS by Gravimetry	E160	626137	2	39	5.1	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	621468	1	8	12.5	5.0	✓
Ammonia by Fluorescence	E298	624520	2	37	5.4	5.0	✓
Chloride in Water by IC	E235.Cl	621462	1	12	8.3	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	621470	1	3	33.3	5.0	✓
Conductivity in Water	E100	621469	1	8	12.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	622631	1	10	10.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	624515	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	621460	1	10	10.0	5.0	✓
Fluoride in Water by IC	E235.F	621461	1	12	8.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	621464	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	621465	1	12	8.3	5.0	✓
Reactive Silica by Colourimetry	E392	627591	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	621466	1	12	8.3	5.0	✓
TDS by Gravimetry	E162	626133	2	39	5.1	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	624519	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	624514	2	18	11.1	5.0	✓
Total Nitrogen by Colourimetry	E366	624517	2	30	6.6	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	624516	2	23	8.7	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	624518	2	29	6.9	5.0	✓
TSS by Gravimetry	E160	626137	2	39	5.1	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	624520	2	37	5.4	5.0	✓
Chloride in Water by IC	E235.Cl	621462	1	12	8.3	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	622631	1	10	10.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	624515	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	621460	1	10	10.0	5.0	✓
Fluoride in Water by IC	E235.F	621461	1	12	8.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	621464	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	621465	1	12	8.3	5.0	✓
Reactive Silica by Colourimetry	E392	627591	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	621466	1	12	8.3	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	624519	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	624514	2	18	11.1	5.0	✓

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Matrix Spikes (MS) - Continued							
Total Nitrogen by Colourimetry	E366	624517	2	30	6.6	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	624516	2	23	8.7	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	624518	2	29	6.9	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Vancouver - Environmental	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).
Colour (True) by Spectrometer (5 CU)	E329 Vancouver - Environmental	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U Vancouver - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Reactive Silica by Colourimetry	E392 Vancouver - Environmental	Water	APHA 4500-SiO2 E (mod)	Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method using a discrete analyzer. Method Limitation: Arsenic (5+) above 100 mg/L is a negative interference on this test
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 Vancouver - Environmental	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 Vancouver - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for Dissolved Phosphorus in water	EP375 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **FJ2202313**	Page	: 1 of 10
Client	: Ecofish Research Ltd	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 25-Aug-2022 08:07
PO	: 1200-25.03.02	Date Analysis Commenced	: 27-Aug-2022
C-O-C number	: 2022-Aug-Mon8/9-Day 4	Issue Date	: 09-Sep-2022 17:49
Sampler	: PB		
Site	: Site C RSEM Water Quality Monitoring		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angelo Salandanan	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Cindy Tang	Team Leader - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Vancouver Inorganics, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 621467)											
FJ2202313-001	PD5	pH	----	E108	0.10	pH units	8.20	8.16	0.489%	4%	----
Physical Tests (QC Lot: 621468)											
FJ2202313-001	PD5	alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	89.9	89.2	0.782%	20%	----
		alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	89.9	89.2	0.782%	20%	----
Physical Tests (QC Lot: 621469)											
FJ2202313-001	PD5	conductivity	----	E100	2.0	µS/cm	193	194	0.361%	10%	----
Physical Tests (QC Lot: 621470)											
FJ2202313-001	PD5	colour, true	----	E329	5.0	CU	6.8	7.5	0.7	Diff <2x LOR	----
Physical Tests (QC Lot: 626133)											
FJ2202313-001	PD5	solids, total dissolved [TDS]	----	E162	13	mg/L	116	118	2	Diff <2x LOR	----
Physical Tests (QC Lot: 626137)											
FJ2202313-001	PD5	solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 627022)											
FJ2202313-002	MD-FB	solids, total dissolved [TDS]	----	E162	10	mg/L	<10	<10	0	Diff <2x LOR	----
Physical Tests (QC Lot: 627036)											
FJ2202313-002	MD-FB	solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 621460)											
FJ2202313-001	PD5	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0017	0.0014	0.0003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 621461)											
FJ2202312-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.086	0.083	0.002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 621462)											
FJ2202312-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 621464)											
FJ2202312-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0197	0.0200	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 621465)											
FJ2202312-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 621466)											
FJ2202312-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	73.8	73.5	0.443%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 624514)											
FJ2202313-001	PD5	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.094	0.091	0.003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 624517)											
FJ2202313-001	PD5	nitrogen, total	7727-37-9	E366	0.030	mg/L	0.155	0.156	0.001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 624518)											
FJ2202313-001	PD5	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0114	0.0147	0.0033	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 624519)											
FJ2202313-001	PD5	phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 624520)											
FJ2202313-001	PD5	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 627591)											
EO2206998-001	Anonymous	silicate (as SiO2)	7631-86-9	E392	0.50	mg/L	2.89	2.88	0.01	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 628489)											
FJ2202313-003	Travel Blank	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 628490)											
FJ2202313-003	Travel Blank	nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	<0.030	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 628491)											
FJ2202313-003	Travel Blank	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 628492)											
FJ2202313-003	Travel Blank	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0071	0.0068	0.0002	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 624515)											
FJ2202313-001	PD5	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.95	3.25	0.30	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 624516)											
FJ2202313-001	PD5	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	3.09	3.08	0.005	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 628554)											
FJ2202313-003	Travel Blank	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 622631)											
VA22B9855-001	Anonymous	calcium, dissolved	7440-70-2	E421	0.050	mg/L	38.8	39.7	2.40%	20%	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	7.77	7.50	3.59%	20%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 621468)						
alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	1.0	----
alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	1.0	----
Physical Tests (QCLot: 621469)						
conductivity	----	E100	1	µS/cm	1.4	----
Physical Tests (QCLot: 621470)						
colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 626133)						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 626137)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 627022)						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 627036)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 621460)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 621461)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 621462)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 621464)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 621465)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 621466)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 624514)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 624517)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 624518)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 624519)						
phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 624520)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 627591)						
silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 628489)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 628490)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 628491)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 628492)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Organic / Inorganic Carbon (QCLot: 624515)						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 624516)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 628554)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 622631)						
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 621467)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 621468)									
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	229 mg/L	110	75.0	125	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	111	85.0	115	----
Physical Tests (QCLot: 621469)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	97.1	90.0	110	----
Physical Tests (QCLot: 621470)									
colour, true	----	E329	5	CU	100 CU	103	85.0	115	----
Physical Tests (QCLot: 626133)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	107	85.0	115	----
Physical Tests (QCLot: 626137)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	95.0	85.0	115	----
Physical Tests (QCLot: 627022)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	105	85.0	115	----
Physical Tests (QCLot: 627036)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	99.8	85.0	115	----
Anions and Nutrients (QCLot: 621460)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	104	80.0	120	----
Anions and Nutrients (QCLot: 621461)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	98.6	90.0	110	----
Anions and Nutrients (QCLot: 621462)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 621464)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 621465)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	97.9	90.0	110	----
Anions and Nutrients (QCLot: 621466)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 624514)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	96.0	75.0	125	----
Anions and Nutrients (QCLot: 624517)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	102	75.0	125	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 624518)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	89.6	80.0	120	----
Anions and Nutrients (QCLot: 624519)									
phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.05 mg/L	90.4	80.0	120	----
Anions and Nutrients (QCLot: 624520)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	99.9	85.0	115	----
Anions and Nutrients (QCLot: 627591)									
silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	10 mg/L	99.0	85.0	115	----
Anions and Nutrients (QCLot: 628489)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	94.1	75.0	125	----
Anions and Nutrients (QCLot: 628490)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 628491)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	89.8	80.0	120	----
Anions and Nutrients (QCLot: 628492)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	97.5	85.0	115	----
Organic / Inorganic Carbon (QCLot: 624515)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	98.4	80.0	120	----
Organic / Inorganic Carbon (QCLot: 624516)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	107	80.0	120	----
Organic / Inorganic Carbon (QCLot: 628554)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	95.3	80.0	120	----
Dissolved Metals (QCLot: 622631)									
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	97.7	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	98.8	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 621460)										
FJ2202313-002	MD-FB	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0306 mg/L	0.03 mg/L	102	70.0	130	----
Anions and Nutrients (QCLot: 621461)										
FJ2202312-002	Anonymous	fluoride	16984-48-8	E235.F	1.01 mg/L	1 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 621462)										
FJ2202312-002	Anonymous	chloride	16887-00-6	E235.Cl	104 mg/L	100 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 621464)										
FJ2202312-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.66 mg/L	2.5 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 621465)										
FJ2202312-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.507 mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 621466)										
FJ2202312-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	105 mg/L	100 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 624514)										
FJ2202313-002	MD-FB	Kjeldahl nitrogen, total [TKN]	----	E318	2.38 mg/L	2.5 mg/L	95.2	70.0	130	----
Anions and Nutrients (QCLot: 624517)										
FJ2202313-002	MD-FB	nitrogen, total	7727-37-9	E366	0.401 mg/L	0.4 mg/L	100	70.0	130	----
Anions and Nutrients (QCLot: 624518)										
FJ2202313-002	MD-FB	phosphorus, total	7723-14-0	E372-U	0.0463 mg/L	0.05 mg/L	92.7	70.0	130	----
Anions and Nutrients (QCLot: 624519)										
FJ2202313-002	MD-FB	phosphorus, total dissolved	7723-14-0	E375-T	0.0495 mg/L	0.05 mg/L	99.0	70.0	130	----
Anions and Nutrients (QCLot: 624520)										
FJ2202313-002	MD-FB	ammonia, total (as N)	7664-41-7	E298	0.101 mg/L	0.1 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 627591)										
FJ2202313-001	PD5	silicate (as SiO2)	7631-86-9	E392	10.2 mg/L	10 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 628489)										
VA22B9712-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.39 mg/L	2.5 mg/L	95.8	70.0	130	----
Anions and Nutrients (QCLot: 628490)										
FJ2202321-001	Anonymous	nitrogen, total	7727-37-9	E366	ND mg/L	0.4 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 628491)										

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 628491) - continued										
FJ2202321-001	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0461 mg/L	0.05 mg/L	92.1	70.0	130	----
Anions and Nutrients (QCLot: 628492)										
FJ2202321-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	MS-B
Organic / Inorganic Carbon (QCLot: 624515)										
FJ2202313-002	MD-FB	carbon, dissolved organic [DOC]	----	E358-L	4.94 mg/L	5 mg/L	98.9	70.0	130	----
Organic / Inorganic Carbon (QCLot: 624516)										
FJ2202313-002	MD-FB	carbon, total organic [TOC]	----	E355-L	5.01 mg/L	5 mg/L	100	70.0	130	----
Organic / Inorganic Carbon (QCLot: 628554)										
KS2203134-001	Anonymous	carbon, total organic [TOC]	----	E355-L	5.28 mg/L	5 mg/L	106	70.0	130	----
Dissolved Metals (QCLot: 622631)										
VA22B9855-002	Anonymous	calcium, dissolved	7440-70-2	E421	ND mg/L	8 mg/L	ND	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	2 mg/L	ND	70.0	130	----

Qualifiers

Qualifier	Description
MS-B	*Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.*

Chain of Custody (COC) / Analytical Request Form

COC Number: 2022-Aug-MON8/9- Day 4

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Page of

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Leah Hull
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A

☑ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: lhull@ecofishresearch.com

Email 2: tkasubuchi@ecofishresearch.com

Email 3: waterqualitylabdata@ecofishresearch.com

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: accountspayable@ecofishresearch.com

Email 2:

Project Information	
ALS Account # / Quote #:	VA22-ECOF100-004
Job #:	Surface water MON8/9- no metals
PO / AFE:	1200-25.03.02
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#

Major/Minor Code: Routing Code:

Requisitioner:

Location:

ALS Lab Work Order # (ALS use only):

ALS Contact: Sneha Sansare Sampler: Pat Beaupre

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Alk., Ec, pH, TDS, TSS, Anions, Si, diss ortho P, colour, pH (F/P)	DOC, Total dissolved P (F/P)	Hardness (P)	NH3, Total Kjeldahl Nitrogen, Total N, TOC, Total P	IONBALANCE-BC-CL	HOLD NO S	STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	PD5	24 AUG 22	08:55	Water	4	R	R	R	R	R			
	~~PD6~~			~~Water~~	~~4~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~			
	~~PD4~~			~~Water~~	~~4~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~			
	~~KR~~			~~Water~~	~~4~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~			
	~~PD3~~ MD-FB	24 AUG 22	12:00	~~Water~~ VHF	4	R	R	R	R	R			
	Travel Blank	—	—	Water	2	R			R	R			

Telephone : +1 250 261 5517

Work Order Reference FJ2202313

Fort St. John

FJAE Shipping & Receiving
Call Out Expedite
Priority
1 # of Coolers X Air
# of Carboys Ground

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Please send Azimuth a copy of the data in their EDD format:

gmann@azimuthgroup.ca imcivor@azimuthgroup.ca

Add. for report: csuzanne@ecofishresearch.com,kganshorn@ecofishresearch.com

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
5.6	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by:	Date: Aug 24, 2022	Time:	Received by: RICK	Date: 8.25.22	Time: 8:45	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202315**	Page	: 1 of 4
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Site C MMP - Surface Water	Date Samples Received	: 25-Aug-2022 08:45
PO	: 1200-25.03.05	Date Analysis Commenced	: 27-Aug-2022
C-O-C number	: 2022Aug Water MMP	Issue Date	: 16-Sep-2022 17:10
Sampler	: KG		
Site	: Site C RSEM Water Quality Monitoring		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Hamideh Moradi	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
%	percent
µS/cm	Microsiemens per centimetre
meq/L	milliequivalents per litre
mg/L	milligrams per litre
ng/L	nanograms per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	*Description*
RRV	*Reported result verified by repeat analysis.*

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	PR2-A-FB	PD1-A	PD1-B	PD5-A	PD5-B
					Client sampling date / time	24-Aug-2022 12:00	24-Aug-2022 15:50	24-Aug-2022 15:50	24-Aug-2022 08:55	24-Aug-2022 08:55
						FJ2202315-001	FJ2202315-002	FJ2202315-003	FJ2202315-004	FJ2202315-005
						Result	Result	Result	Result	Result
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		----	86.9	----	91.8	----
conductivity	----	E100	2.0	µS/cm		----	189	----	198	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		----	104	----	108	----
pH	----	E108	0.10	pH units		----	8.18	----	8.17	----
solids, total suspended [TSS]	----	E160	3.0	mg/L		----	9.7	----	<3.0	----
Anions and Nutrients										
chloride	16887-00-6	E235.Cl	0.50	mg/L		----	<0.50	----	<0.50	----
fluoride	16984-48-8	E235.F	0.020	mg/L		----	0.044	----	0.043	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		----	0.0656	----	0.0497	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		----	0.0020	----	0.0011	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		----	14.5	----	14.8	----
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L		----	2.66	----	3.41 RRV	----
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		----	2.93	----	2.99 RRV	----
Ion Balance										
anion sum	----	EC101	0.10	meq/L		----	2.04	----	2.15	----
cation sum	----	EC101	0.10	meq/L		----	2.14	----	2.23	----
ion balance (APHA)	----	EC101	0.010	%		----	2.39	----	1.83	----
Total Metals										
mercury, total	7439-97-6	E508-L	0.50	ng/L		<0.50	0.89	0.61	0.68	0.70
Dissolved Metals										
mercury, dissolved	7439-97-6	E509-L	0.50	ng/L		<0.50	<0.50	<0.50	<0.50	<0.50
calcium, dissolved	7440-70-2	E421	0.050	mg/L		----	30.1	----	31.0	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		----	7.05	----	7.37	----
dissolved MeHg filtration location	----	EP537	-	-		Field	Field	Field	Field	Field
dissolved mercury filtration location	----	EP509-L	-	-		Field	Field	Field	Field	Field
dissolved metals filtration location	----	EP421	-	-		----	Laboratory	----	Laboratory	----
Speciated Metals										
methylmercury (as MeHg), total	22967-92-6	E536	0.020	ng/L		<0.020	<0.020	<0.020	0.024	0.023
methylmercury (as MeHg), dissolved	22967-92-6	E537	0.020	ng/L		<0.020	<0.020	<0.020	0.022	0.020

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202315**	Page	: 1 of 13
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Site C MMP - Surface Water	Date Samples Received	: 25-Aug-2022 08:45
PO	: 1200-25.03.05	Issue Date	: 16-Sep-2022 17:10
C-O-C number	: 2022Aug Water MMP		
Sampler	: KG		
Site	: Site C RSEM Water Quality Monitoring		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE										
PD1-A	E235.Cl	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
PD5-A	E235.Cl	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
PD1-A	E235.F	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
PD5-A	E235.F	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
PD1-A	E235.NO3-L	24-Aug-2022	27-Aug-2022	3 days	3 days	✓	27-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
PD5-A	E235.NO3-L	24-Aug-2022	27-Aug-2022	3 days	3 days	✓	27-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
PD1-A	E235.NO2-L	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	3 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
PD5-A	E235.NO2-L	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	3 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
PD1-A	E235.SO4	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
PD5-A	E235.SO4	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved)										
PD1-A	E509-L	24-Aug-2022	31-Aug-2022	----	----		31-Aug-2022	28 days	7 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved)										
PD1-B	E509-L	24-Aug-2022	31-Aug-2022	----	----		31-Aug-2022	28 days	7 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved)										
PD5-A	E509-L	24-Aug-2022	31-Aug-2022	----	----		31-Aug-2022	28 days	7 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved)										
PD5-B	E509-L	24-Aug-2022	31-Aug-2022	----	----		31-Aug-2022	28 days	7 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved)										
PR2-A-FB	E509-L	24-Aug-2022	31-Aug-2022	----	----		31-Aug-2022	28 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
PD1-A	E421	24-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	180 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PD5-A	E421	24-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	180 days	6 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PD1-A	E358-L	24-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	8 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PD5-A	E358-L	24-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	8 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PD1-A	E355-L	24-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	8 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PD5-A	E355-L	24-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	8 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PD1-A	E290	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	14 days	3 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PD5-A	E290	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	14 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE PD1-A	E100	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE PD5-A	E100	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE PD1-A	E108	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	0.25 hrs	7.25 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PD5-A	E108	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	0.25 hrs	7.25 hrs	× EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE PD1-A	E160	24-Aug-2022	----	----	----		30-Aug-2022	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PD5-A	E160	24-Aug-2022	----	----	----		30-Aug-2022	7 days	6 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PD1-A	E537	24-Aug-2022	02-Sep-2022	180 days	9 days	✓	07-Sep-2022	180 days	5 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PD1-B	E537	24-Aug-2022	02-Sep-2022	180 days	9 days	✓	07-Sep-2022	180 days	5 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PD5-A	E537	24-Aug-2022	02-Sep-2022	180 days	9 days	✓	07-Sep-2022	180 days	5 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PD5-B	E537	24-Aug-2022	02-Sep-2022	180 days	9 days	✓	07-Sep-2022	180 days	5 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PR2-A-FB	E537	24-Aug-2022	02-Sep-2022	180 days	9 days	✓	07-Sep-2022	180 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) PD1-A	E536	24-Aug-2022	02-Sep-2022	----	----		07-Sep-2022	180 days	14 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) PD1-B	E536	24-Aug-2022	02-Sep-2022	----	----		07-Sep-2022	180 days	14 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) PD5-A	E536	24-Aug-2022	02-Sep-2022	----	----		07-Sep-2022	180 days	14 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) PR2-A-FB	E536	24-Aug-2022	02-Sep-2022	----	----		07-Sep-2022	180 days	14 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) PD5-B	E536	24-Aug-2022	02-Sep-2022	----	----		09-Sep-2022	180 days	16 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) PD1-A	E508-L	24-Aug-2022	01-Sep-2022	28 days	8 days	✓	01-Sep-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) PD1-B	E508-L	24-Aug-2022	01-Sep-2022	28 days	8 days	✓	01-Sep-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) PD5-A	E508-L	24-Aug-2022	01-Sep-2022	28 days	8 days	✓	01-Sep-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) PD5-B	E508-L	24-Aug-2022	01-Sep-2022	28 days	8 days	✓	01-Sep-2022	28 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved)										
PR2-A-FB	E508-L	24-Aug-2022	01-Sep-2022	28 days	8 days	✓	01-Sep-2022	28 days	0 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	621468	1	8	12.5	5.0	✓
Chloride in Water by IC	E235.Cl	621462	1	12	8.3	5.0	✓
Conductivity in Water	E100	621469	1	8	12.5	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	626630	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	622631	1	10	10.0	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	630063	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	628134	1	18	5.5	5.0	✓
Fluoride in Water by IC	E235.F	621461	1	12	8.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	621464	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	621465	1	12	8.3	5.0	✓
pH by Meter	E108	621467	1	8	12.5	5.0	✓
Sulfate in Water by IC	E235.SO4	621466	1	12	8.3	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	629034	1	16	6.2	5.0	✓
Total Methylmercury in Water by GCAFS	E536	630059	2	40	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	628135	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	625937	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	621468	1	8	12.5	5.0	✓
Chloride in Water by IC	E235.Cl	621462	1	12	8.3	5.0	✓
Conductivity in Water	E100	621469	1	8	12.5	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	626630	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	622631	1	10	10.0	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	630063	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	628134	1	18	5.5	5.0	✓
Fluoride in Water by IC	E235.F	621461	1	12	8.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	621464	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	621465	1	12	8.3	5.0	✓
pH by Meter	E108	621467	1	8	12.5	5.0	✓
Sulfate in Water by IC	E235.SO4	621466	1	12	8.3	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	629034	1	16	6.2	5.0	✓
Total Methylmercury in Water by GCAFS	E536	630059	2	40	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	628135	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	625937	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	621468	1	8	12.5	5.0	✓
Chloride in Water by IC	E235.Cl	621462	1	12	8.3	5.0	✓
Conductivity in Water	E100	621469	1	8	12.5	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	626630	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	622631	1	10	10.0	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	630063	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	628134	1	18	5.5	5.0	✓
Fluoride in Water by IC	E235.F	621461	1	12	8.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	621464	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	621465	1	12	8.3	5.0	✓
Sulfate in Water by IC	E235.SO4	621466	1	12	8.3	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	629034	1	16	6.2	5.0	✓
Total Methylmercury in Water by GCAFS	E536	630059	2	40	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	628135	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	625937	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Chloride in Water by IC	E235.Cl	621462	1	12	8.3	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	626630	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	622631	1	10	10.0	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	630063	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	628134	1	18	5.5	5.0	✓
Fluoride in Water by IC	E235.F	621461	1	12	8.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	621464	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	621465	1	12	8.3	5.0	✓
Sulfate in Water by IC	E235.SO4	621466	1	12	8.3	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	629034	1	16	6.2	5.0	✓
Total Methylmercury in Water by GCAFS	E536	630059	2	40	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	628135	1	19	5.2	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L Vancouver - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAFS.
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAFS.
Total Methylmercury in Water by GCAFS	E536 Vancouver - Environmental	Water	EPA 1630 (mod)	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Methylmercury in Water by GCAFS	E537 Vancouver - Environmental	Water	EPA 1630 (mod)	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	“Hardness (as $CaCO_3$), dissolved” is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. “Total Hardness” refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ion Balance using Dissolved Metals	EC101 Vancouver - Environmental	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 Vancouver - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration (Low Level)	EP509-L Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
Total Methylmercury Water Preparation	EP536 Vancouver - Environmental	Water	EPA 1630	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Methylmercury Water Preparation	EP537 Vancouver - Environmental	Water	EPA 1630	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **FJ2202315**	Page	: 1 of 10
Client	: Ecofish Research Ltd	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Site C MMP - Surface Water	Date Samples Received	: 25-Aug-2022 08:45
PO	: 1200-25.03.05	Date Analysis Commenced	: 27-Aug-2022
C-O-C number	: 2022Aug Water MMP	Issue Date	: 16-Sep-2022 17:10
Sampler	: KG		
Site	: Site C RSEM Water Quality Monitoring		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angelo Salandanan	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Hamideh Moradi	Analyst	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Vancouver Inorganics, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 621467)											
FJ2202313-001	Anonymous	pH	----	E108	0.10	pH units	8.20	8.16	0.489%	4%	----
Physical Tests (QC Lot: 621468)											
FJ2202313-001	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	89.9	89.2	0.782%	20%	----
Physical Tests (QC Lot: 621469)											
FJ2202313-001	Anonymous	conductivity	----	E100	2.0	µS/cm	193	194	0.361%	10%	----
Physical Tests (QC Lot: 625937)											
FJ2202315-002	PD1-A	solids, total suspended [TSS]	----	E160	3.0	mg/L	9.7	8.5	1.2	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 621461)											
FJ2202312-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.086	0.083	0.002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 621462)											
FJ2202312-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 621464)											
FJ2202312-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0197	0.0200	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 621465)											
FJ2202312-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 621466)											
FJ2202312-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	73.8	73.5	0.443%	20%	----
Organic / Inorganic Carbon (QC Lot: 628134)											
FJ2202286-001	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	3.24	3.12	0.12	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 628135)											
FJ2202286-001	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	2.92	2.78	0.14	Diff <2x LOR	----
Total Metals (QC Lot: 629034)											
CG2211434-001	Anonymous	mercury, total	7439-97-6	E508-L	0.50	ng/L	<0.00050 µg/L	<0.50	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 622631)											
VA22B9855-001	Anonymous	calcium, dissolved	7440-70-2	E421	0.050	mg/L	38.8	39.7	2.40%	20%	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	7.77	7.50	3.59%	20%	----
Dissolved Metals (QC Lot: 626630)											
FC2201927-001	Anonymous	mercury, dissolved	7439-97-6	E509-L	0.50	ng/L	<0.50	<0.50	0	Diff <2x LOR	----
Speciated Metals (QC Lot: 630059)											
FC2201977-001	Anonymous	methylmercury (as MeHg), total	22967-92-6	E536	0.000020	µg/L	0.000091	0.000089	0.000002	Diff <2x LOR	----
Speciated Metals (QC Lot: 630063)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Speciated Metals (QC Lot: 630063) - continued											
FJ2202315-001	PR2-A-FB	methylmercury (as MeHg), dissolved	22967-92-6	E537	0.000020	µg/L	<0.020 ng/L	<0.000020	0	Diff <2x LOR	----
Speciated Metals (QC Lot: 631430)											
CG2211557-001	Anonymous	methylmercury (as MeHg), total	22967-92-6	E536	0.000020	µg/L	0.000064	0.000065	0.000001	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 621468)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	1.0	----
Physical Tests (QCLot: 621469)						
conductivity	----	E100	1	µS/cm	1.4	----
Physical Tests (QCLot: 625937)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 621461)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 621462)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 621464)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 621465)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 621466)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Organic / Inorganic Carbon (QCLot: 628134)						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 628135)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 629034)						
mercury, total	7439-97-6	E508-L	0.5	ng/L	<0.50	----
Dissolved Metals (QCLot: 622631)						
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Dissolved Metals (QCLot: 626630)						
mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	<0.50	----
Speciated Metals (QCLot: 630059)						
methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 630063)						
methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 631430)						
methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	<0.000020	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 621467)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 621468)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	111	85.0	115	----
Physical Tests (QCLot: 621469)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	97.1	90.0	110	----
Physical Tests (QCLot: 625937)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	94.2	85.0	115	----
Anions and Nutrients (QCLot: 621461)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	98.6	90.0	110	----
Anions and Nutrients (QCLot: 621462)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 621464)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 621465)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	97.9	90.0	110	----
Anions and Nutrients (QCLot: 621466)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
Organic / Inorganic Carbon (QCLot: 628134)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	99.8	80.0	120	----
Organic / Inorganic Carbon (QCLot: 628135)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	103	80.0	120	----
Total Metals (QCLot: 629034)									
mercury, total	7439-97-6	E508-L	0.5	ng/L	5 ng/L	101	80.0	120	----
Dissolved Metals (QCLot: 622631)									
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	97.7	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	98.8	80.0	120	----
mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	5 ng/L	107	80.0	120	----
Speciated Metals (QCLot: 630059)									
methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	0.0025 µg/L	76.1	70.0	130	----
Speciated Metals (QCLot: 630063)									

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Speciated Metals (QCLot: 630063) - continued									
methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	0.0025 µg/L	82.7	70.0	130	----
Speciated Metals (QCLot: 631430)									
methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	0.0025 µg/L	76.0	70.0	130	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 621461)										
FJ2202312-002	Anonymous	fluoride	16984-48-8	E235.F	1.01 mg/L	1 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 621462)										
FJ2202312-002	Anonymous	chloride	16887-00-6	E235.Cl	104 mg/L	100 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 621464)										
FJ2202312-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.66 mg/L	2.5 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 621465)										
FJ2202312-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.507 mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 621466)										
FJ2202312-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	105 mg/L	100 mg/L	105	75.0	125	----
Organic / Inorganic Carbon (QCLot: 628134)										
FJ2202315-002	PD1-A	carbon, dissolved organic [DOC]	----	E358-L	5.44 mg/L	5 mg/L	109	70.0	130	----
Organic / Inorganic Carbon (QCLot: 628135)										
FJ2202315-002	PD1-A	carbon, total organic [TOC]	----	E355-L	5.13 mg/L	5 mg/L	103	70.0	130	----
Total Metals (QCLot: 629034)										
CG2211434-002	Anonymous	mercury, total	7439-97-6	E508-L	5.03 ng/L	5 ng/L	100	70.0	130	----
Dissolved Metals (QCLot: 622631)										
VA22B9855-002	Anonymous	calcium, dissolved	7440-70-2	E421	ND mg/L	8 mg/L	ND	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	2 mg/L	ND	70.0	130	----
Dissolved Metals (QCLot: 626630)										
FC2201927-002	Anonymous	mercury, dissolved	7439-97-6	E509-L	4.56 ng/L	5 ng/L	91.1	70.0	130	----
Speciated Metals (QCLot: 630059)										
FJ2202286-001	Anonymous	methylmercury (as MeHg), total	22967-92-6	E536	0.00172 µg/L	0.0025 µg/L	68.8	60.0	140	----
Speciated Metals (QCLot: 630063)										
FJ2202315-002	PD1-A	methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00191 µg/L	0.0025 µg/L	76.6	60.0	140	----
Speciated Metals (QCLot: 631430)										
FJ2202315-005	PD5-B	methylmercury (as MeHg), total	22967-92-6	E536	0.00213 µg/L	0.0025 µg/L	85.2	60.0	140	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: COC # 2022AUG WATER MMP

Page 1 of 1

Telephone: +1 250 261 5517

For St. John Work Order Reference FJ2202315

Report To	Contact and company name below will appear on the final report	Report Format / Distribution		Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply
Company:	Ecofish Research Ltd.	Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)	Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surc
Contact:	Leah Hull	Quality Control (QC) Report with Report	☑ YES ☐ NO	PRIORITY (Business Days): 4 day [P4] ☐ / 3 day [P3] ☐ / 2 day [P2] ☐ — EMERGENCY: 1 Business day [E1] / Same Day, Weekend or Statutory holiday [E0]
Phone:	250-334-3042	☑ Compare Results to Criteria on Report - provide details below if box checked		Date and Time Required for all E&P TATs:
	Company address below will appear on the final report	Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX	For tests that can not be performed according to the service level selected, you will be contacted.
Street:	600 Comox Rd.	Email 1 or Fax	lhull@ecofishresearch.com, kganshorn@ecofishres	
City/Province:	Courtenay, BC	Email 2	tkasubuchi@ecofishresearch.com	
Postal Code:	V9N 3P6	Email 3	waterqualitylabdata@ecofishresearch.com	
Invoice To	Same as Report To ☐ YES ☑ NO	Invoice Distribution		
	Copy of Invoice with Report ☐ YES ☑ NO	Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX	
Company:	Ecofish Research Ltd.	Email 1 or Fax	accountspayable@ecofishresearch.com	
Contact:	accountspayable@ecofishresearch.com	Email 2		

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #: VA22-ECOF100-004 (MMP Surface Water)		AFE/Cost Center:	PO#
Job #:	Site C MMP - Surface Water	Major/Minor Code:	Routing Code:
PO / AFE:	1200-25.03.05	Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only)

ALS Contact: Sneha Sansare Sampler: Kevin Ganshorn

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Methylmercury in Water by GCAFS (0.02 ng/L) P	Dissolved Methylmercury in Water by GCAFS (0.02 ng/L) F/P	Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ng/L) P	Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ng/L) F/P	General (Anions, Cond., Total Alk, pH, TSS)	TOC P	Hardness F	DOC F/P	IONBALANCE-BC-CIL				
	~~PR1-A~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~				~~8~~
	~~PR1-B~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~									~~4~~
	~~PR1-C~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~				~~8~~
	~~PR2-A~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~				~~8~~
	~~PR2-A-FB~~ PR2-A-FB	24-Aug-22	12:00	~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~									~~4~~
	~~PR2-B~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~									~~4~~
	~~PR2-B-FB~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~				~~8~~
	~~PR3-B1-A~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~									~~4~~
	~~PR3-B1-B~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~									~~4~~
	PD1-A	24-Aug-22	15:50	Water	R	R	R	R	R	R	R	R	R				8
	PD1-B	24-Aug-22	15:50	Water	R	R	R	R									4
	~~PD2-A~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~				~~8~~
	~~PD2-B~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~									~~4~~
	PD5-A	24-Aug-22	08:55	Water	R	R	R	R	R	R	R	R	R				8
	PD5-B	24-Aug-22	08:55	Water	R	R	R	R									4
	~~D1-Shallow-A~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~				~~8~~
	~~D1-Shallow-B~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~									~~4~~
	~~D1-Deep-A~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~				~~8~~
	~~D1-Deep-B~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~									~~4~~
	~~W1-Shallow-A~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~				~~8~~
	~~W1-Shallow-B~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~									~~4~~
	~~W1-Deep-A~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~				~~8~~
	~~W1-Deep-B~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~									~~4~~
	~~Travel Blank~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~									~~4~~

FJAE Shipping & Receiving
___ Call Out ___ Expedite
___ Priority
1 # of Coolers X Air
___ # of Carboys ___ Ground

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	Please send Azimuth a copy of the data in their EDD format:
Are samples for human drinking water use? ☐ YES ☑ NO	amann@azimuthgroup.ca imcivor@azimuthgroup.ca

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
10.3					

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: Aug 25, 2022	Time:	Received by: RICH	Date: 8.25.22	Time: 9:45	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202327**	Page	: 1 of 6
Amendment	: **1**		
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Site C MMP - Surface Water	Date Samples Received	: 26-Aug-2022 07:25
PO	: 1200-25.03.05	Date Analysis Commenced	: 30-Aug-2022
C-O-C number	: 2022Aug Water MMP	Issue Date	: 06-Jun-2023 14:36
Sampler	: KG		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 10		
No. of samples analysed	: 10		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Hamideh Moradi	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Sukhman Khosa	Lab Assistant	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
µS/cm	microsiemens per centimetre
meq/L	milliequivalents per litre
mg/L	milligrams per litre
ng/L	nanograms per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Accreditation

Accreditation	*Description*	*Laboratory*	*Address*
A	CALA ISO/IEC 17025:2017	VA Vancouver - Environmental	8081 Lougheed Highway, Burnaby, British Columbia

Applicable accreditations are indicated in the Method/Lab column as superscripts.

Workorder Comments

Amendment (6/6/2023): This report has been amended as a result of a request to change sample identification numbers (IDs) received by ALS from Sarah Kennedy on 6/6/2023. All analysis results are as per the previous report.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID: PR3-A	PR3-B	D1-Shallow-A	D1-Shallow-B	D1-Deep-A
						Client sampling date / time: 25-Aug-2022 17:15	25-Aug-2022 17:15	25-Aug-2022 12:20	25-Aug-2022 12:20	25-Aug-2022 11:55
						FJ2202327-001	FJ2202327-002	FJ2202327-003	FJ2202327-004	FJ2202327-005
						Result	Result	Result	Result	Result
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	A	1.0	mg/L	81.0	----	81.7	----	80.1
Conductivity	----	E100/VA	A	2.0	µS/cm	186	----	176	----	178
Hardness (as CaCO3), dissolved	----	EC100/VA		0.60	mg/L	93.2	----	93.7	----	95.1
pH	----	E108/VA	A	0.10	pH units	8.12	----	7.78	----	7.82
Solids, total suspended [TSS]	----	E160/VA	A	3.0	mg/L	5.3	----	3.3	----	3.7
Anions and Nutrients										
Chloride	16887-00-6	E235.Cl/VA	A	0.50	mg/L	<0.50	----	<0.50	----	<0.50
Fluoride	16984-48-8	E235.F/VA	A	0.020	mg/L	0.038	----	0.035	----	0.035
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	A	0.0050	mg/L	0.0675	----	0.0756	----	0.0775
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	A	0.0010	mg/L	<0.0010	----	0.0024	----	0.0016
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	A	0.30	mg/L	13.9	----	13.4	----	13.3
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/VA	A	0.50	mg/L	2.83	----	2.83	----	3.13
Carbon, total organic [TOC]	----	E355-L/VA	A	0.50	mg/L	2.86	----	2.84	----	3.35
Ion Balance										
Anion sum	----	EC101/VA		0.10	meq/L	1.91	----	1.92	----	1.88
Cation sum	----	EC101/VA		0.10	meq/L	1.92	----	1.93	----	1.96
Ion balance (APHA)	----	EC101/VA		0.010	%	0.261	----	0.260	----	2.08
Total Metals										
Mercury, total	7439-97-6	E508-L/VA	A	0.50	ng/L	0.58	0.61	0.59	0.60	0.57
Dissolved Metals										
Mercury, dissolved	7439-97-6	E509-L/VA	A	0.50	ng/L	<0.50	<0.50	<0.50	<0.50	<0.50
Calcium, dissolved	7440-70-2	E421/VA	A	0.050	mg/L	26.6	----	27.4	----	27.4
Magnesium, dissolved	7439-95-4	E421/VA	A	0.0050	mg/L	6.50	----	6.13	----	6.48
Dissolved MeHg filtration location	----	EP537/VA		-	-	Field	Field	Field	Field	Field
Dissolved mercury filtration location	----	EP509-L/VA		-	-	Field	Field	Field	Field	Field
Dissolved metals filtration location	----	EP421/VA		-	-	Laboratory	----	Laboratory	----	Laboratory

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	PR3-A	PR3-B	D1-Shallow-A	D1-Shallow-B	D1-Deep-A
					Client sampling date / time	25-Aug-2022 17:15	25-Aug-2022 17:15	25-Aug-2022 12:20	25-Aug-2022 12:20	25-Aug-2022 11:55
Analyte	CAS Number	Method/Lab		LOR	Unit	FJ2202327-001	FJ2202327-002	FJ2202327-003	FJ2202327-004	FJ2202327-005
						Result	Result	Result	Result	Result
Speciated Metals										
Methylmercury (as MeHg), total	22967-92-6	E536/VA	A	0.020	ng/L	0.022	0.026	<0.020	<0.020	<0.020
Methylmercury (as MeHg), dissolved	22967-92-6	E537/VA	A	0.020	ng/L	<0.020	<0.020	<0.020	<0.020	<0.020

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	D1-Deep-B	W1-Shallow-A	W1-Shallow-B	W1-Deep-A	W1-Deep-B
						Client sampling date / time	25-Aug-2022 11:55	25-Aug-2022 10:30	25-Aug-2022 10:30	25-Aug-2022 10:00	25-Aug-2022 10:00
							FJ2202327-006	FJ2202327-007	FJ2202327-008	FJ2202327-009	FJ2202327-010
							Result	Result	Result	Result	Result
Physical Tests											
Alkalinity, total (as CaCO3)	----	E290/VA	A	1.0	mg/L		----	79.6	----	78.3	----
Conductivity	----	E100/VA	A	2.0	µS/cm		----	168	----	169	----
Hardness (as CaCO3), dissolved	----	EC100/VA		0.60	mg/L		----	89.5	----	90.4	----
pH	----	E108/VA	A	0.10	pH units		----	7.86	----	7.85	----
Solids, total suspended [TSS]	----	E160/VA	A	3.0	mg/L		----	<3.0	----	<3.0	----
Anions and Nutrients											
Chloride	16887-00-6	E235.Cl/VA	A	0.50	mg/L		----	<0.50	----	<0.50	----
Fluoride	16984-48-8	E235.F/VA	A	0.020	mg/L		----	0.033	----	0.034	----
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	A	0.0050	mg/L		----	0.0396	----	0.0398	----
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	A	0.0010	mg/L		----	<0.0010	----	<0.0010	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	A	0.30	mg/L		----	11.9	----	11.9	----
Organic / Inorganic Carbon											
Carbon, dissolved organic [DOC]	----	E358-L/VA	A	0.50	mg/L		----	3.04	----	3.04	----
Carbon, total organic [TOC]	----	E355-L/VA	A	0.50	mg/L		----	3.07	----	3.31	----
Ion Balance											
Anion sum	----	EC101/VA		0.10	meq/L		----	1.84	----	1.82	----
Cation sum	----	EC101/VA		0.10	meq/L		----	1.84	----	1.86	----
Ion balance (APHA)	----	EC101/VA		0.010	%		----	<0.010	----	1.09	----
Total Metals											
Mercury, total	7439-97-6	E508-L/VA	A	0.50	ng/L		0.60	0.51	0.66	0.59	0.58
Dissolved Metals											
Mercury, dissolved	7439-97-6	E509-L/VA	A	0.50	ng/L		<0.50	<0.50	<0.50	<0.50	<0.50
Calcium, dissolved	7440-70-2	E421/VA	A	0.050	mg/L		----	25.6	----	26.3	----
Magnesium, dissolved	7439-95-4	E421/VA	A	0.0050	mg/L		----	6.22	----	6.01	----
Dissolved MeHg filtration location	----	EP537/VA		-	-		Field	Field	Field	Field	Field
Dissolved mercury filtration location	----	EP509-L/VA		-	-		Field	Field	Field	Field	Field
Dissolved metals filtration location	----	EP421/VA		-	-		----	Laboratory	----	Laboratory	----
Speciated Metals											

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	D1-Deep-B	W1-Shallow-A	W1-Shallow-B	W1-Deep-A	W1-Deep-B
					Client sampling date / time	25-Aug-2022 11:55	25-Aug-2022 10:30	25-Aug-2022 10:30	25-Aug-2022 10:00	25-Aug-2022 10:00
Analyte	CAS Number	Method/Lab		LOR	Unit	FJ2202327-006	FJ2202327-007	FJ2202327-008	FJ2202327-009	FJ2202327-010
						Result	Result	Result	Result	Result
Speciated Metals										
Methylmercury (as MeHg), total	22967-92-6	E536/VA	A	0.020	ng/L	<0.020	<0.020	<0.020	0.021	<0.020
Methylmercury (as MeHg), dissolved	22967-92-6	E537/VA	A	0.020	ng/L	<0.020	<0.020	<0.020	<0.020	<0.020

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

right solutions.
right partner.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202327**	Page	: 1 of 19
Amendment	: **1**		
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Site C MMP - Surface Water	Date Samples Received	: 26-Aug-2022 07:25
PO	: 1200-25.03.05	Issue Date	: 06-Jun-2023 14:36
C-O-C number	: 2022Aug Water MMP		
Sampler	: KG		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 10		
No. of samples analysed	: 10		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE										
D1-Deep-A	E235.Cl	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	5 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
D1-Shallow-A	E235.Cl	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	5 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
W1-Deep-A	E235.Cl	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	5 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
W1-Shallow-A	E235.Cl	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	5 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
PR3-A	E235.Cl	25-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	7 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
D1-Deep-A	E235.F	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
D1-Shallow-A	E235.F	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE W1-Deep-A	E235.F	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE W1-Shallow-A	E235.F	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PR3-A	E235.F	25-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	7 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE D1-Deep-A	E235.NO3-L	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	3 days	5 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE D1-Shallow-A	E235.NO3-L	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	3 days	5 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE W1-Deep-A	E235.NO3-L	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	3 days	5 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE W1-Shallow-A	E235.NO3-L	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	3 days	5 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PR3-A	E235.NO3-L	25-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	3 days	7 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE D1-Deep-A	E235.NO2-L	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	3 days	5 days	× EHT

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE D1-Shallow-A	E235.NO2-L	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	3 days	5 days	✖ EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE W1-Deep-A	E235.NO2-L	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	3 days	5 days	✖ EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE W1-Shallow-A	E235.NO2-L	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	3 days	5 days	✖ EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PR3-A	E235.NO2-L	25-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	3 days	7 days	✖ EHT
Anions and Nutrients : Sulfate in Water by IC										
HDPE D1-Deep-A	E235.SO4	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE D1-Shallow-A	E235.SO4	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE W1-Deep-A	E235.SO4	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE W1-Shallow-A	E235.SO4	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PR3-A	E235.SO4	25-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved)										
D1-Deep-A	E509-L	25-Aug-2022	02-Sep-2022	----	----		02-Sep-2022	28 days	8 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved)										
D1-Deep-B	E509-L	25-Aug-2022	02-Sep-2022	----	----		02-Sep-2022	28 days	8 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved)										
D1-Shallow-A	E509-L	25-Aug-2022	02-Sep-2022	----	----		02-Sep-2022	28 days	8 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved)										
D1-Shallow-B	E509-L	25-Aug-2022	02-Sep-2022	----	----		02-Sep-2022	28 days	8 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved)										
PR3-A	E509-L	25-Aug-2022	02-Sep-2022	----	----		02-Sep-2022	28 days	8 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved)										
PR3-B	E509-L	25-Aug-2022	02-Sep-2022	----	----		02-Sep-2022	28 days	8 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved)										
W1-Deep-A	E509-L	25-Aug-2022	02-Sep-2022	----	----		02-Sep-2022	28 days	8 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved)										
W1-Deep-B	E509-L	25-Aug-2022	02-Sep-2022	----	----		02-Sep-2022	28 days	8 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved)										
W1-Shallow-A	E509-L	25-Aug-2022	02-Sep-2022	----	----		02-Sep-2022	28 days	8 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved)										
W1-Shallow-B	E509-L	25-Aug-2022	02-Sep-2022	----	----		02-Sep-2022	28 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
PR3-A	E421	25-Aug-2022	05-Sep-2022	----	----		06-Sep-2022	180 days	12 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
D1-Deep-A	E421	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	180 days	5 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
D1-Shallow-A	E421	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	180 days	5 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
W1-Deep-A	E421	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	180 days	5 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
W1-Shallow-A	E421	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	180 days	5 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
D1-Deep-A	E358-L	25-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
D1-Shallow-A	E358-L	25-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
PR3-A	E358-L	25-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) W1-Deep-A	E358-L	25-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) W1-Shallow-A	E358-L	25-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) D1-Deep-A	E355-L	25-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) D1-Shallow-A	E355-L	25-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PR3-A	E355-L	25-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) W1-Deep-A	E355-L	25-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) W1-Shallow-A	E355-L	25-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE D1-Deep-A	E290	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE D1-Shallow-A	E290	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	14 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE W1-Deep-A	E290	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE W1-Shallow-A	E290	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PR3-A	E290	25-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	14 days	7 days	✓
Physical Tests : Conductivity in Water										
HDPE D1-Deep-A	E100	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE D1-Shallow-A	E100	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE W1-Deep-A	E100	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE W1-Shallow-A	E100	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE PR3-A	E100	25-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	7 days	✓
Physical Tests : pH by Meter										
HDPE PR3-A	E108	25-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	0.25 hrs	0.29 hrs	× EHTR-FM

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE D1-Deep-A	E108	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	0.25 hrs	1.63 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE D1-Shallow-A	E108	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	0.25 hrs	1.63 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE W1-Deep-A	E108	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	0.25 hrs	1.63 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE W1-Shallow-A	E108	25-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	0.25 hrs	1.63 hrs	× EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE D1-Deep-A	E160	25-Aug-2022	----	----	----		01-Sep-2022	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE D1-Shallow-A	E160	25-Aug-2022	----	----	----		01-Sep-2022	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PR3-A	E160	25-Aug-2022	----	----	----		01-Sep-2022	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE W1-Deep-A	E160	25-Aug-2022	----	----	----		01-Sep-2022	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE W1-Shallow-A	E160	25-Aug-2022	----	----	----		01-Sep-2022	7 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid)										
D1-Deep-A	E537	25-Aug-2022	02-Sep-2022	180 days	8 days	✓	07-Sep-2022	180 days	5 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid)										
D1-Deep-B	E537	25-Aug-2022	02-Sep-2022	180 days	8 days	✓	07-Sep-2022	180 days	5 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid)										
D1-Shallow-A	E537	25-Aug-2022	02-Sep-2022	180 days	8 days	✓	07-Sep-2022	180 days	5 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid)										
D1-Shallow-B	E537	25-Aug-2022	02-Sep-2022	180 days	8 days	✓	07-Sep-2022	180 days	5 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid)										
PR3-A	E537	25-Aug-2022	02-Sep-2022	180 days	8 days	✓	07-Sep-2022	180 days	5 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid)										
PR3-B	E537	25-Aug-2022	02-Sep-2022	180 days	8 days	✓	07-Sep-2022	180 days	5 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid)										
W1-Deep-A	E537	25-Aug-2022	02-Sep-2022	180 days	8 days	✓	07-Sep-2022	180 days	5 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid)										
W1-Deep-B	E537	25-Aug-2022	02-Sep-2022	180 days	8 days	✓	07-Sep-2022	180 days	5 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid)										
W1-Shallow-A	E537	25-Aug-2022	02-Sep-2022	180 days	8 days	✓	07-Sep-2022	180 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid)										
W1-Shallow-B	E537	25-Aug-2022	02-Sep-2022	180 days	8 days	✓	07-Sep-2022	180 days	5 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid)										
D1-Deep-A	E536	25-Aug-2022	02-Sep-2022	----	----		09-Sep-2022	180 days	15 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid)										
D1-Deep-B	E536	25-Aug-2022	02-Sep-2022	----	----		09-Sep-2022	180 days	15 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid)										
D1-Shallow-A	E536	25-Aug-2022	02-Sep-2022	----	----		09-Sep-2022	180 days	15 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid)										
D1-Shallow-B	E536	25-Aug-2022	02-Sep-2022	----	----		09-Sep-2022	180 days	15 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid)										
PR3-A	E536	25-Aug-2022	02-Sep-2022	----	----		09-Sep-2022	180 days	15 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid)										
PR3-B	E536	25-Aug-2022	02-Sep-2022	----	----		09-Sep-2022	180 days	15 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid)										
W1-Deep-A	E536	25-Aug-2022	02-Sep-2022	----	----		09-Sep-2022	180 days	15 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid)										
W1-Deep-B	E536	25-Aug-2022	02-Sep-2022	----	----		09-Sep-2022	180 days	15 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid)										
W1-Shallow-A	E536	25-Aug-2022	02-Sep-2022	----	----		09-Sep-2022	180 days	15 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid)										
W1-Shallow-B	E536	25-Aug-2022	02-Sep-2022	----	----		09-Sep-2022	180 days	15 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved)										
D1-Deep-A	E508-L	25-Aug-2022	01-Sep-2022	28 days	7 days	✓	01-Sep-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved)										
D1-Deep-B	E508-L	25-Aug-2022	01-Sep-2022	28 days	7 days	✓	01-Sep-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved)										
D1-Shallow-A	E508-L	25-Aug-2022	01-Sep-2022	28 days	7 days	✓	01-Sep-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved)										
D1-Shallow-B	E508-L	25-Aug-2022	01-Sep-2022	28 days	7 days	✓	01-Sep-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved)										
PR3-A	E508-L	25-Aug-2022	01-Sep-2022	28 days	7 days	✓	01-Sep-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved)										
PR3-B	E508-L	25-Aug-2022	01-Sep-2022	28 days	7 days	✓	01-Sep-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved)										
W1-Deep-A	E508-L	25-Aug-2022	01-Sep-2022	28 days	7 days	✓	01-Sep-2022	28 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved)										
W1-Deep-B	E508-L	25-Aug-2022	01-Sep-2022	28 days	7 days	✓	01-Sep-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved)										
W1-Shallow-A	E508-L	25-Aug-2022	01-Sep-2022	28 days	7 days	✓	01-Sep-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved)										
W1-Shallow-B	E508-L	25-Aug-2022	01-Sep-2022	28 days	7 days	✓	01-Sep-2022	28 days	0 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	624246	2	39	5.1	5.0	✓
Chloride in Water by IC	E235.Cl	624251	2	39	5.1	5.0	✓
Conductivity in Water	E100	624244	2	39	5.1	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	630550	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	624762	3	38	7.8	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	630063	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	629551	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	624248	2	21	9.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	624249	2	39	5.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	624250	2	39	5.1	5.0	✓
pH by Meter	E108	624245	2	39	5.1	5.0	✓
Sulfate in Water by IC	E235.SO4	624247	2	39	5.1	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	629555	1	20	5.0	5.0	✓
Total Methylmercury in Water by GCAFS	E536	631430	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	629552	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	629645	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	624246	2	39	5.1	5.0	✓
Chloride in Water by IC	E235.Cl	624251	2	39	5.1	5.0	✓
Conductivity in Water	E100	624244	2	39	5.1	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	630550	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	624762	2	38	5.2	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	630063	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	629551	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	624248	2	21	9.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	624249	2	39	5.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	624250	2	39	5.1	5.0	✓
pH by Meter	E108	624245	2	39	5.1	5.0	✓
Sulfate in Water by IC	E235.SO4	624247	2	39	5.1	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	629555	1	20	5.0	5.0	✓
Total Methylmercury in Water by GCAFS	E536	631430	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	629552	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	629645	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	624246	2	39	5.1	5.0	✓

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Chloride in Water by IC	E235.Cl	624251	2	39	5.1	5.0	✓
Conductivity in Water	E100	624244	2	39	5.1	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	630550	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	624762	2	38	5.2	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	630063	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	629551	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	624248	2	21	9.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	624249	2	39	5.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	624250	2	39	5.1	5.0	✓
Sulfate in Water by IC	E235.SO4	624247	2	39	5.1	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	629555	1	20	5.0	5.0	✓
Total Methylmercury in Water by GCAFS	E536	631430	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	629552	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	629645	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Chloride in Water by IC	E235.Cl	624251	2	39	5.1	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	630550	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	624762	2	38	5.2	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	630063	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	629551	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	624248	2	21	9.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	624249	2	39	5.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	624250	2	39	5.1	5.0	✓
Sulfate in Water by IC	E235.SO4	624247	2	39	5.1	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	629555	1	20	5.0	5.0	✓
Total Methylmercury in Water by GCAFS	E536	631430	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	629552	1	20	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L Vancouver - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAFS.
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAFS.
Total Methylmercury in Water by GCAFS	E536 Vancouver - Environmental	Water	EPA 1630 (mod)	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Methylmercury in Water by GCAFS	E537 Vancouver - Environmental	Water	EPA 1630 (mod)	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	“Hardness (as $CaCO_3$), dissolved” is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. “Total Hardness” refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ion Balance using Dissolved Metals	EC101 Vancouver - Environmental	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 Vancouver - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration (Low Level)	EP509-L Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
Total Methylmercury Water Preparation	EP536 Vancouver - Environmental	Water	EPA 1630	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Methylmercury Water Preparation	EP537 Vancouver - Environmental	Water	EPA 1630	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".

QUALITY CONTROL REPORT

Work Order	: **FJ2202327**	Page	: 1 of 10
Amendment	: **1**		
Client	: Ecofish Research Ltd	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	:	Telephone	: +1 250 261 5517
Project	: Site C MMP - Surface Water	Date Samples Received	: 26-Aug-2022 07:25
PO	: 1200-25.03.05	Date Analysis Commenced	: 30-Aug-2022
C-O-C number	: 2022Aug Water MMP	Issue Date	: 06-Jun-2023 14:36
Sampler	: KG 250 334 3042		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 10		
No. of samples analysed	: 10		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angelo Salandanan	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Hamideh Moradi	Analyst	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Inorganics, Burnaby, British Columbia
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Kinny Wu	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
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Miles Gropen	Department Manager - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Sukhman Khosa	Lab Assistant	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 624244)											
FJ2202327-007	W1-Shallow-A	Conductivity	----	E100	2.0	µS/cm	168	171	1.65%	10%	----
Physical Tests (QC Lot: 624245)											
FJ2202327-007	W1-Shallow-A	pH	----	E108	0.10	pH units	7.86	7.87	0.127%	4%	----
Physical Tests (QC Lot: 624246)											
FJ2202327-007	W1-Shallow-A	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	79.6	78.9	0.883%	20%	----
Physical Tests (QC Lot: 628236)											
YL2201331-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	<2.0	<2.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 628237)											
YL2201331-001	Anonymous	pH	----	E108	0.10	pH units	5.72	5.73	0.175%	4%	----
Physical Tests (QC Lot: 628238)											
YL2201331-001	Anonymous	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 629645)											
FJ2202327-001	PR3-A	Solids, total suspended [TSS]	----	E160	3.0	mg/L	5.3	5.1	0.2	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 624247)											
FJ2202328-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	28.5	28.5	0.111%	20%	----
Anions and Nutrients (QC Lot: 624248)											
FJ2202328-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.156	0.150	0.006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 624249)											
FJ2202328-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0157	0.0155	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 624250)											
FJ2202328-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 624251)											
FJ2202328-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	0.78	0.77	0.007	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 628239)											
VA22C0190-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	24.3	24.2	0.336%	20%	----
Anions and Nutrients (QC Lot: 628240)											
VA22C0190-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 628241)											
VA22C0190-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 628242)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 628242) - continued											
VA22C0190-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.144	0.146	0.002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 628243)											
VA22C0190-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	73.3	73.3	0.0140%	20%	----
Organic / Inorganic Carbon (QC Lot: 629551)											
FJ2202327-001	PR3-A	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.83	2.76	0.06	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 629552)											
FJ2202327-001	PR3-A	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	2.86	2.85	0.01	Diff <2x LOR	----
Total Metals (QC Lot: 629555)											
FJ2202327-001	PR3-A	Mercury, total	7439-97-6	E508-L	0.50	ng/L	0.58	0.58	0.004	Diff <2x LOR	----
Dissolved Metals (QC Lot: 624762)											
VA22C0108-001	Anonymous	Calcium, dissolved	7440-70-2	E421	0.500	mg/L	206	209	1.59%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0500	mg/L	56.8	55.2	2.84%	20%	----
Dissolved Metals (QC Lot: 630550)											
EO2206775-001	Anonymous	Mercury, dissolved	7439-97-6	E509-L	0.50	ng/L	14.0	13.0	6.97%	20%	----
Dissolved Metals (QC Lot: 632979)											
YL2201358-001	Anonymous	Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	47.5	46.7	1.73%	20%	----
YL2201358-001	Anonymous	Calcium, dissolved	7440-70-2	E421	0.050	mg/L	157	161	2.21%	20%	----
Speciated Metals (QC Lot: 630063)											
FJ2202315-001	Anonymous	Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.000020	µg/L	<0.020 ng/L	<0.000020	0	Diff <2x LOR	----
Speciated Metals (QC Lot: 631430)											
CG2211557-001	Anonymous	Methylmercury (as MeHg), total	22967-92-6	E536	0.000020	µg/L	0.000064	0.000065	0.000001	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 624244)						
Conductivity	----	E100	1	µS/cm	1.2	----
Physical Tests (QCLot: 624246)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 628236)						
Conductivity	----	E100	1	µS/cm	1.1	----
Physical Tests (QCLot: 628238)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 629645)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 624247)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 624248)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 624249)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 624250)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 624251)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 628239)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 628240)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 628241)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 628242)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 628243)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 629551)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 629552)						

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Organic / Inorganic Carbon (QCLot: 629552) - continued						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 629555)						
Mercury, total	7439-97-6	E508-L	0.5	ng/L	<0.50	----
Dissolved Metals (QCLot: 624762)						
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Dissolved Metals (QCLot: 630550)						
Mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	<0.50	----
Dissolved Metals (QCLot: 632979)						
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Speciated Metals (QCLot: 630063)						
Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 631430)						
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	<0.000020	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 624244)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	96.0	90.0	110	----
Physical Tests (QCLot: 624245)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 624246)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	107	85.0	115	----
Physical Tests (QCLot: 628236)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	101	90.0	110	----
Physical Tests (QCLot: 628237)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 628238)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	107	85.0	115	----
Physical Tests (QCLot: 629645)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	88.2	85.0	115	----
Anions and Nutrients (QCLot: 624247)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	99.4	90.0	110	----
Anions and Nutrients (QCLot: 624248)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	97.7	90.0	110	----
Anions and Nutrients (QCLot: 624249)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	98.8	90.0	110	----
Anions and Nutrients (QCLot: 624250)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	97.2	90.0	110	----
Anions and Nutrients (QCLot: 624251)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	98.3	90.0	110	----
Anions and Nutrients (QCLot: 628239)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	99.8	90.0	110	----
Anions and Nutrients (QCLot: 628240)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.1	90.0	110	----
Anions and Nutrients (QCLot: 628241)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	96.9	90.0	110	----
Anions and Nutrients (QCLot: 628242)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	98.3	90.0	110	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 628243)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	98.7	90.0	110	----
Organic / Inorganic Carbon (QCLot: 629551)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	101	80.0	120	----
Organic / Inorganic Carbon (QCLot: 629552)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	99.7	80.0	120	----
Total Metals (QCLot: 629555)									
Mercury, total	7439-97-6	E508-L	0.5	ng/L	5 ng/L	115	80.0	120	----
Dissolved Metals (QCLot: 624762)									
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	97.2	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	102	80.0	120	----
Mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	5 ng/L	101	80.0	120	----
Dissolved Metals (QCLot: 632979)									
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	96.6	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	103	80.0	120	----
Speciated Metals (QCLot: 630063)									
Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	0.0025 µg/L	82.7	70.0	130	----
Speciated Metals (QCLot: 631430)									
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	0.0025 µg/L	76.0	70.0	130	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 624247)										
VA22C0138-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	106 mg/L	100 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 624248)										
VA22C0138-001	Anonymous	Fluoride	16984-48-8	E235.F	1.05 mg/L	1 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 624249)										
VA22C0138-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.63 mg/L	2.5 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 624250)										
VA22C0138-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.516 mg/L	0.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 624251)										
VA22C0138-001	Anonymous	Chloride	16887-00-6	E235.Cl	105 mg/L	100 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 628239)										
VA22C0190-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	107 mg/L	100 mg/L	107	75.0	125	----
Anions and Nutrients (QCLot: 628240)										
VA22C0190-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.69 mg/L	2.5 mg/L	108	75.0	125	----
Anions and Nutrients (QCLot: 628241)										
VA22C0190-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.522 mg/L	0.5 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 628242)										
VA22C0190-001	Anonymous	Fluoride	16984-48-8	E235.F	1.07 mg/L	1 mg/L	107	75.0	125	----
Anions and Nutrients (QCLot: 628243)										
VA22C0190-001	Anonymous	Chloride	16887-00-6	E235.Cl	105 mg/L	100 mg/L	105	75.0	125	----
Organic / Inorganic Carbon (QCLot: 629551)										
FJ2202327-003	D1-Shallow-A	Carbon, dissolved organic [DOC]	----	E358-L	4.69 mg/L	5 mg/L	93.9	70.0	130	----
Organic / Inorganic Carbon (QCLot: 629552)										
FJ2202327-003	D1-Shallow-A	Carbon, total organic [TOC]	----	E355-L	5.08 mg/L	5 mg/L	102	70.0	130	----
Total Metals (QCLot: 629555)										
FJ2202327-002	PR3-B	Mercury, total	7439-97-6	E508-L	5.64 ng/L	5 ng/L	113	70.0	130	----
Dissolved Metals (QCLot: 624762)										
KS2203131-001	Anonymous	Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 624762) - continued										
KS2203131-001	Anonymous	Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
Dissolved Metals (QCLot: 630550)										
FC2201954-001	Anonymous	Mercury, dissolved	7439-97-6	E509-L	4.41 ng/L	5 ng/L	88.3	70.0	130	----
Dissolved Metals (QCLot: 632979)										
YL2201358-002	Anonymous	Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
Speciated Metals (QCLot: 630063)										
FJ2202315-002	Anonymous	Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00191 µg/L	0.0025 µg/L	76.6	60.0	140	----
Speciated Metals (QCLot: 631430)										
FJ2202315-005	Anonymous	Methylmercury (as MeHg), total	22967-92-6	E536	0.00213 µg/L	0.0025 µg/L	85.2	60.0	140	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: COC #: 2022AUG WATER MMP

Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply
Company:	Ecofish Research Ltd.	Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)	Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Leah Hull	Quality Control (QC) Report with Report ☑ YES ☐ NO	Priority (Business Days): 4 day [P4] ☐ / 3 day [P3] ☐ / 2 day [P2] ☐
Phone:	250-334-3042	☑ Compare Results to Criteria on Report - provide details below if box checked	Emergency: 1 Business day [E1] ☐ / Same Day, Weekend or Statutory holiday [E0] ☐
	Company address below will appear on the final report	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	Date and Time Required for all E&P TATs:
Street:	600 Comox Rd.	Email 1 or Fax: lhull@ecofishresearch.com, kganshorn@ecofishres	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Courtenay, BC	Email 2: tkasubuchi@ecofishresearch.com	
Postal Code:	V9N 3P6	Email 3: waterqualitylabdata@ecofishresearch.com	
Invoice To	Same as Report To ☐ YES ☑ NO	Invoice Distribution	
	Copy of Invoice with Report ☐ YES ☑ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	
Company:	Ecofish Research Ltd.	Email 1 or Fax: accountspayable@ecofishresearch.com	
Contact:	accountspayable@ecofishresearch.com	Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #: VA22-ECOF100-004 (MMP Surface Water)		AFE/Cost Center:	PO#:
Job #:	Site C MMP - Surface Water	Major/Minor Code:	Routing Code:
PO / AFE:	1200-25.03.05	Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only):

ALS Contact: Sneha Sansare | Sampler: Kevin Ganshorn

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Methylmercury in Water by GCAFS (0.02 ng/L) P	Dissolved Methylmercury in Water by GCAFS (0.02 ng/L) F/P	Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ng/L) P	Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ng/L) F/P	General (Anions, Cond., Total Alk, pH, TSS)	TOC P	Hardness F	DOC F/P	ICNBALANCE-BC-CL	Number of Containers
	PR1-A	25 AUG 22	17:15	Water	R	R	R	R	R	R	R	R	R	8
	PR1-B	25 AUG 22	17:15	Water	R	R	R	R						4
	~~PR2-A~~	[redacted]		~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~8~~
	~~PR2-B~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~8~~
	~~PR2-A-FD~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~						~~4~~
	~~PR3-B~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~						~~4~~
	~~PR3-A~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~8~~
	~~PR4-A~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~						~~4~~
	~~PR4-B~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~8~~
	~~PR5-A~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~						~~4~~
	~~PR5-B~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~8~~
	~~PR6-A~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~						~~4~~
	~~PR6-B~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~8~~
	~~PR7-A~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~						~~4~~
	~~PR7-B~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~8~~
	~~PR8-A~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~						~~4~~
	~~PR8-B~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~8~~
	D1-Shallow-A	25 AUG 22	12:20	Water	R	R	R	R	R	R	R	R	R	8
	D1-Shallow-B	25 AUG 22	12:20	Water	R	R	R	R						4
	D1-Deep-A	25 AUG 22	11:55	Water	R	R	R	R	R	R	R	R	R	8
	D1-Deep-B	25 AUG 22	11:55	Water	R	R	R	R						4
	W1-Shallow-A	25 AUG 22	10:30	Water	R	R	R	R	R	R	R	R	R	8
	W1-Shallow-B	25 AUG 22	10:30	Water	R	R	R	R						4
	W1-Deep-A	25 AUG 22	10:00	Water	R	R	R	R	R	R	R	R	R	8
	W1-Deep-B	25 AUG 22	10:00	Water	R	R	R	R						4
	Travel Blank			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~						~~4~~

Telephone : +1 250 261 5617

Fort St. John Work Order Reference FJ2202327

FJAE Shipping & Receiving
Call Out ___ Expedite
___ Priority
# of Coolers X Air
# of Carboys ___ Ground

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)	SAMPLE CONDITION AS RECEIVED (lab use only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	Please send Azimuth a copy of the data in their EDD format:	Frozen ☐ SIF Observations Yes ☐ No ☐
Are samples for human drinking water use? ☐ YES ☑ NO	gmann@azimuthgroup.ca imcivor@azimuthgroup.ca	Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
		Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
17.1	9c

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: Aug 25, 2022	Time:	Received by: RICK	Date: 8.26.22	Time: 7:25	Received by: AS	Date: AUG 26 2022	Time: 6PM

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202360**	Page	: 1 of 4
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Site C MMP - Surface Water	Date Samples Received	: 26-Aug-2022 17:10
PO	: 1200-25.03.05	Date Analysis Commenced	: 30-Aug-2022
C-O-C number	: 2022Aug Water MMP	Issue Date	: 27-Sep-2022 17:23
Sampler	: KG		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 6		
No. of samples analysed	: 6		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Hamideh Moradi	Analyst	Metals, Burnaby, British Columbia
Jennifer Nguyen	Lab Analyst	Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Kyle Chang	Lab Assistant	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
%	percent
µS/cm	Microsiemens per centimetre
meq/L	milliequivalents per litre
mg/L	milligrams per litre
ng/L	nanograms per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	PR1-A	PR1-B	PR1-C	PR2-A	PR2-B
					Client sampling date / time	26-Aug-2022 09:45	26-Aug-2022 09:45	26-Aug-2022 09:45	26-Aug-2022 13:55	26-Aug-2022 13:55
						FJ2202360-001	FJ2202360-002	FJ2202360-003	FJ2202360-004	FJ2202360-005
						Result	Result	Result	Result	Result
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		82.0	----	82.7	82.1	----
conductivity	----	E100	2.0	µS/cm		183	----	183	183	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		90.6	----	90.7	90.2	----
pH	----	E108	0.10	pH units		7.95	----	7.97	7.98	----
solids, total suspended [TSS]	----	E160	3.0	mg/L		<3.0	----	<3.0	5.3	----
Anions and Nutrients										
chloride	16887-00-6	E235.Cl	0.50	mg/L		<0.50	----	<0.50	<0.50	----
fluoride	16984-48-8	E235.F	0.020	mg/L		0.038	----	0.037	0.037	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		0.0771	----	0.0780	0.0711	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		0.0014	----	0.0014	<0.0010	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		13.1	----	13.1	13.2	----
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L		2.83	----	2.77	2.77	----
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		3.10	----	2.88	3.04	----
Ion Balance										
anion sum	----	EC101	0.10	meq/L		1.92	----	1.93	1.92	----
cation sum	----	EC101	0.10	meq/L		1.87	----	1.87	1.86	----
ion balance (APHA)	----	EC101	0.010	%		1.32	----	1.58	1.59	----
Total Metals										
mercury, total	7439-97-6	E508-L	0.50	ng/L		<0.50	<0.50	<0.50	0.55	0.63
Dissolved Metals										
mercury, dissolved	7439-97-6	E509-L	0.50	ng/L		<0.50	<0.50	<0.50	<0.50	<0.50
calcium, dissolved	7440-70-2	E421	0.050	mg/L		26.7	----	26.2	26.0	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		5.81	----	6.13	6.15	----
dissolved MeHg filtration location	----	EP537	-	-		Field	Field	Field	Field	Field
dissolved mercury filtration location	----	EP509-L	-	-		Field	Field	Field	Field	Field
dissolved metals filtration location	----	EP421	-	-		Laboratory	----	Laboratory	Laboratory	----
Speciated Metals										
methylmercury (as MeHg), total	22967-92-6	E536	0.020	ng/L		<0.020	0.021	<0.020	0.030	0.029
methylmercury (as MeHg), dissolved	22967-92-6	E537	0.020	ng/L		<0.020	<0.020	<0.020	<0.020	0.025

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: **Water** (Matrix: **Water**)					Client sample ID	**Travel Blank**	----	----	----	----
					Client sampling date / time	26-Aug-2022	----	----	----	----
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*		**FJ2202360-006**	--------	--------	--------	--------
						Result	----	----	----	----
Total Metals										
mercury, total	7439-97-6	E508-L	0.50	ng/L		<0.50	----	----	----	----
Speciated Metals										
methylmercury (as MeHg), total	22967-92-6	E536	0.020	ng/L		<0.020	----	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202360**	Page	: 1 of 14
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
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Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Site C MMP - Surface Water	Date Samples Received	: 26-Aug-2022 17:10
PO	: 1200-25.03.05	Issue Date	: 27-Sep-2022 17:24
C-O-C number	: 2022Aug Water MMP		
Sampler	: KG		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 6		
No. of samples analysed	: 6		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE PR1-A	E235.Cl	26-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PR1-C	E235.Cl	26-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PR2-A	E235.Cl	26-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PR1-A	E235.F	26-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PR1-C	E235.F	26-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PR2-A	E235.F	26-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	4 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PR1-A	E235.NO3-L	26-Aug-2022	30-Aug-2022	3 days	4 days	× EHT	31-Aug-2022	3 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PR1-C	E235.NO3-L	26-Aug-2022	30-Aug-2022	3 days	4 days	× EHT	31-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PR2-A	E235.NO3-L	26-Aug-2022	30-Aug-2022	3 days	4 days	× EHT	31-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PR1-A	E235.NO2-L	26-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	3 days	4 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PR1-C	E235.NO2-L	26-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	3 days	4 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PR2-A	E235.NO2-L	26-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	3 days	4 days	× EHT
Anions and Nutrients : Sulfate in Water by IC										
HDPE PR1-A	E235.SO4	26-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	4 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PR1-C	E235.SO4	26-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	4 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PR2-A	E235.SO4	26-Aug-2022	30-Aug-2022	----	----		31-Aug-2022	28 days	4 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) PR1-A	E509-L	26-Aug-2022	03-Sep-2022	----	----		03-Sep-2022	28 days	8 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) PR1-B	E509-L	26-Aug-2022	03-Sep-2022	----	----		03-Sep-2022	28 days	8 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) PR1-C	E509-L	26-Aug-2022	03-Sep-2022	----	----		03-Sep-2022	28 days	8 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) PR2-A	E509-L	26-Aug-2022	03-Sep-2022	----	----		03-Sep-2022	28 days	8 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) PR2-B	E509-L	26-Aug-2022	03-Sep-2022	----	----		03-Sep-2022	28 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PR1-A	E421	26-Aug-2022	02-Sep-2022	----	----		03-Sep-2022	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PR1-C	E421	26-Aug-2022	02-Sep-2022	----	----		03-Sep-2022	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PR2-A	E421	26-Aug-2022	02-Sep-2022	----	----		03-Sep-2022	180 days	8 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PR1-A	E358-L	26-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	6 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PR1-C	E358-L	26-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PR2-A	E358-L	26-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	6 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PR1-A	E355-L	26-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	6 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PR1-C	E355-L	26-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	6 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PR2-A	E355-L	26-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PR1-A	E290	26-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PR1-C	E290	26-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PR2-A	E290	26-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	14 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE PR1-A	E100	26-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE PR1-C	E100	26-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE PR2-A	E100	26-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	28 days	4 days	✓
Physical Tests : pH by Meter										
HDPE PR1-A	E108	26-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	0.25 hrs	1.71 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PR1-C	E108	26-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	0.25 hrs	1.71 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PR2-A	E108	26-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	0.25 hrs	1.71 hrs	× EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE PR1-A	E160	26-Aug-2022	----	----	----		01-Sep-2022	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PR1-C	E160	26-Aug-2022	----	----	----		01-Sep-2022	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PR2-A	E160	26-Aug-2022	----	----	----		01-Sep-2022	7 days	6 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PR1-A	E537	26-Aug-2022	20-Sep-2022	180 days	25 days	✓	23-Sep-2022	180 days	3 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PR1-B	E537	26-Aug-2022	20-Sep-2022	180 days	25 days	✓	23-Sep-2022	180 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid)										
PR1-C	E537	26-Aug-2022	20-Sep-2022	180 days	25 days	✓	23-Sep-2022	180 days	3 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid)										
PR2-A	E537	26-Aug-2022	20-Sep-2022	180 days	25 days	✓	23-Sep-2022	180 days	3 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid)										
PR2-B	E537	26-Aug-2022	20-Sep-2022	180 days	25 days	✓	23-Sep-2022	180 days	3 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid)										
PR1-A	E536	26-Aug-2022	03-Sep-2022	----	----		07-Sep-2022	180 days	12 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid)										
PR1-B	E536	26-Aug-2022	03-Sep-2022	----	----		07-Sep-2022	180 days	12 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid)										
PR1-C	E536	26-Aug-2022	03-Sep-2022	----	----		07-Sep-2022	180 days	12 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid)										
PR2-A	E536	26-Aug-2022	03-Sep-2022	----	----		07-Sep-2022	180 days	12 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid)										
PR2-B	E536	26-Aug-2022	03-Sep-2022	----	----		07-Sep-2022	180 days	12 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid)										
Travel Blank	E536	26-Aug-2022	03-Sep-2022	----	----		07-Sep-2022	180 days	12 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) PR1-A	E508-L	26-Aug-2022	03-Sep-2022	28 days	8 days	✓	03-Sep-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) PR1-B	E508-L	26-Aug-2022	03-Sep-2022	28 days	8 days	✓	03-Sep-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) PR1-C	E508-L	26-Aug-2022	03-Sep-2022	28 days	8 days	✓	03-Sep-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) PR2-A	E508-L	26-Aug-2022	03-Sep-2022	28 days	8 days	✓	03-Sep-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) PR2-B	E508-L	26-Aug-2022	03-Sep-2022	28 days	8 days	✓	03-Sep-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) Travel Blank	E508-L	26-Aug-2022	03-Sep-2022	28 days	8 days	✓	03-Sep-2022	28 days	0 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	626009	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	626014	1	18	5.5	5.0	✓
Conductivity in Water	E100	626007	1	12	8.3	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	632345	1	5	20.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	631727	1	5	20.0	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	654341	1	18	5.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	629551	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	626013	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	626011	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	626012	1	19	5.2	5.0	✓
pH by Meter	E108	626008	1	18	5.5	5.0	✓
Sulfate in Water by IC	E235.SO4	626010	1	18	5.5	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	632257	1	13	7.6	5.0	✓
Total Methylmercury in Water by GCAFS	E536	631443	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	629552	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	629645	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	626009	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	626014	1	18	5.5	5.0	✓
Conductivity in Water	E100	626007	1	12	8.3	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	632345	1	5	20.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	631727	1	5	20.0	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	654341	1	18	5.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	629551	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	626013	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	626011	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	626012	1	19	5.2	5.0	✓
pH by Meter	E108	626008	1	18	5.5	5.0	✓
Sulfate in Water by IC	E235.SO4	626010	1	18	5.5	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	632257	1	13	7.6	5.0	✓
Total Methylmercury in Water by GCAFS	E536	631443	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	629552	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	629645	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	626009	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	626014	1	18	5.5	5.0	✓
Conductivity in Water	E100	626007	1	12	8.3	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	632345	1	5	20.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	631727	1	5	20.0	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	654341	1	18	5.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	629551	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	626013	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	626011	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	626012	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	626010	1	18	5.5	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	632257	1	13	7.6	5.0	✓
Total Methylmercury in Water by GCAFS	E536	631443	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	629552	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	629645	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Chloride in Water by IC	E235.Cl	626014	1	18	5.5	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	632345	1	5	20.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	631727	1	5	20.0	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	654341	1	18	5.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	629551	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	626013	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	626011	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	626012	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	626010	1	18	5.5	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	632257	1	13	7.6	5.0	✓
Total Methylmercury in Water by GCAFS	E536	631443	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	629552	1	20	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L Vancouver - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAFS.
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAFS.
Total Methylmercury in Water by GCAFS	E536 Vancouver - Environmental	Water	EPA 1630 (mod)	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Methylmercury in Water by GCAFS	E537 Vancouver - Environmental	Water	EPA 1630 (mod)	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	“Hardness (as $CaCO_3$), dissolved” is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. “Total Hardness” refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ion Balance using Dissolved Metals	EC101 Vancouver - Environmental	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 Vancouver - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration (Low Level)	EP509-L Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
Total Methylmercury Water Preparation	EP536 Vancouver - Environmental	Water	EPA 1630	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Methylmercury Water Preparation	EP537 Vancouver - Environmental	Water	EPA 1630	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **FJ2202360**	Page	: 1 of 10
Client	: Ecofish Research Ltd	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Site C MMP - Surface Water	Date Samples Received	: 26-Aug-2022 17:10
PO	: 1200-25.03.05	Date Analysis Commenced	: 30-Aug-2022
C-O-C number	: 2022Aug Water MMP	Issue Date	: 27-Sep-2022 17:23
Sampler	: KG		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 6		
No. of samples analysed	: 6		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Hamideh Moradi	Analyst	Vancouver Metals, Burnaby, British Columbia
Jennifer Nguyen	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Kyle Chang	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
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Ophelia Chiu	Department Manager - Organics	Vancouver Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 626007)											
FJ2202360-004	PR2-A	conductivity	----	E100	2.0	µS/cm	183	184	0.328%	10%	----
Physical Tests (QC Lot: 626008)											
FJ2202360-004	PR2-A	pH	----	E108	0.10	pH units	7.98	7.99	0.125%	4%	----
Physical Tests (QC Lot: 626009)											
FJ2202360-004	PR2-A	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	82.1	82.3	0.243%	20%	----
Physical Tests (QC Lot: 629645)											
FJ2202327-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	5.3	5.1	0.2	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 626010)											
FJ2202364-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	3.00	mg/L	469	471	0.384%	20%	----
Anions and Nutrients (QC Lot: 626011)											
FJ2202364-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0500	mg/L	0.487	0.490	0.0025	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 626012)											
FJ2202364-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0100	mg/L	<0.0100	<0.0100	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 626013)											
FJ2202364-001	Anonymous	fluoride	16984-48-8	E235.F	0.200	mg/L	0.436	0.434	0.002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 626014)											
FJ2202364-001	Anonymous	chloride	16887-00-6	E235.Cl	5.00	mg/L	27.7	27.8	0.04	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 629551)											
FJ2202327-001	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.83	2.76	0.06	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 629552)											
FJ2202327-001	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	2.86	2.85	0.01	Diff <2x LOR	----
Total Metals (QC Lot: 632257)											
FJ2202360-001	PR1-A	mercury, total	7439-97-6	E508-L	0.50	ng/L	<0.50	<0.50	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 631727)											
VA22C0514-004	Anonymous	calcium, dissolved	7440-70-2	E421	0.100	mg/L	564	525	7.11%	20%	----
		magnesium, dissolved	7439-95-4	E421	0.0100	mg/L	83.7	75.4	10.5%	20%	----
Dissolved Metals (QC Lot: 632345)											
FJ2202360-001	PR1-A	mercury, dissolved	7439-97-6	E509-L	0.50	ng/L	<0.50	<0.50	0	Diff <2x LOR	----
Speciated Metals (QC Lot: 631443)											
CG2211557-002	Anonymous	methylmercury (as MeHg), total	22967-92-6	E536	0.000020	µg/L	0.000128	0.000128	0.0000003	Diff <2x LOR	----
Speciated Metals (QC Lot: 654341)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Speciated Metals (QC Lot: 654341) - continued											
FC2202096-001	Anonymous	methylmercury (as MeHg), dissolved	22967-92-6	E537	0.000020	µg/L	0.000072	0.000055	0.000017	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 626007)						
conductivity	----	E100	1	µS/cm	1.1	----
Physical Tests (QCLot: 626009)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	1.4	----
Physical Tests (QCLot: 629645)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 626010)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 626011)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 626012)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 626013)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 626014)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 629551)						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 629552)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 632257)						
mercury, total	7439-97-6	E508-L	0.5	ng/L	<0.50	----
Dissolved Metals (QCLot: 631727)						
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Dissolved Metals (QCLot: 632345)						
mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	<0.50	----
Speciated Metals (QCLot: 631443)						
methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 654341)						
methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	<0.000020	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 626007)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.3	90.0	110	----
Physical Tests (QCLot: 626008)									
pH	----	E108	----	pH units	7 pH units	99.7	98.0	102	----
Physical Tests (QCLot: 626009)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	108	85.0	115	----
Physical Tests (QCLot: 629645)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	88.2	85.0	115	----
Anions and Nutrients (QCLot: 626010)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 626011)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.2	90.0	110	----
Anions and Nutrients (QCLot: 626012)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	97.6	90.0	110	----
Anions and Nutrients (QCLot: 626013)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	96.9	90.0	110	----
Anions and Nutrients (QCLot: 626014)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	98.8	90.0	110	----
Organic / Inorganic Carbon (QCLot: 629551)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	101	80.0	120	----
Organic / Inorganic Carbon (QCLot: 629552)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	99.7	80.0	120	----
Total Metals (QCLot: 632257)									
mercury, total	7439-97-6	E508-L	0.5	ng/L	5 ng/L	105	80.0	120	----
Dissolved Metals (QCLot: 631727)									
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	99.6	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	97.6	80.0	120	----
mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	5 ng/L	105	80.0	120	----
Speciated Metals (QCLot: 631443)									
methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	0.0025 µg/L	93.4	70.0	130	----
Speciated Metals (QCLot: 654341)									

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Speciated Metals (QCLot: 654341) - continued									
methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	0.0025 µg/L	76.9	70.0	130	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 626010)										
FJ2202365-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	2020 mg/L	2000 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 626011)										
FJ2202365-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	51.0 mg/L	50 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 626012)										
FJ2202365-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	9.98 mg/L	10 mg/L	99.8	75.0	125	----
Anions and Nutrients (QCLot: 626013)										
FJ2202365-001	Anonymous	fluoride	16984-48-8	E235.F	20.4 mg/L	20 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 626014)										
FJ2202365-001	Anonymous	chloride	16887-00-6	E235.Cl	2040 mg/L	2000 mg/L	102	75.0	125	----
Organic / Inorganic Carbon (QCLot: 629551)										
FJ2202327-003	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	4.69 mg/L	5 mg/L	93.9	70.0	130	----
Organic / Inorganic Carbon (QCLot: 629552)										
FJ2202327-003	Anonymous	carbon, total organic [TOC]	----	E355-L	5.08 mg/L	5 mg/L	102	70.0	130	----
Total Metals (QCLot: 632257)										
FJ2202360-002	PR1-B	mercury, total	7439-97-6	E508-L	4.88 ng/L	5 ng/L	97.6	70.0	130	----
Dissolved Metals (QCLot: 631727)										
VA22C0668-001	Anonymous	calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	0.972 mg/L	1 mg/L	97.2	70.0	130	----
Dissolved Metals (QCLot: 632345)										
FJ2202360-002	PR1-B	mercury, dissolved	7439-97-6	E509-L	5.25 ng/L	5 ng/L	105	70.0	130	----
Speciated Metals (QCLot: 631443)										
FJ2202360-001	PR1-A	methylmercury (as MeHg), total	22967-92-6	E536	0.00192 µg/L	0.0025 µg/L	76.8	60.0	140	----
Speciated Metals (QCLot: 654341)										
FC2202140-001	Anonymous	methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00177 µg/L	0.0025 µg/L	70.7	60.0	140	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: COC #: 2022AUG WATER MMP

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Leah Hull
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Report Format / Distribution	
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☑ Compare Results to Criteria on Report - Provide details below if box checked	
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Email 1 or Fax	lhull@ecofishresearch.com, kganshorn@ecofishres
Email 2	(kasubuchi@ecofishresearch.com
Email 3	waterqualitylabdata@ecofishresearch.com
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Email 1 or Fax	accountspayable@ecofishresearch.com
Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA22-ECOF100-004 (MMP Surface Water)	AFE/Cost Center:	PO#:
Job #:	Site C MMP - Surface Water	Major/Minor Code:	Routing Code:
PO / AFE:	1200-25.03.05	Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only):

ALS Contact: Sneha Sansare Sampler: Kevin Ganshorn

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☐
2 day [P2]	☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	P Total Methylmercury in Water by GCAFS (0.02 ng/L)	F/P Dissolved Methylmercury in Water by GCAFS (0.02 ng/L)	P Total Mercury in Water by CVAFS (Low Level LOR = 0.5 ng/L)	F/P Dissolved Mercury in Water by CVAFS (Low Level LOR = 0.5 ng/L)	P General (Anions, Cond., Total Alk, pH, TSS)	P TOC	F Hardness	F/P DOC	F/P IONBALANCE-BC-CL	Number of Containers
	PR1-A	26 AUG 22	09:45	Water	R	R	R	R	R	R	R	R	R	8
	PR1-B	26 AUG 22	09:45	Water	R	R	R	R						4
	PR1-C	26 AUG 22	09:45	Water	R	R	R	R	R	R	R	R	R	8
	PR2-A	26AUG22	13:55	Water	R	R	R	R	R	R	R	R	R	8
	~~PR2-FD~~			~~Water~~	R	R	R	R						4
	PR2-B	26AUG22	13:55	Water	R	R	R	R						4
	~~PR2-B1-A~~			~~Water~~	R	R	R	R	R	R	R	R	R	8
	~~PR2-B1-B~~			~~Water~~	R	R	R	R						4
	~~PD1-A~~			~~Water~~	R	R	R	R	R	R	R	R	R	8
	~~PD1-B~~			~~Water~~	R	R	R	R						4
	~~PD3-A~~			~~Water~~	R	R	R	R	R	R	R	R	R	8
	~~PD3-B~~			~~Water~~	R	R	R	R						4
	~~PD5-A~~			~~Water~~	R	R	R	R	R	R	R	R	R	8
	~~PD5-B~~			~~Water~~	R	R	R	R						4
	~~D1-Shallow-A~~			~~Water~~	R	R	R	R	R	R	R	R	R	8
	~~D1-Shallow-B~~			~~Water~~	R	R	R	R						4
	~~D1-Deep-A~~			~~Water~~	R	R	R	R	R	R	R	R	R	8
	~~D1-Deep-B~~			~~Water~~	R	R	R	R						4
	~~W1-Shallow-A~~			~~Water~~	R	R	R	R	R	R	R	R	R	8
	~~W1-Shallow-B~~			~~Water~~	R	R	R	R						4
	~~W1-Deep-A~~			~~Water~~	R	R	R	R	R	R	R	R	R	8
	~~W1-Deep-B~~			~~Water~~	R	R	R	R						4
	Travel Blank	26 AUG 22	-	Water	R		R	22						2

Environmental Division
Fort St. John
Work Order Reference
FJ2202360

Telephone : +1 250 261 6517

FJAE Shipping & Receiving
Call Out Expedite
Priority
Air
# of Coolers
# of Carboys Ground

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	Please send Azimuth a copy of the data in their EDD format:
Are samples for human drinking water use? ☐ YES ☑ NO	gmann@azimuthgroup.ca imcivor@azimuthgroup.ca

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
5.7	12.7

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: Aug 26, 2022	Time:	Received by:	Date: Aug 26/22	Time: 1700	Received by: RC	Date: 08/28/22	Time: 1330

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 back page of the white - report copy.

[1] If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202608**	Page	: 1 of 6
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 19-Sep-2022 14:46
PO	: 1200-25.03.02	Date Analysis Commenced	: 21-Sep-2022
C-O-C number	: ----	Issue Date	: 28-Sep-2022 16:57
Sampler	: ----		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 6		
No. of samples analysed	: 6		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Anthony Calero	Supervisor - Inorganic	Metals, Calgary, Alberta
Elke Tabora		Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter		Metals, Calgary, Alberta
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Parker Sgarbossa	Laboratory Analyst	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sara Niroomand		Inorganics, Calgary, Alberta
Vladka Stamenova	Analyst	Inorganics, Calgary, Alberta

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
%	percent
µS/cm	Microsiemens per centimetre
CU	colour units (1 CU = 1 mg/L Pt)
meq/L	milliequivalents per litre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	*Description*
DLDS	*Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.*
SFT	*Sample was filtered due to turbidity interference. Result reflects soluble analyte concentration.*

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	PD2	BEA	PD3	KR	PD4
					Client sampling date / time	19-Sep-2022 08:50	19-Sep-2022 09:40	19-Sep-2022 10:30	19-Sep-2022 11:15	19-Sep-2022 12:05
						FJ2202608-001	FJ2202608-002	FJ2202608-003	FJ2202608-004	FJ2202608-005
						Result	Result	Result	Result	Result
Physical Tests										
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L		86.7	149	86.1	206	90.7
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L		<1.0	<1.0	<1.0	10.4	<1.0
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L		<1.0	<1.0	<1.0	5.2	<1.0
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		86.7	149	86.1	216	90.7
colour, true	----	E329	5.0	CU		6.1	118	6.5	11.4	5.6
conductivity	----	E100	2.0	µS/cm		182	386	185	539	188
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		92.0	149	96.4	169	96.7
pH	----	E108	0.10	pH units		8.06	8.24	8.08	8.43	8.10
solids, total dissolved [TDS]	----	E162	10	mg/L		108	283	104	365	108
solids, total suspended [TSS]	----	E160	3.0	mg/L		<3.0	<3.0	<3.0	24.8	<3.0
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L		<0.0050	0.0091	0.0109	0.0157	0.0060
chloride	16887-00-6	E235.Cl	0.50	mg/L		<0.50	2.65	<0.50	2.29	<0.50
fluoride	16984-48-8	E235.F	0.020	mg/L		0.034	0.134	0.036	0.180	0.036
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L		0.104	0.764	0.088	1.01	0.106
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		0.0527	<0.0050	0.0527	0.283	0.0480
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		0.0017	<0.0010	0.0015	0.0053	0.0013
nitrogen, total	7727-37-9	EC368	0.050	mg/L		0.158	0.764	0.142	1.30	0.155
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L		0.0015	0.0041	0.0016	0.0019	0.0016
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L		0.0100	0.0356	0.0105	0.231	0.0124
phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L		<0.0020	0.0111	<0.0020	0.0256	<0.0020
silicate (as SiO2)	7631-86-9	E392	0.50	mg/L		4.15	3.52 SFT	4.10	0.79 SFT	4.00
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		13.6	66.2	14.0	92.4	14.6
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L		2.78	26.5	2.85	8.00	2.70
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		3.16	28.9	2.64	10.5	2.81
Ion Balance										
anion sum	----	EC101	0.10	meq/L		2.02	4.44	2.02	6.33	2.12
cation sum	----	EC101	0.10	meq/L		1.90	4.42	2.00	6.21	2.01

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	PD2	BEA	PD3	KR	PD4
					Client sampling date / time	19-Sep-2022 08:50	19-Sep-2022 09:40	19-Sep-2022 10:30	19-Sep-2022 11:15	19-Sep-2022 12:05
						FJ2202608-001	FJ2202608-002	FJ2202608-003	FJ2202608-004	FJ2202608-005
						Result	Result	Result	Result	Result
Ion Balance										
ion balance (APHA)	----	EC101	0.010	%		3.06	0.226	0.498	0.957	2.66
Dissolved Metals										
calcium, dissolved	7440-70-2	E421	0.050	mg/L		25.6	39.3	27.1	37.2	26.9
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		6.81	12.3	6.97	18.6	7.18
dissolved metals filtration location	----	EP421	-	-		Laboratory	Laboratory	Laboratory	Laboratory	Laboratory

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	POUCE	----	----	----	----
					Client sampling date / time	19-Sep-2022 12:40	----	----	----	----
					FJ2202608-006	--------	--------	--------	--------
					Result	----	----	----	----
Physical Tests										
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L		207	----	----	----	----
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L		8.2	----	----	----	----
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L		<1.0	----	----	----	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L		4.1	----	----	----	----
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		216	----	----	----	----
colour, true	----	E329	5.0	CU		12.6	----	----	----	----
conductivity	----	E100	2.0	µS/cm		1180	----	----	----	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		403	----	----	----	----
pH	----	E108	0.10	pH units		8.40	----	----	----	----
solids, total dissolved [TDS]	----	E162	10	mg/L		853	----	----	----	----
solids, total suspended [TSS]	----	E160	3.0	mg/L		<3.0	----	----	----	----
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L		0.0068	----	----	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L		28.8	----	----	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L		0.224	----	----	----	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L		0.561	----	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		0.0679	----	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		<0.0050 DLDS	----	----	----	----
nitrogen, total	7727-37-9	EC368	0.050	mg/L		0.629	----	----	----	----
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L		0.0016	----	----	----	----
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L		0.0167	----	----	----	----
phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L		0.0026	----	----	----	----
silicate (as SiO2)	7631-86-9	E392	0.50	mg/L		1.19	----	----	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		427	----	----	----	----
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L		12.1	----	----	----	----
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		11.9	----	----	----	----
Ion Balance										
anion sum	----	EC101	0.10	meq/L		14.0	----	----	----	----
cation sum	----	EC101	0.10	meq/L		13.9	----	----	----	----
ion balance (APHA)	----	EC101	0.010	%		0.358	----	----	----	----

Analytical Results

Sub-Matrix: **Water** (Matrix: **Water**)					Client sample ID	**POUCE**	----	----	----	----
					Client sampling date / time	19-Sep-2022 12:40	----	----	----	----
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*		**FJ2202608-006**	--------	--------	--------	--------
						Result	----	----	----	----
Dissolved Metals										
calcium, dissolved	7440-70-2	E421	0.050	mg/L		92.7	----	----	----	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		41.6	----	----	----	----
dissolved metals filtration location	----	EP421	-	-		Laboratory	----	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202608**	Page	: 1 of 21
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 19-Sep-2022 14:46
PO	: 1200-25.03.02	Issue Date	: 28-Sep-2022 16:58
C-O-C number	: ----		
Sampler	: ----		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 6		
No. of samples analysed	: 6		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
BEA	E298	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
KR	E298	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
PD2	E298	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
PD3	E298	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
PD4	E298	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
POUCE	E298	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
BEA	E235.Cl	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE KR	E235.Cl	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PD2	E235.Cl	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PD3	E235.Cl	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PD4	E235.Cl	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE POUCE	E235.Cl	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE BEA	E378-U	19-Sep-2022	22-Sep-2022	----	----		22-Sep-2022	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE KR	E378-U	19-Sep-2022	22-Sep-2022	----	----		22-Sep-2022	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PD2	E378-U	19-Sep-2022	22-Sep-2022	----	----		22-Sep-2022	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PD3	E378-U	19-Sep-2022	22-Sep-2022	----	----		22-Sep-2022	3 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PD4	E378-U	19-Sep-2022	22-Sep-2022	----	----		22-Sep-2022	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE POUCE	E378-U	19-Sep-2022	22-Sep-2022	----	----		22-Sep-2022	3 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE BEA	E235.F	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE KR	E235.F	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PD2	E235.F	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PD3	E235.F	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PD4	E235.F	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE POUCE	E235.F	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE BEA	E235.NO3-L	19-Sep-2022	21-Sep-2022	3 days	2 days	✓	21-Sep-2022	3 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE KR	E235.NO3-L	19-Sep-2022	21-Sep-2022	3 days	2 days	✓	21-Sep-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PD2	E235.NO3-L	19-Sep-2022	21-Sep-2022	3 days	2 days	✓	21-Sep-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PD3	E235.NO3-L	19-Sep-2022	21-Sep-2022	3 days	2 days	✓	21-Sep-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PD4	E235.NO3-L	19-Sep-2022	21-Sep-2022	3 days	2 days	✓	21-Sep-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE POUCE	E235.NO3-L	19-Sep-2022	21-Sep-2022	3 days	2 days	✓	21-Sep-2022	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE BEA	E235.NO2-L	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE KR	E235.NO2-L	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PD2	E235.NO2-L	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PD3	E235.NO2-L	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PD4	E235.NO2-L	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE POUCE	E235.NO2-L	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	2 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE BEA	E392	19-Sep-2022	----	----	----		22-Sep-2022	28 days	3 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE KR	E392	19-Sep-2022	----	----	----		22-Sep-2022	28 days	3 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PD2	E392	19-Sep-2022	----	----	----		22-Sep-2022	28 days	3 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PD3	E392	19-Sep-2022	----	----	----		22-Sep-2022	28 days	3 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PD4	E392	19-Sep-2022	----	----	----		22-Sep-2022	28 days	3 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE POUCE	E392	19-Sep-2022	----	----	----		22-Sep-2022	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE BEA	E235.SO4	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE KR	E235.SO4	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PD2	E235.SO4	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PD3	E235.SO4	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PD4	E235.SO4	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE POUCE	E235.SO4	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) BEA	E375-T	19-Sep-2022	23-Sep-2022	----	----		25-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) KR	E375-T	19-Sep-2022	23-Sep-2022	----	----		25-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PD2	E375-T	19-Sep-2022	23-Sep-2022	----	----		25-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PD3	E375-T	19-Sep-2022	23-Sep-2022	----	----		25-Sep-2022	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PD4	E375-T	19-Sep-2022	23-Sep-2022	----	----		25-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) POUCE	E375-T	19-Sep-2022	23-Sep-2022	----	----		25-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) BEA	E318	19-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	4 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) KR	E318	19-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	4 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PD2	E318	19-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	4 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PD3	E318	19-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	4 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PD4	E318	19-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	4 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) POUCE	E318	19-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	4 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) BEA	E372-U	19-Sep-2022	22-Sep-2022	----	----		25-Sep-2022	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) KR	E372-U	19-Sep-2022	22-Sep-2022	----	----		25-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PD2	E372-U	19-Sep-2022	22-Sep-2022	----	----		25-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PD3	E372-U	19-Sep-2022	22-Sep-2022	----	----		25-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PD4	E372-U	19-Sep-2022	22-Sep-2022	----	----		25-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) POUCE	E372-U	19-Sep-2022	22-Sep-2022	----	----		25-Sep-2022	28 days	6 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) BEA	E421	19-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	180 days	5 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) KR	E421	19-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	180 days	5 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PD2	E421	19-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	180 days	5 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PD3	E421	19-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	180 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PD4	E421	19-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	180 days	5 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) POUCE	E421	19-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	180 days	5 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) BEA	E358-L	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) KR	E358-L	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PD2	E358-L	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PD3	E358-L	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PD4	E358-L	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) POUCE	E358-L	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) BEA	E355-L	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) KR	E355-L	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PD2	E355-L	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PD3	E355-L	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PD4	E355-L	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) POUCE	E355-L	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE BEA	E290	19-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE KR	E290	19-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PD2	E290	19-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PD3	E290	19-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	14 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE PD4	E290	19-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE POUCE	E290	19-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	14 days	5 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE BEA	E329	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE KR	E329	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PD2	E329	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PD3	E329	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PD4	E329	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE POUCE	E329	19-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE BEA	E100	19-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	28 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE KR	E100	19-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE PD2	E100	19-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE PD3	E100	19-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE PD4	E100	19-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE POUCE	E100	19-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	28 days	5 days	✓
Physical Tests : pH by Meter										
HDPE BEA	E108	19-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	0.25 hrs	0.26 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE KR	E108	19-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	0.25 hrs	0.26 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PD2	E108	19-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	0.25 hrs	0.26 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PD3	E108	19-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	0.25 hrs	0.26 hrs	× EHTR-FM

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE PD4	E108	19-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	0.25 hrs	0.26 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE POUCE	E108	19-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	0.25 hrs	0.26 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE BEA	E162	19-Sep-2022	----	----	----		22-Sep-2022	7 days	3 days	✓
Physical Tests : TDS by Gravimetry										
HDPE KR	E162	19-Sep-2022	----	----	----		22-Sep-2022	7 days	3 days	✓
Physical Tests : TDS by Gravimetry										
HDPE PD2	E162	19-Sep-2022	----	----	----		22-Sep-2022	7 days	3 days	✓
Physical Tests : TDS by Gravimetry										
HDPE PD3	E162	19-Sep-2022	----	----	----		22-Sep-2022	7 days	3 days	✓
Physical Tests : TDS by Gravimetry										
HDPE PD4	E162	19-Sep-2022	----	----	----		22-Sep-2022	7 days	3 days	✓
Physical Tests : TDS by Gravimetry										
HDPE POUCE	E162	19-Sep-2022	----	----	----		22-Sep-2022	7 days	3 days	✓
Physical Tests : TSS by Gravimetry										
HDPE BEA	E160	19-Sep-2022	----	----	----		23-Sep-2022	7 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TSS by Gravimetry										
HDPE KR	E160	19-Sep-2022	----	----	----		23-Sep-2022	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PD2	E160	19-Sep-2022	----	----	----		23-Sep-2022	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PD3	E160	19-Sep-2022	----	----	----		23-Sep-2022	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PD4	E160	19-Sep-2022	----	----	----		23-Sep-2022	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE POUCE	E160	19-Sep-2022	----	----	----		23-Sep-2022	7 days	4 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	663940	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	657878	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	657793	1	11	9.0	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	658631	1	12	8.3	5.0	✓
Conductivity in Water	E100	663939	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	664252	1	18	5.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	657267	1	11	9.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	659566	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	657787	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	657790	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	657791	1	20	5.0	5.0	✓
pH by Meter	E108	663938	1	17	5.8	5.0	✓
Reactive Silica by Colourimetry	E392	660946	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	657792	1	16	6.2	5.0	✓
TDS by Gravimetry	E162	658118	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	661979	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	660033	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	657271	1	11	9.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	660111	2	40	5.0	5.0	✓
TSS by Gravimetry	E160	661507	1	15	6.6	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	663940	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	657878	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	657793	1	11	9.0	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	658631	1	12	8.3	5.0	✓
Conductivity in Water	E100	663939	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	664252	1	18	5.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	657267	1	11	9.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	659566	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	657787	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	657790	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	657791	1	20	5.0	5.0	✓
pH by Meter	E108	663938	1	17	5.8	5.0	✓
Reactive Silica by Colourimetry	E392	660946	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	657792	1	16	6.2	5.0	✓
TDS by Gravimetry	E162	658118	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	661979	1	20	5.0	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	660033	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	657271	1	11	9.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	660111	2	40	5.0	5.0	✓
TSS by Gravimetry	E160	661507	1	15	6.6	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	663940	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	657878	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	657793	1	11	9.0	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	658631	1	12	8.3	5.0	✓
Conductivity in Water	E100	663939	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	664252	1	18	5.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	657267	1	11	9.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	659566	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	657787	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	657790	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	657791	1	20	5.0	5.0	✓
Reactive Silica by Colourimetry	E392	660946	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	657792	1	16	6.2	5.0	✓
TDS by Gravimetry	E162	658118	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	661979	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	660033	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	657271	1	11	9.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	660111	2	40	5.0	5.0	✓
TSS by Gravimetry	E160	661507	1	15	6.6	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	657878	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	657793	1	11	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	664252	1	18	5.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	657267	1	11	9.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	659566	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	657787	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	657790	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	657791	1	20	5.0	5.0	✓
Reactive Silica by Colourimetry	E392	660946	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	657792	1	16	6.2	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	661979	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	660033	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	657271	1	11	9.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	660111	2	40	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Calgary - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Calgary - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Calgary - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 Calgary - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Calgary - Environmental	Water	APHA 2320 B (mod)	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.
Ammonia by Fluorescence	E298 Calgary - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Calgary - Environmental	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Colour (True) by Spectrometer (5 CU)	E329 Calgary - Environmental	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Calgary - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Calgary - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U Calgary - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T Calgary - Environmental	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U Calgary - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Reactive Silica by Colourimetry	E392 Vancouver - Environmental	Water	APHA 4500-SiO_2 E (mod)	Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method using a discrete analyzer. Method Limitation: Arsenic (5+) above 100 mg/L is a negative interference on this test
Dissolved Metals in Water by CRC ICPMS	E421 Calgary - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 Calgary - Environmental	Water	APHA 2340B	"Hardness (as $CaCO_3$), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ion Balance using Dissolved Metals	EC101 Calgary - Environmental	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
Total Nitrogen (calculation)	EC368 Calgary - Environmental	Water	BC MOE LABORATORY MANUAL (2005)	Total Nitrogen is a calculated parameter. Total Nitrogen = Total Kjeldahl Nitrogen + [Nitrate and Nitrite (as N)].

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Calgary - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 Calgary - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Total Organic Carbon by Combustion	EP355 Calgary - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 Calgary - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Phosphorus in water	EP372 Calgary - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 Calgary - Environmental	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 Calgary - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

QUALITY CONTROL REPORT

Work Order	: **FJ2202608**	Page	: 1 of 10
Client	: Ecofish Research Ltd	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 19-Sep-2022 14:46
PO	: 1200-25.03.02	Date Analysis Commenced	: 21-Sep-2022
C-O-C number	: ----	Issue Date	: 28-Sep-2022 16:57
Sampler	: ----		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 6		
No. of samples analysed	: 6		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Anthony Calero	Supervisor - Inorganic	Calgary Metals, Calgary, Alberta
Elke Tabora		Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter		Calgary Metals, Calgary, Alberta
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Parker Sgarbossa	Laboratory Analyst	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sara Niroomand		Calgary Inorganics, Calgary, Alberta
Vladka Stamenova	Analyst	Calgary Inorganics, Calgary, Alberta

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 658118)											
CG2212867-007	Anonymous	solids, total dissolved [TDS]	----	E162	10	mg/L	<10	<10	0	Diff <2x LOR	----
Physical Tests (QC Lot: 658631)											
FJ2202603-001	Anonymous	colour, true	----	E329	5.0	CU	<5.0	<5.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 661507)											
FJ2202608-001	PD2	solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 663938)											
CG2212783-022	Anonymous	pH	----	E108	0.10	pH units	7.98	8.01	0.375%	4%	----
Physical Tests (QC Lot: 663939)											
CG2212783-023	Anonymous	conductivity	----	E100	2.0	µS/cm	99.6	98.7	0.908%	10%	----
Physical Tests (QC Lot: 663940)											
CG2212783-023	Anonymous	alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	59.0	62.7	6.08%	20%	----
		alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, total (as CaCO3)	----	E290	2.0	mg/L	59.0	62.7	6.08%	20%	----
Anions and Nutrients (QC Lot: 657787)											
CG2212850-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.169	0.171	0.001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 657790)											
CG2212850-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	12.3	12.4	0.438%	20%	----
Anions and Nutrients (QC Lot: 657791)											
CG2212850-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0038	0.0038	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 657792)											
CG2212850-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	205	206	0.485%	20%	----
Anions and Nutrients (QC Lot: 657793)											
FJ2202608-001	PD2	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 657878)											
FJ2202608-001	PD2	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 659566)											
CG2212844-001	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0031	0.0030	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 660033)											
CG2212932-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	1.07	1.04	2.92%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 660111)											
FC2202240-002	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0457	0.0468	2.48%	20%	----
Anions and Nutrients (QC Lot: 660112)											
FJ2202608-006	POUCE	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0167	0.0167	0.00004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 660946)											
EO2207790-001	Anonymous	silicate (as SiO2)	7631-86-9	E392	0.50	mg/L	11.6	11.5	0.618%	20%	----
Anions and Nutrients (QC Lot: 661979)											
FC2202257-001	Anonymous	phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	0.0032	0.0029	0.0003	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 657267)											
FJ2202608-001	PD2	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.78	2.78	0.004	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 657271)											
FJ2202608-001	PD2	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	3.16	3.01	0.14	Diff <2x LOR	----
Dissolved Metals (QC Lot: 664252)											
CG2212922-001	Anonymous	calcium, dissolved	7440-70-2	E421	0.050	mg/L	66.6	65.5	1.69%	20%	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	29.9	29.3	1.88%	20%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 658118)						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 658631)						
colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 661507)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 663939)						
conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 663940)						
alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Anions and Nutrients (QCLot: 657787)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 657790)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 657791)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 657792)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 657793)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 657878)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 659566)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 660033)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 660111)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 660112)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 660946)						
silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 661979)						
phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----
Organic / Inorganic Carbon (QCLot: 657267)						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 657271)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 664252)						
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 658118)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	97.9	85.0	115	----
Physical Tests (QCLot: 658631)									
colour, true	----	E329	5	CU	100 CU	101	85.0	115	----
Physical Tests (QCLot: 661507)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	89.2	85.0	115	----
Physical Tests (QCLot: 663938)									
pH	----	E108	----	pH units	7 pH units	101	98.6	101	----
Physical Tests (QCLot: 663939)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	103	90.0	110	----
Physical Tests (QCLot: 663940)									
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	229 mg/L	99.4	75.0	125	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	104	85.0	115	----
Anions and Nutrients (QCLot: 657787)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 657790)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 657791)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.8	90.0	110	----
Anions and Nutrients (QCLot: 657792)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 657793)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.6	90.0	110	----
Anions and Nutrients (QCLot: 657878)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	103	85.0	115	----
Anions and Nutrients (QCLot: 659566)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	99.7	80.0	120	----
Anions and Nutrients (QCLot: 660033)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	99.1	75.0	125	----
Anions and Nutrients (QCLot: 660111)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	110	80.0	120	----
Anions and Nutrients (QCLot: 660112)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	110	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 660946)									
silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	10 mg/L	106	85.0	115	----
Anions and Nutrients (QCLot: 661979)									
phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.03 mg/L	103	80.0	120	----
Organic / Inorganic Carbon (QCLot: 657267)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	93.7	80.0	120	----
Organic / Inorganic Carbon (QCLot: 657271)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	100	80.0	120	----
Dissolved Metals (QCLot: 664252)									
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	96.4	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	105	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 657787)										
CG2212854-001	Anonymous	fluoride	16984-48-8	E235.F	1.02 mg/L	1 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 657790)										
CG2212854-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.53 mg/L	2.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 657791)										
CG2212854-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.513 mg/L	0.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 657792)										
CG2212854-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	100 mg/L	100 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 657793)										
FJ2202608-002	BEA	chloride	16887-00-6	E235.Cl	95.4 mg/L	100 mg/L	95.4	75.0	125	----
Anions and Nutrients (QCLot: 657878)										
FJ2202608-002	BEA	ammonia, total (as N)	7664-41-7	E298	0.104 mg/L	0.1 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 659566)										
CG2212844-002	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0515 mg/L	0.05 mg/L	103	70.0	130	----
Anions and Nutrients (QCLot: 660033)										
CG2212932-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.60 mg/L	2.5 mg/L	104	70.0	130	----
Anions and Nutrients (QCLot: 660111)										
FC2202241-001	Anonymous	phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 660112)										
SK2205149-001	Anonymous	phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 660946)										
EO2207790-002	Anonymous	silicate (as SiO2)	7631-86-9	E392	ND mg/L	10 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 661979)										
FC2202258-001	Anonymous	phosphorus, total dissolved	7723-14-0	E375-T	0.0473 mg/L	0.05 mg/L	94.7	70.0	130	----
Organic / Inorganic Carbon (QCLot: 657267)										
FJ2202608-001	PD2	carbon, dissolved organic [DOC]	----	E358-L	4.77 mg/L	5 mg/L	95.4	70.0	130	----
Organic / Inorganic Carbon (QCLot: 657271)										
FJ2202608-001	PD2	carbon, total organic [TOC]	----	E355-L	4.92 mg/L	5 mg/L	98.4	70.0	130	----
Dissolved Metals (QCLot: 664252)										

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 664252) - continued										
CG2212922-002	Anonymous	calcium, dissolved	7440-70-2	E421	ND mg/L	40 mg/L	ND	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	10 mg/L	ND	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 2022-Sept-MON8/9- Day 2

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Page of

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Leah Hull
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To YES / NO
	Copy of Invoice with Report YES / NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Reports / Recipients

Select Report Format: PDF / EXCEL / EDD (DIGITAL)
Merge QC/QCI Reports with COA YES / NO / N/A
Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: EMAIL / MAIL / FAX
Email 1 or Fax lhull@ecofishresearch.com
Email 2 tkasubuchi@ecofishresearch.com
Email 3 waterqualitylabdata@ecofishresearch.com

Invoice Recipients

Select Invoice Distribution: EMAIL / MAIL / FAX
Email 1 or Fax accountspayable@ecofishresearch.com
Email 2

Turnaround Time (TAT) Requested

- Routine [R] if received by 3pm M-F - no surcharges apply
- 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
- 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
- 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
- 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
  Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Date and Time Required for all E&P TATs:

For all tests with rush TATs requested, please contact your AM to confirm availability.

Project Information

ALS Account # / Quote #:	VA22-ECOF100-004
Job #:	Surface water MON8/9- no metals
PO / AFE:	1200-25.03.02
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (ALS use only):

ALS Contact: Sneha Sansare

Sampler: Pat Beaupre

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Alk., Ec, pH, TDS, TSS, Anions, Si, diss ortho P, colour, pH (F/P)	DOC, Total dissolved P (F)	Hardness (F)	NH3, Total Kjeldahl, Nitrogen, Total N, TOC, Total P (P)	IONBALANCE-BC-CL	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	~~PG1~~ PD2	19 SEP 22	08:50	Water	4	R	R	R	R	R			
	~~PR1~~ BEA	19 SEP 22	09:40	Water	4	R	R	R	R	R			
	~~PR2~~ PD3	19 SEP 22	10:30	Water	4	R	R	R	R	R			
	~~HB-A~~ KR	19 SEP 22	11:15	Water	4	R	R	R	R	R			
	~~HB-B~~ PD4	19 SEP 22	12:05	Water	4	R	R	R	R	R			
	~~PR-2.84-A~~ POUCE	19 SEP 22	12:40	Water	4	R	R	R	R	R			
	~~PR-2.84-B~~			~~Water~~	4	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~			

Fort St. John
Work Order Reference
FJ2202608

Telephone : +1 250 261 5517

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? YES / NO

Are samples for human consumption/ use? YES / NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Please send Azimuth a copy of the data in their EDD format:

qmann@azimuthgroup.ca jmcivor@azimuthgroup.ca

Add. for report: csuzanne@ecofishresearch.com,kganshorn@ecofishresearch.com

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: NONE / ICE / ICE PACKS / FROZEN / COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: YES / NO

Cooler Custody Seals Intact: YES / N/A Sample Custody Seals Intact: YES / N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
9.1°C							

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
	Sept 19, 2022	

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
	9-19-22	2:46

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202622**	Page	: 1 of 4
Amendment	: **1**		
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 20-Sep-2022 11:40
PO	: 1200-25.03.02	Date Analysis Commenced	: 21-Sep-2022
C-O-C number	: 2022-sept-MON8/9-Day2	Issue Date	: 06-Jun-2023 14:39
Sampler	: PAT BEAUPRE		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Anthony Calero	Supervisor - Inorganic	Inorganics, Calgary, Alberta
Anthony Calero	Supervisor - Inorganic	Metals, Calgary, Alberta
Caitlin Macey	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Elke Tabora		Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Naeun Kim	Analyst	Metals, Calgary, Alberta
Parker Sgarbossa	Laboratory Analyst	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Vladka Stamenova	Analyst	Inorganics, Calgary, Alberta

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.
Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
µS/cm	microsiemens per centimetre
CU	colour units (1 cu = 1 mg/l pt)
meq/L	milliequivalents per litre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Accreditation

Accreditation	*Description*	*Laboratory*	*Address*
A	CALA ISO/IEC 17025:2017	CG Calgary - Environmental	2559 29th Street NE, Calgary, Alberta
B	CALA ISO/IEC 17025:2017	VA Vancouver - Environmental	8081 Lougheed Highway, Burnaby, British Columbia

Applicable accreditations are indicated in the Method/Lab column as superscripts.

Workorder Comments

Amendment (6/6/2023): This report has been amended as a result of a request to change sample identification numbers (IDs) received by ALS from Sarah Kennedy on 6/6/2023. All analysis results are as per the previous report.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID: MD	PR3-A	PR3-B	----	----
						Client sampling date / time: 20-Sep-2022 09:25	20-Sep-2022 10:35	20-Sep-2022 10:35	----	----
						FJ2202622-001	FJ2202622-002	FJ2202622-003	--------	--------
						Result	Result	Result	----	----
Physical Tests										
Alkalinity, bicarbonate (as CaCO3)	----	E290/CG	A	1.0	mg/L	166	84.1	86.5	----	----
Alkalinity, carbonate (as CaCO3)	----	E290/CG	A	1.0	mg/L	6.0	<1.0	<1.0	----	----
Alkalinity, hydroxide (as CaCO3)	----	E290/CG	A	1.0	mg/L	<1.0	<1.0	<1.0	----	----
Alkalinity, phenolphthalein (as CaCO3)	----	E290/CG	A	1.0	mg/L	3.0	<1.0	<1.0	----	----
Alkalinity, total (as CaCO3)	----	E290/CG	A	1.0	mg/L	172	84.1	86.5	----	----
Colour, true	----	E329/CG	A	5.0	CU	5.3	6.6	7.0	----	----
Conductivity	----	E100/CG	A	2.0	µS/cm	339	175	175	----	----
Hardness (as CaCO3), dissolved	----	EC100/CG		0.60	mg/L	174	87.4	86.9	----	----
pH	----	E108/CG	A	0.10	pH units	8.34	7.99	7.99	----	----
Solids, total dissolved [TDS]	----	E162/CG	A	10	mg/L	192	97	110	----	----
Solids, total suspended [TSS]	----	E160/CG	A	3.0	mg/L	<3.0	<3.0	<3.0	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	A	0.0050	mg/L	<0.0050	<0.0050	<0.0050	----	----
Chloride	16887-00-6	E235.Cl/CG	A	0.50	mg/L	0.54	<0.50	<0.50	----	----
Fluoride	16984-48-8	E235.F/CG	A	0.020	mg/L	0.086	0.033	0.033	----	----
Kjeldahl nitrogen, total [TKN]	----	E318/CG	A	0.050	mg/L	0.146	0.092	0.129	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/CG	A	0.0050	mg/L	<0.0050	0.0561	0.0566	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/CG	A	0.0010	mg/L	<0.0010	0.0017	0.0018	----	----
Nitrogen, total	7727-37-9	EC368/CG		0.050	mg/L	0.146	0.150	0.187	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	A	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----
Phosphorus, total	7723-14-0	E372-U/CG	A	0.0020	mg/L	0.0048	0.0050	0.0046	----	----
Phosphorus, total dissolved	7723-14-0	E375-T/CG	A	0.0020	mg/L	<0.0020	<0.0020	<0.0020	----	----
Silicate (as SiO2)	7631-86-9	E392/VA	B	0.50	mg/L	3.81	4.11	4.11	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/CG	A	0.30	mg/L	21.4	12.8	12.8	----	----
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/CG	A	0.50	mg/L	3.93	3.29	3.19	----	----
Carbon, total organic [TOC]	----	E355-L/CG	A	0.50	mg/L	3.51	3.14	3.07	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MD	PR3-A	PR3-B	----	----
					Client sampling date / time	20-Sep-2022 09:25	20-Sep-2022 10:35	20-Sep-2022 10:35	----	----
Analyte	CAS Number	Method/Lab		LOR	Unit	FJ2202622-001	FJ2202622-002	FJ2202622-003	--------	--------
						Result	Result	Result	----	----
Ion Balance										
Anion sum	----	EC101/CG		0.10	meq/L	3.90	1.95	2.00	----	----
Cation sum	----	EC101/CG		0.10	meq/L	3.74	1.80	1.79	----	----
Ion balance (APHA)	----	EC101/CG		0.010	%	2.09	4.00	5.54	----	----
Dissolved Metals										
Calcium, dissolved	7440-70-2	E421/CG	A	0.050	mg/L	48.1	25.2	25.1	----	----
Magnesium, dissolved	7439-95-4	E421/CG	A	0.0050	mg/L	13.2	5.95	5.89	----	----
Dissolved metals filtration location	----	EP421/CG		-	-	Laboratory	Laboratory	Laboratory	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202622**	Page	: 1 of 16
Amendment	: 1		
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 20-Sep-2022 11:40
PO	: 1200-25.03.02	Issue Date	: 06-Jun-2023 14:40
C-O-C number	: 2022-sept-MON8/9-Day2		
Sampler	: PAT BEAUPRE		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MD	E298	20-Sep-2022	22-Sep-2022	----	----		22-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PR3-A	E298	20-Sep-2022	22-Sep-2022	----	----		22-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PR3-B	E298	20-Sep-2022	22-Sep-2022	----	----		22-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MD	E235.Cl	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PR3-A	E235.Cl	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PR3-B	E235.Cl	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE MD	E378-U	20-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PR3-A	E378-U	20-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PR3-B	E378-U	20-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE MD	E235.F	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PR3-A	E235.F	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PR3-B	E235.F	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MD	E235.NO3-L	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PR3-A	E235.NO3-L	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PR3-B	E235.NO3-L	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MD	E235.NO2-L	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PR3-A	E235.NO2-L	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PR3-B	E235.NO2-L	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	1 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE MD	E392	20-Sep-2022	----	----	----		22-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PR3-A	E392	20-Sep-2022	----	----	----		22-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PR3-B	E392	20-Sep-2022	----	----	----		22-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE MD	E235.SO4	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	1 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PR3-A	E235.SO4	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE PR3-B	E235.SO4	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	1 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) MD	E375-T	20-Sep-2022	23-Sep-2022	----	----		26-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PR3-A	E375-T	20-Sep-2022	23-Sep-2022	----	----		26-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PR3-B	E375-T	20-Sep-2022	23-Sep-2022	----	----		26-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) MD	E318	20-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	28 days	4 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PR3-A	E318	20-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	28 days	4 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PR3-B	E318	20-Sep-2022	24-Sep-2022	----	----		24-Sep-2022	28 days	4 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MD	E372-U	20-Sep-2022	23-Sep-2022	----	----		26-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PR3-A	E372-U	20-Sep-2022	23-Sep-2022	----	----		26-Sep-2022	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PR3-B	E372-U	20-Sep-2022	23-Sep-2022	----	----		26-Sep-2022	28 days	6 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) MD	E421	20-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	180 days	5 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) PR3-A	E421	20-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	180 days	5 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) PR3-B	E421	20-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	180 days	5 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MD	E358-L	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	1 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PR3-A	E358-L	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	1 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PR3-B	E358-L	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) MD	E355-L	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PR3-A	E355-L	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PR3-B	E355-L	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	28 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MD	E290	20-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PR3-A	E290	20-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PR3-B	E290	20-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	14 days	5 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE MD	E329	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	1 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PR3-A	E329	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	1 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PR3-B	E329	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE MD	E100	20-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE PR3-A	E100	20-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	28 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE PR3-B	E100	20-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	28 days	5 days	✓
Physical Tests : pH by Meter										
HDPE MD	E108	20-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	0.25 hrs	0.26 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PR3-A	E108	20-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	0.25 hrs	0.26 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PR3-B	E108	20-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	0.25 hrs	0.26 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE MD	E162	20-Sep-2022	----	----	----		22-Sep-2022	7 days	2 days	✓
Physical Tests : TDS by Gravimetry										
HDPE PR3-A	E162	20-Sep-2022	----	----	----		22-Sep-2022	7 days	2 days	✓
Physical Tests : TDS by Gravimetry										
HDPE PR3-B	E162	20-Sep-2022	----	----	----		22-Sep-2022	7 days	2 days	✓
Physical Tests : TSS by Gravimetry										
HDPE MD	E160	20-Sep-2022	----	----	----		23-Sep-2022	7 days	3 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PR3-A	E160	20-Sep-2022	----	----	----		23-Sep-2022	7 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TSS by Gravimetry										
HDPE										
PR3-B	E160	20-Sep-2022	----	----	----		23-Sep-2022	7 days	3 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	664706	1	13	7.6	5.0	✓
Ammonia by Fluorescence	E298	660421	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	657793	1	11	9.0	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	658631	1	12	8.3	5.0	✓
Conductivity in Water	E100	664705	1	14	7.1	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	664934	1	18	5.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	657267	1	11	9.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	661541	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	657787	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	657790	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	657791	1	20	5.0	5.0	✓
pH by Meter	E108	664704	1	19	5.2	5.0	✓
Reactive Silica by Colourimetry	E392	660946	2	37	5.4	5.0	✓
Sulfate in Water by IC	E235.SO4	657792	1	16	6.2	5.0	✓
TDS by Gravimetry	E162	658118	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	662375	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	662642	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	657271	1	11	9.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	662384	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	661507	1	15	6.6	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	664706	1	13	7.6	5.0	✓
Ammonia by Fluorescence	E298	660421	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	657793	1	11	9.0	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	658631	1	12	8.3	5.0	✓
Conductivity in Water	E100	664705	1	14	7.1	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	664934	1	18	5.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	657267	1	11	9.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	661541	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	657787	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	657790	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	657791	1	20	5.0	5.0	✓
pH by Meter	E108	664704	1	19	5.2	5.0	✓
Reactive Silica by Colourimetry	E392	660946	2	37	5.4	5.0	✓
Sulfate in Water by IC	E235.SO4	657792	1	16	6.2	5.0	✓
TDS by Gravimetry	E162	658118	1	20	5.0	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	662375	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	662642	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	657271	1	11	9.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	662384	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	661507	1	15	6.6	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	664706	1	13	7.6	5.0	✓
Ammonia by Fluorescence	E298	660421	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	657793	1	11	9.0	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	658631	1	12	8.3	5.0	✓
Conductivity in Water	E100	664705	1	14	7.1	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	664934	1	18	5.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	657267	1	11	9.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	661541	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	657787	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	657790	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	657791	1	20	5.0	5.0	✓
Reactive Silica by Colourimetry	E392	660946	2	37	5.4	5.0	✓
Sulfate in Water by IC	E235.SO4	657792	1	16	6.2	5.0	✓
TDS by Gravimetry	E162	658118	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	662375	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	662642	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	657271	1	11	9.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	662384	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	661507	1	15	6.6	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	660421	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	657793	1	11	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	664934	1	18	5.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	657267	1	11	9.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	661541	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	657787	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	657790	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	657791	1	20	5.0	5.0	✓
Reactive Silica by Colourimetry	E392	660946	2	37	5.4	5.0	✓
Sulfate in Water by IC	E235.SO4	657792	1	16	6.2	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	662375	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	662642	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	657271	1	11	9.0	5.0	✓

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Matrix Spikes (MS) - Continued							
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	662384	1	20	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Calgary - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Calgary - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Calgary - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 Calgary - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Calgary - Environmental	Water	APHA 2320 B (mod)	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.
Ammonia by Fluorescence	E298 Calgary - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Calgary - Environmental	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Colour (True) by Spectrometer (5 CU)	E329 Calgary - Environmental	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Calgary - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Calgary - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U Calgary - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T Calgary - Environmental	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U Calgary - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Reactive Silica by Colourimetry	E392 Vancouver - Environmental	Water	APHA 4500-SiO_2 E (mod)	Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method using a discrete analyzer. Method Limitation: Arsenic (5+) above 100 mg/L is a negative interference on this test
Dissolved Metals in Water by CRC ICPMS	E421 Calgary - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 Calgary - Environmental	Water	APHA 2340B	"Hardness (as $CaCO_3$), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ion Balance using Dissolved Metals	EC101 Calgary - Environmental	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
Total Nitrogen (calculation)	EC368 Calgary - Environmental	Water	BC MOE LABORATORY MANUAL (2005)	Total Nitrogen is a calculated parameter. Total Nitrogen = Total Kjeldahl Nitrogen + [Nitrate and Nitrite (as N)].

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Calgary - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 Calgary - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Total Organic Carbon by Combustion	EP355 Calgary - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 Calgary - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Phosphorus in water	EP372 Calgary - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 Calgary - Environmental	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 Calgary - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

QUALITY CONTROL REPORT

Work Order	: **FJ2202622**	Page	: 1 of 10
Amendment	: **1**		
Client	: Ecofish Research Ltd	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	:	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 20-Sep-2022 11:40
PO	: 1200-25.03.02	Date Analysis Commenced	: 21-Sep-2022
C-O-C number	: 2022-sept-MON8/9-Day2	Issue Date	: 06-Jun-2023 14:40
Sampler	: PAT BEAUPRE 250 334 3042		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Anthony Calero	Supervisor - Inorganic	Calgary Inorganics, Calgary, Alberta
Anthony Calero	Supervisor - Inorganic	Calgary Metals, Calgary, Alberta
Caitlin Macey	Team Leader - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Elke Tabora		Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Naeun Kim	Analyst	Calgary Metals, Calgary, Alberta
Parker Sgarbossa	Laboratory Analyst	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Vladka Stamenova	Analyst	Calgary Inorganics, Calgary, Alberta

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 658118)											
CG2212867-007	Anonymous	Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	<10	0	Diff <2x LOR	----
Physical Tests (QC Lot: 658631)											
FJ2202603-001	Anonymous	Colour, true	----	E329	5.0	CU	<5.0	<5.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 661507)											
FJ2202608-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 664704)											
CG2212925-001	Anonymous	pH	----	E108	0.10	pH units	7.66	7.67	0.130%	4%	----
Physical Tests (QC Lot: 664705)											
CG2212925-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	675	674	0.148%	10%	----
Physical Tests (QC Lot: 664706)											
CG2212925-001	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	486	496	2.02%	20%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO3)	----	E290	2.0	mg/L	486	496	2.02%	20%	----
Anions and Nutrients (QC Lot: 657787)											
CG2212850-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.169	0.171	0.001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 657790)											
CG2212850-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	12.3	12.4	0.438%	20%	----
Anions and Nutrients (QC Lot: 657791)											
CG2212850-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0038	0.0038	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 657792)											
CG2212850-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	205	206	0.485%	20%	----
Anions and Nutrients (QC Lot: 657793)											
FJ2202608-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 660421)											
CG2212919-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	1.25	mg/L	4.66	4.58	0.0792	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 660946)											
EO2207790-001	Anonymous	Silicate (as SiO2)	7631-86-9	E392	0.50	mg/L	11.6	11.5	0.618%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 660947)											
FJ2202622-003	PR3-B	Silicate (as SiO2)	7631-86-9	E392	0.50	mg/L	4.11	4.11	0.0004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 661541)											
CG2213023-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 662375)											
CG2212805-001	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	0.0021	<0.0020	0.00008	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 662384)											
CG2212920-003	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0223	0.0263	16.3%	20%	----
Anions and Nutrients (QC Lot: 662642)											
CG2212865-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.200	mg/L	1.67	1.57	0.102	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 657267)											
FJ2202608-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.78	2.78	0.004	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 657271)											
FJ2202608-001	Anonymous	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	3.16	3.01	0.14	Diff <2x LOR	----
Dissolved Metals (QC Lot: 664934)											
CG2213021-001	Anonymous	Calcium, dissolved	7440-70-2	E421	0.050	mg/L	30.0	28.3	6.05%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	15.2	15.0	1.17%	20%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 658118)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 658631)						
Colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 661507)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 664705)						
Conductivity	----	E100	1	µS/cm	1.3	----
Physical Tests (QCLot: 664706)						
Alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Anions and Nutrients (QCLot: 657787)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 657790)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 657791)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 657792)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 657793)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 660421)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 660946)						
Silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 660947)						
Silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 661541)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 662375)						

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 662375) - continued						
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 662384)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 662642)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Organic / Inorganic Carbon (QCLot: 657267)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 657271)						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 664934)						
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 658118)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	97.9	85.0	115	----
Physical Tests (QCLot: 658631)									
Colour, true	----	E329	5	CU	100 CU	101	85.0	115	----
Physical Tests (QCLot: 661507)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	89.2	85.0	115	----
Physical Tests (QCLot: 664704)									
pH	----	E108	----	pH units	7 pH units	100	98.6	101	----
Physical Tests (QCLot: 664705)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	102	90.0	110	----
Physical Tests (QCLot: 664706)									
Alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	229 mg/L	105	75.0	125	----
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	104	85.0	115	----
Anions and Nutrients (QCLot: 657787)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 657790)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 657791)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.8	90.0	110	----
Anions and Nutrients (QCLot: 657792)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 657793)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.6	90.0	110	----
Anions and Nutrients (QCLot: 660421)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	106	85.0	115	----
Anions and Nutrients (QCLot: 660946)									
Silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	10 mg/L	106	85.0	115	----
Anions and Nutrients (QCLot: 660947)									
Silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	10 mg/L	105	85.0	115	----
Anions and Nutrients (QCLot: 661541)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	87.8	80.0	120	----
Anions and Nutrients (QCLot: 662375)									

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 662375) - continued									
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.03 mg/L	94.0	80.0	120	----
Anions and Nutrients (QCLot: 662384)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	94.0	80.0	120	----
Anions and Nutrients (QCLot: 662642)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	102	75.0	125	----
Organic / Inorganic Carbon (QCLot: 657267)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	93.7	80.0	120	----
Organic / Inorganic Carbon (QCLot: 657271)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	100	80.0	120	----
Dissolved Metals (QCLot: 664934)									
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	94.8	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	92.3	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 657787)										
CG2212854-001	Anonymous	Fluoride	16984-48-8	E235.F	1.02 mg/L	1 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 657790)										
CG2212854-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.53 mg/L	2.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 657791)										
CG2212854-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.513 mg/L	0.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 657792)										
CG2212854-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	100 mg/L	100 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 657793)										
FJ2202608-002	Anonymous	Chloride	16887-00-6	E235.Cl	95.4 mg/L	100 mg/L	95.4	75.0	125	----
Anions and Nutrients (QCLot: 660421)										
CG2212919-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 660946)										
EO2207790-002	Anonymous	Silicate (as SiO2)	7631-86-9	E392	ND mg/L	10 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 660947)										
FJ2202623-001	Anonymous	Silicate (as SiO2)	7631-86-9	E392	10.4 mg/L	10 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 661541)										
CG2213023-003	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0415 mg/L	0.05 mg/L	83.0	70.0	130	----
Anions and Nutrients (QCLot: 662375)										
FJ2202622-001	MD	Phosphorus, total dissolved	7723-14-0	E375-T	0.0450 mg/L	0.05 mg/L	89.9	70.0	130	----
Anions and Nutrients (QCLot: 662384)										
CG2212920-004	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0418 mg/L	0.05 mg/L	83.6	70.0	130	----
Anions and Nutrients (QCLot: 662642)										
CG2212865-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.60 mg/L	2.5 mg/L	104	70.0	130	----
Organic / Inorganic Carbon (QCLot: 657267)										
FJ2202608-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	4.77 mg/L	5 mg/L	95.4	70.0	130	----
Organic / Inorganic Carbon (QCLot: 657271)										
FJ2202608-001	Anonymous	Carbon, total organic [TOC]	----	E355-L	4.92 mg/L	5 mg/L	98.4	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 664934)										
CG2213021-002	Anonymous	Calcium, dissolved	7440-70-2	E421	35.0 mg/L	40 mg/L	87.5	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	10 mg/L	ND	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 2022-Sept-MON8/9- Day 2

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Page of

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Leah Hull
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To YES NO
	Copy of Invoice with Report YES NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Reports / Recipients

Select Report Format: PDF EXCEL EDD (DIGITAL)

Merge QC/QCI Reports with COA YES NO N/A

Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: EMAIL MAIL FAX

Email 1 or Fax: lhull@ecofishresearch.com

Email 2: tkasubuchi@ecofishresearch.com

Email 3: waterqualitylabdata@ecofishresearch.com

Invoice Recipients

Select Invoice Distribution: EMAIL MAIL FAX

Email 1 or Fax: accountspayable@ecofishresearch.com

Email 2:

Turnaround Time (TAT) Requested

- Routine [R] if received by 3pm M-F - no surcharges apply
- 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
- 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
- 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
- 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
- Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA22-ECOF100-004	AFE/Cost Center:	PO#:
Job #:	Surface water MON8/9- no metals	Major/Minor Code:	Routing Code:
PO / AFE:	1200-25.03.02	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (ALS use only):		ALS Contact: Sneha Sansare	Sampler: Pat Beaupre

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Alk., Ec, pH, TDS, TSS, Anions, SI, diss ortho P, colour, pH (F)	DOC, Total dissolved P (F/P)	Hardness (F)	NH3, Total Kjeldahl, Nitrogen, Total N, TOC, Total P (P)	IONBALANCE-BC-CL	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	~~PCT~~	~~20-Sept-22~~	~~09:35~~	~~Water~~	4	R	R	R	R	R			
	~~PR1~~			~~Water~~	4	R	R	R	R	R			
	~~PR2~~			Water	4	R	R	R	R	R			
	~~HD-A~~			Water	4	R	R	R	R	R			
	~~HD-B~~ MD	20-Sept-22	09:35	Water	4	R	R	R	R	R			
	~~PR 2-81 A~~ PR3-A	20-Sept-22	10:35	Water	4	R	R	R	R	R			
	~~PR 2-81 B~~ PR3-B	20-Sept-22	10:35	Water	4	R	R	R	R	R			

Fort St. John
Work Order Reference
FJ2202622
Telephone : +1 250 261 5517

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? YES NO

Are samples for human consumption/ use? YES NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Please send Azimuth a copy of the data in their EDD format:

qmann@azimuthgroup.ca imcivor@azimuthgroup.ca

Add. for report: csuzanne@ecofishresearch.com,kganshorn@ecofishresearch.com

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: NONE ICE ICE PACKS FROZEN COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: YES NO

Cooler Custody Seals Intact: YES N/A Sample Custody Seals Intact: YES N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
8.9c							

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by:	Date:	Time:	Received by:	Date: 9-20-22	Time: 11:40	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY AUG 2020 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202642**	Page	: 1 of 4
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 21-Sep-2022 09:44
PO	: 1200-25.03.02	Date Analysis Commenced	: 23-Sep-2022
C-O-C number	: 2022-Sept-MON8/9-Day 4	Issue Date	: 28-Sep-2022 17:00
Sampler	: Pat Beaupre		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Anthony Calero	Supervisor - Inorganic	Metals, Calgary, Alberta
Caitlin Macey	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Elke Tabora		Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter		Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sara Niroomand		Inorganics, Calgary, Alberta
Summie Lo	Lab Assistant	Metals, Calgary, Alberta
Vladka Stamenova	Analyst	Inorganics, Calgary, Alberta

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
%	percent
µS/cm	Microsiemens per centimetre
CU	colour units (1 CU = 1 mg/L Pt)
meq/L	milliequivalents per litre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	PD5	PD5-FB	----	----	----
					Client sampling date / time	20-Sep-2022 14:55	20-Sep-2022 14:55	----	----	----
						FJ2202642-001	FJ2202642-002	--------	--------	--------
						Result	Result	----	----	----
Physical Tests										
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L		86.9	<1.0	----	----	----
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L		<1.0	<1.0	----	----	----
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L		<1.0	<1.0	----	----	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L		<1.0	<1.0	----	----	----
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		86.9	<1.0	----	----	----
colour, true	----	E329	5.0	CU		6.4	<5.0	----	----	----
conductivity	----	E100	2.0	µS/cm		185	<2.0	----	----	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		98.4	<0.60	----	----	----
pH	----	E108	0.10	pH units		8.10	5.18	----	----	----
solids, total dissolved [TDS]	----	E162	10	mg/L		124	<10	----	----	----
solids, total suspended [TSS]	----	E160	3.0	mg/L		<3.0	<3.0	----	----	----
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L		<0.0050	<0.0050	----	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L		<0.50	<0.50	----	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L		0.036	<0.020	----	----	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L		0.102	<0.050	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		0.0410	<0.0050	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		0.0013	<0.0010	----	----	----
nitrogen, total	7727-37-9	EC368	0.050	mg/L		0.144	<0.050	----	----	----
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L		<0.0010	<0.0010	----	----	----
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L		0.0083	<0.0020	----	----	----
phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L		<0.0020	<0.0020	----	----	----
silicate (as SiO2)	7631-86-9	E392	0.50	mg/L		3.82	<0.50	----	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		14.6	<0.30	----	----	----
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L		3.45	<0.50	----	----	----
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		3.12	<0.50	----	----	----
Ion Balance										
anion sum	----	EC101	0.10	meq/L		2.04	<0.10	----	----	----
cation sum	----	EC101	0.10	meq/L		2.06	<0.10	----	----	----

Analytical Results

Sub-Matrix: **Water** (Matrix: **Water**)					Client sample ID	**PD5**	**PD5-FB**	**----**	**----**	**----**
					Client sampling date / time	20-Sep-2022 14:55	20-Sep-2022 14:55	----	----	----
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*		**FJ2202642-001**	**FJ2202642-002**	--------	--------	--------
						Result	Result	----	----	----
Ion Balance										
ion balance (APHA)	----	EC101	0.010	%		0.488	<0.010	----	----	----
Dissolved Metals										
calcium, dissolved	7440-70-2	E421	0.050	mg/L		28.0	<0.050	----	----	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		6.92	<0.0050	----	----	----
dissolved metals filtration location	----	EP421	-	-		Laboratory	Laboratory	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202642**	Page	: 1 of 12
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 21-Sep-2022 09:44
PO	: 1200-25.03.02	Issue Date	: 28-Sep-2022 17:00
C-O-C number	: 2022-Sept-MON8/9-Day 4		
Sampler	: Pat Beaupre		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PD5	E298	20-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	3 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PD5-FB	E298	20-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PD5	E235.Cl	20-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PD5-FB	E235.Cl	20-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PD5	E378-U	20-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PD5-FB	E378-U	20-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PD5	E235.F	20-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE PD5-FB	E235.F	20-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PD5	E235.NO3-L	20-Sep-2022	23-Sep-2022	3 days	3 days	✓	23-Sep-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PD5-FB	E235.NO3-L	20-Sep-2022	23-Sep-2022	3 days	3 days	✓	23-Sep-2022	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PD5	E235.NO2-L	20-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PD5-FB	E235.NO2-L	20-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	3 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PD5	E392	20-Sep-2022	----	----	----		25-Sep-2022	28 days	5 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PD5-FB	E392	20-Sep-2022	----	----	----		25-Sep-2022	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PD5	E235.SO4	20-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PD5-FB	E235.SO4	20-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PD5	E375-T	20-Sep-2022	25-Sep-2022	----	----		27-Sep-2022	28 days	7 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PD5-FB	E375-T	20-Sep-2022	25-Sep-2022	----	----		27-Sep-2022	28 days	7 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PD5	E318	20-Sep-2022	23-Sep-2022	----	----		24-Sep-2022	28 days	4 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PD5-FB	E318	20-Sep-2022	23-Sep-2022	----	----		24-Sep-2022	28 days	4 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PD5	E372-U	20-Sep-2022	27-Sep-2022	----	----		27-Sep-2022	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PD5-FB	E372-U	20-Sep-2022	27-Sep-2022	----	----		27-Sep-2022	28 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) PD5	E421	20-Sep-2022	27-Sep-2022	----	----		27-Sep-2022	180 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) PD5-FB	E421	20-Sep-2022	27-Sep-2022	----	----		27-Sep-2022	180 days	7 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PD5	E358-L	20-Sep-2022	23-Sep-2022	----	----		24-Sep-2022	28 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PD5-FB	E358-L	20-Sep-2022	23-Sep-2022	----	----		24-Sep-2022	28 days	4 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PD5	E355-L	20-Sep-2022	23-Sep-2022	----	----		24-Sep-2022	28 days	4 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PD5-FB	E355-L	20-Sep-2022	23-Sep-2022	----	----		24-Sep-2022	28 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PD5	E290	20-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PD5-FB	E290	20-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	14 days	5 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PD5	E329	20-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	3 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PD5-FB	E329	20-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE PD5	E100	20-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE PD5-FB	E100	20-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	28 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE PD5	E108	20-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	0.25 hrs	0.25 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PD5-FB	E108	20-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	0.25 hrs	0.25 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE PD5	E162	20-Sep-2022	----	----	----		26-Sep-2022	7 days	6 days	✓
Physical Tests : TDS by Gravimetry										
HDPE PD5-FB	E162	20-Sep-2022	----	----	----		26-Sep-2022	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PD5	E160	20-Sep-2022	----	----	----		25-Sep-2022	7 days	5 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PD5-FB	E160	20-Sep-2022	----	----	----		25-Sep-2022	7 days	5 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	664951	1	14	7.1	5.0	✓
Ammonia by Fluorescence	E298	662151	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	661940	1	7	14.2	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	662028	1	18	5.5	5.0	✓
Conductivity in Water	E100	664949	1	17	5.8	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	668260	1	12	8.3	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	662389	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	661541	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	661934	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	661938	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	661939	1	18	5.5	5.0	✓
pH by Meter	E108	664950	1	20	5.0	5.0	✓
Reactive Silica by Colourimetry	E392	664768	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	661935	1	15	6.6	5.0	✓
TDS by Gravimetry	E162	663868	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	664739	1	19	5.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	662149	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	662390	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	665683	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	663878	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	664951	1	14	7.1	5.0	✓
Ammonia by Fluorescence	E298	662151	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	661940	1	7	14.2	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	662028	1	18	5.5	5.0	✓
Conductivity in Water	E100	664949	1	17	5.8	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	668260	1	12	8.3	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	662389	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	661541	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	661934	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	661938	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	661939	1	18	5.5	5.0	✓
pH by Meter	E108	664950	1	20	5.0	5.0	✓
Reactive Silica by Colourimetry	E392	664768	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	661935	1	15	6.6	5.0	✓
TDS by Gravimetry	E162	663868	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	664739	1	19	5.2	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	662149	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	662390	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	665683	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	663878	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	664951	1	14	7.1	5.0	✓
Ammonia by Fluorescence	E298	662151	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	661940	1	7	14.2	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	662028	1	18	5.5	5.0	✓
Conductivity in Water	E100	664949	1	17	5.8	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	668260	1	12	8.3	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	662389	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	661541	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	661934	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	661938	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	661939	1	18	5.5	5.0	✓
Reactive Silica by Colourimetry	E392	664768	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	661935	1	15	6.6	5.0	✓
TDS by Gravimetry	E162	663868	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	664739	1	19	5.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	662149	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	662390	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	665683	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	663878	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	662151	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	661940	1	7	14.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	668260	1	12	8.3	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	662389	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	661541	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	661934	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	661938	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	661939	1	18	5.5	5.0	✓
Reactive Silica by Colourimetry	E392	664768	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	661935	1	15	6.6	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	664739	1	19	5.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	662149	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	662390	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	665683	1	20	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Calgary - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Calgary - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Calgary - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 Calgary - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Calgary - Environmental	Water	APHA 2320 B (mod)	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.
Ammonia by Fluorescence	E298 Calgary - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Calgary - Environmental	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Colour (True) by Spectrometer (5 CU)	E329 Calgary - Environmental	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Calgary - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Calgary - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U Calgary - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T Calgary - Environmental	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U Calgary - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Reactive Silica by Colourimetry	E392 Vancouver - Environmental	Water	APHA 4500-SiO2 E (mod)	Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method using a discrete analyzer. Method Limitation: Arsenic (5+) above 100 mg/L is a negative interference on this test
Dissolved Metals in Water by CRC ICPMS	E421 Calgary - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 Calgary - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ion Balance using Dissolved Metals	EC101 Calgary - Environmental	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
Total Nitrogen (calculation)	EC368 Calgary - Environmental	Water	BC MOE LABORATORY MANUAL (2005)	Total Nitrogen is a calculated parameter. Total Nitrogen = Total Kjeldahl Nitrogen + [Nitrate and Nitrite (as N)].

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Calgary - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 Calgary - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Total Organic Carbon by Combustion	EP355 Calgary - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 Calgary - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Phosphorus in water	EP372 Calgary - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 Calgary - Environmental	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 Calgary - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **FJ2202642**	Page	: 1 of 10
Client	: Ecofish Research Ltd	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 21-Sep-2022 09:44
PO	: 1200-25.03.02	Date Analysis Commenced	: 23-Sep-2022
C-O-C number	: 2022-Sept-MON8/9-Day 4	Issue Date	: 28-Sep-2022 17:00
Sampler	: Pat Beaupre		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Anthony Calero	Supervisor - Inorganic	Calgary Metals, Calgary, Alberta
Caitlin Macey	Team Leader - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Elke Tabora		Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter		Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sara Niroomand		Calgary Inorganics, Calgary, Alberta
Summie Lo	Lab Assistant	Calgary Metals, Calgary, Alberta
Vladka Stamenova	Analyst	Calgary Inorganics, Calgary, Alberta

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 662028)											
FJ2202642-001	PD5	colour, true	----	E329	5.0	CU	6.4	6.6	0.3	Diff <2x LOR	----
Physical Tests (QC Lot: 663868)											
CG2213023-004	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	1620	1560	3.42%	20%	----
Physical Tests (QC Lot: 663878)											
CG2213018-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 664949)											
CG2212977-021	Anonymous	conductivity	----	E100	2.0	µS/cm	1290	1260	2.43%	10%	----
Physical Tests (QC Lot: 664950)											
CG2212977-021	Anonymous	pH	----	E108	0.10	pH units	8.07	8.08	0.124%	4%	----
Physical Tests (QC Lot: 664951)											
CG2212977-021	Anonymous	alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	330	320	3.23%	20%	----
		alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	330	320	3.23%	20%	----
Anions and Nutrients (QC Lot: 661541)											
CG2213023-002	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 661934)											
CG2212978-001	Anonymous	fluoride	16984-48-8	E235.F	0.100	mg/L	0.113	0.122	0.009	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 661935)											
CG2212978-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	786	792	0.749%	20%	----
Anions and Nutrients (QC Lot: 661938)											
CG2212978-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	2.76	2.80	1.49%	20%	----
Anions and Nutrients (QC Lot: 661939)											
CG2212978-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	0.0057	0.0007	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 661940)											
FJ2202642-001	PD5	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 662149)											
CG2212959-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.356	0.326	0.030	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 662151)											
CG2212959-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0077	0.0074	0.0003	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 664739)											
CG2212884-001	Anonymous	phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	0.0360	0.0354	1.47%	20%	----
Anions and Nutrients (QC Lot: 664768)											
CG2213013-001	Anonymous	silicate (as SiO2)	7631-86-9	E392	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 665683)											
CG2213023-007	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 662389)											
FJ2202642-001	PD5	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	3.45	3.58	0.14	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 662390)											
FJ2202642-001	PD5	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	3.12	3.59	0.46	Diff <2x LOR	----
Dissolved Metals (QC Lot: 668260)											
FJ2202642-001	PD5	calcium, dissolved	7440-70-2	E421	0.050	mg/L	28.0	27.7	0.879%	20%	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	6.92	6.72	2.91%	20%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 662028)						
colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 663868)						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 663878)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 664949)						
conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 664951)						
alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Anions and Nutrients (QCLot: 661541)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 661934)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 661935)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 661938)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 661939)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 661940)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 662149)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 662151)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 664739)						
phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 664768)						
silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	<0.50	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 665683)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Organic / Inorganic Carbon (QCLot: 662389)						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 662390)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 668260)						
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 662028)									
colour, true	----	E329	5	CU	100 CU	100	85.0	115	----
Physical Tests (QCLot: 663868)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	94.7	85.0	115	----
Physical Tests (QCLot: 663878)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	90.7	85.0	115	----
Physical Tests (QCLot: 664949)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.4	90.0	110	----
Physical Tests (QCLot: 664950)									
pH	----	E108	----	pH units	7 pH units	100	98.6	101	----
Physical Tests (QCLot: 664951)									
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	229 mg/L	92.2	75.0	125	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	100	85.0	115	----
Anions and Nutrients (QCLot: 661541)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	87.8	80.0	120	----
Anions and Nutrients (QCLot: 661934)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 661935)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 661938)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 661939)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	97.4	90.0	110	----
Anions and Nutrients (QCLot: 661940)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 662149)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 662151)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	97.3	85.0	115	----
Anions and Nutrients (QCLot: 664739)									
phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.03 mg/L	100	80.0	120	----
Anions and Nutrients (QCLot: 664768)									
silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	10 mg/L	97.7	85.0	115	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 665683)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	94.2	80.0	120	----
Organic / Inorganic Carbon (QCLot: 662389)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	94.0	80.0	120	----
Organic / Inorganic Carbon (QCLot: 662390)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	93.2	80.0	120	----
Dissolved Metals (QCLot: 668260)									
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	97.7	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	96.9	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 661541)										
CG2213023-003	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0415 mg/L	0.05 mg/L	83.0	70.0	130	----
Anions and Nutrients (QCLot: 661934)										
CG2213003-013	Anonymous	fluoride	16984-48-8	E235.F	1.05 mg/L	1 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 661935)										
CG2213003-013	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	104 mg/L	100 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 661938)										
CG2213003-013	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.57 mg/L	2.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 661939)										
CG2213003-013	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.518 mg/L	0.5 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 661940)										
FJ2202642-002	PD5-FB	chloride	16887-00-6	E235.Cl	97.9 mg/L	100 mg/L	97.9	75.0	125	----
Anions and Nutrients (QCLot: 662149)										
CG2212959-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.64 mg/L	2.5 mg/L	106	70.0	130	----
Anions and Nutrients (QCLot: 662151)										
CG2212959-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.104 mg/L	0.1 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 664739)										
CG2212884-002	Anonymous	phosphorus, total dissolved	7723-14-0	E375-T	0.0437 mg/L	0.05 mg/L	87.5	70.0	130	----
Anions and Nutrients (QCLot: 664768)										
CG2213014-001	Anonymous	silicate (as SiO2)	7631-86-9	E392	10.2 mg/L	10 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 665683)										
CG2213023-008	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0450 mg/L	0.05 mg/L	90.1	70.0	130	----
Organic / Inorganic Carbon (QCLot: 662389)										
FJ2202642-001	PD5	carbon, dissolved organic [DOC]	----	E358-L	5.18 mg/L	5 mg/L	104	70.0	130	----
Organic / Inorganic Carbon (QCLot: 662390)										
FJ2202642-001	PD5	carbon, total organic [TOC]	----	E355-L	5.32 mg/L	5 mg/L	106	70.0	130	----
Dissolved Metals (QCLot: 668260)										
FJ2202642-002	PD5-FB	calcium, dissolved	7440-70-2	E421	40.6 mg/L	40 mg/L	102	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	10.5 mg/L	10 mg/L	105	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 2022-Sept-MON8/9- Day 4

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Page of

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Leah Hull
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To YES ☑ NO
	Copy of Invoice with Report YES ☑ NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Project Information

ALS Account # / Quote #:	VA22-ECOF100-004
Job #:	Surface water MON8/9- no metals
PO / AFE:	1200-25.03.02
LSD:	
ALS Lab Work Order # (ALS use only):	

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A

☑ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax	lhull@ecofishresearch.com
Email 2	tkasubuchi@ecofishresearch.com
Email 3	waterqualitylabdata@ecofishresearch.com

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax	accountspayable@ecofishresearch.com
Email 2	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Contact: Sneha Sansare Sampler: Pat Beaupre

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Alk., Ec, pH, TDS, TSS, Anions, SI, diss ortho P, colour, pH (F/P)	DOC, Total dissolved P (F)	Hardness (P)	NH3, Total Kjeldahl, Nitrogen, Total N, TOC, Total P (P)	IONBALANCE-BC-CL	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	PD5	20 SEP 22	14:55	Water	4	R	R	R	R	R			
	PD5-FB	20 SEP 22	14:55	Water	4	R	R	R	R	R			
	~~MB~~			~~Water~~	~~4~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~			

Fort St. John
Work Order Reference
FJ2202642

Telephone : +1 250 261 5617

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Please send Azimuth a copy of the data in their EDD format:

gmann@azimuthgroup.ca imcivor@azimuthgroup.ca

Add. for report: csuzanne@ecofishresearch.com,kganshorn@ecofishresearch.com

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
10.1							

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
	Sept 20, 2022	

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
8	Sept 20/22	1753

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202647**	Page	: 1 of 4
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 21-Sep-2022 11:40
PO	: 1200-25.03.02	Date Analysis Commenced	: 23-Sep-2022
C-O-C number	: 2022-Sept-MON8/9-Day 2	Issue Date	: 28-Sep-2022 17:28
Sampler	: Pat Beaupre		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Anthony Calero	Supervisor - Inorganic	Metals, Calgary, Alberta
Caitlin Macey	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Dwayne Bennett	Technical Specialist	Inorganics, Calgary, Alberta
Elke Tabora		Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sara Niroomand		Inorganics, Calgary, Alberta
Summie Lo	Lab Assistant	Metals, Calgary, Alberta
Vladka Stamenova	Analyst	Inorganics, Calgary, Alberta

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
%	percent
µS/cm	Microsiemens per centimetre
CU	colour units (1 CU = 1 mg/L Pt)
meq/L	milliequivalents per litre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	PC1	PR1	PR2	HD-A	HD-B
					Client sampling date / time	21-Sep-2022 07:20	21-Sep-2022 08:00	21-Sep-2022 09:25	21-Sep-2022 10:00	21-Sep-2022 10:00
						FJ2202647-001	FJ2202647-002	FJ2202647-003	FJ2202647-004	FJ2202647-005
						Result	Result	Result	Result	Result
Physical Tests										
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L		81.6	80.8	81.6	181	179
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L		<1.0	<1.0	<1.0	15.6	15.8
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L		<1.0	<1.0	<1.0	7.8	7.9
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		81.6	80.8	81.6	197	195
colour, true	----	E329	5.0	CU		6.8	6.3	6.4	<5.0	<5.0
conductivity	----	E100	2.0	µS/cm		173	169	170	427	424
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		89.4	89.0	89.8	243	240
pH	----	E108	0.10	pH units		7.99	8.03	8.05	8.48	8.48
solids, total dissolved [TDS]	----	E162	10	mg/L		121	112	118	268	270
solids, total suspended [TSS]	----	E160	3.0	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L		0.0097	0.0087	<0.0050	<0.0050	<0.0050
chloride	16887-00-6	E235.Cl	0.50	mg/L		<0.50	<0.50	<0.50	<0.50	<0.50
fluoride	16984-48-8	E235.F	0.020	mg/L		0.034	0.032	0.032	0.093	0.095
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L		0.094	0.189	0.104	0.102	0.080
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		0.0641	0.0607	0.0583	<0.0050	<0.0050
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		0.0024	0.0021	0.0015	<0.0010	<0.0010
nitrogen, total	7727-37-9	EC368	0.050	mg/L		0.160	0.252	0.164	0.102	0.080
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L		0.0013	0.0013	0.0010	0.0011	<0.0010
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L		0.0041	0.0046	0.0053	0.0104	0.0094
phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
silicate (as SiO2)	7631-86-9	E392	0.50	mg/L		4.34	4.35	4.16	3.46	3.44
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		12.2	12.1	12.3	52.5	54.0
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L		3.12	3.02	3.20	3.44	2.79
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		2.90	3.09	2.73	3.43	2.99
Ion Balance										
anion sum	----	EC101	0.10	meq/L		----	----	1.89	5.03	5.03
cation sum	----	EC101	0.10	meq/L		----	----	1.85	5.00	4.94

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	PC1	PR1	PR2	HD-A	HD-B
					Client sampling date / time	21-Sep-2022 07:20	21-Sep-2022 08:00	21-Sep-2022 09:25	21-Sep-2022 10:00	21-Sep-2022 10:00
						FJ2202647-001	**FJ2202647-002**	**FJ2202647-003**	**FJ2202647-004**	**FJ2202647-005**
						Result	Result	Result	Result	Result
Ion Balance										
ion balance (APHA)	----	EC101	0.010	%		----	----	1.07	0.299	0.903
Dissolved Metals										
calcium, dissolved	7440-70-2	E421	0.050	mg/L		25.7	25.6	25.8	65.0	64.5
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		6.12	6.08	6.17	19.5	19.1
dissolved metals filtration location	----	EP421	-	-		Laboratory	Laboratory	Laboratory	Laboratory	Laboratory

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202647**	Page	: 1 of 19
Client	: **Ecofish Research Ltd**	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 21-Sep-2022 11:40
PO	: 1200-25.03.02	Issue Date	: 28-Sep-2022 17:28
C-O-C number	: 2022-Sept-MON8/9-Day 2		
Sampler	: Pat Beaupre		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) HD-A	E298	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) HD-B	E298	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PC1	E298	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PR1	E298	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PR2	E298	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE HD-A	E235.Cl	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE HD-B	E235.Cl	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE PC1	E235.Cl	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PR1	E235.Cl	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PR2	E235.Cl	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE HD-A	E378-U	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE HD-B	E378-U	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PC1	E378-U	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PR1	E378-U	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PR2	E378-U	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE HD-A	E235.F	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE HD-B	E235.F	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PC1	E235.F	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PR1	E235.F	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PR2	E235.F	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE HD-A	E235.NO3-L	21-Sep-2022	23-Sep-2022	3 days	2 days	✓	23-Sep-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE HD-B	E235.NO3-L	21-Sep-2022	23-Sep-2022	3 days	2 days	✓	23-Sep-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PC1	E235.NO3-L	21-Sep-2022	23-Sep-2022	3 days	2 days	✓	23-Sep-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PR1	E235.NO3-L	21-Sep-2022	23-Sep-2022	3 days	2 days	✓	23-Sep-2022	3 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PR2	E235.NO3-L	21-Sep-2022	23-Sep-2022	3 days	2 days	✓	23-Sep-2022	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE HD-A	E235.NO2-L	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE HD-B	E235.NO2-L	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PC1	E235.NO2-L	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PR1	E235.NO2-L	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PR2	E235.NO2-L	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	2 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE HD-A	E392	21-Sep-2022	----	----	----		25-Sep-2022	28 days	4 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE HD-B	E392	21-Sep-2022	----	----	----		25-Sep-2022	28 days	4 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PC1	E392	21-Sep-2022	----	----	----		25-Sep-2022	28 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PR1	E392	21-Sep-2022	----	----	----		25-Sep-2022	28 days	4 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PR2	E392	21-Sep-2022	----	----	----		25-Sep-2022	28 days	4 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE HD-A	E235.SO4	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE HD-B	E235.SO4	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PC1	E235.SO4	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PR1	E235.SO4	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PR2	E235.SO4	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) HD-A	E375-T	21-Sep-2022	25-Sep-2022	----	----		27-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) HD-B	E375-T	21-Sep-2022	25-Sep-2022	----	----		27-Sep-2022	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PC1	E375-T	21-Sep-2022	25-Sep-2022	----	----		27-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PR1	E375-T	21-Sep-2022	25-Sep-2022	----	----		27-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PR2	E375-T	21-Sep-2022	25-Sep-2022	----	----		27-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) HD-A	E318	21-Sep-2022	23-Sep-2022	----	----		24-Sep-2022	28 days	3 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) HD-B	E318	21-Sep-2022	23-Sep-2022	----	----		24-Sep-2022	28 days	3 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PC1	E318	21-Sep-2022	23-Sep-2022	----	----		24-Sep-2022	28 days	3 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PR1	E318	21-Sep-2022	23-Sep-2022	----	----		24-Sep-2022	28 days	3 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) PR2	E318	21-Sep-2022	23-Sep-2022	----	----		24-Sep-2022	28 days	3 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) HD-A	E372-U	21-Sep-2022	27-Sep-2022	----	----		27-Sep-2022	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) HD-B	E372-U	21-Sep-2022	27-Sep-2022	----	----		27-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PC1	E372-U	21-Sep-2022	27-Sep-2022	----	----		27-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PR1	E372-U	21-Sep-2022	27-Sep-2022	----	----		27-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PR2	E372-U	21-Sep-2022	27-Sep-2022	----	----		27-Sep-2022	28 days	6 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) HD-A	E421	21-Sep-2022	27-Sep-2022	----	----		27-Sep-2022	180 days	6 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) HD-B	E421	21-Sep-2022	27-Sep-2022	----	----		27-Sep-2022	180 days	6 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) PC1	E421	21-Sep-2022	27-Sep-2022	----	----		27-Sep-2022	180 days	6 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) PR1	E421	21-Sep-2022	27-Sep-2022	----	----		27-Sep-2022	180 days	6 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) PR2	E421	21-Sep-2022	27-Sep-2022	----	----		27-Sep-2022	180 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) HD-A	E358-L	21-Sep-2022	23-Sep-2022	----	----		24-Sep-2022	28 days	3 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) HD-B	E358-L	21-Sep-2022	23-Sep-2022	----	----		24-Sep-2022	28 days	3 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PC1	E358-L	21-Sep-2022	23-Sep-2022	----	----		24-Sep-2022	28 days	3 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PR1	E358-L	21-Sep-2022	23-Sep-2022	----	----		24-Sep-2022	28 days	3 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PR2	E358-L	21-Sep-2022	23-Sep-2022	----	----		24-Sep-2022	28 days	3 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) HD-A	E355-L	21-Sep-2022	23-Sep-2022	----	----		24-Sep-2022	28 days	3 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) HD-B	E355-L	21-Sep-2022	23-Sep-2022	----	----		24-Sep-2022	28 days	3 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PC1	E355-L	21-Sep-2022	23-Sep-2022	----	----		24-Sep-2022	28 days	3 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PR1	E355-L	21-Sep-2022	23-Sep-2022	----	----		24-Sep-2022	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PR2	E355-L	21-Sep-2022	23-Sep-2022	----	----		24-Sep-2022	28 days	3 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE HD-A	E290	21-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE HD-B	E290	21-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PC1	E290	21-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PR1	E290	21-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PR2	E290	21-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	14 days	4 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE HD-A	E329	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE HD-B	E329	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PC1	E329	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PR1	E329	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PR2	E329	21-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE HD-A	E100	21-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE HD-B	E100	21-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE PC1	E100	21-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE PR1	E100	21-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE PR2	E100	21-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	28 days	4 days	✓
Physical Tests : pH by Meter										
HDPE HD-A	E108	21-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	0.25 hrs	0.25 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE HD-B	E108	21-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	0.25 hrs	0.25 hrs	× EHTR-FM

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE PC1	E108	21-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	0.25 hrs	0.25 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PR1	E108	21-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	0.25 hrs	0.25 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PR2	E108	21-Sep-2022	25-Sep-2022	----	----		25-Sep-2022	0.25 hrs	0.25 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE HD-A	E162	21-Sep-2022	----	----	----		26-Sep-2022	7 days	5 days	✓
Physical Tests : TDS by Gravimetry										
HDPE HD-B	E162	21-Sep-2022	----	----	----		26-Sep-2022	7 days	5 days	✓
Physical Tests : TDS by Gravimetry										
HDPE PC1	E162	21-Sep-2022	----	----	----		26-Sep-2022	7 days	5 days	✓
Physical Tests : TDS by Gravimetry										
HDPE PR1	E162	21-Sep-2022	----	----	----		26-Sep-2022	7 days	5 days	✓
Physical Tests : TDS by Gravimetry										
HDPE PR2	E162	21-Sep-2022	----	----	----		26-Sep-2022	7 days	5 days	✓
Physical Tests : TSS by Gravimetry										
HDPE HD-A	E160	21-Sep-2022	----	----	----		25-Sep-2022	7 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TSS by Gravimetry										
HDPE HD-B	E160	21-Sep-2022	----	----	----		25-Sep-2022	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PC1	E160	21-Sep-2022	----	----	----		25-Sep-2022	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PR1	E160	21-Sep-2022	----	----	----		25-Sep-2022	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PR2	E160	21-Sep-2022	----	----	----		25-Sep-2022	7 days	4 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	664968	1	11	9.0	5.0	✓
Ammonia by Fluorescence	E298	662151	2	37	5.4	5.0	✓
Chloride in Water by IC	E235.Cl	661940	1	7	14.2	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	662028	1	18	5.5	5.0	✓
Conductivity in Water	E100	664967	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	668260	1	12	8.3	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	662389	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	662043	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	661934	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	661938	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	661939	1	18	5.5	5.0	✓
pH by Meter	E108	664966	1	19	5.2	5.0	✓
Reactive Silica by Colourimetry	E392	664768	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	661935	1	15	6.6	5.0	✓
TDS by Gravimetry	E162	663869	1	6	16.6	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	664739	1	19	5.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	662149	2	37	5.4	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	662390	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	665683	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	663878	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	664968	1	11	9.0	5.0	✓
Ammonia by Fluorescence	E298	662151	2	37	5.4	5.0	✓
Chloride in Water by IC	E235.Cl	661940	1	7	14.2	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	662028	1	18	5.5	5.0	✓
Conductivity in Water	E100	664967	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	668260	1	12	8.3	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	662389	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	662043	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	661934	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	661938	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	661939	1	18	5.5	5.0	✓
pH by Meter	E108	664966	1	19	5.2	5.0	✓
Reactive Silica by Colourimetry	E392	664768	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	661935	1	15	6.6	5.0	✓
TDS by Gravimetry	E162	663869	1	6	16.6	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	664739	1	19	5.2	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	662149	2	37	5.4	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	662390	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	665683	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	663878	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	664968	1	11	9.0	5.0	✓
Ammonia by Fluorescence	E298	662151	2	37	5.4	5.0	✓
Chloride in Water by IC	E235.Cl	661940	1	7	14.2	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	662028	1	18	5.5	5.0	✓
Conductivity in Water	E100	664967	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	668260	1	12	8.3	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	662389	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	662043	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	661934	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	661938	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	661939	1	18	5.5	5.0	✓
Reactive Silica by Colourimetry	E392	664768	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	661935	1	15	6.6	5.0	✓
TDS by Gravimetry	E162	663869	1	6	16.6	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	664739	1	19	5.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	662149	2	37	5.4	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	662390	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	665683	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	663878	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	662151	2	37	5.4	5.0	✓
Chloride in Water by IC	E235.Cl	661940	1	7	14.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	668260	1	12	8.3	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	662389	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	662043	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	661934	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	661938	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	661939	1	18	5.5	5.0	✓
Reactive Silica by Colourimetry	E392	664768	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	661935	1	15	6.6	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	664739	1	19	5.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	662149	2	37	5.4	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	662390	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	665683	1	20	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Calgary - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Calgary - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Calgary - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 Calgary - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Calgary - Environmental	Water	APHA 2320 B (mod)	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.
Ammonia by Fluorescence	E298 Calgary - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Calgary - Environmental	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Colour (True) by Spectrometer (5 CU)	E329 Calgary - Environmental	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Calgary - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Calgary - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U Calgary - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T Calgary - Environmental	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U Calgary - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Reactive Silica by Colourimetry	E392 Vancouver - Environmental	Water	APHA 4500-SiO2 E (mod)	Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method using a discrete analyzer. Method Limitation: Arsenic (5+) above 100 mg/L is a negative interference on this test
Dissolved Metals in Water by CRC ICPMS	E421 Calgary - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 Calgary - Environmental	Water	APHA 2340B	“Hardness (as CaCO3), dissolved” is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. “Total Hardness” refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ion Balance using Dissolved Metals	EC101 Calgary - Environmental	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
Total Nitrogen (calculation)	EC368 Calgary - Environmental	Water	BC MOE LABORATORY MANUAL (2005)	Total Nitrogen is a calculated parameter. Total Nitrogen = Total Kjeldahl Nitrogen + [Nitrate and Nitrite (as N)].

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Calgary - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 Calgary - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Total Organic Carbon by Combustion	EP355 Calgary - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 Calgary - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Phosphorus in water	EP372 Calgary - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 Calgary - Environmental	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 Calgary - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **FJ2202647**	Page	: 1 of 10
Client	: Ecofish Research Ltd	Laboratory	: Fort St. John - Environmental
Contact	: Leah Hull	Account Manager	: Sneha Sansare
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: 250 334 3042	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-No Metals	Date Samples Received	: 21-Sep-2022 11:40
PO	: 1200-25.03.02	Date Analysis Commenced	: 23-Sep-2022
C-O-C number	: 2022-Sept-MON8/9-Day 2	Issue Date	: 28-Sep-2022 17:28
Sampler	: Pat Beaupre		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Anthony Calero	Supervisor - Inorganic	Calgary Metals, Calgary, Alberta
Caitlin Macey	Team Leader - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Dwayne Bennett	Technical Specialist	Calgary Inorganics, Calgary, Alberta
Elke Tabora		Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sara Niroomand		Calgary Inorganics, Calgary, Alberta
Summie Lo	Lab Assistant	Calgary Metals, Calgary, Alberta
Vladka Stamenova	Analyst	Calgary Inorganics, Calgary, Alberta

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 662028)											
FJ2202642-001	Anonymous	colour, true	----	E329	5.0	CU	6.4	6.6	0.3	Diff <2x LOR	----
Physical Tests (QC Lot: 663869)											
FJ2202646-004	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	277	277	0.00%	20%	----
Physical Tests (QC Lot: 663878)											
CG2213018-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 664966)											
FJ2202646-003	Anonymous	pH	----	E108	0.10	pH units	8.45	8.48	0.354%	4%	----
Physical Tests (QC Lot: 664967)											
FJ2202646-004	Anonymous	conductivity	----	E100	2.0	µS/cm	422	422	0.00%	10%	----
Physical Tests (QC Lot: 664968)											
FJ2202647-001	PC1	alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	81.6	82.0	0.489%	20%	----
		alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	81.6	82.0	0.489%	20%	----
Anions and Nutrients (QC Lot: 661934)											
CG2212978-001	Anonymous	fluoride	16984-48-8	E235.F	0.100	mg/L	0.113	0.122	0.009	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 661935)											
CG2212978-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	786	792	0.749%	20%	----
Anions and Nutrients (QC Lot: 661938)											
CG2212978-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	2.76	2.80	1.49%	20%	----
Anions and Nutrients (QC Lot: 661939)											
CG2212978-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	0.0057	0.0007	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 661940)											
FJ2202642-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 662043)											
CG2213003-025	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 662149)											
CG2212959-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.356	0.326	0.030	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 662150)											
FJ2202647-003	PR2	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.104	0.116	0.011	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 662151)											
CG2212959-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0077	0.0074	0.0003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 662152)											
FJ2202647-003	PR2	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 664739)											
CG2212884-001	Anonymous	phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	0.0360	0.0354	1.47%	20%	----
Anions and Nutrients (QC Lot: 664768)											
CG2213013-001	Anonymous	silicate (as SiO2)	7631-86-9	E392	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 665683)											
CG2213023-007	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 662389)											
FJ2202642-001	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	3.45	3.58	0.14	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 662390)											
FJ2202642-001	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	3.12	3.59	0.46	Diff <2x LOR	----
Dissolved Metals (QC Lot: 668260)											
FJ2202642-001	Anonymous	calcium, dissolved	7440-70-2	E421	0.050	mg/L	28.0	27.7	0.879%	20%	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	6.92	6.72	2.91%	20%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 662028)						
colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 663869)						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 663878)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 664967)						
conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 664968)						
alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Anions and Nutrients (QCLot: 661934)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 661935)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 661938)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 661939)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 661940)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 662043)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 662149)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 662150)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 662151)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 662152)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 664739)						
phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 664768)						
silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 665683)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Organic / Inorganic Carbon (QCLot: 662389)						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 662390)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 668260)						
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 662028)									
colour, true	----	E329	5	CU	100 CU	100	85.0	115	----
Physical Tests (QCLot: 663869)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	94.3	85.0	115	----
Physical Tests (QCLot: 663878)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	90.7	85.0	115	----
Physical Tests (QCLot: 664966)									
pH	----	E108	----	pH units	7 pH units	101	98.6	101	----
Physical Tests (QCLot: 664967)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.3	90.0	110	----
Physical Tests (QCLot: 664968)									
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	229 mg/L	90.7	75.0	125	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	103	85.0	115	----
Anions and Nutrients (QCLot: 661934)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 661935)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 661938)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 661939)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	97.4	90.0	110	----
Anions and Nutrients (QCLot: 661940)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 662043)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	91.9	80.0	120	----
Anions and Nutrients (QCLot: 662149)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 662150)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 662151)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	97.3	85.0	115	----
Anions and Nutrients (QCLot: 662152)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	99.2	85.0	115	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 664739)									
phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.03 mg/L	100	80.0	120	----
Anions and Nutrients (QCLot: 664768)									
silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	10 mg/L	97.7	85.0	115	----
Anions and Nutrients (QCLot: 665683)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	94.2	80.0	120	----
Organic / Inorganic Carbon (QCLot: 662389)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	94.0	80.0	120	----
Organic / Inorganic Carbon (QCLot: 662390)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	93.2	80.0	120	----
Dissolved Metals (QCLot: 668260)									
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	97.7	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	96.9	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 661934)										
CG2213003-013	Anonymous	fluoride	16984-48-8	E235.F	1.05 mg/L	1 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 661935)										
CG2213003-013	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	104 mg/L	100 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 661938)										
CG2213003-013	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.57 mg/L	2.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 661939)										
CG2213003-013	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.518 mg/L	0.5 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 661940)										
FJ2202642-002	Anonymous	chloride	16887-00-6	E235.Cl	97.9 mg/L	100 mg/L	97.9	75.0	125	----
Anions and Nutrients (QCLot: 662043)										
CG2213003-026	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0408 mg/L	0.05 mg/L	81.7	70.0	130	----
Anions and Nutrients (QCLot: 662149)										
CG2212959-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.64 mg/L	2.5 mg/L	106	70.0	130	----
Anions and Nutrients (QCLot: 662150)										
FJ2202647-004	HD-A	Kjeldahl nitrogen, total [TKN]	----	E318	2.58 mg/L	2.5 mg/L	103	70.0	130	----
Anions and Nutrients (QCLot: 662151)										
CG2212959-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.104 mg/L	0.1 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 662152)										
FJ2202647-004	HD-A	ammonia, total (as N)	7664-41-7	E298	0.103 mg/L	0.1 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 664739)										
CG2212884-002	Anonymous	phosphorus, total dissolved	7723-14-0	E375-T	0.0437 mg/L	0.05 mg/L	87.5	70.0	130	----
Anions and Nutrients (QCLot: 664768)										
CG2213014-001	Anonymous	silicate (as SiO2)	7631-86-9	E392	10.2 mg/L	10 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 665683)										
CG2213023-008	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0450 mg/L	0.05 mg/L	90.1	70.0	130	----
Organic / Inorganic Carbon (QCLot: 662389)										
FJ2202642-001	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	5.18 mg/L	5 mg/L	104	70.0	130	----
Organic / Inorganic Carbon (QCLot: 662390)										

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Organic / Inorganic Carbon (QCLot: 662390) - continued										
FJ2202642-001	Anonymous	carbon, total organic [TOC]	----	E355-L	5.32 mg/L	5 mg/L	106	70.0	130	----
Dissolved Metals (QCLot: 668260)										
FJ2202642-002	Anonymous	calcium, dissolved	7440-70-2	E421	40.6 mg/L	40 mg/L	102	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	10.5 mg/L	10 mg/L	105	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 2022-Sept-MON8/9- Day 2

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Page of

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Leah Hull
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To YES NO
	Copy of Invoice with Report YES NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Reports / Recipients

Select Report Format: PDF EXCEL EDD (DIGITAL)

Merge QC/QCI Reports with COA YES NO N/A

Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: EMAIL MAIL FAX

Email 1 or Fax: lhull@ecofishresearch.com

Email 2: tkasubuchi@ecofishresearch.com

Email 3: waterqualitylabdata@ecofishresearch.com

Invoice Recipients

Select Invoice Distribution: EMAIL MAIL FAX

Email 1 or Fax: accountspayable@ecofishresearch.com

Email 2:

Turnaround Time (TAT) Requested

- Routine [R] if received by 3pm M-F - no surcharges apply
- 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
- 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
- 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
- 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
- Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Date and Time Required for all E&P TATs:

For all tests with rush TATs requested, please contact your AM to confirm availability.

Project Information

ALS Account # / Quote #:	VA22-ECOF100-004
Job #:	Surface water MON8/9- no metals
PO / AFE:	1200-25.03.02
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (ALS use only): Fort St. John Work Order Reference FJ2202647

LS Contact: Sneha Sansare Sampler: Pat Beaupre

Telephone : +1 250 261 5617

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Samp (This	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Alk., Ec, pH, TDS, TSS, Anions, SI, diss ortho P, colour, pH	DOC, Total dissolved P (F/P)	Hardness (F)	NH3, Total Kjeldahl, Nitrogen, Total N, TOC, Total P (P)	IONBALANCE-BC-CL	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	~~PC1~~ PC1	21 SEP 22	07:20	~~Water~~	4	R	R	R	R	R			
	~~PR1~~ PR1	21 SEP 22	08:00	~~Water~~	4	R	R	R	R	R			
	PR2	21 SEP 22	09:25	Water	4	R	R	R	R	R			
	HD-A	21 SEP 22	10:00	Water	4	R	R	R	R	R			
	HD-B	21 SEP 22	10:00	Water	4	R	R	R	R	R			
	~~PR-2.01-A~~			~~Water~~	4	R	R	R	R	R			
	~~PR-2.01-B~~			~~Water~~	4	R	R	R	R	R			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? YES NO

Are samples for human consumption/ use? YES NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Please send Azimuth a copy of the data in their EDD format:

gmann@azimuthgroup.ca imcivor@azimuthgroup.ca

Add. for report: csuzanne@ecofishresearch.com,kganshorn@ecofishresearch.com

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: NONE ICE ICE PACKS FROZEN COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: YES NO

Cooler Custody Seals Intact: YES N/A Sample Custody Seals Intact: YES N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
4.1							

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by:	Date: Sept 21, 2022	Time:	Received by:	Date: Sept 21/22	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY AUG 2020 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form.**

Chain of Custody (COC) / Analytical Request Form

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

COC Number: 2022-Sept-MON8/9- Day 4

Page of

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Leah Hull
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To YES ☐ NO
	Copy of Invoice with Report YES ☐ NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Reports / Recipients

Select Report Format: ☐ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Merge QC/QCI Reports with COA ☐ YES ☐ NO ☐ N/A
☑ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax lhull@ecofishresearch.com
Email 2 tkasubuchi@ecofishresearch.com
Email 3 waterqualitylabdata@ecofishresearch.com

Invoice Recipients

Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax accountspayable@ecofishresearch.com
Email 2

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Date and Time Required for all E&P TATs:

For all tests with rush TATs requested, please contact your AM to confirm availability.

Project Information

ALS Account # / Quote #: VA22-ECOF100-004
Job #: Surface water MON8/9- no metals
PO / AFE: 1200-25.03.02
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (ALS use only):

ALS Contact: Sneha Sansare Sampler: Pat Beaupre

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Alk., Ec, pH, TDS, TSS, Anions, Si, diss ortho P, colour, pH (F/P)	DOC, Total dissolved P (F)	Hardness (P)	NH3, Total Kjeldahl, Nitrogen, Total N, TOC, Total P (P)	IONBALANCE-BC-CL (P)	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	~~PD5~~ PD1	22SEP22	09:55	Water	4	R	R	R	R	R			
	~~PD5-FB~~ PINE	22SEP22	10:35	Water	4	R	R	R	R	R			
	~~MB~~			~~Water~~	~~4~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~			

Fort St. John
Work Order Reference
FJ2202682

Telephone : +1 250 261 5517

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO
Are samples for human consumption/ use? ☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Please send Azimuth a copy of the data in their EDD format:
gmann@azimuthgroup.ca imcivor@azimuthgroup.ca
Add. for report: csuzanne@ecofishresearch.com,kganshorn@ecofishresearch.com

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED
Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO
Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
6.3							

SHIPMENT RELEASE (client use)

Released by: Date: 22 SEP 22 Time:

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by: Date: 9-22-22 Time: 12:50

FINAL SHIPMENT RECEPTION (ALS use only)

Received by: Date: Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

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Chain of Custody (COC) / Analytical Request Form

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

COC Number: 2022-Sept-MON8/9- Day 1

Page of

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Leah Hull
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Project Information

ALS Account # / Quote #:	VA22-ECOF100-004
Job #:	Surface water MON8/9- no metals
PO / AFE:	1200-25.03.02
LSD:	

ALS Lab Work Order # (ALS use only):

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A

☑ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax	lhull@ecofishresearch.com
Email 2	tkasubuchi@ecofishresearch.com
Email 3	waterqualitylabdata@ecofishresearch.com

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax	accountspayable@ecofishresearch.com
Email 2	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Contact: Sneha Sansare **Sampler:** Pat Beaupre

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Alk., Ec, pH, TDS, TSS, Anions, Sl, diss ortho P, colour, pH (F/P)	Chlorophyll-a by fluorometry (F)	DOC, Total dissolved P (F/P)	Hardness (F)	NH3, Total Kjeldahl, Nitrogen, Total N, TOC, Total P (P)	IONBALANCE-BC-CL	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	W1-Shallow	23-Sept-22	07:20	Water	5	R	R	R	R	R	R			
	W1-Deep	23-Sept-22	07:45	Water	5	R	R	R	R	R	R			
	D1-Shallow	23-Sept-22	09:30	Water	5	R	R	R	R	R	R			
	D1-Deep	23-Sept-22	09:50	Water	5	R	R	R	R	R	R			
	Travel Blank	—	—	Water	1		R							
	Travel Blank	—	—	Water	3	R			R	R	R			

Fort St. John
Work Order Reference
FJ2202687

Phone: +1 250 261 5617

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Please send Azimuth a copy of the data in their EDD format:

gmann@azimuthgroup.ca imcivor@azimuthgroup.ca

Add. for report: csuzanne@ecofishresearch.com,kganshorn@ecofishresearch.com

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
6.3	

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
	9-23-22	12:14

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form.**

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202949**	Page	: 1 of 8
Amendment	: **2**		
Client	: **Ecofish Research Ltd**	Laboratory	: ALS Environmental - Fort St. John
Contact	: Sarah Kennedy	Account Manager	: Sean Zhang
Address	: 600 Comox Road Courtenay BC Canada V9N3P6	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: ----	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-With Metals	Date Samples Received	: 17-Oct-2022 18:50
PO	: 1200-25.03.02	Date Analysis Commenced	: 19-Oct-2022
C-O-C number	: 2022-OCT-MON8/9-Day 3	Issue Date	: 25-Aug-2023 17:57
Sampler	: Pat Beaupre		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Caitlin Macey	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Cindy Tang	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Erin Sanchez		Metals, Burnaby, British Columbia
Hamideh Moradi	Analyst	Metals, Burnaby, British Columbia
Jayden Piattelli	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Parnian Sane	Analyst	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.
Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
µS/cm	microsiemens per centimetre
CU	colour units (1 cu = 1 mg/l pt)
meq/L	milliequivalents per litre
mg/L	milligrams per litre
ng/L	nanograms per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Accreditation

Accreditation	*Description*	*Laboratory*	*Address*
A	CALA ISO/IEC 17025:2017	VA ALS Environmental - Vancouver	8081 Lougheed Highway, Burnaby, BC

Applicable accreditations are indicated in the Method/Lab column as superscripts.

Workorder Comments

Amendment (07/12/2022): This report has been amended and re-released to allow the reporting of additional analytical data.

Amendment (25/8/2023): This report has been amended following holding time evaluation corrections. All analysis results are as per the previous report.

Qualifiers

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLIS	Detection Limit Adjusted due to insufficient sample.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	BEA-A	BEA-B	POUCE	PD4	KR
						Client sampling date / time	17-Oct-2022 17:00	17-Oct-2022 17:00	17-Oct-2022 11:45	17-Oct-2022 13:10	17-Oct-2022 14:55
							FJ2202949-001	FJ2202949-002	FJ2202949-003	FJ2202949-004	FJ2202949-005
							Result	Result	Result	Result	Result
Sample Preparation											
Dissolved Fe2 filtration location	----	EP541/VA		-	-		Field	Field	Field	Field	Field
Physical Tests											
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	A	1.0	mg/L		185	184	186	77.3	200
Alkalinity, carbonate (as CaCO3)	----	E290/VA	A	1.0	mg/L		10.2	10.4	6.4	<1.0	11.8
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	A	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, total (as CaCO3)	----	E290/VA	A	1.0	mg/L		195	194	192	77.3	212
Colour, true	----	E329/VA	A	5.0	CU		76.3	70.4	14.7	6.0	8.3
Conductivity	----	E100/VA	A	2.0	µS/cm		561	562	1530	181	504
Hardness (as CaCO3), dissolved	----	EC100/VA		0.50	mg/L		195	208	536	88.9	222
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA		0.50	mg/L		210	210	576	97.0	235
pH	----	E108/VA	A	0.10	pH units		8.46	8.46	8.33	8.12	8.46
Solids, total dissolved [TDS]	----	E162/VA	A	10	mg/L		406	385	1120	106	317
Solids, total suspended [TSS]	----	E160/VA	A	3.0	mg/L		<3.0	<3.0	4.4	7.0	<3.0
Anions and Nutrients											
Ammonia, total (as N)	7664-41-7	E298/VA	A	0.0050	mg/L		0.0074	0.0082	0.0112	<0.0050	0.0104
Chloride	16887-00-6	E235.Cl/VA	A	0.50	mg/L		3.83	3.80	36.0	<0.50	1.84
Fluoride	16984-48-8	E235.F/VA	A	0.020	mg/L		0.172	0.170	0.252	0.041	0.122
Kjeldahl nitrogen, total [TKN]	----	EC318/VA		0.050	mg/L		0.573	0.568	0.650	0.109	0.270
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	A	0.0050	mg/L		<0.0050	<0.0050	<0.0250 DLDS	0.0526	0.0915
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	A	0.0010	mg/L		<0.0010	<0.0010	<0.0050 DLDS	<0.0010	0.0030
Nitrogen, total	7727-37-9	E366/VA	A	0.030	mg/L		0.573	0.568	0.650	0.162	0.364
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/VA	A	0.0010	mg/L		0.0016	0.0022	<0.0010	<0.0010	<0.0010
Phosphorus, total	7723-14-0	E372-U/VA	A	0.0020	mg/L		0.0220	0.0219	0.0176	0.0260	0.0034
Phosphorus, total dissolved	7723-14-0	E375-T/VA	A	0.0020	mg/L		0.0042	0.0048	0.0047	<0.0020	0.0092
Silicate (as SiO2)	7631-86-9	E392/VA	A	0.50	mg/L		0.85	0.84	0.82	4.08	<0.50
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	A	0.30	mg/L		105	106	625	13.7	66.5
Nitrate + Nitrite (as N)	----	EC235.N+N/VA		0.0032	mg/L		<0.0051	<0.0051	<0.0255	0.0526	0.0945

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	BEA-A	BEA-B	POUCE	PD4	KR
						Client sampling date / time	17-Oct-2022 17:00	17-Oct-2022 17:00	17-Oct-2022 11:45	17-Oct-2022 13:10	17-Oct-2022 14:55
							FJ2202949-001	FJ2202949-002	FJ2202949-003	FJ2202949-004	FJ2202949-005
							Result	Result	Result	Result	Result
Organic / Inorganic Carbon											
Carbon, dissolved organic [DOC]	----	E358-L/VA	A	0.50	mg/L		21.0	22.5	14.2	2.93	6.88
Carbon, total organic [TOC]	----	E355-L/VA	A	0.50	mg/L		22.0	23.3	15.0	2.94	6.91
Ion Balance											
Anion sum	----	EC101/VA		0.10	meq/L		6.20	6.20	17.9	1.84	5.69
Cation sum	----	EC101/VA		0.10	meq/L		6.30	6.60	17.6	1.84	5.87
Ion balance (APHA)	----	EC101/VA		0.010	%		0.800	3.12	0.845	<0.010	1.56
Total Metals											
Aluminum, total	7429-90-5	E420/VA	A	0.0030	mg/L		0.110	0.105	0.152	0.230	0.0508
Antimony, total	7440-36-0	E420/VA	A	0.00010	mg/L		0.00014	0.00014	0.00017	<0.00010	0.00015
Arsenic, total	7440-38-2	E420/VA	A	0.00010	mg/L		0.00085	0.00082	0.00071	0.00039	0.00059
Barium, total	7440-39-3	E420/VA	A	0.00010	mg/L		0.0972	0.0978	0.0743	0.0424	0.157
Beryllium, total	7440-41-7	E420/VA	A	0.000020	mg/L		<0.000020	0.000022	<0.000020	<0.000020	<0.000020
Bismuth, total	7440-69-9	E420/VA	A	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, total	7440-42-8	E420/VA	A	0.010	mg/L		0.054	0.054	0.162	<0.010	0.032
Cadmium, total	7440-43-9	E420/VA	A	0.0000050	mg/L		0.0000285	0.0000312	0.0000109	0.0000294	<0.0000050
Calcium, total	7440-70-2	E420/VA	A	0.050	mg/L		55.8	56.9	136	28.0	55.3
Cesium, total	7440-46-2	E420/VA	A	0.000010	mg/L		0.000018	0.000017	0.000030	0.000053	0.000012
Chromium, total	7440-47-3	E420/VA	A	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, total	7440-48-4	E420/VA	A	0.00010	mg/L		0.00028	0.00028	0.00034	0.00018	<0.00010
Copper, total	7440-50-8	E420/VA	A	0.00050	mg/L		0.00202	0.00197	0.00190	0.00106	0.00142
Iron, total	7439-89-6	E420/VA	A	0.010	mg/L		0.749	0.701	0.237	0.443	0.063
Lead, total	7439-92-1	E420/VA	A	0.000050	mg/L		0.000160	0.000156	0.000117	0.000199	<0.000050
Lithium, total	7439-93-2	E420/VA	A	0.0010	mg/L		0.0089	0.0090	0.0310	0.0015	0.0076
Magnesium, total	7439-95-4	E420/VA	A	0.0050	mg/L		17.1	16.5	57.5	6.57	23.5
Manganese, total	7439-96-5	E420/VA	A	0.00010	mg/L		0.0577	0.0562	0.109	0.0105	0.00518
Mercury, total	7439-97-6	E508-L/VA	A	0.50	ng/L		3.53	3.26	1.88	2.58	1.36
Molybdenum, total	7439-98-7	E420/VA	A	0.000050	mg/L		0.00112	0.00114	0.00153	0.000827	0.00139
Nickel, total	7440-02-0	E420/VA	A	0.00050	mg/L		0.00406	0.00401	0.00644	0.00125	0.00165
Phosphorus, total	7723-14-0	E420/VA	A	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, total	7440-09-7	E420/VA	A	0.050	mg/L		2.39	2.35	10.7	0.539	2.26

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	BEA-A	BEA-B	POUCE	PD4	KR
						Client sampling date / time	17-Oct-2022 17:00	17-Oct-2022 17:00	17-Oct-2022 11:45	17-Oct-2022 13:10	17-Oct-2022 14:55
							FJ2202949-001	FJ2202949-002	FJ2202949-003	FJ2202949-004	FJ2202949-005
							Result	Result	Result	Result	Result
Total Metals											
Rubidium, total	7440-17-7	E420/VA	A	0.00020	mg/L		0.00108	0.00111	0.00243	0.00083	0.00068
Selenium, total	7782-49-2	E420/VA	A	0.000050	mg/L		0.000369	0.000314	0.000582	0.000305	0.000178
Silicon, total	7440-21-3	E420/VA	A	0.10	mg/L		0.55	0.57	0.80	2.36	0.18
Silver, total	7440-22-4	E420/VA	A	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, total	7440-23-5	E420/VA	A	0.050	mg/L		53.4	52.8	158	1.27	31.6
Strontium, total	7440-24-6	E420/VA	A	0.00020	mg/L		0.227	0.229	0.660	0.108	0.332
Sulfur, total	7704-34-9	E420/VA	A	0.50	mg/L		38.0	38.1	242	4.69	24.5
Tellurium, total	13494-80-9	E420/VA	A	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium, total	7440-28-0	E420/VA	A	0.000010	mg/L		<0.000010	<0.000010	0.000015	<0.000010	<0.000010
Thorium, total	7440-29-1	E420/VA	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin, total	7440-31-5	E420/VA	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, total	7440-32-6	E420/VA	A	0.00030	mg/L		0.00527	0.00528	<0.00390 DLM	0.00403	0.00145
Tungsten, total	7440-33-7	E420/VA	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium, total	7440-61-1	E420/VA	A	0.000010	mg/L		0.00166	0.00167	0.00303	0.000436	0.00123
Vanadium, total	7440-62-2	E420/VA	A	0.00050	mg/L		0.00074	0.00067	0.00062	0.00147	<0.00050
Zinc, total	7440-66-6	E420/VA	A	0.0030	mg/L		<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium, total	7440-67-7	E420/VA	A	0.00020	mg/L		0.00043	<0.00060 DLM	0.00028	<0.00020	<0.00020
Dissolved Metals											
Aluminum, dissolved	7429-90-5	E421/VA	A	0.0010	mg/L		0.0065	0.0069	0.0025	0.0040	0.0017
Antimony, dissolved	7440-36-0	E421/VA	A	0.00010	mg/L		0.00013	0.00014	0.00017	<0.00010	0.00015
Arsenic, dissolved	7440-38-2	E421/VA	A	0.00010	mg/L		0.00054	0.00056	0.00058	0.00020	0.00051
Barium, dissolved	7440-39-3	E421/VA	A	0.00010	mg/L		0.0883	0.0893	0.0679	0.0349	0.149
Beryllium, dissolved	7440-41-7	E421/VA	A	0.000020	mg/L		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, dissolved	7440-69-9	E421/VA	A	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, dissolved	7440-42-8	E421/VA	A	0.010	mg/L		0.046	0.048	0.139	<0.010	0.027
Cadmium, dissolved	7440-43-9	E421/VA	A	0.0000050	mg/L		0.0000080	0.0000119	<0.0000050	<0.0000050	<0.0000050
Calcium, dissolved	7440-70-2	E421/VA	A	0.050	mg/L		52.2	57.3	126	25.8	51.6
Cesium, dissolved	7440-46-2	E421/VA	A	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium, dissolved	7440-47-3	E421/VA	A	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, dissolved	7440-48-4	E421/VA	A	0.00010	mg/L		0.00021	0.00023	0.00023	<0.00010	<0.00010

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	BEA-A	BEA-B	POUCE	PD4	KR
						Client sampling date / time	17-Oct-2022 17:00	17-Oct-2022 17:00	17-Oct-2022 11:45	17-Oct-2022 13:10	17-Oct-2022 14:55
							FJ2202949-001	FJ2202949-002	FJ2202949-003	FJ2202949-004	FJ2202949-005
							Result	Result	Result	Result	Result
Dissolved Metals											
Copper, dissolved	7440-50-8	E421/VA	A	0.00020	mg/L		0.00161	0.00165	0.00153	0.00058	0.00119
Iron, dissolved	7439-89-6	E421/VA	A	0.010	mg/L		0.046	0.066	<0.010	<0.010	<0.010
Lead, dissolved	7439-92-1	E421/VA	A	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium, dissolved	7439-93-2	E421/VA	A	0.0010	mg/L		0.0085	0.0091	0.0291	0.0012	0.0069
Magnesium, dissolved	7439-95-4	E421/VA	A	0.0050	mg/L		15.8	15.9	53.9	5.95	22.7
Manganese, dissolved	7439-96-5	E421/VA	A	0.00010	mg/L		0.0150	0.0159	0.0180	0.00094	0.00283
Mercury, dissolved	7439-97-6	E509-L/VA	A	0.50	ng/L		2.12	2.79	2.49	1.41	0.80
Molybdenum, dissolved	7439-98-7	E421/VA	A	0.000050	mg/L		0.00106	0.00106	0.00146	0.000796	0.00128
Nickel, dissolved	7440-02-0	E421/VA	A	0.00050	mg/L		0.00352	0.00366	0.00571	0.00067	0.00146
Phosphorus, dissolved	7723-14-0	E421/VA	A	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, dissolved	7440-09-7	E421/VA	A	0.050	mg/L		2.28	2.43	9.82	0.435	2.21
Rubidium, dissolved	7440-17-7	E421/VA	A	0.00020	mg/L		0.00090	0.00102	0.00218	0.00029	0.00061
Selenium, dissolved	7782-49-2	E421/VA	A	0.000050	mg/L		0.000323	0.000347	0.000582	0.000263	0.000243
Silicon, dissolved	7440-21-3	E421/VA	A	0.050	mg/L		0.312	0.331	0.351	1.80	<0.050
Silver, dissolved	7440-22-4	E421/VA	A	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, dissolved	7440-23-5	E421/VA	A	0.050	mg/L		53.7	54.4	153	1.18	31.5
Strontium, dissolved	7440-24-6	E421/VA	A	0.00020	mg/L		0.229	0.220	0.596	0.110	0.323
Sulfur, dissolved	7704-34-9	E421/VA	A	0.50	mg/L		36.3	35.9	225	4.27	23.2
Tellurium, dissolved	13494-80-9	E421/VA	A	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium, dissolved	7440-28-0	E421/VA	A	0.000010	mg/L		<0.000010	<0.000010	0.000012	<0.000010	<0.000010
Thorium, dissolved	7440-29-1	E421/VA	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin, dissolved	7440-31-5	E421/VA	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, dissolved	7440-32-6	E421/VA	A	0.00030	mg/L		<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten, dissolved	7440-33-7	E421/VA	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium, dissolved	7440-61-1	E421/VA	A	0.000010	mg/L		0.00172	0.00165	0.00298	0.000402	0.00115
Vanadium, dissolved	7440-62-2	E421/VA	A	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc, dissolved	7440-66-6	E421/VA	A	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zirconium, dissolved	7440-67-7	E421/VA	A	0.00030	mg/L		<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Dissolved MeHg filtration location	----	EP537/VA		-	-		Field	Field	Field	Field	Field
Dissolved mercury filtration location	----	EP509-L/VA		-	-		Field	Field	Field	Field	Field

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	BEA-A	BEA-B	POUCE	PD4	KR
						Client sampling date / time	17-Oct-2022 17:00	17-Oct-2022 17:00	17-Oct-2022 11:45	17-Oct-2022 13:10	17-Oct-2022 14:55
							FJ2202949-001	FJ2202949-002	FJ2202949-003	FJ2202949-004	FJ2202949-005
							Result	Result	Result	Result	Result
Dissolved Metals											
Dissolved metals filtration location	----	EP421/VA		-	-		Field	Field	Field	Field	Field
Speciated Metals											
Methylmercury (as MeHg), total	22967-92-6	E536/VA	A	0.000000020	mg/L		0.000000074 DTC	0.000000130	0.000000038	<0.000000020	<0.000000080 DLIS
Iron, ferrous [Fe II], dissolved	15438-31-0	E541/VA	A	0.020	mg/L		0.046	0.061	<0.020	<0.020	<0.020
Methylmercury (as MeHg), dissolved	22967-92-6	E537/VA	A	0.000000020	mg/L		0.000000125 DTC	0.000000132	<0.000000020	<0.000000020	<0.000000040 DLIS

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202949**	Page	: 1 of 25
Amendment	: **2**		
Client	: **Ecofish Research Ltd**	Laboratory	: ALS Environmental - Fort St. John
Contact	: Sarah Kennedy	Account Manager	: Sean Zhang
Address	: 600 Comox Road Courtenay BC Canada V9N3P6	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-With Metals	Date Samples Received	: 17-Oct-2022 18:50
PO	: 1200-25.03.02	Issue Date	: 25-Aug-2023 17:57
C-O-C number	: 2022-OCT-MON8/9-Day 3		
Sampler	: Pat Beaupre		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) BEA-A	E298	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	21-Oct-2022	28 days	4 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) BEA-B	E298	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	21-Oct-2022	28 days	4 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) KR	E298	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	21-Oct-2022	28 days	4 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PD4	E298	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	21-Oct-2022	28 days	4 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) POUCE	E298	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	21-Oct-2022	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE BEA-A	E235.Cl	17-Oct-2022	19-Oct-2022	28 days	2 days	✓	19-Oct-2022	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE BEA-B	E235.Cl	17-Oct-2022	19-Oct-2022	28 days	2 days	✓	19-Oct-2022	28 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE KR	E235.Cl	17-Oct-2022	19-Oct-2022	28 days	2 days	✓	19-Oct-2022	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PD4	E235.Cl	17-Oct-2022	19-Oct-2022	28 days	2 days	✓	19-Oct-2022	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE POUCE	E235.Cl	17-Oct-2022	19-Oct-2022	28 days	2 days	✓	19-Oct-2022	28 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE BEA-A	E378-U	17-Oct-2022	19-Oct-2022	3 days	2 days	✓	19-Oct-2022	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE BEA-B	E378-U	17-Oct-2022	19-Oct-2022	3 days	2 days	✓	19-Oct-2022	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE KR	E378-U	17-Oct-2022	19-Oct-2022	3 days	2 days	✓	19-Oct-2022	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PD4	E378-U	17-Oct-2022	19-Oct-2022	3 days	2 days	✓	19-Oct-2022	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE POUCE	E378-U	17-Oct-2022	19-Oct-2022	3 days	2 days	✓	19-Oct-2022	3 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE BEA-A	E235.F	17-Oct-2022	19-Oct-2022	28 days	2 days	✓	19-Oct-2022	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE BEA-B	E235.F	17-Oct-2022	19-Oct-2022	28 days	2 days	✓	19-Oct-2022	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE KR	E235.F	17-Oct-2022	19-Oct-2022	28 days	2 days	✓	19-Oct-2022	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PD4	E235.F	17-Oct-2022	19-Oct-2022	28 days	2 days	✓	19-Oct-2022	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE POUCE	E235.F	17-Oct-2022	19-Oct-2022	28 days	2 days	✓	19-Oct-2022	28 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE BEA-A	E235.NO3-L	17-Oct-2022	19-Oct-2022	3 days	2 days	✓	19-Oct-2022	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE BEA-B	E235.NO3-L	17-Oct-2022	19-Oct-2022	3 days	2 days	✓	19-Oct-2022	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE KR	E235.NO3-L	17-Oct-2022	19-Oct-2022	3 days	2 days	✓	19-Oct-2022	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PD4	E235.NO3-L	17-Oct-2022	19-Oct-2022	3 days	2 days	✓	19-Oct-2022	3 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
POUCE	E235.NO3-L	17-Oct-2022	19-Oct-2022	3 days	2 days	✓	19-Oct-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
BEA-A	E235.NO2-L	17-Oct-2022	19-Oct-2022	3 days	2 days	✓	19-Oct-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
BEA-B	E235.NO2-L	17-Oct-2022	19-Oct-2022	3 days	2 days	✓	19-Oct-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
KR	E235.NO2-L	17-Oct-2022	19-Oct-2022	3 days	2 days	✓	19-Oct-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
PD4	E235.NO2-L	17-Oct-2022	19-Oct-2022	3 days	2 days	✓	19-Oct-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
POUCE	E235.NO2-L	17-Oct-2022	19-Oct-2022	3 days	2 days	✓	19-Oct-2022	3 days	2 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE										
BEA-A	E392	17-Oct-2022	----	----	----		19-Oct-2022	28 days	2 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE										
BEA-B	E392	17-Oct-2022	----	----	----		19-Oct-2022	28 days	2 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE										
KR	E392	17-Oct-2022	----	----	----		19-Oct-2022	28 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PD4	E392	17-Oct-2022	----	----	----		19-Oct-2022	28 days	2 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE POUCE	E392	17-Oct-2022	----	----	----		19-Oct-2022	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE BEA-A	E235.SO4	17-Oct-2022	19-Oct-2022	28 days	2 days	✓	19-Oct-2022	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE BEA-B	E235.SO4	17-Oct-2022	19-Oct-2022	28 days	2 days	✓	19-Oct-2022	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE KR	E235.SO4	17-Oct-2022	19-Oct-2022	28 days	2 days	✓	19-Oct-2022	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PD4	E235.SO4	17-Oct-2022	19-Oct-2022	28 days	2 days	✓	19-Oct-2022	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE POUCE	E235.SO4	17-Oct-2022	19-Oct-2022	28 days	2 days	✓	19-Oct-2022	28 days	2 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) BEA-A	E375-T	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	20-Oct-2022	28 days	3 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) BEA-B	E375-T	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	20-Oct-2022	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) KR	E375-T	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	20-Oct-2022	28 days	3 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PD4	E375-T	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	20-Oct-2022	28 days	3 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) POUCE	E375-T	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	20-Oct-2022	28 days	3 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) BEA-A	E366	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	21-Oct-2022	28 days	4 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) BEA-B	E366	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	21-Oct-2022	28 days	4 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) KR	E366	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	21-Oct-2022	28 days	4 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) PD4	E366	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	21-Oct-2022	28 days	4 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) POUCE	E366	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	21-Oct-2022	28 days	4 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) BEA-A	E372-U	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	20-Oct-2022	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) BEA-B	E372-U	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	20-Oct-2022	28 days	3 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) KR	E372-U	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	20-Oct-2022	28 days	3 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PD4	E372-U	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	20-Oct-2022	28 days	3 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) POUCE	E372-U	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	20-Oct-2022	28 days	3 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) BEA-A	E509-L	17-Oct-2022	25-Oct-2022	28 days	8 days	✓	25-Oct-2022	28 days	8 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) BEA-B	E509-L	17-Oct-2022	25-Oct-2022	28 days	8 days	✓	25-Oct-2022	28 days	8 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) KR	E509-L	17-Oct-2022	25-Oct-2022	28 days	8 days	✓	25-Oct-2022	28 days	8 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) PD4	E509-L	17-Oct-2022	25-Oct-2022	28 days	8 days	✓	25-Oct-2022	28 days	8 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) POUCE	E509-L	17-Oct-2022	25-Oct-2022	28 days	8 days	✓	25-Oct-2022	28 days	8 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) BEA-A	E421	17-Oct-2022	20-Oct-2022	180 days	3 days	✓	20-Oct-2022	180 days	3 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) BEA-B	E421	17-Oct-2022	20-Oct-2022	180 days	3 days	✓	20-Oct-2022	180 days	3 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) KR	E421	17-Oct-2022	20-Oct-2022	180 days	3 days	✓	20-Oct-2022	180 days	3 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PD4	E421	17-Oct-2022	20-Oct-2022	180 days	3 days	✓	20-Oct-2022	180 days	3 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) POUCE	E421	17-Oct-2022	20-Oct-2022	180 days	3 days	✓	20-Oct-2022	180 days	3 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) BEA-A	E358-L	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	20-Oct-2022	28 days	3 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) BEA-B	E358-L	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	20-Oct-2022	28 days	3 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) KR	E358-L	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	20-Oct-2022	28 days	3 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PD4	E358-L	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	20-Oct-2022	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) POUCE	E358-L	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	20-Oct-2022	28 days	3 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) BEA-A	E355-L	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	20-Oct-2022	28 days	3 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) BEA-B	E355-L	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	20-Oct-2022	28 days	3 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) KR	E355-L	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	20-Oct-2022	28 days	3 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PD4	E355-L	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	20-Oct-2022	28 days	3 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) POUCE	E355-L	17-Oct-2022	20-Oct-2022	28 days	3 days	✓	20-Oct-2022	28 days	3 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE BEA-A	E290	17-Oct-2022	19-Oct-2022	14 days	2 days	✓	22-Oct-2022	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE BEA-B	E290	17-Oct-2022	19-Oct-2022	14 days	2 days	✓	22-Oct-2022	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE KR	E290	17-Oct-2022	19-Oct-2022	14 days	2 days	✓	22-Oct-2022	14 days	5 days	✓

Matrix: **Water**

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Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE PD4	E290	17-Oct-2022	19-Oct-2022	14 days	2 days	✓	22-Oct-2022	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE POUCE	E290	17-Oct-2022	19-Oct-2022	14 days	2 days	✓	22-Oct-2022	14 days	5 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE BEA-A	E329	17-Oct-2022	19-Oct-2022	3 days	2 days	✓	19-Oct-2022	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE BEA-B	E329	17-Oct-2022	19-Oct-2022	3 days	2 days	✓	19-Oct-2022	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE KR	E329	17-Oct-2022	19-Oct-2022	3 days	2 days	✓	19-Oct-2022	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PD4	E329	17-Oct-2022	19-Oct-2022	3 days	2 days	✓	19-Oct-2022	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE POUCE	E329	17-Oct-2022	19-Oct-2022	3 days	2 days	✓	19-Oct-2022	3 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE BEA-A	E100	17-Oct-2022	19-Oct-2022	28 days	2 days	✓	22-Oct-2022	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE BEA-B	E100	17-Oct-2022	19-Oct-2022	28 days	2 days	✓	22-Oct-2022	28 days	5 days	✓

Matrix: **Water**

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Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE KR	E100	17-Oct-2022	19-Oct-2022	28 days	2 days	✓	22-Oct-2022	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE PD4	E100	17-Oct-2022	19-Oct-2022	28 days	2 days	✓	22-Oct-2022	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE POUCE	E100	17-Oct-2022	19-Oct-2022	28 days	2 days	✓	22-Oct-2022	28 days	5 days	✓
Physical Tests : pH by Meter										
HDPE BEA-A	E108	17-Oct-2022	19-Oct-2022	0.25 hrs	52 hrs	× EHTR-FM	22-Oct-2022	0.25 hrs	118 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE BEA-B	E108	17-Oct-2022	19-Oct-2022	0.25 hrs	52 hrs	× EHTR-FM	22-Oct-2022	0.25 hrs	118 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE KR	E108	17-Oct-2022	19-Oct-2022	0.25 hrs	54 hrs	× EHTR-FM	22-Oct-2022	0.25 hrs	120 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PD4	E108	17-Oct-2022	19-Oct-2022	0.25 hrs	56 hrs	× EHTR-FM	22-Oct-2022	0.25 hrs	122 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE POUCE	E108	17-Oct-2022	19-Oct-2022	0.25 hrs	57 hrs	× EHTR-FM	22-Oct-2022	0.25 hrs	123 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE BEA-A	E162	17-Oct-2022	----	----	----		19-Oct-2022	7 days	2 days	✓

Matrix: **Water**

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Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TDS by Gravimetry										
HDPE BEA-B	E162	17-Oct-2022	----	----	----		19-Oct-2022	7 days	2 days	✓
Physical Tests : TDS by Gravimetry										
HDPE KR	E162	17-Oct-2022	----	----	----		19-Oct-2022	7 days	2 days	✓
Physical Tests : TDS by Gravimetry										
HDPE PD4	E162	17-Oct-2022	----	----	----		19-Oct-2022	7 days	2 days	✓
Physical Tests : TDS by Gravimetry										
HDPE POUCE	E162	17-Oct-2022	----	----	----		19-Oct-2022	7 days	2 days	✓
Physical Tests : TSS by Gravimetry										
HDPE BEA-A	E160	17-Oct-2022	----	----	----		19-Oct-2022	7 days	2 days	✓
Physical Tests : TSS by Gravimetry										
HDPE BEA-B	E160	17-Oct-2022	----	----	----		19-Oct-2022	7 days	2 days	✓
Physical Tests : TSS by Gravimetry										
HDPE KR	E160	17-Oct-2022	----	----	----		19-Oct-2022	7 days	2 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PD4	E160	17-Oct-2022	----	----	----		19-Oct-2022	7 days	2 days	✓
Physical Tests : TSS by Gravimetry										
HDPE POUCE	E160	17-Oct-2022	----	----	----		19-Oct-2022	7 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Speciated Metals : Dissolved Ferrous Iron in Water by Colour										
Amber glass dissolved (hydrochloric acid) BEA-A	E541	17-Oct-2022	24-Nov-2022	7 days	38 days	× EHT	24-Nov-2022	7 days	38 days	× EHT
Speciated Metals : Dissolved Ferrous Iron in Water by Colour										
Amber glass dissolved (hydrochloric acid) BEA-B	E541	17-Oct-2022	24-Nov-2022	7 days	38 days	× EHT	24-Nov-2022	7 days	38 days	× EHT
Speciated Metals : Dissolved Ferrous Iron in Water by Colour										
Amber glass dissolved (hydrochloric acid) KR	E541	17-Oct-2022	24-Nov-2022	7 days	38 days	× EHT	24-Nov-2022	7 days	38 days	× EHT
Speciated Metals : Dissolved Ferrous Iron in Water by Colour										
Amber glass dissolved (hydrochloric acid) PD4	E541	17-Oct-2022	24-Nov-2022	7 days	38 days	× EHT	24-Nov-2022	7 days	38 days	× EHT
Speciated Metals : Dissolved Ferrous Iron in Water by Colour										
Amber glass dissolved (hydrochloric acid) POUCE	E541	17-Oct-2022	24-Nov-2022	7 days	38 days	× EHT	24-Nov-2022	7 days	38 days	× EHT
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) BEA-A	E537	17-Oct-2022	04-Nov-2022	180 days	18 days	✓	10-Nov-2022	180 days	6 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) BEA-B	E537	17-Oct-2022	04-Nov-2022	180 days	18 days	✓	10-Nov-2022	180 days	6 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) KR	E537	17-Oct-2022	04-Nov-2022	180 days	18 days	✓	10-Nov-2022	180 days	6 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PD4	E537	17-Oct-2022	04-Nov-2022	180 days	18 days	✓	10-Nov-2022	180 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) POUCE	E537	17-Oct-2022	04-Nov-2022	180 days	18 days	✓	10-Nov-2022	180 days	6 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) BEA-A	E536	17-Oct-2022	03-Nov-2022	180 days	17 days	✓	07-Nov-2022	180 days	21 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) BEA-B	E536	17-Oct-2022	03-Nov-2022	180 days	17 days	✓	07-Nov-2022	180 days	21 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) KR	E536	17-Oct-2022	03-Nov-2022	180 days	17 days	✓	07-Nov-2022	180 days	21 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) PD4	E536	17-Oct-2022	03-Nov-2022	180 days	17 days	✓	07-Nov-2022	180 days	21 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) POUCE	E536	17-Oct-2022	03-Nov-2022	180 days	17 days	✓	07-Nov-2022	180 days	21 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) BEA-A	E508-L	17-Oct-2022	25-Oct-2022	28 days	8 days	✓	25-Oct-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) BEA-B	E508-L	17-Oct-2022	25-Oct-2022	28 days	8 days	✓	25-Oct-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) KR	E508-L	17-Oct-2022	25-Oct-2022	28 days	8 days	✓	25-Oct-2022	28 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved)										
PD4	E508-L	17-Oct-2022	25-Oct-2022	28 days	8 days	✓	25-Oct-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved)										
POUCE	E508-L	17-Oct-2022	25-Oct-2022	28 days	8 days	✓	25-Oct-2022	28 days	0 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
BEA-A	E420	17-Oct-2022	20-Oct-2022	180 days	3 days	✓	20-Oct-2022	180 days	3 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
BEA-B	E420	17-Oct-2022	20-Oct-2022	180 days	3 days	✓	20-Oct-2022	180 days	3 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
KR	E420	17-Oct-2022	20-Oct-2022	180 days	3 days	✓	20-Oct-2022	180 days	3 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
PD4	E420	17-Oct-2022	20-Oct-2022	180 days	3 days	✓	20-Oct-2022	180 days	3 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
POUCE	E420	17-Oct-2022	20-Oct-2022	180 days	3 days	✓	20-Oct-2022	180 days	3 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✗ = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	704570	1	18	5.5	5.0	✓
Ammonia by Fluorescence	E298	705240	1	9	11.1	5.0	✓
Chloride in Water by IC	E235.Cl	704574	1	18	5.5	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	704580	1	13	7.6	5.0	✓
Conductivity in Water	E100	704571	1	18	5.5	5.0	✓
Dissolved Ferrous Iron in Water by Colour	E541	756854	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	713015	1	19	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	704058	1	14	7.1	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	730526	1	18	5.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	705235	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	704579	1	10	10.0	5.0	✓
Fluoride in Water by IC	E235.F	704573	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	704575	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	704576	1	18	5.5	5.0	✓
pH by Meter	E108	704569	1	18	5.5	5.0	✓
Reactive Silica by Colourimetry	E392	704461	2	20	10.0	5.0	✓
Sulfate in Water by IC	E235.SO4	704577	1	18	5.5	5.0	✓
TDS by Gravimetry	E162	704380	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	705239	1	9	11.1	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	712785	1	18	5.5	5.0	✓
Total Metals in Water by CRC ICPMS	E420	704100	1	20	5.0	5.0	✓
Total Methylmercury in Water by GCAFS	E536	726346	2	50	4.0	5.0	✗
Total Nitrogen by Colourimetry	E366	705237	1	9	11.1	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	705236	1	9	11.1	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	705238	1	9	11.1	5.0	✓
TSS by Gravimetry	E160	704394	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	704570	1	18	5.5	5.0	✓
Ammonia by Fluorescence	E298	705240	1	9	11.1	5.0	✓
Chloride in Water by IC	E235.Cl	704574	1	18	5.5	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	704580	1	13	7.6	5.0	✓
Conductivity in Water	E100	704571	1	18	5.5	5.0	✓
Dissolved Ferrous Iron in Water by Colour	E541	756854	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	713015	1	19	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	704058	1	14	7.1	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	730526	1	18	5.5	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	705235	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	704579	1	10	10.0	5.0	✓
Fluoride in Water by IC	E235.F	704573	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	704575	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	704576	1	18	5.5	5.0	✓
pH by Meter	E108	704569	1	18	5.5	5.0	✓
Reactive Silica by Colourimetry	E392	704461	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	704577	1	18	5.5	5.0	✓
TDS by Gravimetry	E162	704380	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	705239	1	9	11.1	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	712785	1	18	5.5	5.0	✓
Total Metals in Water by CRC ICPMS	E420	704100	1	20	5.0	5.0	✓
Total Methylmercury in Water by GCAFS	E536	726346	3	50	6.0	5.0	✓
Total Nitrogen by Colourimetry	E366	705237	1	9	11.1	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	705236	1	9	11.1	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	705238	1	9	11.1	5.0	✓
TSS by Gravimetry	E160	704394	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	704570	1	18	5.5	5.0	✓
Ammonia by Fluorescence	E298	705240	1	9	11.1	5.0	✓
Chloride in Water by IC	E235.Cl	704574	1	18	5.5	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	704580	1	13	7.6	5.0	✓
Conductivity in Water	E100	704571	1	18	5.5	5.0	✓
Dissolved Ferrous Iron in Water by Colour	E541	756854	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	713015	1	19	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	704058	1	14	7.1	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	730526	1	18	5.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	705235	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	704579	1	10	10.0	5.0	✓
Fluoride in Water by IC	E235.F	704573	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	704575	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	704576	1	18	5.5	5.0	✓
Reactive Silica by Colourimetry	E392	704461	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	704577	1	18	5.5	5.0	✓
TDS by Gravimetry	E162	704380	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	705239	1	9	11.1	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	712785	1	18	5.5	5.0	✓
Total Metals in Water by CRC ICPMS	E420	704100	1	20	5.0	5.0	✓
Total Methylmercury in Water by GCAFS	E536	726346	3	50	6.0	5.0	✓

Matrix: **Water**

Evaluation: ✗ = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Total Nitrogen by Colourimetry	E366	705237	1	9	11.1	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	705236	1	9	11.1	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	705238	1	9	11.1	5.0	✓
TSS by Gravimetry	E160	704394	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	705240	1	9	11.1	5.0	✓
Chloride in Water by IC	E235.Cl	704574	1	18	5.5	5.0	✓
Dissolved Ferrous Iron in Water by Colour	E541	756854	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	713015	1	19	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	704058	1	14	7.1	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	730526	1	18	5.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	705235	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	704579	1	10	10.0	5.0	✓
Fluoride in Water by IC	E235.F	704573	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	704575	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	704576	1	18	5.5	5.0	✓
Reactive Silica by Colourimetry	E392	704461	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	704577	1	18	5.5	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	705239	1	9	11.1	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	712785	1	18	5.5	5.0	✓
Total Metals in Water by CRC ICPMS	E420	704100	1	20	5.0	5.0	✓
Total Methylmercury in Water by GCAFS	E536	726346	2	50	4.0	5.0	✗
Total Nitrogen by Colourimetry	E366	705237	1	9	11.1	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	705236	1	9	11.1	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	705238	1	9	11.1	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Vancouver	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Vancouver	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	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.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Colour (True) by Spectrometer (5 CU)	E329 ALS Environmental - Vancouver	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366 ALS Environmental - Vancouver	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Vancouver	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Reactive Silica by Colourimetry	E392 ALS Environmental - Vancouver	Water	APHA 4500-SiO2 E (mod)	Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method using a discrete analyzer. Method Limitation: Arsenic (5+) above 100 mg/L is a negative interference on this test
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Vancouver	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L ALS Environmental - Vancouver	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAFS.
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L ALS Environmental - Vancouver	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAFS.
Total Methylmercury in Water by GCAFS	E536 ALS Environmental - Vancouver	Water	EPA 1630 (mod)	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Methylmercury in Water by GCAFS	E537 ALS Environmental - Vancouver	Water	EPA 1630 (mod)	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Ferrous Iron in Water by Colour	E541 ALS Environmental - Vancouver	Water	APHA 3500-Fe B/James Ball et al (1999)	This analysis is carried out using procedures adapted from APHA 3500-Fe B and Environ. Sci. Technol. 1999, 33, 5, 807–813. The procedure involves preliminary sample filtration, and ferrous iron is determined using the "FerroZine" colourimetric method. Holding time is 7 days for 0.45um filtration or 6 months if samples have been filtered using 0.1um filters.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	Water	APHA 2340B	“Hardness (as CaCO3), dissolved” is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. “Total Hardness” refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Ion Balance using Dissolved Metals	EC101 ALS Environmental - Vancouver	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Vancouver	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
Total Kjeldahl Nitrogen (Calculation)	EC318 ALS Environmental - Vancouver	Water	BC MOE LABORATORY MANUAL (2005)	Total Kjeldahl Nitrogen is a calculated parameter. Total Kjeldahl Nitrogen (calc) = Total Nitrogen - [Nitrite (as N) + Nitrate (as N)].

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Preparation for Total Organic Carbon by Combustion	EP355 ALS Environmental - Vancouver	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Nitrogen in water	EP366 ALS Environmental - Vancouver	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals Water Filtration	EP421 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration (Low Level)	EP509-L ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
Total Methylmercury Water Preparation	EP536 ALS Environmental - Vancouver	Water	EPA 1630	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Methylmercury Water Preparation	EP537 ALS Environmental - Vancouver	Water	EPA 1630	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Ferrous Iron in Water by Colour	EP541 ALS Environmental - Vancouver	Water	APHA 3500-Fe B/James Ball et al (1999)	This analysis is carried out using procedures adapted from APHA 3500-Fe B and "A New Method for the Direct Determination of Dissolved Iron Concentration in Acid Mine Waters" published by James W. Ball et al (1999). The procedure involves preliminary sample filtration, and ferrous iron is determined using the "FerroZine" colourimetric method.

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QUALITY CONTROL REPORT

Work Order	: **FJ2202949**	Page	: 1 of 19
Amendment	: **2**		
Client	: Ecofish Research Ltd	Laboratory	: ALS Environmental - Fort St. John
Contact	: Sarah Kennedy	Account Manager	: Sean Zhang
Address	: 600 Comox Road Courtenay BC Canada V9N3P6	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	:	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-With Metals	Date Samples Received	: 17-Oct-2022 18:50
PO	: 1200-25.03.02	Date Analysis Commenced	: 19-Oct-2022
C-O-C number	: 2022-OCT-MON8/9-Day 3	Issue Date	: 25-Aug-2023 17:57
Sampler	: Pat Beaupre ----		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
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General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 704380)											
FJ2202949-001	BEA-A	Solids, total dissolved [TDS]	----	E162	20	mg/L	406	410	0.858%	20%	----
Physical Tests (QC Lot: 704394)											
FJ2202949-001	BEA-A	Solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 704569)											
FJ2202949-003	POUCE	pH	----	E108	0.10	pH units	8.33	8.34	0.120%	4%	----
Physical Tests (QC Lot: 704570)											
FJ2202949-003	POUCE	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	186	186	0.269%	20%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	6.4	6.6	0.2	Diff <2x LOR	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	192	192	0.156%	20%	----
Physical Tests (QC Lot: 704571)											
FJ2202949-003	POUCE	Conductivity	----	E100	2.0	µS/cm	1530	1510	1.31%	10%	----
Physical Tests (QC Lot: 704580)											
FJ2202949-001	BEA-A	Colour, true	----	E329	5.0	CU	76.3	75.3	1.27%	20%	----
Anions and Nutrients (QC Lot: 704461)											
CG2213996-001	Anonymous	Silicate (as SiO2)	7631-86-9	E392	0.50	mg/L	8.01	7.98	0.328%	20%	----
CG2213996-001	Anonymous	Silicate (as SiO2)	7631-86-9	E392	0.50	mg/L	8.01	8.02	0.126%	20%	----
Anions and Nutrients (QC Lot: 704573)											
FJ2202968-004	Anonymous	Fluoride	16984-48-8	E235.F	0.100	mg/L	0.215	0.216	0.0003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 704574)											
FJ2202968-004	Anonymous	Chloride	16887-00-6	E235.Cl	2.50	mg/L	<2.50	<2.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 704575)											
FJ2202968-004	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.0648	0.0634	0.0014	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 704576)											
FJ2202968-004	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	0.0085	0.0095	0.0010	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 704577)											
FJ2202968-004	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	537	536	0.00925%	20%	----
Anions and Nutrients (QC Lot: 704579)											
FJ2202949-001	BEA-A	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0016	0.0016	0.000001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 705237)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 705237) - continued											
FJ2202949-001	BEA-A	Nitrogen, total	7727-37-9	E366	0.030	mg/L	0.573	0.576	0.663%	20%	----
Anions and Nutrients (QC Lot: 705238)											
FJ2202949-001	BEA-A	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0220	0.0221	0.726%	20%	----
Anions and Nutrients (QC Lot: 705239)											
FJ2202949-001	BEA-A	Phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	0.0042	0.0045	0.0003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 705240)											
FJ2202949-001	BEA-A	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0074	0.0076	0.0002	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 705235)											
FJ2202949-001	BEA-A	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	21.0	22.4	6.17%	20%	----
Organic / Inorganic Carbon (QC Lot: 705236)											
FJ2202949-001	BEA-A	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	22.0	23.2	5.29%	20%	----
Total Metals (QC Lot: 704100)											
FJ2202949-001	BEA-A	Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.110	0.111	1.08%	20%	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	0.00014	0.00014	0.0000007	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00085	0.00088	0.00004	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.0972	0.105	7.73%	20%	----
		Beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	0.054	0.055	0.0010	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000285	0.0000241	0.0000044	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	55.8	57.3	2.64%	20%	----
		Cesium, total	7440-46-2	E420	0.000010	mg/L	0.000018	0.000016	0.000002	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00028	0.00029	0.000010	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.00202	0.00195	0.00007	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.010	mg/L	0.749	0.737	1.63%	20%	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	0.000160	0.000159	0.000001	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	0.0089	0.0091	0.0002	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	17.1	16.0	6.68%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.0577	0.0569	1.38%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00112	0.00114	1.71%	20%	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	0.00406	0.00411	0.00005	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	2.39	2.37	0.740%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 704100) - continued											
FJ2202949-001	BEA-A	Rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00108	0.00107	0.000004	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000369	0.000293	0.000076	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	0.55	0.61	0.06	Diff <2x LOR	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	53.4	52.8	1.10%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	0.227	0.233	2.57%	20%	----
		Sulfur, total	7704-34-9	E420	0.50	mg/L	38.0	39.3	3.43%	20%	----
		Tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00030	mg/L	0.00527	0.00481	9.10%	20%	----
		Tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.00166	0.00167	0.803%	20%	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00074	0.00070	0.00004	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00020	mg/L	0.00043	0.00048	0.00005	Diff <2x LOR	----
Total Metals (QC Lot: 712785)											
CG2214494-007	Anonymous	Mercury, total	7439-97-6	E508-L	0.50	ng/L	<0.00050 µg/L	<0.50	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 704058)											
FJ2202949-001	BEA-A	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0065	0.0064	0.0001	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00013	0.00014	0.000003	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00054	0.00057	0.00003	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0883	0.0892	0.919%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.046	0.043	0.003	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000080	0.0000115	0.0000034	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	52.2	50.4	3.59%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00021	0.00021	0.000005	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00161	0.00160	0.00002	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.046	0.046	0.0007	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 704058) - continued											
FJ2202949-001	BEA-A	Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0085	0.0080	0.0005	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	15.8	15.7	1.20%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0150	0.0153	1.61%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00106	0.00110	3.91%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00352	0.00350	0.00001	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	2.28	2.29	0.241%	20%	----
		Rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00090	0.00084	0.00006	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000323	0.000309	0.000014	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	0.312	0.311	0.0007	Diff <2x LOR	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	53.7	52.5	2.29%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.229	0.224	2.54%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	36.3	36.0	1.03%	20%	----
		Tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.00172	0.00164	4.82%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 713015)											
FJ2202949-001	BEA-A	Mercury, dissolved	7439-97-6	E509-L	0.50	ng/L	2.12	2.73	0.60	Diff <2x LOR	----
Speciated Metals (QC Lot: 726346)											
FJ2202949-001	BEA-A	Methylmercury (as MeHg), total	22967-92-6	E536	0.000020	µg/L	0.000000074 mg/L	0.000095	0.000021	Diff <2x LOR	----
Speciated Metals (QC Lot: 728312)											
FJ2202949-005	KR	Methylmercury (as MeHg), total	22967-92-6	E536	0.000080	µg/L	<0.000000080 mg/L	<0.000080	0	Diff <2x LOR	----
Speciated Metals (QC Lot: 730526)											
FJ2202949-001	BEA-A	Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.000020	µg/L	0.000000125 mg/L	0.000149	17.0%	30%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Speciated Metals (QC Lot: 756854)											
FJ2202949-001	BEA-A	Iron, ferrous [Fe II], dissolved	15438-31-0	E541	0.020	mg/L	0.046	0.046	0.0002	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 704380)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 704394)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 704570)						
Alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 704571)						
Conductivity	----	E100	1	µS/cm	1.2	----
Physical Tests (QCLot: 704580)						
Colour, true	----	E329	5	CU	<5.0	----
Anions and Nutrients (QCLot: 704461)						
Silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 704573)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 704574)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 704575)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 704576)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 704577)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 704579)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 705237)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 705238)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 705239)						
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 705240)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Organic / Inorganic Carbon (QCLot: 705235)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 705236)						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 704100)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 704100) - continued						
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Total Metals (QCLot: 712785)						
Mercury, total	7439-97-6	E508-L	0.5	ng/L	<0.50	----
Dissolved Metals (QCLot: 704058)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 704058) - continued						
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 713015)						
Mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	<0.50	----
Speciated Metals (QCLot: 726346)						
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 728312)						
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 730526)						
Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 740379)						
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 756854)						
Iron, ferrous [Fe II], dissolved	15438-31-0	E541	0.02	mg/L	<0.020	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 704380)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	102	85.0	115	----
Physical Tests (QCLot: 704394)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	97.3	85.0	115	----
Physical Tests (QCLot: 704569)									
pH	----	E108	----	pH units	7 pH units	99.8	98.0	102	----
Physical Tests (QCLot: 704570)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	103	85.0	115	----
Physical Tests (QCLot: 704571)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.2	90.0	110	----
Physical Tests (QCLot: 704580)									
Colour, true	----	E329	5	CU	100 CU	100	85.0	115	----
Anions and Nutrients (QCLot: 704461)									
Silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	10 mg/L	103	85.0	115	----
Anions and Nutrients (QCLot: 704573)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	97.8	90.0	110	----
Anions and Nutrients (QCLot: 704574)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 704575)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 704576)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	98.7	90.0	110	----
Anions and Nutrients (QCLot: 704577)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 704579)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	97.3	80.0	120	----
Anions and Nutrients (QCLot: 705237)									
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 705238)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	92.8	80.0	120	----
Anions and Nutrients (QCLot: 705239)									
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.05 mg/L	90.7	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 705240)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	97.7	85.0	115	----
Organic / Inorganic Carbon (QCLot: 705235)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	103	80.0	120	----
Organic / Inorganic Carbon (QCLot: 705236)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	103	80.0	120	----
Total Metals (QCLot: 704100)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	97.7	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	103	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	100	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	98.3	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	99.0	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	97.1	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	94.8	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	97.0	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	100	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	102	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	95.2	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	96.8	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	94.3	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	106	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	100	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	95.3	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	97.2	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	95.8	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	103	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	97.0	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	96.2	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	99.2	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	97.0	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	98.0	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	97.1	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	96.1	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	97.8	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	106	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 704100) - continued									
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	88.7	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	96.1	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	106	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	91.4	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	98.6	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	90.8	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	101	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	96.6	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	96.6	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	97.4	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	104	80.0	120	----
Total Metals (QCLot: 712785)									
Mercury, total	7439-97-6	E508-L	0.5	ng/L	5 ng/L	112	80.0	120	----
Dissolved Metals (QCLot: 704058)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	102	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	99.4	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	101	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	95.1	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	96.9	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	98.1	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	81.4	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	97.5	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	100	80.0	120	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	97.3	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	96.8	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	94.6	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	93.1	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	104	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	98.2	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	91.1	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	100	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	99.2	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	99.4	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	95.4	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	87.5	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Dissolved Metals (QCLot: 704058) - continued									
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	99.9	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	94.0	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	102	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	99.6	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	92.7	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	98.4	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	102	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	85.2	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	92.9	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	103	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	91.3	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	98.1	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	92.2	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	99.5	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	98.9	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	96.1	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	94.3	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
Mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	5 ng/L	102	80.0	120	----
Speciated Metals (QCLot: 726346)									
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	0.0025 µg/L	85.7	70.0	130	----
Speciated Metals (QCLot: 728312)									
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	0.0025 µg/L	76.3	70.0	130	----
Speciated Metals (QCLot: 730526)									
Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	0.0025 µg/L	79.4	70.0	130	----
Speciated Metals (QCLot: 740379)									
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	0.0025 µg/L	81.8	70.0	130	----
Speciated Metals (QCLot: 756854)									
Iron, ferrous [Fe II], dissolved	15438-31-0	E541	0.02	mg/L	0.5 mg/L	103	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 704461)										
CG2214293-001	Anonymous	Silicate (as SiO2)	7631-86-9	E392	10.2 mg/L	10 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 704573)										
FJ2202969-001	Anonymous	Fluoride	16984-48-8	E235.F	4.95 mg/L	5 mg/L	98.9	75.0	125	----
Anions and Nutrients (QCLot: 704574)										
FJ2202969-001	Anonymous	Chloride	16887-00-6	E235.Cl	515 mg/L	500 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 704575)										
FJ2202969-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	13.2 mg/L	12.5 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 704576)										
FJ2202969-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	2.49 mg/L	2.5 mg/L	99.6	75.0	125	----
Anions and Nutrients (QCLot: 704577)										
FJ2202969-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	500 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 704579)										
FJ2202949-002	BEA-B	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0353 mg/L	0.03 mg/L	118	70.0	130	----
Anions and Nutrients (QCLot: 705237)										
FJ2202949-002	BEA-B	Nitrogen, total	7727-37-9	E366	ND mg/L	0.4 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 705238)										
FJ2202949-002	BEA-B	Phosphorus, total	7723-14-0	E372-U	0.0487 mg/L	0.05 mg/L	97.4	70.0	130	----
Anions and Nutrients (QCLot: 705239)										
FJ2202949-002	BEA-B	Phosphorus, total dissolved	7723-14-0	E375-T	0.0485 mg/L	0.05 mg/L	97.1	70.0	130	----
Anions and Nutrients (QCLot: 705240)										
FJ2202949-002	BEA-B	Ammonia, total (as N)	7664-41-7	E298	0.101 mg/L	0.1 mg/L	101	75.0	125	----
Organic / Inorganic Carbon (QCLot: 705235)										
FJ2202949-002	BEA-B	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 705236)										
FJ2202949-002	BEA-B	Carbon, total organic [TOC]	----	E355-L	ND mg/L	5 mg/L	ND	70.0	130	----
Total Metals (QCLot: 704100)										
FJ2202949-002	BEA-B	Aluminum, total	7429-90-5	E420	0.185 mg/L	0.2 mg/L	92.6	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 704100) - continued										
FJ2202949-002	BEA-B	Antimony, total	7440-36-0	E420	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0199 mg/L	0.02 mg/L	99.4	70.0	130	----
		Barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0435 mg/L	0.04 mg/L	109	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.00834 mg/L	0.01 mg/L	83.4	70.0	130	----
		Boron, total	7440-42-8	E420	0.105 mg/L	0.1 mg/L	105	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00388 mg/L	0.004 mg/L	97.1	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.00978 mg/L	0.01 mg/L	97.8	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0382 mg/L	0.04 mg/L	95.6	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0193 mg/L	0.02 mg/L	96.6	70.0	130	----
		Copper, total	7440-50-8	E420	0.0185 mg/L	0.02 mg/L	92.6	70.0	130	----
		Iron, total	7439-89-6	E420	1.96 mg/L	2 mg/L	97.9	70.0	130	----
		Lead, total	7439-92-1	E420	0.0172 mg/L	0.02 mg/L	86.0	70.0	130	----
		Lithium, total	7439-93-2	E420	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0209 mg/L	0.02 mg/L	104	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0380 mg/L	0.04 mg/L	95.0	70.0	130	----
		Phosphorus, total	7723-14-0	E420	10.00 mg/L	10 mg/L	100.0	70.0	130	----
		Potassium, total	7440-09-7	E420	4.10 mg/L	4 mg/L	102	70.0	130	----
		Rubidium, total	7440-17-7	E420	0.0190 mg/L	0.02 mg/L	94.8	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0421 mg/L	0.04 mg/L	105	70.0	130	----
		Silicon, total	7440-21-3	E420	9.84 mg/L	10 mg/L	98.4	70.0	130	----
		Silver, total	7440-22-4	E420	0.00412 mg/L	0.004 mg/L	103	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	ND mg/L	20 mg/L	ND	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.0371 mg/L	0.04 mg/L	92.8	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00354 mg/L	0.004 mg/L	88.4	70.0	130	----
		Thorium, total	7440-29-1	E420	0.0190 mg/L	0.02 mg/L	95.1	70.0	130	----
		Tin, total	7440-31-5	E420	0.0198 mg/L	0.02 mg/L	99.2	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0391 mg/L	0.04 mg/L	97.7	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.0186 mg/L	0.02 mg/L	93.0	70.0	130	----
		Uranium, total	7440-61-1	E420	0.00372 mg/L	0.004 mg/L	93.1	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 704100) - continued										
FJ2202949-002	BEA-B	Vanadium, total	7440-62-2	E420	0.0997 mg/L	0.1 mg/L	99.7	70.0	130	----
		Zinc, total	7440-66-6	E420	0.364 mg/L	0.4 mg/L	90.9	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.0449 mg/L	0.04 mg/L	112	70.0	130	----
Total Metals (QCLot: 712785)										
CG2214545-001	Anonymous	Mercury, total	7439-97-6	E508-L	6.41 ng/L	5 ng/L	128	70.0	130	----
Dissolved Metals (QCLot: 704058)										
FJ2202949-002	BEA-B	Aluminum, dissolved	7429-90-5	E421	0.197 mg/L	0.2 mg/L	98.7	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0203 mg/L	0.02 mg/L	102	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0198 mg/L	0.02 mg/L	99.1	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0391 mg/L	0.04 mg/L	97.8	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00866 mg/L	0.01 mg/L	86.6	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.077 mg/L	0.1 mg/L	76.8	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00379 mg/L	0.004 mg/L	94.8	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.0102 mg/L	0.01 mg/L	102	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0373 mg/L	0.04 mg/L	93.2	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0187 mg/L	0.02 mg/L	93.6	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0182 mg/L	0.02 mg/L	91.2	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.94 mg/L	2 mg/L	97.0	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0187 mg/L	0.02 mg/L	93.7	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0926 mg/L	0.1 mg/L	92.6	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0180 mg/L	0.02 mg/L	90.2	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0210 mg/L	0.02 mg/L	105	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0373 mg/L	0.04 mg/L	93.2	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	10.0 mg/L	10 mg/L	100	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	4.01 mg/L	4 mg/L	100	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.0189 mg/L	0.02 mg/L	94.4	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0448 mg/L	0.04 mg/L	112	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.96 mg/L	10 mg/L	99.6	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00342 mg/L	0.004 mg/L	85.5	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	ND mg/L	20 mg/L	ND	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 704058) - continued										
FJ2202949-002	BEA-B	Tellurium, dissolved	13494-80-9	E421	0.0405 mg/L	0.04 mg/L	101	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00388 mg/L	0.004 mg/L	97.0	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.0199 mg/L	0.02 mg/L	99.4	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0191 mg/L	0.02 mg/L	95.3	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0394 mg/L	0.04 mg/L	98.6	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.0205 mg/L	0.02 mg/L	102	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00406 mg/L	0.004 mg/L	102	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0978 mg/L	0.1 mg/L	97.8	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.384 mg/L	0.4 mg/L	95.9	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0441 mg/L	0.04 mg/L	110	70.0	130	----
Dissolved Metals (QCLot: 713015)										
FJ2202949-002	BEA-B	Mercury, dissolved	7439-97-6	E509-L	5.55 ng/L	5 ng/L	111	70.0	130	----
Speciated Metals (QCLot: 726346)										
FJ2202949-002	BEA-B	Methylmercury (as MeHg), total	22967-92-6	E536	0.00186 µg/L	0.0025 µg/L	74.6	60.0	140	----
Speciated Metals (QCLot: 728312)										
FJ2202978-001	Anonymous	Methylmercury (as MeHg), total	22967-92-6	E536	0.00178 µg/L	0.0025 µg/L	71.1	60.0	140	----
Speciated Metals (QCLot: 730526)										
FJ2202949-002	BEA-B	Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00417 µg/L	0.0025 µg/L	83.5	60.0	140	----
Speciated Metals (QCLot: 756854)										
FJ2202949-002	BEA-B	Iron, ferrous [Fe II], dissolved	15438-31-0	E541	0.355 mg/L	0.5 mg/L	71.1	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 2022-Oct-MON8/9- Day 3

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Page of

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Sarah Kennedy
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A
☑ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax	skennedy@ecofishresearch.com
Email 2	tkasubuchi@ecofishresearch.com
Email 3	waterqualitylabdata@ecofishresearch.com

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax	accountspayable@ecofishresearch.com
Email 2	

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Project Information

ALS Account # / Quote #:	VA22-ECOF100-004
Job #:	Surface water MON8/9- with metals
PO / AFE:	1200-25.03.02
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (ALS use only): Fort St. John Work Order Reference FJ2202949

Telephone : +1 250 261 5517

Project Manager: Sean Zhang Sampler: Pat Beaupre

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identi (This descripti	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Alk., Ec, pH, TDS, TSS, Anions, Silicate, diss ortho P, colour, pH	DOC, Total dissolved P (F/P)	NH3, Total Kjeldahl Nitrogen, Total N, TOC, Total P (P)	IONBALANCE-BC-CL	Total Methyl Hg by GCAFS (0.00000002 mg/L) (F)	Dissolved Methyl Hg by GCAFS (0.00000002 mg/L) (F)	Total Metals by CRC ICPMS, Hardness from Total Ca/Mg (F)	Dissolved Metals by CRC ICPMS, Hardness (F)	Total Mercury in Water CVAFS (Low Level 0.0000005 mg/L) (F)	Dissolved Mercury in Water by CVAFS (Low Level 0.0000005 mg/L) (F)	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	BEA-A	17Oct2022	17:00	Water	9	R	R	R	R	R	R	R	R	R	R			
	~~BEA-B~~ BEA-B	17Oct2022	17:00	Water	9	R	R	R	R	R	R	R	R	R	R			
	~~PD2-A~~			~~Water~~	~~9~~	R	R	R	R	R	R	R	R	R	R			
	~~PD2-B~~			~~Water~~	~~9~~	R	R	R	R	R	R	R	R	R	R			
	~~PINE~~			~~Water~~	~~9~~	R	R	R	R	R	R	R	R	R	R			
	~~PD1~~			~~Water~~	~~9~~	R	R	R	R	R	R	R	R	R	R			
	POUCE	17 OCT 22	11:45	Water	9	R	R	R	R	R	R	R	R	R	R			
	PD4	17Oct22	13:10	Water	9	R	R	R	R	R	R	R	R	R	R			
	KR	17Oct22	14:55	Water	9	R	R	R	R	R	R	R	R	R	R			
	~~PD3~~			~~Water~~	~~9~~	R	R	R	R	R	R	R	R	R	R			
	~~Travel Blank~~			~~Water~~	~~5~~	R		R	R	R		R		R				

FJAE Shipping & Receiving: Call Out / Expedite / Priority / Air / # of Coolers / Ground / # of Carboys

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO
Are samples for human consumption/ use? ☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Please send Azimuth a copy of the data in their EDD format:

gmann@azimuthgroup.ca imcivor@azimuthgroup.ca
csuzanne@ecofishresearch.com kganshorn@ecofishresearch.com

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED
Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO
Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
8.7	

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
BM	17Oct 2022	18:45

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
	Oct 17/22	1850

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Chain of Custody (COC) / Analytical Request Form

COC Number: 2022-Oct-MON8/9- Day 3

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Page of

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Sarah Kennedy
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A
☑ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax	skennedy@ecofishresearch.com
Email 2	tkasubuchi@ecofishresearch.com
Email 3	waterqualitylabdata@ecofishresearch.com

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax	accountspayable@ecofishresearch.com
Email 2	

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Project Information

ALS Account # / Quote #:	VA22-ECOF100-004
Job #:	Surface water MON8/9- with metals
PO / AFE:	1200-25.03.02
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (ALS use only):

Contact: Sean Zhang Sampler: Pat Beaupre

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification (This description)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Alk., Ec, pH, TDS, TSS, Anions, Silicate, diss ortho P, colour, pH	DOC, Total dissolved P (F/P)	NH3, Total Kjeldahl Nitrogen, Total N, TOC, Total P (P)	IONBALANCE-BC-CL	Total Methyl Hg by GCAFS (0.00000002 mg/L) (F)	Dissolved Methyl Hg by GCAFS (0.00000002 mg/L) (F)	Total Metals by CRC ICPMS, Hardness from Total Ca/Mg	Dissolved Metals by CRC ICPMS, Hardness (F)	Total Mercury in Water CVAFS (Low Level 0.0000005 mg/L) (F)	Dissolved Mercury in Water by CVAFS (Low Level 0.0000005 mg/L) (F)					SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	BEA-A	17Oct2022	17:00	Water	9	R	R	R	R	R	R	R	R	R	R							
	~~BEA-B~~ BEA-B	17Oct2022	17:00	Water	9	R	R	R	R	R	R	R	R	R	R							
	~~PD2-A~~			~~Water~~	~~9~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~							
	~~PD2-B~~			~~Water~~	~~9~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~							
	~~PINE~~			~~Water~~	~~9~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~							
	~~PD1~~			~~Water~~	~~9~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~							
	POUCE	17 OCT 22	11:45	Water	9	R	R	R	R	R	R	R	R	R	R							
	PD4	17Oct22	13:10	Water	9	R	R	R	R	R	R	R	R	R	R							
	KR	17Oct 22	14:55	Water	9	R	R	R	R	R	R	R	R	R	R							
	~~PD3~~			~~Water~~	~~9~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~							
	~~Travel Blank~~			~~Water~~	5	R		R	R	R		R		R								

Fort St. John Work Order Reference FJ2202949

Telephone : +1 250 261 5517

FJAE Shipping & Receiving
Call Out ___ Expedite ___ Priority
# of Coolers 1 Air ___ Ground
# of Carboys ___

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Please send Azimuth a copy of the data in their EDD format:

gmann@azimuthgroup.ca imcivor@azimuthgroup.ca
csuzanne@ecofishresearch.com kganshorn@ecofishresearch.com

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☒ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
8.7							9

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
BM	17Oct 2022	18:45

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
	Oct 17/22	1850

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
	18/10/18	6:45P

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202956**	Page	: 1 of 8
Amendment	: **4**		
Client	: **Ecofish Research Ltd**	Laboratory	: ALS Environmental - Fort St. John
Contact	: Sarah Kennedy	Account Manager	: Sean Zhang
Address	: 600 Comox Road Courtenay BC Canada V9N3P6	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: ----	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-With Metals	Date Samples Received	: 18-Oct-2022 16:30
PO	: 1200-25.03.02	Date Analysis Commenced	: 21-Oct-2022
C-O-C number	: 2022-Oct-MON8/9-Day4	Issue Date	: 25-Aug-2023 17:57
Sampler	: PB		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Caitlin Macey	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Cindy Tang	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Hamideh Moradi	Analyst	Metals, Burnaby, British Columbia
Jayden Piattelli	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Parnian Sane	Analyst	Metals, Burnaby, British Columbia
Sukhman Khosa	Lab Assistant	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.
Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
µS/cm	microsiemens per centimetre
CU	colour units (1 cu = 1 mg/l pt)
meq/L	milliequivalents per litre
mg/L	milligrams per litre
ng/L	nanograms per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Accreditation

Accreditation	*Description*	*Laboratory*	*Address*
A	CALA ISO/IEC 17025:2017	VA ALS Environmental - Vancouver	8081 Lougheed Highway, Burnaby, BC

Applicable accreditations are indicated in the Method/Lab column as superscripts.

Workorder Comments

Amendment (07/12/2022): This report has been amended and re-released to allow the reporting of additional analytical data.

Amendment (6/6/2023): This report has been amended as a result of a request to change sample identification numbers (IDs) received by ALS from Sarah Kennedy on 6/6/2023. All analysis results are as per the previous report.
Amendment (25/8/2023): This report has been amended following holding time evaluation corrections. All analysis results are as per the previous report.

Qualifiers

Qualifier	Description
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
RRV	Reported result verified by repeat analysis.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	PR3	MD	MD-FB	----	----
						Client sampling date / time	18-Oct-2022 08:20	18-Oct-2022 11:05	18-Oct-2022 08:20	----	----
							FJ2202956-001	FJ2202956-002	FJ2202956-003	--------	--------
							Result	Result	Result	----	----
Sample Preparation											
Dissolved Fe2 filtration location	----	EP541/VA		-	-		Field	Field	Field	----	----
Physical Tests											
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	A	1.0	mg/L		74.7	188	<1.0	----	----
Alkalinity, carbonate (as CaCO3)	----	E290/VA	A	1.0	mg/L		<1.0	15.6	<1.0	----	----
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	A	1.0	mg/L		<1.0	<1.0	<1.0	----	----
Alkalinity, total (as CaCO3)	----	E290/VA	A	1.0	mg/L		74.7	203	<1.0	----	----
Colour, true	----	E329/VA	A	5.0	CU		6.4	6.2	<5.0	----	----
Conductivity	----	E100/VA	A	2.0	µS/cm		174	424	<2.0	----	----
Hardness (as CaCO3), dissolved	----	EC100/VA		0.50	mg/L		90.2	222	<0.50	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA		0.50	mg/L		92.5	216	<0.50	----	----
pH	----	E108/VA	A	0.10	pH units		8.14	8.54	5.58	----	----
Solids, total dissolved [TDS]	----	E162/VA	A	10	mg/L		114	275	<10	----	----
Solids, total suspended [TSS]	----	E160/VA	A	3.0	mg/L		6.6	<3.0	<3.0	----	----
Anions and Nutrients											
Ammonia, total (as N)	7664-41-7	E298/VA	A	0.0050	mg/L		0.0146	<0.0050	0.0116 RRV	----	----
Chloride	16887-00-6	E235.Cl/VA	A	0.50	mg/L		<0.50	0.69	<0.50	----	----
Fluoride	16984-48-8	E235.F/VA	A	0.020	mg/L		0.032	0.094	<0.020	----	----
Kjeldahl nitrogen, total [TKN]	----	EC318/VA		0.050	mg/L		0.109	0.082	<0.050	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	A	0.0050	mg/L		0.0602	0.0053	<0.0050	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	A	0.0010	mg/L		<0.0010	<0.0010	<0.0010	----	----
Nitrogen, total	7727-37-9	E366/VA	A	0.030	mg/L		0.169	0.087	<0.030	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/VA	A	0.0010	mg/L		<0.0010	<0.0010	<0.0010	----	----
Phosphorus, total	7723-14-0	E372-U/VA	A	0.0020	mg/L		0.0093	0.0049	<0.0020	----	----
Phosphorus, total dissolved	7723-14-0	E375-T/VA	A	0.0020	mg/L		<0.0020	0.0023	<0.0020	----	----
Silicate (as SiO2)	7631-86-9	E392/VA	A	0.50	mg/L		4.16	4.69	<0.50	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	A	0.30	mg/L		12.3	31.5	<0.30	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/VA		0.0032	mg/L		0.0602	0.0053	<0.0051	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	PR3	MD	MD-FB	----	----
					Client sampling date / time	18-Oct-2022 08:20	18-Oct-2022 11:05	18-Oct-2022 08:20	----	----
Analyte	CAS Number	Method/Lab		LOR	Unit	FJ2202956-001	FJ2202956-002	FJ2202956-003	--------	--------
						Result	Result	Result	----	----
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/VA	A	0.50	mg/L	3.77	3.97	1.22 RRV	----	----
Carbon, total organic [TOC]	----	E355-L/VA	A	0.50	mg/L	2.83	3.21	1.27 RRV	----	----
Ion Balance										
Anion sum	----	EC101/VA		0.10	meq/L	1.75	4.74	<0.10	----	----
Cation sum	----	EC101/VA		0.10	meq/L	1.86	4.85	<0.10	----	----
Ion balance (APHA)	----	EC101/VA		0.010	%	3.05	1.15	<0.010	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	A	0.0030	mg/L	0.0809	0.0447	<0.0030	----	----
Antimony, total	7440-36-0	E420/VA	A	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----
Arsenic, total	7440-38-2	E420/VA	A	0.00010	mg/L	0.00023	0.00030	<0.00010	----	----
Barium, total	7440-39-3	E420/VA	A	0.00010	mg/L	0.0325	0.197	<0.00010	----	----
Beryllium, total	7440-41-7	E420/VA	A	0.000020	mg/L	<0.000020	<0.000020	<0.000020	----	----
Bismuth, total	7440-69-9	E420/VA	A	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----
Boron, total	7440-42-8	E420/VA	A	0.010	mg/L	<0.010	0.013	<0.010	----	----
Cadmium, total	7440-43-9	E420/VA	A	0.0000050	mg/L	0.0000169	0.0000111	<0.0000050	----	----
Calcium, total	7440-70-2	E420/VA	A	0.050	mg/L	27.1	60.3	<0.050	----	----
Cesium, total	7440-46-2	E420/VA	A	0.000010	mg/L	0.000016	<0.000010	<0.000010	----	----
Chromium, total	7440-47-3	E420/VA	A	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
Cobalt, total	7440-48-4	E420/VA	A	0.00010	mg/L	<0.00010	0.00018	<0.00010	----	----
Copper, total	7440-50-8	E420/VA	A	0.00050	mg/L	0.00078	0.00058	<0.00050	----	----
Iron, total	7439-89-6	E420/VA	A	0.010	mg/L	0.115	0.183	<0.010	----	----
Lead, total	7439-92-1	E420/VA	A	0.000050	mg/L	0.000065	<0.000050	<0.000050	----	----
Lithium, total	7439-93-2	E420/VA	A	0.0010	mg/L	0.0011	0.0059	<0.0010	----	----
Magnesium, total	7439-95-4	E420/VA	A	0.0050	mg/L	6.04	16.0	<0.0050	----	----
Manganese, total	7439-96-5	E420/VA	A	0.00010	mg/L	0.00397	0.0342	<0.00010	----	----
Mercury, total	7439-97-6	E508-L/VA	A	0.50	ng/L	0.83	1.12	<0.50 DTC	----	----
Molybdenum, total	7439-98-7	E420/VA	A	0.000050	mg/L	0.000767	0.000929	<0.000050	----	----
Nickel, total	7440-02-0	E420/VA	A	0.00050	mg/L	0.00083	0.00130	<0.00050	----	----
Phosphorus, total	7723-14-0	E420/VA	A	0.050	mg/L	<0.050	<0.050	<0.050	----	----
Potassium, total	7440-09-7	E420/VA	A	0.050	mg/L	0.445	1.14	<0.050	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	PR3	MD	MD-FB	----	----
						Client sampling date / time	18-Oct-2022 08:20	18-Oct-2022 11:05	18-Oct-2022 08:20	----	----
							FJ2202956-001	FJ2202956-002	FJ2202956-003	--------	--------
							Result	Result	Result	----	----
Total Metals											
Rubidium, total	7440-17-7	E420/VA	A	0.00020	mg/L		0.00046	0.00045	<0.00020	----	----
Selenium, total	7782-49-2	E420/VA	A	0.000050	mg/L		0.000284	0.000202	<0.000050	----	----
Silicon, total	7440-21-3	E420/VA	A	0.10	mg/L		2.13	2.34	<0.10	----	----
Silver, total	7440-22-4	E420/VA	A	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
Sodium, total	7440-23-5	E420/VA	A	0.050	mg/L		1.11	9.26	<0.050	----	----
Strontium, total	7440-24-6	E420/VA	A	0.00020	mg/L		0.104	0.177	<0.00020	----	----
Sulfur, total	7704-34-9	E420/VA	A	0.50	mg/L		4.72	11.8	<0.50	----	----
Tellurium, total	13494-80-9	E420/VA	A	0.00020	mg/L		<0.00020	<0.00020	<0.00020	----	----
Thallium, total	7440-28-0	E420/VA	A	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
Thorium, total	7440-29-1	E420/VA	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
Tin, total	7440-31-5	E420/VA	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
Titanium, total	7440-32-6	E420/VA	A	0.00030	mg/L		0.00157	0.00071	<0.00030	----	----
Tungsten, total	7440-33-7	E420/VA	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
Uranium, total	7440-61-1	E420/VA	A	0.000010	mg/L		0.000416	0.000713	<0.000010	----	----
Vanadium, total	7440-62-2	E420/VA	A	0.00050	mg/L		0.00060	<0.00050	<0.00050	----	----
Zinc, total	7440-66-6	E420/VA	A	0.0030	mg/L		<0.0030	<0.0030	<0.0030	----	----
Zirconium, total	7440-67-7	E420/VA	A	0.00020	mg/L		<0.00020	<0.00020	<0.00020	----	----
Dissolved Metals											
Aluminum, dissolved	7429-90-5	E421/VA	A	0.0010	mg/L		0.0044	0.0079	0.0033 RRV	----	----
Antimony, dissolved	7440-36-0	E421/VA	A	0.00010	mg/L		<0.00010	0.00011	<0.00010	----	----
Arsenic, dissolved	7440-38-2	E421/VA	A	0.00010	mg/L		0.00021	0.00022	<0.00010	----	----
Barium, dissolved	7440-39-3	E421/VA	A	0.00010	mg/L		0.0304	0.182	<0.00010	----	----
Beryllium, dissolved	7440-41-7	E421/VA	A	0.000020	mg/L		<0.000020	<0.000020	<0.000020	----	----
Bismuth, dissolved	7440-69-9	E421/VA	A	0.000050	mg/L		<0.000050	<0.000050	<0.000050	----	----
Boron, dissolved	7440-42-8	E421/VA	A	0.010	mg/L		<0.010	0.013	<0.010	----	----
Cadmium, dissolved	7440-43-9	E421/VA	A	0.0000050	mg/L		0.0000056	0.0000062	0.0000057 RRV	----	----
Calcium, dissolved	7440-70-2	E421/VA	A	0.050	mg/L		26.5	61.4	<0.050	----	----
Cesium, dissolved	7440-46-2	E421/VA	A	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
Chromium, dissolved	7440-47-3	E421/VA	A	0.00050	mg/L		<0.00050	<0.00050	<0.00050	----	----
Cobalt, dissolved	7440-48-4	E421/VA	A	0.00010	mg/L		<0.00010	0.00024	<0.00010	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	PR3	MD	MD-FB	----	----
					Client sampling date / time	18-Oct-2022 08:20	18-Oct-2022 11:05	18-Oct-2022 08:20	----	----
Analyte	CAS Number	Method/Lab		LOR	Unit	FJ2202956-001	FJ2202956-002	FJ2202956-003	--------	--------
						Result	Result	Result	----	----
Dissolved Metals										
Copper, dissolved	7440-50-8	E421/VA	A	0.00020	mg/L	0.00059	0.00041	<0.00020	----	----
Iron, dissolved	7439-89-6	E421/VA	A	0.010	mg/L	<0.010	<0.010	<0.010	----	----
Lead, dissolved	7439-92-1	E421/VA	A	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----
Lithium, dissolved	7439-93-2	E421/VA	A	0.0010	mg/L	0.0011	0.0064	<0.0010	----	----
Magnesium, dissolved	7439-95-4	E421/VA	A	0.0050	mg/L	5.83	16.7	<0.0050	----	----
Manganese, dissolved	7439-96-5	E421/VA	A	0.00010	mg/L	0.00044	0.0320	0.00014 RRV	----	----
Mercury, dissolved	7439-97-6	E509-L/VA	A	0.50	ng/L	1.76	1.79	<0.50 DTC	----	----
Molybdenum, dissolved	7439-98-7	E421/VA	A	0.000050	mg/L	0.000725	0.000922	<0.000050	----	----
Nickel, dissolved	7440-02-0	E421/VA	A	0.00050	mg/L	0.00065	0.00125	<0.00050	----	----
Phosphorus, dissolved	7723-14-0	E421/VA	A	0.050	mg/L	<0.050	<0.050	<0.050	----	----
Potassium, dissolved	7440-09-7	E421/VA	A	0.050	mg/L	0.420	1.19	<0.050	----	----
Rubidium, dissolved	7440-17-7	E421/VA	A	0.00020	mg/L	0.00033	0.00032	<0.00020	----	----
Selenium, dissolved	7782-49-2	E421/VA	A	0.000050	mg/L	0.000283	0.000219	<0.000050	----	----
Silicon, dissolved	7440-21-3	E421/VA	A	0.050	mg/L	1.93	2.26	<0.050	----	----
Silver, dissolved	7440-22-4	E421/VA	A	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----
Sodium, dissolved	7440-23-5	E421/VA	A	0.050	mg/L	1.06	8.85	<0.050	----	----
Strontium, dissolved	7440-24-6	E421/VA	A	0.00020	mg/L	0.103	0.167	<0.00020	----	----
Sulfur, dissolved	7704-34-9	E421/VA	A	0.50	mg/L	4.23	11.2	<0.50	----	----
Tellurium, dissolved	13494-80-9	E421/VA	A	0.00020	mg/L	<0.00020	<0.00020	<0.00020	----	----
Thallium, dissolved	7440-28-0	E421/VA	A	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----
Thorium, dissolved	7440-29-1	E421/VA	A	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----
Tin, dissolved	7440-31-5	E421/VA	A	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----
Titanium, dissolved	7440-32-6	E421/VA	A	0.00030	mg/L	<0.00030	<0.00030	<0.00030	----	----
Tungsten, dissolved	7440-33-7	E421/VA	A	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----
Uranium, dissolved	7440-61-1	E421/VA	A	0.000010	mg/L	0.000424	0.000760	<0.000010	----	----
Vanadium, dissolved	7440-62-2	E421/VA	A	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
Zinc, dissolved	7440-66-6	E421/VA	A	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----
Zirconium, dissolved	7440-67-7	E421/VA	A	0.00030	mg/L	<0.00030	<0.00030	<0.00030	----	----
Dissolved MeHg filtration location	----	EP537/VA		-	-	Field	Field	Field	----	----
Dissolved mercury filtration location	----	EP509-L/VA		-	-	Field	Field	Field	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	PR3	MD	MD-FB	----	----
					Client sampling date / time	18-Oct-2022 08:20	18-Oct-2022 11:05	18-Oct-2022 08:20	----	----
Analyte	CAS Number	Method/Lab		LOR	Unit	FJ2202956-001	FJ2202956-002	FJ2202956-003	--------	--------
						Result	Result	Result	----	----
Dissolved Metals										
Dissolved metals filtration location	----	EP421/VA		-	-	Field	Field	Field	----	----
Speciated Metals										
Methylmercury (as MeHg), total	22967-92-6	E536/VA	A	0.000000020	mg/L	<0.000000020	<0.000000020	<0.000000020	----	----
Iron, ferrous [Fe II], dissolved	15438-31-0	E541/VA	A	0.020	mg/L	<0.020	<0.020	<0.020	----	----
Methylmercury (as MeHg), dissolved	22967-92-6	E537/VA	A	0.000000020	mg/L	<0.000000020	<0.000000020	<0.000000020	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202956**	Page	: 1 of 20
Amendment	: **4**		
Client	: **Ecofish Research Ltd**	Laboratory	: ALS Environmental - Fort St. John
Contact	: Sarah Kennedy	Account Manager	: Sean Zhang
Address	: 600 Comox Road Courtenay BC Canada V9N3P6	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-With Metals	Date Samples Received	: 18-Oct-2022 16:30
PO	: 1200-25.03.02	Issue Date	: 25-Aug-2023 17:57
C-O-C number	: 2022-Oct-MON8/9-Day4		
Sampler	: PB		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MD	E298	18-Oct-2022	21-Oct-2022	28 days	3 days	✓	22-Oct-2022	28 days	4 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PR3	E298	18-Oct-2022	21-Oct-2022	28 days	3 days	✓	22-Oct-2022	28 days	4 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MD-FB	E298	18-Oct-2022	22-Oct-2022	28 days	4 days	✓	24-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MD	E235.Cl	18-Oct-2022	21-Oct-2022	28 days	3 days	✓	21-Oct-2022	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MD-FB	E235.Cl	18-Oct-2022	21-Oct-2022	28 days	3 days	✓	21-Oct-2022	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PR3	E235.Cl	18-Oct-2022	21-Oct-2022	28 days	3 days	✓	21-Oct-2022	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE MD	E378-U	18-Oct-2022	21-Oct-2022	3 days	3 days	✓	21-Oct-2022	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PR3	E378-U	18-Oct-2022	21-Oct-2022	3 days	3 days	✓	21-Oct-2022	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE MD-FB	E378-U	18-Oct-2022	21-Oct-2022	3 days	3 days	✓	21-Oct-2022	3 days	4 days	× EHT
Anions and Nutrients : Fluoride in Water by IC										
HDPE MD	E235.F	18-Oct-2022	21-Oct-2022	28 days	3 days	✓	21-Oct-2022	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE MD-FB	E235.F	18-Oct-2022	21-Oct-2022	28 days	3 days	✓	21-Oct-2022	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PR3	E235.F	18-Oct-2022	21-Oct-2022	28 days	3 days	✓	21-Oct-2022	28 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MD	E235.NO3-L	18-Oct-2022	21-Oct-2022	3 days	3 days	✓	21-Oct-2022	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MD-FB	E235.NO3-L	18-Oct-2022	21-Oct-2022	3 days	3 days	✓	21-Oct-2022	3 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
PR3	E235.NO3-L	18-Oct-2022	21-Oct-2022	3 days	3 days	✓	21-Oct-2022	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
MD	E235.NO2-L	18-Oct-2022	21-Oct-2022	3 days	3 days	✓	21-Oct-2022	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
MD-FB	E235.NO2-L	18-Oct-2022	21-Oct-2022	3 days	3 days	✓	21-Oct-2022	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
PR3	E235.NO2-L	18-Oct-2022	21-Oct-2022	3 days	3 days	✓	21-Oct-2022	3 days	3 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE										
MD	E392	18-Oct-2022	----	----	----		24-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE										
MD-FB	E392	18-Oct-2022	----	----	----		24-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE										
PR3	E392	18-Oct-2022	----	----	----		24-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MD	E235.SO4	18-Oct-2022	21-Oct-2022	28 days	3 days	✓	21-Oct-2022	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MD-FB	E235.SO4	18-Oct-2022	21-Oct-2022	28 days	3 days	✓	21-Oct-2022	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE PR3	E235.SO4	18-Oct-2022	21-Oct-2022	28 days	3 days	✓	21-Oct-2022	28 days	3 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) MD	E375-T	18-Oct-2022	22-Oct-2022	28 days	4 days	✓	24-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) MD-FB	E375-T	18-Oct-2022	22-Oct-2022	28 days	4 days	✓	24-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PR3	E375-T	18-Oct-2022	22-Oct-2022	28 days	4 days	✓	24-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MD	E366	18-Oct-2022	21-Oct-2022	28 days	3 days	✓	24-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) PR3	E366	18-Oct-2022	21-Oct-2022	28 days	3 days	✓	24-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MD-FB	E366	18-Oct-2022	22-Oct-2022	28 days	4 days	✓	25-Oct-2022	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MD	E372-U	18-Oct-2022	21-Oct-2022	28 days	3 days	✓	22-Oct-2022	28 days	4 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PR3	E372-U	18-Oct-2022	21-Oct-2022	28 days	3 days	✓	22-Oct-2022	28 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MD-FB	E372-U	18-Oct-2022	22-Oct-2022	28 days	4 days	✓	23-Oct-2022	28 days	5 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) MD	E509-L	18-Oct-2022	25-Oct-2022	28 days	7 days	✓	25-Oct-2022	28 days	7 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) MD-FB	E509-L	18-Oct-2022	25-Oct-2022	28 days	7 days	✓	25-Oct-2022	28 days	7 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) PR3	E509-L	18-Oct-2022	25-Oct-2022	28 days	7 days	✓	25-Oct-2022	28 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) MD	E421	18-Oct-2022	22-Oct-2022	180 days	4 days	✓	22-Oct-2022	180 days	4 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) MD-FB	E421	18-Oct-2022	22-Oct-2022	180 days	4 days	✓	22-Oct-2022	180 days	4 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PR3	E421	18-Oct-2022	22-Oct-2022	180 days	4 days	✓	22-Oct-2022	180 days	4 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MD	E358-L	18-Oct-2022	22-Oct-2022	28 days	4 days	✓	22-Oct-2022	28 days	4 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MD-FB	E358-L	18-Oct-2022	22-Oct-2022	28 days	4 days	✓	22-Oct-2022	28 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PR3	E358-L	18-Oct-2022	22-Oct-2022	28 days	4 days	✓	22-Oct-2022	28 days	4 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) MD	E355-L	18-Oct-2022	21-Oct-2022	28 days	3 days	✓	22-Oct-2022	28 days	4 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PR3	E355-L	18-Oct-2022	21-Oct-2022	28 days	3 days	✓	22-Oct-2022	28 days	4 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) MD-FB	E355-L	18-Oct-2022	22-Oct-2022	28 days	4 days	✓	22-Oct-2022	28 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MD	E290	18-Oct-2022	21-Oct-2022	14 days	3 days	✓	22-Oct-2022	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MD-FB	E290	18-Oct-2022	21-Oct-2022	14 days	3 days	✓	22-Oct-2022	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PR3	E290	18-Oct-2022	21-Oct-2022	14 days	3 days	✓	22-Oct-2022	14 days	4 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE MD	E329	18-Oct-2022	21-Oct-2022	3 days	3 days	✓	21-Oct-2022	3 days	3 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE MD-FB	E329	18-Oct-2022	21-Oct-2022	3 days	3 days	✓	21-Oct-2022	3 days	4 days	× EHT

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PR3	E329	18-Oct-2022	21-Oct-2022	3 days	3 days	✓	21-Oct-2022	3 days	4 days	× EHT
Physical Tests : Conductivity in Water										
HDPE MD	E100	18-Oct-2022	21-Oct-2022	28 days	3 days	✓	22-Oct-2022	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE MD-FB	E100	18-Oct-2022	21-Oct-2022	28 days	3 days	✓	22-Oct-2022	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE PR3	E100	18-Oct-2022	21-Oct-2022	28 days	3 days	✓	22-Oct-2022	28 days	4 days	✓
Physical Tests : pH by Meter										
HDPE MD	E108	18-Oct-2022	21-Oct-2022	0.25 hrs	79 hrs	× EHTR-FM	22-Oct-2022	0.25 hrs	94 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PR3	E108	18-Oct-2022	21-Oct-2022	0.25 hrs	79 hrs	× EHTR-FM	22-Oct-2022	0.25 hrs	97 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE MD-FB	E108	18-Oct-2022	21-Oct-2022	0.25 hrs	82 hrs	× EHTR-FM	22-Oct-2022	0.25 hrs	97 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE MD	E162	18-Oct-2022	----	----	----		22-Oct-2022	7 days	4 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MD-FB	E162	18-Oct-2022	----	----	----		22-Oct-2022	7 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TDS by Gravimetry										
HDPE PR3	E162	18-Oct-2022	----	----	----		22-Oct-2022	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE MD	E160	18-Oct-2022	----	----	----		22-Oct-2022	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE MD-FB	E160	18-Oct-2022	----	----	----		22-Oct-2022	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PR3	E160	18-Oct-2022	----	----	----		22-Oct-2022	7 days	4 days	✓
Speciated Metals : Dissolved Ferrous Iron in Water by Colour										
Amber glass dissolved (hydrochloric acid) MD	E541	18-Oct-2022	24-Nov-2022	7 days	37 days	× EHT	24-Nov-2022	7 days	37 days	× EHT
Speciated Metals : Dissolved Ferrous Iron in Water by Colour										
Amber glass dissolved (hydrochloric acid) MD-FB	E541	18-Oct-2022	24-Nov-2022	7 days	37 days	× EHT	24-Nov-2022	7 days	37 days	× EHT
Speciated Metals : Dissolved Ferrous Iron in Water by Colour										
Amber glass dissolved (hydrochloric acid) PR3	E541	18-Oct-2022	24-Nov-2022	7 days	37 days	× EHT	24-Nov-2022	7 days	37 days	× EHT
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) MD	E537	18-Oct-2022	04-Nov-2022	180 days	17 days	✓	10-Nov-2022	180 days	6 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) MD-FB	E537	18-Oct-2022	04-Nov-2022	180 days	17 days	✓	10-Nov-2022	180 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PR3	E537	18-Oct-2022	04-Nov-2022	180 days	17 days	✓	10-Nov-2022	180 days	6 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) MD	E536	18-Oct-2022	03-Nov-2022	180 days	16 days	✓	07-Nov-2022	180 days	20 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) MD-FB	E536	18-Oct-2022	03-Nov-2022	180 days	16 days	✓	07-Nov-2022	180 days	20 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) PR3	E536	18-Oct-2022	03-Nov-2022	180 days	16 days	✓	07-Nov-2022	180 days	20 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) MD	E508-L	18-Oct-2022	25-Oct-2022	28 days	7 days	✓	25-Oct-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) MD-FB	E508-L	18-Oct-2022	25-Oct-2022	28 days	7 days	✓	25-Oct-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) PR3	E508-L	18-Oct-2022	25-Oct-2022	28 days	7 days	✓	25-Oct-2022	28 days	0 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) MD	E420	18-Oct-2022	21-Oct-2022	180 days	3 days	✓	22-Oct-2022	180 days	4 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) MD-FB	E420	18-Oct-2022	21-Oct-2022	180 days	3 days	✓	22-Oct-2022	180 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
PR3	E420	18-Oct-2022	21-Oct-2022	180 days	3 days	✓	22-Oct-2022	180 days	4 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	708319	3	30	10.0	5.0	✓
Ammonia by Fluorescence	E298	708387	2	29	6.9	5.0	✓
Chloride in Water by IC	E235.Cl	708324	3	21	14.2	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	708335	3	11	27.2	5.0	✓
Conductivity in Water	E100	708321	3	28	10.7	5.0	✓
Dissolved Ferrous Iron in Water by Colour	E541	756854	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	713015	1	19	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	708361	1	13	7.6	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	730526	1	18	5.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	709304	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	708334	3	19	15.7	5.0	✓
Fluoride in Water by IC	E235.F	708323	3	17	17.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	708325	3	34	8.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	708326	3	36	8.3	5.0	✓
pH by Meter	E108	708318	3	25	12.0	5.0	✓
Reactive Silica by Colourimetry	E392	712325	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	708327	3	17	17.6	5.0	✓
TDS by Gravimetry	E162	709337	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	709303	1	6	16.6	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	712785	1	18	5.5	5.0	✓
Total Metals in Water by CRC ICPMS	E420	708233	1	13	7.6	5.0	✓
Total Methylmercury in Water by GCAFS	E536	726346	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	708385	2	4	50.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	708391	2	19	10.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	708392	2	19	10.5	5.0	✓
TSS by Gravimetry	E160	709333	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	708319	3	30	10.0	5.0	✓
Ammonia by Fluorescence	E298	708387	2	29	6.9	5.0	✓
Chloride in Water by IC	E235.Cl	708324	3	21	14.2	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	708335	3	11	27.2	5.0	✓
Conductivity in Water	E100	708321	3	28	10.7	5.0	✓
Dissolved Ferrous Iron in Water by Colour	E541	756854	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	713015	1	19	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	708361	1	13	7.6	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	730526	1	18	5.5	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	709304	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	708334	3	19	15.7	5.0	✓
Fluoride in Water by IC	E235.F	708323	3	17	17.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	708325	3	34	8.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	708326	3	36	8.3	5.0	✓
pH by Meter	E108	708318	3	25	12.0	5.0	✓
Reactive Silica by Colourimetry	E392	712325	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	708327	3	17	17.6	5.0	✓
TDS by Gravimetry	E162	709337	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	709303	1	6	16.6	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	712785	1	18	5.5	5.0	✓
Total Metals in Water by CRC ICPMS	E420	708233	1	13	7.6	5.0	✓
Total Methylmercury in Water by GCAFS	E536	726346	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	708385	2	4	50.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	708391	2	19	10.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	708392	2	19	10.5	5.0	✓
TSS by Gravimetry	E160	709333	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	708319	3	30	10.0	5.0	✓
Ammonia by Fluorescence	E298	708387	2	29	6.9	5.0	✓
Chloride in Water by IC	E235.Cl	708324	3	21	14.2	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	708335	3	11	27.2	5.0	✓
Conductivity in Water	E100	708321	3	28	10.7	5.0	✓
Dissolved Ferrous Iron in Water by Colour	E541	756854	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	713015	1	19	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	708361	1	13	7.6	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	730526	1	18	5.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	709304	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	708334	3	19	15.7	5.0	✓
Fluoride in Water by IC	E235.F	708323	3	17	17.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	708325	3	34	8.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	708326	3	36	8.3	5.0	✓
Reactive Silica by Colourimetry	E392	712325	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	708327	3	17	17.6	5.0	✓
TDS by Gravimetry	E162	709337	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	709303	1	6	16.6	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	712785	1	18	5.5	5.0	✓
Total Metals in Water by CRC ICPMS	E420	708233	1	13	7.6	5.0	✓
Total Methylmercury in Water by GCAFS	E536	726346	1	20	5.0	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Total Nitrogen by Colourimetry	E366	708385	2	4	50.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	708391	2	19	10.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	708392	2	19	10.5	5.0	✓
TSS by Gravimetry	E160	709333	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	708387	2	29	6.9	5.0	✓
Chloride in Water by IC	E235.Cl	708324	2	21	9.5	5.0	✓
Dissolved Ferrous Iron in Water by Colour	E541	756854	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	713015	1	19	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	708361	1	13	7.6	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	730526	1	18	5.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	709304	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	708334	2	19	10.5	5.0	✓
Fluoride in Water by IC	E235.F	708323	2	17	11.7	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	708325	3	34	8.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	708326	3	36	8.3	5.0	✓
Reactive Silica by Colourimetry	E392	712325	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	708327	2	17	11.7	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	709303	1	6	16.6	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	712785	1	18	5.5	5.0	✓
Total Metals in Water by CRC ICPMS	E420	708233	1	13	7.6	5.0	✓
Total Methylmercury in Water by GCAFS	E536	726346	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	708385	1	4	25.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	708391	2	19	10.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	708392	2	19	10.5	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Vancouver	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Vancouver	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	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.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Colour (True) by Spectrometer (5 CU)	E329 ALS Environmental - Vancouver	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366 ALS Environmental - Vancouver	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Vancouver	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Reactive Silica by Colourimetry	E392 ALS Environmental - Vancouver	Water	APHA 4500-SiO2 E (mod)	Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method using a discrete analyzer. Method Limitation: Arsenic (5+) above 100 mg/L is a negative interference on this test
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Vancouver	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L ALS Environmental - Vancouver	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAFS.
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L ALS Environmental - Vancouver	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAFS.
Total Methylmercury in Water by GCAFS	E536 ALS Environmental - Vancouver	Water	EPA 1630 (mod)	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Methylmercury in Water by GCAFS	E537 ALS Environmental - Vancouver	Water	EPA 1630 (mod)	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Ferrous Iron in Water by Colour	E541 ALS Environmental - Vancouver	Water	APHA 3500-Fe B/James Ball et al (1999)	This analysis is carried out using procedures adapted from APHA 3500-Fe B and Environ. Sci. Technol. 1999, 33, 5, 807–813. The procedure involves preliminary sample filtration, and ferrous iron is determined using the "FerroZine" colourimetric method. Holding time is 7 days for 0.45um filtration or 6 months if samples have been filtered using 0.1um filters.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	Water	APHA 2340B	“Hardness (as CaCO3), dissolved” is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. “Total Hardness” refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Ion Balance using Dissolved Metals	EC101 ALS Environmental - Vancouver	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Vancouver	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
Total Kjeldahl Nitrogen (Calculation)	EC318 ALS Environmental - Vancouver	Water	BC MOE LABORATORY MANUAL (2005)	Total Kjeldahl Nitrogen is a calculated parameter. Total Kjeldahl Nitrogen (calc) = Total Nitrogen - [Nitrite (as N) + Nitrate (as N)].

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Preparation for Total Organic Carbon by Combustion	EP355 ALS Environmental - Vancouver	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Nitrogen in water	EP366 ALS Environmental - Vancouver	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals Water Filtration	EP421 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration (Low Level)	EP509-L ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
Total Methylmercury Water Preparation	EP536 ALS Environmental - Vancouver	Water	EPA 1630	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Methylmercury Water Preparation	EP537 ALS Environmental - Vancouver	Water	EPA 1630	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Ferrous Iron in Water by Colour	EP541 ALS Environmental - Vancouver	Water	APHA 3500-Fe B/James Ball et al (1999)	This analysis is carried out using procedures adapted from APHA 3500-Fe B and "A New Method for the Direct Determination of Dissolved Iron Concentration in Acid Mine Waters" published by James W. Ball et al (1999). The procedure involves preliminary sample filtration, and ferrous iron is determined using the "FerroZine" colourimetric method.

QUALITY CONTROL REPORT

Work Order	: **FJ2202956**	Page	: 1 of 25
Amendment	: **4**		
Client	: Ecofish Research Ltd	Laboratory	: ALS Environmental - Fort St. John
Contact	: Sarah Kennedy	Account Manager	: Sean Zhang
Address	: 600 Comox Road Courtenay BC Canada V9N3P6	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	:	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-With Metals	Date Samples Received	: 18-Oct-2022 16:30
PO	: 1200-25.03.02	Date Analysis Commenced	: 21-Oct-2022
C-O-C number	: 2022-Oct-MON8/9-Day4	Issue Date	: 25-Aug-2023 17:57
Sampler	: PB ----		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Caitlin Macey	Team Leader - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
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Parnian Sane	Analyst	Vancouver Metals, Burnaby, British Columbia
Sukhman Khosa	Lab Assistant	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 708318)											
YL2201850-001	Anonymous	pH	----	E108	0.10	pH units	7.85	7.87	0.254%	4%	----
Physical Tests (QC Lot: 708319)											
YL2201850-001	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	113	112	0.623%	20%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	113	112	0.623%	20%	----
Physical Tests (QC Lot: 708321)											
YL2201850-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	16400	16100	1.60%	10%	----
Physical Tests (QC Lot: 708335)											
FJ2202956-001	PR3	Colour, true	----	E329	5.0	CU	6.4	6.5	0.1	Diff <2x LOR	----
Physical Tests (QC Lot: 708680)											
FJ2202956-002	MD	Conductivity	----	E100	2.0	µS/cm	424	421	0.710%	10%	----
Physical Tests (QC Lot: 708681)											
FJ2202956-002	MD	pH	----	E108	0.10	pH units	8.54	8.54	0.00%	4%	----
Physical Tests (QC Lot: 708682)											
FJ2202956-002	MD	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	188	188	0.00%	20%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	15.6	15.2	2.60%	20%	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	203	203	0.197%	20%	----
Physical Tests (QC Lot: 708691)											
FJ2202956-002	MD	Colour, true	----	E329	5.0	CU	6.2	6.9	0.7	Diff <2x LOR	----
Physical Tests (QC Lot: 708828)											
FJ2202956-003	MD-FB	Conductivity	----	E100	2.0	µS/cm	<2.0	<2.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 708829)											
FJ2202956-003	MD-FB	pH	----	E108	0.10	pH units	5.58	5.40	3.28%	4%	----
Physical Tests (QC Lot: 708830)											
FJ2202956-003	MD-FB	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 708837)											
FJ2202956-003	MD-FB	Colour, true	----	E329	5.0	CU	<5.0	<5.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 709333)											
FJ2202956-001	PR3	Solids, total suspended [TSS]	----	E160	3.0	mg/L	6.6	6.2	0.4	Diff <2x LOR	----
Physical Tests (QC Lot: 709337)											
FJ2202956-001	PR3	Solids, total dissolved [TDS]	----	E162	13	mg/L	114	110	4	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 708323)											
VA22C5356-001	Anonymous	Fluoride	16984-48-8	E235.F	0.100	mg/L	<100 µg/L	<0.100	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 708324)											
VA22C5356-001	Anonymous	Chloride	16887-00-6	E235.Cl	2.50	mg/L	49900 µg/L	50.2	0.561%	20%	----
Anions and Nutrients (QC Lot: 708325)											
VA22C5356-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	21700 µg/L	21.8	0.711%	20%	----
Anions and Nutrients (QC Lot: 708326)											
VA22C5356-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	7.9 µg/L	0.0078	0.00006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 708327)											
VA22C5356-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	7060 µg/L	7.20	0.14	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 708334)											
FJ2202956-001	PR3	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 708385)											
FJ2202956-001	PR3	Nitrogen, total	7727-37-9	E366	0.030	mg/L	0.169	0.166	0.003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 708387)											
FJ2202956-001	PR3	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0146	0.0150	0.0004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 708392)											
FJ2202956-001	PR3	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0093	0.0091	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 708683)											
VA22C4889-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	46.7	46.6	0.0663%	20%	----
Anions and Nutrients (QC Lot: 708684)											
VA22C4889-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0745	0.0845	12.6%	20%	----
Anions and Nutrients (QC Lot: 708685)											
VA22C4889-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0038	0.0034	0.0003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 708686)											
VA22C4889-002	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.096	0.096	0.0001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 708687)											
VA22C4889-002	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	47.8	47.8	0.0420%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 708690)											
FJ2202956-002	MD	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 708831)											
FJ2202956-003	MD-FB	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	<0.30	<0.30	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 708832)											
FJ2202956-003	MD-FB	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 708833)											
FJ2202956-003	MD-FB	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 708834)											
FJ2202956-003	MD-FB	Fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 708835)											
FJ2202956-003	MD-FB	Chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 708836)											
FJ2202956-003	MD-FB	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 709303)											
FJ2202956-001	PR3	Phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 709306)											
FJ2202956-003	MD-FB	Nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	<0.030	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 709307)											
FJ2202956-003	MD-FB	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 709308)											
FJ2202956-003	MD-FB	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0116	0.0110	0.0006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 712325)											
FJ2202956-001	PR3	Silicate (as SiO2)	7631-86-9	E392	0.50	mg/L	4.16	4.16	0.002	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 708391)											
FJ2202956-001	PR3	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	2.83	3.13	0.30	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 709304)											
FJ2202956-001	PR3	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	3.77	3.62	0.15	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 709305)											
FJ2202956-003	MD-FB	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	1.27	1.08	0.19	Diff <2x LOR	----
Total Metals (QC Lot: 708233)											
YL2201853-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.174	0.192	9.70%	20%	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00026	0.00026	0.000002	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 708233) - continued											
YL2201853-001	Anonymous	Barium, total	7440-39-3	E420	0.00010	mg/L	0.00361	0.00394	8.53%	20%	----
		Beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	0.018	0.019	0.0008	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	7.85	8.14	3.62%	20%	----
		Cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	0.00053	0.00003	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.00199	0.00205	0.00006	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.010	mg/L	0.265	0.288	8.44%	20%	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	0.000071	0.000078	0.000006	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	0.0029	0.0030	0.0001	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	6.21	6.01	3.39%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.0121	0.0134	9.85%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000196	0.000204	0.000008	Diff <2x LOR	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	0.00087	0.00078	0.00009	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	2.06	2.05	0.283%	20%	----
		Rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00164	0.00164	0.000003	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000056	0.000057	0.0000005	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	1.70	1.75	2.81%	20%	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	28.4	29.7	4.67%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	0.0382	0.0371	2.85%	20%	----
		Sulfur, total	7704-34-9	E420	0.50	mg/L	1.02	0.83	0.19	Diff <2x LOR	----
		Tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00030	mg/L	0.00543	0.00649	17.9%	20%	----
		Tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.000045	0.000049	0.000004	Diff <2x LOR	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 708233) - continued											
YL2201853-001	Anonymous	Zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Total Metals (QC Lot: 712785)											
CG2214494-007	Anonymous	Mercury, total	7439-97-6	E508-L	0.50	ng/L	<0.00050 µg/L	<0.50	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 708361)											
FJ2202956-001	PR3	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0044	0.0045	0.0002	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00021	0.00016	0.00005	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0304	0.0308	1.31%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000056	0.0000087	0.0000031	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	26.5	26.6	0.368%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00059	0.00058	0.000006	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0011	0.0011	0.00001	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	5.83	5.84	0.141%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00044	0.00044	0.000004	Diff <2x LOR	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000725	0.000770	6.01%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00065	0.00065	0.000003	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.420	0.419	0.0008	Diff <2x LOR	----
		Rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00033	0.00030	0.00002	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000283	0.000252	0.000030	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.93	1.91	1.12%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	1.06	1.05	0.806%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.103	0.102	0.385%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	4.23	4.09	0.14	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 708361) - continued											
FJ2202956-001	PR3	Tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000424	0.000423	0.141%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 713015)											
FJ2202949-001	Anonymous	Mercury, dissolved	7439-97-6	E509-L	0.50	ng/L	2.12	2.73	0.60	Diff <2x LOR	----
Speciated Metals (QC Lot: 726346)											
FJ2202949-001	Anonymous	Methylmercury (as MeHg), total	22967-92-6	E536	0.000020	µg/L	0.000000074 mg/L	0.000095	0.000021	Diff <2x LOR	----
Speciated Metals (QC Lot: 730526)											
FJ2202949-001	Anonymous	Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.000020	µg/L	0.000000125 mg/L	0.000149	17.0%	30%	----
Speciated Metals (QC Lot: 756854)											
FJ2202949-001	Anonymous	Iron, ferrous [Fe II], dissolved	15438-31-0	E541	0.020	mg/L	0.046	0.046	0.0002	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 708319)						
Alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 708321)						
Conductivity	----	E100	1	µS/cm	1.1	----
Physical Tests (QCLot: 708335)						
Colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 708680)						
Conductivity	----	E100	1	µS/cm	1.1	----
Physical Tests (QCLot: 708682)						
Alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 708691)						
Colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 708828)						
Conductivity	----	E100	1	µS/cm	1.1	----
Physical Tests (QCLot: 708830)						
Alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 708837)						
Colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 709333)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 709337)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 708323)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 708324)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 708325)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 708326)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 708327)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 708334)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 708385)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 708387)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 708392)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 708683)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 708684)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 708685)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 708686)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 708687)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 708690)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 708831)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 708832)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 708833)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 708834)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 708835)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 708836)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 709303)						
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 709306)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 709307)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 709308)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 712325)						
Silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 708391)						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 709304)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 709305)						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 708233)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 708233) - continued						
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Total Metals (QCLot: 712785)						
Mercury, total	7439-97-6	E508-L	0.5	ng/L	<0.50	----
Dissolved Metals (QCLot: 708361)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 708361) - continued						
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 713015)						
Mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	<0.50	----
Speciated Metals (QCLot: 726346)						
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	<0.000020	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Speciated Metals (QCLot: 730526)						
Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 756854)						
Iron, ferrous [Fe II], dissolved	15438-31-0	E541	0.02	mg/L	<0.020	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 708318)									
pH	----	E108	----	pH units	7 pH units	99.8	98.0	102	----
Physical Tests (QCLot: 708319)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	107	85.0	115	----
Physical Tests (QCLot: 708321)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	98.5	90.0	110	----
Physical Tests (QCLot: 708335)									
Colour, true	----	E329	5	CU	100 CU	101	85.0	115	----
Physical Tests (QCLot: 708680)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.6	90.0	110	----
Physical Tests (QCLot: 708681)									
pH	----	E108	----	pH units	7 pH units	99.8	98.0	102	----
Physical Tests (QCLot: 708682)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	107	85.0	115	----
Physical Tests (QCLot: 708691)									
Colour, true	----	E329	5	CU	100 CU	102	85.0	115	----
Physical Tests (QCLot: 708828)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	100	90.0	110	----
Physical Tests (QCLot: 708829)									
pH	----	E108	----	pH units	7 pH units	99.7	98.0	102	----
Physical Tests (QCLot: 708830)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	106	85.0	115	----
Physical Tests (QCLot: 708837)									
Colour, true	----	E329	5	CU	100 CU	101	85.0	115	----
Physical Tests (QCLot: 709333)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	87.0	85.0	115	----
Physical Tests (QCLot: 709337)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	101	85.0	115	----
Anions and Nutrients (QCLot: 708323)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 708324)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 708325)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 708326)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 708327)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 708334)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	102	80.0	120	----
Anions and Nutrients (QCLot: 708385)									
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 708387)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	99.7	85.0	115	----
Anions and Nutrients (QCLot: 708392)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	93.3	80.0	120	----
Anions and Nutrients (QCLot: 708683)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 708684)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 708685)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 708686)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 708687)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 708690)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	100	80.0	120	----
Anions and Nutrients (QCLot: 708831)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 708832)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 708833)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	98.2	90.0	110	----
Anions and Nutrients (QCLot: 708834)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	98.7	90.0	110	----
Anions and Nutrients (QCLot: 708835)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.3	90.0	110	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 708836)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	99.2	80.0	120	----
Anions and Nutrients (QCLot: 709303)									
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.05 mg/L	92.1	80.0	120	----
Anions and Nutrients (QCLot: 709306)									
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	97.0	75.0	125	----
Anions and Nutrients (QCLot: 709307)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	92.0	80.0	120	----
Anions and Nutrients (QCLot: 709308)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	103	85.0	115	----
Anions and Nutrients (QCLot: 712325)									
Silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	10 mg/L	104	85.0	115	----
Organic / Inorganic Carbon (QCLot: 708391)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	101	80.0	120	----
Organic / Inorganic Carbon (QCLot: 709304)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	95.9	80.0	120	----
Organic / Inorganic Carbon (QCLot: 709305)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	102	80.0	120	----
Total Metals (QCLot: 708233)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	103	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	104	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	104	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	99.6	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	99.5	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	107	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	93.8	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	102	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	103	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	97.6	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	98.8	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	96.0	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	107	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	99.4	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	90.8	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 708233) - continued									
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	99.8	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	101	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	98.5	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	95.2	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	98.6	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	107	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	105	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	104	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	94.2	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	116	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	102	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	104	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	94.8	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	103	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	97.1	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	101	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	94.2	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	101	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	105	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	94.5	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
Total Metals (QCLot: 712785)									
Mercury, total	7439-97-6	E508-L	0.5	ng/L	5 ng/L	112	80.0	120	----
Dissolved Metals (QCLot: 708361)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	101	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	104	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	106	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	103	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	103	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	92.8	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	106	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	103	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 708361) - continued									
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	103	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	100	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	100	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	102	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	102	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	103	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	105	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	104	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	99.1	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	104	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	97.8	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	107	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	108	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	98.3	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	105	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	105	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	96.4	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	97.8	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	103	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	97.4	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	101	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	100	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	103	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	104	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	105	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	99.0	80.0	120	----
Mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	5 ng/L	102	80.0	120	----
Speciated Metals (QCLot: 726346)									
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	0.0025 µg/L	85.7	70.0	130	----
Speciated Metals (QCLot: 730526)									
Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	0.0025 µg/L	79.4	70.0	130	----
Speciated Metals (QCLot: 756854)									

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Speciated Metals (QCLot: 756854) - continued									
Iron, ferrous [Fe II], dissolved	15438-31-0	E541	0.02	mg/L	0.5 mg/L	103	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 708323)										
YL2201843-001	Anonymous	Fluoride	16984-48-8	E235.F	20.4 mg/L	20 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 708324)										
YL2201843-001	Anonymous	Chloride	16887-00-6	E235.Cl	2050 mg/L	2000 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 708325)										
YL2201843-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	51.4 mg/L	50 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 708326)										
YL2201843-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	9.91 mg/L	10 mg/L	99.1	75.0	125	----
Anions and Nutrients (QCLot: 708327)										
YL2201843-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	2040 mg/L	2000 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 708334)										
VA22C5356-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	ND mg/L	0.03 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 708385)										
FJ2202956-002	MD	Nitrogen, total	7727-37-9	E366	0.400 mg/L	0.4 mg/L	100	70.0	130	----
Anions and Nutrients (QCLot: 708387)										
FJ2202956-002	MD	Ammonia, total (as N)	7664-41-7	E298	0.104 mg/L	0.1 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 708392)										
FJ2202956-002	MD	Phosphorus, total	7723-14-0	E372-U	0.0500 mg/L	0.05 mg/L	100	70.0	130	----
Anions and Nutrients (QCLot: 708683)										
VA22C4889-003	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	105 mg/L	100 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 708684)										
VA22C4889-003	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.63 mg/L	2.5 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 708685)										
VA22C4889-003	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.506 mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 708686)										
VA22C4889-003	Anonymous	Fluoride	16984-48-8	E235.F	1.05 mg/L	1 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 708687)										
VA22C4889-003	Anonymous	Chloride	16887-00-6	E235.Cl	105 mg/L	100 mg/L	105	75.0	125	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 708832)										
VA22C4152-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.66 mg/L	2.5 mg/L	107	75.0	125	----
Anions and Nutrients (QCLot: 708833)										
VA22C4152-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.522 mg/L	0.5 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 708836)										
VA22C4152-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0290 mg/L	0.03 mg/L	96.5	70.0	130	----
Anions and Nutrients (QCLot: 709303)										
FJ2202956-002	MD	Phosphorus, total dissolved	7723-14-0	E375-T	0.0492 mg/L	0.05 mg/L	98.3	70.0	130	----
Anions and Nutrients (QCLot: 709307)										
WR2201327-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0499 mg/L	0.05 mg/L	99.9	70.0	130	----
Anions and Nutrients (QCLot: 709308)										
WR2201327-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.101 mg/L	0.1 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 712325)										
FJ2202956-002	MD	Silicate (as SiO2)	7631-86-9	E392	10.4 mg/L	10 mg/L	104	75.0	125	----
Organic / Inorganic Carbon (QCLot: 708391)										
FJ2202956-002	MD	Carbon, total organic [TOC]	----	E355-L	5.56 mg/L	5 mg/L	111	70.0	130	----
Organic / Inorganic Carbon (QCLot: 709304)										
FJ2202956-002	MD	Carbon, dissolved organic [DOC]	----	E358-L	4.54 mg/L	5 mg/L	90.9	70.0	130	----
Organic / Inorganic Carbon (QCLot: 709305)										
WR2201327-001	Anonymous	Carbon, total organic [TOC]	----	E355-L	4.55 mg/L	5 mg/L	91.0	70.0	130	----
Total Metals (QCLot: 708233)										
FJ2202956-002	MD	Aluminum, total	7429-90-5	E420	0.197 mg/L	0.2 mg/L	98.4	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0197 mg/L	0.02 mg/L	98.7	70.0	130	----
		Barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0407 mg/L	0.04 mg/L	102	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.00891 mg/L	0.01 mg/L	89.1	70.0	130	----
		Boron, total	7440-42-8	E420	0.096 mg/L	0.1 mg/L	96.3	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00404 mg/L	0.004 mg/L	101	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.00972 mg/L	0.01 mg/L	97.2	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0400 mg/L	0.04 mg/L	100	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0189 mg/L	0.02 mg/L	94.4	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 708233) - continued										
FJ2202956-002	MD	Copper, total	7440-50-8	E420	0.0184 mg/L	0.02 mg/L	91.8	70.0	130	----
		Iron, total	7439-89-6	E420	1.98 mg/L	2 mg/L	99.0	70.0	130	----
		Lead, total	7439-92-1	E420	0.0183 mg/L	0.02 mg/L	91.3	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0935 mg/L	0.1 mg/L	93.5	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0372 mg/L	0.04 mg/L	93.0	70.0	130	----
		Phosphorus, total	7723-14-0	E420	10.4 mg/L	10 mg/L	104	70.0	130	----
		Potassium, total	7440-09-7	E420	3.88 mg/L	4 mg/L	96.9	70.0	130	----
		Rubidium, total	7440-17-7	E420	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0416 mg/L	0.04 mg/L	104	70.0	130	----
		Silicon, total	7440-21-3	E420	9.62 mg/L	10 mg/L	96.2	70.0	130	----
		Silver, total	7440-22-4	E420	0.00405 mg/L	0.004 mg/L	101	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	22.3 mg/L	20 mg/L	111	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.0388 mg/L	0.04 mg/L	96.9	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00368 mg/L	0.004 mg/L	92.0	70.0	130	----
		Thorium, total	7440-29-1	E420	0.0209 mg/L	0.02 mg/L	104	70.0	130	----
		Tin, total	7440-31-5	E420	0.0195 mg/L	0.02 mg/L	97.6	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0381 mg/L	0.04 mg/L	95.2	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.0193 mg/L	0.02 mg/L	96.4	70.0	130	----
		Uranium, total	7440-61-1	E420	0.00388 mg/L	0.004 mg/L	97.1	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.104 mg/L	0.1 mg/L	104	70.0	130	----
		Zinc, total	7440-66-6	E420	0.371 mg/L	0.4 mg/L	92.8	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.0434 mg/L	0.04 mg/L	108	70.0	130	----
Total Metals (QCLot: 712785)										
CG2214545-001	Anonymous	Mercury, total	7439-97-6	E508-L	6.41 ng/L	5 ng/L	128	70.0	130	----
Dissolved Metals (QCLot: 708361)										
FJ2202956-002	MD	Aluminum, dissolved	7429-90-5	E421	0.196 mg/L	0.2 mg/L	97.9	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0208 mg/L	0.02 mg/L	104	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0404 mg/L	0.04 mg/L	101	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 708361) - continued										
FJ2202956-002	MD	Bismuth, dissolved	7440-69-9	E421	0.00925 mg/L	0.01 mg/L	92.5	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.089 mg/L	0.1 mg/L	88.7	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00412 mg/L	0.004 mg/L	103	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.0104 mg/L	0.01 mg/L	104	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0386 mg/L	0.04 mg/L	96.5	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0192 mg/L	0.02 mg/L	96.1	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0187 mg/L	0.02 mg/L	93.5	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.98 mg/L	2 mg/L	98.8	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0194 mg/L	0.02 mg/L	97.1	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0982 mg/L	0.1 mg/L	98.2	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0208 mg/L	0.02 mg/L	104	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0380 mg/L	0.04 mg/L	94.9	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	9.98 mg/L	10 mg/L	99.8	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	3.91 mg/L	4 mg/L	97.8	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.0192 mg/L	0.02 mg/L	96.0	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0446 mg/L	0.04 mg/L	111	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.61 mg/L	10 mg/L	96.1	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00427 mg/L	0.004 mg/L	107	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	20.3 mg/L	20 mg/L	101	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.0407 mg/L	0.04 mg/L	102	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00392 mg/L	0.004 mg/L	97.9	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0196 mg/L	0.02 mg/L	98.1	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0386 mg/L	0.04 mg/L	96.4	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.0200 mg/L	0.02 mg/L	99.9	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00403 mg/L	0.004 mg/L	101	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.402 mg/L	0.4 mg/L	101	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0414 mg/L	0.04 mg/L	104	70.0	130	----
Dissolved Metals (QCLot: 713015)										

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 713015) - continued										
FJ2202949-002	Anonymous	Mercury, dissolved	7439-97-6	E509-L	5.55 ng/L	5 ng/L	111	70.0	130	----
Speciated Metals (QCLot: 726346)										
FJ2202949-002	Anonymous	Methylmercury (as MeHg), total	22967-92-6	E536	0.00186 µg/L	0.0025 µg/L	74.6	60.0	140	----
Speciated Metals (QCLot: 730526)										
FJ2202949-002	Anonymous	Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00417 µg/L	0.0025 µg/L	83.5	60.0	140	----
Speciated Metals (QCLot: 756854)										
FJ2202949-002	Anonymous	Iron, ferrous [Fe II], dissolved	15438-31-0	E541	0.355 mg/L	0.5 mg/L	71.1	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 2022-Oct-MON8/9- Day 4

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Page of

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Sarah Kennedy
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A

☑ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: skennedy@ecofishresearch.com

Email 2: tkasubuchi@ecofishresearch.com

Email 3: waterqualitylabdata@ecofishresearch.com

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: accountspayable@ecofishresearch.com

Email 2:

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA22-ECOF100-004	AFE/Cost Center:	PO#
Job #:	Surface water MON8/9- with metals	Major/Minor Code:	Routing Code:
PO / AFE:	1200-25.03.02	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (ALS use only):		ALS Contact: Sean Zhang	Sampler: Pat Beaupre

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Alk., Ec, pH, TDS, TSS, Anions, Silicate, diss ortho P, colour, pH	DOC, Total dissolved P	NH3, Total Kjeldahl Nitrogen, Total N, TOC, Total P	IONBALANCE-BC-CL	Total Methyl Hg by GCAFS (0.00000002 mg/L)	Dissolved Methyl Hg by GCAFS (0.00000002 mg/L)	Total Metals by CRC ICPMS, Hardness from Total Ca/Mg	Dissolved Metals by CRC ICPMS, Hardness	Total Mercury in Water CVAFS (Low Level 0.0000005 mg/L)	Dissolved Mercury in Water by CVAFS (Low Level 0.0000005 mg/L)	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	~~PD5~~ PR2.81 PR3	18 OCT22	08:20	Water	9	R	F/P	P	R	F	F	F	F	F	F			
	MD	18 OCT22	11:05	Water	9	R	F/P	P	R	F	F	F	F	F	F			
	MD-FB	18 OCT22	08:20	Water	9	R	F/P	P	R	F	F	F	F	F	F			

Fort St. John
Work Order Reference
FJ2202956

Telephone : +1 250 261 5517

FJAE Shipping & Receiving
Call Out — Expedite
— Priority
1 # of Coolers ✓ Air
— # of Carboys — Ground

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	Please send Azimuth a copy of the data in their EDD format:
Are samples for human consumption/ use? ☐ YES ☑ NO	gmann@azimuthgroup.ca imcivor@azimuthgroup.ca csuzanne@ecofishresearch.com kganshorn@ecofishresearch.com

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☑ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
7.2°				6.2			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by:	Date: Oct 18, 2022	Time:	Received by:	Date: 10-18-22	Time: 4:30	Received by: AB	Date: OCT 19 2022	Time: 8:45 AM

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Canada Ltd.

right solutions.
right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202978**	Page	: 1 of 9
Amendment	: **5**		
Client	: **Ecofish Research Ltd**	Laboratory	: ALS Environmental - Fort St. John
Contact	: Sarah Kennedy	Account Manager	: Sean Zhang
Address	: 600 Comox Road Courtenay BC Canada V9N3P6	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: ----	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-With Metals	Date Samples Received	: 19-Oct-2022 11:29
PO	: 1200-25.03.02	Date Analysis Commenced	: 20-Oct-2022
C-O-C number	: 2022-OCT-MON8/9-DAY 1	Issue Date	: 25-Aug-2023 17:57
Sampler	: ----		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Anthony Calero	Supervisor - Inorganic	Inorganics, Calgary, Alberta
Anthony Calero	Supervisor - Inorganic	Metals, Calgary, Alberta
Dan Gebert	Laboratory Analyst	Metals, Burnaby, British Columbia
Elke Tabora		Inorganics, Calgary, Alberta
Hamideh Moradi	Analyst	Metals, Burnaby, British Columbia
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Jayden Piattelli	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Louis Wagner	Technical Specialist	Administration, Calgary, Alberta
Louis Wagner	Technical Specialist	Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Millicent Brentnall	Laboratory Analyst	Metals, Calgary, Alberta
Parker Sgarbossa	Laboratory Analyst	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sara Niroomand		Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia
Vladka Stamenova	Analyst	Inorganics, Calgary, Alberta

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.
Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
µg/L	micrograms per litre
µg/sample	micrograms per sample
µS/cm	microsiemens per centimetre
CU	colour units (1 cu = 1 mg/l pt)
L	litres
meq/L	milliequivalents per litre
mg/L	milligrams per litre
ng/L	nanograms per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Accreditation

Accreditation	*Description*	*Laboratory*	*Address*
A	CALA ISO/IEC 17025:2017	CG ALS Environmental - Calgary	2559 29th Street NE, Calgary, AB
B	CALA ISO/IEC 17025:2017	VA ALS Environmental - Vancouver	8081 Lougheed Highway, Burnaby, BC

Applicable accreditations are indicated in the Method/Lab column as superscripts.

Workorder Comments

Amendment (07/12/2022): This report has been amended and re-released to allow the reporting of additional analytical data.

Amendment (10/5/2023): This report has been amended and re-released to allow the reporting of additional analytical data. Added ug/L calculation for Chlorophyll-a.

Amendment (25/8/2023): This report has been amended following holding time evaluation corrections. All analysis results are as per the previous report.

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID: W1-SHALLOW	W1-DEEP	D1-SHALLOW	D1-DEEP	TRAVEL BLANK
						Client sampling date / time: 19-Oct-2022 07:50	19-Oct-2022 08:30	19-Oct-2022 10:25	19-Oct-2022 09:55	19-Oct-2022 00:00
						FJ2202978-001	FJ2202978-002	FJ2202978-003	FJ2202978-004	FJ2202978-005
						Result	Result	Result	Result	Result
Sample Preparation										
Dissolved Fe2 filtration location	----	EP541/VA		-	-	Field	Field	Field	Field	----
Volume filtered	----	EF870B/CG		0.001	L	0.200	0.200	0.200	0.200	0.200
Physical Tests										
Alkalinity, bicarbonate (as CaCO3)	----	E290/CG	A	1.0	mg/L	74.8	76.1	83.0	81.0	----
Alkalinity, carbonate (as CaCO3)	----	E290/CG	A	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
Alkalinity, hydroxide (as CaCO3)	----	E290/CG	A	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
Alkalinity, total (as CaCO3)	----	E290/CG	A	1.0	mg/L	74.8	76.1	83.0	81.0	----
Colour, true	----	E329/CG	A	5.0	CU	7.0	7.3	7.7	10.9	----
Conductivity	----	E100/CG	A	2.0	µS/cm	159	159	163	163	----
Hardness (as CaCO3), dissolved	----	EC100/CG		0.50	mg/L	92.2	89.8	92.8	90.2	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/CG		0.50	mg/L	94.4	94.4	96.3	94.2	----
pH	----	E108/CG	A	0.10	pH units	8.07	8.00	7.97	7.97	----
Solids, total dissolved [TDS]	----	E162/CG	A	10	mg/L	110	108	96	92	----
Solids, total suspended [TSS]	----	E160/CG	A	3.0	mg/L	<3.0	<3.0	<3.0	<3.0	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	A	0.0050	mg/L	<0.0050	<0.0050	0.0073	<0.0050	----
Chloride	16887-00-6	E235.Cl/CG	A	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	----
Fluoride	16984-48-8	E235.F/CG	A	0.020	mg/L	0.034	0.032	0.034	0.033	----
Kjeldahl nitrogen, total [TKN]	----	EC318/VA		0.050	mg/L	0.084	0.094	0.108	0.086	----
Nitrate (as N)	14797-55-8	E235.NO3-L/CG	A	0.0050	mg/L	0.0688	0.0615	0.0667	0.0654	----
Nitrite (as N)	14797-65-0	E235.NO2-L/CG	A	0.0010	mg/L	0.0017	0.0010	<0.0010	<0.0010	----
Nitrogen, total	7727-37-9	E366/VA	B	0.030	mg/L	0.155	0.157	0.175	0.151	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	A	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----
Phosphorus, total	7723-14-0	E372-U/CG	A	0.0020	mg/L	0.0038	0.0036	0.0119	0.0039	----
Phosphorus, total dissolved	7723-14-0	E375-T/CG	A	0.0020	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	----
Silicate (as SiO2)	7631-86-9	E392/VA	B	0.50	mg/L	4.16	4.17	4.24	4.26	----
Sulfate (as SO4)	14808-79-8	E235.SO4/CG	A	0.30	mg/L	11.9	11.6	12.0	12.0	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	W1-SHALLOW	W1-DEEP	D1-SHALLOW	D1-DEEP	TRAVEL BLANK
						Client sampling date / time	19-Oct-2022 07:50	19-Oct-2022 08:30	19-Oct-2022 10:25	19-Oct-2022 09:55	19-Oct-2022 00:00
							FJ2202978-001	FJ2202978-002	FJ2202978-003	FJ2202978-004	FJ2202978-005
							Result	Result	Result	Result	Result
Anions and Nutrients											
Nitrate + Nitrite (as N)	----	EC235.N+N/CG		0.0032	mg/L		0.0705	0.0625	0.0667	0.0654	----
Organic / Inorganic Carbon											
Carbon, dissolved organic [DOC]	----	E358-L/CG	A	0.50	mg/L		2.69	2.30	3.07	2.58	----
Carbon, total organic [TOC]	----	E355-L/CG	A	0.50	mg/L		2.61	2.74	3.23	2.44	----
Ion Balance											
Anion sum	----	EC101/CG		0.10	meq/L		1.75	1.77	1.92	1.87	----
Cation sum	----	EC101/CG		0.10	meq/L		1.90	1.85	1.91	1.86	----
Ion balance (APHA)	----	EC101/CG		0.010	%		4.11	2.21	0.261	0.268	----
Total Metals											
Aluminum, total	7429-90-5	E420/CG	A	0.0030	mg/L		0.0166	0.0153	0.0212	0.0205	----
Antimony, total	7440-36-0	E420/CG	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Arsenic, total	7440-38-2	E420/CG	A	0.00010	mg/L		0.00021	0.00019	0.00022	0.00020	----
Barium, total	7440-39-3	E420/CG	A	0.00010	mg/L		0.0291	0.0280	0.0298	0.0290	----
Beryllium, total	7440-41-7	E420/CG	A	0.000020	mg/L		<0.000020	<0.000020	<0.000020	<0.000020	----
Bismuth, total	7440-69-9	E420/CG	A	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	----
Boron, total	7440-42-8	E420/CG	A	0.010	mg/L		<0.010	<0.010	<0.010	<0.010	----
Cadmium, total	7440-43-9	E420/CG	A	0.0000050	mg/L		0.0000110	0.0000110	0.0000166	0.0000186	----
Calcium, total	7440-70-2	E420/CG	A	0.050	mg/L		27.8	27.6	28.2	27.8	----
Cesium, total	7440-46-2	E420/CG	A	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
Chromium, total	7440-47-3	E420/CG	A	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	----
Cobalt, total	7440-48-4	E420/CG	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Copper, total	7440-50-8	E420/CG	A	0.00050	mg/L		0.00067	0.00069	0.00077	0.00066	----
Iron, total	7439-89-6	E420/CG	A	0.010	mg/L		0.014	0.014	0.023	0.023	----
Lead, total	7439-92-1	E420/CG	A	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	----
Lithium, total	7439-93-2	E420/CG	A	0.0010	mg/L		0.0013	0.0013	0.0014	0.0013	----
Magnesium, total	7439-95-4	E420/CG	A	0.0050	mg/L		6.08	6.20	6.29	6.02	----
Manganese, total	7439-96-5	E420/CG	A	0.00010	mg/L		0.00132	0.00127	0.00188	0.00206	----
Mercury, total	7439-97-6	E508-L/VA	B	0.50	ng/L		0.51	<0.50	<0.50	0.52	----
Molybdenum, total	7439-98-7	E420/CG	A	0.000050	mg/L		0.000808	0.000767	0.000765	0.000717	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	W1-SHALLOW	W1-DEEP	D1-SHALLOW	D1-DEEP	TRAVEL BLANK
						Client sampling date / time	19-Oct-2022 07:50	19-Oct-2022 08:30	19-Oct-2022 10:25	19-Oct-2022 09:55	19-Oct-2022 00:00
							FJ2202978-001	FJ2202978-002	FJ2202978-003	FJ2202978-004	FJ2202978-005
							Result	Result	Result	Result	Result
Total Metals											
Nickel, total	7440-02-0	E420/CG	A	0.00050	mg/L		0.00072	0.00069	0.00075	0.00072	----
Phosphorus, total	7723-14-0	E420/CG	A	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	----
Potassium, total	7440-09-7	E420/CG	A	0.050	mg/L		0.435	0.443	0.442	0.436	----
Rubidium, total	7440-17-7	E420/CG	A	0.00020	mg/L		0.00034	0.00029	0.00030	0.00029	----
Selenium, total	7782-49-2	E420/CG	A	0.000050	mg/L		0.000241	0.000241	0.000211	0.000251	----
Silicon, total	7440-21-3	E420/CG	A	0.10	mg/L		2.07	2.06	2.15	2.10	----
Silver, total	7440-22-4	E420/CG	A	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
Sodium, total	7440-23-5	E420/CG	A	0.050	mg/L		1.01	1.02	1.04	1.01	----
Strontium, total	7440-24-6	E420/CG	A	0.00020	mg/L		0.106	0.104	0.109	0.106	----
Sulfur, total	7704-34-9	E420/CG	A	0.50	mg/L		4.67	4.54	4.71	4.73	----
Tellurium, total	13494-80-9	E420/CG	A	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	----
Thallium, total	7440-28-0	E420/CG	A	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
Thorium, total	7440-29-1	E420/CG	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Tin, total	7440-31-5	E420/CG	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Titanium, total	7440-32-6	E420/CG	A	0.00030	mg/L		0.00046	<0.00030	0.00066	0.00048	----
Tungsten, total	7440-33-7	E420/CG	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Uranium, total	7440-61-1	E420/CG	A	0.000010	mg/L		0.000412	0.000401	0.000420	0.000400	----
Vanadium, total	7440-62-2	E420/CG	A	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	----
Zinc, total	7440-66-6	E420/CG	A	0.0030	mg/L		<0.0030	<0.0030	<0.0030	<0.0030	----
Zirconium, total	7440-67-7	E420/CG	A	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	----
Dissolved Metals											
Aluminum, dissolved	7429-90-5	E421/CG	A	0.0010	mg/L		0.0044	0.0047	0.0044	0.0043	----
Antimony, dissolved	7440-36-0	E421/CG	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Arsenic, dissolved	7440-38-2	E421/CG	A	0.00010	mg/L		0.00019	0.00018	0.00019	0.00020	----
Barium, dissolved	7440-39-3	E421/CG	A	0.00010	mg/L		0.0285	0.0275	0.0290	0.0292	----
Beryllium, dissolved	7440-41-7	E421/CG	A	0.000020	mg/L		<0.000020	<0.000020	<0.000020	<0.000020	----
Bismuth, dissolved	7440-69-9	E421/CG	A	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	----
Boron, dissolved	7440-42-8	E421/CG	A	0.010	mg/L		<0.010	<0.010	<0.010	<0.010	----
Cadmium, dissolved	7440-43-9	E421/CG	A	0.0000050	mg/L		0.0000080	0.0000071	0.0000070	0.0000077	----
Calcium, dissolved	7440-70-2	E421/CG	A	0.050	mg/L		26.6	25.9	26.8	26.1	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	W1-SHALLOW	W1-DEEP	D1-SHALLOW	D1-DEEP	TRAVEL BLANK
						Client sampling date / time	19-Oct-2022 07:50	19-Oct-2022 08:30	19-Oct-2022 10:25	19-Oct-2022 09:55	19-Oct-2022 00:00
							FJ2202978-001	FJ2202978-002	FJ2202978-003	FJ2202978-004	FJ2202978-005
							Result	Result	Result	Result	Result
Dissolved Metals											
Cesium, dissolved	7440-46-2	E421/CG	A	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
Chromium, dissolved	7440-47-3	E421/CG	A	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	----
Cobalt, dissolved	7440-48-4	E421/CG	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Copper, dissolved	7440-50-8	E421/CG	A	0.00020	mg/L		0.00060	0.00057	0.00059	0.00061	----
Iron, dissolved	7439-89-6	E421/CG	A	0.010	mg/L		<0.010	<0.010	<0.010	<0.010	----
Lead, dissolved	7439-92-1	E421/CG	A	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	----
Lithium, dissolved	7439-93-2	E421/CG	A	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	----
Magnesium, dissolved	7439-95-4	E421/CG	A	0.0050	mg/L		6.26	6.10	6.28	6.09	----
Manganese, dissolved	7439-96-5	E421/CG	A	0.00010	mg/L		0.00021	0.00018	0.00051	0.00051	----
Mercury, dissolved	7439-97-6	E509-L/VA	B	0.50	ng/L		<0.50	<0.50	<0.50	<0.50	----
Molybdenum, dissolved	7439-98-7	E421/CG	A	0.000050	mg/L		0.000709	0.000708	0.000728	0.000702	----
Nickel, dissolved	7440-02-0	E421/CG	A	0.00050	mg/L		0.00068	0.00061	0.00065	0.00062	----
Phosphorus, dissolved	7723-14-0	E421/CG	A	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	----
Potassium, dissolved	7440-09-7	E421/CG	A	0.050	mg/L		0.378	0.370	0.380	0.372	----
Rubidium, dissolved	7440-17-7	E421/CG	A	0.00020	mg/L		0.00030	0.00031	0.00030	0.00031	----
Selenium, dissolved	7782-49-2	E421/CG	A	0.000050	mg/L		0.000244	0.000259	0.000281	0.000254	----
Silicon, dissolved	7440-21-3	E421/CG	A	0.050	mg/L		2.11	2.04	2.12	2.10	----
Silver, dissolved	7440-22-4	E421/CG	A	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
Sodium, dissolved	7440-23-5	E421/CG	A	0.050	mg/L		1.00	0.985	1.01	1.01	----
Strontium, dissolved	7440-24-6	E421/CG	A	0.00020	mg/L		0.106	0.101	0.104	0.102	----
Sulfur, dissolved	7704-34-9	E421/CG	A	0.50	mg/L		3.72	3.48	3.81	3.78	----
Tellurium, dissolved	13494-80-9	E421/CG	A	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	----
Thallium, dissolved	7440-28-0	E421/CG	A	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
Thorium, dissolved	7440-29-1	E421/CG	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Tin, dissolved	7440-31-5	E421/CG	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Titanium, dissolved	7440-32-6	E421/CG	A	0.00030	mg/L		<0.00030	<0.00030	<0.00030	<0.00030	----
Tungsten, dissolved	7440-33-7	E421/CG	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Uranium, dissolved	7440-61-1	E421/CG	A	0.000010	mg/L		0.000404	0.000393	0.000404	0.000407	----
Vanadium, dissolved	7440-62-2	E421/CG	A	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	----
Zinc, dissolved	7440-66-6	E421/CG	A	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	W1-SHALLOW	W1-DEEP	D1-SHALLOW	D1-DEEP	TRAVEL BLANK
					Client sampling date / time	19-Oct-2022 07:50	19-Oct-2022 08:30	19-Oct-2022 10:25	19-Oct-2022 09:55	19-Oct-2022 00:00
Analyte	CAS Number	Method/Lab		LOR	Unit	FJ2202978-001	FJ2202978-002	FJ2202978-003	FJ2202978-004	FJ2202978-005
						Result	Result	Result	Result	Result
Dissolved Metals										
Zirconium, dissolved	7440-67-7	E421/CG	A	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	----
Dissolved MeHg filtration location	----	EP537/VA		-	-	Field	Field	Field	Field	----
Dissolved mercury filtration location	----	EP509-L/VA		-	-	Field	Field	Field	Field	----
Dissolved metals filtration location	----	EP421/CG		-	-	Field	Field	Field	Field	----
Speciated Metals										
Methylmercury (as MeHg), total	22967-92-6	E536/VA	B	0.000000020	mg/L	<0.000000020	<0.000000020	<0.000000020	<0.000000020	----
Iron, ferrous [Fe II], dissolved	15438-31-0	E541/VA	B	0.020	mg/L	0.029	<0.020	<0.020	<0.020	----
Methylmercury (as MeHg), dissolved	22967-92-6	E537/VA	B	0.000000020	mg/L	<0.000000020	<0.000000020	<0.000000020	<0.000000020	----
Plant Pigments										
Chlorophyll a	479-61-8	EC870B/VA		0.010	µg/L	2.56	3.08	2.58	2.60	<0.010
Chlorophyll a	479-61-8	E870B/VA	B	0.0020	µg/sample	0.513	0.617	0.516	0.520	<0.0020

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202978**	Page	: 1 of 24
Amendment	: **5**		
Client	: **Ecofish Research Ltd**	Laboratory	: ALS Environmental - Fort St. John
Contact	: Sarah Kennedy	Account Manager	: Sean Zhang
Address	: 600 Comox Road Courtenay BC Canada V9N3P6	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-With Metals	Date Samples Received	: 19-Oct-2022 11:29
PO	: 1200-25.03.02	Issue Date	: 25-Aug-2023 17:58
C-O-C number	: 2022-OCT-MON8/9-DAY 1		
Sampler	: ----		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) D1-DEEP	E298	19-Oct-2022	20-Oct-2022	28 days	1 days	✓	20-Oct-2022	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) D1-SHALLOW	E298	19-Oct-2022	20-Oct-2022	28 days	1 days	✓	20-Oct-2022	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) W1-DEEP	E298	19-Oct-2022	20-Oct-2022	28 days	1 days	✓	20-Oct-2022	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) W1-SHALLOW	E298	19-Oct-2022	20-Oct-2022	28 days	1 days	✓	20-Oct-2022	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE D1-DEEP	E235.Cl	19-Oct-2022	20-Oct-2022	28 days	1 days	✓	20-Oct-2022	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE D1-SHALLOW	E235.Cl	19-Oct-2022	20-Oct-2022	28 days	1 days	✓	20-Oct-2022	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE W1-DEEP	E235.Cl	19-Oct-2022	20-Oct-2022	28 days	1 days	✓	20-Oct-2022	28 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE W1-SHALLOW	E235.Cl	19-Oct-2022	20-Oct-2022	28 days	1 days	✓	20-Oct-2022	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE D1-DEEP	E378-U	19-Oct-2022	20-Oct-2022	3 days	1 days	✓	20-Oct-2022	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE D1-SHALLOW	E378-U	19-Oct-2022	20-Oct-2022	3 days	1 days	✓	20-Oct-2022	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE W1-DEEP	E378-U	19-Oct-2022	20-Oct-2022	3 days	1 days	✓	20-Oct-2022	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE W1-SHALLOW	E378-U	19-Oct-2022	20-Oct-2022	3 days	1 days	✓	20-Oct-2022	3 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE D1-DEEP	E235.F	19-Oct-2022	20-Oct-2022	28 days	1 days	✓	20-Oct-2022	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE D1-SHALLOW	E235.F	19-Oct-2022	20-Oct-2022	28 days	1 days	✓	20-Oct-2022	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE W1-DEEP	E235.F	19-Oct-2022	20-Oct-2022	28 days	1 days	✓	20-Oct-2022	28 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE W1-SHALLOW	E235.F	19-Oct-2022	20-Oct-2022	28 days	1 days	✓	20-Oct-2022	28 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE D1-DEEP	E235.NO3-L	19-Oct-2022	20-Oct-2022	3 days	1 days	✓	20-Oct-2022	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE D1-SHALLOW	E235.NO3-L	19-Oct-2022	20-Oct-2022	3 days	1 days	✓	20-Oct-2022	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE W1-DEEP	E235.NO3-L	19-Oct-2022	20-Oct-2022	3 days	1 days	✓	20-Oct-2022	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE W1-SHALLOW	E235.NO3-L	19-Oct-2022	20-Oct-2022	3 days	1 days	✓	20-Oct-2022	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE D1-DEEP	E235.NO2-L	19-Oct-2022	20-Oct-2022	3 days	1 days	✓	20-Oct-2022	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE D1-SHALLOW	E235.NO2-L	19-Oct-2022	20-Oct-2022	3 days	1 days	✓	20-Oct-2022	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE W1-DEEP	E235.NO2-L	19-Oct-2022	20-Oct-2022	3 days	1 days	✓	20-Oct-2022	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE W1-SHALLOW	E235.NO2-L	19-Oct-2022	20-Oct-2022	3 days	1 days	✓	20-Oct-2022	3 days	1 days	✓

Matrix: **Water**

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Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE										
D1-DEEP	E392	19-Oct-2022	----	----	----		24-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE										
D1-SHALLOW	E392	19-Oct-2022	----	----	----		24-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE										
W1-DEEP	E392	19-Oct-2022	----	----	----		24-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE										
W1-SHALLOW	E392	19-Oct-2022	----	----	----		24-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
D1-DEEP	E235.SO4	19-Oct-2022	20-Oct-2022	28 days	1 days	✓	20-Oct-2022	28 days	1 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
D1-SHALLOW	E235.SO4	19-Oct-2022	20-Oct-2022	28 days	1 days	✓	20-Oct-2022	28 days	1 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
W1-DEEP	E235.SO4	19-Oct-2022	20-Oct-2022	28 days	1 days	✓	20-Oct-2022	28 days	1 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
W1-SHALLOW	E235.SO4	19-Oct-2022	20-Oct-2022	28 days	1 days	✓	20-Oct-2022	28 days	1 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
D1-DEEP	E375-T	19-Oct-2022	22-Oct-2022	28 days	3 days	✓	25-Oct-2022	28 days	6 days	✓

Matrix: **Water**

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Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) D1-SHALLOW	E375-T	19-Oct-2022	22-Oct-2022	28 days	3 days	✓	25-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) W1-DEEP	E375-T	19-Oct-2022	22-Oct-2022	28 days	3 days	✓	25-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) W1-SHALLOW	E375-T	19-Oct-2022	22-Oct-2022	28 days	3 days	✓	25-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) D1-DEEP	E366	19-Oct-2022	22-Oct-2022	28 days	3 days	✓	25-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) D1-SHALLOW	E366	19-Oct-2022	22-Oct-2022	28 days	3 days	✓	25-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) W1-DEEP	E366	19-Oct-2022	22-Oct-2022	28 days	3 days	✓	25-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) W1-SHALLOW	E366	19-Oct-2022	22-Oct-2022	28 days	3 days	✓	25-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) D1-DEEP	E372-U	19-Oct-2022	22-Oct-2022	28 days	3 days	✓	25-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) D1-SHALLOW	E372-U	19-Oct-2022	22-Oct-2022	28 days	3 days	✓	25-Oct-2022	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) W1-DEEP	E372-U	19-Oct-2022	22-Oct-2022	28 days	3 days	✓	25-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) W1-SHALLOW	E372-U	19-Oct-2022	22-Oct-2022	28 days	3 days	✓	25-Oct-2022	28 days	6 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) D1-DEEP	E509-L	19-Oct-2022	26-Oct-2022	28 days	7 days	✓	26-Oct-2022	28 days	7 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) D1-SHALLOW	E509-L	19-Oct-2022	26-Oct-2022	28 days	7 days	✓	26-Oct-2022	28 days	7 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) W1-DEEP	E509-L	19-Oct-2022	26-Oct-2022	28 days	7 days	✓	26-Oct-2022	28 days	7 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) W1-SHALLOW	E509-L	19-Oct-2022	26-Oct-2022	28 days	7 days	✓	26-Oct-2022	28 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) D1-DEEP	E421	19-Oct-2022	24-Oct-2022	180 days	5 days	✓	25-Oct-2022	180 days	6 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) D1-SHALLOW	E421	19-Oct-2022	24-Oct-2022	180 days	5 days	✓	25-Oct-2022	180 days	6 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) W1-DEEP	E421	19-Oct-2022	24-Oct-2022	180 days	5 days	✓	25-Oct-2022	180 days	6 days	✓

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Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) W1-SHALLOW	E421	19-Oct-2022	24-Oct-2022	180 days	5 days	✓	25-Oct-2022	180 days	6 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) D1-DEEP	E358-L	19-Oct-2022	20-Oct-2022	28 days	1 days	✓	20-Oct-2022	28 days	1 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) D1-SHALLOW	E358-L	19-Oct-2022	20-Oct-2022	28 days	1 days	✓	20-Oct-2022	28 days	1 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) W1-DEEP	E358-L	19-Oct-2022	20-Oct-2022	28 days	1 days	✓	20-Oct-2022	28 days	1 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) W1-SHALLOW	E358-L	19-Oct-2022	20-Oct-2022	28 days	1 days	✓	20-Oct-2022	28 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) D1-DEEP	E355-L	19-Oct-2022	20-Oct-2022	28 days	1 days	✓	20-Oct-2022	28 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) D1-SHALLOW	E355-L	19-Oct-2022	20-Oct-2022	28 days	1 days	✓	20-Oct-2022	28 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) W1-DEEP	E355-L	19-Oct-2022	20-Oct-2022	28 days	1 days	✓	20-Oct-2022	28 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) W1-SHALLOW	E355-L	19-Oct-2022	20-Oct-2022	28 days	1 days	✓	20-Oct-2022	28 days	1 days	✓

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Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE D1-DEEP	E290	19-Oct-2022	22-Oct-2022	14 days	3 days	✓	22-Oct-2022	14 days	3 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE D1-SHALLOW	E290	19-Oct-2022	22-Oct-2022	14 days	3 days	✓	22-Oct-2022	14 days	3 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE W1-DEEP	E290	19-Oct-2022	22-Oct-2022	14 days	3 days	✓	22-Oct-2022	14 days	3 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE W1-SHALLOW	E290	19-Oct-2022	22-Oct-2022	14 days	3 days	✓	22-Oct-2022	14 days	3 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE D1-DEEP	E329	19-Oct-2022	20-Oct-2022	3 days	1 days	✓	20-Oct-2022	3 days	1 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE D1-SHALLOW	E329	19-Oct-2022	20-Oct-2022	3 days	1 days	✓	20-Oct-2022	3 days	1 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE W1-DEEP	E329	19-Oct-2022	20-Oct-2022	3 days	1 days	✓	20-Oct-2022	3 days	1 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE W1-SHALLOW	E329	19-Oct-2022	20-Oct-2022	3 days	1 days	✓	20-Oct-2022	3 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE D1-DEEP	E100	19-Oct-2022	22-Oct-2022	28 days	3 days	✓	22-Oct-2022	28 days	3 days	✓

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Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE D1-SHALLOW	E100	19-Oct-2022	22-Oct-2022	28 days	3 days	✓	22-Oct-2022	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE W1-DEEP	E100	19-Oct-2022	22-Oct-2022	28 days	3 days	✓	22-Oct-2022	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE W1-SHALLOW	E100	19-Oct-2022	22-Oct-2022	28 days	3 days	✓	22-Oct-2022	28 days	3 days	✓
Physical Tests : pH by Meter										
HDPE D1-SHALLOW	E108	19-Oct-2022	22-Oct-2022	0.25 hrs	71 hrs	× EHTR-FM	22-Oct-2022	0.25 hrs	71 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE D1-DEEP	E108	19-Oct-2022	22-Oct-2022	0.25 hrs	72 hrs	× EHTR-FM	22-Oct-2022	0.25 hrs	72 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE W1-DEEP	E108	19-Oct-2022	22-Oct-2022	0.25 hrs	73 hrs	× EHTR-FM	22-Oct-2022	0.25 hrs	73 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE W1-SHALLOW	E108	19-Oct-2022	22-Oct-2022	0.25 hrs	74 hrs	× EHTR-FM	22-Oct-2022	0.25 hrs	74 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE D1-DEEP	E162	19-Oct-2022	----	----	----		24-Oct-2022	7 days	5 days	✓
Physical Tests : TDS by Gravimetry										
HDPE D1-SHALLOW	E162	19-Oct-2022	----	----	----		24-Oct-2022	7 days	5 days	✓

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Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TDS by Gravimetry										
HDPE W1-DEEP	E162	19-Oct-2022	----	----	----		24-Oct-2022	7 days	5 days	✓
Physical Tests : TDS by Gravimetry										
HDPE W1-SHALLOW	E162	19-Oct-2022	----	----	----		24-Oct-2022	7 days	5 days	✓
Physical Tests : TSS by Gravimetry										
HDPE D1-DEEP	E160	19-Oct-2022	----	----	----		25-Oct-2022	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE D1-SHALLOW	E160	19-Oct-2022	----	----	----		25-Oct-2022	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE W1-DEEP	E160	19-Oct-2022	----	----	----		25-Oct-2022	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE W1-SHALLOW	E160	19-Oct-2022	----	----	----		25-Oct-2022	7 days	6 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Support Lab Filtered µg)										
Opaque HDPE D1-DEEP	E870B	19-Oct-2022	24-Oct-2022	28 days	5 days	✓	24-Oct-2022	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Support Lab Filtered µg)										
Opaque HDPE D1-SHALLOW	E870B	19-Oct-2022	24-Oct-2022	28 days	5 days	✓	24-Oct-2022	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Support Lab Filtered µg)										
Opaque HDPE TRAVEL BLANK	E870B	19-Oct-2022	24-Oct-2022	28 days	5 days	✓	24-Oct-2022	28 days	0 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Plant Pigments : Chlorophyll-a by Fluorometry (Support Lab Filtered µg)										
Opaque HDPE W1-DEEP	E870B	19-Oct-2022	24-Oct-2022	28 days	5 days	✓	24-Oct-2022	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Support Lab Filtered µg)										
Opaque HDPE W1-SHALLOW	E870B	19-Oct-2022	24-Oct-2022	28 days	5 days	✓	24-Oct-2022	28 days	0 days	✓
Sample Preparation : Chlorophyll-a Filtration by Support Laboratory										
Opaque HDPE tube TRAVEL BLANK	EF870B	19-Oct-2022	----	----	----		20-Oct-2022	48 hrs	25 hrs	✓
Sample Preparation : Chlorophyll-a Filtration by Support Laboratory										
Opaque HDPE tube D1-SHALLOW	EF870B	19-Oct-2022	----	----	----		20-Oct-2022	48 hrs	29 hrs	✓
Sample Preparation : Chlorophyll-a Filtration by Support Laboratory										
Opaque HDPE tube D1-DEEP	EF870B	19-Oct-2022	----	----	----		20-Oct-2022	48 hrs	30 hrs	✓
Sample Preparation : Chlorophyll-a Filtration by Support Laboratory										
Opaque HDPE tube W1-DEEP	EF870B	19-Oct-2022	----	----	----		20-Oct-2022	48 hrs	31 hrs	✓
Sample Preparation : Chlorophyll-a Filtration by Support Laboratory										
Opaque HDPE tube W1-SHALLOW	EF870B	19-Oct-2022	----	----	----		20-Oct-2022	48 hrs	32 hrs	✓
Speciated Metals : Dissolved Ferrous Iron in Water by Colour										
Amber glass dissolved (hydrochloric acid) D1-DEEP	E541	19-Oct-2022	24-Nov-2022	7 days	36 days	× EHT	24-Nov-2022	7 days	36 days	× EHT
Speciated Metals : Dissolved Ferrous Iron in Water by Colour										
Amber glass dissolved (hydrochloric acid) D1-SHALLOW	E541	19-Oct-2022	24-Nov-2022	7 days	36 days	× EHT	24-Nov-2022	7 days	36 days	× EHT

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Speciated Metals : Dissolved Ferrous Iron in Water by Colour										
Amber glass dissolved (hydrochloric acid)										
W1-DEEP	E541	19-Oct-2022	24-Nov-2022	7 days	36 days	× EHT	24-Nov-2022	7 days	36 days	× EHT
Speciated Metals : Dissolved Ferrous Iron in Water by Colour										
Amber glass dissolved (hydrochloric acid)										
W1-SHALLOW	E541	19-Oct-2022	24-Nov-2022	7 days	36 days	× EHT	24-Nov-2022	7 days	36 days	× EHT
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid)										
D1-DEEP	E537	19-Oct-2022	04-Nov-2022	180 days	16 days	✓	10-Nov-2022	180 days	6 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid)										
D1-SHALLOW	E537	19-Oct-2022	04-Nov-2022	180 days	16 days	✓	10-Nov-2022	180 days	6 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid)										
W1-DEEP	E537	19-Oct-2022	04-Nov-2022	180 days	16 days	✓	10-Nov-2022	180 days	6 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid)										
W1-SHALLOW	E537	19-Oct-2022	04-Nov-2022	180 days	16 days	✓	10-Nov-2022	180 days	6 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid)										
D1-DEEP	E536	19-Oct-2022	03-Nov-2022	180 days	15 days	✓	07-Nov-2022	180 days	19 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid)										
D1-SHALLOW	E536	19-Oct-2022	03-Nov-2022	180 days	15 days	✓	07-Nov-2022	180 days	19 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid)										
W1-DEEP	E536	19-Oct-2022	03-Nov-2022	180 days	15 days	✓	07-Nov-2022	180 days	19 days	✓

Matrix: **Water**

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Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) W1-SHALLOW	E536	19-Oct-2022	03-Nov-2022	180 days	15 days	✓	07-Nov-2022	180 days	19 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) D1-DEEP	E508-L	19-Oct-2022	26-Oct-2022	28 days	7 days	✓	26-Oct-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) D1-SHALLOW	E508-L	19-Oct-2022	26-Oct-2022	28 days	7 days	✓	26-Oct-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) W1-DEEP	E508-L	19-Oct-2022	26-Oct-2022	28 days	7 days	✓	26-Oct-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) W1-SHALLOW	E508-L	19-Oct-2022	26-Oct-2022	28 days	7 days	✓	26-Oct-2022	28 days	0 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) D1-DEEP	E420	19-Oct-2022	23-Oct-2022	180 days	4 days	✓	24-Oct-2022	180 days	5 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) D1-SHALLOW	E420	19-Oct-2022	23-Oct-2022	180 days	4 days	✓	24-Oct-2022	180 days	5 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) W1-DEEP	E420	19-Oct-2022	23-Oct-2022	180 days	4 days	✓	24-Oct-2022	180 days	5 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) W1-SHALLOW	E420	19-Oct-2022	23-Oct-2022	180 days	4 days	✓	24-Oct-2022	180 days	5 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✗ = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	709480	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	706906	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	706622	1	19	5.2	5.0	✓
Chlorophyll-a by Fluorometry (Support Lab Filtered µg)	E870B	711796	0	5	0.0	5.0	✗
Colour (True) by Spectrometer (5 CU)	E329	706831	1	10	10.0	5.0	✓
Conductivity in Water	E100	709479	1	15	6.6	5.0	✓
Dissolved Ferrous Iron in Water by Colour	E541	756854	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	715134	1	8	12.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	712298	1	8	12.5	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	730526	2	22	9.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	706185	1	11	9.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	706660	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	706619	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	706624	1	4	25.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	706625	1	4	25.0	5.0	✓
pH by Meter	E108	709478	1	20	5.0	5.0	✓
Reactive Silica by Colourimetry	E392	712325	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	706621	1	19	5.2	5.0	✓
TDS by Gravimetry	E162	708441	1	4	25.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	709902	1	18	5.5	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	715085	1	19	5.2	5.0	✓
Total Metals in Water by CRC ICPMS	E420	710437	1	18	5.5	5.0	✓
Total Methylmercury in Water by GCAFS	E536	728312	2	44	4.5	5.0	✗
Total Nitrogen by Colourimetry	E366	709885	1	4	25.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	706186	1	11	9.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	709210	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	708445	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	709480	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	706906	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	706622	1	19	5.2	5.0	✓
Chlorophyll-a by Fluorometry (Support Lab Filtered µg)	E870B	711796	1	5	20.0	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	706831	1	10	10.0	5.0	✓
Conductivity in Water	E100	709479	1	15	6.6	5.0	✓
Dissolved Ferrous Iron in Water by Colour	E541	756854	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	715134	1	8	12.5	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Dissolved Metals in Water by CRC ICPMS	E421	712298	1	8	12.5	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	730526	2	22	9.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	706185	1	11	9.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	706660	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	706619	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	706624	1	4	25.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	706625	1	4	25.0	5.0	✓
pH by Meter	E108	709478	1	20	5.0	5.0	✓
Reactive Silica by Colourimetry	E392	712325	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	706621	1	19	5.2	5.0	✓
TDS by Gravimetry	E162	708441	1	4	25.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	709902	1	18	5.5	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	715085	1	19	5.2	5.0	✓
Total Metals in Water by CRC ICPMS	E420	710437	1	18	5.5	5.0	✓
Total Methylmercury in Water by GCAFS	E536	728312	3	44	6.8	5.0	✓
Total Nitrogen by Colourimetry	E366	709885	1	4	25.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	706186	1	11	9.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	709210	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	708445	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	709480	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	706906	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	706622	1	19	5.2	5.0	✓
Chlorophyll-a by Fluorometry (Support Lab Filtered µg)	E870B	711796	1	5	20.0	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	706831	1	10	10.0	5.0	✓
Conductivity in Water	E100	709479	1	15	6.6	5.0	✓
Dissolved Ferrous Iron in Water by Colour	E541	756854	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	715134	1	8	12.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	712298	1	8	12.5	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	730526	2	22	9.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	706185	1	11	9.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	706660	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	706619	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	706624	1	4	25.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	706625	1	4	25.0	5.0	✓
Reactive Silica by Colourimetry	E392	712325	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	706621	1	19	5.2	5.0	✓
TDS by Gravimetry	E162	708441	1	4	25.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	709902	1	18	5.5	5.0	✓

Matrix: **Water**

Evaluation: ✗ = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	715085	1	19	5.2	5.0	✓
Total Metals in Water by CRC ICPMS	E420	710437	1	18	5.5	5.0	✓
Total Methylmercury in Water by GCAFS	E536	728312	3	44	6.8	5.0	✓
Total Nitrogen by Colourimetry	E366	709885	1	4	25.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	706186	1	11	9.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	709210	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	708445	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	706906	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	706622	1	19	5.2	5.0	✓
Dissolved Ferrous Iron in Water by Colour	E541	756854	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	715134	1	8	12.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	712298	1	8	12.5	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	730526	2	22	9.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	706185	1	11	9.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	706660	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	706619	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	706624	1	4	25.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	706625	1	4	25.0	5.0	✓
Reactive Silica by Colourimetry	E392	712325	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	706621	1	19	5.2	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	709902	1	18	5.5	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	715085	1	19	5.2	5.0	✓
Total Metals in Water by CRC ICPMS	E420	710437	1	18	5.5	5.0	✓
Total Methylmercury in Water by GCAFS	E536	728312	2	44	4.5	5.0	✗
Total Nitrogen by Colourimetry	E366	709885	1	4	25.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	706186	1	11	9.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	709210	1	20	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Calgary	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 ALS Environmental - Calgary	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Alkalinity Species by Titration	E290 ALS Environmental - Calgary	Water	APHA 2320 B (mod)	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.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Colour (True) by Spectrometer (5 CU)	E329 ALS Environmental - Calgary	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L ALS Environmental - Calgary	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Calgary	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366 ALS Environmental - Vancouver	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Reactive Silica by Colourimetry	E392 ALS Environmental - Vancouver	Water	APHA 4500-SiO2 E (mod)	Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method using a discrete analyzer. Method Limitation: Arsenic (5+) above 100 mg/L is a negative interference on this test
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Calgary	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Calgary	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L ALS Environmental - Vancouver	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAFS.
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L ALS Environmental - Vancouver	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAFS.
Total Methylmercury in Water by GCAFS	E536 ALS Environmental - Vancouver	Water	EPA 1630 (mod)	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Methylmercury in Water by GCAFS	E537 ALS Environmental - Vancouver	Water	EPA 1630 (mod)	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Ferrous Iron in Water by Colour	E541 ALS Environmental - Vancouver	Water	APHA 3500-Fe B/James Ball et al (1999)	This analysis is carried out using procedures adapted from APHA 3500-Fe B and Environ. Sci. Technol. 1999, 33, 5, 807–813. The procedure involves preliminary sample filtration, and ferrous iron is determined using the "FerroZine" colourimetric method. Holding time is 7 days for 0.45um filtration or 6 months if samples have been filtered using 0.1um filters.
Chlorophyll-a by Fluorometry (Support Lab Filtered µg)	E870B ALS Environmental - Vancouver	Water	EPA 445.0 (mod)	Chlorophyll-a is determined by solvent extraction followed with analysis by fluorometry using the non-acidification procedure. Sampling volume not provided by client.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Calgary	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Calgary	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Ion Balance using Dissolved Metals	EC101 ALS Environmental - Calgary	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
Total Kjeldahl Nitrogen (Calculation)	EC318 ALS Environmental - Vancouver	Water	BC MOE LABORATORY MANUAL (2005)	Total Kjeldahl Nitrogen is a calculated parameter. Total Kjeldahl Nitrogen (calc) = Total Nitrogen - [Nitrite (as N) + Nitrate (as N)].
Chlorophyll-a by Fluorometry (Support Lab Filtered µg/L)	EC870B ALS Environmental - Vancouver	Water	CALC	Convert results to sample concentration based on support lab filter information.
Chlorophyll-a Filtration by Support Laboratory	EF870B ALS Environmental - Calgary	Water	EPA 445.0 (mod)	Filtration for chlorophyll-a analysis

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Preparation for Total Organic Carbon by Combustion	EP355 ALS Environmental - Calgary	Water		Preparation for Total Organic Carbon by Combustion

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Calgary	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Nitrogen in water	EP366 ALS Environmental - Vancouver	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 ALS Environmental - Calgary	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration (Low Level)	EP509-L ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
Total Methylmercury Water Preparation	EP536 ALS Environmental - Vancouver	Water	EPA 1630	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Methylmercury Water Preparation	EP537 ALS Environmental - Vancouver	Water	EPA 1630	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Ferrous Iron in Water by Colour	EP541 ALS Environmental - Vancouver	Water	APHA 3500-Fe B/James Ball et al (1999)	This analysis is carried out using procedures adapted from APHA 3500-Fe B and "A New Method for the Direct Determination of Dissolved Iron Concentration in Acid Mine Waters" published by James W. Ball et al (1999). The procedure involves preliminary sample filtration, and ferrous iron is determined using the "FerroZine" colourimetric method.
Chlorophyll-a Extraction (Support Lab Filtered)	EP870B ALS Environmental - Vancouver	Water	EPA 445.0 (mod)	Chlorophyll-a solvent extraction.

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QUALITY CONTROL REPORT

Work Order	: **FJ2202978**	Page	: 1 of 21
Amendment	: **5**		
Client	: Ecofish Research Ltd	Laboratory	: ALS Environmental - Fort St. John
Contact	: Sarah Kennedy	Account Manager	: Sean Zhang
Address	: 600 Comox Road Courtenay BC Canada V9N3P6	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	:	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-With Metals	Date Samples Received	: 19-Oct-2022 11:29
PO	: 1200-25.03.02	Date Analysis Commenced	: 20-Oct-2022
C-O-C number	: 2022-OCT-MON8/9-DAY 1	Issue Date	: 25-Aug-2023 17:58
Sampler	: ---- ----		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
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Anthony Calero	Supervisor - Inorganic	Calgary Metals, Calgary, Alberta
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Vladka Stamenova	Analyst	Calgary Inorganics, Calgary, Alberta

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 706831)											
CG2214572-001	Anonymous	Colour, true	----	E329	5.0	CU	138	136	1.19%	20%	----
Physical Tests (QC Lot: 708441)											
FJ2202978-001	W1-SHALLOW	Solids, total dissolved [TDS]	----	E162	20	mg/L	110	108	3	Diff <2x LOR	----
Physical Tests (QC Lot: 708445)											
CG2214684-004	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	10.5	10.3	0.2	Diff <2x LOR	----
Physical Tests (QC Lot: 709478)											
CG2214644-003	Anonymous	pH	----	E108	0.10	pH units	5.24	5.45	3.93%	4%	----
Physical Tests (QC Lot: 709479)											
CG2214645-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	1260	1270	0.710%	10%	----
Physical Tests (QC Lot: 709480)											
CG2214645-001	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	319	322	0.905%	20%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	319	322	0.905%	20%	----
Anions and Nutrients (QC Lot: 706619)											
CG2214600-001	Anonymous	Fluoride	16984-48-8	E235.F	0.400	mg/L	<0.400	<0.400	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 706621)											
CG2214600-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	6.00	mg/L	3410	3450	1.16%	20%	----
Anions and Nutrients (QC Lot: 706622)											
CG2214600-001	Anonymous	Chloride	16887-00-6	E235.Cl	10.0	mg/L	509	512	0.615%	20%	----
Anions and Nutrients (QC Lot: 706624)											
FJ2202978-001	W1-SHALLOW	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0688	0.0668	2.95%	20%	----
Anions and Nutrients (QC Lot: 706625)											
FJ2202978-001	W1-SHALLOW	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0017	0.0016	0.0001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 706660)											
CG2214557-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 706906)											
CG2214603-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.380	0.380	0.0263%	20%	----
Anions and Nutrients (QC Lot: 709210)											
FC2202569-008	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0063	0.0058	0.0005	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 709885)											
FJ2202978-001	W1-SHALLOW	Nitrogen, total	7727-37-9	E366	0.030	mg/L	0.155	0.155	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 709902)											
CG2214526-005	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	0.0822	0.0815	0.799%	20%	----
Anions and Nutrients (QC Lot: 712325)											
FJ2202956-001	Anonymous	Silicate (as SiO2)	7631-86-9	E392	0.50	mg/L	4.16	4.16	0.002	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 706185)											
FJ2202978-001	W1-SHALLOW	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.69	3.04	0.35	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 706186)											
FJ2202978-001	W1-SHALLOW	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	2.61	2.58	0.03	Diff <2x LOR	----
Total Metals (QC Lot: 710437)											
CG2214619-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0060	mg/L	<0.0060	<0.0060	0	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00020	mg/L	0.00068	0.00071	0.00002	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00020	mg/L	0.00020	0.00021	0.000004	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00020	mg/L	0.0301	0.0301	0.0593%	20%	----
		Beryllium, total	7440-41-7	E420	0.000040	mg/L	<0.040 µg/L	<0.000040	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000100	mg/L	1.41 µg/L	0.00150	6.43%	20%	----
		Calcium, total	7440-70-2	E420	0.100	mg/L	472	479	1.66%	20%	----
		Cesium, total	7440-46-2	E420	0.000020	mg/L	0.000027	0.000030	0.000002	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00020	mg/L	0.77 µg/L	0.00077	0.000002	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00100	mg/L	0.00102	<0.00100	0.00002	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
		Lead, total	7439-92-1	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0020	mg/L	0.0911	0.0889	2.42%	20%	----
		Magnesium, total	7439-95-4	E420	0.0100	mg/L	364	368	0.939%	20%	----
		Manganese, total	7439-96-5	E420	0.00020	mg/L	0.00574	0.00585	1.96%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000100	mg/L	0.00402	0.00415	3.01%	20%	----
		Nickel, total	7440-02-0	E420	0.00100	mg/L	0.0658	0.0658	0.0509%	20%	----
		Phosphorus, total	7723-14-0	E420	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.100	mg/L	5.30	5.28	0.325%	20%	----
		Rubidium, total	7440-17-7	E420	0.00040	mg/L	0.00386	0.00379	0.00008	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000100	mg/L	588 µg/L	0.594	0.969%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 710437) - continued											
CG2214619-001	Anonymous	Silicon, total	7440-21-3	E420	0.20	mg/L	2.69	2.65	1.54%	20%	----
		Silver, total	7440-22-4	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.100	mg/L	2.63	2.65	0.638%	20%	----
		Strontium, total	7440-24-6	E420	0.00040	mg/L	0.289	0.296	2.51%	20%	----
		Sulfur, total	7704-34-9	E420	1.00	mg/L	775	752	3.08%	20%	----
		Tellurium, total	13494-80-9	E420	0.00040	mg/L	<0.00040	<0.00040	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000020	mg/L	0.000069	0.000066	0.000003	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00060	mg/L	<0.00060	<0.00060	0	Diff <2x LOR	----
		Tungsten, total	7440-33-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000020	mg/L	0.0198	0.0195	1.19%	20%	----
		Vanadium, total	7440-62-2	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0060	mg/L	0.0795	0.0787	1.05%	20%	----
		Zirconium, total	7440-67-7	E420	0.00040	mg/L	<0.00040	<0.00040	0	Diff <2x LOR	----
Total Metals (QC Lot: 715085)											
CG2214161-001	Anonymous	Mercury, total	7439-97-6	E508-L	0.50	ng/L	1.47	1.50	0.02	Diff <2x LOR	----
Dissolved Metals (QC Lot: 712298)											
CG2214693-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0011	0.0011	0.00004	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00026	0.00025	0.00001	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	0.00010	0.000002	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0894	0.0865	3.24%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.020 µg/L	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.016	0.016	0.0005	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0674 µg/L	0.0000696	3.06%	20%	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	186	188	0.734%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000011	<0.000010	0.000001	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00024	0.00025	0.000004	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.012	0.012	0.0005	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0926	0.0934	0.929%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 712298) - continued											
CG2214693-001	Anonymous	Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	105	101	4.54%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00906	0.00862	5.00%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00727	0.00730	0.392%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00845	0.00827	2.11%	20%	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	2.89	2.77	4.19%	20%	----
		Rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00171	0.00161	0.00010	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	89.1 µg/L	0.0898	0.857%	20%	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.80	1.74	3.67%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	6.53	6.26	4.28%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.232	0.234	0.559%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	181	181	0.133%	20%	----
		Tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.000010	<0.000010	0.00000005	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.00607	0.00605	0.286%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0031	0.0029	0.0002	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 715134)											
FJ2202978-001	W1-SHALLOW	Mercury, dissolved	7439-97-6	E509-L	0.50	ng/L	<0.50	<0.50	0	Diff <2x LOR	----
Speciated Metals (QC Lot: 728312)											
FJ2202949-005	Anonymous	Methylmercury (as MeHg), total	22967-92-6	E536	0.000080	µg/L	<0.000000080 mg/L	<0.000080	0	Diff <2x LOR	----
Speciated Metals (QC Lot: 730526)											
FJ2202949-001	Anonymous	Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.000020	µg/L	0.000000125 mg/L	0.000149	17.0%	30%	----
Speciated Metals (QC Lot: 733968)											
FJ2202978-004	D1-DEEP	Methylmercury (as MeHg), total	22967-92-6	E536	0.000020	µg/L	<0.000000020 mg/L	<0.000020	0	Diff <2x LOR	----
Speciated Metals (QC Lot: 747329)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Speciated Metals (QC Lot: 747329) - continued											
FJ2202978-002	W1-DEEP	Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.000020	µg/L	<0.000000020 mg/L	<0.000020	0	Diff <2x LOR	----
Speciated Metals (QC Lot: 756854)											
FJ2202949-001	Anonymous	Iron, ferrous [Fe II], dissolved	15438-31-0	E541	0.020	mg/L	0.046	0.046	0.0002	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 706831)						
Colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 708441)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 708445)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 709479)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 709480)						
Alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Anions and Nutrients (QCLot: 706619)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 706621)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 706622)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 706624)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 706625)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 706660)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 706906)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 709210)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 709885)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 709902)						
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 712325)						
Silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 706185)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 706186)						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 710437)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 710437) - continued						
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Total Metals (QCLot: 715085)						
Mercury, total	7439-97-6	E508-L	0.5	ng/L	<0.50	----
Dissolved Metals (QCLot: 712298)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 712298) - continued						
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 715134)						
Mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	<0.50	----
Speciated Metals (QCLot: 728312)						
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 730526)						
Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 733968)						
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 740379)						
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 747329)						
Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 756854)						
Iron, ferrous [Fe II], dissolved	15438-31-0	E541	0.02	mg/L	<0.020	----
Plant Pigments (QCLot: 711796)						
Chlorophyll a	479-61-8	E870B	0.002	µg/sample	<0.0020	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 706831)									
Colour, true	----	E329	5	CU	100 CU	95.8	85.0	115	----
Physical Tests (QCLot: 708441)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	95.6	85.0	115	----
Physical Tests (QCLot: 708445)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	106	85.0	115	----
Physical Tests (QCLot: 709478)									
pH	----	E108	----	pH units	7 pH units	100	98.6	101	----
Physical Tests (QCLot: 709479)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	100	90.0	110	----
Physical Tests (QCLot: 709480)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	103	85.0	115	----
Anions and Nutrients (QCLot: 706619)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	99.6	90.0	110	----
Anions and Nutrients (QCLot: 706621)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 706622)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	98.8	90.0	110	----
Anions and Nutrients (QCLot: 706624)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.1	90.0	110	----
Anions and Nutrients (QCLot: 706625)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	98.7	90.0	110	----
Anions and Nutrients (QCLot: 706660)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	101	80.0	120	----
Anions and Nutrients (QCLot: 706906)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 709210)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	105	80.0	120	----
Anions and Nutrients (QCLot: 709885)									
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	97.4	75.0	125	----
Anions and Nutrients (QCLot: 709902)									
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.03 mg/L	100	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 712325)									
Silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	10 mg/L	104	85.0	115	----
Organic / Inorganic Carbon (QCLot: 706185)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	95.5	80.0	120	----
Organic / Inorganic Carbon (QCLot: 706186)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	97.5	80.0	120	----
Total Metals (QCLot: 710437)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	94.8	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	87.3	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	89.0	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	91.9	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	80.1	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	83.1	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	83.4	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	87.6	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	91.8	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	86.6	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	92.1	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	91.9	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	90.7	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	90.0	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	86.6	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	105	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	97.5	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	91.2	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	90.4	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	89.8	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	94.8	70.0	130	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	94.6	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	96.4	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	84.6	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	92.7	60.0	140	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	82.0	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	96.4	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	91.8	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 710437) - continued									
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	109	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	81.0	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	83.2	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	81.7	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	88.6	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	99.5	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	86.6	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	90.7	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	92.5	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	80.8	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	92.3	80.0	120	----
Total Metals (QCLot: 715085)									
Mercury, total	7439-97-6	E508-L	0.5	ng/L	5 ng/L	102	80.0	120	----
Dissolved Metals (QCLot: 712298)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	102	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	98.2	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	95.3	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	97.3	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	92.8	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	96.5	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	104	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	93.6	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	99.5	80.0	120	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	98.8	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	91.7	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	93.5	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	93.8	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	94.6	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	96.9	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	103	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	108	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	97.0	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	94.6	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	91.8	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	102	70.0	130	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 712298) - continued									
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	98.7	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	94.0	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	93.5	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	97.4	60.0	140	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	90.4	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	97.0	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	103	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	105	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	96.0	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	96.8	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	96.6	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	93.3	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	95.7	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	96.9	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	97.6	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	96.6	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	91.4	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	94.0	80.0	120	----
Mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	5 ng/L	102	80.0	120	----
Speciated Metals (QCLot: 728312)									
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	0.0025 µg/L	76.3	70.0	130	----
Speciated Metals (QCLot: 730526)									
Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	0.0025 µg/L	79.4	70.0	130	----
Speciated Metals (QCLot: 733968)									
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	0.0025 µg/L	79.0	70.0	130	----
Speciated Metals (QCLot: 740379)									
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	0.0025 µg/L	81.8	70.0	130	----
Speciated Metals (QCLot: 747329)									
Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	0.0025 µg/L	73.9	70.0	130	----
Speciated Metals (QCLot: 756854)									
Iron, ferrous [Fe II], dissolved	15438-31-0	E541	0.02	mg/L	0.5 mg/L	103	80.0	120	----
Plant Pigments (QCLot: 711796)									
Chlorophyll a	479-61-8	E870B	0.002	µg/sample	1 µg/sample	95.0	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 706619)										
CG2214600-002	Anonymous	Fluoride	16984-48-8	E235.F	0.898 mg/L	1 mg/L	89.8	75.0	125	----
Anions and Nutrients (QCLot: 706621)										
CG2214600-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	100 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 706622)										
CG2214600-002	Anonymous	Chloride	16887-00-6	E235.Cl	ND mg/L	100 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 706624)										
FJ2202978-002	W1-DEEP	Nitrate (as N)	14797-55-8	E235.NO3-L	2.46 mg/L	2.5 mg/L	98.5	75.0	125	----
Anions and Nutrients (QCLot: 706625)										
FJ2202978-002	W1-DEEP	Nitrite (as N)	14797-65-0	E235.NO2-L	0.501 mg/L	0.5 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 706660)										
CG2214557-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0534 mg/L	0.05 mg/L	107	70.0	130	----
Anions and Nutrients (QCLot: 706906)										
CG2214603-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 709210)										
FC2202573-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 709885)										
FJ2202978-002	W1-DEEP	Nitrogen, total	7727-37-9	E366	0.378 mg/L	0.4 mg/L	94.5	70.0	130	----
Anions and Nutrients (QCLot: 709902)										
FC2202568-001	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-T	ND mg/L	0.05 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 712325)										
FJ2202956-002	Anonymous	Silicate (as SiO2)	7631-86-9	E392	10.4 mg/L	10 mg/L	104	75.0	125	----
Organic / Inorganic Carbon (QCLot: 706185)										
FJ2202978-001	W1-SHALLOW	Carbon, dissolved organic [DOC]	----	E358-L	4.85 mg/L	5 mg/L	97.0	70.0	130	----
Organic / Inorganic Carbon (QCLot: 706186)										
FJ2202978-001	W1-SHALLOW	Carbon, total organic [TOC]	----	E355-L	5.24 mg/L	5 mg/L	105	70.0	130	----
Total Metals (QCLot: 710437)										
CG2214619-003	Anonymous	Aluminum, total	7429-90-5	E420	2.16 mg/L	2 mg/L	108	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 710437) - continued										
CG2214619-003	Anonymous	Antimony, total	7440-36-0	E420	0.201 mg/L	0.2 mg/L	100	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.203 mg/L	0.2 mg/L	102	70.0	130	----
		Barium, total	7440-39-3	E420	0.202 mg/L	0.2 mg/L	101	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.403 mg/L	0.4 mg/L	101	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.103 mg/L	0.1 mg/L	103	70.0	130	----
		Boron, total	7440-42-8	E420	1.09 mg/L	1 mg/L	109	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.0403 mg/L	0.04 mg/L	101	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	40 mg/L	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.114 mg/L	0.1 mg/L	114	70.0	130	----
		Chromium, total	7440-47-3	E420	0.414 mg/L	0.4 mg/L	103	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.204 mg/L	0.2 mg/L	102	70.0	130	----
		Copper, total	7440-50-8	E420	0.197 mg/L	0.2 mg/L	98.6	70.0	130	----
		Iron, total	7439-89-6	E420	20.2 mg/L	20 mg/L	101	70.0	130	----
		Lead, total	7439-92-1	E420	0.215 mg/L	0.2 mg/L	108	70.0	130	----
		Lithium, total	7439-93-2	E420	0.862 mg/L	1 mg/L	86.2	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	10 mg/L	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	0.202 mg/L	0.2 mg/L	101	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.228 mg/L	0.2 mg/L	114	70.0	130	----
		Nickel, total	7440-02-0	E420	0.390 mg/L	0.4 mg/L	97.5	70.0	130	----
		Phosphorus, total	7723-14-0	E420	104 mg/L	100 mg/L	104	70.0	130	----
		Potassium, total	7440-09-7	E420	40.6 mg/L	40 mg/L	102	70.0	130	----
		Rubidium, total	7440-17-7	E420	0.211 mg/L	0.2 mg/L	106	70.0	130	----
		Selenium, total	7782-49-2	E420	0.396 mg/L	0.4 mg/L	99.1	70.0	130	----
		Silicon, total	7440-21-3	E420	96.4 mg/L	100 mg/L	96.4	70.0	130	----
		Silver, total	7440-22-4	E420	0.0444 mg/L	0.04 mg/L	111	70.0	130	----
		Sodium, total	7440-23-5	E420	19.3 mg/L	20 mg/L	96.4	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	0.2 mg/L	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	ND mg/L	200 mg/L	ND	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.398 mg/L	0.4 mg/L	99.5	70.0	130	----
		Thallium, total	7440-28-0	E420	0.0417 mg/L	0.04 mg/L	104	70.0	130	----
		Thorium, total	7440-29-1	E420	0.216 mg/L	0.2 mg/L	108	70.0	130	----
		Tin, total	7440-31-5	E420	0.203 mg/L	0.2 mg/L	101	70.0	130	----
		Titanium, total	7440-32-6	E420	0.402 mg/L	0.4 mg/L	100	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.214 mg/L	0.2 mg/L	107	70.0	130	----
		Uranium, total	7440-61-1	E420	0.0424 mg/L	0.04 mg/L	106	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 710437) - continued										
CG2214619-003	Anonymous	Vanadium, total	7440-62-2	E420	1.03 mg/L	1 mg/L	103	70.0	130	----
		Zinc, total	7440-66-6	E420	3.90 mg/L	4 mg/L	97.6	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.487 mg/L	0.4 mg/L	122	70.0	130	----
Total Metals (QCLot: 715085)										
CG2214161-002	Anonymous	Mercury, total	7439-97-6	E508-L	4.98 ng/L	5 ng/L	99.6	70.0	130	----
Dissolved Metals (QCLot: 712298)										
CG2214807-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	1.87 mg/L	2 mg/L	93.5	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.188 mg/L	0.2 mg/L	93.8	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.187 mg/L	0.2 mg/L	93.3	70.0	130	----
		Barium, dissolved	7440-39-3	E421	0.178 mg/L	0.2 mg/L	89.2	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.337 mg/L	0.4 mg/L	84.2	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.0885 mg/L	0.1 mg/L	88.5	70.0	130	----
		Boron, dissolved	7440-42-8	E421	1.05 mg/L	1 mg/L	105	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.0371 mg/L	0.04 mg/L	92.7	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	40 mg/L	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.0978 mg/L	0.1 mg/L	97.8	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.358 mg/L	0.4 mg/L	89.5	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	ND mg/L	0.2 mg/L	ND	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.182 mg/L	0.2 mg/L	91.0	70.0	130	----
		Iron, dissolved	7439-89-6	E421	18.3 mg/L	20 mg/L	91.3	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.184 mg/L	0.2 mg/L	91.8	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.856 mg/L	1 mg/L	85.6	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	10 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	0.2 mg/L	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.181 mg/L	0.2 mg/L	90.4	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.358 mg/L	0.4 mg/L	89.6	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	96.5 mg/L	100 mg/L	96.5	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	ND mg/L	40 mg/L	ND	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.180 mg/L	0.2 mg/L	90.2	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.380 mg/L	0.4 mg/L	95.1	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	95.0 mg/L	100 mg/L	95.0	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.0350 mg/L	0.04 mg/L	87.5	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	20 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.2 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	ND mg/L	200 mg/L	ND	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 712298) - continued										
CG2214807-001	Anonymous	Tellurium, dissolved	13494-80-9	E421	0.369 mg/L	0.4 mg/L	92.2	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.0353 mg/L	0.04 mg/L	88.4	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.189 mg/L	0.2 mg/L	94.4	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.184 mg/L	0.2 mg/L	92.3	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.378 mg/L	0.4 mg/L	94.6	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.185 mg/L	0.2 mg/L	92.7	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.0359 mg/L	0.04 mg/L	89.8	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.931 mg/L	1 mg/L	93.1	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.393 mg/L	0.4 mg/L	98.3	70.0	130	----
Dissolved Metals (QCLot: 715134)										
FJ2202978-002	W1-DEEP	Mercury, dissolved	7439-97-6	E509-L	5.35 ng/L	5 ng/L	107	70.0	130	----
Speciated Metals (QCLot: 728312)										
FJ2202978-001	W1-SHALLOW	Methylmercury (as MeHg), total	22967-92-6	E536	0.00178 µg/L	0.0025 µg/L	71.1	60.0	140	----
Speciated Metals (QCLot: 730526)										
FJ2202949-002	Anonymous	Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00417 µg/L	0.0025 µg/L	83.5	60.0	140	----
Speciated Metals (QCLot: 733968)										
FJ2202994-003	Anonymous	Methylmercury (as MeHg), total	22967-92-6	E536	0.00175 µg/L	0.0025 µg/L	70.0	60.0	140	----
Speciated Metals (QCLot: 747329)										
VA22C5113-001	Anonymous	Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00176 µg/L	0.0025 µg/L	70.4	60.0	140	----
Speciated Metals (QCLot: 756854)										
FJ2202949-002	Anonymous	Iron, ferrous [Fe II], dissolved	15438-31-0	E541	0.355 mg/L	0.5 mg/L	71.1	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 2022-OCT-MON8/9- Day 1

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Page of

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Sarah Kennedy
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Project Information	
ALS Account # / Quote #:	VA22-ECOF100-004
Job #:	Surface water MON8/9- with metals
PO / AFE:	1200-25.03.02
LSD:	
ALS Lab Work Order # (ALS use only):	

Reports / Recipients	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Merge QC/QC! Reports with COA	☑ YES ☐ NO ☐ N/A
☑ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	skennedy@ecofishresearch.com
Email 2	tkasubuchi@ecofishresearch.com
Email 3	waterqualitylabdata@ecofishresearch.com

Invoice Recipients	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	accountspayable@ecofishresearch.com
Email 2	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Contact: Sean Zhang Sampler: Pat Beaupre

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Alk., Ec, pH, TDS, TSS, Anions, Silicate, diss ortho P, colour, pH (F)	Chlorophyll-a by fluorometry (P)	DOC, Total dissolved P (F/P)	NH3, Total Kjeldahl Nitrogen, Total N, TOC, Total P (P)	IONBALANCE-BC-CL	Total Methyl Hg by GCAFS (0.00000002 mg/L) (F)	Dissolved Methyl Hg by GCAFS (0.00000002 mg/L) (F)	Total Metals by CRC ICPMS, Hardness from Total Ca/Mg	Dissolved Metals by CRC ICPMS, Hardness (F)	Total Mercury in Water CVAFS (Low Level 0.0000005 mg/L) (F)	Dissolved Mercury in Water by CVAFS (Low Level 0.0000005 mg/L) (F)	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	W1-Shallow	19-10-22	7:50	Water	10	R	R	R	R	R	R	R	R	R	R	R			
	W1-Deep	19-10-22	8:30	Water	10	R	R	R	R	R	R	R	R	R	R	R			
	D1-Shallow	19-10-22	10:25	Water	10	R	R	R	R	R	R	R	R	R	R	R			
	D1-Deep	19-10-22	9:55	Water	10	R	R	R	R	R	R	R	R	R	R	R			
	Travel Blank			Water	1		R												

Fort St. John
Work Order Reference
FJ2202978

Telephone : +1 250 261 5517

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	Please send Azimuth a copy of the data in their EDD format:
Are samples for human consumption/ use? ☐ YES ☑ NO	gmann@azimuthgroup.ca imcivor@azimuthgroup.ca
	csuzanne@ecofishresearch.com kganshorn@azimuthgroup.ca

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
10 C							

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by: BM	Date: ~~19 Oct 2022~~ 19 Oct 2022	Time:	Received by:	Date: 10-19-22	Time: 12:29	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Canada Ltd.

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CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202994**	Page	: 1 of 9
Amendment	: **2**		
Client	: **Ecofish Research Ltd**	Laboratory	: ALS Environmental - Fort St. John
Contact	: Sarah Kennedy	Account Manager	: Sean Zhang
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: ----	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-With Metals	Date Samples Received	: 20-Oct-2022 15:28
PO	: 1200-25.03.02	Date Analysis Commenced	: 25-Oct-2022
C-O-C number	: 2022-Oct-Mon8/9-Day3	Issue Date	: 25-Aug-2023 17:58
Sampler	: PB		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Hamideh Moradi	Analyst	Metals, Burnaby, British Columbia
Jayden Piattelli	Analyst	Metals, Burnaby, British Columbia
Kenson Lo		Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Kyle Chang	Lab Assistant	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
µS/cm	microsiemens per centimetre
CU	colour units (1 cu = 1 mg/l pt)
meq/L	milliequivalents per litre
mg/L	milligrams per litre
ng/L	nanograms per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Accreditation

Accreditation	*Description*	*Laboratory*	*Address*
A	CALA ISO/IEC 17025:2017	VA ALS Environmental - Vancouver	8081 Lougheed Highway, Burnaby, BC

Applicable accreditations are indicated in the Method/Lab column as superscripts.

Workorder Comments

Amendment (07/12/2022): This report has been amended and re-released to allow the reporting of additional analytical data.

Amendment (25/8/2023): This report has been amended following holding time evaluation corrections. All analysis results are as per the previous report.

Qualifiers

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	PD2-A	PD2-B	PD5	PD3	Travel Blank
						Client sampling date / time	20-Oct-2022 13:15	20-Oct-2022 13:15	20-Oct-2022 07:45	20-Oct-2022 11:40	20-Oct-2022 00:00
							FJ2202994-001	FJ2202994-002	FJ2202994-003	FJ2202994-004	FJ2202994-005
							Result	Result	Result	Result	Result
Sample Preparation											
Dissolved Fe2 filtration location	----	EP541/VA		-	-		Field	Field	Field	Field	----
Physical Tests											
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	A	1.0	mg/L		77.2	77.3	79.2	78.5	<1.0
Alkalinity, carbonate (as CaCO3)	----	E290/VA	A	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	A	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, total (as CaCO3)	----	E290/VA	A	1.0	mg/L		77.2	77.3	79.2	78.5	<1.0
Colour, true	----	E329/VA	A	5.0	CU		6.3	6.3	7.1	6.0	<5.0
Conductivity	----	E100/VA	A	2.0	µS/cm		178	179	186	184	<2.0
Hardness (as CaCO3), dissolved	----	EC100/VA		0.50	mg/L		86.2	86.9	90.5	88.3	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA		0.50	mg/L		91.6	90.6	94.3	93.9	<0.50
pH	----	E108/VA	A	0.10	pH units		8.18	8.20	8.20	8.21	5.44
Solids, total dissolved [TDS]	----	E162/VA	A	10	mg/L		111	112	112	108	<10
Solids, total suspended [TSS]	----	E160/VA	A	3.0	mg/L		10.2	12.6	13.4	10.6	<3.0
Anions and Nutrients											
Ammonia, total (as N)	7664-41-7	E298/VA	A	0.0050	mg/L		<0.0050	<0.0050	0.0103	0.0075	<0.0050
Chloride	16887-00-6	E235.Cl/VA	A	0.50	mg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	16984-48-8	E235.F/VA	A	0.020	mg/L		0.038	0.037	0.038	0.037	<0.020
Kjeldahl nitrogen, total [TKN]	----	EC318/VA		0.050	mg/L		0.114	0.110	0.136	0.100	<0.050
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	A	0.0050	mg/L		0.0610	0.0594	0.0556	0.0547	<0.0050
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	A	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrogen, total	7727-37-9	E366/VA	A	0.030	mg/L		0.175	0.169	0.192	0.155	<0.030
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/VA	A	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus, total	7723-14-0	E372-U/VA	A	0.0020	mg/L		0.0156	0.0212	0.0188	0.0238	<0.0020
Phosphorus, total dissolved	7723-14-0	E375-T/VA	A	0.0020	mg/L		<0.0020	<0.0020	<0.0020	<0.0020	----
Silicate (as SiO2)	7631-86-9	E392/VA	A	0.50	mg/L		4.18	4.15	4.07	4.09	<0.50
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	A	0.30	mg/L		13.0	12.9	13.4	13.0	<0.30
Nitrate + Nitrite (as N)	----	EC235.N+N/VA		0.0032	mg/L		0.0610	0.0594	0.0556	0.0547	<0.0051

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	PD2-A	PD2-B	PD5	PD3	Travel Blank
						Client sampling date / time	20-Oct-2022 13:15	20-Oct-2022 13:15	20-Oct-2022 07:45	20-Oct-2022 11:40	20-Oct-2022 00:00
							FJ2202994-001	FJ2202994-002	FJ2202994-003	FJ2202994-004	FJ2202994-005
							Result	Result	Result	Result	Result
Organic / Inorganic Carbon											
Carbon, dissolved organic [DOC]	----	E358-L/VA	A	0.50	mg/L		3.06	2.86	3.53	2.93	----
Carbon, total organic [TOC]	----	E355-L/VA	A	0.50	mg/L		3.01	3.11	3.66	3.24	<0.50
Ion Balance											
Anion sum	----	EC101/VA		0.10	meq/L		1.82	1.82	1.87	1.84	----
Anion sum	----	EC101A/VA		0.10	meq/L		----	----	----	----	<0.10
Cation sum (total)	----	EC101A/VA		0.10	meq/L		----	----	----	----	<0.10
Cation sum	----	EC101/VA		0.10	meq/L		1.78	1.79	1.88	1.82	----
Ion balance (APHA)	----	EC101A/VA		0.010	%		----	----	----	----	<0.010
Ion balance (APHA)	----	EC101/VA		0.01	%		1.11	0.83	0.27	0.55	----
Total Metals											
Aluminum, total	7429-90-5	E420/VA	A	0.0030	mg/L		0.155	0.146	0.194	0.138	<0.0030
Antimony, total	7440-36-0	E420/VA	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, total	7440-38-2	E420/VA	A	0.00010	mg/L		0.00032	0.00032	0.00036	0.00026	<0.00010
Barium, total	7440-39-3	E420/VA	A	0.00010	mg/L		0.0368	0.0364	0.0414	0.0370	<0.00010
Beryllium, total	7440-41-7	E420/VA	A	0.000020	mg/L		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, total	7440-69-9	E420/VA	A	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, total	7440-42-8	E420/VA	A	0.010	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium, total	7440-43-9	E420/VA	A	0.0000050	mg/L		0.0000239	0.0000239	0.0000257	0.0000188	<0.0000050
Calcium, total	7440-70-2	E420/VA	A	0.050	mg/L		26.5	26.2	27.3	27.2	<0.050
Cesium, total	7440-46-2	E420/VA	A	0.000010	mg/L		0.000038	0.000042	0.000053	0.000034	<0.000010
Chromium, total	7440-47-3	E420/VA	A	0.00050	mg/L		0.00051	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, total	7440-48-4	E420/VA	A	0.00010	mg/L		0.00012	0.00012	0.00017	0.00011	<0.00010
Copper, total	7440-50-8	E420/VA	A	0.00050	mg/L		0.00094	0.00098	0.00102	0.00091	<0.00050
Iron, total	7439-89-6	E420/VA	A	0.010	mg/L		0.256	0.271	0.353	0.228	<0.010
Lead, total	7439-92-1	E420/VA	A	0.000050	mg/L		0.000140	0.000150	0.000197	0.000123	<0.000050
Lithium, total	7439-93-2	E420/VA	A	0.0010	mg/L		0.0014	0.0014	0.0016	0.0015	<0.0010
Magnesium, total	7439-95-4	E420/VA	A	0.0050	mg/L		6.18	6.11	6.34	6.32	<0.0050
Manganese, total	7439-96-5	E420/VA	A	0.00010	mg/L		0.00710	0.00726	0.00915	0.00676	<0.00010
Mercury, total	7439-97-6	E508-L/VA	A	0.50	ng/L		<0.50	<0.50	0.56	<0.50	<0.50
Molybdenum, total	7439-98-7	E420/VA	A	0.000050	mg/L		0.000825	0.000830	0.000858	0.000864	<0.000050

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	PD2-A	PD2-B	PD5	PD3	Travel Blank
						Client sampling date / time	20-Oct-2022 13:15	20-Oct-2022 13:15	20-Oct-2022 07:45	20-Oct-2022 11:40	20-Oct-2022 00:00
							FJ2202994-001	FJ2202994-002	FJ2202994-003	FJ2202994-004	FJ2202994-005
							Result	Result	Result	Result	Result
Total Metals											
Nickel, total	7440-02-0	E420/VA	A	0.00050	mg/L		0.00101	0.00105	0.00108	0.00093	<0.00050
Phosphorus, total	7723-14-0	E420/VA	A	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, total	7440-09-7	E420/VA	A	0.050	mg/L		0.477	0.487	0.499	0.466	<0.050
Rubidium, total	7440-17-7	E420/VA	A	0.00020	mg/L		0.00072	0.00067	0.00082	0.00066	<0.00020
Selenium, total	7782-49-2	E420/VA	A	0.000050	mg/L		0.000307	0.000286	0.000264	0.000252	<0.000050
Silicon, total	7440-21-3	E420/VA	A	0.10	mg/L		2.09	2.13	2.30	2.05	<0.10
Silver, total	7440-22-4	E420/VA	A	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, total	7440-23-5	E420/VA	A	0.050	mg/L		1.08	1.07	1.29	1.14	<0.050
Strontium, total	7440-24-6	E420/VA	A	0.00020	mg/L		0.104	0.105	0.114	0.105	<0.00020
Sulfur, total	7704-34-9	E420/VA	A	0.50	mg/L		3.86	4.23	4.70	4.45	<0.50
Tellurium, total	13494-80-9	E420/VA	A	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium, total	7440-28-0	E420/VA	A	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium, total	7440-29-1	E420/VA	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin, total	7440-31-5	E420/VA	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, total	7440-32-6	E420/VA	A	0.00030	mg/L		0.00293	0.00225	<0.00360 DLM	<0.00300 DLM	<0.00030
Tungsten, total	7440-33-7	E420/VA	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium, total	7440-61-1	E420/VA	A	0.000010	mg/L		0.000458	0.000474	0.000478	0.000483	<0.000010
Vanadium, total	7440-62-2	E420/VA	A	0.00050	mg/L		0.00089	0.00089	0.00108	0.00078	<0.00050
Zinc, total	7440-66-6	E420/VA	A	0.0030	mg/L		<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium, total	7440-67-7	E420/VA	A	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Metals											
Aluminum, dissolved	7429-90-5	E421/VA	A	0.0010	mg/L		0.0042	0.0075	0.0043	0.0058	----
Antimony, dissolved	7440-36-0	E421/VA	A	0.00010	mg/L		0.00013	0.00011	<0.00010	<0.00010	----
Arsenic, dissolved	7440-38-2	E421/VA	A	0.00010	mg/L		0.00018	0.00020	0.00020	0.00018	----
Barium, dissolved	7440-39-3	E421/VA	A	0.00010	mg/L		0.0323	0.0312	0.0366	0.0321	----
Beryllium, dissolved	7440-41-7	E421/VA	A	0.000020	mg/L		<0.000020	<0.000020	<0.000020	<0.000020	----
Bismuth, dissolved	7440-69-9	E421/VA	A	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	----
Boron, dissolved	7440-42-8	E421/VA	A	0.010	mg/L		<0.010	<0.010	<0.010	<0.010	----
Cadmium, dissolved	7440-43-9	E421/VA	A	0.0000050	mg/L		0.0000076	0.0000068	0.0000057	0.0000061	----
Calcium, dissolved	7440-70-2	E421/VA	A	0.050	mg/L		25.3	25.7	25.9	25.9	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	PD2-A	PD2-B	PD5	PD3	Travel Blank
						Client sampling date / time	20-Oct-2022 13:15	20-Oct-2022 13:15	20-Oct-2022 07:45	20-Oct-2022 11:40	20-Oct-2022 00:00
							FJ2202994-001	FJ2202994-002	FJ2202994-003	FJ2202994-004	FJ2202994-005
							Result	Result	Result	Result	Result
Dissolved Metals											
Cesium, dissolved	7440-46-2	E421/VA	A	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
Chromium, dissolved	7440-47-3	E421/VA	A	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	----
Cobalt, dissolved	7440-48-4	E421/VA	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Copper, dissolved	7440-50-8	E421/VA	A	0.00020	mg/L		0.00058	0.00061	0.00061	0.00058	----
Iron, dissolved	7439-89-6	E421/VA	A	0.010	mg/L		<0.010	<0.010	<0.010	<0.010	----
Lead, dissolved	7439-92-1	E421/VA	A	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	----
Lithium, dissolved	7439-93-2	E421/VA	A	0.0010	mg/L		0.0012	0.0012	0.0013	0.0013	----
Magnesium, dissolved	7439-95-4	E421/VA	A	0.0050	mg/L		5.58	5.53	6.28	5.73	----
Manganese, dissolved	7439-96-5	E421/VA	A	0.00010	mg/L		0.00075	0.00091	0.00067	0.00067	----
Mercury, dissolved	7439-97-6	E509-L/VA	A	0.50	ng/L		<0.50	<0.50	<0.50	<0.50	----
Molybdenum, dissolved	7439-98-7	E421/VA	A	0.000050	mg/L		0.000792	0.000761	0.000778	0.000799	----
Nickel, dissolved	7440-02-0	E421/VA	A	0.00050	mg/L		0.00058	0.00059	0.00065	0.00059	----
Phosphorus, dissolved	7723-14-0	E421/VA	A	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	----
Potassium, dissolved	7440-09-7	E421/VA	A	0.050	mg/L		0.431	0.421	0.440	0.422	----
Rubidium, dissolved	7440-17-7	E421/VA	A	0.00020	mg/L		0.00026	0.00030	0.00024	0.00028	----
Selenium, dissolved	7782-49-2	E421/VA	A	0.000050	mg/L		0.000256	0.000251	0.000253	0.000247	----
Silicon, dissolved	7440-21-3	E421/VA	A	0.050	mg/L		1.87	1.87	1.90	1.88	----
Silver, dissolved	7440-22-4	E421/VA	A	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
Sodium, dissolved	7440-23-5	E421/VA	A	0.050	mg/L		1.07	1.06	1.32	1.14	----
Strontium, dissolved	7440-24-6	E421/VA	A	0.00020	mg/L		0.103	0.104	0.105	0.106	----
Sulfur, dissolved	7704-34-9	E421/VA	A	0.50	mg/L		4.46	4.53	4.62	4.69	----
Tellurium, dissolved	13494-80-9	E421/VA	A	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	----
Thallium, dissolved	7440-28-0	E421/VA	A	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
Thorium, dissolved	7440-29-1	E421/VA	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Tin, dissolved	7440-31-5	E421/VA	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Titanium, dissolved	7440-32-6	E421/VA	A	0.00030	mg/L		<0.00030	<0.00030	<0.00030	<0.00030	----
Tungsten, dissolved	7440-33-7	E421/VA	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Uranium, dissolved	7440-61-1	E421/VA	A	0.000010	mg/L		0.000422	0.000427	0.000390	0.000441	----
Vanadium, dissolved	7440-62-2	E421/VA	A	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	----
Zinc, dissolved	7440-66-6	E421/VA	A	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	PD2-A	PD2-B	PD5	PD3	Travel Blank
						Client sampling date / time	20-Oct-2022 13:15	20-Oct-2022 13:15	20-Oct-2022 07:45	20-Oct-2022 11:40	20-Oct-2022 00:00
							FJ2202994-001	FJ2202994-002	FJ2202994-003	FJ2202994-004	FJ2202994-005
							Result	Result	Result	Result	Result
Dissolved Metals											
Zirconium, dissolved	7440-67-7	E421/VA	A	0.00030	mg/L		<0.00030	<0.00030	<0.00030	<0.00030	----
Dissolved MeHg filtration location	----	EP537/VA		-	-		Field	Field	Field	Field	----
Dissolved mercury filtration location	----	EP509-L/VA		-	-		Field	Field	Field	Field	----
Dissolved metals filtration location	----	EP421/VA		-	-		Field	Field	Field	Field	----
Speciated Metals											
Methylmercury (as MeHg), total	22967-92-6	E536/VA	A	0.000000020	mg/L		<0.000000020	0.000000023	0.000000148	0.000000065	<0.000000020
Iron, ferrous [Fe II], dissolved	15438-31-0	E541/VA	A	0.020	mg/L		<0.020	<0.020	<0.020	<0.020	----
Methylmercury (as MeHg), dissolved	22967-92-6	E537/VA	A	0.000000020	mg/L		<0.000000020	<0.000000020	<0.000000020	<0.000000020	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202994**	Page	: 1 of 25
Amendment	: **2**		
Client	: **Ecofish Research Ltd**	Laboratory	: ALS Environmental - Fort St. John
Contact	: Sarah Kennedy	Account Manager	: Sean Zhang
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-With Metals	Date Samples Received	: 20-Oct-2022 15:28
PO	: 1200-25.03.02	Issue Date	: 25-Aug-2023 17:58
C-O-C number	: 2022-Oct-Mon8/9-Day3		
Sampler	: PB		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PD2-A	E298	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PD2-B	E298	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PD3	E298	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PD5	E298	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (lab preserved) Travel Blank	E298	20-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	25-Oct-2022	28 days	0 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PD2-A	E235.Cl	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PD2-B	E235.Cl	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE PD3	E235.Cl	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PD5	E235.Cl	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Travel Blank	E235.Cl	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PD2-A	E378-U	20-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	25-Oct-2022	3 days	5 days	× EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PD2-B	E378-U	20-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	25-Oct-2022	3 days	5 days	× EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PD3	E378-U	20-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	25-Oct-2022	3 days	5 days	× EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PD5	E378-U	20-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	25-Oct-2022	3 days	5 days	× EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE Travel Blank	E378-U	20-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	25-Oct-2022	3 days	5 days	× EHT

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE PD2-A	E235.F	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PD2-B	E235.F	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PD3	E235.F	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PD5	E235.F	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Travel Blank	E235.F	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PD2-A	E235.NO3-L	20-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	25-Oct-2022	3 days	5 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PD2-B	E235.NO3-L	20-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	25-Oct-2022	3 days	5 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PD3	E235.NO3-L	20-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	25-Oct-2022	3 days	5 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PD5	E235.NO3-L	20-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	25-Oct-2022	3 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
Travel Blank	E235.NO3-L	20-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	25-Oct-2022	3 days	5 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
PD2-A	E235.NO2-L	20-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	25-Oct-2022	3 days	5 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
PD2-B	E235.NO2-L	20-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	25-Oct-2022	3 days	5 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
PD3	E235.NO2-L	20-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	25-Oct-2022	3 days	5 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
PD5	E235.NO2-L	20-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	25-Oct-2022	3 days	5 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
Travel Blank	E235.NO2-L	20-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	25-Oct-2022	3 days	5 days	× EHT
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE										
PD2-A	E392	20-Oct-2022	----	----	----		26-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE										
PD2-B	E392	20-Oct-2022	----	----	----		26-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE										
PD3	E392	20-Oct-2022	----	----	----		26-Oct-2022	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PD5	E392	20-Oct-2022	----	----	----		26-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE Travel Blank	E392	20-Oct-2022	----	----	----		26-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PD2-A	E235.SO4	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PD2-B	E235.SO4	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PD3	E235.SO4	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PD5	E235.SO4	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Travel Blank	E235.SO4	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PD2-A	E375-T	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	26-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PD2-B	E375-T	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	26-Oct-2022	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PD3	E375-T	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	26-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PD5	E375-T	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	26-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) PD2-A	E366	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	26-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) PD2-B	E366	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	26-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) PD3	E366	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	26-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) PD5	E366	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	26-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (lab preserved) Travel Blank	E366	20-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	26-Oct-2022	28 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PD2-A	E372-U	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	26-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PD2-B	E372-U	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	26-Oct-2022	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PD3	E372-U	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	26-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PD5	E372-U	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	26-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (lab preserved) Travel Blank	E372-U	20-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	26-Oct-2022	28 days	1 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) PD2-A	E509-L	20-Oct-2022	26-Oct-2022	28 days	6 days	✓	26-Oct-2022	28 days	6 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) PD2-B	E509-L	20-Oct-2022	26-Oct-2022	28 days	6 days	✓	26-Oct-2022	28 days	6 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) PD3	E509-L	20-Oct-2022	26-Oct-2022	28 days	6 days	✓	26-Oct-2022	28 days	6 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) PD5	E509-L	20-Oct-2022	26-Oct-2022	28 days	6 days	✓	26-Oct-2022	28 days	6 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) PD2-A	E421	20-Oct-2022	25-Oct-2022	180 days	5 days	✓	25-Oct-2022	180 days	5 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) PD2-B	E421	20-Oct-2022	25-Oct-2022	180 days	5 days	✓	25-Oct-2022	180 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) PD3	E421	20-Oct-2022	25-Oct-2022	180 days	5 days	✓	25-Oct-2022	180 days	5 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) PD5	E421	20-Oct-2022	25-Oct-2022	180 days	5 days	✓	25-Oct-2022	180 days	6 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PD2-A	E358-L	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PD2-B	E358-L	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PD3	E358-L	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PD5	E358-L	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PD2-A	E355-L	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PD2-B	E355-L	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PD3	E355-L	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PD5	E355-L	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (lab preserved) Travel Blank	E355-L	20-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	25-Oct-2022	28 days	0 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PD2-A	E290	20-Oct-2022	25-Oct-2022	14 days	5 days	✓	25-Oct-2022	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PD2-B	E290	20-Oct-2022	25-Oct-2022	14 days	5 days	✓	25-Oct-2022	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PD3	E290	20-Oct-2022	25-Oct-2022	14 days	5 days	✓	25-Oct-2022	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PD5	E290	20-Oct-2022	25-Oct-2022	14 days	5 days	✓	25-Oct-2022	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Travel Blank	E290	20-Oct-2022	25-Oct-2022	14 days	5 days	✓	25-Oct-2022	14 days	5 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PD2-A	E329	20-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	25-Oct-2022	3 days	5 days	× EHT
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PD2-B	E329	20-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	25-Oct-2022	3 days	5 days	× EHT

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PD3	E329	20-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	25-Oct-2022	3 days	5 days	× EHT
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PD5	E329	20-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	25-Oct-2022	3 days	5 days	× EHT
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE Travel Blank	E329	20-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	25-Oct-2022	3 days	5 days	× EHT
Physical Tests : Conductivity in Water										
HDPE PD2-A	E100	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE PD2-B	E100	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE PD3	E100	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE PD5	E100	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE Travel Blank	E100	20-Oct-2022	25-Oct-2022	28 days	5 days	✓	25-Oct-2022	28 days	5 days	✓
Physical Tests : pH by Meter										
HDPE PD2-A	E108	20-Oct-2022	25-Oct-2022	0.25 hrs	112 hrs	× EHTR-FM	25-Oct-2022	0.25 hrs	124 hrs	× EHTR-FM

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE PD2-B	E108	20-Oct-2022	25-Oct-2022	0.25 hrs	112 hrs	× EHTR-FM	25-Oct-2022	0.25 hrs	124 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Travel Blank	E108	20-Oct-2022	25-Oct-2022	0.25 hrs	112 hrs	× EHTR-FM	25-Oct-2022	0.25 hrs	124 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PD3	E108	20-Oct-2022	25-Oct-2022	0.25 hrs	114 hrs	× EHTR-FM	25-Oct-2022	0.25 hrs	125 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PD5	E108	20-Oct-2022	25-Oct-2022	0.25 hrs	118 hrs	× EHTR-FM	25-Oct-2022	0.25 hrs	129 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE PD2-A	E162	20-Oct-2022	----	----	----		25-Oct-2022	7 days	5 days	✓
Physical Tests : TDS by Gravimetry										
HDPE PD2-B	E162	20-Oct-2022	----	----	----		25-Oct-2022	7 days	5 days	✓
Physical Tests : TDS by Gravimetry										
HDPE PD3	E162	20-Oct-2022	----	----	----		25-Oct-2022	7 days	5 days	✓
Physical Tests : TDS by Gravimetry										
HDPE PD5	E162	20-Oct-2022	----	----	----		25-Oct-2022	7 days	5 days	✓
Physical Tests : TDS by Gravimetry										
HDPE Travel Blank	E162	20-Oct-2022	----	----	----		25-Oct-2022	7 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TSS by Gravimetry										
HDPE PD2-A	E160	20-Oct-2022	----	----	----		25-Oct-2022	7 days	5 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PD2-B	E160	20-Oct-2022	----	----	----		25-Oct-2022	7 days	5 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PD3	E160	20-Oct-2022	----	----	----		25-Oct-2022	7 days	5 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PD5	E160	20-Oct-2022	----	----	----		25-Oct-2022	7 days	5 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Travel Blank	E160	20-Oct-2022	----	----	----		25-Oct-2022	7 days	5 days	✓
Speciated Metals : Dissolved Ferrous Iron in Water by Colour										
Amber glass dissolved (hydrochloric acid) PD2-A	E541	20-Oct-2022	24-Nov-2022	7 days	35 days	× EHT	24-Nov-2022	7 days	35 days	× EHT
Speciated Metals : Dissolved Ferrous Iron in Water by Colour										
Amber glass dissolved (hydrochloric acid) PD2-B	E541	20-Oct-2022	24-Nov-2022	7 days	35 days	× EHT	24-Nov-2022	7 days	35 days	× EHT
Speciated Metals : Dissolved Ferrous Iron in Water by Colour										
Amber glass dissolved (hydrochloric acid) PD3	E541	20-Oct-2022	24-Nov-2022	7 days	35 days	× EHT	24-Nov-2022	7 days	35 days	× EHT
Speciated Metals : Dissolved Ferrous Iron in Water by Colour										
Amber glass dissolved (hydrochloric acid) PD5	E541	20-Oct-2022	24-Nov-2022	7 days	35 days	× EHT	24-Nov-2022	7 days	35 days	× EHT

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PD2-A	E537	20-Oct-2022	07-Nov-2022	180 days	18 days	✓	11-Nov-2022	180 days	4 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PD2-B	E537	20-Oct-2022	07-Nov-2022	180 days	18 days	✓	11-Nov-2022	180 days	4 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PD3	E537	20-Oct-2022	07-Nov-2022	180 days	18 days	✓	11-Nov-2022	180 days	4 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PD5	E537	20-Oct-2022	07-Nov-2022	180 days	18 days	✓	11-Nov-2022	180 days	4 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) PD2-A	E536	20-Oct-2022	05-Nov-2022	180 days	16 days	✓	07-Nov-2022	180 days	18 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) PD2-B	E536	20-Oct-2022	05-Nov-2022	180 days	16 days	✓	07-Nov-2022	180 days	18 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) PD3	E536	20-Oct-2022	05-Nov-2022	180 days	16 days	✓	07-Nov-2022	180 days	18 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) PD5	E536	20-Oct-2022	05-Nov-2022	180 days	16 days	✓	07-Nov-2022	180 days	18 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) Travel Blank	E536	20-Oct-2022	05-Nov-2022	180 days	16 days	✓	07-Nov-2022	180 days	18 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) PD2-A	E508-L	20-Oct-2022	27-Oct-2022	28 days	7 days	✓	27-Oct-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) PD2-B	E508-L	20-Oct-2022	27-Oct-2022	28 days	7 days	✓	27-Oct-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) PD3	E508-L	20-Oct-2022	27-Oct-2022	28 days	7 days	✓	27-Oct-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) PD5	E508-L	20-Oct-2022	27-Oct-2022	28 days	7 days	✓	27-Oct-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) Travel Blank	E508-L	20-Oct-2022	27-Oct-2022	28 days	7 days	✓	27-Oct-2022	28 days	0 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) PD2-A	E420	20-Oct-2022	25-Oct-2022	180 days	5 days	✓	26-Oct-2022	180 days	6 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) PD2-B	E420	20-Oct-2022	25-Oct-2022	180 days	5 days	✓	26-Oct-2022	180 days	6 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) PD3	E420	20-Oct-2022	25-Oct-2022	180 days	5 days	✓	26-Oct-2022	180 days	6 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) PD5	E420	20-Oct-2022	25-Oct-2022	180 days	5 days	✓	26-Oct-2022	180 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
Travel Blank	E420	20-Oct-2022	25-Oct-2022	180 days	5 days	✓	26-Oct-2022	180 days	6 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✗ = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	712518	1	18	5.5	5.0	✓
Ammonia by Fluorescence	E298	712921	2	37	5.4	5.0	✓
Chloride in Water by IC	E235.Cl	712522	1	20	5.0	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	712528	1	8	12.5	5.0	✓
Conductivity in Water	E100	712519	1	18	5.5	5.0	✓
Dissolved Ferrous Iron in Water by Colour	E541	756854	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	715134	1	8	12.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	712946	1	20	5.0	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	733465	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	712916	1	19	5.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	712527	1	9	11.1	5.0	✓
Fluoride in Water by IC	E235.F	712521	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	712523	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	712524	1	20	5.0	5.0	✓
pH by Meter	E108	712517	1	20	5.0	5.0	✓
Reactive Silica by Colourimetry	E392	716357	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	712525	1	18	5.5	5.0	✓
TDS by Gravimetry	E162	714302	1	19	5.2	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	712920	1	19	5.2	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	717310	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	712956	1	20	5.0	5.0	✓
Total Methylmercury in Water by GCAFS	E536	730278	2	42	4.7	5.0	✗
Total Nitrogen by Colourimetry	E366	712918	2	31	6.4	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	712917	2	27	7.4	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	712919	2	37	5.4	5.0	✓
TSS by Gravimetry	E160	714283	1	19	5.2	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	712518	1	18	5.5	5.0	✓
Ammonia by Fluorescence	E298	712921	2	37	5.4	5.0	✓
Chloride in Water by IC	E235.Cl	712522	1	20	5.0	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	712528	1	8	12.5	5.0	✓
Conductivity in Water	E100	712519	1	18	5.5	5.0	✓
Dissolved Ferrous Iron in Water by Colour	E541	756854	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	715134	1	8	12.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	712946	1	20	5.0	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	733465	1	20	5.0	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	712916	1	19	5.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	712527	1	9	11.1	5.0	✓
Fluoride in Water by IC	E235.F	712521	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	712523	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	712524	1	20	5.0	5.0	✓
pH by Meter	E108	712517	1	20	5.0	5.0	✓
Reactive Silica by Colourimetry	E392	716357	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	712525	1	18	5.5	5.0	✓
TDS by Gravimetry	E162	714302	1	19	5.2	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	712920	1	19	5.2	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	717310	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	712956	1	20	5.0	5.0	✓
Total Methylmercury in Water by GCAFS	E536	730278	3	42	7.1	5.0	✓
Total Nitrogen by Colourimetry	E366	712918	2	31	6.4	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	712917	2	27	7.4	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	712919	2	37	5.4	5.0	✓
TSS by Gravimetry	E160	714283	1	19	5.2	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	712518	1	18	5.5	5.0	✓
Ammonia by Fluorescence	E298	712921	2	37	5.4	5.0	✓
Chloride in Water by IC	E235.Cl	712522	1	20	5.0	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	712528	1	8	12.5	5.0	✓
Conductivity in Water	E100	712519	1	18	5.5	5.0	✓
Dissolved Ferrous Iron in Water by Colour	E541	756854	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	715134	1	8	12.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	712946	1	20	5.0	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	733465	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	712916	1	19	5.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	712527	1	9	11.1	5.0	✓
Fluoride in Water by IC	E235.F	712521	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	712523	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	712524	1	20	5.0	5.0	✓
Reactive Silica by Colourimetry	E392	716357	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	712525	1	18	5.5	5.0	✓
TDS by Gravimetry	E162	714302	1	19	5.2	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	712920	1	19	5.2	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	717310	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	712956	1	20	5.0	5.0	✓
Total Methylmercury in Water by GCAFS	E536	730278	3	42	7.1	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Total Nitrogen by Colourimetry	E366	712918	2	31	6.4	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	712917	2	27	7.4	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	712919	2	37	5.4	5.0	✓
TSS by Gravimetry	E160	714283	1	19	5.2	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	712921	2	37	5.4	5.0	✓
Chloride in Water by IC	E235.Cl	712522	1	20	5.0	5.0	✓
Dissolved Ferrous Iron in Water by Colour	E541	756854	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	715134	1	8	12.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	712946	1	20	5.0	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	733465	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	712916	1	19	5.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	712527	1	9	11.1	5.0	✓
Fluoride in Water by IC	E235.F	712521	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	712523	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	712524	1	20	5.0	5.0	✓
Reactive Silica by Colourimetry	E392	716357	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	712525	1	18	5.5	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	712920	1	19	5.2	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	717310	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	712956	1	20	5.0	5.0	✓
Total Methylmercury in Water by GCAFS	E536	730278	2	42	4.7	5.0	×
Total Nitrogen by Colourimetry	E366	712918	2	31	6.4	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	712917	2	27	7.4	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	712919	2	37	5.4	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Vancouver	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Vancouver	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	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.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Colour (True) by Spectrometer (5 CU)	E329 ALS Environmental - Vancouver	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366 ALS Environmental - Vancouver	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Vancouver	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Reactive Silica by Colourimetry	E392 ALS Environmental - Vancouver	Water	APHA 4500-SiO2 E (mod)	Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method using a discrete analyzer. Method Limitation: Arsenic (5+) above 100 mg/L is a negative interference on this test
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Vancouver	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L ALS Environmental - Vancouver	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAFS.
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L ALS Environmental - Vancouver	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAFS.
Total Methylmercury in Water by GCAFS	E536 ALS Environmental - Vancouver	Water	EPA 1630 (mod)	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Methylmercury in Water by GCAFS	E537 ALS Environmental - Vancouver	Water	EPA 1630 (mod)	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Ferrous Iron in Water by Colour	E541 ALS Environmental - Vancouver	Water	APHA 3500-Fe B/James Ball et al (1999)	This analysis is carried out using procedures adapted from APHA 3500-Fe B and Environ. Sci. Technol. 1999, 33, 5, 807–813. The procedure involves preliminary sample filtration, and ferrous iron is determined using the "FerroZine" colourimetric method. Holding time is 7 days for 0.45um filtration or 6 months if samples have been filtered using 0.1um filters.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	Water	APHA 2340B	“Hardness (as CaCO3), dissolved” is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. “Total Hardness” refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Ion Balance using Dissolved Metals	EC101 ALS Environmental - Vancouver	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
Ion Balance using Total Metals	EC101A ALS Environmental - Vancouver	Water	APHA 1030E	Cation Sum (using total metals), Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Vancouver	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
Total Kjeldahl Nitrogen (Calculation)	EC318 ALS Environmental - Vancouver	Water	BC MOE LABORATORY MANUAL (2005)	Total Kjeldahl Nitrogen is a calculated parameter. Total Kjeldahl Nitrogen (calc) = Total Nitrogen - [Nitrite (as N) + Nitrate (as N)].

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Preparation for Total Organic Carbon by Combustion	EP355 ALS Environmental - Vancouver	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Nitrogen in water	EP366 ALS Environmental - Vancouver	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for Dissolved Phosphorus in water	EP375 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration (Low Level)	EP509-L ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
Total Methylmercury Water Preparation	EP536 ALS Environmental - Vancouver	Water	EPA 1630	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Methylmercury Water Preparation	EP537 ALS Environmental - Vancouver	Water	EPA 1630	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Ferrous Iron in Water by Colour	EP541 ALS Environmental - Vancouver	Water	APHA 3500-Fe B/James Ball et al (1999)	This analysis is carried out using procedures adapted from APHA 3500-Fe B and "A New Method for the Direct Determination of Dissolved Iron Concentration in Acid Mine Waters" published by James W. Ball et al (1999). The procedure involves preliminary sample filtration, and ferrous iron is determined using the "FerroZine" colourimetric method.

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QUALITY CONTROL REPORT

Work Order	: **FJ2202994**	Page	: 1 of 22
Amendment	: **2**		
Client	: Ecofish Research Ltd	Laboratory	: ALS Environmental - Fort St. John
Contact	: Sarah Kennedy	Account Manager	: Sean Zhang
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	:	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-With Metals	Date Samples Received	: 20-Oct-2022 15:28
PO	: 1200-25.03.02	Date Analysis Commenced	: 25-Oct-2022
C-O-C number	: 2022-Oct-Mon8/9-Day3	Issue Date	: 25-Aug-2023 17:58
Sampler	: PB ----		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
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Tracy Harley	Supervisor - Water Quality Instrumentation	Vancouver Inorganics, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 712517)											
YL2201885-001	Anonymous	pH	----	E108	0.10	pH units	8.17	8.19	0.196%	4%	----
Physical Tests (QC Lot: 712518)											
YL2201885-001	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	118	117	0.581%	20%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	118	117	0.581%	20%	----
Physical Tests (QC Lot: 712519)											
YL2201885-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	7600	7600	0.00%	10%	----
Physical Tests (QC Lot: 712528)											
FJ2202994-001	PD2-A	Colour, true	----	E329	5.0	CU	6.3	6.1	0.2	Diff <2x LOR	----
Physical Tests (QC Lot: 714283)											
FJ2202955-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 714302)											
FJ2202955-001	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	318	305	4.18%	20%	----
Anions and Nutrients (QC Lot: 712521)											
FJ2203002-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.291	0.299	2.81%	20%	----
Anions and Nutrients (QC Lot: 712522)											
FJ2203002-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 712523)											
FJ2203002-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 712524)											
FJ2203002-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 712525)											
FJ2203002-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	3.08	3.00	2.55%	20%	----
Anions and Nutrients (QC Lot: 712527)											
FJ2202994-001	PD2-A	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 712918)											
FJ2202994-001	PD2-A	Nitrogen, total	7727-37-9	E366	0.030	mg/L	0.175	0.149	0.027	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 712919)											
FJ2202994-001	PD2-A	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0156	0.0160	0.0003	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 712920)											
FJ2202994-001	PD2-A	Phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 712921)											
FJ2202994-001	PD2-A	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 713226)											
FJ2202994-005	Travel Blank	Nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	<0.030	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 713227)											
FJ2202994-005	Travel Blank	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 713228)											
FJ2202994-005	Travel Blank	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 716357)											
EO2209213-021	Anonymous	Silicate (as SiO2)	7631-86-9	E392	0.50	mg/L	15.3	15.2	0.638%	20%	----
Organic / Inorganic Carbon (QC Lot: 712916)											
FJ2202994-001	PD2-A	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	3.06	2.94	0.12	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 712917)											
FJ2202994-001	PD2-A	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	3.01	2.99	0.02	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 713225)											
FJ2202994-005	Travel Blank	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Total Metals (QC Lot: 712956)											
FJ2202994-001	PD2-A	Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.155	0.167	7.18%	20%	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00032	0.00032	0.000005	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.0368	0.0384	4.18%	20%	----
		Beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000239	0.0000264	0.0000025	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	26.5	26.6	0.477%	20%	----
		Cesium, total	7440-46-2	E420	0.000010	mg/L	0.000038	0.000039	0.0000010	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	0.00051	<0.00050	0.00001	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00012	0.00014	0.00002	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.00094	0.00096	0.00001	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.010	mg/L	0.256	0.268	4.30%	20%	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	0.000140	0.000139	0.0000008	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	0.0014	0.0014	0.00006	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 712956) - continued											
FJ2202994-001	PD2-A	Magnesium, total	7439-95-4	E420	0.0050	mg/L	6.18	6.10	1.39%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.00710	0.00721	1.55%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000825	0.000892	7.78%	20%	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	0.00101	0.00106	0.00005	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	0.477	0.479	0.002	Diff <2x LOR	----
		Rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00072	0.00072	0.0000004	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000307	0.000268	0.000039	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	2.09	2.18	4.44%	20%	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	1.08	1.08	0.360%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	0.104	0.108	2.88%	20%	----
		Sulfur, total	7704-34-9	E420	0.50	mg/L	3.86	4.02	0.16	Diff <2x LOR	----
		Tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00030	mg/L	0.00293	0.00296	0.00002	Diff <2x LOR	----
		Tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.000458	0.000474	3.61%	20%	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00089	0.00090	0.000004	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Total Metals (QC Lot: 717310)											
CG2214660-001	Anonymous	Mercury, total	7439-97-6	E508-L	0.50	ng/L	<0.00050 µg/L	<0.50	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 712946)											
FJ2202982-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0011	0.0010	0.0001	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00048	0.00048	0.000003	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0168	0.0173	3.31%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.078	0.079	0.0008	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 712946) - continued											
FJ2202982-001	Anonymous	Calcium, dissolved	7440-70-2	E421	0.050	mg/L	110	110	0.509%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000056	0.000054	0.000001	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00024	0.00025	0.000008	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.136	0.138	1.23%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	141	146	3.01%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00010	<0.00010	0.000004	Diff <2x LOR	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00276	0.00268	2.87%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00874	0.00912	4.29%	20%	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.267	0.247	0.020	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	2.96	3.03	2.36%	20%	----
		Rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00203	0.00206	1.31%	20%	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	121 µg/L	0.131	7.86%	20%	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.05	1.07	1.50%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	22.2	22.1	0.720%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.764	0.764	0.0168%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	226	222	1.93%	20%	----
		Tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.000017	0.000018	0.0000004	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	0.00545	0.00560	2.60%	20%	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.0115	0.0114	0.892%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0063	0.0068	0.0005	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 715134)											
FJ2202978-001	Anonymous	Mercury, dissolved	7439-97-6	E509-L	0.50	ng/L	<0.50	<0.50	0	Diff <2x LOR	----
Speciated Metals (QC Lot: 730278)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Speciated Metals (QC Lot: 730278) - continued											
FJ2202994-001	PD2-A	Methylmercury (as MeHg), total	22967-92-6	E536	0.000020	µg/L	<0.000000020 mg/L	<0.000020	0	Diff <2x LOR	----
Speciated Metals (QC Lot: 733465)											
FC2202619-001	Anonymous	Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.000020	µg/L	0.000060	0.000058	0.000002	Diff <2x LOR	----
Speciated Metals (QC Lot: 733968)											
FJ2202978-004	Anonymous	Methylmercury (as MeHg), total	22967-92-6	E536	0.000020	µg/L	<0.000000020 mg/L	<0.000020	0	Diff <2x LOR	----
Speciated Metals (QC Lot: 756854)											
FJ2202949-001	Anonymous	Iron, ferrous [Fe II], dissolved	15438-31-0	E541	0.020	mg/L	0.046	0.046	0.0002	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 712518)						
Alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 712519)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 712528)						
Colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 714283)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 714302)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 712521)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 712522)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 712523)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 712524)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 712525)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 712527)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 712918)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 712919)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 712920)						
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 712921)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 713226)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 713227)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 713228)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 716357)						
Silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 712916)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 712917)						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 713225)						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 712956)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	MBRR
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 712956) - continued						
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Total Metals (QCLot: 717310)						
Mercury, total	7439-97-6	E508-L	0.5	ng/L	<0.50	----
Dissolved Metals (QCLot: 712946)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 712946) - continued						
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 715134)						
Mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	<0.50	----
Speciated Metals (QCLot: 730278)						
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 733465)						
Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 733968)						
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 740379)						
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	<0.000020	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Speciated Metals (QCLot: 756854)						
Iron, ferrous [Fe II], dissolved	15438-31-0	E541	0.02	mg/L	<0.020	----

Qualifiers

Qualifier	Description
MBRR	*Initial MB for this submission had positive results for flagged analyte (data not shown). Low level samples were repeated with new QC (2nd MB results shown). High level results (>5x initial MB level) and non-detect results were reported and are defensible*

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 712517)									
pH	----	E108	----	pH units	7 pH units	99.9	98.0	102	----
Physical Tests (QCLot: 712518)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	100	85.0	115	----
Physical Tests (QCLot: 712519)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.0	90.0	110	----
Physical Tests (QCLot: 712528)									
Colour, true	----	E329	5	CU	100 CU	100	85.0	115	----
Physical Tests (QCLot: 714283)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	90.3	85.0	115	----
Physical Tests (QCLot: 714302)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 712521)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 712522)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 712523)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 712524)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	98.5	90.0	110	----
Anions and Nutrients (QCLot: 712525)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 712527)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	103	80.0	120	----
Anions and Nutrients (QCLot: 712918)									
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 712919)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	89.8	80.0	120	----
Anions and Nutrients (QCLot: 712920)									
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.05 mg/L	89.8	80.0	120	----
Anions and Nutrients (QCLot: 712921)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	103	85.0	115	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 713226)									
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 713227)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	90.0	80.0	120	----
Anions and Nutrients (QCLot: 713228)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	107	85.0	115	----
Anions and Nutrients (QCLot: 716357)									
Silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	10 mg/L	106	85.0	115	----
Organic / Inorganic Carbon (QCLot: 712916)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	108	80.0	120	----
Organic / Inorganic Carbon (QCLot: 712917)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	100	80.0	120	----
Organic / Inorganic Carbon (QCLot: 713225)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	102	80.0	120	----
Total Metals (QCLot: 712956)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	95.5	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	102	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	100.0	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	95.7	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	102	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	100	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	90.9	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	98.2	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	98.8	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	103	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	94.8	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	93.6	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	95.6	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	99.2	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	99.7	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	99.6	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	98.0	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	96.1	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	104	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	94.0	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 712956) - continued									
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	96.2	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	99.2	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	96.4	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	100.0	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	99.5	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	92.9	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	99.4	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	99.8	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	89.9	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	95.6	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	103	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	94.7	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	97.2	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	89.7	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	95.9	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	104	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	96.7	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	91.4	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	97.6	80.0	120	----
Total Metals (QCLot: 717310)									
Mercury, total	7439-97-6	E508-L	0.5	ng/L	5 ng/L	112	80.0	120	----
Dissolved Metals (QCLot: 712946)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	97.6	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	103	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	104	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	101	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	109	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	95.5	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	98.6	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	100	80.0	120	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	106	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	98.0	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	99.8	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	97.0	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Dissolved Metals (QCLot: 712946) - continued									
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	102	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	106	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	104	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	97.9	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	98.0	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	98.8	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	97.1	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	99.4	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	101	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	95.8	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	105	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	102	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	96.6	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	104	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	105	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	105	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	103	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	104	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	97.8	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	96.3	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	97.6	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	100	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	104	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	95.6	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	94.4	80.0	120	----
Mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	5 ng/L	102	80.0	120	----
Speciated Metals (QCLot: 730278)									
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	0.0025 µg/L	81.5	70.0	130	----
Speciated Metals (QCLot: 733465)									
Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	0.0025 µg/L	83.2	70.0	130	----
Speciated Metals (QCLot: 733968)									
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	0.0025 µg/L	79.0	70.0	130	----
Speciated Metals (QCLot: 740379)									
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	0.0025 µg/L	81.8	70.0	130	----
Speciated Metals (QCLot: 756854)									

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Speciated Metals (QCLot: 756854) - continued									
Iron, ferrous [Fe II], dissolved	15438-31-0	E541	0.02	mg/L	0.5 mg/L	103	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 712521)										
FJ2203002-002	Anonymous	Fluoride	16984-48-8	E235.F	1.03 mg/L	1 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 712522)										
FJ2203002-002	Anonymous	Chloride	16887-00-6	E235.Cl	100 mg/L	100 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 712523)										
FJ2203002-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.58 mg/L	2.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 712524)										
FJ2203002-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.490 mg/L	0.5 mg/L	98.1	75.0	125	----
Anions and Nutrients (QCLot: 712525)										
FJ2203002-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	98.1 mg/L	100 mg/L	98.1	75.0	125	----
Anions and Nutrients (QCLot: 712527)										
FJ2202994-002	PD2-B	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0311 mg/L	0.03 mg/L	104	70.0	130	----
Anions and Nutrients (QCLot: 712918)										
FJ2202994-002	PD2-B	Nitrogen, total	7727-37-9	E366	0.384 mg/L	0.4 mg/L	96.1	70.0	130	----
Anions and Nutrients (QCLot: 712919)										
FJ2202994-002	PD2-B	Phosphorus, total	7723-14-0	E372-U	0.0514 mg/L	0.05 mg/L	103	70.0	130	----
Anions and Nutrients (QCLot: 712920)										
FJ2202994-002	PD2-B	Phosphorus, total dissolved	7723-14-0	E375-T	0.0478 mg/L	0.05 mg/L	95.7	70.0	130	----
Anions and Nutrients (QCLot: 712921)										
FJ2202994-002	PD2-B	Ammonia, total (as N)	7664-41-7	E298	0.111 mg/L	0.1 mg/L	111	75.0	125	----
Anions and Nutrients (QCLot: 713226)										
VA22C5507-001	Anonymous	Nitrogen, total	7727-37-9	E366	ND mg/L	2 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 713227)										
VA22C5405-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	0.5 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 713228)										
VA22C5405-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	MS-B
Anions and Nutrients (QCLot: 716357)										
EO2209213-022	Anonymous	Silicate (as SiO2)	7631-86-9	E392	ND mg/L	10 mg/L	ND	75.0	125	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Organic / Inorganic Carbon (QCLot: 712916)										
FJ2202994-002	PD2-B	Carbon, dissolved organic [DOC]	----	E358-L	5.04 mg/L	5 mg/L	101	70.0	130	----
Organic / Inorganic Carbon (QCLot: 712917)										
FJ2202994-002	PD2-B	Carbon, total organic [TOC]	----	E355-L	4.95 mg/L	5 mg/L	99.0	70.0	130	----
Organic / Inorganic Carbon (QCLot: 713225)										
VA22C5405-001	Anonymous	Carbon, total organic [TOC]	----	E355-L	ND mg/L	5 mg/L	ND	70.0	130	----
Total Metals (QCLot: 712956)										
FJ2202994-002	PD2-B	Aluminum, total	7429-90-5	E420	0.185 mg/L	0.2 mg/L	92.6	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0192 mg/L	0.02 mg/L	96.0	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0190 mg/L	0.02 mg/L	95.0	70.0	130	----
		Barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0406 mg/L	0.04 mg/L	102	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.00981 mg/L	0.01 mg/L	98.1	70.0	130	----
		Boron, total	7440-42-8	E420	0.095 mg/L	0.1 mg/L	94.8	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00390 mg/L	0.004 mg/L	97.6	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.0105 mg/L	0.01 mg/L	105	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0374 mg/L	0.04 mg/L	93.4	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0184 mg/L	0.02 mg/L	91.8	70.0	130	----
		Copper, total	7440-50-8	E420	0.0188 mg/L	0.02 mg/L	94.3	70.0	130	----
		Iron, total	7439-89-6	E420	1.84 mg/L	2 mg/L	92.1	70.0	130	----
		Lead, total	7439-92-1	E420	0.0192 mg/L	0.02 mg/L	96.1	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0984 mg/L	0.1 mg/L	98.4	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	0.0188 mg/L	0.02 mg/L	94.0	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0205 mg/L	0.02 mg/L	102	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0373 mg/L	0.04 mg/L	93.2	70.0	130	----
		Phosphorus, total	7723-14-0	E420	9.52 mg/L	10 mg/L	95.2	70.0	130	----
		Potassium, total	7440-09-7	E420	3.84 mg/L	4 mg/L	96.1	70.0	130	----
		Rubidium, total	7440-17-7	E420	0.0197 mg/L	0.02 mg/L	98.6	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0403 mg/L	0.04 mg/L	101	70.0	130	----
		Silicon, total	7440-21-3	E420	9.10 mg/L	10 mg/L	91.0	70.0	130	----
		Silver, total	7440-22-4	E420	0.00415 mg/L	0.004 mg/L	104	70.0	130	----
		Sodium, total	7440-23-5	E420	1.91 mg/L	2 mg/L	95.6	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 712956) - continued										
FJ2202994-002	PD2-B	Sulfur, total	7704-34-9	E420	19.1 mg/L	20 mg/L	95.4	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.0375 mg/L	0.04 mg/L	93.8	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00390 mg/L	0.004 mg/L	97.5	70.0	130	----
		Thorium, total	7440-29-1	E420	0.0223 mg/L	0.02 mg/L	112	70.0	130	----
		Tin, total	7440-31-5	E420	0.0194 mg/L	0.02 mg/L	97.0	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0358 mg/L	0.04 mg/L	89.5	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.0189 mg/L	0.02 mg/L	94.7	70.0	130	----
		Uranium, total	7440-61-1	E420	0.00419 mg/L	0.004 mg/L	105	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.0966 mg/L	0.1 mg/L	96.6	70.0	130	----
		Zinc, total	7440-66-6	E420	0.360 mg/L	0.4 mg/L	90.1	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.0397 mg/L	0.04 mg/L	99.2	70.0	130	----
Total Metals (QCLot: 717310)										
CG2214660-002	Anonymous	Mercury, total	7439-97-6	E508-L	4.87 ng/L	5 ng/L	97.4	70.0	130	----
Dissolved Metals (QCLot: 712946)										
FJ2202982-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.191 mg/L	0.2 mg/L	95.4	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0396 mg/L	0.04 mg/L	99.0	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00897 mg/L	0.01 mg/L	89.7	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.078 mg/L	0.1 mg/L	78.0	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00374 mg/L	0.004 mg/L	93.6	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.0111 mg/L	0.01 mg/L	111	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0379 mg/L	0.04 mg/L	94.7	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0188 mg/L	0.02 mg/L	94.0	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0181 mg/L	0.02 mg/L	90.3	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.90 mg/L	2 mg/L	95.2	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0194 mg/L	0.02 mg/L	97.0	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0203 mg/L	0.02 mg/L	102	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0364 mg/L	0.04 mg/L	91.0	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	10.4 mg/L	10 mg/L	104	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 712946) - continued										
FJ2202982-002	Anonymous	Potassium, dissolved	7440-09-7	E421	3.81 mg/L	4 mg/L	95.2	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.0187 mg/L	0.02 mg/L	93.7	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0450 mg/L	0.04 mg/L	112	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.27 mg/L	10 mg/L	92.7	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00408 mg/L	0.004 mg/L	102	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	ND mg/L	20 mg/L	ND	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.0407 mg/L	0.04 mg/L	102	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00378 mg/L	0.004 mg/L	94.6	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.0215 mg/L	0.02 mg/L	108	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0189 mg/L	0.02 mg/L	94.7	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0387 mg/L	0.04 mg/L	96.8	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.0193 mg/L	0.02 mg/L	96.6	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	ND mg/L	0.004 mg/L	ND	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.358 mg/L	0.4 mg/L	89.4	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0412 mg/L	0.04 mg/L	103	70.0	130	----
Dissolved Metals (QCLot: 715134)										
FJ2202978-002	Anonymous	Mercury, dissolved	7439-97-6	E509-L	5.35 ng/L	5 ng/L	107	70.0	130	----
Speciated Metals (QCLot: 730278)										
FJ2202994-002	PD2-B	Methylmercury (as MeHg), total	22967-92-6	E536	0.00216 µg/L	0.0025 µg/L	86.2	60.0	140	----
Speciated Metals (QCLot: 733465)										
FJ2202994-001	PD2-A	Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00152 µg/L	0.0025 µg/L	61.0	60.0	140	----
Speciated Metals (QCLot: 733968)										
FJ2202994-003	PD5	Methylmercury (as MeHg), total	22967-92-6	E536	0.00175 µg/L	0.0025 µg/L	70.0	60.0	140	----
Speciated Metals (QCLot: 756854)										
FJ2202949-002	Anonymous	Iron, ferrous [Fe II], dissolved	15438-31-0	E541	0.355 mg/L	0.5 mg/L	71.1	70.0	130	----

Qualifiers

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Chain of Custody (COC) / Analytical Request Form

COC Number: 2022-Oct-MON8/9- Day 3

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Page of

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Sarah Kennedy
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Reports / Recipients	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Merge QC/QCI Reports with COA	☑ YES ☐ NO ☐ N/A
☑ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	skennedy@ecofishresearch.com
Email 2	tkasubuchi@ecofishresearch.com
Email 3	waterqualitylabdata@ecofishresearch.com

Invoice Recipients	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	accountspayable@ecofishresearch.com
Email 2	

Project Information	
ALS Account # / Quote #:	VA22-ECOF100-004
Job #:	Surface water MON8/9- with metals
PO / AFE:	1200-25.03.02
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

ALS Lab Work Order # (ALS use only):

ALS Contact: Sean Zhang Sampler: Pat Beaupre

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Alk., Ec, pH, TDS, TSS, Anions, Silicate, diss ortho P, colour, pH	DOC, Total dissolved P	NH3, Total Kjeldahl Nitrogen, Total N, TOC, Total P	IONBALANCE-BC-CL	Total Methyl Hg by GCAFS (0.00000002 mg/L)	Dissolved Methyl Hg by GCAFS (0.00000002 mg/L)	Total Metals by CRC ICPMS, Hardness from Total Ca/Mg	Dissolved Metals by CRC ICPMS, Hardness	Total Mercury in Water CVAFS (Low Level 0.0000005 mg/L)	Dissolved Mercury in Water by CVAFS (Low Level 0.0000005 mg/L)	HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	~~BEA-A~~	~~17 OCT 22~~	~~17:00~~	~~Water~~	~~9~~	R	R	R	R	R	R	R	R	R	R			
	~~BEA-B~~	—	—	~~Water~~	~~9~~	R	R	R	R	R	R	R	R	R	R			
	PD2-A	20 OCT 22	13:05	Water	9	R	R	R	R	R	R	R	R	R	R			
	PD2-B	20 OCT 22	13:05	Water	9	R	R	R	R	R	R	R	R	R	R			
	~~PINE~~	—	—	~~Water~~	~~9~~	R	R	R	R	R	R	R	R	R	R			
	PD5	20 OCT 22	07:45	Water	9	R	R	R	R	R	R	R	R	R	R			
	~~POND~~	~~17 OCT 22~~	~~11:45~~	~~Water~~	~~9~~	R	R	R	R	R	R	R	R	R	R			
	~~BEA~~	~~17 OCT 22~~	~~13:10~~	~~Water~~	~~9~~	R	R	R	R	R	R	R	R	R	R			
	~~KR~~	~~17 OCT 22~~	~~14:55~~	~~Water~~	~~9~~	R	R	R	R	R	R	R	R	R	R			
	PD3	20 OCT 22	11:40	Water	9	R	R	R	R	R	R	R	R	R	R			
	Travel Blank	20 OCT 22	✓	Water	5	R		R	R	R		R		R				

Fort St. John
Work Order Reference
FJ2202994

Telephone : +1 250 261 5517

FJAE Shipping & Receiving
Call Out ___ Expedite
___ Priority
2 # of Coolers ✓ Air
___ # of Carboys ___ Ground

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	Please send Azimuth a copy of the data in their EDD format:
Are samples for human consumption/ use? ☐ YES ☑ NO	gmann@azimuthgroup.ca imcivor@azimuthgroup.ca
	csuzanne@ecofishresearch.com kganshorn@ecofishresearch.com

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
7°C	8.3°C			7.2°C			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by:	Date: 20 OCT 2022	Time:	Received by:	Date: 10-20-22	Time: 3:28	Received by:	Date: Oct 21	Time: 17:25

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

ALS 2020 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2203009**	Page	: 1 of 8
Amendment	: **2**		
Client	: **Ecofish Research Ltd**	Laboratory	: ALS Environmental - Fort St. John
Contact	: Sarah Kennedy	Account Manager	: Sean Zhang
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: ----	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-With Metals	Date Samples Received	: 22-Oct-2022 13:00
PO	: 1200-25.03.02	Date Analysis Commenced	: 25-Oct-2022
C-O-C number	: 2022-Oct-MON8/9-Day 2	Issue Date	: 25-Aug-2023 17:58
Sampler	: PB		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Hamideh Moradi	Analyst	Metals, Burnaby, British Columbia
Jayden Piattelli	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Parnian Sane	Analyst	Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Sukhman Khosa	Lab Assistant	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.
Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
µS/cm	microsiemens per centimetre
CU	colour units (1 cu = 1 mg/l pt)
meq/L	milliequivalents per litre
mg/L	milligrams per litre
ng/L	nanograms per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Accreditation

Accreditation	*Description*	*Laboratory*	*Address*
A	CALA ISO/IEC 17025:2017	VA ALS Environmental - Vancouver	8081 Lougheed Highway, Burnaby, BC

Applicable accreditations are indicated in the Method/Lab column as superscripts.

Workorder Comments

Amendment (07/12/2022): This report has been amended and re-released to allow the reporting of additional analytical data.

Amendment (25/8/2023): This report has been amended following holding time evaluation corrections. All analysis results are as per the previous report.

Qualifiers

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	PC1	PR1	PR2	HD	----
						Client sampling date / time	21-Oct-2022 08:40	21-Oct-2022 08:00	21-Oct-2022 13:45	21-Oct-2022 13:15	----
							FJ2203009-001	FJ2203009-002	FJ2203009-003	FJ2203009-004	--------
							Result	Result	Result	Result	----
Sample Preparation											
Dissolved Fe2 filtration location	----	EP541/VA		-	-		Field	Field	Field	Field	----
Physical Tests											
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	A	1.0	mg/L		71.0	71.4	71.0	178	----
Alkalinity, carbonate (as CaCO3)	----	E290/VA	A	1.0	mg/L		<1.0	<1.0	<1.0	8.8	----
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	A	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	----
Alkalinity, total (as CaCO3)	----	E290/VA	A	1.0	mg/L		71.0	71.4	71.0	186	----
Colour, true	----	E329/VA	A	5.0	CU		6.4	7.0	7.0	<5.0	----
Conductivity	----	E100/VA	A	2.0	µS/cm		174	175	176	470	----
Hardness (as CaCO3), dissolved	----	EC100/VA		0.50	mg/L		81.2	82.3	84.4	214	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA		0.50	mg/L		88.2	88.9	93.2	254	----
pH	----	E108/VA	A	0.10	pH units		8.07	8.09	8.11	8.41	----
Solids, total dissolved [TDS]	----	E162/VA	A	10	mg/L		104	112	100	296	----
Solids, total suspended [TSS]	----	E160/VA	A	3.0	mg/L		<3.0	<3.0	<3.0	6.2	----
Anions and Nutrients											
Ammonia, total (as N)	7664-41-7	E298/VA	A	0.0050	mg/L		0.0060	<0.0050	0.0231	0.0050	----
Chloride	16887-00-6	E235.Cl/VA	A	0.50	mg/L		<0.50	<0.50	<0.50	0.61	----
Fluoride	16984-48-8	E235.F/VA	A	0.020	mg/L		0.037	0.036	0.035	0.099	----
Kjeldahl nitrogen, total [TKN]	----	EC318/VA		0.050	mg/L		0.089	0.089	0.115	0.073	----
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	A	0.0050	mg/L		0.0641	0.0640	0.0596	<0.0050	----
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	A	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	----
Nitrogen, total	7727-37-9	E366/VA	A	0.030	mg/L		0.153	0.153	0.175	0.073	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/VA	A	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	----
Phosphorus, total	7723-14-0	E372-U/VA	A	0.0020	mg/L		0.0042	0.0043	0.0066	0.0116	----
Phosphorus, total dissolved	7723-14-0	E375-T/VA	A	0.0020	mg/L		<0.0020	<0.0020	<0.0020	<0.0020	----
Silicate (as SiO2)	7631-86-9	E392/VA	A	0.50	mg/L		4.31	4.27	4.23	3.70	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	A	0.30	mg/L		11.8	12.0	12.0	57.7	----
Nitrate + Nitrite (as N)	----	EC235.N+N/VA		0.0032	mg/L		0.0641	0.0640	0.0596	<0.0051	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	PC1	PR1	PR2	HD	----
						Client sampling date / time	21-Oct-2022 08:40	21-Oct-2022 08:00	21-Oct-2022 13:45	21-Oct-2022 13:15	----
							FJ2203009-001	FJ2203009-002	FJ2203009-003	FJ2203009-004	--------
							Result	Result	Result	Result	----
Organic / Inorganic Carbon											
Carbon, dissolved organic [DOC]	----	E358-L/VA	A	0.50	mg/L		2.77	2.87	2.83	2.50	----
Carbon, total organic [TOC]	----	E355-L/VA	A	0.50	mg/L		2.82	2.91	3.02	1.92	----
Ion Balance											
Anion sum	----	EC101/VA		0.10	meq/L		1.67	1.68	1.67	4.94	----
Cation sum	----	EC101/VA		0.10	meq/L		1.68	1.70	1.74	4.44	----
Ion balance (APHA)	----	EC101/VA		0.01	%		0.30	0.59	2.05	5.33	----
Total Metals											
Aluminum, total	7429-90-5	E420/VA	A	0.0030	mg/L		0.0432	0.0355	0.0574	0.222	----
Antimony, total	7440-36-0	E420/VA	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	0.00018	----
Arsenic, total	7440-38-2	E420/VA	A	0.00010	mg/L		0.00020	0.00022	0.00021	0.00025	----
Barium, total	7440-39-3	E420/VA	A	0.00010	mg/L		0.0304	0.0314	0.0335	0.121	----
Beryllium, total	7440-41-7	E420/VA	A	0.000020	mg/L		<0.000020	<0.000020	<0.000020	<0.000020	----
Bismuth, total	7440-69-9	E420/VA	A	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	----
Boron, total	7440-42-8	E420/VA	A	0.010	mg/L		<0.010	<0.010	<0.010	0.014	----
Cadmium, total	7440-43-9	E420/VA	A	0.0000050	mg/L		0.0000128	0.0000163	0.0000175	0.0000272	----
Calcium, total	7440-70-2	E420/VA	A	0.050	mg/L		25.7	25.6	26.8	68.3	----
Cesium, total	7440-46-2	E420/VA	A	0.000010	mg/L		<0.000010	<0.000010	<0.000010	0.000042	----
Chromium, total	7440-47-3	E420/VA	A	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	----
Cobalt, total	7440-48-4	E420/VA	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	0.00013	----
Copper, total	7440-50-8	E420/VA	A	0.00050	mg/L		0.00070	0.00072	0.00088	0.00058	----
Iron, total	7439-89-6	E420/VA	A	0.010	mg/L		0.036	0.046	0.074	0.248	----
Lead, total	7439-92-1	E420/VA	A	0.000050	mg/L		<0.000050	<0.000050	<0.000050	0.000121	----
Lithium, total	7439-93-2	E420/VA	A	0.0010	mg/L		0.0011	0.0011	0.0012	0.0086	----
Magnesium, total	7439-95-4	E420/VA	A	0.0050	mg/L		5.83	6.06	6.37	20.2	----
Manganese, total	7439-96-5	E420/VA	A	0.00010	mg/L		0.00197	0.00208	0.00314	0.00863	----
Mercury, total	7439-97-6	E508-L/VA	A	0.50	ng/L		<0.50	<0.50	0.50	0.80	----
Molybdenum, total	7439-98-7	E420/VA	A	0.000050	mg/L		0.000802	0.000824	0.000889	0.00450	----
Nickel, total	7440-02-0	E420/VA	A	0.00050	mg/L		0.00080	0.00076	0.00084	0.00127	----
Phosphorus, total	7723-14-0	E420/VA	A	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	----
Potassium, total	7440-09-7	E420/VA	A	0.050	mg/L		0.429	0.439	0.474	0.792	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	PC1	PR1	PR2	HD	----
						Client sampling date / time	21-Oct-2022 08:40	21-Oct-2022 08:00	21-Oct-2022 13:45	21-Oct-2022 13:15	----
							FJ2203009-001	FJ2203009-002	FJ2203009-003	FJ2203009-004	--------
							Result	Result	Result	Result	----
Total Metals											
Rubidium, total	7440-17-7	E420/VA	A	0.00020	mg/L		0.00038	0.00039	0.00044	0.00072	----
Selenium, total	7782-49-2	E420/VA	A	0.000050	mg/L		0.000249	0.000253	0.000240	0.00140	----
Silicon, total	7440-21-3	E420/VA	A	0.10	mg/L		2.13	2.24	2.25	2.36	----
Silver, total	7440-22-4	E420/VA	A	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
Sodium, total	7440-23-5	E420/VA	A	0.050	mg/L		1.03	1.04	1.14	3.69	----
Strontium, total	7440-24-6	E420/VA	A	0.00020	mg/L		0.102	0.105	0.110	0.405	----
Sulfur, total	7704-34-9	E420/VA	A	0.50	mg/L		4.46	4.55	4.69	23.2	----
Tellurium, total	13494-80-9	E420/VA	A	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	----
Thallium, total	7440-28-0	E420/VA	A	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
Thorium, total	7440-29-1	E420/VA	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Tin, total	7440-31-5	E420/VA	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Titanium, total	7440-32-6	E420/VA	A	0.00030	mg/L		0.00074	0.00082	0.00132	<0.00600 DLM	----
Tungsten, total	7440-33-7	E420/VA	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Uranium, total	7440-61-1	E420/VA	A	0.000010	mg/L		0.000423	0.000420	0.000444	0.000962	----
Vanadium, total	7440-62-2	E420/VA	A	0.00050	mg/L		<0.00050	<0.00050	0.00054	0.00106	----
Zinc, total	7440-66-6	E420/VA	A	0.0030	mg/L		<0.0030	<0.0030	<0.0030	<0.0030	----
Zirconium, total	7440-67-7	E420/VA	A	0.00020	mg/L		<0.00020	<0.00020	<0.00020	0.00025	----
Dissolved Metals											
Aluminum, dissolved	7429-90-5	E421/VA	A	0.0010	mg/L		0.0046	0.0046	0.0040	0.0020	----
Antimony, dissolved	7440-36-0	E421/VA	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	0.00014	----
Arsenic, dissolved	7440-38-2	E421/VA	A	0.00010	mg/L		0.00016	0.00018	0.00018	0.00014	----
Barium, dissolved	7440-39-3	E421/VA	A	0.00010	mg/L		0.0294	0.0291	0.0300	0.103	----
Beryllium, dissolved	7440-41-7	E421/VA	A	0.000020	mg/L		<0.000020	<0.000020	<0.000020	<0.000020	----
Bismuth, dissolved	7440-69-9	E421/VA	A	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	----
Boron, dissolved	7440-42-8	E421/VA	A	0.010	mg/L		<0.010	<0.010	<0.010	0.010	----
Cadmium, dissolved	7440-43-9	E421/VA	A	0.0000050	mg/L		0.0000070	0.0000079	0.0000084	0.0000055	----
Calcium, dissolved	7440-70-2	E421/VA	A	0.050	mg/L		23.6	23.7	24.4	55.8	----
Cesium, dissolved	7440-46-2	E421/VA	A	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
Chromium, dissolved	7440-47-3	E421/VA	A	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	----
Cobalt, dissolved	7440-48-4	E421/VA	A	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	PC1	PR1	PR2	HD	----
					Client sampling date / time	21-Oct-2022 08:40	21-Oct-2022 08:00	21-Oct-2022 13:45	21-Oct-2022 13:15	----
Analyte	CAS Number	Method/Lab		LOR	Unit	FJ2203009-001	FJ2203009-002	FJ2203009-003	FJ2203009-004	--------
						Result	Result	Result	Result	----
Dissolved Metals										
Copper, dissolved	7440-50-8	E421/VA	A	0.00020	mg/L	0.00056	0.00057	0.00056	0.00033	----
Iron, dissolved	7439-89-6	E421/VA	A	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	----
Lead, dissolved	7439-92-1	E421/VA	A	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----
Lithium, dissolved	7439-93-2	E421/VA	A	0.0010	mg/L	<0.0010	<0.0010	0.0010	0.0070	----
Magnesium, dissolved	7439-95-4	E421/VA	A	0.0050	mg/L	5.42	5.62	5.69	18.2	----
Manganese, dissolved	7439-96-5	E421/VA	A	0.00010	mg/L	0.00045	0.00045	0.00038	0.00249	----
Mercury, dissolved	7439-97-6	E509-L/VA	A	0.50	ng/L	<0.50	<0.50	<0.50	<0.50	----
Molybdenum, dissolved	7439-98-7	E421/VA	A	0.000050	mg/L	0.000740	0.000701	0.000732	0.00368	----
Nickel, dissolved	7440-02-0	E421/VA	A	0.00050	mg/L	0.00061	0.00062	0.00061	0.00083	----
Phosphorus, dissolved	7723-14-0	E421/VA	A	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	----
Potassium, dissolved	7440-09-7	E421/VA	A	0.050	mg/L	0.406	0.407	0.416	0.660	----
Rubidium, dissolved	7440-17-7	E421/VA	A	0.00020	mg/L	0.00029	0.00030	0.00030	0.00027	----
Selenium, dissolved	7782-49-2	E421/VA	A	0.000050	mg/L	0.000218	0.000251	0.000187	0.00122	----
Silicon, dissolved	7440-21-3	E421/VA	A	0.050	mg/L	2.03	1.98	1.94	1.74	----
Silver, dissolved	7440-22-4	E421/VA	A	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	----
Sodium, dissolved	7440-23-5	E421/VA	A	0.050	mg/L	0.970	0.954	0.985	3.36	----
Strontium, dissolved	7440-24-6	E421/VA	A	0.00020	mg/L	0.0944	0.0936	0.0970	0.330	----
Sulfur, dissolved	7704-34-9	E421/VA	A	0.50	mg/L	4.05	4.05	3.93	20.5	----
Tellurium, dissolved	13494-80-9	E421/VA	A	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	----
Thallium, dissolved	7440-28-0	E421/VA	A	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	----
Thorium, dissolved	7440-29-1	E421/VA	A	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----
Tin, dissolved	7440-31-5	E421/VA	A	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----
Titanium, dissolved	7440-32-6	E421/VA	A	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	----
Tungsten, dissolved	7440-33-7	E421/VA	A	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----
Uranium, dissolved	7440-61-1	E421/VA	A	0.000010	mg/L	0.000388	0.000384	0.000382	0.000763	----
Vanadium, dissolved	7440-62-2	E421/VA	A	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
Zinc, dissolved	7440-66-6	E421/VA	A	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----
Zirconium, dissolved	7440-67-7	E421/VA	A	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	----
Dissolved MeHg filtration location	----	EP537/VA		-	-	Field	Field	Field	Field	----
Dissolved mercury filtration location	----	EP509-L/VA		-	-	Field	Field	Field	Field	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	PC1	PR1	PR2	HD	----
					Client sampling date / time	21-Oct-2022 08:40	21-Oct-2022 08:00	21-Oct-2022 13:45	21-Oct-2022 13:15	----
Analyte	CAS Number	Method/Lab		LOR	Unit	FJ2203009-001	FJ2203009-002	FJ2203009-003	FJ2203009-004	--------
						Result	Result	Result	Result	----
Dissolved Metals										
Dissolved metals filtration location	----	EP421/VA		-	-	Field	Field	Field	Field	----
Speciated Metals										
Methylmercury (as MeHg), total	22967-92-6	E536/VA	A	0.000000020	mg/L	<0.000000020	<0.000000020	<0.000000020	<0.000000020	----
Iron, ferrous [Fe II], dissolved	15438-31-0	E541/VA	A	0.020	mg/L	<0.020	<0.020	<0.020	<0.020	----
Methylmercury (as MeHg), dissolved	22967-92-6	E537/VA	A	0.000000020	mg/L	<0.000000020	<0.000000020	<0.000000020	<0.000000020	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2203009**	Page	: 1 of 22
Amendment	: **2**		
Client	: **Ecofish Research Ltd**	Laboratory	: ALS Environmental - Fort St. John
Contact	: Sarah Kennedy	Account Manager	: Sean Zhang
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-With Metals	Date Samples Received	: 22-Oct-2022 13:00
PO	: 1200-25.03.02	Issue Date	: 25-Aug-2023 17:59
C-O-C number	: 2022-Oct-MON8/9-Day 2		
Sampler	: PB		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) HD	E298	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	27-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PR2	E298	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	27-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PC1	E298	21-Oct-2022	25-Oct-2022	28 days	5 days	✓	27-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PR1	E298	21-Oct-2022	25-Oct-2022	28 days	5 days	✓	27-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE HD	E235.Cl	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	25-Oct-2022	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PC1	E235.Cl	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	25-Oct-2022	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PR2	E235.Cl	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	25-Oct-2022	28 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE PR1	E235.Cl	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	25-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE HD	E378-U	21-Oct-2022	25-Oct-2022	3 days	4 days	× EHT	25-Oct-2022	3 days	4 days	× EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PR2	E378-U	21-Oct-2022	25-Oct-2022	3 days	4 days	× EHT	25-Oct-2022	3 days	4 days	× EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PC1	E378-U	21-Oct-2022	25-Oct-2022	3 days	4 days	× EHT	25-Oct-2022	3 days	5 days	× EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PR1	E378-U	21-Oct-2022	25-Oct-2022	3 days	4 days	× EHT	25-Oct-2022	3 days	5 days	× EHT
Anions and Nutrients : Fluoride in Water by IC										
HDPE HD	E235.F	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	25-Oct-2022	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PC1	E235.F	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	25-Oct-2022	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PR2	E235.F	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	25-Oct-2022	28 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE PR1	E235.F	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	25-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE HD	E235.NO3-L	21-Oct-2022	25-Oct-2022	3 days	4 days	× EHT	25-Oct-2022	3 days	4 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PC1	E235.NO3-L	21-Oct-2022	25-Oct-2022	3 days	4 days	× EHT	25-Oct-2022	3 days	4 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PR2	E235.NO3-L	21-Oct-2022	25-Oct-2022	3 days	4 days	× EHT	25-Oct-2022	3 days	4 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PR1	E235.NO3-L	21-Oct-2022	25-Oct-2022	3 days	4 days	× EHT	25-Oct-2022	3 days	5 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE HD	E235.NO2-L	21-Oct-2022	25-Oct-2022	3 days	4 days	× EHT	25-Oct-2022	3 days	4 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PC1	E235.NO2-L	21-Oct-2022	25-Oct-2022	3 days	4 days	× EHT	25-Oct-2022	3 days	4 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PR2	E235.NO2-L	21-Oct-2022	25-Oct-2022	3 days	4 days	× EHT	25-Oct-2022	3 days	4 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PR1	E235.NO2-L	21-Oct-2022	25-Oct-2022	3 days	4 days	× EHT	25-Oct-2022	3 days	5 days	× EHT

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE										
HD	E392	21-Oct-2022	----	----	----		26-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE										
PC1	E392	21-Oct-2022	----	----	----		26-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE										
PR1	E392	21-Oct-2022	----	----	----		26-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE										
PR2	E392	21-Oct-2022	----	----	----		26-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
HD	E235.SO4	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	25-Oct-2022	28 days	4 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
PC1	E235.SO4	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	25-Oct-2022	28 days	4 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
PR2	E235.SO4	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	25-Oct-2022	28 days	4 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
PR1	E235.SO4	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	25-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
HD	E375-T	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	26-Oct-2022	28 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PR2	E375-T	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	26-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PC1	E375-T	21-Oct-2022	25-Oct-2022	28 days	5 days	✓	26-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) PR1	E375-T	21-Oct-2022	25-Oct-2022	28 days	5 days	✓	26-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) HD	E366	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	27-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) PR2	E366	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	27-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) PC1	E366	21-Oct-2022	25-Oct-2022	28 days	5 days	✓	27-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) PR1	E366	21-Oct-2022	25-Oct-2022	28 days	5 days	✓	27-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) HD	E372-U	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	26-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PR2	E372-U	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	26-Oct-2022	28 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PC1	E372-U	21-Oct-2022	25-Oct-2022	28 days	5 days	✓	26-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PR1	E372-U	21-Oct-2022	25-Oct-2022	28 days	5 days	✓	26-Oct-2022	28 days	5 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) HD	E509-L	21-Oct-2022	28-Oct-2022	28 days	7 days	✓	28-Oct-2022	28 days	7 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) PC1	E509-L	21-Oct-2022	28-Oct-2022	28 days	7 days	✓	28-Oct-2022	28 days	7 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) PR1	E509-L	21-Oct-2022	28-Oct-2022	28 days	7 days	✓	28-Oct-2022	28 days	7 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) PR2	E509-L	21-Oct-2022	28-Oct-2022	28 days	7 days	✓	28-Oct-2022	28 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) PR2	E421	21-Oct-2022	29-Oct-2022	180 days	7 days	✓	29-Oct-2022	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) HD	E421	21-Oct-2022	29-Oct-2022	180 days	8 days	✓	29-Oct-2022	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) PC1	E421	21-Oct-2022	29-Oct-2022	180 days	8 days	✓	29-Oct-2022	180 days	8 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
PR1	E421	21-Oct-2022	29-Oct-2022	180 days	8 days	✓	29-Oct-2022	180 days	8 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
HD	E358-L	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	26-Oct-2022	28 days	5 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
PR2	E358-L	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	26-Oct-2022	28 days	5 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
PC1	E358-L	21-Oct-2022	25-Oct-2022	28 days	5 days	✓	26-Oct-2022	28 days	5 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
PR1	E358-L	21-Oct-2022	25-Oct-2022	28 days	5 days	✓	26-Oct-2022	28 days	5 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
HD	E355-L	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	26-Oct-2022	28 days	5 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
PR2	E355-L	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	26-Oct-2022	28 days	5 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
PC1	E355-L	21-Oct-2022	25-Oct-2022	28 days	5 days	✓	26-Oct-2022	28 days	5 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
PR1	E355-L	21-Oct-2022	25-Oct-2022	28 days	5 days	✓	26-Oct-2022	28 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE HD	E290	21-Oct-2022	25-Oct-2022	14 days	4 days	✓	25-Oct-2022	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PR2	E290	21-Oct-2022	25-Oct-2022	14 days	4 days	✓	25-Oct-2022	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PC1	E290	21-Oct-2022	25-Oct-2022	14 days	4 days	✓	25-Oct-2022	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PR1	E290	21-Oct-2022	25-Oct-2022	14 days	4 days	✓	25-Oct-2022	14 days	5 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE HD	E329	21-Oct-2022	25-Oct-2022	3 days	4 days	× EHT	25-Oct-2022	3 days	4 days	× EHT
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PR2	E329	21-Oct-2022	25-Oct-2022	3 days	4 days	× EHT	25-Oct-2022	3 days	4 days	× EHT
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PC1	E329	21-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	25-Oct-2022	3 days	5 days	× EHT
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PR1	E329	21-Oct-2022	25-Oct-2022	3 days	5 days	× EHT	25-Oct-2022	3 days	5 days	× EHT
Physical Tests : Conductivity in Water										
HDPE HD	E100	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	25-Oct-2022	28 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE PR2	E100	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	25-Oct-2022	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE PC1	E100	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	25-Oct-2022	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE PR1	E100	21-Oct-2022	25-Oct-2022	28 days	4 days	✓	25-Oct-2022	28 days	5 days	✓
Physical Tests : pH by Meter										
HDPE HD	E108	21-Oct-2022	25-Oct-2022	0.25 hrs	101 hrs	× EHTR-FM	25-Oct-2022	0.25 hrs	105 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PR2	E108	21-Oct-2022	25-Oct-2022	0.25 hrs	101 hrs	× EHTR-FM	25-Oct-2022	0.25 hrs	105 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PC1	E108	21-Oct-2022	25-Oct-2022	0.25 hrs	106 hrs	× EHTR-FM	25-Oct-2022	0.25 hrs	110 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PR1	E108	21-Oct-2022	25-Oct-2022	0.25 hrs	107 hrs	× EHTR-FM	25-Oct-2022	0.25 hrs	111 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE HD	E162	21-Oct-2022	----	----	----		25-Oct-2022	7 days	4 days	✓
Physical Tests : TDS by Gravimetry										
HDPE PC1	E162	21-Oct-2022	----	----	----		25-Oct-2022	7 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TDS by Gravimetry										
HDPE PR1	E162	21-Oct-2022	----	----	----		25-Oct-2022	7 days	4 days	✓
Physical Tests : TDS by Gravimetry										
HDPE PR2	E162	21-Oct-2022	----	----	----		25-Oct-2022	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE HD	E160	21-Oct-2022	----	----	----		25-Oct-2022	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PC1	E160	21-Oct-2022	----	----	----		25-Oct-2022	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PR1	E160	21-Oct-2022	----	----	----		25-Oct-2022	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PR2	E160	21-Oct-2022	----	----	----		25-Oct-2022	7 days	4 days	✓
Speciated Metals : Dissolved Ferrous Iron in Water by Colour										
Amber glass dissolved (hydrochloric acid) HD	E541	21-Oct-2022	24-Nov-2022	7 days	34 days	× EHT	24-Nov-2022	7 days	34 days	× EHT
Speciated Metals : Dissolved Ferrous Iron in Water by Colour										
Amber glass dissolved (hydrochloric acid) PC1	E541	21-Oct-2022	24-Nov-2022	7 days	34 days	× EHT	24-Nov-2022	7 days	34 days	× EHT
Speciated Metals : Dissolved Ferrous Iron in Water by Colour										
Amber glass dissolved (hydrochloric acid) PR1	E541	21-Oct-2022	24-Nov-2022	7 days	34 days	× EHT	24-Nov-2022	7 days	34 days	× EHT

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Speciated Metals : Dissolved Ferrous Iron in Water by Colour										
Amber glass dissolved (hydrochloric acid) PR2	E541	21-Oct-2022	24-Nov-2022	7 days	34 days	× EHT	24-Nov-2022	7 days	34 days	× EHT
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) HD	E537	21-Oct-2022	07-Nov-2022	180 days	17 days	✓	11-Nov-2022	180 days	4 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PC1	E537	21-Oct-2022	07-Nov-2022	180 days	17 days	✓	11-Nov-2022	180 days	4 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PR1	E537	21-Oct-2022	07-Nov-2022	180 days	17 days	✓	11-Nov-2022	180 days	4 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PR2	E537	21-Oct-2022	07-Nov-2022	180 days	17 days	✓	11-Nov-2022	180 days	4 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) HD	E536	21-Oct-2022	05-Nov-2022	180 days	15 days	✓	07-Nov-2022	180 days	17 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) PC1	E536	21-Oct-2022	05-Nov-2022	180 days	15 days	✓	07-Nov-2022	180 days	17 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) PR1	E536	21-Oct-2022	05-Nov-2022	180 days	15 days	✓	07-Nov-2022	180 days	17 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid) PR2	E536	21-Oct-2022	05-Nov-2022	180 days	15 days	✓	07-Nov-2022	180 days	17 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) HD	E508-L	21-Oct-2022	27-Oct-2022	28 days	6 days	✓	27-Oct-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) PC1	E508-L	21-Oct-2022	27-Oct-2022	28 days	6 days	✓	27-Oct-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) PR1	E508-L	21-Oct-2022	27-Oct-2022	28 days	6 days	✓	27-Oct-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved) PR2	E508-L	21-Oct-2022	27-Oct-2022	28 days	6 days	✓	27-Oct-2022	28 days	0 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) HD	E420	21-Oct-2022	27-Oct-2022	180 days	6 days	✓	28-Oct-2022	180 days	7 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) PC1	E420	21-Oct-2022	27-Oct-2022	180 days	6 days	✓	28-Oct-2022	180 days	7 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) PR1	E420	21-Oct-2022	27-Oct-2022	180 days	6 days	✓	28-Oct-2022	180 days	7 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) PR2	E420	21-Oct-2022	27-Oct-2022	180 days	6 days	✓	28-Oct-2022	180 days	7 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	714265	1	19	5.2	5.0	✓
Ammonia by Fluorescence	E298	714669	1	10	10.0	5.0	✓
Chloride in Water by IC	E235.Cl	714269	1	4	25.0	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	714273	1	4	25.0	5.0	✓
Conductivity in Water	E100	714266	1	5	20.0	5.0	✓
Dissolved Ferrous Iron in Water by Colour	E541	756854	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	719532	1	19	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	718309	1	15	6.6	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	733465	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	714670	1	5	20.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	714263	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	714268	1	4	25.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	714270	1	5	20.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	714271	1	4	25.0	5.0	✓
pH by Meter	E108	714264	1	19	5.2	5.0	✓
Reactive Silica by Colourimetry	E392	716537	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	714272	1	5	20.0	5.0	✓
TDS by Gravimetry	E162	714302	1	19	5.2	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	714672	1	5	20.0	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	718376	1	10	10.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	714046	1	19	5.2	5.0	✓
Total Methylmercury in Water by GCAFS	E536	730278	2	27	7.4	5.0	✓
Total Nitrogen by Colourimetry	E366	714668	1	10	10.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	714671	1	5	20.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	714673	1	5	20.0	5.0	✓
TSS by Gravimetry	E160	714283	1	19	5.2	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	714265	1	19	5.2	5.0	✓
Ammonia by Fluorescence	E298	714669	1	10	10.0	5.0	✓
Chloride in Water by IC	E235.Cl	714269	1	4	25.0	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	714273	1	4	25.0	5.0	✓
Conductivity in Water	E100	714266	1	5	20.0	5.0	✓
Dissolved Ferrous Iron in Water by Colour	E541	756854	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	719532	1	19	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	718309	1	15	6.6	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	733465	1	20	5.0	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	714670	1	5	20.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	714263	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	714268	1	4	25.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	714270	1	5	20.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	714271	1	4	25.0	5.0	✓
pH by Meter	E108	714264	1	19	5.2	5.0	✓
Reactive Silica by Colourimetry	E392	716537	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	714272	1	5	20.0	5.0	✓
TDS by Gravimetry	E162	714302	1	19	5.2	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	714672	1	5	20.0	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	718376	1	10	10.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	714046	1	19	5.2	5.0	✓
Total Methylmercury in Water by GCAFS	E536	730278	2	27	7.4	5.0	✓
Total Nitrogen by Colourimetry	E366	714668	1	10	10.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	714671	1	5	20.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	714673	1	5	20.0	5.0	✓
TSS by Gravimetry	E160	714283	1	19	5.2	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	714265	1	19	5.2	5.0	✓
Ammonia by Fluorescence	E298	714669	1	10	10.0	5.0	✓
Chloride in Water by IC	E235.Cl	714269	1	4	25.0	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	714273	1	4	25.0	5.0	✓
Conductivity in Water	E100	714266	1	5	20.0	5.0	✓
Dissolved Ferrous Iron in Water by Colour	E541	756854	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	719532	1	19	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	718309	1	15	6.6	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	733465	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	714670	1	5	20.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	714263	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	714268	1	4	25.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	714270	1	5	20.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	714271	1	4	25.0	5.0	✓
Reactive Silica by Colourimetry	E392	716537	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	714272	1	5	20.0	5.0	✓
TDS by Gravimetry	E162	714302	1	19	5.2	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	714672	1	5	20.0	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	718376	1	10	10.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	714046	1	19	5.2	5.0	✓
Total Methylmercury in Water by GCAFS	E536	730278	2	27	7.4	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Total Nitrogen by Colourimetry	E366	714668	1	10	10.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	714671	1	5	20.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	714673	1	5	20.0	5.0	✓
TSS by Gravimetry	E160	714283	1	19	5.2	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	714669	1	10	10.0	5.0	✓
Chloride in Water by IC	E235.Cl	714269	1	4	25.0	5.0	✓
Dissolved Ferrous Iron in Water by Colour	E541	756854	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	719532	1	19	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	718309	1	15	6.6	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	733465	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	714670	1	5	20.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	714263	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	714268	1	4	25.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	714270	1	5	20.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	714271	1	4	25.0	5.0	✓
Reactive Silica by Colourimetry	E392	716537	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	714272	1	5	20.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	714672	1	5	20.0	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	718376	1	10	10.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	714046	1	19	5.2	5.0	✓
Total Methylmercury in Water by GCAFS	E536	730278	2	27	7.4	5.0	✓
Total Nitrogen by Colourimetry	E366	714668	1	10	10.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	714671	1	5	20.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	714673	1	5	20.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Vancouver	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Vancouver	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	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.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Colour (True) by Spectrometer (5 CU)	E329 ALS Environmental - Vancouver	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366 ALS Environmental - Vancouver	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Vancouver	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Reactive Silica by Colourimetry	E392 ALS Environmental - Vancouver	Water	APHA 4500-SiO2 E (mod)	Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method using a discrete analyzer. Method Limitation: Arsenic (5+) above 100 mg/L is a negative interference on this test
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Vancouver	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L ALS Environmental - Vancouver	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAFS.
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L ALS Environmental - Vancouver	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAFS.
Total Methylmercury in Water by GCAFS	E536 ALS Environmental - Vancouver	Water	EPA 1630 (mod)	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Methylmercury in Water by GCAFS	E537 ALS Environmental - Vancouver	Water	EPA 1630 (mod)	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Ferrous Iron in Water by Colour	E541 ALS Environmental - Vancouver	Water	APHA 3500-Fe B/James Ball et al (1999)	This analysis is carried out using procedures adapted from APHA 3500-Fe B and Environ. Sci. Technol. 1999, 33, 5, 807–813. The procedure involves preliminary sample filtration, and ferrous iron is determined using the "FerroZine" colourimetric method. Holding time is 7 days for 0.45um filtration or 6 months if samples have been filtered using 0.1um filters.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	Water	APHA 2340B	“Hardness (as CaCO3), dissolved” is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. “Total Hardness” refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Ion Balance using Dissolved Metals	EC101 ALS Environmental - Vancouver	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Vancouver	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
Total Kjeldahl Nitrogen (Calculation)	EC318 ALS Environmental - Vancouver	Water	BC MOE LABORATORY MANUAL (2005)	Total Kjeldahl Nitrogen is a calculated parameter. Total Kjeldahl Nitrogen (calc) = Total Nitrogen - [Nitrite (as N) + Nitrate (as N)].

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Preparation for Total Organic Carbon by Combustion	EP355 ALS Environmental - Vancouver	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Nitrogen in water	EP366 ALS Environmental - Vancouver	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals Water Filtration	EP421 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration (Low Level)	EP509-L ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
Total Methylmercury Water Preparation	EP536 ALS Environmental - Vancouver	Water	EPA 1630	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Methylmercury Water Preparation	EP537 ALS Environmental - Vancouver	Water	EPA 1630	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Ferrous Iron in Water by Colour	EP541 ALS Environmental - Vancouver	Water	APHA 3500-Fe B/James Ball et al (1999)	This analysis is carried out using procedures adapted from APHA 3500-Fe B and "A New Method for the Direct Determination of Dissolved Iron Concentration in Acid Mine Waters" published by James W. Ball et al (1999). The procedure involves preliminary sample filtration, and ferrous iron is determined using the "FerroZine" colourimetric method.

QUALITY CONTROL REPORT

Work Order	: **FJ2203009**	Page	: 1 of 18
Amendment	: **2**		
Client	: Ecofish Research Ltd	Laboratory	: ALS Environmental - Fort St. John
Contact	: Sarah Kennedy	Account Manager	: Sean Zhang
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	:	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-With Metals	Date Samples Received	: 22-Oct-2022 13:00
PO	: 1200-25.03.02	Date Analysis Commenced	: 25-Oct-2022
C-O-C number	: 2022-Oct-MON8/9-Day 2	Issue Date	: 25-Aug-2023 17:59
Sampler	: PB ----		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angela Ren	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia
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General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 714264)											
FJ2203009-001	PC1	pH	----	E108	0.10	pH units	8.07	8.10	0.371%	4%	----
Physical Tests (QC Lot: 714265)											
FJ2203009-001	PC1	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	71.0	71.6	0.823%	20%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	71.0	71.6	0.823%	20%	----
Physical Tests (QC Lot: 714266)											
FJ2203009-001	PC1	Conductivity	----	E100	2.0	µS/cm	174	176	0.685%	10%	----
Physical Tests (QC Lot: 714273)											
FJ2203009-001	PC1	Colour, true	----	E329	5.0	CU	6.4	5.9	0.5	Diff <2x LOR	----
Physical Tests (QC Lot: 714283)											
FJ2202955-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 714302)											
FJ2202955-001	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	318	305	4.18%	20%	----
Anions and Nutrients (QC Lot: 714263)											
FJ2203009-001	PC1	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 714268)											
FJ2203009-001	PC1	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.037	0.036	0.001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 714269)											
FJ2203009-001	PC1	Chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 714270)											
FJ2203009-001	PC1	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0641	0.0641	0.0796%	20%	----
Anions and Nutrients (QC Lot: 714271)											
FJ2203009-001	PC1	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 714272)											
FJ2203009-001	PC1	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	11.8	11.8	0.176%	20%	----
Anions and Nutrients (QC Lot: 714668)											
FJ2203009-001	PC1	Nitrogen, total	7727-37-9	E366	0.030	mg/L	0.153	0.151	0.002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 714669)											
FJ2203009-001	PC1	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0060	0.0055	0.0005	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 714672)											
FJ2203009-001	PC1	Phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 714673)											
FJ2203009-001	PC1	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0042	0.0049	0.0007	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 716537)											
EO2209213-024	Anonymous	Silicate (as SiO2)	7631-86-9	E392	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 714670)											
FJ2203009-001	PC1	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.77	2.85	0.08	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 714671)											
FJ2203009-001	PC1	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	2.82	3.11	0.29	Diff <2x LOR	----
Total Metals (QC Lot: 714046)											
FJ2203009-001	PC1	Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0432	0.0523	18.9%	20%	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00020	0.00023	0.00002	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.0304	0.0314	3.17%	20%	----
		Beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000128	0.0000122	0.0000006	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	25.7	25.0	2.70%	20%	----
		Cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.00070	0.00069	0.000004	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.010	mg/L	0.036	0.035	0.001	Diff <2x LOR	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	0.0011	0.0010	0.00002	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	5.83	6.08	4.06%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.00197	0.00195	1.01%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000802	0.000801	0.0734%	20%	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	0.00080	0.00074	0.00006	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	0.429	0.439	0.010	Diff <2x LOR	----
		Rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00038	0.00041	0.00003	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000249	0.000275	0.000026	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 714046) - continued											
FJ2203009-001	PC1	Silicon, total	7440-21-3	E420	0.10	mg/L	2.13	2.21	3.97%	20%	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	1.03	1.06	2.55%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	0.102	0.107	4.48%	20%	----
		Sulfur, total	7704-34-9	E420	0.50	mg/L	4.46	4.74	0.28	Diff <2x LOR	----
		Tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00030	mg/L	0.00074	0.00052	0.00022	Diff <2x LOR	----
		Tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.000423	0.000428	1.06%	20%	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Total Metals (QC Lot: 718376)											
EO2208940-001	Anonymous	Mercury, total	7439-97-6	E508-L	0.50	ng/L	2.02	1.86	0.16	Diff <2x LOR	----
Dissolved Metals (QC Lot: 718309)											
FJ2203009-001	PC1	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0046	0.0048	0.0002	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00016	0.00017	0.000004	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0294	0.0290	1.20%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000070	0.0000087	0.0000017	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	23.6	23.4	0.639%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00056	0.00057	0.000010	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 718309) - continued											
FJ2203009-001	PC1	Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	5.42	5.63	3.86%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00045	0.00043	0.00002	Diff <2x LOR	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000740	0.000722	2.42%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00061	0.00063	0.00001	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.406	0.405	0.0007	Diff <2x LOR	----
		Rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00029	0.00034	0.00005	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000218	0.000144	0.000074	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	2.03	1.96	3.64%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.970	0.960	0.964%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0944	0.0947	0.289%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	4.05	3.80	0.24	Diff <2x LOR	----
		Tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000388	0.000378	2.56%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 719532)											
EO2208953-001	Anonymous	Mercury, dissolved	7439-97-6	E509-L	1.00	ng/L	<1.00	<1.00	0	Diff <2x LOR	----
Speciated Metals (QC Lot: 730278)											
FJ2202994-001	Anonymous	Methylmercury (as MeHg), total	22967-92-6	E536	0.000020	µg/L	<0.000000020 mg/L	<0.000020	0	Diff <2x LOR	----
Speciated Metals (QC Lot: 733465)											
FC2202619-001	Anonymous	Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.000020	µg/L	0.000060	0.000058	0.000002	Diff <2x LOR	----
Speciated Metals (QC Lot: 733968)											
FJ2202978-004	Anonymous	Methylmercury (as MeHg), total	22967-92-6	E536	0.000020	µg/L	<0.000000020 mg/L	<0.000020	0	Diff <2x LOR	----
Speciated Metals (QC Lot: 756854)											
FJ2202949-001	Anonymous	Iron, ferrous [Fe II], dissolved	15438-31-0	E541	0.020	mg/L	0.046	0.046	0.0002	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 714265)						
Alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 714266)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 714273)						
Colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 714283)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 714302)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 714263)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 714268)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 714269)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 714270)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 714271)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 714272)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 714668)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 714669)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 714672)						
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 714673)						

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 714673) - continued						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 716537)						
Silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 714670)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 714671)						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 714046)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 714046) - continued						
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Total Metals (QCLot: 718376)						
Mercury, total	7439-97-6	E508-L	0.5	ng/L	<0.50	----
Dissolved Metals (QCLot: 718309)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 718309) - continued						
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 719532)						
Mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	<0.50	----
Speciated Metals (QCLot: 730278)						
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 733465)						
Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 733968)						
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 756854)						
Iron, ferrous [Fe II], dissolved	15438-31-0	E541	0.02	mg/L	<0.020	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 714264)									
pH	----	E108	----	pH units	7 pH units	99.8	98.0	102	----
Physical Tests (QCLot: 714265)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	109	85.0	115	----
Physical Tests (QCLot: 714266)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	100	90.0	110	----
Physical Tests (QCLot: 714273)									
Colour, true	----	E329	5	CU	100 CU	102	85.0	115	----
Physical Tests (QCLot: 714283)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	90.3	85.0	115	----
Physical Tests (QCLot: 714302)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 714263)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	97.1	80.0	120	----
Anions and Nutrients (QCLot: 714268)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	97.7	90.0	110	----
Anions and Nutrients (QCLot: 714269)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 714270)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 714271)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.8	90.0	110	----
Anions and Nutrients (QCLot: 714272)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 714668)									
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 714669)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	100	85.0	115	----
Anions and Nutrients (QCLot: 714672)									
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.05 mg/L	91.9	80.0	120	----
Anions and Nutrients (QCLot: 714673)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	91.0	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Anions and Nutrients (QCLot: 716537)									
Silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	10 mg/L	105	85.0	115	----
Organic / Inorganic Carbon (QCLot: 714670)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	101	80.0	120	----
Organic / Inorganic Carbon (QCLot: 714671)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	102	80.0	120	----
Total Metals (QCLot: 714046)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	101	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	104	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	106	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	106	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	100	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	99.9	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	100	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	102	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	100	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	103	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	101	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	106	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	99.2	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	98.6	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	105	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	104	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	99.1	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	111	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	103	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	108	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	100	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	106	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	98.6	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	103	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	109	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 714046) - continued									
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	102	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	105	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	101	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	99.1	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	101	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	99.2	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	93.8	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	101	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	103	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	98.6	80.0	120	----
Total Metals (QCLot: 718376)									
Mercury, total	7439-97-6	E508-L	0.5	ng/L	5 ng/L	100	80.0	120	----
Dissolved Metals (QCLot: 718309)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	97.4	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	100	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	101	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	98.7	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	94.1	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	94.8	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	89.2	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	97.3	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	94.7	80.0	120	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	101	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	94.3	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	94.3	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	94.1	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	101	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	96.8	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	92.9	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	97.2	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	96.5	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	99.6	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	94.9	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	101	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 718309) - continued									
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	97.3	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	98.2	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	101	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	95.4	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	101	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	100	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	80.4	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	98.9	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	93.1	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	96.2	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	93.8	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	92.3	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	101	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	96.8	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	96.6	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	94.4	80.0	120	----
Mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	5 ng/L	100	80.0	120	----
Speciated Metals (QCLot: 730278)									
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	0.0025 µg/L	81.5	70.0	130	----
Speciated Metals (QCLot: 733465)									
Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	0.0025 µg/L	83.2	70.0	130	----
Speciated Metals (QCLot: 733968)									
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	0.0025 µg/L	79.0	70.0	130	----
Speciated Metals (QCLot: 756854)									
Iron, ferrous [Fe II], dissolved	15438-31-0	E541	0.02	mg/L	0.5 mg/L	103	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 714263)										
FJ2203009-002	PR1	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0315 mg/L	0.03 mg/L	105	70.0	130	----
Anions and Nutrients (QCLot: 714268)										
FJ2203009-002	PR1	Fluoride	16984-48-8	E235.F	0.991 mg/L	1 mg/L	99.1	75.0	125	----
Anions and Nutrients (QCLot: 714269)										
FJ2203009-002	PR1	Chloride	16887-00-6	E235.Cl	102 mg/L	100 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 714270)										
FJ2203009-002	PR1	Nitrate (as N)	14797-55-8	E235.NO3-L	2.59 mg/L	2.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 714271)										
FJ2203009-002	PR1	Nitrite (as N)	14797-65-0	E235.NO2-L	0.503 mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 714272)										
FJ2203009-002	PR1	Sulfate (as SO4)	14808-79-8	E235.SO4	104 mg/L	100 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 714668)										
FJ2203009-002	PR1	Nitrogen, total	7727-37-9	E366	0.394 mg/L	0.4 mg/L	98.5	70.0	130	----
Anions and Nutrients (QCLot: 714669)										
FJ2203009-002	PR1	Ammonia, total (as N)	7664-41-7	E298	0.102 mg/L	0.1 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 714672)										
FJ2203009-002	PR1	Phosphorus, total dissolved	7723-14-0	E375-T	0.0438 mg/L	0.05 mg/L	87.6	70.0	130	----
Anions and Nutrients (QCLot: 714673)										
FJ2203009-002	PR1	Phosphorus, total	7723-14-0	E372-U	0.0443 mg/L	0.05 mg/L	88.7	70.0	130	----
Anions and Nutrients (QCLot: 716537)										
EO2209213-025	Anonymous	Silicate (as SiO2)	7631-86-9	E392	9.41 mg/L	10 mg/L	94.1	75.0	125	----
Organic / Inorganic Carbon (QCLot: 714670)										
FJ2203009-002	PR1	Carbon, dissolved organic [DOC]	----	E358-L	5.03 mg/L	5 mg/L	101	70.0	130	----
Organic / Inorganic Carbon (QCLot: 714671)										
FJ2203009-002	PR1	Carbon, total organic [TOC]	----	E355-L	5.07 mg/L	5 mg/L	101	70.0	130	----
Total Metals (QCLot: 714046)										
FJ2203009-002	PR1	Aluminum, total	7429-90-5	E420	0.186 mg/L	0.2 mg/L	92.8	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 714046) - continued										
FJ2203009-002	PR1	Antimony, total	7440-36-0	E420	0.0198 mg/L	0.02 mg/L	99.0	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0195 mg/L	0.02 mg/L	97.7	70.0	130	----
		Barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0394 mg/L	0.04 mg/L	98.4	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.00959 mg/L	0.01 mg/L	95.9	70.0	130	----
		Boron, total	7440-42-8	E420	0.098 mg/L	0.1 mg/L	97.7	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00396 mg/L	0.004 mg/L	99.0	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.0105 mg/L	0.01 mg/L	105	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0396 mg/L	0.04 mg/L	99.1	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0192 mg/L	0.02 mg/L	96.2	70.0	130	----
		Copper, total	7440-50-8	E420	0.0193 mg/L	0.02 mg/L	96.5	70.0	130	----
		Iron, total	7439-89-6	E420	1.93 mg/L	2 mg/L	96.4	70.0	130	----
		Lead, total	7439-92-1	E420	0.0188 mg/L	0.02 mg/L	94.0	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0937 mg/L	0.1 mg/L	93.7	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	0.0197 mg/L	0.02 mg/L	98.4	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0205 mg/L	0.02 mg/L	102	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0379 mg/L	0.04 mg/L	94.7	70.0	130	----
		Phosphorus, total	7723-14-0	E420	10.5 mg/L	10 mg/L	105	70.0	130	----
		Potassium, total	7440-09-7	E420	3.90 mg/L	4 mg/L	97.5	70.0	130	----
		Rubidium, total	7440-17-7	E420	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0403 mg/L	0.04 mg/L	101	70.0	130	----
		Silicon, total	7440-21-3	E420	9.73 mg/L	10 mg/L	97.3	70.0	130	----
		Silver, total	7440-22-4	E420	0.00418 mg/L	0.004 mg/L	104	70.0	130	----
		Sodium, total	7440-23-5	E420	1.96 mg/L	2 mg/L	97.9	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	20.8 mg/L	20 mg/L	104	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.0407 mg/L	0.04 mg/L	102	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00367 mg/L	0.004 mg/L	91.7	70.0	130	----
		Thorium, total	7440-29-1	E420	0.0208 mg/L	0.02 mg/L	104	70.0	130	----
		Tin, total	7440-31-5	E420	0.0197 mg/L	0.02 mg/L	98.7	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0376 mg/L	0.04 mg/L	94.0	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.0182 mg/L	0.02 mg/L	90.8	70.0	130	----
		Uranium, total	7440-61-1	E420	0.00385 mg/L	0.004 mg/L	96.2	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 714046) - continued										
FJ2203009-002	PR1	Vanadium, total	7440-62-2	E420	0.0981 mg/L	0.1 mg/L	98.1	70.0	130	----
		Zinc, total	7440-66-6	E420	0.396 mg/L	0.4 mg/L	99.0	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.0397 mg/L	0.04 mg/L	99.2	70.0	130	----
Total Metals (QCLot: 718376)										
EO2208940-002	Anonymous	Mercury, total	7439-97-6	E508-L	4.35 ng/L	5 ng/L	87.0	70.0	130	----
Dissolved Metals (QCLot: 718309)										
FJ2203009-002	PR1	Aluminum, dissolved	7429-90-5	E421	0.187 mg/L	0.2 mg/L	93.6	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0192 mg/L	0.02 mg/L	96.3	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0187 mg/L	0.02 mg/L	93.4	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0380 mg/L	0.04 mg/L	95.0	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00854 mg/L	0.01 mg/L	85.4	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.091 mg/L	0.1 mg/L	90.7	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00379 mg/L	0.004 mg/L	94.8	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.00975 mg/L	0.01 mg/L	97.5	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0366 mg/L	0.04 mg/L	91.5	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0181 mg/L	0.02 mg/L	90.7	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0181 mg/L	0.02 mg/L	90.4	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.80 mg/L	2 mg/L	90.0	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0183 mg/L	0.02 mg/L	91.5	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0911 mg/L	0.1 mg/L	91.1	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0188 mg/L	0.02 mg/L	93.8	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0196 mg/L	0.02 mg/L	98.1	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0365 mg/L	0.04 mg/L	91.2	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	10.0 mg/L	10 mg/L	100	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	3.78 mg/L	4 mg/L	94.5	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.0192 mg/L	0.02 mg/L	96.3	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0400 mg/L	0.04 mg/L	99.9	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.36 mg/L	10 mg/L	93.6	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00402 mg/L	0.004 mg/L	100	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	1.91 mg/L	2 mg/L	95.4	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	20.1 mg/L	20 mg/L	100	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 718309) - continued										
FJ2203009-002	PR1	Tellurium, dissolved	13494-80-9	E421	0.0398 mg/L	0.04 mg/L	99.4	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00358 mg/L	0.004 mg/L	89.6	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.0197 mg/L	0.02 mg/L	98.6	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0188 mg/L	0.02 mg/L	93.8	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0374 mg/L	0.04 mg/L	93.6	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.0178 mg/L	0.02 mg/L	88.8	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00372 mg/L	0.004 mg/L	93.0	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0938 mg/L	0.1 mg/L	93.8	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.375 mg/L	0.4 mg/L	93.7	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0383 mg/L	0.04 mg/L	95.9	70.0	130	----
Dissolved Metals (QCLot: 719532)										
FC2202541-001	Anonymous	Mercury, dissolved	7439-97-6	E509-L	4.48 ng/L	5 ng/L	89.6	70.0	130	----
Speciated Metals (QCLot: 730278)										
FJ2202994-002	Anonymous	Methylmercury (as MeHg), total	22967-92-6	E536	0.00216 µg/L	0.0025 µg/L	86.2	60.0	140	----
Speciated Metals (QCLot: 733465)										
FJ2202994-001	Anonymous	Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00152 µg/L	0.0025 µg/L	61.0	60.0	140	----
Speciated Metals (QCLot: 733968)										
FJ2202994-003	Anonymous	Methylmercury (as MeHg), total	22967-92-6	E536	0.00175 µg/L	0.0025 µg/L	70.0	60.0	140	----
Speciated Metals (QCLot: 756854)										
FJ2202949-002	Anonymous	Iron, ferrous [Fe II], dissolved	15438-31-0	E541	0.355 mg/L	0.5 mg/L	71.1	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 2022-Oct-MON8/9- Day 2

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Page of

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Sarah Kennedy
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A

☑ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: skennedy@ecofishresearch.com

Email 2: tkasubuchi@ecofishresearch.com

Email 3: waterqualitylabdata@ecofishresearch.com

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Project Information

ALS Account # / Quote #:	VA22-ECOF100-004
Job #:	Surface water MON8/9- with metals
PO / AFE:	1200-25.03.02
LSD:	

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: accountspayable@ecofishresearch.com

Email 2:

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (ALS use only):

Intact: Sean Zhang Sampler: Pat Beaupre

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Alk., Ec, pH, TDS, TSS, Anions, Silicate, diss ortho P, colour, pH	DOC, Total dissolved P	NH3, Total Kjeldahl Nitrogen, Total N, TOC, Total P	IONBALANCE-BC-CL	Total Methyl Hg by GCAFS (0.00000002 mg/L)	Dissolved Methyl Hg by GCAFS (0.00000002 mg/L)	Total Metals by CRC ICPMS, Hardness from Total Ca/Mg	Dissolved Metals by CRC ICPMS, Hardness	Total Mercury in Water CVAFS (Low Level 0.0000005 mg/L)	Dissolved Mercury in Water by CVAFS (Low Level 0.0000005 mg/L)	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
						F/P	P			F		F		F				
	PC1	21-Oct-22	8:40	Water	9	R	R	R	R	R	R	R	R	R				
	PR1	21-Oct-22	8:00	Water	9	R	R	R	R	R	R	R	R	R				
	PR2	21-Oct-22	13:45	Water	9	R	R	R	R	R	R	R	R	R				
	HD	21-Oct-22	13:15	Water	9	R	R	R	R	R	R	R	R	R				
	~~DUP-01~~			~~Water~~	9	R	R	R	R	R	R	R	R	R				

Fort St. John Work Order Reference FJ2203009

Telephone : +1 250 261 5517

FJAE Shipping & Receiving
Call Out Expedite
Priority
1 # of Coolers Air
# of Carboys Ground

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Please send Azimuth a copy of the data in their EDD format:

gmann@azimuthgroup.ca imcivor@azimuthgroup.ca

csuzanne@ecofishresearch.com kganshorn@ecofishresearch.com

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
5.9	

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
[illegible]	Oct 22/22	1300

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Chain of Custody (COC) / Analytical Request Form

COC Number: 2022-Oct-MON8/9- Day 2

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Page of

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Sarah Kennedy
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Project Information

ALS Account # / Quote #:	VA22-ECOF100-004
Job #:	Surface water MON8/9- with metals
PO / AFE:	1200-25.03.02
LSD:	

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A

☑ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax	skennedy@ecofishresearch.com
Email 2	tkasubuchi@ecofishresearch.com
Email 3	waterqualitylabdata@ecofishresearch.com

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax	accountspayable@ecofishresearch.com
Email 2	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

ALS Lab Work Order # (ALS use only):

Sampler: Pat Beaupre

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Alk., Ec, pH, TDS, TSS, Anions, Silicate, diss ortho P, colour, pH	DOC, Total dissolved P (F/P)	NH3, Total Kjeldahl Nitrogen, Total N, TOC, Total P (P)	IONBALANCE-BC-CL	Total Methyl Hg by GCAFS (0.00000002 mg/L)	Dissolved Methyl Hg by GCAFS (0.00000002 mg/L) (F)	Total Metals by CRC ICPMS, Hardness from Total Ca/Mg	Dissolved Metals by CRC ICPMS, Hardness (F)	Total Mercury in Water CVAFS (Low Level 0.0000005 mg/L)	Dissolved Mercury in Water by CVAFS (Low Level 0.0000005 mg/L) (F)	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	PC1	21-Oct-22	8:40	Water	9	R	R	R	R	R	R	R	R	R	R			
	PR1	21-Oct-22	8:00	Water	9	R	R	R	R	R	R	R	R	R	R			
	PR2	21-Oct-22	13:45	Water	9	R	R	R	R	R	R	R	R	R	R			
	HD	21-Oct-22	13:15	Water	9	R	R	R	R	R	R	R	R	R	R			
	~~[illegible]~~			~~Water~~	9	R	R	R	R	R	R	R	R	R	R			

Fort St. John
Work Order Reference
FJ2203009

Telephone : +1 250 261 5517

FJAE Shipping & Receiving

___ Call Out ___ Expedite

___ Priority

1 # of Coolers ✓ Air

___ # of Carboys ___ Ground

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Please send Azimuth a copy of the data in their EDD format:

gmann@azimuthgroup.ca imcivor@azimuthgroup.ca

csuzanne@ecofishresearch.com kganshorn@ecofishresearch.com

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☑ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
5.9				9°C [Avg]			

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
[illegible]	21/10/22	1300

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
MeK	10/24/22	1115

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

ALS 2020 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

A-M

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2203012**	Page	: 1 of 8
Amendment	: **2**		
Client	: **Ecofish Research Ltd**	Laboratory	: ALS Environmental - Fort St. John
Contact	: Sarah Kennedy	Account Manager	: Sean Zhang
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: ----	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-With Metals	Date Samples Received	: 22-Oct-2022 13:00
PO	: 1200-25.03.02	Date Analysis Commenced	: 25-Oct-2022
C-O-C number	: 2022-Oct-MON8/9-Day 4	Issue Date	: 25-Aug-2023 17:59
Sampler	: PB		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Brieanna Allen	Production/Validation Manager	Inorganics, Burnaby, British Columbia
Cindy Tang	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Hamideh Moradi	Analyst	Metals, Burnaby, British Columbia
Jayden Piattelli	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Parnian Sane	Analyst	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.
Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
µS/cm	microsiemens per centimetre
CU	colour units (1 cu = 1 mg/l pt)
meq/L	milliequivalents per litre
mg/L	milligrams per litre
ng/L	nanograms per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Accreditation

Accreditation	*Description*	*Laboratory*	*Address*
A	CALA ISO/IEC 17025:2017	VA ALS Environmental - Vancouver	8081 Lougheed Highway, Burnaby, BC

Applicable accreditations are indicated in the Method/Lab column as superscripts.

Workorder Comments

Amendment (07/12/2022): This report has been amended and re-released to allow the reporting of additional analytical data.

Amendment (25/8/2023): This report has been amended following holding time evaluation corrections. All analysis results are as per the previous report.

Qualifiers

Qualifier	Description
RRV	Reported result verified by repeat analysis.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID: PDI	Pine	----	----	----
						Client sampling date / time: 22-Oct-2022 09:10	22-Oct-2022 11:10	----	----	----
						FJ2203012-001	FJ2203012-002	--------	--------	--------
						Result	Result	----	----	----
Sample Preparation										
Dissolved Fe2 filtration location	----	EP541/VA		-	-	Field	Field	----	----	----
Physical Tests										
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	A	1.0	mg/L	73.8	142	----	----	----
Alkalinity, carbonate (as CaCO3)	----	E290/VA	A	1.0	mg/L	<1.0	7.2	----	----	----
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	A	1.0	mg/L	<1.0	<1.0	----	----	----
Alkalinity, total (as CaCO3)	----	E290/VA	A	1.0	mg/L	73.8	150	----	----	----
Colour, true	----	E329/VA	A	5.0	CU	6.1	<5.0	----	----	----
Conductivity	----	E100/VA	A	2.0	µS/cm	183	352	----	----	----
Hardness (as CaCO3), dissolved	----	EC100/VA		0.50	mg/L	95.1	188	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA		0.50	mg/L	98.1	192	----	----	----
pH	----	E108/VA	A	0.10	pH units	8.17	8.43	----	----	----
Solids, total dissolved [TDS]	----	E162/VA	A	10	mg/L	106	220	----	----	----
Solids, total suspended [TSS]	----	E160/VA	A	3.0	mg/L	<3.0	<3.0	----	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/VA	A	0.0050	mg/L	0.0120	<0.0050	----	----	----
Chloride	16887-00-6	E235.Cl/VA	A	0.50	mg/L	<0.50	1.64	----	----	----
Fluoride	16984-48-8	E235.F/VA	A	0.020	mg/L	0.040	0.073	----	----	----
Kjeldahl nitrogen, total [TKN]	----	EC318/VA		0.050	mg/L	0.132	0.082	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	A	0.0050	mg/L	0.0615	<0.0050	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	A	0.0010	mg/L	<0.0010	<0.0010	----	----	----
Nitrogen, total	7727-37-9	E366/VA	A	0.030	mg/L	0.193	0.082	----	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/VA	A	0.0010	mg/L	<0.0010	<0.0010	----	----	----
Phosphorus, total	7723-14-0	E372-U/VA	A	0.0020	mg/L	0.0084	0.0040	----	----	----
Phosphorus, total dissolved	7723-14-0	E375-T/VA	A	0.0020	mg/L	0.0023 RRV	<0.0020	----	----	----
Silicate (as SiO2)	7631-86-9	E392/VA	A	0.50	mg/L	4.06	2.59	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	A	0.30	mg/L	12.9	28.5	----	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/VA		0.0032	mg/L	0.0615	<0.0051	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	PDI	Pine	----	----	----
					Client sampling date / time	22-Oct-2022 09:10	22-Oct-2022 11:10	----	----	----
Analyte	CAS Number	Method/Lab		LOR	Unit	FJ2203012-001	FJ2203012-002	--------	--------	--------
						Result	Result	----	----	----
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/VA	A	0.50	mg/L	2.57	1.28	----	----	----
Carbon, total organic [TOC]	----	E355-L/VA	A	0.50	mg/L	2.90	1.50	----	----	----
Ion Balance										
Anion sum	----	EC101/VA		0.10	meq/L	1.75	3.64	----	----	----
Cation sum	----	EC101/VA		0.10	meq/L	1.96	3.98	----	----	----
Ion balance (APHA)	----	EC101/VA		0.01	%	5.66	4.46	----	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	A	0.0030	mg/L	0.0887	0.0499	----	----	----
Antimony, total	7440-36-0	E420/VA	A	0.00010	mg/L	<0.00010	<0.00010	----	----	----
Arsenic, total	7440-38-2	E420/VA	A	0.00010	mg/L	0.00028	0.00020	----	----	----
Barium, total	7440-39-3	E420/VA	A	0.00010	mg/L	0.0373	0.129	----	----	----
Beryllium, total	7440-41-7	E420/VA	A	0.000020	mg/L	<0.000020	<0.000020	----	----	----
Bismuth, total	7440-69-9	E420/VA	A	0.000050	mg/L	<0.000050	<0.000050	----	----	----
Boron, total	7440-42-8	E420/VA	A	0.010	mg/L	<0.010	0.012	----	----	----
Cadmium, total	7440-43-9	E420/VA	A	0.0000050	mg/L	0.0000211	0.0000084	----	----	----
Calcium, total	7440-70-2	E420/VA	A	0.050	mg/L	28.1	53.0	----	----	----
Cesium, total	7440-46-2	E420/VA	A	0.000010	mg/L	0.000017	<0.000010	----	----	----
Chromium, total	7440-47-3	E420/VA	A	0.00050	mg/L	<0.00050	<0.00050	----	----	----
Cobalt, total	7440-48-4	E420/VA	A	0.00010	mg/L	<0.00010	<0.00010	----	----	----
Copper, total	7440-50-8	E420/VA	A	0.00050	mg/L	0.00081	<0.00050	----	----	----
Iron, total	7439-89-6	E420/VA	A	0.010	mg/L	0.104	0.091	----	----	----
Lead, total	7439-92-1	E420/VA	A	0.000050	mg/L	0.000058	<0.000050	----	----	----
Lithium, total	7439-93-2	E420/VA	A	0.0010	mg/L	0.0014	0.0088	----	----	----
Magnesium, total	7439-95-4	E420/VA	A	0.0050	mg/L	6.78	14.5	----	----	----
Manganese, total	7439-96-5	E420/VA	A	0.00010	mg/L	0.00412	0.00268	----	----	----
Mercury, total	7439-97-6	E508-L/VA	A	0.50	ng/L	<0.50	<0.50	----	----	----
Molybdenum, total	7439-98-7	E420/VA	A	0.000050	mg/L	0.000863	0.00106	----	----	----
Nickel, total	7440-02-0	E420/VA	A	0.00050	mg/L	0.00095	0.00064	----	----	----
Phosphorus, total	7723-14-0	E420/VA	A	0.050	mg/L	<0.050	<0.050	----	----	----
Potassium, total	7440-09-7	E420/VA	A	0.050	mg/L	0.508	0.705	----	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	PDI	Pine	----	----	----
						Client sampling date / time	22-Oct-2022 09:10	22-Oct-2022 11:10	----	----	----
							FJ2203012-001	FJ2203012-002	--------	--------	--------
							Result	Result	----	----	----
Total Metals											
Rubidium, total	7440-17-7	E420/VA	A	0.00020	mg/L		0.00053	0.00038	----	----	----
Selenium, total	7782-49-2	E420/VA	A	0.000050	mg/L		0.000240	0.000374	----	----	----
Silicon, total	7440-21-3	E420/VA	A	0.10	mg/L		2.09	1.34	----	----	----
Silver, total	7440-22-4	E420/VA	A	0.000010	mg/L		<0.000010	<0.000010	----	----	----
Sodium, total	7440-23-5	E420/VA	A	0.050	mg/L		1.24	4.58	----	----	----
Strontium, total	7440-24-6	E420/VA	A	0.00020	mg/L		0.110	0.206	----	----	----
Sulfur, total	7704-34-9	E420/VA	A	0.50	mg/L		5.01	11.2	----	----	----
Tellurium, total	13494-80-9	E420/VA	A	0.00020	mg/L		<0.00020	<0.00020	----	----	----
Thallium, total	7440-28-0	E420/VA	A	0.000010	mg/L		<0.000010	<0.000010	----	----	----
Thorium, total	7440-29-1	E420/VA	A	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Tin, total	7440-31-5	E420/VA	A	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Titanium, total	7440-32-6	E420/VA	A	0.00030	mg/L		0.00161	0.00080	----	----	----
Tungsten, total	7440-33-7	E420/VA	A	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Uranium, total	7440-61-1	E420/VA	A	0.000010	mg/L		0.000448	0.000444	----	----	----
Vanadium, total	7440-62-2	E420/VA	A	0.00050	mg/L		0.00084	<0.00050	----	----	----
Zinc, total	7440-66-6	E420/VA	A	0.0030	mg/L		<0.0030	<0.0030	----	----	----
Zirconium, total	7440-67-7	E420/VA	A	0.00020	mg/L		<0.00020	<0.00020	----	----	----
Dissolved Metals											
Aluminum, dissolved	7429-90-5	E421/VA	A	0.0010	mg/L		0.0045	0.0038	----	----	----
Antimony, dissolved	7440-36-0	E421/VA	A	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Arsenic, dissolved	7440-38-2	E421/VA	A	0.00010	mg/L		0.00019	0.00012	----	----	----
Barium, dissolved	7440-39-3	E421/VA	A	0.00010	mg/L		0.0304	0.115	----	----	----
Beryllium, dissolved	7440-41-7	E421/VA	A	0.000020	mg/L		<0.000020	<0.000020	----	----	----
Bismuth, dissolved	7440-69-9	E421/VA	A	0.000050	mg/L		<0.000050	<0.000050	----	----	----
Boron, dissolved	7440-42-8	E421/VA	A	0.010	mg/L		<0.010	0.012	----	----	----
Cadmium, dissolved	7440-43-9	E421/VA	A	0.0000050	mg/L		0.0000070	<0.0000050	----	----	----
Calcium, dissolved	7440-70-2	E421/VA	A	0.050	mg/L		27.5	51.9	----	----	----
Cesium, dissolved	7440-46-2	E421/VA	A	0.000010	mg/L		<0.000010	<0.000010	----	----	----
Chromium, dissolved	7440-47-3	E421/VA	A	0.00050	mg/L		<0.00050	<0.00050	----	----	----
Cobalt, dissolved	7440-48-4	E421/VA	A	0.00010	mg/L		<0.00010	<0.00010	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	PDI	Pine	----	----	----
					Client sampling date / time	22-Oct-2022 09:10	22-Oct-2022 11:10	----	----	----
Analyte	CAS Number	Method/Lab		LOR	Unit	FJ2203012-001	FJ2203012-002	--------	--------	--------
						Result	Result	----	----	----
Dissolved Metals										
Copper, dissolved	7440-50-8	E421/VA	A	0.00020	mg/L	0.00062	0.00031	----	----	----
Iron, dissolved	7439-89-6	E421/VA	A	0.010	mg/L	<0.010	<0.010	----	----	----
Lead, dissolved	7439-92-1	E421/VA	A	0.000050	mg/L	<0.000050	<0.000050	----	----	----
Lithium, dissolved	7439-93-2	E421/VA	A	0.0010	mg/L	0.0011	0.0080	----	----	----
Magnesium, dissolved	7439-95-4	E421/VA	A	0.0050	mg/L	6.43	14.2	----	----	----
Manganese, dissolved	7439-96-5	E421/VA	A	0.00010	mg/L	0.00070	0.00140	----	----	----
Mercury, dissolved	7439-97-6	E509-L/VA	A	0.50	ng/L	<0.50	<0.50	----	----	----
Molybdenum, dissolved	7439-98-7	E421/VA	A	0.000050	mg/L	0.000765	0.000932	----	----	----
Nickel, dissolved	7440-02-0	E421/VA	A	0.00050	mg/L	0.00066	<0.00050	----	----	----
Phosphorus, dissolved	7723-14-0	E421/VA	A	0.050	mg/L	<0.050	<0.050	----	----	----
Potassium, dissolved	7440-09-7	E421/VA	A	0.050	mg/L	0.447	0.672	----	----	----
Rubidium, dissolved	7440-17-7	E421/VA	A	0.00020	mg/L	0.00034	0.00032	----	----	----
Selenium, dissolved	7782-49-2	E421/VA	A	0.000050	mg/L	0.000286	0.000446	----	----	----
Silicon, dissolved	7440-21-3	E421/VA	A	0.050	mg/L	1.95	1.20	----	----	----
Silver, dissolved	7440-22-4	E421/VA	A	0.000010	mg/L	<0.000010	<0.000010	----	----	----
Sodium, dissolved	7440-23-5	E421/VA	A	0.050	mg/L	1.18	4.62	----	----	----
Strontium, dissolved	7440-24-6	E421/VA	A	0.00020	mg/L	0.109	0.204	----	----	----
Sulfur, dissolved	7704-34-9	E421/VA	A	0.50	mg/L	4.60	10.3	----	----	----
Tellurium, dissolved	13494-80-9	E421/VA	A	0.00020	mg/L	<0.00020	<0.00020	----	----	----
Thallium, dissolved	7440-28-0	E421/VA	A	0.000010	mg/L	<0.000010	<0.000010	----	----	----
Thorium, dissolved	7440-29-1	E421/VA	A	0.00010	mg/L	<0.00010	<0.00010	----	----	----
Tin, dissolved	7440-31-5	E421/VA	A	0.00010	mg/L	<0.00010	<0.00010	----	----	----
Titanium, dissolved	7440-32-6	E421/VA	A	0.00030	mg/L	<0.00030	<0.00030	----	----	----
Tungsten, dissolved	7440-33-7	E421/VA	A	0.00010	mg/L	<0.00010	<0.00010	----	----	----
Uranium, dissolved	7440-61-1	E421/VA	A	0.000010	mg/L	0.000400	0.000414	----	----	----
Vanadium, dissolved	7440-62-2	E421/VA	A	0.00050	mg/L	<0.00050	<0.00050	----	----	----
Zinc, dissolved	7440-66-6	E421/VA	A	0.0010	mg/L	<0.0010	<0.0010	----	----	----
Zirconium, dissolved	7440-67-7	E421/VA	A	0.00030	mg/L	<0.00030	<0.00030	----	----	----
Dissolved MeHg filtration location	----	EP537/VA		-	-	Field	Field	----	----	----
Dissolved mercury filtration location	----	EP509-L/VA		-	-	Field	Field	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	PDI	Pine	----	----	----
					Client sampling date / time	22-Oct-2022 09:10	22-Oct-2022 11:10	----	----	----
Analyte	CAS Number	Method/Lab		LOR	Unit	FJ2203012-001	FJ2203012-002	--------	--------	--------
						Result	Result	----	----	----
Dissolved Metals										
Dissolved metals filtration location	----	EP421/VA		-	-	Field	Field	----	----	----
Speciated Metals										
Methylmercury (as MeHg), total	22967-92-6	E536/VA	A	0.000000020	mg/L	<0.000000020	<0.000000020	----	----	----
Iron, ferrous [Fe II], dissolved	15438-31-0	E541/VA	A	0.020	mg/L	<0.020	<0.020	----	----	----
Methylmercury (as MeHg), dissolved	22967-92-6	E537/VA	A	0.000000020	mg/L	<0.000000020	<0.000000020	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2203012**	Page	: 1 of 18
Amendment	: **2**		
Client	: **Ecofish Research Ltd**	Laboratory	: ALS Environmental - Fort St. John
Contact	: Sarah Kennedy	Account Manager	: Sean Zhang
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-With Metals	Date Samples Received	: 22-Oct-2022 13:00
PO	: 1200-25.03.02	Issue Date	: 25-Aug-2023 17:59
C-O-C number	: 2022-Oct-MON8/9-Day 4		
Sampler	: PB		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Duplicate outliers occur.
- No Matrix Spike outliers occur.
- Method Blank value outliers occur - please see following pages for full details.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Method Blank (MB) Values								
Anions and Nutrients	QC-718139-001	----	Ammonia, total (as N)	7664-41-7	E298	0.0099 mg/L B	0.005 mg/L	Blank result exceeds permitted value

Result Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

Laboratory Control Sample (LCS) Recoveries								
Total Metals	QC-MRG2-717501002	----	Phosphorus, total	7723-14-0	E420	122 % MES	80.0-120%	Recovery greater than upper control limit

Result Qualifiers

Qualifier	Description
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PDI	E298	22-Oct-2022	27-Oct-2022	28 days	5 days	✓	28-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Pine	E298	22-Oct-2022	27-Oct-2022	28 days	5 days	✓	28-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PDI	E235.Cl	22-Oct-2022	25-Oct-2022	28 days	3 days	✓	25-Oct-2022	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Pine	E235.Cl	22-Oct-2022	25-Oct-2022	28 days	3 days	✓	25-Oct-2022	28 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PDI	E378-U	22-Oct-2022	25-Oct-2022	3 days	3 days	✓	25-Oct-2022	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE Pine	E378-U	22-Oct-2022	25-Oct-2022	3 days	3 days	✓	25-Oct-2022	3 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE PDI	E235.F	22-Oct-2022	25-Oct-2022	28 days	3 days	✓	25-Oct-2022	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Pine	E235.F	22-Oct-2022	25-Oct-2022	28 days	3 days	✓	25-Oct-2022	28 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PDI	E235.NO3-L	22-Oct-2022	25-Oct-2022	3 days	3 days	✓	25-Oct-2022	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Pine	E235.NO3-L	22-Oct-2022	25-Oct-2022	3 days	3 days	✓	25-Oct-2022	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PDI	E235.NO2-L	22-Oct-2022	25-Oct-2022	3 days	3 days	✓	25-Oct-2022	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Pine	E235.NO2-L	22-Oct-2022	25-Oct-2022	3 days	3 days	✓	25-Oct-2022	3 days	3 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE PDI	E392	22-Oct-2022	----	----	----		26-Oct-2022	28 days	4 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE Pine	E392	22-Oct-2022	----	----	----		26-Oct-2022	28 days	4 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PDI	E235.SO4	22-Oct-2022	25-Oct-2022	28 days	3 days	✓	25-Oct-2022	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Pine	E235.SO4	22-Oct-2022	25-Oct-2022	28 days	3 days	✓	25-Oct-2022	28 days	3 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
PDI	E375-T	22-Oct-2022	27-Oct-2022	28 days	5 days	✓	28-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
Pine	E375-T	22-Oct-2022	27-Oct-2022	28 days	5 days	✓	28-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
PDI	E366	22-Oct-2022	27-Oct-2022	28 days	5 days	✓	28-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Pine	E366	22-Oct-2022	27-Oct-2022	28 days	5 days	✓	28-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
PDI	E372-U	22-Oct-2022	27-Oct-2022	28 days	5 days	✓	28-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
Pine	E372-U	22-Oct-2022	27-Oct-2022	28 days	5 days	✓	28-Oct-2022	28 days	6 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved)										
PDI	E509-L	22-Oct-2022	28-Oct-2022	28 days	6 days	✓	28-Oct-2022	28 days	6 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved)										
Pine	E509-L	22-Oct-2022	28-Oct-2022	28 days	6 days	✓	28-Oct-2022	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) PDI	E421	22-Oct-2022	30-Oct-2022	180 days	8 days	✓	31-Oct-2022	180 days	9 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) Pine	E421	22-Oct-2022	30-Oct-2022	180 days	8 days	✓	31-Oct-2022	180 days	9 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PDI	E358-L	22-Oct-2022	27-Oct-2022	28 days	5 days	✓	27-Oct-2022	28 days	5 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Pine	E358-L	22-Oct-2022	27-Oct-2022	28 days	5 days	✓	27-Oct-2022	28 days	5 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PDI	E355-L	22-Oct-2022	27-Oct-2022	28 days	5 days	✓	27-Oct-2022	28 days	5 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) Pine	E355-L	22-Oct-2022	27-Oct-2022	28 days	5 days	✓	27-Oct-2022	28 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PDI	E290	22-Oct-2022	25-Oct-2022	14 days	3 days	✓	25-Oct-2022	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Pine	E290	22-Oct-2022	25-Oct-2022	14 days	3 days	✓	25-Oct-2022	14 days	4 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE Pine	E329	22-Oct-2022	25-Oct-2022	3 days	3 days	✓	25-Oct-2022	3 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE PDI	E329	22-Oct-2022	25-Oct-2022	3 days	3 days	✓	25-Oct-2022	3 days	4 days	× EHT
Physical Tests : Conductivity in Water										
HDPE PDI	E100	22-Oct-2022	25-Oct-2022	28 days	3 days	✓	25-Oct-2022	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE Pine	E100	22-Oct-2022	25-Oct-2022	28 days	3 days	✓	25-Oct-2022	28 days	4 days	✓
Physical Tests : pH by Meter										
HDPE Pine	E108	22-Oct-2022	25-Oct-2022	0.25 hrs	77 hrs	× EHTR-FM	25-Oct-2022	0.25 hrs	84 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PDI	E108	22-Oct-2022	25-Oct-2022	0.25 hrs	79 hrs	× EHTR-FM	25-Oct-2022	0.25 hrs	86 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE PDI	E162	22-Oct-2022	----	----	----		25-Oct-2022	7 days	3 days	✓
Physical Tests : TDS by Gravimetry										
HDPE Pine	E162	22-Oct-2022	----	----	----		25-Oct-2022	7 days	3 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PDI	E160	22-Oct-2022	----	----	----		25-Oct-2022	7 days	3 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Pine	E160	22-Oct-2022	----	----	----		25-Oct-2022	7 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Speciated Metals : Dissolved Ferrous Iron in Water by Colour										
Amber glass dissolved (hydrochloric acid)										
PDI	E541	22-Oct-2022	24-Nov-2022	7 days	33 days	× EHT	24-Nov-2022	7 days	33 days	× EHT
Speciated Metals : Dissolved Ferrous Iron in Water by Colour										
Amber glass dissolved (hydrochloric acid)										
Pine	E541	22-Oct-2022	24-Nov-2022	7 days	33 days	× EHT	24-Nov-2022	7 days	33 days	× EHT
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid)										
PDI	E537	22-Oct-2022	07-Nov-2022	180 days	16 days	✓	11-Nov-2022	180 days	4 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid)										
Pine	E537	22-Oct-2022	07-Nov-2022	180 days	16 days	✓	11-Nov-2022	180 days	4 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid)										
PDI	E536	22-Oct-2022	05-Nov-2022	180 days	14 days	✓	07-Nov-2022	180 days	16 days	✓
Speciated Metals : Total Methylmercury in Water by GCAFS										
Amber glass total (hydrochloric acid)										
Pine	E536	22-Oct-2022	05-Nov-2022	180 days	14 days	✓	07-Nov-2022	180 days	16 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved)										
PDI	E508-L	22-Oct-2022	27-Oct-2022	28 days	5 days	✓	27-Oct-2022	28 days	0 days	✓
Total Metals : Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - total (lab preserved)										
Pine	E508-L	22-Oct-2022	27-Oct-2022	28 days	5 days	✓	27-Oct-2022	28 days	0 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
PDI	E420	22-Oct-2022	27-Oct-2022	180 days	5 days	✓	28-Oct-2022	180 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
Pine	E420	22-Oct-2022	27-Oct-2022	180 days	5 days	✓	28-Oct-2022	180 days	6 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	714167	1	14	7.1	5.0	✓
Ammonia by Fluorescence	E298	718139	1	9	11.1	5.0	✓
Chloride in Water by IC	E235.Cl	714170	1	18	5.5	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	714177	1	3	33.3	5.0	✓
Conductivity in Water	E100	714168	1	4	25.0	5.0	✓
Dissolved Ferrous Iron in Water by Colour	E541	756855	1	2	50.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	719532	1	19	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	720452	1	16	6.2	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	733465	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	718134	1	12	8.3	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	714178	1	4	25.0	5.0	✓
Fluoride in Water by IC	E235.F	714169	1	4	25.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	714171	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	714172	1	8	12.5	5.0	✓
pH by Meter	E108	714166	1	4	25.0	5.0	✓
Reactive Silica by Colourimetry	E392	716537	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	714174	1	4	25.0	5.0	✓
TDS by Gravimetry	E162	714302	1	19	5.2	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	718138	1	4	25.0	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	717494	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	717501	1	10	10.0	5.0	✓
Total Methylmercury in Water by GCAFS	E536	730278	2	27	7.4	5.0	✓
Total Nitrogen by Colourimetry	E366	718136	1	4	25.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	718135	1	12	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	718137	1	4	25.0	5.0	✓
TSS by Gravimetry	E160	714283	1	19	5.2	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	714167	1	14	7.1	5.0	✓
Ammonia by Fluorescence	E298	718139	1	9	11.1	5.0	✓
Chloride in Water by IC	E235.Cl	714170	1	18	5.5	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	714177	1	3	33.3	5.0	✓
Conductivity in Water	E100	714168	1	4	25.0	5.0	✓
Dissolved Ferrous Iron in Water by Colour	E541	756855	1	2	50.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	719532	1	19	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	720452	1	16	6.2	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	733465	1	20	5.0	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	718134	1	12	8.3	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	714178	1	4	25.0	5.0	✓
Fluoride in Water by IC	E235.F	714169	1	4	25.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	714171	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	714172	1	8	12.5	5.0	✓
pH by Meter	E108	714166	1	4	25.0	5.0	✓
Reactive Silica by Colourimetry	E392	716537	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	714174	1	4	25.0	5.0	✓
TDS by Gravimetry	E162	714302	1	19	5.2	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	718138	1	4	25.0	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	717494	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	717501	1	10	10.0	5.0	✓
Total Methylmercury in Water by GCAFS	E536	730278	2	27	7.4	5.0	✓
Total Nitrogen by Colourimetry	E366	718136	1	4	25.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	718135	1	12	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	718137	1	4	25.0	5.0	✓
TSS by Gravimetry	E160	714283	1	19	5.2	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	714167	1	14	7.1	5.0	✓
Ammonia by Fluorescence	E298	718139	1	9	11.1	5.0	✓
Chloride in Water by IC	E235.Cl	714170	1	18	5.5	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	714177	1	3	33.3	5.0	✓
Conductivity in Water	E100	714168	1	4	25.0	5.0	✓
Dissolved Ferrous Iron in Water by Colour	E541	756855	1	2	50.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	719532	1	19	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	720452	1	16	6.2	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	733465	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	718134	1	12	8.3	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	714178	1	4	25.0	5.0	✓
Fluoride in Water by IC	E235.F	714169	1	4	25.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	714171	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	714172	1	8	12.5	5.0	✓
Reactive Silica by Colourimetry	E392	716537	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	714174	1	4	25.0	5.0	✓
TDS by Gravimetry	E162	714302	1	19	5.2	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	718138	1	4	25.0	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	717494	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	717501	1	10	10.0	5.0	✓
Total Methylmercury in Water by GCAFS	E536	730278	2	27	7.4	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Total Nitrogen by Colourimetry	E366	718136	1	4	25.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	718135	1	12	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	718137	1	4	25.0	5.0	✓
TSS by Gravimetry	E160	714283	1	19	5.2	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	718139	1	9	11.1	5.0	✓
Chloride in Water by IC	E235.Cl	714170	1	18	5.5	5.0	✓
Dissolved Ferrous Iron in Water by Colour	E541	756855	1	2	50.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	719532	1	19	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	720452	1	16	6.2	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	733465	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	718134	1	12	8.3	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	714178	1	4	25.0	5.0	✓
Fluoride in Water by IC	E235.F	714169	1	4	25.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	714171	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	714172	1	8	12.5	5.0	✓
Reactive Silica by Colourimetry	E392	716537	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	714174	1	4	25.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	718138	1	4	25.0	5.0	✓
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L	717494	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	717501	2	10	20.0	5.0	✓
Total Methylmercury in Water by GCAFS	E536	730278	2	27	7.4	5.0	✓
Total Nitrogen by Colourimetry	E366	718136	1	4	25.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	718135	1	12	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	718137	1	4	25.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Vancouver	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Vancouver	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	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.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Colour (True) by Spectrometer (5 CU)	E329 ALS Environmental - Vancouver	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366 ALS Environmental - Vancouver	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Vancouver	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Reactive Silica by Colourimetry	E392 ALS Environmental - Vancouver	Water	APHA 4500-SiO2 E (mod)	Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method using a discrete analyzer. Method Limitation: Arsenic (5+) above 100 mg/L is a negative interference on this test
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Vancouver	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E508-L ALS Environmental - Vancouver	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAFS.
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L ALS Environmental - Vancouver	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAFS.
Total Methylmercury in Water by GCAFS	E536 ALS Environmental - Vancouver	Water	EPA 1630 (mod)	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Methylmercury in Water by GCAFS	E537 ALS Environmental - Vancouver	Water	EPA 1630 (mod)	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Ferrous Iron in Water by Colour	E541 ALS Environmental - Vancouver	Water	APHA 3500-Fe B/James Ball et al (1999)	This analysis is carried out using procedures adapted from APHA 3500-Fe B and Environ. Sci. Technol. 1999, 33, 5, 807–813. The procedure involves preliminary sample filtration, and ferrous iron is determined using the "FerroZine" colourimetric method. Holding time is 7 days for 0.45um filtration or 6 months if samples have been filtered using 0.1um filters.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	Water	APHA 2340B	“Hardness (as CaCO3), dissolved” is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. “Total Hardness” refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Ion Balance using Dissolved Metals	EC101 ALS Environmental - Vancouver	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Vancouver	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
Total Kjeldahl Nitrogen (Calculation)	EC318 ALS Environmental - Vancouver	Water	BC MOE LABORATORY MANUAL (2005)	Total Kjeldahl Nitrogen is a calculated parameter. Total Kjeldahl Nitrogen (calc) = Total Nitrogen - [Nitrite (as N) + Nitrate (as N)].

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Preparation for Total Organic Carbon by Combustion	EP355 ALS Environmental - Vancouver	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Nitrogen in water	EP366 ALS Environmental - Vancouver	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals Water Filtration	EP421 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration (Low Level)	EP509-L ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
Total Methylmercury Water Preparation	EP536 ALS Environmental - Vancouver	Water	EPA 1630	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Methylmercury Water Preparation	EP537 ALS Environmental - Vancouver	Water	EPA 1630	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Ferrous Iron in Water by Colour	EP541 ALS Environmental - Vancouver	Water	APHA 3500-Fe B/James Ball et al (1999)	This analysis is carried out using procedures adapted from APHA 3500-Fe B and "A New Method for the Direct Determination of Dissolved Iron Concentration in Acid Mine Waters" published by James W. Ball et al (1999). The procedure involves preliminary sample filtration, and ferrous iron is determined using the "FerroZine" colourimetric method.

QUALITY CONTROL REPORT

Work Order	: **FJ2203012**	Page	: 1 of 18
Amendment	: **2**		
Client	: Ecofish Research Ltd	Laboratory	: ALS Environmental - Fort St. John
Contact	: Sarah Kennedy	Account Manager	: Sean Zhang
Address	: 1220 - 1175 Douglas Street Victoria BC Canada V8W 2E1	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	:	Telephone	: +1 250 261 5517
Project	: Surface Water MON8/9-With Metals	Date Samples Received	: 22-Oct-2022 13:00
PO	: 1200-25.03.02	Date Analysis Commenced	: 25-Oct-2022
C-O-C number	: 2022-Oct-MON8/9-Day 4	Issue Date	: 25-Aug-2023 17:59
Sampler	: PB ----		
Site	:		
Quote number	: VA22-ECOF100-004		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Brieanna Allen	Production/Validation Manager	Vancouver Inorganics, Burnaby, British Columbia
Cindy Tang	Team Leader - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Hamideh Moradi	Analyst	Vancouver Metals, Burnaby, British Columbia
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Tracy Harley	Supervisor - Water Quality Instrumentation	Vancouver Inorganics, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 714166)											
FJ2203021-001	Anonymous	pH	----	E108	0.10	pH units	8.11	8.13	0.246%	4%	----
Physical Tests (QC Lot: 714167)											
FJ2203021-001	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	184	185	0.530%	20%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	184	185	0.530%	20%	----
Physical Tests (QC Lot: 714168)											
FJ2203021-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	1210	1200	0.996%	10%	----
Physical Tests (QC Lot: 714177)											
FJ2203012-001	PDI	Colour, true	----	E329	5.0	CU	6.1	6.5	0.4	Diff <2x LOR	----
Physical Tests (QC Lot: 714283)											
FJ2202955-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 714302)											
FJ2202955-001	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	318	305	4.18%	20%	----
Anions and Nutrients (QC Lot: 714169)											
FJ2203021-001	Anonymous	Fluoride	16984-48-8	E235.F	0.100	mg/L	0.189	0.185	0.004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 714170)											
FJ2203021-001	Anonymous	Chloride	16887-00-6	E235.Cl	2.50	mg/L	<2.50	<2.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 714171)											
FJ2203021-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	<0.0250	<0.0250	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 714172)											
FJ2203021-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 714174)											
FJ2203021-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	554	554	0.0604%	20%	----
Anions and Nutrients (QC Lot: 714178)											
FJ2203012-001	PDI	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 716537)											
EO2209213-024	Anonymous	Silicate (as SiO2)	7631-86-9	E392	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 718136)											
FJ2203012-001	PDI	Nitrogen, total	7727-37-9	E366	0.030	mg/L	0.193	0.196	0.003	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 718137)											
FJ2203012-001	PDI	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0084	0.0080	0.0004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 718138)											
FJ2203012-001	PDI	Phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	0.0023	0.0021	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 718139)											
FJ2203012-001	PDI	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0120	0.0121	0.00008	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 718134)											
FJ2203012-001	PDI	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.57	2.84	0.28	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 718135)											
FJ2203012-001	PDI	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	2.90	2.89	0.004	Diff <2x LOR	----
Total Metals (QC Lot: 717494)											
CG2214693-001	Anonymous	Mercury, total	7439-97-6	E508-L	0.50	ng/L	<0.00050 µg/L	<0.50	0	Diff <2x LOR	----
Total Metals (QC Lot: 717501)											
VA22C5469-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.00020	<0.00010	0.00010	Diff <2x LOR	----
		Beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 717501) - continued											
VA22C5469-001	Anonymous	Rubidium, total	7440-17-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	<0.10	<0.10	0	Diff <2x LOR	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Sulfur, total	7704-34-9	E420	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 719532)											
EO2208953-001	Anonymous	Mercury, dissolved	7439-97-6	E509-L	1.00	ng/L	<1.00	<1.00	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 720452)											
FJ2203006-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0501	0.0488	2.64%	20%	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.0101	0.00998	1.06%	20%	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00019	0.00015	0.00004	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0838	0.0815	2.82%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	0.000040	0.000040	0.0000007	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000181	0.0000140	0.0000041	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	11.5	11.4	0.565%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000019	0.000017	0.000002	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00013	0.00013	0.000002	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.0110	0.0107	2.62%	20%	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.042	0.040	0.002	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 720452) - continued											
FJ2203006-001	Anonymous	Lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000108	0.000106	0.000002	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0045	0.0045	0.00002	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	4.69	4.49	4.24%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00064	0.00058	0.00007	Diff <2x LOR	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00274	0.00269	1.84%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00478	0.00454	0.00023	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	1.05	1.03	2.53%	20%	----
		Rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00078	0.00073	0.00005	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.00330	0.00346	4.51%	20%	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.17	1.16	0.742%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	0.000025	0.000025	0.0000001	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.152	0.143	0.009	Diff <2x LOR	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0244	0.0238	2.65%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	11.0	11.2	1.33%	20%	----
		Tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00196	0.00150	0.00047	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000177	0.000179	0.726%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0061	0.0061	0.00005	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
Speciated Metals (QC Lot: 730278)											
FJ2202994-001	Anonymous	Methylmercury (as MeHg), total	22967-92-6	E536	0.000020	µg/L	<0.000000020 mg/L	<0.000020	0	Diff <2x LOR	----
Speciated Metals (QC Lot: 733465)											
FC2202619-001	Anonymous	Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.000020	µg/L	0.000060	0.000058	0.000002	Diff <2x LOR	----
Speciated Metals (QC Lot: 733968)											
FJ2202978-004	Anonymous	Methylmercury (as MeHg), total	22967-92-6	E536	0.000020	µg/L	<0.000000020 mg/L	<0.000020	0	Diff <2x LOR	----
Speciated Metals (QC Lot: 756855)											
FJ2203012-001	PDI	Iron, ferrous [Fe II], dissolved	15438-31-0	E541	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 714167)						
Alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 714168)						
Conductivity	----	E100	1	µS/cm	1.1	----
Physical Tests (QCLot: 714177)						
Colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 714283)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 714302)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 714169)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 714170)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 714171)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 714172)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 714174)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 714178)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 716537)						
Silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 718136)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 718137)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 718138)						

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 718138) - continued						
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 718139)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	# 0.0099	B
Organic / Inorganic Carbon (QCLot: 718134)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 718135)						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 717494)						
Mercury, total	7439-97-6	E508-L	0.5	ng/L	<0.50	----
Total Metals (QCLot: 717501)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 717501) - continued						
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 719532)						
Mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	<0.50	----
Dissolved Metals (QCLot: 720452)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 720452) - continued						
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Speciated Metals (QCLot: 730278)						
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 733465)						
Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 733968)						
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 756855)						
Iron, ferrous [Fe II], dissolved	15438-31-0	E541	0.02	mg/L	<0.020	----

Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 714166)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 714167)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	109	85.0	115	----
Physical Tests (QCLot: 714168)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.4	90.0	110	----
Physical Tests (QCLot: 714177)									
Colour, true	----	E329	5	CU	100 CU	102	85.0	115	----
Physical Tests (QCLot: 714283)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	90.3	85.0	115	----
Physical Tests (QCLot: 714302)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 714169)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 714170)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 714171)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	107	90.0	110	----
Anions and Nutrients (QCLot: 714172)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 714174)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	109	90.0	110	----
Anions and Nutrients (QCLot: 714178)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	90.8	80.0	120	----
Anions and Nutrients (QCLot: 716537)									
Silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	10 mg/L	105	85.0	115	----
Anions and Nutrients (QCLot: 718136)									
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	97.8	75.0	125	----
Anions and Nutrients (QCLot: 718137)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	88.5	80.0	120	----
Anions and Nutrients (QCLot: 718138)									
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.05 mg/L	90.4	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Anions and Nutrients (QCLot: 718139)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	90.1	85.0	115	----
Organic / Inorganic Carbon (QCLot: 718134)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	98.1	80.0	120	----
Organic / Inorganic Carbon (QCLot: 718135)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	100	80.0	120	----
Total Metals (QCLot: 717494)									
Mercury, total	7439-97-6	E508-L	0.5	ng/L	5 ng/L	112	80.0	120	----
Total Metals (QCLot: 717501)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	117	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	110	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	120	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	114	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	108	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	110	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	100	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	111	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	108	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	108	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	115	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	114	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	114	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	106	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	107	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	109	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	116	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	116	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	111	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	115	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	# 122	80.0	120	MES
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	115	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	113	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	109	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	110	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	103	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 717501) - continued									
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	115	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	111	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	115	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	115	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	106	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	99.3	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	106	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	108	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	109	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	112	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	118	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	105	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	105	80.0	120	----
Mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	5 ng/L	100	80.0	120	----
Dissolved Metals (QCLot: 720452)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	112	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	109	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	112	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	104	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	108	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	100	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	110	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	106	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	107	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	106	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	105	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	102	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	107	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	104	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	107	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	106	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	104	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	104	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 720452) - continued									
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	108	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	110	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	108	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	109	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	111	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	101	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	112	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	106	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	106	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	104	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	110	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	106	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	106	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	104	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	104	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	110	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	111	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	112	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
Speciated Metals (QCLot: 730278)									
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	0.0025 µg/L	81.5	70.0	130	----
Speciated Metals (QCLot: 733465)									
Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	0.0025 µg/L	83.2	70.0	130	----
Speciated Metals (QCLot: 733968)									
Methylmercury (as MeHg), total	22967-92-6	E536	0.00002	µg/L	0.0025 µg/L	79.0	70.0	130	----
Speciated Metals (QCLot: 756855)									
Iron, ferrous [Fe II], dissolved	15438-31-0	E541	0.02	mg/L	0.5 mg/L	103	80.0	120	----

Qualifiers

Qualifier	Description
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 714169)										
FJ2203012-002	Pine	Fluoride	16984-48-8	E235.F	1.00 mg/L	1 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 714170)										
FJ2203012-002	Pine	Chloride	16887-00-6	E235.Cl	104 mg/L	100 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 714171)										
FJ2203012-002	Pine	Nitrate (as N)	14797-55-8	E235.NO3-L	2.68 mg/L	2.5 mg/L	107	75.0	125	----
Anions and Nutrients (QCLot: 714172)										
FJ2203012-002	Pine	Nitrite (as N)	14797-65-0	E235.NO2-L	0.489 mg/L	0.5 mg/L	97.9	75.0	125	----
Anions and Nutrients (QCLot: 714174)										
FJ2203012-002	Pine	Sulfate (as SO4)	14808-79-8	E235.SO4	106 mg/L	100 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 714178)										
FJ2203012-002	Pine	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0280 mg/L	0.03 mg/L	93.3	70.0	130	----
Anions and Nutrients (QCLot: 716537)										
EO2209213-025	Anonymous	Silicate (as SiO2)	7631-86-9	E392	9.41 mg/L	10 mg/L	94.1	75.0	125	----
Anions and Nutrients (QCLot: 718136)										
FJ2203012-002	Pine	Nitrogen, total	7727-37-9	E366	0.406 mg/L	0.4 mg/L	101	70.0	130	----
Anions and Nutrients (QCLot: 718137)										
FJ2203012-002	Pine	Phosphorus, total	7723-14-0	E372-U	0.0469 mg/L	0.05 mg/L	93.9	70.0	130	----
Anions and Nutrients (QCLot: 718138)										
FJ2203012-002	Pine	Phosphorus, total dissolved	7723-14-0	E375-T	0.0474 mg/L	0.05 mg/L	94.7	70.0	130	----
Anions and Nutrients (QCLot: 718139)										
FJ2203012-002	Pine	Ammonia, total (as N)	7664-41-7	E298	0.0958 mg/L	0.1 mg/L	95.8	75.0	125	----
Organic / Inorganic Carbon (QCLot: 718134)										
FJ2203012-002	Pine	Carbon, dissolved organic [DOC]	----	E358-L	4.97 mg/L	5 mg/L	99.4	70.0	130	----
Organic / Inorganic Carbon (QCLot: 718135)										
FJ2203012-002	Pine	Carbon, total organic [TOC]	----	E355-L	4.73 mg/L	5 mg/L	94.6	70.0	130	----
Total Metals (QCLot: 717494)										
CG2214734-001	Anonymous	Mercury, total	7439-97-6	E508-L	5.15 ng/L	5 ng/L	103	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 717501)										
VA22C5469-002	Anonymous	Aluminum, total	7429-90-5	E420	0.197 mg/L	0.2 mg/L	98.6	70.0	130	----
		Barium, total	7440-39-3	E420	0.0182 mg/L	0.02 mg/L	91.2	70.0	130	----
VA22C5469-002	Anonymous	Antimony, total	7440-36-0	E420	0.0199 mg/L	0.02 mg/L	99.6	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0211 mg/L	0.02 mg/L	106	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0401 mg/L	0.04 mg/L	100	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.0102 mg/L	0.01 mg/L	102	70.0	130	----
		Boron, total	7440-42-8	E420	0.097 mg/L	0.1 mg/L	96.8	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00419 mg/L	0.004 mg/L	105	70.0	130	----
		Calcium, total	7440-70-2	E420	4.08 mg/L	4 mg/L	102	70.0	130	----
		Cesium, total	7440-46-2	E420	0.0101 mg/L	0.01 mg/L	101	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0419 mg/L	0.04 mg/L	105	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0212 mg/L	0.02 mg/L	106	70.0	130	----
		Copper, total	7440-50-8	E420	0.0215 mg/L	0.02 mg/L	107	70.0	130	----
		Iron, total	7439-89-6	E420	2.05 mg/L	2 mg/L	102	70.0	130	----
		Lead, total	7439-92-1	E420	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		Lithium, total	7439-93-2	E420	0.100 mg/L	0.1 mg/L	100	70.0	130	----
		Magnesium, total	7439-95-4	E420	1.06 mg/L	1 mg/L	106	70.0	130	----
		Manganese, total	7439-96-5	E420	0.0207 mg/L	0.02 mg/L	103	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0205 mg/L	0.02 mg/L	102	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0430 mg/L	0.04 mg/L	108	70.0	130	----
		Phosphorus, total	7723-14-0	E420	10.6 mg/L	10 mg/L	106	70.0	130	----
		Potassium, total	7440-09-7	E420	4.22 mg/L	4 mg/L	106	70.0	130	----
		Rubidium, total	7440-17-7	E420	0.0207 mg/L	0.02 mg/L	104	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0405 mg/L	0.04 mg/L	101	70.0	130	----
		Silicon, total	7440-21-3	E420	9.83 mg/L	10 mg/L	98.3	70.0	130	----
		Silver, total	7440-22-4	E420	0.00431 mg/L	0.004 mg/L	108	70.0	130	----
		Sodium, total	7440-23-5	E420	2.09 mg/L	2 mg/L	104	70.0	130	----
		Strontium, total	7440-24-6	E420	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		Sulfur, total	7704-34-9	E420	21.0 mg/L	20 mg/L	105	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.0401 mg/L	0.04 mg/L	100	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00393 mg/L	0.004 mg/L	98.3	70.0	130	----
		Thorium, total	7440-29-1	E420	0.0211 mg/L	0.02 mg/L	106	70.0	130	----
		Tin, total	7440-31-5	E420	0.0197 mg/L	0.02 mg/L	98.6	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0412 mg/L	0.04 mg/L	103	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.0200 mg/L	0.02 mg/L	99.8	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 717501) - continued										
VA22C5469-002	Anonymous	Uranium, total	7440-61-1	E420	0.00411 mg/L	0.004 mg/L	103	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.107 mg/L	0.1 mg/L	107	70.0	130	----
		Zinc, total	7440-66-6	E420	0.412 mg/L	0.4 mg/L	103	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.0394 mg/L	0.04 mg/L	98.4	70.0	130	----
Dissolved Metals (QCLot: 719532)										
FC2202541-001	Anonymous	Mercury, dissolved	7439-97-6	E509-L	4.48 ng/L	5 ng/L	89.6	70.0	130	----
Dissolved Metals (QCLot: 720452)										
FJ2203006-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.210 mg/L	0.2 mg/L	105	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0198 mg/L	0.02 mg/L	99.1	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0407 mg/L	0.04 mg/L	102	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00937 mg/L	0.01 mg/L	93.7	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.094 mg/L	0.1 mg/L	93.7	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00402 mg/L	0.004 mg/L	101	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.00993 mg/L	0.01 mg/L	99.3	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0402 mg/L	0.04 mg/L	100	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0196 mg/L	0.02 mg/L	98.1	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0197 mg/L	0.02 mg/L	98.5	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.96 mg/L	2 mg/L	98.0	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0194 mg/L	0.02 mg/L	97.2	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0203 mg/L	0.02 mg/L	101	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0197 mg/L	0.02 mg/L	98.4	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0395 mg/L	0.04 mg/L	98.7	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	10.7 mg/L	10 mg/L	107	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	4.07 mg/L	4 mg/L	102	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0418 mg/L	0.04 mg/L	104	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.54 mg/L	10 mg/L	95.4	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00418 mg/L	0.004 mg/L	104	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	2.07 mg/L	2 mg/L	104	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 720452) - continued										
FJ2203006-002	Anonymous	Sulfur, dissolved	7704-34-9	E421	19.9 mg/L	20 mg/L	99.5	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.0407 mg/L	0.04 mg/L	102	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00383 mg/L	0.004 mg/L	95.7	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.0216 mg/L	0.02 mg/L	108	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0195 mg/L	0.02 mg/L	97.6	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0384 mg/L	0.04 mg/L	96.0	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.0193 mg/L	0.02 mg/L	96.7	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00391 mg/L	0.004 mg/L	97.8	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.105 mg/L	0.1 mg/L	105	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.420 mg/L	0.4 mg/L	105	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0413 mg/L	0.04 mg/L	103	70.0	130	----
Speciated Metals (QCLot: 730278)										
FJ2202994-002	Anonymous	Methylmercury (as MeHg), total	22967-92-6	E536	0.00216 µg/L	0.0025 µg/L	86.2	60.0	140	----
Speciated Metals (QCLot: 733465)										
FJ2202994-001	Anonymous	Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00152 µg/L	0.0025 µg/L	61.0	60.0	140	----
Speciated Metals (QCLot: 733968)										
FJ2202994-003	Anonymous	Methylmercury (as MeHg), total	22967-92-6	E536	0.00175 µg/L	0.0025 µg/L	70.0	60.0	140	----
Speciated Metals (QCLot: 756855)										
FJ2203012-002	Pine	Iron, ferrous [Fe II], dissolved	15438-31-0	E541	0.452 mg/L	0.5 mg/L	90.5	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 2022-Oct-MON8/9- Day 4

Page of

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Sarah Kennedy
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Project Information

ALS Account # / Quote #:	VA22-ECOF100-004
Job #:	Surface water MON8/9- with metals
PO / AFE:	1200-25.03.02
LSD:	

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A

☑ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax	skennedy@ecofishresearch.com
Email 2	tkasubuchi@ecofishresearch.com
Email 3	waterqualitylabdata@ecofishresearch.com

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax	accountspayable@ecofishresearch.com
Email 2	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

Date and Time Required for all E&P TATs:

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

ALS Lab Work Order # (ALS use only): FJ2203012

ALS Contact: Sean Zhang Sampler: Pat Beaupre

Fort St. John Work Order Reference FJ2203012

Telephone : +1 250 261 5517

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample (This d	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Alk., Ec, pH, TDS, TSS, Anions, Silicate, diss ortho P, colour, pH	DOC, Total dissolved P	NH3, Total Kjeldahl Nitrogen, Total N, TOC, Total P	IONBALANCE-BC-CL	Total Methyl Hg by GCAFS (0.00000002 mg/L)	Dissolved Methyl Hg by GCAFS (0.00000002 mg/L)	Total Metals by CRC ICPMS, Hardness from Total Ca/Mg	Dissolved Metals by CRC ICPMS, Hardness	Total Mercury in Water CVAFS (Low Level 0.0000005 mg/L)	Dissolved Mercury in Water by CVAFS (Low Level 0.0000005 mg/L)	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
						F/P	P				F		F		F			
	~~PD5~~ PR2.81	8 Oct 22	08:20	Water	9	R	R	R	R	R	R	R	R	R	R			
	~~MD~~	8 Oct 22	11:05	Water	9	R	R	R	R	R	R	R	R	R	R			
	~~MD-FB~~	8 Oct 22	08:20	Water	9	R	R	R	R	R	R	R	R	R	R			
	~~PD5~~																	
	PDI	22-Oct-2022	9:10	Water	9	R	R	R	R	R	R	R	R	R	R			
	PINE	22-Oct-2022	11:10	Water	9	R	R	R	R	R	R	R	R	R	R			

FJAE Shipping & Receiving

Call Out ___ Expedite

___ Priority

1 # of Coolers ✓ Air

# of Carboys ___ Ground

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Please send Azimuth a copy of the data in their EDD format:

gmann@azimuthgroup.ca imcivor@azimuthgroup.ca

csuzanne@ecofishresearch.com kganshorn@ecofishresearch.com

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
4.1							

SHIPMENT RELEASE (client use)

Released by: Date: Time:

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by: Date: Time: 1300

FINAL SHIPMENT RECEPTION (ALS use only)

Received by: Date: Time:

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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 back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

AUG 2020 F

Chain of Custody (COC) / Analytical Request Form

COC Number: 2022-Oct-MON8/9- Day 4

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Page of

Report To	Contact and company name below will appear on the final report
Company:	Ecofish Research Ltd.
Contact:	Sarah Kennedy
Phone:	250-334-3042
	Company address below will appear on the final report
Street:	600 Comox Rd.
City/Province:	Courtenay, BC
Postal Code:	V9N 3P6
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	Ecofish Research Ltd.
Contact:	accountspayable@ecofishresearch.com

Project Information

ALS Account # / Quote #:	VA22-ECOF100-004
Job #:	Surface water MON8/9- with metals
PO / AFE:	1200-25.03.02
LSD:	

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A

☑ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: skennedy@ecofishresearch.com

Email 2: tkasubuchi@ecofishresearch.com

Email 3: waterqualitylabdata@ecofishresearch.com

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: accountspayable@ecofishresearch.com

Email 2:

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Analysis Request

ALS Lab Work Order # (ALS use only): FJ2203012

ALS Contact: Sean Zhang Sampler: Pat Beaupre

Fort St. John Work Order Reference FJ2203012

Telephone : +1 250 261 5517

ALS Sample # (ALS use only)	Sample (This d	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Alk., Ec, pH, TDS, TSS, Anions, Silicate, diss ortho P, colour, pH	DOC, Total dissolved P	NH3, Total Kjeldahl Nitrogen, Total N, TOC, Total P	IONBALANCE-BC-CL	Total Methyl Hg by GCAFS (0.000000002 mg/L)	Dissolved Methyl Hg by GCAFS (0.000000002 mg/L)	Total Metals by CRC ICPMS, Hardness from Total Ca/Mg	Dissolved Metals by CRC ICPMS, Hardness	Total Mercury in Water CVAFS (Low Level 0.0000005 mg/L)	Dissolved Mercury in Water by CVAFS (Low Level 0.0000005 mg/L)	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	~~PD6~~ CR-2.81	18-Oct-22	08:20	Water	9	R	R	R	R	R	R	R	R	R	R			
	~~MD~~	18-Oct-22	11:05	Water	9	R	R	R	R	R	R	R	R	R	R			
	~~MD FB~~	18-Oct-22	08:22	Water	9	R	R	R	R	R	R	R	R	R	R			
	~~PD5~~																	
	PD1	28-Oct-2022	9:10	Water	9	R	R	R	R	R	R	R	R	R	R			
	PINE	28-Oct-2022	11:10	Water	9	R	R	R	R	R	R	R	R	R	R			

FIAE Shipping & Receiving

___ Call Out ___ Expedite

___ Priority

1 # of Coolers ✓ Air

___ # of Carboys ___ Ground

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Please send Azimuth a copy of the data in their EDD format:

gmann@azimuthgroup.ca imcivor@azimuthgroup.ca

csuzanne@ecofishresearch.com kganshorn@ecofishresearch.com

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☑ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C
4.1				9°C Carg

SHIPMENT RELEASE (client use)

Released by: Date: Oct 21 2022 Time: 7:00

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by: Date: Oct 22 22 Time: 13:00

FINAL SHIPMENT RECEPTION (ALS use only)

Received by: M.K Date: 10/24/22 Time: 11:15 AM

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 F

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 back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

APPENDIX B2: PORE WATER CHEMISTRY ALS REPORTS

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202226**	Page	: 1 of 3
Client	: **Azimuth Consulting Group Inc.**	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Pore Water	Date Samples Received	: 19-Aug-2022 15:52
PO	: BCH-22-01	Date Analysis Commenced	: 24-Aug-2022
C-O-C number	: 2022Aug Porewater	Issue Date	: 31-Aug-2022 10:50
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Cindy Tang	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
%	percent
µS/cm	Microsiemens per centimetre
meq/L	milliequivalents per litre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Sample Comments

Sample	Client Id	*Comment*
FJ2202226-001	PD1	Low level Dissovled mercury analyses listed on submitted Chain of Custody but required 100ml ultra mercury glass bottles not received. Testing will be removed. Please contact your Account manager if any changes are required.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	PD1	----	----	----	----
					Client sampling date / time	[19-Aug-2022]	----	----	----	----
						FJ2202226-001	--------	--------	--------	--------
						Result	----	----	----	----
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		340	----	----	----	----
conductivity	----	E100	2.0	µS/cm		661	----	----	----	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		386	----	----	----	----
pH	----	E108	0.10	pH units		8.28	----	----	----	----
solids, total suspended [TSS]	----	E160	3.0	mg/L		<3.0	----	----	----	----
Anions and Nutrients										
bromide	24959-67-9	E235.Br-L	0.050	mg/L		<0.050	----	----	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L		<0.50	----	----	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L		0.065	----	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		0.0196	----	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		<0.0010	----	----	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		51.4	----	----	----	----
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L		11.9	----	----	----	----
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		11.6	----	----	----	----
Ion Balance										
anion sum	----	EC101	0.10	meq/L		7.87	----	----	----	----
cation sum	----	EC101	0.10	meq/L		7.91	----	----	----	----
ion balance (APHA)	----	EC101	0.010	%		0.253	----	----	----	----
Dissolved Metals										
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L		<0.0000050	----	----	----	----
calcium, dissolved	7440-70-2	E421	0.050	mg/L		114	----	----	----	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		24.6	----	----	----	----
dissolved mercury filtration location	----	EP509	-	-		Field	----	----	----	----
dissolved metals filtration location	----	EP421	-	-		Laboratory	----	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202226**	Page	: 1 of 9
Client	: **Azimuth Consulting Group Inc.**	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Pore Water	Date Samples Received	: 19-Aug-2022 15:52
PO	: BCH-22-01	Issue Date	: 31-Aug-2022 10:46
C-O-C number	: 2022Aug Porewater		
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE PD1	E235.Br-L	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PD1	E235.Cl	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PD1	E235.F	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PD1	E235.NO3-L	19-Aug-2022	25-Aug-2022	3 days	6 days	× EHT	25-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PD1	E235.NO2-L	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	6 days	× EHT
Anions and Nutrients : Sulfate in Water by IC										
HDPE PD1	E235.SO4	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) PD1	E509	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PD1	E421	19-Aug-2022	24-Aug-2022	----	----		25-Aug-2022	180 days	7 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PD1	E358-L	19-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	28 days	10 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PD1	E355-L	19-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	28 days	10 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PD1	E290	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	14 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE PD1	E100	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	6 days	✓
Physical Tests : pH by Meter										
HDPE PD1	E108	19-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	0.25 hrs	0.58 hrs	× EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE PD1	E160	19-Aug-2022	----	----	----		25-Aug-2022	7 days	6 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	618211	1	7	14.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	618220	1	3	33.3	5.0	✓
Chloride in Water by IC	E235.Cl	618216	1	9	11.1	5.0	✓
Conductivity in Water	E100	618212	1	13	7.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	619772	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	616443	1	8	12.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	622665	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	618215	1	9	11.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	618217	1	9	11.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	618218	1	9	11.1	5.0	✓
pH by Meter	E108	618210	1	14	7.1	5.0	✓
Sulfate in Water by IC	E235.SO4	618219	1	9	11.1	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	622666	1	15	6.6	5.0	✓
TSS by Gravimetry	E160	618875	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	618211	1	7	14.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	618220	1	3	33.3	5.0	✓
Chloride in Water by IC	E235.Cl	618216	1	9	11.1	5.0	✓
Conductivity in Water	E100	618212	1	13	7.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	619772	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	616443	1	8	12.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	622665	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	618215	1	9	11.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	618217	1	9	11.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	618218	1	9	11.1	5.0	✓
pH by Meter	E108	618210	1	14	7.1	5.0	✓
Sulfate in Water by IC	E235.SO4	618219	1	9	11.1	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	622666	1	15	6.6	5.0	✓
TSS by Gravimetry	E160	618875	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	618211	1	7	14.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	618220	1	3	33.3	5.0	✓
Chloride in Water by IC	E235.Cl	618216	1	9	11.1	5.0	✓
Conductivity in Water	E100	618212	1	13	7.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	619772	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	616443	1	8	12.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	622665	1	15	6.6	5.0	✓

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Fluoride in Water by IC	E235.F	618215	1	9	11.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	618217	1	9	11.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	618218	1	9	11.1	5.0	✓
Sulfate in Water by IC	E235.SO4	618219	1	9	11.1	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	622666	1	15	6.6	5.0	✓
TSS by Gravimetry	E160	618875	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Bromide in Water by IC (Low Level)	E235.Br-L	618220	1	3	33.3	5.0	✓
Chloride in Water by IC	E235.Cl	618216	1	9	11.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	619772	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	616443	1	8	12.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	622665	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	618215	1	9	11.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	618217	1	9	11.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	618218	1	9	11.1	5.0	✓
Sulfate in Water by IC	E235.SO4	618219	1	9	11.1	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	622666	1	15	6.6	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Bromide in Water by IC (Low Level)	E235.Br-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as $CaCO_3$), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 Vancouver - Environmental	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 Vancouver - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Dissolved Metals Water Filtration	EP421	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO_3.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
	Vancouver - Environmental			
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **FJ2202226**	Page	: 1 of 7
Client	: Azimuth Consulting Group Inc.	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Pore Water	Date Samples Received	: 19-Aug-2022 15:52
PO	: BCH-22-01	Date Analysis Commenced	: 24-Aug-2022
C-O-C number	: 2022Aug Porewater	Issue Date	: 31-Aug-2022 10:48
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angela Ren	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia
Angelo Salandanan	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Cindy Tang	Team Leader - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Owen Cheng		Vancouver Metals, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 618210)											
FJ2202227-001	Anonymous	pH	----	E108	0.10	pH units	7.90	7.88	0.253%	4%	----
Physical Tests (QC Lot: 618211)											
FJ2202227-001	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	62.0	61.6	0.647%	20%	----
Physical Tests (QC Lot: 618212)											
FJ2202227-001	Anonymous	conductivity	----	E100	2.0	µS/cm	192	191	0.887%	10%	----
Physical Tests (QC Lot: 618875)											
FJ2202204-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	38.8	39.2	1.02%	20%	----
Anions and Nutrients (QC Lot: 618215)											
FJ2202226-001	PD1	fluoride	16984-48-8	E235.F	0.020	mg/L	0.065	0.068	0.003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 618216)											
FJ2202226-001	PD1	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 618217)											
FJ2202226-001	PD1	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0196	0.0184	0.0011	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 618218)											
FJ2202226-001	PD1	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 618219)											
FJ2202226-001	PD1	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	51.4	51.4	0.0366%	20%	----
Anions and Nutrients (QC Lot: 618220)											
FJ2202226-001	PD1	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 622665)											
FJ2202199-001	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	51.4	51.5	0.243%	20%	----
Organic / Inorganic Carbon (QC Lot: 622666)											
FJ2202199-001	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	49.3	51.9	5.09%	20%	----
Dissolved Metals (QC Lot: 616443)											
FJ2202227-002	Anonymous	calcium, dissolved	7440-70-2	E421	0.050	mg/L	27.5	29.1	5.69%	20%	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	6.43	6.68	3.84%	20%	----
Dissolved Metals (QC Lot: 619772)											
FJ2202215-003	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 618211)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 618212)						
conductivity	----	E100	1	µS/cm	1.0	----
Physical Tests (QCLot: 618875)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 618215)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 618216)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 618217)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 618218)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 618219)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 618220)						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Organic / Inorganic Carbon (QCLot: 622665)						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 622666)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 616443)						
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Dissolved Metals (QCLot: 619772)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 618210)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 618211)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	110	85.0	115	----
Physical Tests (QCLot: 618212)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	98.8	90.0	110	----
Physical Tests (QCLot: 618875)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 618215)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	99.0	90.0	110	----
Anions and Nutrients (QCLot: 618216)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 618217)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 618218)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.5	90.0	110	----
Anions and Nutrients (QCLot: 618219)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 618220)									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	97.8	85.0	115	----
Organic / Inorganic Carbon (QCLot: 622665)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	99.4	80.0	120	----
Organic / Inorganic Carbon (QCLot: 622666)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	105	80.0	120	----
Dissolved Metals (QCLot: 616443)									
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	98.2	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	95.9	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	98.4	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 618215)										
VA22B9818-001	Anonymous	fluoride	16984-48-8	E235.F	1.02 mg/L	1 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 618216)										
VA22B9818-001	Anonymous	chloride	16887-00-6	E235.Cl	105 mg/L	100 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 618217)										
VA22B9818-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.62 mg/L	2.5 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 618218)										
VA22B9818-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.512 mg/L	0.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 618219)										
VA22B9818-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	106 mg/L	100 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 618220)										
VA22B9818-001	Anonymous	bromide	24959-67-9	E235.Br-L	0.523 mg/L	0.5 mg/L	105	75.0	125	----
Organic / Inorganic Carbon (QCLot: 622665)										
FJ2202199-002	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 622666)										
FJ2202199-002	Anonymous	carbon, total organic [TOC]	----	E355-L	ND mg/L	5 mg/L	ND	70.0	130	----
Dissolved Metals (QCLot: 616443)										
FJ2202227-003	Anonymous	calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
Dissolved Metals (QCLot: 619772)										
FJ2202215-004	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000995 mg/L	0.0001 mg/L	99.5	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: COC #: 2022AUG POREWATER

Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply
Company:	Azimuth Consulting Group Inc.	Select Report Format: ☑ EXCEL ☑ EDD (DIGITAL)	Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Ian McIvor	Quality Control (QC) Report with Report ☑ YES ☐ NO	PRIORITY (Business Days): 4 day [P4] ☐ / 3 day [P3] ☐ / 2 day [P2] ☐ — EMERGENCY: 1 Business day [E1] ☐ / Same Day, Weekend or Statutory holiday [E0] ☐
Phone:	604-730-1220	☑ Compare Results to Criteria on Report - provide details below if box checked	
	Company address below will appear on the final report	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:	2902 West Broadway	Email 1 or Fax gmann@azimuthgroup.ca	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Vancouver	Email 2 imcivor@azimuthgroup.ca	
Postal Code:	V6K 2G8	Email 3	
Invoice To	Same as Report To ☑ YES ☐ NO	Invoice Distribution	
	Copy of Invoice with Report ☑ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	
	Azimuth Consulting Group Inc.	Email 1 or Fax gmann@azimuthgroup.ca	
Contact:	Gary Mann	Email 2 imcivor@azimuthgroup.ca	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #: Q75925		AFE/Cost Center:	PO#
Job #:	Site C MMP - Pore Water	Major/Minor Code:	Routing Code:
PO / AFE:	BCH-22-01	Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only):

ALS Contact: Sneha Sansare Sampler: Kevin Ganshorn

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F/P Dissolved Methylmercury in Water by GCAFS (0.02 ng/L)	F/P Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ng/L)	Anions, Cond., pH, Total Alk, TSS	F Hardness	F/P DOC	P TOC	IONBALANCE-BC-CL	Number of Containers
	PR1			Water	R	R	R	R	R	R	R	6
	PR2			Water	R	R	R	R	R	R	R	6
	PR3-01			Water	R	R	R	R	R	R	R	6
	PD1			Water	R	R	R	R	R	R	R	6
	PD3			Water	R	R	R	R	R	R	R	6
	PD3-FD			Water	R	R	R	R	R	R	R	6
	PD6-A			Water	R	R	R	R	R	R	R	6
	PD6-B			Water	R	R	R	R	R	R	R	6
	Travel Blank			Water			R			R	R	3

Fort St. John
Work Order Reference
FJ2202226

Telephone : +1 250 261 5617

Drinking Water (DW) Samples

Are samples taken from a Regulated DW System?
☐ YES ☑ NO

Are samples for human drinking water use?
☐ YES ☑ NO

...report by clicking on the drop-down list below
...COC only)

...-004 (MMP Pore Water Quality) for parameters/detection limits

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐		SIF Observations	Yes ☐	No ☐	
Ice Packs ☐	Ice Cubes ☐	Custody seal intact	Yes ☐	No ☐	
Cooling Initiated ☐					

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
14.6					

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
Kevin Ganshorn	Aug. 19 2022	15:45	Rick	8/19/20	3:45			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202288**	Page	: 1 of 4
Client	: **Azimuth Consulting Group Inc.**	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Pore Water	Date Samples Received	: 23-Aug-2022 18:55
PO	: BCH-22-01	Date Analysis Commenced	: 25-Aug-2022
C-O-C number	: 2022Aug Porewater	Issue Date	: 21-Sep-2022 16:25
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Erin Sanchez		Metals, Burnaby, British Columbia
Hamideh Moradi	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Inorganics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
%	percent
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
meq/L	milliequivalents per litre
mg/L	milligrams per litre
ng/L	nanograms per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	PD3	----	----	----	----
					Client sampling date / time	23-Aug-2022 13:20	----	----	----	----
						FJ2202288-001	--------	--------	--------	--------
						Result	----	----	----	----
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		296	----	----	----	----
conductivity	----	E100	2.0	µS/cm		519	----	----	----	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		307	----	----	----	----
pH	----	E108	0.10	pH units		8.48	----	----	----	----
solids, total suspended [TSS]	----	E160	3.0	mg/L		<7.5	----	----	----	----
Anions and Nutrients										
bromide	24959-67-9	E235.Br-L	0.050	mg/L		<0.050	----	----	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L		<0.50	----	----	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L		0.073	----	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		0.0205	----	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		<0.0010	----	----	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		20.4	----	----	----	----
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L		11.7	----	----	----	----
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		10.2	----	----	----	----
Ion Balance										
anion sum	----	EC101	0.10	meq/L		6.34	----	----	----	----
cation sum	----	EC101	0.10	meq/L		6.43	----	----	----	----
ion balance (APHA)	----	EC101	0.010	%		0.705	----	----	----	----
Dissolved Metals										
mercury, dissolved	7439-97-6	E509-L	0.50	ng/L		3.44	----	----	----	----
calcium, dissolved	7440-70-2	E421	0.050	mg/L		88.4	----	----	----	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		21.0	----	----	----	----
dissolved MeHg filtration location	----	EP537	-	-		Field	----	----	----	----
dissolved mercury filtration location	----	EP509-L	-	-		Field	----	----	----	----
dissolved metals filtration location	----	EP421	-	-		Laboratory	----	----	----	----
Speciated Metals										
methylmercury (as MeHg), dissolved	22967-92-6	E537	0.000020	µg/L		0.000332	----	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202288**	Page	: 1 of 9
Client	: **Azimuth Consulting Group Inc.**	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Pore Water	Date Samples Received	: 23-Aug-2022 18:55
PO	: BCH-22-01	Issue Date	: 21-Sep-2022 16:25
C-O-C number	: 2022Aug Porewater		
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE PD3	E235.Br-L	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PD3	E235.Cl	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PD3	E235.F	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PD3	E235.NO3-L	23-Aug-2022	25-Aug-2022	3 days	2 days	✓	25-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PD3	E235.NO2-L	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	3 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE PD3	E235.SO4	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	2 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) PD3	E509-L	23-Aug-2022	31-Aug-2022	----	----		31-Aug-2022	28 days	8 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PD3	E421	23-Aug-2022	25-Aug-2022	----	----		26-Aug-2022	180 days	3 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PD3	E358-L	23-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	28 days	6 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PD3	E355-L	23-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	28 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PD3	E290	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	14 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE PD3	E100	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	2 days	✓
Physical Tests : pH by Meter										
HDPE PD3	E108	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	0.25 hrs	1.94 hrs	× EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE PD3	E160	23-Aug-2022	----	----	----		27-Aug-2022	7 days	4 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PD3	E537	23-Aug-2022	02-Sep-2022	180 days	10 days	✓	07-Sep-2022	180 days	5 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	617919	1	15	6.6	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	617925	1	2	50.0	5.0	✓
Chloride in Water by IC	E235.Cl	617924	1	9	11.1	5.0	✓
Conductivity in Water	E100	617920	1	9	11.1	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	626630	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	618486	1	13	7.6	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	627800	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	622665	1	9	11.1	5.0	✓
Fluoride in Water by IC	E235.F	617923	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	617926	1	9	11.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	617927	1	9	11.1	5.0	✓
pH by Meter	E108	617918	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	617928	1	7	14.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	622666	1	9	11.1	5.0	✓
TSS by Gravimetry	E160	621936	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	617919	1	15	6.6	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	617925	1	2	50.0	5.0	✓
Chloride in Water by IC	E235.Cl	617924	1	9	11.1	5.0	✓
Conductivity in Water	E100	617920	1	9	11.1	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	626630	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	618486	1	13	7.6	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	627800	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	622665	1	9	11.1	5.0	✓
Fluoride in Water by IC	E235.F	617923	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	617926	1	9	11.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	617927	1	9	11.1	5.0	✓
pH by Meter	E108	617918	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	617928	1	7	14.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	622666	1	9	11.1	5.0	✓
TSS by Gravimetry	E160	621936	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	617919	1	15	6.6	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	617925	1	2	50.0	5.0	✓
Chloride in Water by IC	E235.Cl	617924	1	9	11.1	5.0	✓
Conductivity in Water	E100	617920	1	9	11.1	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	626630	1	20	5.0	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Dissolved Metals in Water by CRC ICPMS	E421	618486	1	13	7.6	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	627800	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	622665	1	9	11.1	5.0	✓
Fluoride in Water by IC	E235.F	617923	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	617926	1	9	11.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	617927	1	9	11.1	5.0	✓
Sulfate in Water by IC	E235.SO4	617928	1	7	14.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	622666	1	9	11.1	5.0	✓
TSS by Gravimetry	E160	621936	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Bromide in Water by IC (Low Level)	E235.Br-L	617925	1	2	50.0	5.0	✓
Chloride in Water by IC	E235.Cl	617924	1	9	11.1	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	626630	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	618486	1	13	7.6	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	627800	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	622665	1	9	11.1	5.0	✓
Fluoride in Water by IC	E235.F	617923	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	617926	1	9	11.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	617927	1	9	11.1	5.0	✓
Sulfate in Water by IC	E235.SO4	617928	1	7	14.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	622666	1	9	11.1	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Bromide in Water by IC (Low Level)	E235.Br-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAFS.
Dissolved Methylmercury in Water by GCAFS	E537 Vancouver - Environmental	Water	EPA 1630 (mod)	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	“Hardness (as $CaCO_3$), dissolved” is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. “Total Hardness” refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 Vancouver - Environmental	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Dissolved Organic Carbon for Combustion	EP358 Vancouver - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration (Low Level)	EP509-L Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
Dissolved Methylmercury Water Preparation	EP537 Vancouver - Environmental	Water	EPA 1630	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **FJ2202288**	Page	: 1 of 7
Client	: Azimuth Consulting Group Inc.	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Pore Water	Date Samples Received	: 23-Aug-2022 18:55
PO	: BCH-22-01	Date Analysis Commenced	: 25-Aug-2022
C-O-C number	: 2022Aug Porewater	Issue Date	: 21-Sep-2022 16:25
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Erin Sanchez		Vancouver Metals, Burnaby, British Columbia
Hamideh Moradi	Analyst	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Inorganics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Vancouver Inorganics, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 617918)											
FJ2202288-001	PD3	pH	----	E108	0.10	pH units	8.48	8.49	0.118%	4%	----
Physical Tests (QC Lot: 617919)											
FJ2202288-001	PD3	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	296	284	3.93%	20%	----
Physical Tests (QC Lot: 617920)											
FJ2202288-001	PD3	conductivity	----	E100	2.0	µS/cm	519	517	0.386%	10%	----
Physical Tests (QC Lot: 621936)											
FJ2202291-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 617923)											
FJ2202288-001	PD3	fluoride	16984-48-8	E235.F	0.020	mg/L	0.073	0.069	0.004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 617924)											
FJ2202288-001	PD3	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 617925)											
FJ2202288-001	PD3	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 617926)											
FJ2202288-001	PD3	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0205	0.0190	0.0015	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 617927)											
FJ2202288-001	PD3	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 617928)											
FJ2202288-001	PD3	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	20.4	20.4	0.235%	20%	----
Organic / Inorganic Carbon (QC Lot: 622665)											
FJ2202199-001	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	51.4	51.5	0.243%	20%	----
Organic / Inorganic Carbon (QC Lot: 622666)											
FJ2202199-001	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	49.3	51.9	5.09%	20%	----
Dissolved Metals (QC Lot: 618486)											
FJ2202295-001	Anonymous	calcium, dissolved	7440-70-2	E421	0.050	mg/L	34.9	36.0	3.28%	20%	----
		magnesium, dissolved	7439-95-4	E421	0.100	mg/L	7.69	7.91	2.83%	20%	----
Dissolved Metals (QC Lot: 626630)											
FC2201927-001	Anonymous	mercury, dissolved	7439-97-6	E509-L	0.50	ng/L	<0.50	<0.50	0	Diff <2x LOR	----
Speciated Metals (QC Lot: 627800)											
FC2201977-001	Anonymous	methylmercury (as MeHg), dissolved	22967-92-6	E537	0.000020	µg/L	0.000126	0.000143	12.2%	30%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 617919)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	1.3	----
Physical Tests (QCLot: 617920)						
conductivity	----	E100	1	µS/cm	1.2	----
Physical Tests (QCLot: 621936)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 617923)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 617924)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 617925)						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 617926)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 617927)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 617928)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Organic / Inorganic Carbon (QCLot: 622665)						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 622666)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 618486)						
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Dissolved Metals (QCLot: 626630)						
mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	<0.50	----
Speciated Metals (QCLot: 627800)						
methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	<0.000020	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 617918)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 617919)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	108	85.0	115	----
Physical Tests (QCLot: 617920)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	97.4	90.0	110	----
Physical Tests (QCLot: 621936)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	92.2	85.0	115	----
Anions and Nutrients (QCLot: 617923)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	97.2	90.0	110	----
Anions and Nutrients (QCLot: 617924)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 617925)									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	101	85.0	115	----
Anions and Nutrients (QCLot: 617926)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 617927)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	98.5	90.0	110	----
Anions and Nutrients (QCLot: 617928)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	105	90.0	110	----
Organic / Inorganic Carbon (QCLot: 622665)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	99.4	80.0	120	----
Organic / Inorganic Carbon (QCLot: 622666)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	105	80.0	120	----
Dissolved Metals (QCLot: 618486)									
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	100	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	99.9	80.0	120	----
mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	5 ng/L	107	80.0	120	----
Speciated Metals (QCLot: 627800)									
methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	0.0025 µg/L	89.2	70.0	130	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 617923)										
VA22B9754-001	Anonymous	fluoride	16984-48-8	E235.F	0.975 mg/L	1 mg/L	97.5	75.0	125	----
Anions and Nutrients (QCLot: 617924)										
VA22B9754-001	Anonymous	chloride	16887-00-6	E235.Cl	102 mg/L	100 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 617925)										
VA22B9754-001	Anonymous	bromide	24959-67-9	E235.Br-L	0.497 mg/L	0.5 mg/L	99.4	75.0	125	----
Anions and Nutrients (QCLot: 617926)										
VA22B9754-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	ND mg/L	2.5 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 617927)										
VA22B9754-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.479 mg/L	0.5 mg/L	95.9	75.0	125	----
Anions and Nutrients (QCLot: 617928)										
VA22B9754-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	100 mg/L	ND	75.0	125	----
Organic / Inorganic Carbon (QCLot: 622665)										
FJ2202199-002	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 622666)										
FJ2202199-002	Anonymous	carbon, total organic [TOC]	----	E355-L	ND mg/L	5 mg/L	ND	70.0	130	----
Dissolved Metals (QCLot: 618486)										
VA22B9732-001	Anonymous	calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
Dissolved Metals (QCLot: 626630)										
FC2201927-002	Anonymous	mercury, dissolved	7439-97-6	E509-L	4.56 ng/L	5 ng/L	91.1	70.0	130	----
Speciated Metals (QCLot: 627800)										
FJ2202286-001	Anonymous	methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00214 µg/L	0.0025 µg/L	85.6	60.0	140	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: COC #: 2022AUG POREWATER

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Azimuth Consulting Group Inc.
Contact:	Ian McIvor
Phone:	604-730-1220
	Company address below will appear on the final report
Street:	2902 West Broadway
City/Province:	Vancouver
Postal Code:	V6K 2G8
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
	Azimuth Consulting Group Inc.
Contact:	Gary Mann

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax gmann@azimuthgroup.ca
Email 2 imcivor@azimuthgroup.ca
Email 3 kganshorn@ecofishresearch.com

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax gmann@azimuthgroup.ca
Email 2 imcivor@azimuthgroup.ca

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #: Q75925
Job #: Site C MMP - Pore Water
PO / AFE: BCH-22-01
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (lab use only):

ALS Contact: Sneha Sansare Sampler: Kevin Ganshorn

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Dissolved Methylmercury in Water by GCAFS (0.02 ng/L) F/P	Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ng/L) F/P	Anions, Cond., pH, Total Alk, TSS F	Hardness F	DOC F/P	TOC F/P	ION BALANCE-BC-CL	Number of Containers
	~~PR1~~			Water	R	R	R	R	R	R	R	6
	~~PR2~~			Water	R	R	R	R	R	R	R	6
	~~PR2.81~~			Water	R	R	R	R	R	R	R	6
	~~PD1~~			Water	R	R	R	R	R	R	R	6
	PD3	23-AUG-22	13:20	Water	R	R	R	R	R	R	R	6
	~~PD3-FB~~			Water	R	R	R	R	R	R	R	6
	~~PD5-A~~			Water	R	R	R	R	R	R	R	6
	~~PD5-B~~			Water	R	R	R	R	R	R	R	6
	~~Travel Blank~~			Water			R			R	R	3

FJAE Shipping & Receiving
___ Call Out ___ Expedite
___ Priority
1 # of Coolers ✓ Air
___ # of Carboys ___ Ground

rt St. John
Work Order Reference
FJ2202288

e : + 1 250 261 5517

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO
Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Please reference VA22-ECOF100-004 (MMP Pore Water Quality) for parameters/detection limits

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
22 C					

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
	Aug 23, 2022	

INITIAL SHIPMENT RECEPTION (lab use only)

Received by:	Date:	Time:
	8-23-22	6:38

FINAL SHIPMENT RECEPTION (lab use only)

Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: COC #: 2022AUG POREWATER

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Azimuth Consulting Group Inc.
Contact:	Ian McIvor
Phone:	604-730-1220
	Company address below will appear on the final report
Street:	2902 West Broadway
City/Province:	Vancouver
Postal Code:	V6K 2G8
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
	Azimuth Consulting Group Inc.
Contact:	Gary Mann

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax gmann@azimuthgroup.ca
Email 2 imcivor@azimuthgroup.ca
Email 3 kganshorn@ecofishresearch.com

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax gmann@azimuthgroup.ca
Email 2 imcivor@azimuthgroup.ca

Project Information

ALS Account # / Quote #: Q75925
Job #: Site C MMP - Pore Water
PO / AFE: BCH-22-01
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (lab use only):
ALS Contact: Sneha Sansare Sampler: Kevin Ganshorn

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐
EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F/P Dissolved Methylmercury in Water by GCAFS (0.02 ng/L)	F/P Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ng/L)	F Anions, Cond., pH, Total Alk, TSS	F Hardness	F/P DOC	F/P TOC	IONBALANCE-BC-CL	Number of Containers
	~~PR1~~			Water	R	R	R	R	R	R	R	6
	~~PR2~~			Water	R	R	R	R	R	R	R	6
	~~PR2.81~~			Water	R	R	R	R	R	R	R	6
	~~PD1~~			Water	R	R	R	R	R	R	R	6
	PD3	23-AUG-22	13:20	Water	R	R	R	R	R	R	R	6
	~~PD3-PB~~			Water	R	R	R	R	R	R	R	6
	~~PD3-A~~			Water	R	R	R	R	R	R	R	6
	~~PD3-B~~			Water	R	R	R	R	R	R	R	6
	~~Travel Blank~~			Water			R			R	R	3

FJAE Shipping & Receiving
___ Call Out ___ Expedite
___ Priority
1 # of Coolers ✓ Air
___ # of Carboys ___ Ground

rt St. John
Work Order Reference
FJ2202288

ne : +1 250 261 5517

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO
Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Please reference VA22-ECOF100-004 (MMP Pore Water Quality) for parameters/detection limits

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
22					2

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: Aug 23, 2022	Time:	Received by:	Date: 8-23-22	Time: 6:38	Received by:	Date: 8/24	Time: 8:00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202312**	Page	: 1 of 4
Client	: **Azimuth Consulting Group Inc.**	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Pore Water	Date Samples Received	: 25-Aug-2022 08:45
PO	: BCH-22-01	Date Analysis Commenced	: 27-Aug-2022
C-O-C number	: 2022aug Porewater	Issue Date	: 26-Sep-2022 11:42
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Hamideh Moradi	Analyst	Metals, Burnaby, British Columbia
Jennifer Nguyen	Lab Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Inorganics, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
%	percent
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
meq/L	milliequivalents per litre
mg/L	milligrams per litre
ng/L	nanograms per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	*Description*
HTD	*Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.*
RRV	*Reported result verified by repeat analysis.*

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	PD1-A	PD3-FB	PD5-A	PD1-B	----
					Client sampling date / time	24-Aug-2022 16:15	24-Aug-2022 16:15	24-Aug-2022 09:55	24-Aug-2022 16:15	----
						FJ2202312-001	FJ2202312-002	FJ2202312-003	FJ2202312-004	--------
						Result	Result	Result	Result	----
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		287	<1.0	329	292	----
conductivity	----	E100	2.0	µS/cm		613	<2.0	603	633	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		352	<0.60	345	360	----
pH	----	E108	0.10	pH units		8.24	5.08	8.33	8.32	----
solids, total suspended [TSS]	----	E160	3.0	mg/L		6.1	<3.0	<3.0	8.7	----
Anions and Nutrients										
bromide	24959-67-9	E235.Br-L	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	----
chloride	16887-00-6	E235.Cl	0.50	mg/L		<0.50	<0.50	0.80	<0.50	----
fluoride	16984-48-8	E235.F	0.020	mg/L		0.086	<0.020	0.062	0.082	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		0.0197	0.0095 HTD, RRV	0.0191	0.0189	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		73.8	<0.30	23.9	70.7	----
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L		12.5	<0.50	16.0	16.0	----
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		12.3	<0.50	18.6	15.2	----
Ion Balance										
anion sum	----	EC101	0.10	meq/L		7.28	<0.10	7.10	7.31	----
cation sum	----	EC101	0.10	meq/L		7.21	<0.10	7.31	7.38	----
ion balance (APHA)	----	EC101	0.010	%		0.483	<0.010	1.46	0.476	----
Dissolved Metals										
mercury, dissolved	7439-97-6	E509-L	0.50	ng/L		5.32	<0.50	8.27	7.16	----
calcium, dissolved	7440-70-2	E421	0.050	mg/L		101	<0.050	98.1	104	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		24.2	<0.0050	24.3	24.3	----
dissolved MeHg filtration location	----	EP537	-	-		Field	Field	Field	Field	----
dissolved mercury filtration location	----	EP509-L	-	-		Field	Field	Field	Field	----
dissolved metals filtration location	----	EP421	-	-		Laboratory	Laboratory	Laboratory	Laboratory	----
Speciated Metals										
methylmercury (as MeHg), dissolved	22967-92-6	E537	0.000020	µg/L		0.000165	<0.000020	0.000545	0.000342	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202312**	Page	: 1 of 14
Client	: **Azimuth Consulting Group Inc.**	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Pore Water	Date Samples Received	: 25-Aug-2022 08:45
PO	: BCH-22-01	Issue Date	: 26-Sep-2022 11:43
C-O-C number	: 2022aug Porewater		
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE PD1-A	E235.Br-L	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE PD1-B	E235.Br-L	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE PD3-FB	E235.Br-L	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE PD5-A	E235.Br-L	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PD1-A	E235.Cl	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PD1-B	E235.Cl	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PD3-FB	E235.Cl	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE PD5-A	E235.Cl	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PD1-A	E235.F	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PD1-B	E235.F	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PD3-FB	E235.F	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PD5-A	E235.F	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PD1-A	E235.NO3-L	24-Aug-2022	27-Aug-2022	3 days	3 days	✓	27-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PD1-B	E235.NO3-L	24-Aug-2022	27-Aug-2022	3 days	3 days	✓	27-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PD3-FB	E235.NO3-L	24-Aug-2022	27-Aug-2022	3 days	3 days	✓	27-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PD5-A	E235.NO3-L	24-Aug-2022	27-Aug-2022	3 days	3 days	✓	27-Aug-2022	3 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
PD1-A	E235.NO2-L	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
PD1-B	E235.NO2-L	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
PD3-FB	E235.NO2-L	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
PD5-A	E235.NO2-L	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	3 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
PD1-A	E235.SO4	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
PD1-B	E235.SO4	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
PD3-FB	E235.SO4	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
PD5-A	E235.SO4	24-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	28 days	3 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved)										
PD1-A	E509-L	24-Aug-2022	31-Aug-2022	----	----		31-Aug-2022	28 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) PD1-B	E509-L	24-Aug-2022	31-Aug-2022	----	----		31-Aug-2022	28 days	7 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) PD3-FB	E509-L	24-Aug-2022	31-Aug-2022	----	----		31-Aug-2022	28 days	7 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) PD5-A	E509-L	24-Aug-2022	31-Aug-2022	----	----		31-Aug-2022	28 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PD1-A	E421	24-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	180 days	6 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PD1-B	E421	24-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	180 days	6 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PD3-FB	E421	24-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	180 days	6 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PD5-A	E421	24-Aug-2022	30-Aug-2022	----	----		30-Aug-2022	180 days	6 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PD1-A	E358-L	24-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	28 days	5 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PD1-B	E358-L	24-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	28 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PD3-FB	E358-L	24-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	28 days	5 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PD5-A	E358-L	24-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	28 days	5 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PD1-A	E355-L	24-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	28 days	5 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PD1-B	E355-L	24-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	28 days	5 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PD3-FB	E355-L	24-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	28 days	5 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PD5-A	E355-L	24-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	28 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PD1-A	E290	24-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PD1-B	E290	24-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PD3-FB	E290	24-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	14 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE PD5-A	E290	24-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	14 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE PD1-A	E100	24-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE PD1-B	E100	24-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE PD3-FB	E100	24-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE PD5-A	E100	24-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	28 days	5 days	✓
Physical Tests : pH by Meter										
HDPE PD1-A	E108	24-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	0.25 hrs	0.26 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PD1-B	E108	24-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	0.25 hrs	0.26 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PD3-FB	E108	24-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	0.25 hrs	0.26 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE PD5-A	E108	24-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	0.25 hrs	0.26 hrs	× EHTR-FM

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TSS by Gravimetry										
HDPE PD1-A	E160	24-Aug-2022	----	----	----		30-Aug-2022	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PD1-B	E160	24-Aug-2022	----	----	----		30-Aug-2022	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PD3-FB	E160	24-Aug-2022	----	----	----		30-Aug-2022	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PD5-A	E160	24-Aug-2022	----	----	----		30-Aug-2022	7 days	6 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PD1-A	E537	24-Aug-2022	02-Sep-2022	180 days	9 days	✓	07-Sep-2022	180 days	5 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PD1-B	E537	24-Aug-2022	02-Sep-2022	180 days	9 days	✓	07-Sep-2022	180 days	5 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PD3-FB	E537	24-Aug-2022	02-Sep-2022	180 days	9 days	✓	07-Sep-2022	180 days	5 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PD5-A	E537	24-Aug-2022	02-Sep-2022	180 days	9 days	✓	07-Sep-2022	180 days	5 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	623997	1	7	14.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	621463	1	4	25.0	5.0	✓
Chloride in Water by IC	E235.Cl	621462	1	12	8.3	5.0	✓
Conductivity in Water	E100	623998	1	4	25.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	626630	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	622631	1	10	10.0	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	627800	2	34	5.8	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	622665	1	9	11.1	5.0	✓
Fluoride in Water by IC	E235.F	621461	1	12	8.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	621464	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	621465	1	12	8.3	5.0	✓
pH by Meter	E108	623996	1	18	5.5	5.0	✓
Sulfate in Water by IC	E235.SO4	621466	1	12	8.3	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	622666	1	9	11.1	5.0	✓
TSS by Gravimetry	E160	625937	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	623997	1	7	14.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	621463	1	4	25.0	5.0	✓
Chloride in Water by IC	E235.Cl	621462	1	12	8.3	5.0	✓
Conductivity in Water	E100	623998	1	4	25.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	626630	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	622631	1	10	10.0	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	627800	2	34	5.8	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	622665	1	9	11.1	5.0	✓
Fluoride in Water by IC	E235.F	621461	1	12	8.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	621464	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	621465	1	12	8.3	5.0	✓
pH by Meter	E108	623996	1	18	5.5	5.0	✓
Sulfate in Water by IC	E235.SO4	621466	1	12	8.3	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	622666	1	9	11.1	5.0	✓
TSS by Gravimetry	E160	625937	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	623997	1	7	14.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	621463	1	4	25.0	5.0	✓
Chloride in Water by IC	E235.Cl	621462	1	12	8.3	5.0	✓
Conductivity in Water	E100	623998	1	4	25.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	626630	1	20	5.0	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Dissolved Metals in Water by CRC ICPMS	E421	622631	1	10	10.0	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	627800	2	34	5.8	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	622665	1	9	11.1	5.0	✓
Fluoride in Water by IC	E235.F	621461	1	12	8.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	621464	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	621465	1	12	8.3	5.0	✓
Sulfate in Water by IC	E235.SO4	621466	1	12	8.3	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	622666	1	9	11.1	5.0	✓
TSS by Gravimetry	E160	625937	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Bromide in Water by IC (Low Level)	E235.Br-L	621463	1	4	25.0	5.0	✓
Chloride in Water by IC	E235.Cl	621462	1	12	8.3	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	626630	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	622631	1	10	10.0	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	627800	2	34	5.8	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	622665	1	9	11.1	5.0	✓
Fluoride in Water by IC	E235.F	621461	1	12	8.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	621464	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	621465	1	12	8.3	5.0	✓
Sulfate in Water by IC	E235.SO4	621466	1	12	8.3	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	622666	1	9	11.1	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Bromide in Water by IC (Low Level)	E235.Br-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAFS.
Dissolved Methylmercury in Water by GCAFS	E537 Vancouver - Environmental	Water	EPA 1630 (mod)	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	“Hardness (as $CaCO_3$), dissolved” is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. “Total Hardness” refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 Vancouver - Environmental	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Dissolved Organic Carbon for Combustion	EP358 Vancouver - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration (Low Level)	EP509-L Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
Dissolved Methylmercury Water Preparation	EP537 Vancouver - Environmental	Water	EPA 1630	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **FJ2202312**	Page	: 1 of 10
Client	: Azimuth Consulting Group Inc.	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Pore Water	Date Samples Received	: 25-Aug-2022 08:45
PO	: BCH-22-01	Date Analysis Commenced	: 27-Aug-2022
C-O-C number	: 2022aug Porewater	Issue Date	: 26-Sep-2022 11:42
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angelo Salandanan	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
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Jennifer Nguyen	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Inorganics, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
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Tracy Harley	Supervisor - Water Quality Instrumentation	Vancouver Inorganics, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 623996)											
FJ2202312-003	PD5-A	pH	----	E108	0.10	pH units	8.33	8.34	0.0720%	4%	----
Physical Tests (QC Lot: 623997)											
FJ2202312-003	PD5-A	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	329	333	1.27%	20%	----
Physical Tests (QC Lot: 623998)											
FJ2202312-003	PD5-A	conductivity	----	E100	2.0	µS/cm	603	603	0.00%	10%	----
Physical Tests (QC Lot: 625937)											
FJ2202315-002	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	9.7	8.5	1.2	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 621461)											
FJ2202312-001	PD1-A	fluoride	16984-48-8	E235.F	0.020	mg/L	0.086	0.083	0.002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 621462)											
FJ2202312-001	PD1-A	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 621463)											
FJ2202312-001	PD1-A	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 621464)											
FJ2202312-001	PD1-A	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0197	0.0200	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 621465)											
FJ2202312-001	PD1-A	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 621466)											
FJ2202312-001	PD1-A	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	73.8	73.5	0.443%	20%	----
Organic / Inorganic Carbon (QC Lot: 622665)											
FJ2202199-001	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	51.4	51.5	0.243%	20%	----
Organic / Inorganic Carbon (QC Lot: 622666)											
FJ2202199-001	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	49.3	51.9	5.09%	20%	----
Dissolved Metals (QC Lot: 622631)											
VA22B9855-001	Anonymous	calcium, dissolved	7440-70-2	E421	0.050	mg/L	38.8	39.7	2.40%	20%	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	7.77	7.50	3.59%	20%	----
Dissolved Metals (QC Lot: 626630)											
FC2201927-001	Anonymous	mercury, dissolved	7439-97-6	E509-L	0.50	ng/L	<0.50	<0.50	0	Diff <2x LOR	----
Speciated Metals (QC Lot: 627800)											
FC2201977-001	Anonymous	methylmercury (as MeHg), dissolved	22967-92-6	E537	0.000020	µg/L	0.000126	0.000143	12.2%	30%	----
Speciated Metals (QC Lot: 654341)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Speciated Metals (QC Lot: 654341) - continued											
FC2202096-001	Anonymous	methylmercury (as MeHg), dissolved	22967-92-6	E537	0.000020	µg/L	0.000072	0.000055	0.000017	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 623997)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 623998)						
conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 625937)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 621461)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 621462)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 621463)						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 621464)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 621465)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 621466)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Organic / Inorganic Carbon (QCLot: 622665)						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 622666)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 622631)						
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Dissolved Metals (QCLot: 626630)						
mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	<0.50	----
Speciated Metals (QCLot: 627800)						
methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	<0.000020	----
Speciated Metals (QCLot: 654341)						
methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	<0.000020	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 623996)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 623997)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	112	85.0	115	----
Physical Tests (QCLot: 623998)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	101	90.0	110	----
Physical Tests (QCLot: 625937)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	94.2	85.0	115	----
Anions and Nutrients (QCLot: 621461)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	98.6	90.0	110	----
Anions and Nutrients (QCLot: 621462)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 621463)									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	97.3	85.0	115	----
Anions and Nutrients (QCLot: 621464)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 621465)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	97.9	90.0	110	----
Anions and Nutrients (QCLot: 621466)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
Organic / Inorganic Carbon (QCLot: 622665)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	99.4	80.0	120	----
Organic / Inorganic Carbon (QCLot: 622666)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	105	80.0	120	----
Dissolved Metals (QCLot: 622631)									
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	97.7	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	98.8	80.0	120	----
mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	5 ng/L	107	80.0	120	----
Speciated Metals (QCLot: 627800)									
methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	0.0025 µg/L	89.2	70.0	130	----
Speciated Metals (QCLot: 654341)									
methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	0.0025 µg/L	76.9	70.0	130	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 621461)										
FJ2202312-002	PD3-FB	fluoride	16984-48-8	E235.F	1.01 mg/L	1 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 621462)										
FJ2202312-002	PD3-FB	chloride	16887-00-6	E235.Cl	104 mg/L	100 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 621463)										
FJ2202312-002	PD3-FB	bromide	24959-67-9	E235.Br-L	0.505 mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 621464)										
FJ2202312-002	PD3-FB	nitrate (as N)	14797-55-8	E235.NO3-L	2.66 mg/L	2.5 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 621465)										
FJ2202312-002	PD3-FB	nitrite (as N)	14797-65-0	E235.NO2-L	0.507 mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 621466)										
FJ2202312-002	PD3-FB	sulfate (as SO4)	14808-79-8	E235.SO4	105 mg/L	100 mg/L	105	75.0	125	----
Organic / Inorganic Carbon (QCLot: 622665)										
FJ2202199-002	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 622666)										
FJ2202199-002	Anonymous	carbon, total organic [TOC]	----	E355-L	ND mg/L	5 mg/L	ND	70.0	130	----
Dissolved Metals (QCLot: 622631)										
VA22B9855-002	Anonymous	calcium, dissolved	7440-70-2	E421	ND mg/L	8 mg/L	ND	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	2 mg/L	ND	70.0	130	----
Dissolved Metals (QCLot: 626630)										
FC2201927-002	Anonymous	mercury, dissolved	7439-97-6	E509-L	4.56 ng/L	5 ng/L	91.1	70.0	130	----
Speciated Metals (QCLot: 627800)										
FJ2202286-001	Anonymous	methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00214 µg/L	0.0025 µg/L	85.6	60.0	140	----
Speciated Metals (QCLot: 654341)										
FC2202140-001	Anonymous	methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00177 µg/L	0.0025 µg/L	70.7	60.0	140	----

FJAE Shipping & Receiving
___ Call Out ___ Expedite
___ Priority
1 # of Coolers X Air
___ # of Carboys ___ Ground

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Affix ALS barcode label here (lab use only)

COC Number: COC #: 2022AUG POREWATER

Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply
Company:	Azimuth Consulting Group Inc.	Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)	Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Ian McIvor	Quality Control (QC) Report with Report ☑ YES ☐ NO	PRIORITY (Business Days): 4 day [P4] ☐ / 3 day [P3] ☐ / 2 day [P2] ☐ — EMERGENCY: 1 Business day [E1] ☐ / Same Day, Weekend or Statutory holiday [E0] ☐
Phone:	604-730-1220	☑ Compare Results to Criteria on Report - provide details below if box checked	
	Company address below will appear on the final report	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	
Street:	2902 West Broadway	Email 1 or Fax gmann@azimuthgroup.ca	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
City/Province:	Vancouver	Email 2 imcivor@azimuthgroup.ca	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:	V6K 2G8	Email 3 kganshorn@ecofishresearch.com	
Invoice To	Same as Report To ☑ YES ☐ NO	**Invoice Distribution**	**Analysis Request**
	Copy of Invoice with Report ☑ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
	Azimuth Consulting Group Inc.	Email 1 or Fax gmann@azimuthgroup.ca	
Contact:	Gary Mann	Email 2 imcivor@azimuthgroup.ca	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #: Q75925		AFE/Cost Center:	PO#
Job #:	Site C MMP - Pore Water	Major/Minor Code:	Routing Code:
PO / AFE:	BCH-22-01	Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only)

ALS Contact: Sneha Sansare Sampler: Kevin Ganshorn

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This descript		Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Dissolved Methylmercury in Water by GCAFS (0.02 ng/L) F/P	Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ng/L) F/P	Anions, Cond., pH, Total Alk, TSS F	Hardness F	DOC F/P	TOC F/P	IONBALANCE-BC-CL	Number of Containers
	~~PR1~~				~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~6~~
	~~PR2~~				~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~6~~
	~~PR2.84~~				~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~6~~
	~~PD1~~ PD1-A		24 Aug 22	16:15	Water	R	R	R	R	R	R	R	6
	~~PD3~~				~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~6~~
	PD3-FB		24 Aug 22	16:15	Water	R	R	R	R	R	R	R	6
	PD5-A		24 Aug 22	09:55	Water	R	R	R	R	R	R	R	6
	~~PD5-B~~ PD1-B		24 Aug 22	16:15	Water	R	R	R	R	R	R	R	6
	~~Travel Blank~~				Water			R			R	R	3

Telephone : +1 250 261 5617

Fort St. John Work Order Reference FJ2202312

Drinking Water (DW) Samples[1] (client use

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

teria to add on report by clicking on the drop-down list below (electronic COC only)

22-ECOF100-004 (MMP Pore Water Quality) for arameters/detection limits

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C	
7.0				

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: Aug 24, 2022	Time:	Received by: Rick	Date: 8.25.22	Time: 8:45	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY OCTOBER 2015 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202328**	Page	: 1 of 4
Amendment	: **1**		
Client	: **Azimuth Consulting Group Inc.**	Laboratory	: ALS Environmental - Fort St. John
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Pore Water	Date Samples Received	: 26-Aug-2022 07:25
PO	: BCH-22-01	Date Analysis Commenced	: 30-Aug-2022
C-O-C number	: 2022Aug Porewater	Issue Date	: 26-Sep-2023 15:50
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Hamideh Moradi	Analyst	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.
Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
meq/L	milliequivalents per litre
mg/L	milligrams per litre
ng/L	nanograms per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Accreditation

Accreditation	*Description*	*Laboratory*	*Address*
A	CALA ISO/IEC 17025:2017	VA ALS Environmental - Vancouver	8081 Lougheed Highway, Burnaby, BC

Applicable accreditations are indicated in the Method/Lab column as superscripts.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID: PR3	----	----	----	----
						Client sampling date / time: 25-Aug-2022 16:20	----	----	----	----
						FJ2202328-001	--------	--------	--------	--------
						Result	----	----	----	----
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	A	1.0	mg/L	206	----	----	----	----
Conductivity	----	E100/VA	A	2.0	µS/cm	401	----	----	----	----
Hardness (as CaCO3), dissolved	----	EC100/VA		0.60	mg/L	222	----	----	----	----
pH	----	E108/VA	A	0.10	pH units	8.31	----	----	----	----
Solids, total suspended [TSS]	----	E160/VA	A	3.0	mg/L	10.1	----	----	----	----
Anions and Nutrients										
Bromide	24959-67-9	E235.Br-L/VA	A	0.050	mg/L	<0.050	----	----	----	----
Chloride	16887-00-6	E235.Cl/VA	A	0.50	mg/L	0.78	----	----	----	----
Fluoride	16984-48-8	E235.F/VA	A	0.020	mg/L	0.156	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	A	0.0050	mg/L	0.0157	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	A	0.0010	mg/L	<0.0010	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	A	0.30	mg/L	28.5	----	----	----	----
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/VA	A	0.50	mg/L	11.1	----	----	----	----
Carbon, total organic [TOC]	----	E355-L/VA	A	0.50	mg/L	10.8	----	----	----	----
Ion Balance										
Anion sum	----	EC101/VA		0.10	meq/L	4.74	----	----	----	----
Cation sum	----	EC101/VA		0.10	meq/L	4.71	----	----	----	----
Ion balance (APHA)	----	EC101/VA		0.010	%	0.317	----	----	----	----
Dissolved Metals										
Mercury, dissolved	7439-97-6	E509-L/VA	A	0.50	ng/L	8.17	----	----	----	----
Calcium, dissolved	7440-70-2	E421/VA	A	0.050	mg/L	65.7	----	----	----	----
Magnesium, dissolved	7439-95-4	E421/VA	A	0.0050	mg/L	14.0	----	----	----	----
Dissolved MeHg filtration location	----	EP537/VA		-	-	Field	----	----	----	----
Dissolved mercury filtration location	----	EP509-L/VA		-	-	Field	----	----	----	----
Dissolved metals filtration location	----	EP421/VA		-	-	Laboratory	----	----	----	----
Speciated Metals										
Methylmercury (as MeHg), dissolved	22967-92-6	E537/VA	A	0.000020	µg/L	0.000692	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

right solutions.
right partner.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202328**	Page	: 1 of 9
Amendment	: **1**		
Client	: **Azimuth Consulting Group Inc.**	Laboratory	: ALS Environmental - Fort St. John
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Pore Water	Date Samples Received	: 26-Aug-2022 07:25
PO	: BCH-22-01	Issue Date	: 26-Sep-2023 15:50
C-O-C number	: 2022Aug Porewater		
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE PR3	E235.Br-L	25-Aug-2022	30-Aug-2022	28 days	5 days	✓	30-Aug-2022	28 days	5 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE PR3	E235.Cl	25-Aug-2022	30-Aug-2022	28 days	5 days	✓	30-Aug-2022	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE PR3	E235.F	25-Aug-2022	30-Aug-2022	28 days	5 days	✓	30-Aug-2022	28 days	5 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PR3	E235.NO3-L	25-Aug-2022	30-Aug-2022	3 days	4 days	× EHT	30-Aug-2022	3 days	4 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PR3	E235.NO2-L	25-Aug-2022	30-Aug-2022	3 days	4 days	× EHT	30-Aug-2022	3 days	4 days	× EHT
Anions and Nutrients : Sulfate in Water by IC										
HDPE PR3	E235.SO4	25-Aug-2022	30-Aug-2022	28 days	5 days	✓	30-Aug-2022	28 days	5 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) PR3	E509-L	25-Aug-2022	02-Sep-2022	28 days	8 days	✓	02-Sep-2022	28 days	8 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PR3	E421	25-Aug-2022	30-Aug-2022	180 days	5 days	✓	30-Aug-2022	180 days	5 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PR3	E358-L	25-Aug-2022	01-Sep-2022	28 days	7 days	✓	01-Sep-2022	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PR3	E355-L	25-Aug-2022	01-Sep-2022	28 days	7 days	✓	01-Sep-2022	28 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE PR3	E290	25-Aug-2022	30-Aug-2022	14 days	5 days	✓	30-Aug-2022	14 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE PR3	E100	25-Aug-2022	30-Aug-2022	28 days	5 days	✓	30-Aug-2022	28 days	5 days	✓
Physical Tests : pH by Meter										
HDPE PR3	E108	25-Aug-2022	30-Aug-2022	0.25 hrs	109 hrs	× EHTR-FM	30-Aug-2022	0.25 hrs	110 hrs	× EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE PR3	E160	25-Aug-2022	----	----	----		01-Sep-2022	7 days	7 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PR3	E537	25-Aug-2022	02-Sep-2022	180 days	8 days	✓	07-Sep-2022	180 days	5 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	624246	1	19	5.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	624252	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	624251	1	19	5.2	5.0	✓
Conductivity in Water	E100	624244	1	19	5.2	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	630550	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	624762	1	18	5.5	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	630063	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	629551	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	624248	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	624249	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	624250	1	19	5.2	5.0	✓
pH by Meter	E108	624245	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	624247	1	19	5.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	629552	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	629645	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	624246	1	19	5.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	624252	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	624251	1	19	5.2	5.0	✓
Conductivity in Water	E100	624244	1	19	5.2	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	630550	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	624762	1	18	5.5	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	630063	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	629551	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	624248	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	624249	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	624250	1	19	5.2	5.0	✓
pH by Meter	E108	624245	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	624247	1	19	5.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	629552	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	629645	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	624246	1	19	5.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	624252	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	624251	1	19	5.2	5.0	✓

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Conductivity in Water	E100	624244	1	19	5.2	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	630550	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	624762	1	18	5.5	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	630063	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	629551	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	624248	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	624249	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	624250	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	624247	1	19	5.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	629552	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	629645	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Bromide in Water by IC (Low Level)	E235.Br-L	624252	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	624251	1	19	5.2	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	630550	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	624762	1	18	5.5	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	630063	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	629551	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	624248	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	624249	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	624250	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	624247	1	19	5.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	629552	1	20	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Vancouver	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Vancouver	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Bromide in Water by IC (Low Level)	E235.Br-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	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.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L ALS Environmental - Vancouver	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAFS.
Dissolved Methylmercury in Water by GCAFS	E537 ALS Environmental - Vancouver	Water	EPA 1630 (mod)	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	Water	APHA 2340B	“Hardness (as $CaCO_3$), dissolved” is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. “Total Hardness” refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 ALS Environmental - Vancouver	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Total Organic Carbon by Combustion	EP355 ALS Environmental - Vancouver	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Dissolved Metals Water Filtration	EP421 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration (Low Level)	EP509-L ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
Dissolved Methylmercury Water Preparation	EP537 ALS Environmental - Vancouver	Water	EPA 1630	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".

ALS Canada Ltd.

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QUALITY CONTROL REPORT

Work Order	: **FJ2202328**	Page	: 1 of 8
Amendment	: **1**		
Client	: Azimuth Consulting Group Inc.	Laboratory	: ALS Environmental - Fort St. John
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	:	Telephone	: 778-370-3279
Project	: Site C MMP - Pore Water	Date Samples Received	: 26-Aug-2022 07:25
PO	: BCH-22-01	Date Analysis Commenced	: 30-Aug-2022
C-O-C number	: 2022Aug Porewater	Issue Date	: 26-Sep-2023 15:50
Sampler	: KG ----		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angelo Salandanan	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Hamideh Moradi	Analyst	Vancouver Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Vancouver Inorganics, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 624244)											
FJ2202327-007	Anonymous	Conductivity	----	E100	2.0	µS/cm	168	171	1.65%	10%	----
Physical Tests (QC Lot: 624245)											
FJ2202327-007	Anonymous	pH	----	E108	0.10	pH units	7.86	7.87	0.127%	4%	----
Physical Tests (QC Lot: 624246)											
FJ2202327-007	Anonymous	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	79.6	78.9	0.883%	20%	----
Physical Tests (QC Lot: 629645)											
FJ2202327-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	5.3	5.1	0.2	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 624247)											
FJ2202328-001	PR3	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	28.5	28.5	0.111%	20%	----
Anions and Nutrients (QC Lot: 624248)											
FJ2202328-001	PR3	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.156	0.150	0.006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 624249)											
FJ2202328-001	PR3	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0157	0.0155	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 624250)											
FJ2202328-001	PR3	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 624251)											
FJ2202328-001	PR3	Chloride	16887-00-6	E235.Cl	0.50	mg/L	0.78	0.77	0.007	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 624252)											
FJ2202328-001	PR3	Bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 629551)											
FJ2202327-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.83	2.76	0.06	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 629552)											
FJ2202327-001	Anonymous	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	2.86	2.85	0.01	Diff <2x LOR	----
Dissolved Metals (QC Lot: 624762)											
VA22C0108-001	Anonymous	Calcium, dissolved	7440-70-2	E421	0.500	mg/L	206	209	1.59%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0500	mg/L	56.8	55.2	2.84%	20%	----
Dissolved Metals (QC Lot: 630550)											
EO2206775-001	Anonymous	Mercury, dissolved	7439-97-6	E509-L	0.50	ng/L	14.0	13.0	6.97%	20%	----
Speciated Metals (QC Lot: 630063)											
FJ2202315-001	Anonymous	Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.000020	µg/L	<0.020 ng/L	<0.000020	0	Diff <2x LOR	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 624244)						
Conductivity	----	E100	1	µS/cm	1.2	----
Physical Tests (QCLot: 624246)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 629645)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 624247)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 624248)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 624249)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 624250)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 624251)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 624252)						
Bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Organic / Inorganic Carbon (QCLot: 629551)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 629552)						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 624762)						
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Dissolved Metals (QCLot: 630550)						
Mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	<0.50	----
Speciated Metals (QCLot: 630063)						
Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	<0.000020	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 624244)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	96.0	90.0	110	----
Physical Tests (QCLot: 624245)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 624246)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	107	85.0	115	----
Physical Tests (QCLot: 629645)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	88.2	85.0	115	----
Anions and Nutrients (QCLot: 624247)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	99.4	90.0	110	----
Anions and Nutrients (QCLot: 624248)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	97.7	90.0	110	----
Anions and Nutrients (QCLot: 624249)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	98.8	90.0	110	----
Anions and Nutrients (QCLot: 624250)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	97.2	90.0	110	----
Anions and Nutrients (QCLot: 624251)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	98.3	90.0	110	----
Anions and Nutrients (QCLot: 624252)									
Bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	108	85.0	115	----
Organic / Inorganic Carbon (QCLot: 629551)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	101	80.0	120	----
Organic / Inorganic Carbon (QCLot: 629552)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	99.7	80.0	120	----
Dissolved Metals (QCLot: 624762)									
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	97.2	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	102	80.0	120	----
Mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	5 ng/L	101	80.0	120	----
Speciated Metals (QCLot: 630063)									

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Speciated Metals (QCLot: 630063) - continued									
Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	0.0025 µg/L	82.7	70.0	130	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 624247)										
VA22C0138-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	106 mg/L	100 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 624248)										
VA22C0138-001	Anonymous	Fluoride	16984-48-8	E235.F	1.05 mg/L	1 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 624249)										
VA22C0138-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.63 mg/L	2.5 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 624250)										
VA22C0138-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.516 mg/L	0.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 624251)										
VA22C0138-001	Anonymous	Chloride	16887-00-6	E235.Cl	105 mg/L	100 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 624252)										
VA22C0138-001	Anonymous	Bromide	24959-67-9	E235.Br-L	0.532 mg/L	0.5 mg/L	106	75.0	125	----
Organic / Inorganic Carbon (QCLot: 629551)										
FJ2202327-003	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	4.69 mg/L	5 mg/L	93.9	70.0	130	----
Organic / Inorganic Carbon (QCLot: 629552)										
FJ2202327-003	Anonymous	Carbon, total organic [TOC]	----	E355-L	5.08 mg/L	5 mg/L	102	70.0	130	----
Dissolved Metals (QCLot: 624762)										
KS2203131-001	Anonymous	Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
Dissolved Metals (QCLot: 630550)										
FC2201954-001	Anonymous	Mercury, dissolved	7439-97-6	E509-L	4.41 ng/L	5 ng/L	88.3	70.0	130	----
Speciated Metals (QCLot: 630063)										
FJ2202315-002	Anonymous	Methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00191 µg/L	0.0025 µg/L	76.6	60.0	140	----

ALS Environmental

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Chain of Custody (COC) / Request Form

FJAE Shipping & Receiving
Call Out / Expedite
Priority
# of Coolers X Air
# of Carboys Ground

Canada Toll Free: 1 800 668 [illegible] abel here

COC Number: COC #: 2022AUG POREWATER

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Azimuth Consulting Group Inc.
Contact:	Ian McIvor
Phone:	604-730-1220
	Company address below will appear on the final report
Street:	2902 West Broadway
City/Province:	Vancouver
Postal Code:	V6K 2G8
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
	Azimuth Consulting Group Inc.
Contact:	Gary Mann

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax gmann@azimuthgroup.ca
Email 2 imcivor@azimuthgroup.ca
Email 3 kganshorn@ecofishresearch.com

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax gmann@azimuthgroup.ca
Email 2 imcivor@azimuthgroup.ca

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #: Q75925
Job #: Site C MMP - Pore Water
PO / AFE: BCH-22-01
LSD:

ALS Lab Work Order # (lab use only)

ALS Contact: Sneha Sansare **Sampler:** Kevin Ganshorn

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F/P Dissolved Methylmercury in Water by GCAFS (0.02 ng/L)	F/P Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ng/L)	F Anions, Cond., pH, Total Alk, TSS	F Hardness	F/P DOC	F/P TOC	IONBALANCE-BC-CL	Number of Containers
	PR2-81	25 Aug 22	16:20	Water	R	R	R	R	R	R	R	6
	~~PR2~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~6~~
	~~DR2-81~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~6~~
	~~PD1~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~6~~
	~~PD3~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~6~~
	~~PD6-FB~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~6~~
	~~PD6-A~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~6~~
	~~PD6-B~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~6~~
	~~Travel Blank~~			~~Water~~			R			R	R	3

Fort St. John
Work Order Reference
FJ2202328

Telephone : +1 250 261 5517

Drinking Water (DW) Samples[1] (client [illegible] ort by clicking on the drop-down list below only)

Are samples taken from a Regulated DW System?
☐ YES ☑ NO

Are samples for human drinking water use?
☐ YES ☑ NO

(MMP Pore Water Quality) for parameters/detection limits

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
15.3					

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: Aug 25, 2022	Time:	Received by: RICK	Date: 8.26.22	Time: 7:25	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Request Form

Canada Toll Free: 1 800 668

FJAE Shipping & Receiving
- ___ Call Out
- ___ Expedite
- ___ Priority
- 1 # of Coolers
- X Air
- ___ # of Carboys
- ___ Ground

abel here

COC Number: COC #: 2022AUG POREWATER

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Azimuth Consulting Group Inc.
Contact:	Ian McIvor
Phone:	604-730-1220
	Company address below will appear on the final report
Street:	2902 West Broadway
City/Province:	Vancouver
Postal Code:	V6K 2G8
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
	Azimuth Consulting Group Inc.
Contact:	Gary Mann

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax gmann@azimuthgroup.ca
Email 2 imcivor@azimuthgroup.ca
Email 3 kganshorn@ecofishresearch.com

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax gmann@azimuthgroup.ca
Email 2 imcivor@azimuthgroup.ca

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)			EMERGENCY	
	4 day [P4]	☐		1 Business day [E1] ☐
	3 day [P3]	☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2]	☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information	
ALS Account # / Quote #: Q75925	
Job #:	Site C MMP - Pore Water
PO / AFE:	BCH-22-01
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only)

ALS Contact: Sneha Sansare Sampler: Kevin Ganshorn

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F/P Dissolved Methylmercury in Water by GCAFS (0.02 ng/L)	F/P Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ng/L)	F Anions, Cond., pH, Total Alk, TSS	F Hardness	F/P DOC	F/P TOC	IONBALANCE-BC-CL	Number of Containers
	PR2.81	25 Aug 22	16:20	Water	R	R	R	R	R	R	R	6
	~~PR2~~			~~Water~~	R	R	R	R	R	R	R	~~6~~
	~~DR2.81~~			~~Water~~	R	R	R	R	R	R	R	~~6~~
	~~PD1~~			~~Water~~	R	R	R	R	R	R	R	~~6~~
	~~PD3~~			~~Water~~	R	R	R	R	R	R	R	~~6~~
	~~PD6-PD~~			~~Water~~	R	R	R	R	R	R	R	~~6~~
	~~PD6-A~~			~~Water~~	R	R	R	R	R	R	R	~~6~~
	~~PD6-B~~			~~Water~~	R	R	R	R	R	R	R	~~6~~
	~~Travel Blank~~			~~Water~~			R			R	R	~~3~~

Fort St. John
Work Order Reference
FJ2202328

Telephone : +1 250 261 5517

Drinking Water (DW) Samples[1] (client

Are samples taken from a Regulated DW System?
☐ YES ☑ NO

Are samples for human drinking water use?
☐ YES ☑ NO

rt by clicking on the drop-down list below only)

(MMP Pore Water Quality) for parameters/detection limits

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
15.3			8C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: Aug 25, 2022	Time:	Received by: RICK	Date: 8.26.22	Time: 7:25	Received by: AB	Date: AUG 26 2022	Time: 16:00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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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 back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202370**	Page	: 1 of 3
Client	: **Azimuth Consulting Group Inc.**	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Pore Water	Date Samples Received	: 26-Aug-2022 17:00
PO	: BCH-22-01	Date Analysis Commenced	: 01-Sep-2022
C-O-C number	: 20220Aug Porewater	Issue Date	: 12-Sep-2022 09:43
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Brieanna Allen	Production/Validation Manager	Inorganics, Burnaby, British Columbia
Hamideh Moradi	Analyst	Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Kyle Chang	Lab Assistant	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
mg/L	milligrams per litre
ng/L	nanograms per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

Samples PR1 and PR2 : Insufficient Sample. Please contact AM for test prioritization.

Qualifiers

Qualifier	*Description*
DLCI	*Detection Limit Raised: Chromatographic interference due to co-elution.*
DLDS	*Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.*

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	PR1	PR2	Travel Blank	----	----
					Client sampling date / time	26-Aug-2022 10:35	26-Aug-2022 13:10	26-Aug-2022	----	----
						FJ2202370-001	FJ2202370-002	FJ2202370-003	--------	--------
						Result	Result	Result	----	----
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		----	----	<1.0	----	----
conductivity	----	E100	2.0	µS/cm		----	----	<2.0	----	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		264	158	----	----	----
pH	----	E108	0.10	pH units		----	----	5.70	----	----
solids, total suspended [TSS]	----	E160	3.0	mg/L		7.9	<3.0	<3.0	----	----
Anions and Nutrients										
bromide	24959-67-9	E235.Br-L	0.050	mg/L		<0.250 DLDS	<0.050	<0.050	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L		10.8	1.08	<0.50	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L		0.145 DLCI	<0.037 DLCI	<0.020	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		<0.0250 DLDS	0.0379	<0.0050	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		<0.0050 DLDS	<0.0010	<0.0010	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		6.53	16.1	<0.30	----	----
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L		19.9	23.8	----	----	----
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		24.1	21.0	<0.50	----	----
Dissolved Metals										
mercury, dissolved	7439-97-6	E509-L	0.50	ng/L		11.3	8.56	----	----	----
calcium, dissolved	7440-70-2	E421	0.050	mg/L		78.3	49.0	----	----	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		16.6	8.61	----	----	----
dissolved MeHg filtration location	----	EP537	-	-		Field	Field	----	----	----
dissolved mercury filtration location	----	EP509-L	-	-		Field	Field	----	----	----
dissolved metals filtration location	----	EP421	-	-		Laboratory	Field	----	----	----
Speciated Metals										
methylmercury (as MeHg), dissolved	22967-92-6	E537	0.000020	µg/L		0.000927	0.000201	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202370**	Page	: 1 of 13
Client	: **Azimuth Consulting Group Inc.**	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Pore Water	Date Samples Received	: 26-Aug-2022 17:00
PO	: BCH-22-01	Issue Date	: 12-Sep-2022 09:43
C-O-C number	: 20220Aug Porewater		
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Duplicate outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Physical Tests	FJ2202370-003	Travel Blank	pH	----	E108	6.12 % DUP-PH	4%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

Qualifier	*Description*
DUP-PH	*Duplicate pH result meets ALS Data Quality Objective for low ionic strength samples (+/- 1 pH unit where EC < 200 uS).*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE										
PR1	E235.Br-L	26-Aug-2022	01-Sep-2022	----	----		02-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE										
PR2	E235.Br-L	26-Aug-2022	01-Sep-2022	----	----		02-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE										
Travel Blank	E235.Br-L	26-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
PR1	E235.Cl	26-Aug-2022	01-Sep-2022	----	----		02-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
PR2	E235.Cl	26-Aug-2022	01-Sep-2022	----	----		02-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Travel Blank	E235.Cl	26-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
PR1	E235.F	26-Aug-2022	01-Sep-2022	----	----		02-Sep-2022	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE PR2	E235.F	26-Aug-2022	01-Sep-2022	----	----		02-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Travel Blank	E235.F	26-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PR1	E235.NO3-L	26-Aug-2022	01-Sep-2022	3 days	6 days	× EHT	02-Sep-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PR2	E235.NO3-L	26-Aug-2022	01-Sep-2022	3 days	6 days	× EHT	02-Sep-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Travel Blank	E235.NO3-L	26-Aug-2022	01-Sep-2022	3 days	6 days	× EHT	01-Sep-2022	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PR1	E235.NO2-L	26-Aug-2022	01-Sep-2022	----	----		02-Sep-2022	3 days	6 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PR2	E235.NO2-L	26-Aug-2022	01-Sep-2022	----	----		02-Sep-2022	3 days	6 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Travel Blank	E235.NO2-L	26-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	3 days	6 days	× EHT
Anions and Nutrients : Sulfate in Water by IC										
HDPE PR1	E235.SO4	26-Aug-2022	01-Sep-2022	----	----		02-Sep-2022	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE PR2	E235.SO4	26-Aug-2022	01-Sep-2022	----	----		02-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Travel Blank	E235.SO4	26-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	6 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) PR1	E509-L	26-Aug-2022	02-Sep-2022	----	----		02-Sep-2022	28 days	7 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)										
Pre-cleaned amber glass - dissolved (lab preserved) PR2	E509-L	26-Aug-2022	02-Sep-2022	----	----		02-Sep-2022	28 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PR1	E421	26-Aug-2022	02-Sep-2022	----	----		02-Sep-2022	180 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) PR2	E421	26-Aug-2022	02-Sep-2022	----	----		02-Sep-2022	180 days	7 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PR1	E358-L	26-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	6 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) PR2	E358-L	26-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	6 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PR1	E355-L	26-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) PR2	E355-L	26-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	6 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) Travel Blank	E355-L	26-Aug-2022	03-Sep-2022	----	----		03-Sep-2022	28 days	8 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Travel Blank	E290	26-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	14 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE Travel Blank	E100	26-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	6 days	✓
Physical Tests : pH by Meter										
HDPE Travel Blank	E108	26-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	0.25 hrs	0.91 hrs	× EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE PR1	E160	26-Aug-2022	----	----	----		01-Sep-2022	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PR2	E160	26-Aug-2022	----	----	----		01-Sep-2022	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Travel Blank	E160	26-Aug-2022	----	----	----		01-Sep-2022	7 days	7 days	✓
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid) PR1	E537	26-Aug-2022	02-Sep-2022	180 days	7 days	✓	07-Sep-2022	180 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Speciated Metals : Dissolved Methylmercury in Water by GCAFS										
Amber glass dissolved (hydrochloric acid)										
PR2	E537	26-Aug-2022	02-Sep-2022	180 days	7 days	✓	07-Sep-2022	180 days	5 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	628289	1	15	6.6	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	628292	2	28	7.1	5.0	✓
Chloride in Water by IC	E235.Cl	628291	2	35	5.7	5.0	✓
Conductivity in Water	E100	628288	1	10	10.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	630550	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	630704	1	4	25.0	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	630063	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	629551	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	628290	2	28	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	628293	2	38	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	628294	2	38	5.2	5.0	✓
pH by Meter	E108	628287	1	15	6.6	5.0	✓
Sulfate in Water by IC	E235.SO4	628295	2	35	5.7	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	629552	2	40	5.0	5.0	✓
TSS by Gravimetry	E160	629645	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	628289	1	15	6.6	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	628292	2	28	7.1	5.0	✓
Chloride in Water by IC	E235.Cl	628291	2	35	5.7	5.0	✓
Conductivity in Water	E100	628288	1	10	10.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	630550	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	630704	1	4	25.0	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	630063	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	629551	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	628290	2	28	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	628293	2	38	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	628294	2	38	5.2	5.0	✓
pH by Meter	E108	628287	1	15	6.6	5.0	✓
Sulfate in Water by IC	E235.SO4	628295	2	35	5.7	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	629552	2	40	5.0	5.0	✓
TSS by Gravimetry	E160	629645	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	628289	1	15	6.6	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	628292	2	28	7.1	5.0	✓
Chloride in Water by IC	E235.Cl	628291	2	35	5.7	5.0	✓
Conductivity in Water	E100	628288	1	10	10.0	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	630550	1	16	6.2	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Dissolved Metals in Water by CRC ICPMS	E421	630704	1	4	25.0	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	630063	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	629551	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	628290	2	28	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	628293	2	38	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	628294	2	38	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	628295	2	35	5.7	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	629552	2	40	5.0	5.0	✓
TSS by Gravimetry	E160	629645	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Bromide in Water by IC (Low Level)	E235.Br-L	628292	2	28	7.1	5.0	✓
Chloride in Water by IC	E235.Cl	628291	2	35	5.7	5.0	✓
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L	630550	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	630704	1	4	25.0	5.0	✓
Dissolved Methylmercury in Water by GCAFS	E537	630063	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	629551	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	628290	2	28	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	628293	2	38	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	628294	2	38	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	628295	2	35	5.7	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	629552	2	40	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Bromide in Water by IC (Low Level)	E235.Br-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ppt)	E509-L Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAFS.
Dissolved Methylmercury in Water by GCAFS	E537 Vancouver - Environmental	Water	EPA 1630 (mod)	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	“Hardness (as $CaCO_3$), dissolved” is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. “Total Hardness” refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 Vancouver - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Dissolved Metals Water Filtration	EP421	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO_3.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
	Vancouver - Environmental			
Dissolved Mercury Water Filtration (Low Level)	EP509-L Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
Dissolved Methylmercury Water Preparation	EP537 Vancouver - Environmental	Water	EPA 1630	This method follows Method 1630 of the US EPA. Samples are distilled under an inert gas flow to isolate methylmercury and minimize matrix interferences. The distillate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **FJ2202370**	Page	: 1 of 10
Client	: Azimuth Consulting Group Inc.	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Pore Water	Date Samples Received	: 26-Aug-2022 17:00
PO	: BCH-22-01	Date Analysis Commenced	: 01-Sep-2022
C-O-C number	: 20220Aug Porewater	Issue Date	: 12-Sep-2022 09:49
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angelo Salandanan	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Brieanna Allen	Production/Validation Manager	Vancouver Inorganics, Burnaby, British Columbia
Hamideh Moradi	Analyst	Vancouver Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Kyle Chang	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 628287)											
FJ2202370-003	Travel Blank	pH	----	E108	0.10	pH units	5.70	6.06	6.12%	4%	DUP-PH
Physical Tests (QC Lot: 628288)											
FJ2202370-003	Travel Blank	conductivity	----	E100	2.0	µS/cm	<2.0	<2.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 628289)											
FJ2202370-003	Travel Blank	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 629645)											
FJ2202327-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	5.3	5.1	0.2	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 628290)											
FJ2202338-001	Anonymous	fluoride	16984-48-8	E235.F	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 628291)											
FJ2202338-001	Anonymous	chloride	16887-00-6	E235.Cl	2.50	mg/L	5.24	5.14	0.10	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 628292)											
FJ2202338-001	Anonymous	bromide	24959-67-9	E235.Br-L	0.250	mg/L	<0.250	<0.250	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 628293)											
FJ2202338-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	<0.0250	<0.0250	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 628294)											
FJ2202338-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 628295)											
FJ2202338-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	344	341	1.00%	20%	----
Anions and Nutrients (QC Lot: 629244)											
FJ2202370-001	PR1	fluoride	16984-48-8	E235.F	0.100	mg/L	0.145	0.141	0.004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 629245)											
FJ2202370-001	PR1	chloride	16887-00-6	E235.Cl	2.50	mg/L	10.8	10.6	0.13	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 629246)											
FJ2202370-001	PR1	bromide	24959-67-9	E235.Br-L	0.250	mg/L	<0.250	<0.250	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 629247)											
FJ2202370-001	PR1	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	<0.0250	<0.0250	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 629248)											
FJ2202370-001	PR1	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 629249)											
FJ2202370-001	PR1	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	6.53	6.47	0.06	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Organic / Inorganic Carbon (QC Lot: 629551)											
FJ2202327-001	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.83	2.76	0.06	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 629552)											
FJ2202327-001	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	2.86	2.85	0.01	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 632096)											
FJ2202314-004	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	0.77	0.74	0.03	Diff <2x LOR	----
Dissolved Metals (QC Lot: 630550)											
EO2206775-001	Anonymous	mercury, dissolved	7439-97-6	E509-L	0.50	ng/L	14.0	13.0	6.97%	20%	----
Dissolved Metals (QC Lot: 630704)											
VA22C0287-001	Anonymous	calcium, dissolved	7440-70-2	E421	0.050	mg/L	18.2	17.7	3.02%	20%	----
		magnesium, dissolved	7439-95-4	E421	0.100	mg/L	2.20	2.23	1.23%	20%	----
Speciated Metals (QC Lot: 630063)											
FJ2202315-001	Anonymous	methylmercury (as MeHg), dissolved	22967-92-6	E537	0.000020	µg/L	<0.020 ng/L	<0.000020	0	Diff <2x LOR	----

Qualifiers

Qualifier	*Description*
DUP-PH	*Duplicate pH result meets ALS Data Quality Objective for low ionic strength samples (+/- 1 pH unit where EC < 200 uS).*

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 628288)						
conductivity	----	E100	1	µS/cm	1.1	----
Physical Tests (QCLot: 628289)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 629645)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 628290)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 628291)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 628292)						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 628293)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 628294)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 628295)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 629244)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 629245)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 629246)						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 629247)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 629248)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 629249)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Organic / Inorganic Carbon (QCLot: 629551)						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 629552)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Organic / Inorganic Carbon (QCLot: 632096)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 630550)						
mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	<0.50	----
Dissolved Metals (QCLot: 630704)						
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Speciated Metals (QCLot: 630063)						
methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	<0.000020	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 628287)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 628288)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	100	90.0	110	----
Physical Tests (QCLot: 628289)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	110	85.0	115	----
Physical Tests (QCLot: 629645)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	88.2	85.0	115	----
Anions and Nutrients (QCLot: 628290)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	96.6	90.0	110	----
Anions and Nutrients (QCLot: 628291)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	97.2	90.0	110	----
Anions and Nutrients (QCLot: 628292)									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	104	85.0	115	----
Anions and Nutrients (QCLot: 628293)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	97.2	90.0	110	----
Anions and Nutrients (QCLot: 628294)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	96.3	90.0	110	----
Anions and Nutrients (QCLot: 628295)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	98.3	90.0	110	----
Anions and Nutrients (QCLot: 629244)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	97.1	90.0	110	----
Anions and Nutrients (QCLot: 629245)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	97.3	90.0	110	----
Anions and Nutrients (QCLot: 629246)									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	97.6	85.0	115	----
Anions and Nutrients (QCLot: 629247)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	98.1	90.0	110	----
Anions and Nutrients (QCLot: 629248)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	96.0	90.0	110	----
Anions and Nutrients (QCLot: 629249)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	99.2	90.0	110	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Organic / Inorganic Carbon (QCLot: 629551)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	101	80.0	120	----
Organic / Inorganic Carbon (QCLot: 629552)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	99.7	80.0	120	----
Organic / Inorganic Carbon (QCLot: 632096)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	99.0	80.0	120	----
mercury, dissolved	7439-97-6	E509-L	0.5	ng/L	5 ng/L	101	80.0	120	----
Dissolved Metals (QCLot: 630704)									
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	94.6	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	101	80.0	120	----
Speciated Metals (QCLot: 630063)									
methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00002	µg/L	0.0025 µg/L	82.7	70.0	130	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 628290)										
FJ2202338-002	Anonymous	fluoride	16984-48-8	E235.F	4.65 mg/L	5 mg/L	93.0	75.0	125	----
Anions and Nutrients (QCLot: 628291)										
FJ2202338-002	Anonymous	chloride	16887-00-6	E235.Cl	482 mg/L	500 mg/L	96.5	75.0	125	----
Anions and Nutrients (QCLot: 628292)										
FJ2202338-002	Anonymous	bromide	24959-67-9	E235.Br-L	2.55 mg/L	2.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 628293)										
FJ2202338-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	12.1 mg/L	12.5 mg/L	96.8	75.0	125	----
Anions and Nutrients (QCLot: 628294)										
FJ2202338-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	2.38 mg/L	2.5 mg/L	95.2	75.0	125	----
Anions and Nutrients (QCLot: 628295)										
FJ2202338-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	500 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 629244)										
VA22B9853-020	Anonymous	fluoride	16984-48-8	E235.F	1.02 mg/L	1 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 629245)										
VA22B9853-020	Anonymous	chloride	16887-00-6	E235.Cl	102 mg/L	100 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 629246)										
VA22B9853-020	Anonymous	bromide	24959-67-9	E235.Br-L	0.503 mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 629247)										
VA22B9853-020	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.58 mg/L	2.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 629248)										
VA22B9853-020	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.486 mg/L	0.5 mg/L	97.2	75.0	125	----
Anions and Nutrients (QCLot: 629249)										
VA22B9853-020	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	103 mg/L	100 mg/L	103	75.0	125	----
Organic / Inorganic Carbon (QCLot: 629551)										
FJ2202327-003	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	4.69 mg/L	5 mg/L	93.9	70.0	130	----
Organic / Inorganic Carbon (QCLot: 629552)										
FJ2202327-003	Anonymous	carbon, total organic [TOC]	----	E355-L	5.08 mg/L	5 mg/L	102	70.0	130	----
Organic / Inorganic Carbon (QCLot: 632096)										

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Organic / Inorganic Carbon (QCLot: 632096) - continued										
VA22C0169-001	Anonymous	carbon, total organic [TOC]	----	E355-L	ND mg/L	5 mg/L	ND	70.0	130	----
Dissolved Metals (QCLot: 630550)										
FC2201954-001	Anonymous	mercury, dissolved	7439-97-6	E509-L	4.41 ng/L	5 ng/L	88.3	70.0	130	----
Dissolved Metals (QCLot: 630704)										
VA22C0287-001	Anonymous	calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
Speciated Metals (QCLot: 630063)										
FJ2202315-002	Anonymous	methylmercury (as MeHg), dissolved	22967-92-6	E537	0.00191 µg/L	0.0025 µg/L	76.6	60.0	140	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: COC #: 2022AUG POREWATER

Page 1 of 1

Environmental Division
Fort St. John
Work Order Reference
FJ2202370

Telephone : +1 250 261 5517

Report To	Contact and company name below will appear on the final report
Company:	Azimuth Consulting Group Inc.
Contact:	Ian McIvor
Phone:	604-730-1220
	Company address below will appear on the final report
Street:	2902 West Broadway
City/Province:	Vancouver
Postal Code:	V6K 2G8
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
	Azimuth Consulting Group Inc.
Contact:	Gary Mann

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax gmann@azimuthgroup.ca
Email 2 imcivor@azimuthgroup.ca
Email 3 kganshorn@ecofishresearch.com

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax gmann@azimuthgroup.ca
Email 2 imcivor@azimuthgroup.ca

Project Information

ALS Account # / Quote #: Q75925
Job #: Site C MMP - Pore Water
PO / AFE: BCH-22-01
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (lab use only)

ALS Contact: Sneha Sansare **Sampler:** Kevin Ganshorn

Select Service Level Below - Please confirm all E&P TA

Regular [R] ☑ Standard TAT

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

Date and Time Required for all E&P TAT:

For tests that can not be performed according to the serv

Anal

Indicate Filtered (F), Preserved (P) or Fi

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F/P Dissolved Methylmercury in Water by GCAFS (0.02 ng/L)	F/P Dissolved Mercury in Water by CVAFS (Low Level, LOR = 0.5 ng/L)	F Anions, Cond., pH, Total Alk, TSS	F Hardness	F/P DOC	F/P TOC	IONBALANCE-BC-CL	Number of Containers
	PR1	26 AUG 22	10:35	Water	R	R	R	R	R	R	R	6
	PR2	26 AUG 22	13:10	Water	R	R	R	R	R	R	R	6
	~~PR2-01~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~6~~
	~~PD1~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~6~~
	~~PD3~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~6~~
	~~RD3-EB~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~6~~
	~~RD5A~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~6~~
	~~RD5-B~~			~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~6~~
	Travel Blank	26 AUG 22	—	Water			R			R	R	3

FJAE Shipping & Receiving
Call Out ___ Expedite ___ Priority
___ # of Coolers ✓ Air
___ # of Carboys ___ Ground

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO
Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Please reference VA22-ECOF100-004 (MMP Pore Water Quality) for parameters/detection limits
PR2 General bottle not sufficiently filled. 52mL only. Please proceed w/ analysis

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C	
5.4			13.5	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: Aug 26, 2022	Time: 17:10	Received by:	Date: Aug 26/22	Time: 1700	Received by: RC	Date: 08/29/22	Time: 1330

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

APPENDIX B3: SEDIMENT CHEMISTRY ALS REPORTS

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202202**	Page	: 1 of 3
Amendment	: **2**		
Client	: **Azimuth Consulting Group Inc.**	Laboratory	: ALS Environmental - Fort St. John
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Sediment	Date Samples Received	: 18-Aug-2022 18:15
PO	: BCH-22-01	Date Analysis Commenced	: 23-Aug-2022
C-O-C number	: 2022AUG SED	Issue Date	: 26-Sep-2023 16:07
Sampler	: Kevin Ganshorn		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 2		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Colby Bingham	Laboratory Supervisor	Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Xihua Yao	Laboratory Analyst	Inorganics, Saskatoon, Saskatchewan

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.
Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
%	percent
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Accreditation

Accreditation	*Description*	*Laboratory*	*Address*
A	CALA ISO/IEC 17025:2017	VA ALS Environmental - Vancouver	8081 Lougheed Highway, Burnaby, BC
B	CALA ISO/IEC 17025:2017	SK ALS Environmental - Saskatoon	819 58 Street East, Saskatoon, SK

Applicable accreditations are indicated in the Method/Lab column as superscripts.

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID: PR3	----	----	----	----
						Client sampling date / time: 18-Aug-2022 11:30	----	----	----	----
						FJ2202202-002	--------	--------	--------	--------
						Result	----	----	----	----
Physical Tests										
Loss on ignition @ 375°C	----	E205B/SK	B	1.0	%	1.6	----	----	----	----
pH (1:2 soil:water)	----	E108/VA	A	0.10	pH units	8.19	----	----	----	----
Particle Size										
Clay (<0.004mm)	----	EC184E/SK		1.0	%	6.6	----	----	----	----
Silt (0.063mm - 0.004mm)	----	EC184E/SK		1.0	%	34.0	----	----	----	----
Sand (2.0mm - 0.063mm)	----	EC184E/SK		1.0	%	59.4	----	----	----	----
Gravel (>2mm)	----	EC184E/SK		1.0	%	<1.0	----	----	----	----
Organic / Inorganic Carbon										
Carbon, total [TC]	----	E351/SK	B	0.050	%	1.87	----	----	----	----
Carbon, inorganic [IC]	----	E354/SK	B	0.050	%	0.676	----	----	----	----
Carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354/SK	B	0.40	%	5.63	----	----	----	----
Carbon, total organic [TOC]	----	EC356/SK		0.050	%	1.19	----	----	----	----
Organic matter	----	EC356/SK		0.10	%	2.05	----	----	----	----
Metals										
Mercury	7439-97-6	E510/VA	A	0.0050	mg/kg	0.0420	----	----	----	----
Speciated Metals										
Methylmercury (as MeHg)	22967-92-6	E538/VA	A	0.050	µg/kg	0.490	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

right solutions.
right partner.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202202**	Page	: 1 of 6
Amendment	: **2**		
Client	: **Azimuth Consulting Group Inc.**	Laboratory	: ALS Environmental - Fort St. John
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Sediment	Date Samples Received	: 18-Aug-2022 18:15
PO	: BCH-22-01	Issue Date	: 26-Sep-2023 16:04
C-O-C number	: 2022AUG SED		
Sampler	: Kevin Ganshorn		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 2		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap										
PR3	E510	18-Aug-2022	26-Aug-2022	28 days	8 days	✓	26-Aug-2022	28 days	8 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
Glass soil jar/Teflon lined cap										
PR3	E351	18-Aug-2022	26-Aug-2022	----	----		26-Aug-2022	0 days	0 days	✓
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
Glass soil jar/Teflon lined cap										
PR3	E354	18-Aug-2022	----	----	----		26-Aug-2022	----	8 days	
Physical Tests : Loss On Ignition (375°C)										
Glass soil jar/Teflon lined cap										
PR3	E205B	18-Aug-2022	----	----	----		25-Aug-2022	365 days	7 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
PR3	E108	18-Aug-2022	26-Aug-2022	30 days	8 days	✓	26-Aug-2022	30 days	8 days	✓
Speciated Metals : Methylmercury in Soil by GCAFS										
Glass soil jar/Teflon lined cap										
PR3	E538	18-Aug-2022	23-Aug-2022	28 days	6 days	✓	24-Aug-2022	28 days	1 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Loss On Ignition (375°C)	E205B	619318	1	2	50.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	618493	1	19	5.2	5.0	✓
Methylmercury in Soil by GCAFS	E538	612349	1	3	33.3	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	618495	1	19	5.2	5.0	✓
Total Carbon by Combustion	E351	621014	1	1	100.0	5.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	620868	1	19	5.2	5.0	✓
Laboratory Control Samples (LCS)							
Loss On Ignition (375°C)	E205B	619318	1	2	50.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	618493	2	19	10.5	10.0	✓
Methylmercury in Soil by GCAFS	E538	612349	2	3	66.6	10.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	618495	1	19	5.2	5.0	✓
Total Carbon by Combustion	E351	621014	2	1	200.0	10.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	620868	2	19	10.5	10.0	✓
Method Blanks (MB)							
Loss On Ignition (375°C)	E205B	619318	1	2	50.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	618493	1	19	5.2	5.0	✓
Methylmercury in Soil by GCAFS	E538	612349	1	3	33.3	5.0	✓
Total Carbon by Combustion	E351	621014	1	1	100.0	5.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	620868	1	19	5.2	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 ALS Environmental - Vancouver	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Loss On Ignition (375°C)	E205B ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 28.3 (mod)	Loss On Ignition (LOI) is determined by drying a portion of an air dried and ground sampled at 105°C, then igniting at 375°C for 16-20 hours. The weight loss after ignition is reported as % loss on ignition. LOI is reported on a dry weight basis. LOI at 375°C can be considered an estimation of Organic Matter Content according to Alberta Agriculture (1988).
Total Carbon by Combustion	E351 ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 21.2 (mod)	Total Carbon is determined by the high temperature combustion method with measurement by an infrared detector.
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354 ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 20.2	Total Inorganic Carbon is determined by acetic acid pH standard curve, where a known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.
Mercury in Soil/Solid by CVAAS	E510 ALS Environmental - Vancouver	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.
Methylmercury in Soil by GCAFS	E538 ALS Environmental - Vancouver	Soil/Solid	DeWild et al. (2004)/EPA 1630 (mod)	This method follows procedures published by DeWild, Olund, Olsen and Tate (2004) for the US Geological Survey (Techniques and Methods 5A-7). Samples are leached with an acidic copper sulphate solution to solubilize methylmercury for inorganic complexes. The methylmercury is then extracted into dichloromethane and then an aliquot is back extracted into ultra-pure water. The extract is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Particle Size Analysis (Pipette) - MMER Classification	EC184E ALS Environmental - Saskatoon	Soil/Solid	Metal Mining Technical Guidance for Environmental Effects Monitoring (2012)	The particle size determination is performed by various methods to generate a Grain Size curve. The data from the curve is then used to produce particle size ranges based on the Metal Mining Effluent Regulations (MMER) classification system for Environmental Effects Monitoring.
Total Organic Carbon (Calculated) in soil	EC356 ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 21.2	Total Organic Carbon (TOC) is calculated by the difference between total carbon (TC) and total inorganic carbon (TIC).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 ALS Environmental - Vancouver	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 ALS Environmental - Vancouver	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available.
Methylmercury Soil Digestion	EP538 ALS Environmental - Vancouver	Soil/Solid	DeWild et al. (2004)	This method follows procedures published by DeWild, Olund, Olsen and Tate (2004) for the US Geological Survey (Techniques and Methods 5A-7). Samples are leached with an acidic copper sulphate solution to solubilize methylmercury for inorganic complexes. The methylmercury is then extracted into dichloromethane and then an aliquot is back extracted into ultra-pure water. The extract is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dry and Grind in Soil/Solid <60°C	EPP442 ALS Environmental - Calgary	Soil/Solid	Soil Sampling and Methods of Analysis, Carter 2008	After removal of any coarse fragments and reservation of wet subsamples a portion of homogenized sample is set in a tray and dried at less than 60°C until dry. The sample is then particle size reduced with an automated crusher or mortar and pestle, typically to <2 mm. Further size reduction may be needed for particular tests.

QUALITY CONTROL REPORT

Work Order	: **FJ2202202**	Page	: 1 of 5
Amendment	: **2**		
Client	: Azimuth Consulting Group Inc.	Laboratory	: ALS Environmental - Fort St. John
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	:	Telephone	: 778-370-3279
Project	: Site C MMP - Sediment	Date Samples Received	: 18-Aug-2022 18:15
PO	: BCH-22-01	Date Analysis Commenced	: 23-Aug-2022
C-O-C number	: 2022AUG SED	Issue Date	: 26-Sep-2023 16:04
Sampler	: Kevin Ganshorn		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 2		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Colby Bingham	Laboratory Supervisor	Saskatoon Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Saskatoon Inorganics, Saskatoon, Saskatchewan
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Xihua Yao	Laboratory Analyst	Saskatoon Inorganics, Saskatoon, Saskatchewan

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 618495)											
FJ2202202-001	PR2	pH (1:2 soil:water)	----	E108	0.10	pH units	7.86	7.94	1.0%	5%	----
Physical Tests (QC Lot: 619318)											
FJ2202202-001	PR2	Loss on ignition @ 375°C	----	E205B	1.0	%	2.6	2.6	0.03	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 620868)											
FJ2202202-001	PR2	Carbon, inorganic [IC]	----	E354	0.050	%	0.954	0.957	0.356%	20%	----
Organic / Inorganic Carbon (QC Lot: 621014)											
EO2206783-014	Anonymous	Carbon, total [TC]	----	E351	0.050	%	1.37	1.29	5.79%	20%	----
Metals (QC Lot: 618493)											
FJ2202202-001	PR2	Mercury	7439-97-6	E510	0.0050	mg/kg	0.0530	0.0545	2.83%	40%	----
Speciated Metals (QC Lot: 612349)											
FJ2202202-001	PR2	Methylmercury (as MeHg)	22967-92-6	E538	0.050	µg/kg	1.79	1.72	4.10%	30%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Organic / Inorganic Carbon (QCLot: 620868)						
Carbon, inorganic [IC]	----	E354	0.05	%	<0.050	----
Organic / Inorganic Carbon (QCLot: 621014)						
Carbon, total [TC]	----	E351	0.05	%	<0.050	----
Metals (QCLot: 618493)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Speciated Metals (QCLot: 612349)						
Methylmercury (as MeHg)	22967-92-6	E538	0.05	µg/kg	<0.050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 618495)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.8	95.0	105	----
Organic / Inorganic Carbon (QCLot: 620868)									
Carbon, inorganic [IC]	----	E354	0.05	%	0.5 %	93.5	90.0	110	----
Organic / Inorganic Carbon (QCLot: 621014)									
Carbon, total [TC]	----	E351	0.05	%	48 %	101	90.0	110	----
Metals (QCLot: 618493)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	100	80.0	120	----
Speciated Metals (QCLot: 612349)									
Methylmercury (as MeHg)	22967-92-6	E538	0.05	µg/kg	10 µg/kg	98.1	70.0	130	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Physical Tests (QCLot: 619318)									
	RM	Loss on ignition @ 375°C	----	E205B	8 %	89.5	80.0	120	----
Organic / Inorganic Carbon (QCLot: 620868)									
	RM	Carbon, inorganic [IC]	----	E354	0.383 %	95.6	80.0	120	----
Organic / Inorganic Carbon (QCLot: 621014)									
	RM	Carbon, total [TC]	----	E351	1.4 %	101	80.0	120	----
Metals (QCLot: 618493)									
	SCP SS-2	Mercury	7439-97-6	E510	0.059 mg/kg	97.7	70.0	130	----
Speciated Metals (QCLot: 612349)									
	RM	Methylmercury (as MeHg)	22967-92-6	E538	14.8 µg/kg	95.9	70.0	130	----

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: COC #: 2022AUG SED

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Azimuth Consulting Group Inc.
Contact:	Ian McIvor
Phone:	604-730-1220
	Company address below will appear on the final report
Street:	2902 West Broadway
City/Province:	Vancouver
Postal Code:	V6K 2G8
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Azimuth Consulting Group Inc.
Contact:	Gary Mann

Report Format / Distribution

Select Report Format: ☑ ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax gmann@azimuthgroup.ca
Email 2 imcivor@azimuthgroup.ca
Email 3

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax gmann@azimuthgroup.ca
Email 2 imcivor@azimuthgroup.ca

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #: Q75925
Job #: Site C MMP - Sediment
PO / AFE: BCH-22-01
LSD:

Oil and Gas Required Fields (client use)

enter: PO#
Code: Routing Code:
)ner:

ALS Lab Work Order # (lab use only): Fort St. John Work Order Reference FJ2202202

Telephone : +1 250 261 5617

tact: Sneha Sansare Sampler: Kevin Ganshorn

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification (This description)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Mercury (DL 0.005 mg/kg ww)	Methylmercury (DL 0.05 µg/kg WW)	Particle Size (Pipette + gravel)	TC, TIC, TOC in soil	pH by meter (1:2 Soil: water extraction)	Loss on Ignition at 375 degrees	Moisture Content by Gravimetry						Number of Containers
	~~PR1~~			~~Sediment~~	R	R	R	R	R	R	R						~~2~~
	PR2	18 AUG 22	15:00	Sediment	R	R	R	R	R	R	R						2
	PR2.81	18 AUG 22	11:30	Sediment	R	R	R	R	R	R	R						2
	~~PD1~~			~~Sediment~~	R	R	R	R	R	R	R						~~2~~
	~~PD5~~			~~Sediment~~	R	R	R	R	R	R	R						~~2~~
	~~PD5-FB~~			~~Sediment~~	R	R	R	R	R	R	R						~~2~~
	PD5-A			Sediment	R	R	R	R	R	R	R						2
	~~PD5-B~~			~~Sediment~~	R	R	R	R	R	R	R						~~2~~

F/AE Shipping & Receiving
Call Out ___ Expedite ___ Priority
1 ___ # of Coolers ___ Air ___ Ground
___ # of Carboys

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☑ NO
Are samples for human drinking water use?
☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Please reference VA22-ECOF100-004 (MMP Sediment) for parameters/detection limits

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
19.4					

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: Aug 18, 2022	Time:	Received by:	Date: Aug 18/22	Time: 1815	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202206**	Page	: 1 of 3
Client	: **Azimuth Consulting Group Inc.**	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Sediment	Date Samples Received	: 18-Aug-2022 07:50
PO	: BCH-22.01	Date Analysis Commenced	: 23-Aug-2022
C-O-C number	: 2022Aug SED	Issue Date	: 09-Sep-2022 13:39
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Maria Painchaud	Laboratory Assistant	Inorganics, Saskatoon, Saskatchewan
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Parnian Sane	Analyst	Metals, Burnaby, British Columbia
Xihua Yao	Laboratory Analyst	Inorganics, Saskatoon, Saskatchewan

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
%	percent
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: PR1	----	----	----	----
					Client sampling date / time: 17-Aug-2022 14:00	----	----	----	----
					FJ2202206-001	--------	--------	--------	--------
					Result	----	----	----	----
Physical Tests									
loss on ignition @ 375°C	----	E205B	1.0	%	1.2	----	----	----	----
moisture	----	E144	0.25	%	25.7	----	----	----	----
pH (1:2 soil:water)	----	E108	0.10	pH units	8.10	----	----	----	----
Particle Size									
clay (<0.004mm)	----	EC184E	1.0	%	1.9	----	----	----	----
silt (0.063mm - 0.004mm)	----	EC184E	1.0	%	14.5	----	----	----	----
sand (2.0mm - 0.063mm)	----	EC184E	1.0	%	83.6	----	----	----	----
gravel (>2mm)	----	EC184E	1.0	%	<1.0	----	----	----	----
Organic / Inorganic Carbon									
carbon, total [TC]	----	E351	0.050	%	1.02	----	----	----	----
carbon, inorganic [IC]	----	E354	0.050	%	0.219	----	----	----	----
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%	1.82	----	----	----	----
carbon, total organic [TOC]	----	EC356	0.050	%	0.801	----	----	----	----
organic matter	----	EC356	0.10	%	1.38	----	----	----	----
Metals									
mercury	7439-97-6	E510	0.0050	mg/kg	0.0528	----	----	----	----
Speciated Metals									
methylmercury (as MeHg)	22967-92-6	E538	0.050	µg/kg	0.639	----	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202206**	Page	: 1 of 7
Client	: **Azimuth Consulting Group Inc.**	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Sediment	Date Samples Received	: 18-Aug-2022 07:50
PO	: BCH-22.01	Issue Date	: 09-Sep-2022 13:43
C-O-C number	: 2022Aug SED		
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap										
PR1	E510	17-Aug-2022	26-Aug-2022	----	----		26-Aug-2022	28 days	9 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
Glass soil jar/Teflon lined cap										
PR1	E351	17-Aug-2022	24-Aug-2022	----	----		24-Aug-2022	180 days	0 days	✓
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
Glass soil jar/Teflon lined cap										
PR1	E354	17-Aug-2022	----	----	----		24-Aug-2022	----	----	
Physical Tests : Loss On Ignition (375°C)										
Glass soil jar/Teflon lined cap										
PR1	E205B	17-Aug-2022	----	----	----		23-Aug-2022	365 days	6 days	✓
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
PR1	E144	17-Aug-2022	----	----	----		25-Aug-2022	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
PR1	E108	17-Aug-2022	26-Aug-2022	----	----		26-Aug-2022	30 days	9 days	✓
Speciated Metals : Methylmercury in Soil by GCAFS										
Glass soil jar/Teflon lined cap										
PR1	E538	17-Aug-2022	23-Aug-2022	28 days	6 days	✓	24-Aug-2022	28 days	1 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Loss On Ignition (375°C)	E205B	615331	1	3	33.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	618113	1	20	5.0	5.0	✓
Methylmercury in Soil by GCAFS	E538	612349	1	3	33.3	5.0	✓
Moisture Content by Gravimetry	E144	618121	1	7	14.2	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	618115	1	20	5.0	5.0	✓
Total Carbon by Combustion	E351	616628	1	10	10.0	5.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	616632	1	11	9.0	5.0	✓
Laboratory Control Samples (LCS)							
Loss On Ignition (375°C)	E205B	615331	1	3	33.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	618113	2	20	10.0	10.0	✓
Methylmercury in Soil by GCAFS	E538	612349	2	3	66.6	10.0	✓
Moisture Content by Gravimetry	E144	618121	1	7	14.2	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	618115	1	20	5.0	5.0	✓
Total Carbon by Combustion	E351	616628	2	10	20.0	10.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	616632	2	11	18.1	10.0	✓
Method Blanks (MB)							
Loss On Ignition (375°C)	E205B	615331	1	3	33.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	618113	1	20	5.0	5.0	✓
Methylmercury in Soil by GCAFS	E538	612349	1	3	33.3	5.0	✓
Moisture Content by Gravimetry	E144	618121	1	7	14.2	5.0	✓
Total Carbon by Combustion	E351	616628	1	10	10.0	5.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	616632	1	11	9.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 Vancouver - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Loss On Ignition (375°C)	E205B Saskatoon - Environmental	Soil/Solid	CSSS (2008) 28.3 (mod)	Loss On Ignition (LOI) is determined by drying a portion of an air dried and ground sampld at 105°C, then igniting at 375°C for 16-20 hours. The weight loss after ignition is reported as % loss on ignition. LOI is reported on a dry weight basis. LOI at 375°C can be considered an estimation of Organic Matter Content according to Alberta Agriculture (1988).
Total Carbon by Combustion	E351 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 21.2 (mod)	Total Carbon is determined by the high temperature combustion method with measurement by an infrared detector.
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 20.2	Total Inorganic Carbon is determined by acetic acid pH standard curve, where a known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.
Mercury in Soil/Solid by CVAAS	E510 Vancouver - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.
Methylmercury in Soil by GCAFS	E538 Vancouver - Environmental	Soil/Solid	DeWild et al. (2004)/EPA 1630 (mod)	This method follows procedures published by DeWild, Olund, Olsen and Tate (2004) for the US Geological Survey (Techniques and Methods 5A-7). Samples are leached with an acidic copper sulphate solution to solubilize methylmercury for inorganic complexes. The methylmercury is then extracted into dichloromethane and then an aliquot is back extracted into ultra-pure water. The extract is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Particle Size Analysis (Pipette) - MMER Classification	EC184E Saskatoon - Environmental	Soil/Solid	Metal Mining Technical Guidance for Environmental Effects Monitoring (2012)	The particle size determination is performed by various methods to generate a Grain Size curve. The data from the curve is then used to produce particle size ranges based on the Metal Mining Effluent Regulations (MMER) classification system for Environmental Effects Monitoring.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Calculated) in soil	EC356 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 21.2	Total Organic Carbon (TOC) is calculated by the difference between total carbon (TC) and total inorganic carbon (TIC).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO_3 and HCl. This method is intended to liberate metals that may be environmentally available.
Methylmercury Soil Digestion	EP538 Vancouver - Environmental	Soil/Solid	DeWild et al. (2004)	This method follows procedures published by DeWild, Olund, Olsen and Tate (2004) for the US Geological Survey (Techniques and Methods 5A-7). Samples are leached with an acidic copper sulphate solution to solubilize methylmercury for inorganic complexes. The methylmercury is then extracted into dichloromethane and then an aliquot is back extracted into ultra-pure water. The extract is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dry and Grind	EPP442 Saskatoon - Environmental	Soil/Solid	Soil Sampling and Methods of Analysis, Carter 2008	After removal of any coarse fragments and reservation of wet subsamples a portion of homogenized sample is set in a tray and dried at less than 60°C until dry. The sample is then particle size reduced with an automated crusher or mortar and pestle, typically to <2 mm. Further size reduction may be needed for particular tests.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **FJ2202206**	Page	: 1 of 5
Client	: Azimuth Consulting Group Inc.	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Sediment	Date Samples Received	: 18-Aug-2022 07:50
PO	: BCH-22.01	Date Analysis Commenced	: 23-Aug-2022
C-O-C number	: 2022Aug SED	Issue Date	: 09-Sep-2022 13:39
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Hedy Lai	Team Leader - Inorganics	Saskatoon Inorganics, Saskatoon, Saskatchewan
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Maria Painchaud	Laboratory Assistant	Saskatoon Inorganics, Saskatoon, Saskatchewan
Ophelia Chiu	Department Manager - Organics	Vancouver Organics, Burnaby, British Columbia
Parnian Sane	Analyst	Vancouver Metals, Burnaby, British Columbia
Xihua Yao	Laboratory Analyst	Saskatoon Inorganics, Saskatoon, Saskatchewan

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 615331)											
FJ2202206-001	PR1	loss on ignition @ 375°C	----	E205B	1.0	%	1.2	1.1	0.05	Diff <2x LOR	----
Physical Tests (QC Lot: 618115)											
FJ2202198-001	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	7.84	7.98	1.8%	5%	----
Physical Tests (QC Lot: 618121)											
FJ2202206-001	PR1	moisture	----	E144	0.25	%	25.7	26.1	1.56%	20%	----
Organic / Inorganic Carbon (QC Lot: 616628)											
EO2206776-006	Anonymous	carbon, total [TC]	----	E351	0.050	%	1.72	1.77	2.41%	20%	----
Organic / Inorganic Carbon (QC Lot: 616632)											
EO2206776-010	Anonymous	carbon, inorganic [IC]	----	E354	0.050	%	0.230	0.230	0.0001	Diff <2x LOR	----
Metals (QC Lot: 618113)											
FJ2202198-001	Anonymous	mercury	7439-97-6	E510	0.0500	mg/kg	0.0794	0.0753	0.0041	Diff <2x LOR	----
Speciated Metals (QC Lot: 612349)											
FJ2202202-001	Anonymous	methylmercury (as MeHg)	22967-92-6	E538	0.050	µg/kg	1.79	1.72	4.10%	30%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 618121)						
moisture	----	E144	0.25	%	<0.25	----
Organic / Inorganic Carbon (QCLot: 616628)						
carbon, total [TC]	----	E351	0.05	%	<0.050	----
Organic / Inorganic Carbon (QCLot: 616632)						
carbon, inorganic [IC]	----	E354	0.05	%	<0.050	----
Metals (QCLot: 618113)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Speciated Metals (QCLot: 612349)						
methylmercury (as MeHg)	22967-92-6	E538	0.05	µg/kg	<0.050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 618115)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	98.8	95.0	105	----
Physical Tests (QCLot: 618121)									
moisture	----	E144	0.25	%	50 %	99.8	90.0	110	----
Organic / Inorganic Carbon (QCLot: 616628)									
carbon, total [TC]	----	E351	0.05	%	48 %	104	90.0	110	----
Organic / Inorganic Carbon (QCLot: 616632)									
carbon, inorganic [IC]	----	E354	0.05	%	0.5 %	94.6	90.0	110	----
Metals (QCLot: 618113)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	100	80.0	120	----
Speciated Metals (QCLot: 612349)									
methylmercury (as MeHg)	22967-92-6	E538	0.05	µg/kg	10 µg/kg	98.1	70.0	130	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

Reference Material (RM) Report									
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method					
Physical Tests (QCLot: 615331)									
	RM	loss on ignition @ 375°C	----	E205B	8 %	88.6	80.0	120	----
Organic / Inorganic Carbon (QCLot: 616628)									
	RM	carbon, total [TC]	----	E351	1.4 %	101	80.0	120	----
Organic / Inorganic Carbon (QCLot: 616632)									
	RM	carbon, inorganic [IC]	----	E354	0.383 %	97.2	80.0	120	----
Metals (QCLot: 618113)									
	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	91.8	70.0	130	----
Speciated Metals (QCLot: 612349)									
	RM	methylmercury (as MeHg)	22967-92-6	E538	14.8 µg/kg	95.9	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: COC #: 2022AUG SED

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Azimuth Consulting Group Inc.
Contact:	Ian McIvor
Phone:	604-730-1220
	Company address below will appear on the final report
Street:	2902 West Broadway
City/Province:	Vancouver
Postal Code:	V6K 2G8
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Azimuth Consulting Group Inc.
Contact:	Gary Mann

Report Format / Distribution

Select Report Format: ☑ ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax gmann@azimuthgroup.ca
Email 2 imcivor@azimuthgroup.ca
Email 3

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax gmann@azimuthgroup.ca
Email 2 imcivor@azimuthgroup.ca

Project Information

ALS Account # / Quote #: Q75925
Job #: Site C MMP - Sediment
PO / AFE: BCH-22-01
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐
EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Lab Work Order # (lab use only):

Environmental Division
Fort St. John
Work Order Reference
FJ2202206

Telephone : +1 250 261 5517

ALS Contact: Sneha Sansare | Sampler: Kevin Ganshorn

ALS Sample # (lab use only)	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Mercury (DL 0.005 mg/kg ww)	Methylmercury (DL 0.05 µg/kg WW)	Particle Size (Pipette + gravel)	TC, TIC, TOC in soil	pH by meter (1:2 Soil: water extraction)	Loss on Ignition at 375 degrees	Moisture Content by Gravimetry	Number of Containers
	PR1	17 AUG 22	14:00	Sediment	R	R	R	R	R	R	R	2
	~~PR2~~			~~Sediment~~	R	R	R	R	R	R	R	~~2~~
	~~PR2-BT~~			~~Sediment~~	R	R	R	R	R	R	R	~~2~~
	~~PR4~~			Sediment	R	R	R	R	R	R	R	~~2~~
	~~PR8~~			Sediment	R	R	R	R	R	R	R	~~2~~
	~~RD8/FB~~			Sediment	R	R	R	R	R	R	R	~~2~~
	~~RD5-A~~			Sediment	R	R	R	R	R	R	R	~~2~~
	~~RD5-B~~			Sediment	R	R	R	R	R	R	R	~~2~~

Number of Containers

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☑ NO
Are samples for human drinking water use?
☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Please reference VA22-ECOF100-004 (MMP Sediment) for parameters/detection limits

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
7.5	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: 18 AUG 22	Time:	Received by:	Date: Aug 19/22	Time: 750	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using **an Authorized DW COC form.**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202228**	Page	: 1 of 3
Client	: **Azimuth Consulting Group Inc.**	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Sediment	Date Samples Received	: 19-Aug-2022 15:45
PO	: BCH-22-01	Date Analysis Commenced	: 24-Aug-2022
C-O-C number	: 2022AUG SED	Issue Date	: 29-Aug-2022 16:44
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Alex Thornton	Analyst	Metals, Burnaby, British Columbia
Colby Bingham	Quality Systems Coordinator	Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Xihua Yao	Laboratory Analyst	Inorganics, Saskatoon, Saskatchewan

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
%	percent
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	PD1	----	----	----	----
					Client sampling date / time	[19-Aug-2022]	----	----	----	----
						FJ2202228-001	--------	--------	--------	--------
						Result	----	----	----	----
Physical Tests										
loss on ignition @ 375°C	----	E205B	1.0	%		2.5	----	----	----	----
moisture	----	E144	0.25	%		32.0	----	----	----	----
pH (1:2 soil:water)	----	E108	0.10	pH units		8.25	----	----	----	----
Particle Size										
clay (<0.004mm)	----	EC184E	1.0	%		8.6	----	----	----	----
silt (0.063mm - 0.004mm)	----	EC184E	1.0	%		62.7	----	----	----	----
sand (2.0mm - 0.063mm)	----	EC184E	1.0	%		28.7	----	----	----	----
gravel (>2mm)	----	EC184E	1.0	%		<1.0	----	----	----	----
Organic / Inorganic Carbon										
carbon, total [TC]	----	E351	0.050	%		2.34	----	----	----	----
carbon, inorganic [IC]	----	E354	0.050	%		0.688	----	----	----	----
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%		5.73	----	----	----	----
carbon, total organic [TOC]	----	EC356	0.050	%		1.65	----	----	----	----
organic matter	----	EC356	0.10	%		2.84	----	----	----	----
Metals										
mercury	7439-97-6	E510	0.0050	mg/kg		0.0582	----	----	----	----
Speciated Metals										
methylmercury (as MeHg)	22967-92-6	E538	0.050	µg/kg		0.759	----	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202228**	Page	: 1 of 7
Client	: **Azimuth Consulting Group Inc.**	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Sediment	Date Samples Received	: 19-Aug-2022 15:45
PO	: BCH-22-01	Issue Date	: 29-Aug-2022 16:44
C-O-C number	: 2022AUG SED		
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap										
PD1	E510	19-Aug-2022	27-Aug-2022	----	----		28-Aug-2022	28 days	9 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag										
PD1	E351	19-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	180 days	0 days	✓
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag										
PD1	E354	19-Aug-2022	----	----	----		26-Aug-2022	----	----	
Physical Tests : Loss On Ignition (375°C)										
LDPE bag										
PD1	E205B	19-Aug-2022	----	----	----		25-Aug-2022	365 days	7 days	✓
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
PD1	E144	19-Aug-2022	----	----	----		26-Aug-2022	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
PD1	E108	19-Aug-2022	27-Aug-2022	----	----		27-Aug-2022	30 days	8 days	✓
Speciated Metals : Methylmercury in Soil by GCAFS										
Glass soil jar/Teflon lined cap										
PD1	E538	19-Aug-2022	24-Aug-2022	28 days	6 days	✓	29-Aug-2022	28 days	5 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Loss On Ignition (375°C)	E205B	619318	1	3	33.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	621087	1	20	5.0	5.0	✓
Methylmercury in Soil by GCAFS	E538	615739	1	10	10.0	5.0	✓
Moisture Content by Gravimetry	E144	621090	1	7	14.2	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	621089	1	20	5.0	5.0	✓
Total Carbon by Combustion	E351	621027	1	20	5.0	5.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	620868	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Loss On Ignition (375°C)	E205B	619318	1	3	33.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	621087	2	20	10.0	10.0	✓
Methylmercury in Soil by GCAFS	E538	615739	2	10	20.0	10.0	✓
Moisture Content by Gravimetry	E144	621090	1	7	14.2	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	621089	1	20	5.0	5.0	✓
Total Carbon by Combustion	E351	621027	2	20	10.0	10.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	620868	2	20	10.0	10.0	✓
Method Blanks (MB)							
Loss On Ignition (375°C)	E205B	619318	1	3	33.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	621087	1	20	5.0	5.0	✓
Methylmercury in Soil by GCAFS	E538	615739	1	10	10.0	5.0	✓
Moisture Content by Gravimetry	E144	621090	1	7	14.2	5.0	✓
Total Carbon by Combustion	E351	621027	1	20	5.0	5.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	620868	1	20	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 Vancouver - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Loss On Ignition (375°C)	E205B Saskatoon - Environmental	Soil/Solid	CSSS (2008) 28.3 (mod)	Loss On Ignition (LOI) is determined by drying a portion of an air dried and ground sampld at 105°C, then igniting at 375°C for 16-20 hours. The weight loss after ignition is reported as % loss on ignition. LOI is reported on a dry weight basis. LOI at 375°C can be considered an estimation of Organic Matter Content according to Alberta Agriculture (1988).
Total Carbon by Combustion	E351 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 21.2 (mod)	Total Carbon is determined by the high temperature combustion method with measurement by an infrared detector.
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 20.2	Total Inorganic Carbon is determined by acetic acid pH standard curve, where a known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.
Mercury in Soil/Solid by CVAAS	E510 Vancouver - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.
Methylmercury in Soil by GCAFS	E538 Vancouver - Environmental	Soil/Solid	DeWild et al. (2004)/EPA 1630 (mod)	This method follows procedures published by DeWild, Olund, Olsen and Tate (2004) for the US Geological Survey (Techniques and Methods 5A-7). Samples are leached with an acidic copper sulphate solution to solubilize methylmercury for inorganic complexes. The methylmercury is then extracted into dichloromethane and then an aliquot is back extracted into ultra-pure water. The extract is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Particle Size Analysis (Pipette) - MMER Classification	EC184E Saskatoon - Environmental	Soil/Solid	Metal Mining Technical Guidance for Environmental Effects Monitoring (2012)	The particle size determination is performed by various methods to generate a Grain Size curve. The data from the curve is then used to produce particle size ranges based on the Metal Mining Effluent Regulations (MMER) classification system for Environmental Effects Monitoring.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Calculated) in soil	EC356 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 21.2	Total Organic Carbon (TOC) is calculated by the difference between total carbon (TC) and total inorganic carbon (TIC).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO_3 and HCl. This method is intended to liberate metals that may be environmentally available.
Methylmercury Soil Digestion	EP538 Vancouver - Environmental	Soil/Solid	DeWild et al. (2004)	This method follows procedures published by DeWild, Olund, Olsen and Tate (2004) for the US Geological Survey (Techniques and Methods 5A-7). Samples are leached with an acidic copper sulphate solution to solubilize methylmercury for inorganic complexes. The methylmercury is then extracted into dichloromethane and then an aliquot is back extracted into ultra-pure water. The extract is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dry and Grind	EPP442 Saskatoon - Environmental	Soil/Solid	Soil Sampling and Methods of Analysis, Carter 2008	After removal of any coarse fragments and reservation of wet subsamples a portion of homogenized sample is set in a tray and dried at less than 60°C until dry. The sample is then particle size reduced with an automated crusher or mortar and pestle, typically to <2 mm. Further size reduction may be needed for particular tests.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **FJ2202228**	Page	: 1 of 5
Client	: Azimuth Consulting Group Inc.	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Sediment	Date Samples Received	: 19-Aug-2022 15:45
PO	: BCH-22-01	Date Analysis Commenced	: 24-Aug-2022
C-O-C number	: 2022AUG SED	Issue Date	: 29-Aug-2022 16:44
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Alex Thornton	Analyst	Vancouver Metals, Burnaby, British Columbia
Colby Bingham	Quality Systems Coordinator	Saskatoon Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Saskatoon Inorganics, Saskatoon, Saskatchewan
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Xihua Yao	Laboratory Analyst	Saskatoon Inorganics, Saskatoon, Saskatchewan

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 619318)											
FJ2202202-001	Anonymous	loss on ignition @ 375°C	----	E205B	1.0	%	2.6	2.6	0.03	Diff <2x LOR	----
Physical Tests (QC Lot: 621089)											
FJ2202228-001	PD1	pH (1:2 soil:water)	----	E108	0.10	pH units	8.25	8.25	0.0%	5%	----
Physical Tests (QC Lot: 621090)											
FJ2202228-001	PD1	moisture	----	E144	0.25	%	32.0	37.4	15.5%	20%	----
Organic / Inorganic Carbon (QC Lot: 620868)											
FJ2202202-001	Anonymous	carbon, inorganic [IC]	----	E354	0.050	%	0.954	0.957	0.356%	20%	----
Organic / Inorganic Carbon (QC Lot: 621027)											
EO2206815-001	Anonymous	carbon, total [TC]	----	E351	0.050	%	2.20	2.08	5.46%	20%	----
Metals (QC Lot: 621087)											
FJ2202228-001	PD1	mercury	7439-97-6	E510	0.0050	mg/kg	0.0582	0.0597	2.54%	40%	----
Speciated Metals (QC Lot: 615739)											
FJ2202228-001	PD1	methylmercury (as MeHg)	22967-92-6	E538	0.050	µg/kg	0.759	0.770	1.44%	30%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 621090)						
moisture	----	E144	0.25	%	<0.25	----
Organic / Inorganic Carbon (QCLot: 620868)						
carbon, inorganic [IC]	----	E354	0.05	%	<0.050	----
Organic / Inorganic Carbon (QCLot: 621027)						
carbon, total [TC]	----	E351	0.05	%	<0.050	----
Metals (QCLot: 621087)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Speciated Metals (QCLot: 615739)						
methylmercury (as MeHg)	22967-92-6	E538	0.05	µg/kg	<0.050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 621089)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.3	95.0	105	----
Physical Tests (QCLot: 621090)									
moisture	----	E144	0.25	%	50 %	99.9	90.0	110	----
Organic / Inorganic Carbon (QCLot: 620868)									
carbon, inorganic [IC]	----	E354	0.05	%	0.5 %	93.5	90.0	110	----
Organic / Inorganic Carbon (QCLot: 621027)									
carbon, total [TC]	----	E351	0.05	%	48 %	102	90.0	110	----
Metals (QCLot: 621087)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	108	80.0	120	----
Speciated Metals (QCLot: 615739)									
methylmercury (as MeHg)	22967-92-6	E538	0.05	µg/kg	10 µg/kg	104	70.0	130	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

Reference Material (RM) Report									
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method					
Physical Tests (QCLot: 619318)									
	RM	loss on ignition @ 375°C	----	E205B	8 %	89.5	80.0	120	----
Organic / Inorganic Carbon (QCLot: 620868)									
	RM	carbon, inorganic [IC]	----	E354	0.383 %	95.6	80.0	120	----
Organic / Inorganic Carbon (QCLot: 621027)									
	RM	carbon, total [TC]	----	E351	1.4 %	102	80.0	120	----
Metals (QCLot: 621087)									
	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	102	70.0	130	----
Speciated Metals (QCLot: 615739)									
	RM	methylmercury (as MeHg)	22967-92-6	E538	14.8 µg/kg	106	70.0	130	----

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: COC #: 2022AUG SED

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Azimuth Consulting Group Inc.
Contact:	Ian McIvor
Phone:	604-730-1220
	Company address below will appear on the final report
Street:	2902 West Broadway
City/Province:	Vancouver
Postal Code:	V6K 2G8
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Azimuth Consulting Group Inc.
Contact:	Gary Mann

Report Format / Distribution

Select Report Format: ☑ ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report: ☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: gmann@azimuthgroup.ca
Email 2: imcivor@azimuthgroup.ca
Email 3:

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: gmann@azimuthgroup.ca
Email 2: imcivor@azimuthgroup.ca

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐
EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
For tests that can not be performed according to the service level selected, you will be contacted.

Project Information	
ALS Account # / Quote #: Q75925	
Job #:	Site C MMP - Sediment
PO / AFE:	BCH-22-01
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):
ALS Contact: Sneha Sansare
Sampler: Kevin Ganshorn

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This des	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Mercury (DL 0.005 mg/kg ww)	Methylmercury (DL 0.05 µg/kg WW)	Particle Size (Pipette + gravel)	TC, TIC, TOC in soil	pH by meter (1:2 Soil: water extraction)	Loss on Ignition at 375 degrees	Moisture Content by Gravimetry	Number of Containers
	~~PR1~~			~~Sediment~~	R	R	R	R	R	R	R	~~2~~
	~~PR2~~			~~Sediment~~	R	R	R	R	R	R	R	~~2~~
	~~PR2-81~~			~~Sediment~~	R	R	R	R	R	R	R	~~2~~
	PD1			Sediment	R	R	R	R	R	R	R	2
	~~PD3~~			~~Sediment~~	R	R	R	R	R	R	R	~~2~~
	~~PD3-FB~~			~~Sediment~~	R	R	R	R	R	R	R	~~2~~
	~~PD5-A~~			~~Sediment~~	R	R	R	R	R	R	R	~~2~~
	~~PD5-B~~			~~Sediment~~	R	R	R	R	R	R	R	~~2~~

Fort St. John
Work Order Reference
FJ2202228

Telephone : +1 250 261 5517

Drinking Water (DW) Samples[1] (clie... ...rt by clicking on the drop-down list below ...only)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO
Are samples for human drinking water use? ☐ YES ☑ NO

Please reference VA22-ECOF100-004 (MMP Sediment) for parameters/detection limits

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
12.6					

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Kevin Ganshorn	Date: Aug 19, 2022	Time: 15:45	Received by: RICK	Date: 8.18.22	Time: 3:45	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION — WHITE - LABORATORY COPY — YELLOW - CLIENT COPY — OCTOBER 2015 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202311**	Page	: 1 of 3
Client	: **Azimuth Consulting Group Inc.**	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Sediment	Date Samples Received	: 23-Aug-2022 18:36
PO	: BCH-22-01	Date Analysis Commenced	: 26-Aug-2022
C-O-C number	: 2022Aug SED	Issue Date	: 14-Sep-2022 10:38
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Colby Bingham	Quality Systems Coordinator	Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Qammar Almas	Lab Assistant	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
%	percent
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: PD3	----	----	----	----
					Client sampling date / time: 23-Aug-2022	----	----	----	----
					FJ2202311-001	--------	--------	--------	--------
					Result	----	----	----	----
Physical Tests									
loss on ignition @ 375°C	----	E205B	1.0	%	2.2	----	----	----	----
moisture	----	E144	0.25	%	32.8	----	----	----	----
pH (1:2 soil:water)	----	E108	0.10	pH units	8.08	----	----	----	----
Particle Size									
clay (<0.004mm)	----	EC184E	1.0	%	7.3	----	----	----	----
silt (0.063mm - 0.004mm)	----	EC184E	1.0	%	48.5	----	----	----	----
sand (2.0mm - 0.063mm)	----	EC184E	1.0	%	44.2	----	----	----	----
gravel (>2mm)	----	EC184E	1.0	%	<1.0	----	----	----	----
Organic / Inorganic Carbon									
carbon, total [TC]	----	E351	0.050	%	2.02	----	----	----	----
carbon, inorganic [IC]	----	E354	0.050	%	0.527	----	----	----	----
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%	4.39	----	----	----	----
carbon, total organic [TOC]	----	EC356	0.050	%	1.49	----	----	----	----
organic matter	----	EC356	0.10	%	2.57	----	----	----	----
Metals									
mercury	7439-97-6	E510	0.0050	mg/kg	0.0511	----	----	----	----
Speciated Metals									
methylmercury (as MeHg)	22967-92-6	E538	0.050	µg/kg	<0.050	----	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202311**	Page	: 1 of 7
Client	: **Azimuth Consulting Group Inc.**	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Sediment	Date Samples Received	: 23-Aug-2022 18:36
PO	: BCH-22-01	Issue Date	: 14-Sep-2022 10:39
C-O-C number	: 2022Aug SED		
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap										
PD3	E510	23-Aug-2022	31-Aug-2022	----	----		31-Aug-2022	28 days	8 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag										
PD3	E351	23-Aug-2022	29-Aug-2022	----	----		29-Aug-2022	180 days	0 days	✓
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag										
PD3	E354	23-Aug-2022	----	----	----		29-Aug-2022	----	----	
Physical Tests : Loss On Ignition (375°C)										
LDPE bag										
PD3	E205B	23-Aug-2022	----	----	----		26-Aug-2022	365 days	4 days	✓
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
PD3	E144	23-Aug-2022	----	----	----		30-Aug-2022	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
PD3	E108	23-Aug-2022	31-Aug-2022	----	----		31-Aug-2022	30 days	8 days	✓
Speciated Metals : Methylmercury in Soil by GCAFS										
Glass soil jar/Teflon lined cap										
PD3	E538	23-Aug-2022	07-Sep-2022	28 days	16 days	✓	12-Sep-2022	28 days	5 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Loss On Ignition (375°C)	E205B	621084	1	13	7.6	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	625610	1	19	5.2	5.0	✓
Methylmercury in Soil by GCAFS	E538	626093	1	19	5.2	5.0	✓
Moisture Content by Gravimetry	E144	625618	1	19	5.2	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	625612	1	19	5.2	5.0	✓
Total Carbon by Combustion	E351	623716	1	6	16.6	5.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	623278	1	9	11.1	5.0	✓
Laboratory Control Samples (LCS)							
Loss On Ignition (375°C)	E205B	621084	1	13	7.6	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	625610	2	19	10.5	10.0	✓
Methylmercury in Soil by GCAFS	E538	626093	2	19	10.5	10.0	✓
Moisture Content by Gravimetry	E144	625618	1	19	5.2	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	625612	1	19	5.2	5.0	✓
Total Carbon by Combustion	E351	623716	2	6	33.3	10.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	623278	2	9	22.2	10.0	✓
Method Blanks (MB)							
Loss On Ignition (375°C)	E205B	621084	1	13	7.6	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	625610	1	19	5.2	5.0	✓
Methylmercury in Soil by GCAFS	E538	626093	1	19	5.2	5.0	✓
Moisture Content by Gravimetry	E144	625618	1	19	5.2	5.0	✓
Total Carbon by Combustion	E351	623716	1	6	16.6	5.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	623278	1	9	11.1	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 Vancouver - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Loss On Ignition (375°C)	E205B Saskatoon - Environmental	Soil/Solid	CSSS (2008) 28.3 (mod)	Loss On Ignition (LOI) is determined by drying a portion of an air dried and ground sampld at 105°C, then igniting at 375°C for 16-20 hours. The weight loss after ignition is reported as % loss on ignition. LOI is reported on a dry weight basis. LOI at 375°C can be considered an estimation of Organic Matter Content according to Alberta Agriculture (1988).
Total Carbon by Combustion	E351 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 21.2 (mod)	Total Carbon is determined by the high temperature combustion method with measurement by an infrared detector.
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 20.2	Total Inorganic Carbon is determined by acetic acid pH standard curve, where a known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.
Mercury in Soil/Solid by CVAAS	E510 Vancouver - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.
Methylmercury in Soil by GCAFS	E538 Vancouver - Environmental	Soil/Solid	DeWild et al. (2004)/EPA 1630 (mod)	This method follows procedures published by DeWild, Olund, Olsen and Tate (2004) for the US Geological Survey (Techniques and Methods 5A-7). Samples are leached with an acidic copper sulphate solution to solubilize methylmercury for inorganic complexes. The methylmercury is then extracted into dichloromethane and then an aliquot is back extracted into ultra-pure water. The extract is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Particle Size Analysis (Pipette) - MMER Classification	EC184E Saskatoon - Environmental	Soil/Solid	Metal Mining Technical Guidance for Environmental Effects Monitoring (2012)	The particle size determination is performed by various methods to generate a Grain Size curve. The data from the curve is then used to produce particle size ranges based on the Metal Mining Effluent Regulations (MMER) classification system for Environmental Effects Monitoring.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Calculated) in soil	EC356 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 21.2	Total Organic Carbon (TOC) is calculated by the difference between total carbon (TC) and total inorganic carbon (TIC).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO_3 and HCl. This method is intended to liberate metals that may be environmentally available.
Methylmercury Soil Digestion	EP538 Vancouver - Environmental	Soil/Solid	DeWild et al. (2004)	This method follows procedures published by DeWild, Olund, Olsen and Tate (2004) for the US Geological Survey (Techniques and Methods 5A-7). Samples are leached with an acidic copper sulphate solution to solubilize methylmercury for inorganic complexes. The methylmercury is then extracted into dichloromethane and then an aliquot is back extracted into ultra-pure water. The extract is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dry and Grind	EPP442 Saskatoon - Environmental	Soil/Solid	Soil Sampling and Methods of Analysis, Carter 2008	After removal of any coarse fragments and reservation of wet subsamples a portion of homogenized sample is set in a tray and dried at less than 60°C until dry. The sample is then particle size reduced with an automated crusher or mortar and pestle, typically to <2 mm. Further size reduction may be needed for particular tests.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **FJ2202311**	Page	: 1 of 5
Client	: Azimuth Consulting Group Inc.	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Sediment	Date Samples Received	: 23-Aug-2022 18:36
PO	: BCH-22-01	Date Analysis Commenced	: 26-Aug-2022
C-O-C number	: 2022Aug SED	Issue Date	: 14-Sep-2022 10:38
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Colby Bingham	Quality Systems Coordinator	Saskatoon Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Saskatoon Inorganics, Saskatoon, Saskatchewan
Kinny Wu	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Vancouver Organics, Burnaby, British Columbia
Qammar Almas	Lab Assistant	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 621084)											
FC2201985-001	Anonymous	loss on ignition @ 375°C	----	E205B	1.0	%	64.8	67.3	3.71%	20%	----
Physical Tests (QC Lot: 625612)											
FJ2202311-001	PD3	pH (1:2 soil:water)	----	E108	0.10	pH units	8.08	8.12	0.5%	5%	----
Physical Tests (QC Lot: 625618)											
FJ2202311-001	PD3	moisture	----	E144	0.25	%	32.8	33.5	1.88%	20%	----
Organic / Inorganic Carbon (QC Lot: 623278)											
YL2201291-004	Anonymous	carbon, inorganic [IC]	----	E354	0.050	%	0.295	0.293	0.002	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 623716)											
FC2201985-001	Anonymous	carbon, total [TC]	----	E351	0.050	%	27.6	26.7	3.42%	20%	----
Metals (QC Lot: 625610)											
FJ2202311-001	PD3	mercury	7439-97-6	E510	0.0050	mg/kg	0.0511	0.0528	3.24%	40%	----
Speciated Metals (QC Lot: 626093)											
FJ2202311-001	PD3	methylmercury (as MeHg)	22967-92-6	E538	0.050	µg/kg	<0.050	<0.050	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 625618)						
moisture	----	E144	0.25	%	<0.25	----
Organic / Inorganic Carbon (QCLot: 623278)						
carbon, inorganic [IC]	----	E354	0.05	%	<0.050	----
Organic / Inorganic Carbon (QCLot: 623716)						
carbon, total [TC]	----	E351	0.05	%	<0.050	----
Metals (QCLot: 625610)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Speciated Metals (QCLot: 626093)						
methylmercury (as MeHg)	22967-92-6	E538	0.05	µg/kg	<0.050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 625612)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.3	95.0	105	----
Physical Tests (QCLot: 625618)									
moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Organic / Inorganic Carbon (QCLot: 623278)									
carbon, inorganic [IC]	----	E354	0.05	%	0.5 %	95.0	90.0	110	----
Organic / Inorganic Carbon (QCLot: 623716)									
carbon, total [TC]	----	E351	0.05	%	48 %	101	90.0	110	----
Metals (QCLot: 625610)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	104	80.0	120	----
Speciated Metals (QCLot: 626093)									
methylmercury (as MeHg)	22967-92-6	E538	0.05	µg/kg	10 µg/kg	73.2	70.0	130	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

Reference Material (RM) Report								
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Physical Tests (QCLot: 621084)									
	RM	loss on ignition @ 375°C	----	E205B	8 %	93.7	80.0	120	----
Organic / Inorganic Carbon (QCLot: 623278)									
	RM	carbon, inorganic [IC]	----	E354	0.383 %	95.1	80.0	120	----
Organic / Inorganic Carbon (QCLot: 623716)									
	RM	carbon, total [TC]	----	E351	1.4 %	103	80.0	120	----
Metals (QCLot: 625610)									
	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	120	70.0	130	----
Speciated Metals (QCLot: 626093)									
	RM	methylmercury (as MeHg)	22967-92-6	E538	14.8 µg/kg	90.6	70.0	130	----

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: COC #: 2022AUG SED

Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply
Company:	Azimuth Consulting Group Inc.	Select Report Format: ☑ EXCEL ☑ EDD (DIGITAL)	Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Ian McIvor	Quality Control (QC) Report with Report ☑ YES ☐ NO	PRIORITY (Business Days): 4 day [P4] ☐ / 3 day [P3] ☐ / 2 day [P2] ☐ — EMERGENCY: 1 Business day [E1] ☐ / Same Day, Weekend or Statutory holiday [E0] ☐
Phone:	604-730-1220	☑ Compare Results to Criteria on Report - provide details below if box checked	
	Company address below will appear on the final report	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:	2902 West Broadway	Email 1 or Fax gmann@azimuthgroup.ca	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Vancouver	Email 2 imcivor@azimuthgroup.ca	
Postal Code:	V6K 2G8	Email 3	
Invoice To	Same as Report To ☑ YES ☐ NO	Invoice Distribution	
	Copy of Invoice with Report ☑ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	
Company:	Azimuth Consulting Group Inc.	Email 1 or Fax gmann@azimuthgroup.ca	
Contact:	Gary Mann	Email 2 imcivor@azimuthgroup.ca	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #: Q75925		AFE/Cost Center:	PO#
Job #:	Site C MMP - Sediment	Major/Minor Code:	Routing Code:
PO / AFE:	BCH-22-01	Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): Environmental Division Fort St. John Work Order Reference FJ2202311

Telephone : +1 250 261 5517

ALS Contact: Sneha Sansare | Sampler: Kevin Ganshorn

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Mercury (DL 0.005 mg/kg ww)	Methylmercury (DL 0.05 µg/kg WW)	Particle Size (Pipette + gravel)	TC, TIC, TOC in soil	pH by meter (1:2 Soil: water extraction)	Loss on Ignition at 375 degrees	Moisture Content by Gravimetry	Number of Containers
	~~PD1~~			Sediment	R	R	R	R	R	R	R	2
	~~PD2~~			Sediment	R	R	R	R	R	R	R	2
	~~PD2-DT~~			Sediment	R	R	R	R	R	R	R	2
	~~PD4~~			Sediment	R	R	R	R	R	R	R	2
	PD3	23 AUG 22		Sediment	R	R	R	R	R	R	R	2
	~~PD3-FD~~			Sediment	R	R	R	R	R	R	R	2
	~~PD5-A~~			Sediment	R	R	R	R	R	R	R	2
	~~PD5-B~~			Sediment	R	R	R	R	R	R	R	2

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)	SAMPLE CONDITION AS RECEIVED (lab use only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	Please reference VA22-ECOF100-004 (MMP Sediment) for parameters/detection limits	Frozen ☐ SIF Observations Yes ☐ No ☐
Are samples for human drinking water use? ☐ YES ☑ NO		Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
		Cooling Initiated ☐
		INITIAL COOLER TEMPERATURES °C: 9.00 — FINAL COOLER TEMPERATURES °C: 2

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: Aug 23 2022	Time:	Received by:	Date: 8-23-22	Time: 636	Received by:	Date: 8/24	Time: 8pm

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202314**	Page	: 1 of 4
Client	: **Azimuth Consulting Group Inc.**	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Sediment	Date Samples Received	: 25-Aug-2022 08:45
PO	: BCH-22-01	Date Analysis Commenced	: 30-Aug-2022
C-O-C number	: 2022Aug Sed	Issue Date	: 13-Sep-2022 09:45
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 4		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Colby Bingham	Quality Systems Coordinator	Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Qammar Almas	Lab Assistant	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
%	percent
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	*Description*
HTP	*Sample preparation or preservation hold time was exceeded.*
RRV	*Reported result verified by repeat analysis.*

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	PD5-A	PD5-B	----	----	----
					Client sampling date / time	24-Aug-2022 09:55	24-Aug-2022 09:55	----	----	----
						FJ2202314-002	FJ2202314-003	--------	--------	--------
						Result	Result	----	----	----
Physical Tests										
loss on ignition @ 375°C	----	E205B	1.0	%		2.3	2.4	----	----	----
moisture	----	E144	0.25	%		30.5	28.7	----	----	----
pH (1:2 soil:water)	----	E108	0.10	pH units		8.27	8.33	----	----	----
Particle Size										
clay (<0.004mm)	----	EC184E	1.0	%		6.0	6.0	----	----	----
silt (0.063mm - 0.004mm)	----	EC184E	1.0	%		24.4	24.8	----	----	----
sand (2.0mm - 0.063mm)	----	EC184E	1.0	%		69.6	69.2	----	----	----
gravel (>2mm)	----	EC184E	1.0	%		<1.0	<1.0	----	----	----
Organic / Inorganic Carbon										
carbon, total [TC]	----	E351	0.050	%		1.73	1.77	----	----	----
carbon, inorganic [IC]	----	E354	0.050	%		0.400	0.394	----	----	----
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%		3.34	3.28	----	----	----
carbon, total organic [TOC]	----	EC356	0.050	%		1.33	1.38	----	----	----
organic matter	----	EC356	0.10	%		2.29	2.38	----	----	----
Metals										
mercury	7439-97-6	E510	0.0050	mg/kg		0.0554	0.0538	----	----	----
Speciated Metals										
methylmercury (as MeHg)	22967-92-6	E538	0.050	µg/kg		0.064	<0.050	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: **Water** (Matrix: **Water**)					Client sample ID	**PD3-FB**	**----**	**----**	**----**	**----**
					Client sampling date / time	24-Aug-2022	----	----	----	----
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*		**FJ2202314-004**	**--------**	**--------**	**--------**	**--------**
						Result	----	----	----	----
Organic / Inorganic Carbon										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		0.77 HTP, RRV	----	----	----	----
Total Metals										
mercury, total	7439-97-6	E508	0.0000050	mg/L		<0.0000050	----	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202314**	Page	: 1 of 9
Client	: **Azimuth Consulting Group Inc.**	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Sediment	Date Samples Received	: 25-Aug-2022 08:45
PO	: BCH-22-01	Issue Date	: 13-Sep-2022 09:45
C-O-C number	: 2022Aug Sed		
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 4		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap										
PD5-A	E510	24-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	8 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap										
PD5-B	E510	24-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	8 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag										
PD5-A	E351	24-Aug-2022	06-Sep-2022	----	----		06-Sep-2022	180 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag										
PD5-B	E351	24-Aug-2022	06-Sep-2022	----	----		06-Sep-2022	180 days	0 days	✓
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag										
PD5-A	E354	24-Aug-2022	----	----	----		31-Aug-2022	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag										
PD5-B	E354	24-Aug-2022	----	----	----		01-Sep-2022	----	----	
Physical Tests : Loss On Ignition (375°C)										
LDPE bag										
PD5-A	E205B	24-Aug-2022	----	----	----		30-Aug-2022	365 days	6 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Loss On Ignition (375°C)										
LDPE bag PD5-B	E205B	24-Aug-2022	----	----	----		30-Aug-2022	365 days	6 days	✓
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap PD5-A	E144	24-Aug-2022	----	----	----		31-Aug-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap PD5-B	E144	24-Aug-2022	----	----	----		31-Aug-2022	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap PD5-A	E108	24-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap PD5-B	E108	24-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	30 days	8 days	✓
Speciated Metals : Methylmercury in Soil by GCAFS										
Glass soil jar/Teflon lined cap PD5-A	E538	24-Aug-2022	07-Sep-2022	28 days	14 days	✓	12-Sep-2022	28 days	5 days	✓
Speciated Metals : Methylmercury in Soil by GCAFS										
Glass soil jar/Teflon lined cap PD5-B	E538	24-Aug-2022	07-Sep-2022	28 days	14 days	✓	12-Sep-2022	28 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Glass soil jar/Teflon lined cap PD3-FB	E355-L	24-Aug-2022	03-Sep-2022	3 days	10 days	× EHT	03-Sep-2022	28 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Total Metals : Total Mercury in Water by CVAAS										
Glass vial - total (lab preserved)										
PD3-FB	E508	24-Aug-2022	12-Sep-2022	----	----		12-Sep-2022	28 days	20 days	✓

Legend & Qualifier Definitions

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Loss On Ignition (375°C)	E205B	625813	1	8	12.5	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	627000	1	12	8.3	5.0	✓
Methylmercury in Soil by GCAFS	E538	626093	1	19	5.2	5.0	✓
Moisture Content by Gravimetry	E144	627005	1	12	8.3	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	627002	1	16	6.2	5.0	✓
Total Carbon by Combustion	E351	629308	1	16	6.2	5.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	628605	2	32	6.2	5.0	✓
Laboratory Control Samples (LCS)							
Loss On Ignition (375°C)	E205B	625813	1	8	12.5	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	627000	2	12	16.6	10.0	✓
Methylmercury in Soil by GCAFS	E538	626093	2	19	10.5	10.0	✓
Moisture Content by Gravimetry	E144	627005	1	12	8.3	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	627002	1	16	6.2	5.0	✓
Total Carbon by Combustion	E351	629308	2	16	12.5	10.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	628605	4	32	12.5	10.0	✓
Method Blanks (MB)							
Loss On Ignition (375°C)	E205B	625813	1	8	12.5	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	627000	1	12	8.3	5.0	✓
Methylmercury in Soil by GCAFS	E538	626093	1	19	5.2	5.0	✓
Moisture Content by Gravimetry	E144	627005	1	12	8.3	5.0	✓
Total Carbon by Combustion	E351	629308	1	16	6.2	5.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	628605	2	32	6.2	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Total Mercury in Water by CVAAS	E508	643264	1	8	12.5	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	632096	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Total Mercury in Water by CVAAS	E508	643264	1	8	12.5	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	632096	1	20	5.0	5.0	✓
Method Blanks (MB)							
Total Mercury in Water by CVAAS	E508	643264	1	8	12.5	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	632096	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Total Mercury in Water by CVAAS	E508	643264	1	8	12.5	5.0	✓

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Matrix Spikes (MS) - Continued							
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	632096	1	20	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 Vancouver - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Loss On Ignition (375°C)	E205B Saskatoon - Environmental	Soil/Solid	CSSS (2008) 28.3 (mod)	Loss On Ignition (LOI) is determined by drying a portion of an air dried and ground sampld at 105°C, then igniting at 375°C for 16-20 hours. The weight loss after ignition is reported as % loss on ignition. LOI is reported on a dry weight basis. LOI at 375°C can be considered an estimation of Organic Matter Content according to Alberta Agriculture (1988).
Total Carbon by Combustion	E351 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 21.2 (mod)	Total Carbon is determined by the high temperature combustion method with measurement by an infrared detector.
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 20.2	Total Inorganic Carbon is determined by acetic acid pH standard curve, where a known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.
Mercury in Soil/Solid by CVAAS	E510 Vancouver - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.
Methylmercury in Soil by GCAFS	E538 Vancouver - Environmental	Soil/Solid	DeWild et al. (2004)/EPA 1630 (mod)	This method follows procedures published by DeWild, Olund, Olsen and Tate (2004) for the US Geological Survey (Techniques and Methods 5A-7). Samples are leached with an acidic copper sulphate solution to solubilize methylmercury for inorganic complexes. The methylmercury is then extracted into dichloromethane and then an aliquot is back extracted into ultra-pure water. The extract is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Particle Size Analysis (Pipette) - MMER Classification	EC184E Saskatoon - Environmental	Soil/Solid	Metal Mining Technical Guidance for Environmental Effects Monitoring (2012)	The particle size determination is performed by various methods to generate a Grain Size curve. The data from the curve is then used to produce particle size ranges based on the Metal Mining Effluent Regulations (MMER) classification system for Environmental Effects Monitoring.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Calculated) in soil	EC356 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 21.2	Total Organic Carbon (TOC) is calculated by the difference between total carbon (TC) and total inorganic carbon (TIC).
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Total Mercury in Water by CVAAS	E508 Vancouver - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO_3 and HCl. This method is intended to liberate metals that may be environmentally available.
Methylmercury Soil Digestion	EP538 Vancouver - Environmental	Soil/Solid	DeWild et al. (2004)	This method follows procedures published by DeWild, Olund, Olsen and Tate (2004) for the US Geological Survey (Techniques and Methods 5A-7). Samples are leached with an acidic copper sulphate solution to solubilize methylmercury for inorganic complexes. The methylmercury is then extracted into dichloromethane and then an aliquot is back extracted into ultra-pure water. The extract is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dry and Grind	EPP442 Saskatoon - Environmental	Soil/Solid	Soil Sampling and Methods of Analysis, Carter 2008	After removal of any coarse fragments and reservation of wet subsamples a portion of homogenized sample is set in a tray and dried at less than 60°C until dry. The sample is then particle size reduced with an automated crusher or mortar and pestle, typically to <2 mm. Further size reduction may be needed for particular tests.
Preparation for Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **FJ2202314**	Page	: 1 of 7
Client	: Azimuth Consulting Group Inc.	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Sediment	Date Samples Received	: 25-Aug-2022 08:45
PO	: BCH-22-01	Date Analysis Commenced	: 30-Aug-2022
C-O-C number	: 2022Aug Sed	Issue Date	: 13-Sep-2022 09:45
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 4		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Colby Bingham	Quality Systems Coordinator	Saskatoon Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Saskatoon Inorganics, Saskatoon, Saskatchewan
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Vancouver Organics, Burnaby, British Columbia
Qammar Almas	Lab Assistant	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 625813)											
CG2211501-061	Anonymous	loss on ignition @ 375°C	----	E205B	1.0	%	7.1	7.1	0.05	Diff <2x LOR	----
Physical Tests (QC Lot: 627002)											
FJ2202314-002	PD5-A	pH (1:2 soil:water)	----	E108	0.10	pH units	8.27	8.25	0.2%	5%	----
Physical Tests (QC Lot: 627005)											
FJ2202314-002	PD5-A	moisture	----	E144	0.25	%	30.5	31.8	4.45%	20%	----
Organic / Inorganic Carbon (QC Lot: 626843)											
CG2211435-021	Anonymous	carbon, inorganic [IC]	----	E354	0.050	%	0.158	0.165	0.007	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 628605)											
CG2211497-001	Anonymous	carbon, inorganic [IC]	----	E354	0.050	%	0.163	0.167	0.004	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 629308)											
YL2201312-001	Anonymous	carbon, total [TC]	----	E351	0.050	%	3.32	3.35	0.720%	20%	----
Metals (QC Lot: 627000)											
FJ2202314-002	PD5-A	mercury	7439-97-6	E510	0.0050	mg/kg	0.0554	0.0562	1.47%	40%	----
Speciated Metals (QC Lot: 626093)											
FJ2202311-001	Anonymous	methylmercury (as MeHg)	22967-92-6	E538	0.050	µg/kg	<0.050	<0.050	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Organic / Inorganic Carbon (QC Lot: 632096)											
FJ2202314-004	PD3-FB	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	0.77	0.74	0.03	Diff <2x LOR	----
Total Metals (QC Lot: 643264)											
FJ2202314-004	PD3-FB	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 627005)						
moisture	----	E144	0.25	%	<0.25	----
Organic / Inorganic Carbon (QCLot: 626843)						
carbon, inorganic [IC]	----	E354	0.05	%	<0.050	----
Organic / Inorganic Carbon (QCLot: 628605)						
carbon, inorganic [IC]	----	E354	0.05	%	<0.050	----
Organic / Inorganic Carbon (QCLot: 629308)						
carbon, total [TC]	----	E351	0.05	%	<0.050	----
Metals (QCLot: 627000)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Speciated Metals (QCLot: 626093)						
methylmercury (as MeHg)	22967-92-6	E538	0.05	µg/kg	<0.050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Organic / Inorganic Carbon (QCLot: 632096)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 643264)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 627002)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.3	95.0	105	----
Physical Tests (QCLot: 627005)									
moisture	----	E144	0.25	%	50 %	101	90.0	110	----
Organic / Inorganic Carbon (QCLot: 626843)									
carbon, inorganic [IC]	----	E354	0.05	%	0.5 %	94.5	90.0	110	----
Organic / Inorganic Carbon (QCLot: 628605)									
carbon, inorganic [IC]	----	E354	0.05	%	0.5 %	94.4	90.0	110	----
Organic / Inorganic Carbon (QCLot: 629308)									
carbon, total [TC]	----	E351	0.05	%	48 %	101	90.0	110	----
Metals (QCLot: 627000)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	106	80.0	120	----
Speciated Metals (QCLot: 626093)									
methylmercury (as MeHg)	22967-92-6	E538	0.05	µg/kg	10 µg/kg	73.2	70.0	130	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Organic / Inorganic Carbon (QCLot: 632096)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	99.0	80.0	120	----
Total Metals (QCLot: 643264)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	113	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Organic / Inorganic Carbon (QCLot: 632096)										
VA22C0169-001	Anonymous	carbon, total organic [TOC]	----	E355-L	ND mg/L	5 mg/L	ND	70.0	130	----
Total Metals (QCLot: 643264)										
VA22C1349-001	Anonymous	mercury, total	7439-97-6	E508	0.000103 mg/L	0.0001 mg/L	103	70.0	130	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Physical Tests (QCLot: 625813)									
	RM	loss on ignition @ 375°C	----	E205B	8 %	100	80.0	120	----
Organic / Inorganic Carbon (QCLot: 626843)									
	RM	carbon, inorganic [IC]	----	E354	0.383 %	82.8	80.0	120	----
Organic / Inorganic Carbon (QCLot: 628605)									
	RM	carbon, inorganic [IC]	----	E354	0.383 %	98.6	80.0	120	----
Organic / Inorganic Carbon (QCLot: 629308)									
	RM	carbon, total [TC]	----	E351	1.4 %	105	80.0	120	----
Metals (QCLot: 627000)									
	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	107	70.0	130	----
Speciated Metals (QCLot: 626093)									
	RM	methylmercury (as MeHg)	22967-92-6	E538	14.8 µg/kg	90.6	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: COC #: 2022AUG SED

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Azimuth Consulting Group Inc.
Contact:	Ian McIvor
Phone:	604-730-1220
	Company address below will appear on the final report
Street:	2902 West Broadway
City/Province:	Vancouver
Postal Code:	V6K 2G8
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Azimuth Consulting Group Inc.
Contact:	Gary Mann

Report Format / Distribution

Select Report Format: ☑ ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax gmann@azimuthgroup.ca
Email 2 imcivor@azimuthgroup.ca
Email 3

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax gmann@azimuthgroup.ca
Email 2 imcivor@azimuthgroup.ca

Project Information

ALS Account # / Quote #: Q75925
Job #: Site C MMP - Sediment
PO / AFE: BCH-22-01
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐
EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Lab Work Order # (lab use only): FJ2202314

Contact: Sneha Sansare | Sampler: Kevin Ganshorn

ALS Sample # (lab use only)	Sample Identification (This description may be entered)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Mercury (DL 0.005 mg/kg ww)	Methylmercury (DL 0.05 µg/kg WW)	Particle Size (Pipette + gravel)	TC, TIC, TOC in soil	pH by meter (1:2 Soil: water extraction)	Loss on Ignition at 375 degrees	Moisture Content by Gravimetry	Number of Containers
	~~PD1~~			Sediment	R	R	R	R	R	R	R	2
	~~PD2~~			Sediment	R	R	R	R	R	R	R	2
	~~PD2-01~~			Sediment	R	R	R	R	R	R	R	2
	~~PD4~~			Sediment	R	R	R	R	R	R	R	2
	~~PD3~~			Sediment	R	R	R	R	R	R	R	2
	~~PD3-FB~~ PD3-FB	24-Aug-22	12:00	Sediment	R	R	R	R	R	R	R	2
	PD5-A	24-Aug-22	09:55	Sediment	R	R	R	R	R	R	R	2
	PD5-B	24-Aug-22	09:55	Sediment	R	R	R	R	R	R	R	2

FJ2202314

Telephone : +1 250 261 5517

Fort St. John Work Order Reference

FLAE Shipping & Receiving
Call Out
Expedite
Priority
Air
Ground
# of Coolers
# of Carboys

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☑ NO

Are samples for human drinking water use?
☐ YES ☑ NO

Criteria to add on report by clicking on the drop-down list below (electronic COC only)

100-004 (MMP Sediment) for parameters/detection limits

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
5.1	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: Aug 24, 2022	Time:	Received by: Rick	Date: 8.25.22	Time: 8:45	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2202371**	Page	: 1 of 3
Client	: **Azimuth Consulting Group Inc.**	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Sediment	Date Samples Received	: 26-Aug-2022 17:00
PO	: BCH-22-01	Date Analysis Commenced	: 31-Aug-2022
C-O-C number	: 2022Aug SED	Issue Date	: 13-Sep-2022 09:41
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Colby Bingham	Quality Systems Coordinator	Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Qammar Almas	Lab Assistant	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
%	percent
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: PR2	----	----	----	----
					Client sampling date / time: 26-Aug-2022 13:10	----	----	----	----
					FJ2202371-001	--------	--------	--------	--------
					Result	----	----	----	----
Physical Tests									
loss on ignition @ 375°C	----	E205B	1.0	%	1.3	----	----	----	----
moisture	----	E144	0.25	%	31.6	----	----	----	----
pH (1:2 soil:water)	----	E108	0.10	pH units	8.31	----	----	----	----
Particle Size									
clay (<0.004mm)	----	EC184E	1.0	%	9.5	----	----	----	----
silt (0.063mm - 0.004mm)	----	EC184E	1.0	%	51.7	----	----	----	----
sand (2.0mm - 0.063mm)	----	EC184E	1.0	%	38.8	----	----	----	----
gravel (>2mm)	----	EC184E	1.0	%	<1.0	----	----	----	----
Organic / Inorganic Carbon									
carbon, total [TC]	----	E351	0.050	%	2.57	----	----	----	----
carbon, inorganic [IC]	----	E354	0.050	%	1.07	----	----	----	----
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%	8.91	----	----	----	----
carbon, total organic [TOC]	----	EC356	0.050	%	1.50	----	----	----	----
organic matter	----	EC356	0.10	%	2.59	----	----	----	----
Metals									
mercury	7439-97-6	E510	0.0050	mg/kg	0.0413	----	----	----	----
Speciated Metals									
methylmercury (as MeHg)	22967-92-6	E538	0.050	µg/kg	<0.050	----	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2202371**	Page	: 1 of 7
Client	: **Azimuth Consulting Group Inc.**	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Sediment	Date Samples Received	: 26-Aug-2022 17:00
PO	: BCH-22-01	Issue Date	: 13-Sep-2022 09:43
C-O-C number	: 2022Aug SED		
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap										
PR2	E510	26-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	28 days	6 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
Glass soil jar/Teflon lined cap										
PR2	E351	26-Aug-2022	06-Sep-2022	----	----		06-Sep-2022	180 days	0 days	✓
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
Glass soil jar/Teflon lined cap										
PR2	E354	26-Aug-2022	----	----	----		03-Sep-2022	----	----	
Physical Tests : Loss On Ignition (375°C)										
Glass soil jar/Teflon lined cap										
PR2	E205B	26-Aug-2022	----	----	----		31-Aug-2022	365 days	5 days	✓
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
PR2	E144	26-Aug-2022	----	----	----		31-Aug-2022	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
PR2	E108	26-Aug-2022	01-Sep-2022	----	----		01-Sep-2022	30 days	6 days	✓
Speciated Metals : Methylmercury in Soil by GCAFS										
Glass soil jar/Teflon lined cap										
PR2	E538	26-Aug-2022	12-Sep-2022	28 days	17 days	✓	12-Sep-2022	28 days	0 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Loss On Ignition (375°C)	E205B	627410	1	1	100.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	627000	1	12	8.3	5.0	✓
Methylmercury in Soil by GCAFS	E538	634852	1	7	14.2	5.0	✓
Moisture Content by Gravimetry	E144	627005	1	12	8.3	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	627002	1	16	6.2	5.0	✓
Total Carbon by Combustion	E351	629807	1	12	8.3	5.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	632002	1	3	33.3	5.0	✓
Laboratory Control Samples (LCS)							
Loss On Ignition (375°C)	E205B	627410	1	1	100.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	627000	2	12	16.6	10.0	✓
Methylmercury in Soil by GCAFS	E538	634852	2	7	28.5	10.0	✓
Moisture Content by Gravimetry	E144	627005	1	12	8.3	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	627002	1	16	6.2	5.0	✓
Total Carbon by Combustion	E351	629807	2	12	16.6	10.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	632002	2	3	66.6	10.0	✓
Method Blanks (MB)							
Loss On Ignition (375°C)	E205B	627410	1	1	100.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	627000	1	12	8.3	5.0	✓
Methylmercury in Soil by GCAFS	E538	634852	1	7	14.2	5.0	✓
Moisture Content by Gravimetry	E144	627005	1	12	8.3	5.0	✓
Total Carbon by Combustion	E351	629807	1	12	8.3	5.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	632002	1	3	33.3	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 Vancouver - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Loss On Ignition (375°C)	E205B Saskatoon - Environmental	Soil/Solid	CSSS (2008) 28.3 (mod)	Loss On Ignition (LOI) is determined by drying a portion of an air dried and ground sampld at 105°C, then igniting at 375°C for 16-20 hours. The weight loss after ignition is reported as % loss on ignition. LOI is reported on a dry weight basis. LOI at 375°C can be considered an estimation of Organic Matter Content according to Alberta Agriculture (1988).
Total Carbon by Combustion	E351 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 21.2 (mod)	Total Carbon is determined by the high temperature combustion method with measurement by an infrared detector.
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 20.2	Total Inorganic Carbon is determined by acetic acid pH standard curve, where a known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.
Mercury in Soil/Solid by CVAAS	E510 Vancouver - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.
Methylmercury in Soil by GCAFS	E538 Vancouver - Environmental	Soil/Solid	DeWild et al. (2004)/EPA 1630 (mod)	This method follows procedures published by DeWild, Olund, Olsen and Tate (2004) for the US Geological Survey (Techniques and Methods 5A-7). Samples are leached with an acidic copper sulphate solution to solubilize methylmercury for inorganic complexes. The methylmercury is then extracted into dichloromethane and then an aliquot is back extracted into ultra-pure water. The extract is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Particle Size Analysis (Pipette) - MMER Classification	EC184E Saskatoon - Environmental	Soil/Solid	Metal Mining Technical Guidance for Environmental Effects Monitoring (2012)	The particle size determination is performed by various methods to generate a Grain Size curve. The data from the curve is then used to produce particle size ranges based on the Metal Mining Effluent Regulations (MMER) classification system for Environmental Effects Monitoring.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Calculated) in soil	EC356 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 21.2	Total Organic Carbon (TOC) is calculated by the difference between total carbon (TC) and total inorganic carbon (TIC).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO_3 and HCl. This method is intended to liberate metals that may be environmentally available.
Methylmercury Soil Digestion	EP538 Vancouver - Environmental	Soil/Solid	DeWild et al. (2004)	This method follows procedures published by DeWild, Olund, Olsen and Tate (2004) for the US Geological Survey (Techniques and Methods 5A-7). Samples are leached with an acidic copper sulphate solution to solubilize methylmercury for inorganic complexes. The methylmercury is then extracted into dichloromethane and then an aliquot is back extracted into ultra-pure water. The extract is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".
Dry and Grind	EPP442 Saskatoon - Environmental	Soil/Solid	Soil Sampling and Methods of Analysis, Carter 2008	After removal of any coarse fragments and reservation of wet subsamples a portion of homogenized sample is set in a tray and dried at less than 60°C until dry. The sample is then particle size reduced with an automated crusher or mortar and pestle, typically to <2 mm. Further size reduction may be needed for particular tests.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **FJ2202371**	Page	: 1 of 5
Client	: Azimuth Consulting Group Inc.	Laboratory	: Fort St. John - Environmental
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: Site C MMP - Sediment	Date Samples Received	: 26-Aug-2022 17:00
PO	: BCH-22-01	Date Analysis Commenced	: 31-Aug-2022
C-O-C number	: 2022Aug SED	Issue Date	: 13-Sep-2022 09:41
Sampler	: KG		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Colby Bingham	Quality Systems Coordinator	Saskatoon Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Saskatoon Inorganics, Saskatoon, Saskatchewan
Kinny Wu	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Vancouver Organics, Burnaby, British Columbia
Qammar Almas	Lab Assistant	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 627002)											
FJ2202314-002	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	8.27	8.25	0.2%	5%	----
Physical Tests (QC Lot: 627005)											
FJ2202314-002	Anonymous	moisture	----	E144	0.25	%	30.5	31.8	4.45%	20%	----
Physical Tests (QC Lot: 627410)											
FJ2202371-001	PR2	loss on ignition @ 375°C	----	E205B	1.0	%	1.3	1.3	0.03	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 629807)											
YL2201330-001	Anonymous	carbon, total [TC]	----	E351	0.050	%	2.91	2.98	2.51%	20%	----
Organic / Inorganic Carbon (QC Lot: 632002)											
VA22B9872-001	Anonymous	carbon, inorganic [IC]	----	E354	0.050	%	0.093	0.090	0.003	Diff <2x LOR	----
Metals (QC Lot: 627000)											
FJ2202314-002	Anonymous	mercury	7439-97-6	E510	0.0050	mg/kg	0.0554	0.0562	1.47%	40%	----
Speciated Metals (QC Lot: 634852)											
FJ2202371-001	PR2	methylmercury (as MeHg)	22967-92-6	E538	0.050	µg/kg	<0.050	<0.050	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 627005)						
moisture	----	E144	0.25	%	<0.25	----
Organic / Inorganic Carbon (QCLot: 629807)						
carbon, total [TC]	----	E351	0.05	%	<0.050	----
Organic / Inorganic Carbon (QCLot: 632002)						
carbon, inorganic [IC]	----	E354	0.05	%	<0.050	----
Metals (QCLot: 627000)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Speciated Metals (QCLot: 634852)						
methylmercury (as MeHg)	22967-92-6	E538	0.05	µg/kg	<0.050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 627002)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.3	95.0	105	----
Physical Tests (QCLot: 627005)									
moisture	----	E144	0.25	%	50 %	101	90.0	110	----
Organic / Inorganic Carbon (QCLot: 629807)									
carbon, total [TC]	----	E351	0.05	%	48 %	103	90.0	110	----
Organic / Inorganic Carbon (QCLot: 632002)									
carbon, inorganic [IC]	----	E354	0.05	%	0.5 %	94.1	90.0	110	----
Metals (QCLot: 627000)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	106	80.0	120	----
Speciated Metals (QCLot: 634852)									
methylmercury (as MeHg)	22967-92-6	E538	0.05	µg/kg	10 µg/kg	76.2	70.0	130	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

Reference Material (RM) Report									
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method					
Physical Tests (QCLot: 627410)									
	RM	loss on ignition @ 375°C	----	E205B	8 %	89.4	80.0	120	----
Organic / Inorganic Carbon (QCLot: 629807)									
	RM	carbon, total [TC]	----	E351	1.4 %	103	80.0	120	----
Organic / Inorganic Carbon (QCLot: 632002)									
	RM	carbon, inorganic [IC]	----	E354	0.383 %	88.9	80.0	120	----
Metals (QCLot: 627000)									
	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	107	70.0	130	----
Speciated Metals (QCLot: 634852)									
	RM	methylmercury (as MeHg)	22967-92-6	E538	14.8 µg/kg	79.6	70.0	130	----

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: COC #: 2022AUG SED

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Azimuth Consulting Group Inc.
Contact:	Ian McIvor
Phone:	604-730-1220
	Company address below will appear on the final report
Street:	2902 West Broadway
City/Province:	Vancouver
Postal Code:	V6K 2G8
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Azimuth Consulting Group Inc.
Contact:	Gary Mann

Project Information

ALS Account # / Quote #:	Q75925
Job #:	Site C MMP - Sediment
PO / AFE:	BCH-22-01
LSD:	

ALS Lab Work Order # (lab use only)

Report Format / Distribution

Select Report Format: ☑ ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: gmann@azimuthgroup.ca
Email 2: imcivor@azimuthgroup.ca
Email 3:

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: gmann@azimuthgroup.ca
Email 2: imcivor@azimuthgroup.ca

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Contact: Sneha Sansare **Sampler:** Kevin Ganshorn

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐
EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or

Date and Time Required for all E&P TATs:
For tests that can not be performed according to the servic
Analy
Indicate Filtered (F), Preserved (P) or Filte

Environmental Division
Fort St. John
Work Order Reference
FJ2202371

Telephone : +1 250 261 5517

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Mercury (DL 0.005 mg/kg ww)	Methylmercury (DL 0.05 µg/kg WW)	Particle Size (Pipette + gravel)	TC, TIC, TOC in soil	pH by meter (1:2 Soil: water extraction)	Loss on Ignition at 375 degrees	Moisture Content by Gravimetry	Nun
	~~PR1~~			~~Sediment~~	R	R	R	R	R	R	R	~~2~~
	PR2	26 Aug 22	13:10	Sediment	R	R	R	R	R	R	R	2
	~~PR2-01~~			~~Sediment~~	R	R	R	R	R	R	R	~~2~~
	~~PD1~~			~~Sediment~~	R	R	R	R	R	R	R	~~2~~
	~~PD3~~			~~Sediment~~	R	R	R	R	R	R	R	~~2~~
	~~PD3-FB~~			~~Sediment~~	R	R	R	R	R	R	R	~~2~~
	~~PD5-A~~			~~Sediment~~	R	R	R	R	R	R	R	~~2~~
	~~PD5-B~~			~~Sediment~~	R	R	R	R	R	R	R	~~2~~

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO
Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Please reference VA22-ECOF100-004 (MMP Sediment) for parameters/detection limits

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
6.7			13.5		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: Aug 26, 2022	Time:	Received by:	Date: Aug 26/22	Time: 1700	Received by: RC	Date: 08/28/22	Time: 1330

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

APPENDIX B4: BENTHIC INVERTEBRATE FIELD SAMPLING SHEETS

Ecofish Research:	RNQA-19411

iForm Record: ID 230	
Form Field ID	2207.0315.2929
Project	1200-25 - Site C Mon 8/9
Existing Waterbody or New Waterbody	Existing Waterbody
Existing Waterbody	Peace River (PCR)
Existing Waypoint or New Site	Existing
Existing Waypoint	PD3
New Site Location	
New Site Location UTM	31 166021 0
Date and Time	2022-08-03 15:29:00
Data Recorder	PBP - Patrick Beaupre
ERL Crew	BRM - Bradley Minielly, PBP - Patrick Beaupre
Weather Ceiling	Mostly Cloudy
Weather Precipitation	Dry
Weather Recent Precipitation	24 hours
Weather Wind	Light Breeze
Comment	Tied lead line to tree - wrap 4 times, connect old carabiner Tied anchor to other end of rope with bowline + half hitch Tied 5 butterfly bites on line approx 2 m apart: 2 basket pairs, 2nd anchor then two basket pairs Baskets are two in series - carabiner, bowline, rope, bowline, basket, carabiner, bowline, rope, bowline, basket Deployed leadline with just anchor and first pair of rock baskets Used a float to mark position while deploying Used a line with carabiner to attach to lead line instead of pole while deployng

Photos	
iForm Record: ID S230	
Photo Caption	Looking upstream
Photo (Landscape)	 Picture Filename: field_134232353862eb18165d8e3.jpg

iForm Record: ID S230	
Photo Caption	Looking downstream

Photo (Landscape)	 Picture Filename: field_47140728462eb181c55623.jpg

iForm Record: ID S230	
Photo Caption	RL to RR
Photo (Landscape)	 Picture Filename: field_55565150062eb18222c4fb.jpg

iForm Record: ID S230	
Photo Caption	RR to RL
Photo (Landscape)	 Picture Filename: field_199724698062eb182c0679f.jpg

iForm Record: ID S230

Photo (Landscape)	 Picture Filename: field_97227606362eb1834f0599.jpg

iForm Record: ID S230	
Photo (Landscape)	 Picture Filename: field_140330397662eb183a4e3de.jpg

iForm Record: ID S230	
Photo (Landscape)	 Picture Filename: field_189652237662eb1841d2726.jpg

iForm Record: ID S230

Photo (Landscape)	 Picture Filename: field_108850837362eb1849ccf6e.jpg

iForm Record: ID S230	
Photo (Landscape)	 Picture Filename: field_138936913562eb1850a1e7b.jpg

Benthic Data	
iForm Record: ID S230	
Basket Location	Latitude:56.102041, Longitude:-120.227802, Altitude:392.036907, Speed:0.016365, Horizontal Accuracy:5.142554, Vertical Accuracy:6.039697, Time:08/03/2022 15:49:44 PDT
Basket Location UTM	10 672415 6220900

Benthic Data	
iForm Record: ID S44	
Benthic Basket Number	1
Basket Depth (m)	2.1
Install Date	2022-08-03
Install Time	16:00:00

iForm Record: ID S44	
Benthic Basket Number	2
Basket Depth (m)	2.1
Install Date	2022-08-03
Install Time	16:00:00

iForm Record: ID S44	
Benthic Basket Number	3

Basket Depth (m)	1.9
Install Date	2022-08-03
Install Time	16:02:00

iForm Record: ID S44	
Benthic Basket Number	4
Basket Depth (m)	1.9
Install Date	2022-08-03
Install Time	16:02:00

iForm Record: ID S44	
Benthic Basket Number	5
Basket Depth (m)	1.7
Install Date	2022-08-03
Install Time	16:07:00

iForm Record: ID S44	
Benthic Basket Number	6
Basket Depth (m)	1.7
Install Date	2022-08-03
Install Time	17:07:00

iForm Record: ID S44	
Benthic Basket Number	7
Basket Depth (m)	1.6
Install Date	2022-08-03
Install Time	16:09:00

iForm Record: ID S44	
Benthic Basket Number	8
Basket Depth (m)	1.6
Install Date	2022-08-03
Install Time	16:09:00

Ecofish Research:	RNQA-19411

iForm Record: ID 227	
Form Field ID	2207.0312.5537
Project	1200-25 - Site C Mon 8/9
Existing Waterbody or New Waterbody	Existing Waterbody
Existing Waterbody	Peace River (PCR)
Existing Waypoint or New Site	Existing
Existing Waypoint	PD1
New Site Location	
New Site Location UTM	31 166021 0
Date and Time	2022-08-03 12:56:00
Data Recorder	PBP - Patrick Beaupre
ERL Crew	BRM - Bradley Minielly, PBP - Patrick Beaupre
Weather Ceiling	Partly Cloudy
Weather Precipitation	Dry
Weather Recent Precipitation	24 hours
Weather Wind	Fresh Breeze
Comment	Tied lead line to tree - wrap 4 times, connect old carabiner Tied anchor to other end of rope with bowline + half hitch Tied 5 butterfly bites on line approx 2 m apart: 2 basket pairs, 2nd anchor then two basket pairs Baskets are two in series - carabiner, bowline, rope, bowline, basket, carabiner, bowline, rope, bowline, basket Deployed leadline with just anchor and first pair of rock baskets Used a float to mark position while deploying Used a line with carabiner to attach to lead line instead of pole while deploying Deployment of baskets only about 20 min (but prep much longer)

Photos	
iForm Record: ID S227	
Photo (Landscape)	 Picture Filename: field_201916188062eb17e1da998.jpg

iForm Record: ID S227

Photo (Landscape)	 Picture Filename: field_122779894962eb17e87c110.jpg

iForm Record: ID S227	
Photo (Landscape)	 Picture Filename: field_154672170062eb17f1cbcb3.jpg

iForm Record: ID S227	
Photo (Landscape)	 Picture Filename: field_172388201162eb17f800dd0.jpg

iForm Record: ID S227

Photo (Landscape)	 Picture Filename: field_1914771288862eb1803118d8.jpg

iForm Record: ID S227	
Photo Caption	Looking upstream
Photo (Landscape)	 Picture Filename: field_1119167910 62ebdf4e82dd6.jpg

iForm Record: ID S227	
Photo Caption	Looking downstream
Photo (Landscape)	 Picture Filename: field_27696372562ebdf54176c4.jpg

iForm Record: ID S227	
Photo Caption	RR to RL

Photo (Landscape)	 Picture Filename: field_185676854762ebdf5cda9c5.jpg

iForm Record: ID S227	
Photo Caption	RL to RR
Photo (Landscape)	 Picture Filename: field_74643468262ebdf628d225.jpg

iForm Record: ID S227	
Photo (Landscape)	 Picture Filename: field_1644667668862ebdf6b12816.jpg

iForm Record: ID S227

Photo (Landscape)	 Picture Filename: field_72340153162ebdf727d112.jpg

Benthic Data	
iForm Record: ID S227	
Basket Location	Latitude:56.161226, Longitude:-120.743387, Altitude:407.214829, Speed:0.020893, Horizontal Accuracy:4.199744, Vertical Accuracy:8.342795, Time:08/03/2022 13:27:45 PDT
Basket Location UTM	10 640140 6226317

Benthic Data	
iForm Record: ID S41	
Benthic Basket Number	1
Basket Depth (m)	1.7
Install Date	2022-08-03
Install Time	13:40:00

iForm Record: ID S41	
Benthic Basket Number	2
Basket Depth (m)	1.7
Install Date	2022-08-03
Install Time	13:40:00

iForm Record: ID S41	
Benthic Basket Number	3
Basket Depth (m)	1.8
Install Date	2022-08-03
Install Time	13:45:00

iForm Record: ID S41	
Benthic Basket Number	4
Basket Depth (m)	1.8
Install Date	2022-08-03
Install Time	13:45:00

iForm Record: ID S41	
Benthic Basket Number	5
Basket Depth (m)	1.4
Install Date	2022-08-03
Install Time	13:50:00

iForm Record: ID S41

Benthic Basket Number	6
Basket Depth (m)	1.4
Install Date	2022-08-03
Install Time	13:50:00

iForm Record: ID S41	
Benthic Basket Number	7
Basket Depth (m)	1.3
Install Date	2022-08-03
Install Time	01:55:00

iForm Record: ID S41	
Benthic Basket Number	8
Basket Depth (m)	1.3
Install Date	2022-08-03
Install Time	13:55:00

Ecofish Research:	RNQA-19425

iForm Record: ID 233	
Form Field ID	2207.0411.5312
Project	1200-25 - Site C Mon 8/9
Existing Waterbody or New Waterbody	Existing Waterbody
Existing Waterbody	Peace River (PCR)
Existing Waypoint or New Site	Existing
Existing Waypoint	PD5
New Site Location	
New Site Location UTM	31 166021 0
Date and Time	2022-08-04 11:54:00
Data Recorder	PBP - Patrick Beaupre
ERL Crew	BRM - Bradley Minielly, PBP - Patrick Beaupre
Air Temperature (Celcius)	14
Weather Ceiling	Overcast
Weather Precipitation	Light Rain
Weather Recent Precipitation	Last few hours
Weather Wind	Fresh Breeze
Comment	Similar deployment as day 1;pd1 and pd3 Tie lead line to tree, deploy endpoint anchor and then first two rock basket pairs, then install midpoint anchor and laser two basket pairs

Photos	
iForm Record: ID S233	
Photo Caption	Looking upstream
Photo (Landscape)	 Picture Filename: field_187635061762ec823fc93f8.jpg

iForm Record: ID S233	
Photo Caption	Looking downstream

Photo (Landscape)	 Picture Filename: field_49169388862ec82473ece8.jpg

iForm Record: ID S233	
Photo Caption	RR to RL
Photo (Landscape)	 Picture Filename: field_206276949762ec824cc0449.jpg

iForm Record: ID S233	
Photo Caption	RL to RR
Photo (Landscape)	 Picture Filename: field_15319265162ec8255af6f1.jpg

iForm Record: ID S233

Photo (Landscape)	 Picture Filename: field_110976193962ec825e80e64.jpg

iForm Record: ID S233	
Photo (Landscape)	 Picture Filename: field_202000323162ec8267f16c1.jpg

iForm Record: ID S233	
Photo (Landscape)	 Picture Filename: field_36531909862ec8275d054b.jpg

iForm Record: ID S233

Photo (Landscape)	 Picture Filename: field_9835372862ec827ef40fe.jpg

iForm Record: ID S233	
Photo (Landscape)	 Picture Filename: field_73803222662ec828682920.jpg

iForm Record: ID S233	
Photo (Landscape)	 Picture Filename: field_147876245962ec828ead585.jpg

Benthic Data	
iForm Record: ID S233	
Basket Location	Latitude:56.309832, Longitude:-119.184870, Altitude:358.695073, Speed:0.000915, Horizontal Accuracy:3.642083, Vertical Accuracy:8.890340, Time:08/04/2022 12:29:21 PDT

Basket Location UTM	11 364839 6242709

Benthic Data	
iForm Record: ID S47	
Benthic Basket Number	1
Basket Depth (m)	1.5
Install Date	2022-08-04
Install Time	12:30:00

iForm Record: ID S47	
Benthic Basket Number	2
Basket Depth (m)	1.5
Install Date	2022-08-04
Install Time	12:40:00

iForm Record: ID S47	
Benthic Basket Number	3
Basket Depth (m)	1.4
Install Date	2022-08-04
Install Time	12:42:00

iForm Record: ID S47	
Benthic Basket Number	4
Basket Depth (m)	1.4
Install Date	2022-08-04
Install Time	12:42:00

iForm Record: ID S47	
Benthic Basket Number	5
Basket Depth (m)	1.4
Install Date	2022-08-04
Install Time	12:44:00

iForm Record: ID S47	
Benthic Basket Number	6
Basket Depth (m)	1.4
Install Date	2022-08-04
Install Time	12:44:00

iForm Record: ID S47	
Benthic Basket Number	7
Basket Depth (m)	1.3
Install Date	2022-08-04
Install Time	12:48:00

iForm Record: ID S47	
Benthic Basket Number	8
Basket Depth (m)	1.3
Install Date	2022-08-04
Install Time	12:48:00

Ecofish Research:	RNQA-19425

iForm Record: ID 236	
Form Field ID	2207.0510.3950
Project	1200-25 - Site C Mon 8/9
Existing Waterbody or New Waterbody	Existing Waterbody
Existing Waterbody	Peace River (PCR)
Existing Waypoint or New Site	Existing
Existing Waypoint	PR1
New Site Location	
New Site Location UTM	31 166021 0
Date and Time	2022-08-05 10:20:00
Data Recorder	PBP - Patrick Beaupre
ERL Crew	BRM - Bradley Minielly, PBP - Patrick Beaupre
Weather Ceiling	Partly Cloudy
Weather Precipitation	Dry
Weather Recent Precipitation	24 hours
Weather Wind	Fresh Breeze
Comment	Baskets deployed as per all others - tie off on tree, anchor at end, 2 basket pairs before mid anchor, put in midpoint anchor, then two basket pairs after. Counting of basket numbers starts with 1 and 2 furthest out near endpoint anchor, and 7 and 8 closest to shore.

Photos	
iForm Record: ID S236	
Photo Caption	Looking upstream
Photo (Landscape)	 Picture Filename: field_17688021762edaed37a6c8.jpg

iForm Record: ID S236	
Photo Caption	Looking downstream

Photo (Landscape)	 Picture Filename: field_93190121762edaed8ee409.jpg

iForm Record: ID S236	
Photo Caption	RR to RL
Photo (Landscape)	 Picture Filename: field_196119721762edaee0cc245.jpg

iForm Record: ID S236	
Photo Caption	RL to RR
Photo (Landscape)	 Picture Filename: field_63185143862edaee98398e.jpg

iForm Record: ID S236

Photo (Landscape)	 Picture Filename: field_39532419262edaef1dfde4.jpg

Benthic Data	
iForm Record: ID S236	
Basket Location	Latitude:56.010567, Longitude:-121.939180, Altitude:466.284465, Speed:0.014799, Horizontal Accuracy:5.534460, Vertical Accuracy:10.595150, Time:08/05/2022 10:44:13 PDT
Basket Location UTM	10 566142 6207763

Benthic Data	
iForm Record: ID S50	
Benthic Basket Number	1
Basket Depth (m)	1.7
Install Date	2022-08-05
Install Time	10:30:00

iForm Record: ID S50	
Benthic Basket Number	2
Basket Depth (m)	1.7
Install Date	2022-08-05
Install Time	10:20:00

iForm Record: ID S50	
Benthic Basket Number	3
Basket Depth (m)	1.5
Install Date	2022-08-05
Install Time	10:32:00

iForm Record: ID S50	
Benthic Basket Number	4
Basket Depth (m)	1.5
Install Date	2022-08-05
Install Time	10:32:00

iForm Record: ID S50	
Benthic Basket Number	5
Basket Depth (m)	1.5
Install Date	2022-08-05
Install Time	10:37:00

iForm Record: ID S50

Benthic Basket Number	6
Basket Depth (m)	1.5
Install Date	2022-08-05
Install Time	10:37:00

iForm Record: ID S50	
Benthic Basket Number	7
Basket Depth (m)	1.5
Install Date	2022-08-05
Install Time	10:39:00

iForm Record: ID S50	
Benthic Basket Number	8
Basket Depth (m)	1.5
Install Date	2022-08-05
Install Time	10:50:00

Ecofish Research:	RNQA-19425

iForm Record: ID 239	
Form Field ID	2207.0513.4033
Project	1200-25 - Site C Mon 8/9
Existing Waterbody or New Waterbody	Existing Waterbody
Existing Waterbody	Peace River (PCR)
Existing Waypoint or New Site	Existing
Existing Waypoint	PR-2.81
New Site Location	
New Site Location UTM	31 166021 0
Date and Time	2022-08-05 13:41:00
Data Recorder	PBP - Patrick Beaupre
ERL Crew	BRM - Bradley Minielly, PBP - Patrick Beaupre
Weather Ceiling	Partly Cloudy
Weather Precipitation	Dry
Weather Recent Precipitation	24 hours
Weather Wind	Calm
Comment	Baskets deployed as per all others - tie off on tree, anchor at end, 2 basket pairs before mid anchor, put in midpoint anchor, then two basket pairs after. Counting of basket numbers starts with 1 and 2 furthest out near endpoint anchor, and 7 and 8 closest to shore. For this site we had to travel 900m upstream as too shallow and too muddy (<1m depth). This entire area the river is wide and shallow. We confirmed presence of rocky substrate with extension pole.

Photos	
iForm Record: ID S239	
Photo Caption	Looking upstream
Photo (Landscape)	 Picture Filename: field_195237486862edaf0451514.jpg

iForm Record: ID S239	
Photo Caption	Looking downstream

Photo (Landscape)	 Picture Filename: field_98257311862edaf0963f7a.jpg

iForm Record: ID S239	
Photo Caption	RL to RR
Photo (Landscape)	 Picture Filename: field_53880038162edaf1167320.jpg

iForm Record: ID S239	
Photo Caption	RR to RL
Photo (Landscape)	 Picture Filename: field_42473339362edaf1755f7a.jpg

Benthic Data
iForm Record: ID S239

Basket Location	Latitude:56.223176, Longitude:-120.957043, Altitude:411.657741, Speed:0.791815, Horizontal Accuracy:2.589021, Vertical Accuracy:6.584630, Time:08/05/2022 13:56:25 PDT
Basket Location UTM	10 626669 6232796

Benthic Data	
iForm Record: ID S53	
Benthic Basket Number	1
Basket Depth (m)	1.7
Install Date	2022-08-05
Install Time	13:45:00

iForm Record: ID S53	
Benthic Basket Number	2
Basket Depth (m)	1.7
Install Date	2022-08-05
Install Time	13:45:00

iForm Record: ID S53	
Benthic Basket Number	3
Basket Depth (m)	1.5
Install Date	2022-08-05
Install Time	13:45:00

iForm Record: ID S53	
Benthic Basket Number	4
Basket Depth (m)	1.5
Install Date	2022-08-05
Install Time	13:46:00

iForm Record: ID S53	
Benthic Basket Number	5
Basket Depth (m)	1.5
Install Date	2022-08-05
Install Time	13:49:00

iForm Record: ID S53	
Benthic Basket Number	6
Basket Depth (m)	1.5
Install Date	2022-08-05
Install Time	13:49:00

iForm Record: ID S53	
Benthic Basket Number	7
Basket Depth (m)	0.9
Install Date	2022-08-05
Install Time	13:50:00

iForm Record: ID S53	
Benthic Basket Number	8
Basket Depth (m)	0.9
Install Date	2022-08-05
Install Time	13:50:00

Ecofish Research:	RNQA-19425

iForm Record: ID 242	
Form Field ID	2207.0514.5642
Project	1200-25 - Site C Mon 8/9
Existing Waterbody or New Waterbody	Existing Waterbody
Existing Waterbody	Peace River (PCR)
Existing Waypoint or New Site	Existing
Existing Waypoint	PR2
New Site Location	
New Site Location UTM	31 166021 0
Date and Time	2022-08-05 14:57:00
Data Recorder	PBP - Patrick Beaupre
ERL Crew	BRM - Bradley Minielly, PBP - Patrick Beaupre
Weather Ceiling	Partly Cloudy
Weather Precipitation	Dry
Weather Recent Precipitation	24 hours
Weather Wind	Fresh Breeze
Comment	Baskets deployed as per all others - tie off on tree, anchor at end, 2 basket pairs before mid anchor, put in midpoint anchor, then two basket pairs after. Counting of basket numbers starts with 1 and 2 furthest out near endpoint anchor, and 7 and 8 closest to shore. Roughly 300 m downstream of normal location Current very fast here

Photos	
iForm Record: ID S242	
Photo Caption	Looking downstream
Photo (Landscape)	 Picture Filename: field_174437597362edaf2bed262.jpg

iForm Record: ID S242	
Photo Caption	RL to RR

Photo (Landscape)	 Picture Filename: field_155373157362edaf318ff92.jpg

iForm Record: ID S242	
Photo Caption	RR to RL
Photo (Landscape)	 Picture Filename: field_4624669162edaf3a12a7e.jpg

iForm Record: ID S242	
Photo Caption	Looking upstream
Photo (Landscape)	 Picture Filename: field_85048663662edaf4330fbd.jpg

iForm Record: ID S242

Photo (Landscape)	 Picture Filename: field_20507161462edaf49624db.jpg

Benthic Data	
iForm Record: ID S242	
Basket Location	Latitude:56.202799, Longitude:-121.469772, Altitude:431.549780, Speed:0.012991, Horizontal Accuracy:3.468159, Vertical Accuracy:7.067013, Time:08/05/2022 15:02:34 PDT
Basket Location UTM	10 594932 6229705

Benthic Data	
iForm Record: ID S56	
Benthic Basket Number	1
Basket Depth (m)	2
Install Date	2022-08-05
Install Time	15:16:00
Removal Date	2022-08-05

iForm Record: ID S56	
Benthic Basket Number	2
Basket Depth (m)	2
Install Date	2022-08-05
Install Time	15:16:00

iForm Record: ID S56	
Benthic Basket Number	3
Basket Depth (m)	1.8
Install Date	2022-08-05
Install Time	15:18:00

iForm Record: ID S56	
Benthic Basket Number	4
Basket Depth (m)	1.8
Install Date	2022-08-05
Install Time	15:18:00

iForm Record: ID S56	
Benthic Basket Number	5
Basket Depth (m)	1.8
Install Date	2022-08-05
Install Time	15:22:00

iForm Record: ID S56	
Benthic Basket Number	6
Basket Depth (m)	1.8
Install Date	2022-08-05
Install Time	15:22:00

iForm Record: ID S56	
Benthic Basket Number	7
Basket Depth (m)	1.7
Install Date	2022-08-05
Install Time	15:28:00

iForm Record: ID S56	
Benthic Basket Number	8
Basket Depth (m)	1.7
Install Date	2022-08-05
Install Time	15:24:00

4 August 2022

1200 MON 8/4

Arrive @ Many Island ~ 11:15
- To Load Boat
- Set Rock Baskets @ PD5

Rock Baskets all set @ 12:45
~ 700m DS of PD5 point
Leaving Site back to many Island BL
@ 13:00

Back at Eco House @ 15:15
Switch to Saltfarm WR Billing Code
- Heading to do Site Maintence
and spot measurement at 3 Sites

At L3-BC @ ~ 16:10
- Wiped sensor after 16:15
- Waiting for 16:30 for spot measure
- Prelim NTU's ~ 2000

PSC-LB ~ 16:45 Reset NEON
- Light not on. Power is good
- Back in truck @ 17:15

Walking to Trib G @ 17:35

At Trib G Station @ 18:05

Plan: -Rinse, spot, spray waspnest

- Wasp Nest Destroyed

Back to truck @ 19:15

No.392

5 August 2022

Lynx Creek Boat Launch @ 9:30

Heading to Teacups (PR1)

PR1 @ 10:00

All baskets deployed @ 10:30
- River Right
- Bottom of cliff (Shale)
- Baskets laid across shelf
- 1.5 - 1.7m depth

Halfway BL @ 12:20

12:30 Heading to PR 2.81
- Prepping Baskets on the way

At PR 2.81 @ 13:15
Depth 0.8m ~50m from shore
- Very muddy - Water not low
Will need to go upstream
Found suitable site 0.9km U/S River Rig
@ 13:25 confirmed Rocky bottom

All baskets deployed 13:45 - 13:50
Depth 1.7 - 0.9m
Current speed ~5 km/h
Left PR2.81 @ ~14:00

Arrive PR2 ~ 15:00
~200m D/S of WQ wpt River Left
All Baskets deployed 15:16 - 15:26
Depth 2.0 - 1.7m
Current speed ~ 7Km/hr

3 Aug 2022

Left Taylor BL @ 10:00

Headed for PAP-RB site Replacement

Deployed PAP-RB Sensor @ 11:10

Dropped sensor in water @ 11:20

~~Pat~~ Power Cycling NEON to reset system @ 11:25

13:20
Retrieved anchor to protie pites to clip baskets to

PD1 Baskets set @ 1400

PAP-RB Reset @ 14:15

Heading to PD3
Arrive PD3 @ 15:30
All Baskets set b/w 1600 & 16:10

Back to Taylor BL @ 17:15
Checked w/ Jordan about PAP-RB
- Waiting to reassess tomorrow

Ecofish Research:	RNQA-20053

iForm Record: ID 287	
Form Field ID	2208.2610.0211
Project	1200-25 - Site C Mon 8/9
Existing Waterbody or New Waterbody	Existing Waterbody
Existing Waterbody	Peace River (PCR)
Existing Waypoint or New Site	New
New Site Location	Latitude:56.010531, Longitude:-121.939202, Altitude:456.231505, Speed:0.004653, Horizontal Accuracy:4.969795, Vertical Accuracy:9.715848, Time:09/26/2022 10:03:06 PDT
New Site Location UTM	10 566140 6207759
New Site Name	PR1-invert
Date and Time	2022-09-26 09:30:00
Data Recorder	PBP - Patrick Beaupre
ERL Crew	KDG - Kevin Ganshorn, PBP - Patrick Beaupre
Additional Crew	Gary mann
Air Temperature (Celcius)	12
Air Temperature Time	10:06:00
Weather Ceiling	Partly Cloudy
Weather Precipitation	Dry
Weather Recent Precipitation	None in 24 hours
Weather Wind	Light Air
Comment	Arrive at site Remove rope pin down cairn Use boat hook to grab main line Follow to first basket closest to shore by hand pulling. Haul up, but keep submerged, place kick net under Plus downstream to catch loose inverts. Unhook first basket via carabiner, haul second basket to surface and repeat. Rock baskets can go in waiting tray. Process two baskets at a time. Processing - first brush off basket itself (exterior) into bucket with river water, then open basket and dump rocks into bucket, then complete brushing of basket. then hand clean every rock individually, placing wiped rocks in separate spent bucket. Rocks will go back into baskets and sealed with two zip ties. Bucket contents through stacked sieve tray - can use river water up from below to spread it out. Bucket and tray can have water added to rinse out through potters sieve. Also rinse out out kicknet trap - this can be gone through twice, including using stacked sieves. Use squirt bottles to dislodge contents into lighter tray. Periphyton masses from trays can be divided up and analzyzed in potters sieves. Do a coarse pick for visible inverts into white bottomed container with water. Then finish site by dividing by taxa last. Each basket takes about 0.75 1 hr to process. Carabiners all left on baskets. Taxa division for this site Trichoptera-big (PR1 TB on vial) Trichoptera-small (PR1 TS) includes more than one species Miscellaneous (PR1 M) includes ephemeroptera, chironomids, hydracarina, oligochaetes, Gastropoda, other Diptera Masses PR1-TB 1.2 g PR1-TS 6.4 g PR1-M 0.6 g Rock sizes All rocks in baskets were large sizes (greater than 10- 15cm diameter)

Photos	
iForm Record: ID S287	
Photo Caption	Looking upstream

Photo (Landscape)	 Picture Filename: field_6315412866338f043962d8.jpg

iForm Record: ID S287	
Photo Caption	Looking downstream
Photo (Landscape)	 Picture Filename: field_9152717846338f04c9911a.jpg

iForm Record: ID S287	
Photo Caption	RR to RL
Photo (Landscape)	 Picture Filename: field_17903089196338f054c48da.jpg

iForm Record: ID S287

Photo (Landscape)	 Picture Filename: field_20236470986338f05d660a9.jpg
Photo Comment	Large bucket to hand scrub individual rocks, smaller bucket to collect spent rocks, then replace in rock baskets

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_10949219156338f0657c24f.jpg
Photo Comment	Rinsing periphyton through potter sieve

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_8285633236338f06dca540.jpg
Photo Comment	Note water from below

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_17888652546338f076d2ca2.jpg
Photo Comment	First brushing of basket

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_15106597336338f08222a85.jpg
Photo Comment	Stacked trays with water from below

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_8265681616338f08a3dd33.jpg
Photo Comment	Use of headlamp crucial. Picking dry,then wet seems to work well.

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_16233193576338f0919e0db.jpg
Photo Comment	Coarse pickings pre taxa division

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_14422617566338f099c909a.jpg
Photo Comment	Very important step. Main bucket through stacked sieves

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_8391844856338f0a25970e.jpg
Photo Comment	Homogenizing and spreading out bucket contents

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_13885539926338f0a98015f.jpg
Photo Comment	8 baskets worth of inverts (almost entirely trichoptera)

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_7074640646338f0b19ef30.jpg
Photo Comment	Taxa 1 - trichoptera-big

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_18070854636338f0b9a008c.jpg
Photo Comment	Taxa 2 - trichoptera-small Note more than one species

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_9311338746338f0c161327.jpg
Photo Comment	Samples, broken down into three taxa

Benthic Data	
iForm Record: ID S287	
Basket Location	Latitude:56.010576, Longitude:-121.939227, Altitude:457.262675, Speed:0.039837, Horizontal Accuracy:5.941677, Vertical Accuracy:10.606409, Time:09/26/2022 10:41:04 PDT
Basket Location UTM	10 566139 6207764

Benthic Data	
iForm Record: ID S77	
Basket Depth (m)	2.3
Removal Date	2022-09-26
Removal Time	09:45:00

Ecofish Research:	RNQA-20053

iForm Record: ID 296	
Form Field ID	2208.2610.0211
Project	1200-25 - Site C Mon 8/9
Existing Waterbody or New Waterbody	Existing Waterbody
Existing Waterbody	Peace River (PCR)
Existing Waypoint or New Site	New
New Site Location	Latitude:56.101872, Longitude:-120.227573, Altitude:392.662348, Speed:0.002447, Horizontal Accuracy:4.571794, Vertical Accuracy:5.878679, Time:09/29/2022 09:28:36 PDT
New Site Location UTM	10 672430 6220882
New Site Name	PD3-invert
Date and Time	2022-09-29 09:00:00
Data Recorder	PBP - Patrick Beaupre
ERL Crew	PBP - Patrick Beaupre, UTW - Tess Ward
Additional Crew	
Air Temperature (Celcius)	11
Air Temperature Time	09:11:00
Weather Ceiling	Overcast
Weather Precipitation	Drizzle
Weather Recent Precipitation	None in 24 hours
Weather Wind	Light Air
Weather Comments	
Comment	Arrive at site Clean gear with liquinox. 6 buckets, 2 sieve trays, 2 brushes, 2 squirt bottles, 2 potters sieves. Plus clean tote lids as table space. Use boat hook to grab main line and nose in with engine running Follow to first basket closest to shore by hand pulling. Haul up, but keep submerged, place kick net under Plus downstream to catch loose inverts. Unhook first basket via carabiner, haul second basket to surface and repeat. Rock baskets can go in waiting tray. Process two baskets at a time. Processing - first brush off basket itself (exterior) into bucket with river water, then open basket and dump rocks into bucket, then complete brushing of basket. then hand clean every rock individually, placing wiped rocks in separate spent bucket. Rocks will go back into baskets and sealed with two zip ties. Bucket contents through stacked sieve tray - can use river water up from below to spread it out. Bucket and tray can have water added to rinse out through potters sieve. Also rinse out out kicknet trap - this can be gone through twice, including using stacked sieves. Use squirt bottles to dislodge contents into lighter tray. Periphyton masses from trays can be divided up and analzyzed in potters sieves. Do a coarse pick for visible inverts into white bottomed container with water. Then finish site by dividing by taxa last. Two baskets take 1.5 to 2 hr to process. Carabiners all left on baskets. Empty vials weigh 3.9g. Taxa division for this site, with masses Plecoptera big PD3-PB- 4.2g (greater than 4cm) Plecoptera small PD3-PS- 0.2g (2cm and smaller) Trichoptera big PD3-TB - 6.5g Trichoptera small PD3-TS- 6.4g Trichoptera from casings PD3-TC -A - 4.2g PD3-TC -B - 5.4g Ephemeroptera PD3-E- 1.0g More mayflies here. Also larger in size. Found in the upper baskets more. More small caddisflies than big. Largest amount of case trichoptera seen. Most of the large plecoptera came from the last/deepest baskets. No medium size plecoptera. P=plecoptera T=trichoptera E=ephemoroptera B=big (greater than 1.5cm for T, greater then 4cm for P) S=small (less than 1.5cm, over 1cm) (give or take T=tiny (less than 1cm) C=casings (trichoptera from casings-different species than main trichoptera) M=miscellaneous A, B and C are replicates Rock sizes: Mix of large and small rocks in baskets Little to no periphyton. Low amount of roots and debris, one basket grab (5 and 6) had lots of sticks and detritus. Detritus and logs stuck on rope line.

Photos	
iForm Record: ID S296	
Photo Caption	Looking upstream

Photo (Landscape)	 Picture Filename: field_7030323276338ef92d205a.jpg

iForm Record: ID S296	
Photo Caption	Looking downstream
Photo (Landscape)	 Picture Filename: field_15398285866338ef9bf3f6b.jpg

iForm Record: ID S296	
Photo Caption	RL to RR
Photo (Landscape)	 Picture Filename: field_532899716338efa36889b.jpg

iForm Record: ID S296

Photo (Landscape)	 Picture Filename: field_12424013856338efaa8b60e.jpg
Photo Comment	First two baskets - right large trichoptera, left small trichoptera, bottom case forming trichoptera (bright green, removed from cases) with several mayflies and a plecopteran

iForm Record: ID S296	
Photo (Landscape)	 Picture Filename: field_5748376436338efb277881.jpg
Photo Comment	Total inverts at end of day. After 8 baskets. Top left trichoptera with casing (TC), top right large trichoptera (TB), bottom left small trichoptera (TS), middle plecoptera, bottom right ephemeroptera.

Benthic Data	
iForm Record: ID S296	
Basket Location	Latitude:56.102882, Longitude:-120.231003, Altitude:392.182224, Speed:11.324138, Horizontal Accuracy:4.049040, Vertical Accuracy:6.569921, Time:09/29/2022 16:57:07 PDT
Basket Location UTM	10 672212 6220985

Benthic Data	
iForm Record: ID S68	
Basket Depth (m)	2.3
Removal Date	2022-09-29
Removal Time	09:35:00

Ecofish Research:	RNQA-20053

iForm Record: ID 290	
Form Field ID	2208.2610.0211
Project	1200-25 - Site C Mon 8/9
Existing Waterbody or New Waterbody	Existing Waterbody
Existing Waterbody	Peace River (PCR)
Existing Waypoint or New Site	New
New Site Location	Latitude:56.202855, Longitude:-121.469783, Altitude:431.633529, Speed:0.084477, Horizontal Accuracy:7.816558, Vertical Accuracy:11.647305, Time:09/27/2022 09:50:17 PDT
New Site Location UTM	10 594931 6229711
New Site Name	PR2-invert
Date and Time	2022-09-27 09:45:00
Data Recorder	PBP - Patrick Beaupre
ERL Crew	KDG - Kevin Ganshorn, PBP - Patrick Beaupre, UTW - Tess Ward
Additional Crew	Gary mann
Air Temperature (Celcius)	10
Air Temperature Time	09:52:00
Weather Ceiling	Foggy
Weather Precipitation	Dry
Weather Recent Precipitation	None in 24 hours
Weather Wind	Light Air
Weather Comments	Very low visibility at arrival, gradually clearing up
Comment	Arrive at site Clean gear with liquinox. 6 buckets, 2 sieve trays, 2 brushes, 2 squirt bottles, 2 potters sieves. Plus clean tote lids as table space. Use boat hook to grab main line and nose in with engine running Follow to first basket closest to shore by hand pulling. Haul up, but keep submerged, place kick net under Plus downstream to catch loose inverts. Unhook first basket via carabiner, haul second basket to surface and repeat. Rock baskets can go in waiting tray. Process two baskets at a time. Processing - first brush off basket itself (exterior) into bucket with river water, then open basket and dump rocks into bucket, then complete brushing of basket. then hand clean every rock individually, placing wiped rocks in separate spent bucket. Rocks will go back into baskets and sealed with two zip ties. Bucket contents through stacked sieve tray - can use river water up from below to spread it out. Bucket and tray can have water added to rinse out through potters sieve. Also rinse out out kicknet trap - this can be gone through twice, including using stacked sieves. Use squirt bottles to dislodge contents into lighter tray. Periphyton masses from trays can be divided up and analzyzed in potters sieves. Do a coarse pick for visible inverts into white bottomed container with water. Then finish site by dividing by taxa last. Two baskets take 1.5 to 2 hr to process. Carabiners all left on baskets. Taxa division for this site, with masses Plecoptera PR2-P 3.9g Trichoptera big PR2-TB -5.5g (greater than 1.5cm, all were the tree belly species for this site) Trichoptera small PR2-TS-A -5.3g Trichoptera small PR2-TS-B - 5.5g Trichoptera tiny PR2-TT-A - 5.9g Trichoptera tiny PR2-TT-B - 6.0g Miscellaneous PR2-M 0.1g Miscellaneous (PR1 M) includes ephemeroptera, oligochaetes P=plecoptera T=trichoptera E=ephemoroptera B=big (greater than 1.5cm) S=small (less than 1.5cm, over 1cm) (give or take T=tiny (less than 1cm) M=miscellaneous A and B are replicates Rock sizes Mix of large and small rocks in baskets Small amount of periphyton and debris

Photos

iForm Record: ID S290	
Photo Caption	Looking upstream

Photo (Landscape)	 Picture Filename: field_16099939826338ef07b32a6.jpg

iForm Record: ID S290	
Photo Caption	Looking downstream
Photo (Landscape)	 Picture Filename: field_10619348516338ef0fcdf37.jpg

iForm Record: ID S290	
Photo Caption	RL to RR
Photo (Landscape)	 Picture Filename: field_10342503376338ef168989c.jpg

iForm Record: ID S290

Photo (Landscape)	 Picture Filename: field_10776277596338ef21ea958.jpg
Photo Comment	Dry picking after first sieving.

iForm Record: ID S290	
Photo (Landscape)	 Picture Filename: field_8697780706338ef2a8b884.jpg
Photo Comment	Plecoptera

iForm Record: ID S290	
Photo (Landscape)	 Picture Filename: field_9695455036338ef342a44f.jpg
Photo Comment	Baskets in buckets

iForm Record: ID S290

Photo (Landscape)	 Picture Filename: field_17454421106338ef3af1144.jpg
Photo Comment	Clipping zip ties from one side of rock basket to open it in cleaning bucket

iForm Record: ID S290	
Photo (Landscape)	 Picture Filename: field_4533840486338ef421b785.jpg
Photo Comment	Large trichoptera. Greater than 1.5 cm

iForm Record: ID S290	
Photo (Landscape)	 Picture Filename: field_7728400306338ef4883326.jpg
Photo Comment	Despite large number of trichoptera and plecoptera, very little Oligochates and Ephemeroptera found

iForm Record: ID S290	
Photo (Landscape)	 Picture Filename: field_15507960816338ef504c226.jpg
Photo Comment	Trichoptera small

iForm Record: ID S290	
Photo (Landscape)	 Picture Filename: field_10151683206338ef5b49d8d.jpg
Photo Comment	Trichoptera tiny

Benthic Data	
iForm Record: ID S290	
Basket Location	Latitude:56.202969, Longitude:-121.469598, Altitude:429.559814, Speed:0.010466, Horizontal Accuracy:4.915706, Vertical Accuracy:10.059930, Time:09/27/2022 10:35:45 PDT
Basket Location UTM	10 594943 6229724

Benthic Data	
iForm Record: ID S62	
Basket Depth (m)	2.4
Removal Date	2022-09-27
Removal Time	10:30:00

Ecofish Research:	RNQA-20053

iForm Record: ID 299	
Form Field ID	2208.2610.0211
Project	1200-25 - Site C Mon 8/9
Existing Waterbody or New Waterbody	Existing Waterbody
Existing Waterbody	Peace River (PCR)
Existing Waypoint or New Site	New
New Site Location	Latitude:56.222980, Longitude:-120.957178, Altitude:412.474393, Speed:0.005357, Horizontal Accuracy:4.328103, Vertical Accuracy:9.356317, Time:09/30/2022 10:01:52 PDT
New Site Location UTM	10 626662 6232774
New Site Name	PR2.81 -invert
Date and Time	2022-09-30 09:15:00
Data Recorder	UTW - Tess Ward
ERL Crew	NWY - Nicole Wolsey, UTW - Tess Ward
Additional Crew	
Air Temperature (Celcius)	11
Air Temperature Time	09:32:00
Weather Ceiling	Foggy
Weather Precipitation	Dry
Weather Recent Precipitation	None in 24 hours
Weather Wind	Light Air
Weather Comments	
Comment	Arrive at site Clean gear with liquinox. 6 buckets, 2 sieve trays, 2 brushes, 2 squirt bottles, 2 potters sieves. Plus clean tote lids as table space. Use boat hook to grab main line and nose in with engine running Follow to first basket closest to shore by hand pulling. Haul up, but keep submerged, place kick net under Plus downstream to catch loose inverts. Unhook first basket via carabiner, haul second basket to surface and repeat. Rock baskets can go in waiting tray. Process two baskets at a time. Processing - first brush off basket itself (exterior) into bucket with river water, then open basket and dump rocks into bucket, then complete brushing of basket. then hand clean every rock individually, placing wiped rocks in separate spent bucket. Rocks will go back into baskets and sealed with two zip ties. Bucket contents through stacked sieve tray - can use river water up from below to spread it out. Bucket and tray can have water added to rinse out through potters sieve. Also rinse out out kicknet trap - this can be gone through twice, including using stacked sieves. Use squirt bottles to dislodge contents into lighter tray. Periphyton masses from trays can be divided up and analzyzed in potters sieves. Do a coarse pick for visible inverts into white bottomed container with water. Then finish site by dividing by taxa last. Two baskets take 1.5 to 2 hr to process. Carabiners all left on baskets. Empty vials weigh 3.9g. Taxa division for this site, with masses Trichoptera big PR2.81-TB - 6.3g Trichoptera small PR2.81-TS- 6.6g Trichoptera from casings PR2.81-TC - 1.9g Miscellaneous PR2.81-M -0.8g (ephemeroptera, plecoptera, chironomids) More mayflies here. Also larger in size. Found in the upper baskets more. More small caddisflies than big. No medium size plecoptera, only 3 small P found. Tiny chironomids also found. P=plecoptera T=trichoptera E=ephemoroptera B=big (greater than 1.5cm for T, greater then 4cm for P) S=small (less than 1.5cm, over 1cm) (give or take T=tiny (less than 1cm) C=casings (trichoptera from casings-different species than main trichoptera) M=miscellaneous A, B and C are replicates Rock sizes: Mix of large and small rocks in baskets-more large. Little to medium periphyton. Low to nil amount of roots and debris. Detritus and logs stuck on rope line, making collection longer and more difficult. Less cobble here, more vegetative and silty shoreline/bottom. Note for baskets 5 and 6 : huge log caught in anchor, took some time to detangle. Then rope caught around anchor, took some time to detangle. Then rope caught around rock baskets, took some time to detangle, didn't have the ability to use the nets to catch extras. Few bugs in this sample. Baskets 7 and 8 were also tangled around the line and had more time suspended in the current while trying to detangle without the net. Not a lot of inverts found all day. No large plecoptera, more small trichoptera than large. More mayflies than other sites.

Photos	
iForm Record: ID S299	
Photo Caption	Looking upstream
Photo (Landscape)	 Picture Filename: field_139966216338efbd4e7c1.jpg

iForm Record: ID S299	
Photo Caption	Looking downstream
Photo (Landscape)	 Picture Filename: field_15980888806338efc67f1d9.jpg

iForm Record: ID S299	
Photo Caption	RR to RL
Photo (Landscape)	 Picture Filename: field_12111066066338efd279ebf.jpg

iForm Record: ID S299	
Photo (Landscape)	 Picture Filename: field_10308484736338efda2b053.jpg
Photo Comment	First two baskets - top right small trichoptera, top left trichoptera with casings, bottom left large trichoptera, bottom right ephemeroptera. Not as much as other sites.

iForm Record: ID S299	
Photo (Landscape)	 Picture Filename: field_14201504206338efe23c750.jpg
Photo Comment	Total inverts at end of day. After 8 baskets. Top left trichoptera with casing (TC), top right small trichoptera (TS), bottom left large trichoptera (TB), bottom right ephemeroptera and plecoptera

iForm Record: ID S299

Photo (Landscape)	 Picture Filename: field_20266508146338efed4b06a.jpg
Photo Comment	Grab from the first 2 baskets

Benthic Data	
iForm Record: ID S299	
Basket Location	Latitude:56.223167, Longitude:-120.957509, Altitude:413.287149, Speed:2.692066, Horizontal Accuracy:5.692351, Vertical Accuracy:13.201870, Time:09/30/2022 16:31:54 PDT
Basket Location UTM	10 626640 6232794

Benthic Data	
iForm Record: ID S71	
Basket Depth (m)	2.7
Removal Date	2022-09-30
Removal Time	09:35:00

Ecofish Research:	RNQA-20053

iForm Record: ID 302	
Form Field ID	2208.2610.0211
Project	1200-25 - Site C Mon 8/9
Existing Waterbody or New Waterbody	Existing Waterbody
Existing Waterbody	Peace River (PCR)
Existing Waypoint or New Site	New
New Site Location	Latitude:56.309927, Longitude:-119.184708, Altitude:358.791652, Speed:0.017736, Horizontal Accuracy:3.146753, Vertical Accuracy:10.726316, Time:10/01/2022 08:48:35 PDT
New Site Location UTM	11 364850 6242719
New Site Name	PD5-invert
Date and Time	2022-10-01 08:50:00
Data Recorder	UTW - Tess Ward
ERL Crew	NWY - Nicole Wolsey, UTW - Tess Ward
Additional Crew	
Air Temperature (Celcius)	11
Air Temperature Time	08:50:00
Weather Ceiling	Foggy
Weather Precipitation	Dry
Weather Recent Precipitation	None in 24 hours
Weather Wind	Light Air
Weather Comments	Foggy morning clearing to overcast and clouds. No delay
Comment	Arrive at site Clean gear with liquinox. 6 buckets, 2 sieve trays, 2 brushes, 2 squirt bottles, 2 potters sieves. Plus clean tote lids as table space. Use boat hook to grab main line and nose in with engine running Follow to first basket closest to shore by hand pulling. Haul up, but keep submerged, place kick net under Plus downstream to catch loose inverts. Unhook first basket via carabiner, haul second basket to surface and repeat. Rock baskets can go in waiting tray. Process two baskets at a time. Processing - first brush off basket itself (exterior) into bucket with river water, then open basket and dump rocks into bucket, then complete brushing of basket. then hand clean every rock individually, placing wiped rocks in separate spent bucket. Rocks will go back into baskets and sealed with two zip ties. Bucket contents through stacked sieve tray - can use river water up from below to spread it out. Bucket and tray can have water added to rinse out through potters sieve. Also rinse out out kicknet trap - this can be gone through twice, including using stacked sieves. Use squirt bottles to dislodge contents into lighter tray. Periphyton masses from trays can be divided up and analzyzed in potters sieves. Do a coarse pick for visible inverts into white bottomed container with water. Then finish site by dividing by taxa last. Two baskets take 1.5 to 2 hr to process. Carabiners all left on baskets. Empty vials weigh 3.9g. Taxa division for this site, with masses Trichoptera big PD5-TB - 2.5g Trichoptera small PD5-TS-A - 3.4g PD5-TS-B - 3.0g Trichoptera from casings PD3-TC - 2.5g Ephemeroptera PD5-E- 2.2g Miscellaneous PD5 - M - 0.1g (1 plecoptera and 2 tiny midges) More mayflies here. Also larger in size. More small caddisflies than big. 1 plecoptera. P=plecoptera T=trichoptera E=ephemoroptera B=big (greater than 1.5cm for T, greater then 4cm for P) S=small (less than 1.5cm, over 1cm) (give or take T=tiny (less than 1cm) C=casings (trichoptera from casings-different species than main trichoptera) M=miscellaneous A, B and C are replicates Rock sizes: Mix of large and small rocks in baskets- more, large no periphyton. Little to nil roots and debris. Very Little muck and such stuck on rocks, little to sift through.

Photos	
iForm Record: ID S302	
Photo Caption	Looking upstream

Photo (Landscape)	 Picture Filename: field_12086814076338eff7470c1.jpg

iForm Record: ID S302	
Photo Caption	Looking downstream
Photo (Landscape)	 Picture Filename: field_17780708056338effe6e4fc.jpg

iForm Record: ID S302	
Photo Caption	RR to RL
Photo (Landscape)	 Picture Filename: field_1891621246338f0051a858.jpg

iForm Record: ID S302

Photo (Landscape)	 Picture Filename: field_2178041246338f00ebaabe.jpg
Photo Comment	First two baskets - left top large trichoptera, right top small trichoptera, bottom left case forming trichoptera, bottom right ephemeroptera

iForm Record: ID S302	
Photo (Landscape)	 Picture Filename: field_11502572116338f015ec8cf.jpg
Photo Comment	Total inverts at end of day. After 8 baskets. Top left small trichoptera (TS), top right large trichoptera (TB), bottom right trichoptera with casing (TC), bottom left ephemeroptera.

iForm Record: ID S302	
Photo Caption	RR to RL

Photo (Landscape)	 Picture Filename: field_9132011126338f021a3e8f.jpg
Photo Comment	Picture of rope location

Benthic Data	
iForm Record: ID S302	
Basket Location	Latitude:56.309924, Longitude:-119.184723, Altitude:357.906955, Speed:0.055703, Horizontal Accuracy:3.855917, Vertical Accuracy:12.360992, Time:10/01/2022 08:51:39 PDT
Basket Location UTM	11 364849 6242719

Benthic Data	
iForm Record: ID S74	
Basket Depth (m)	2.3
Removal Date	2022-10-01
Removal Time	09:15:00

Ecofish Research:	RNQA-20053

iForm Record: ID 293	
Form Field ID	2208.2610.0211
Project	1200-25 - Site C Mon 8/9
Existing Waterbody or New Waterbody	Existing Waterbody
Existing Waterbody	Peace River (PCR)
Existing Waypoint or New Site	New
New Site Location	Latitude:56.161194, Longitude:-120.743319, Altitude:403.330516, Speed:0.016088, Horizontal Accuracy:3.835326, Vertical Accuracy:9.338025, Time:09/28/2022 09:08:02 PDT
New Site Location UTM	10 640144 6226313
New Site Name	PD1-invert
Date and Time	2022-09-28 07:45:00
Data Recorder	PBP - Patrick Beaupre
ERL Crew	PBP - Patrick Beaupre, UTW - Tess Ward
Additional Crew	
Air Temperature (Celcius)	13
Air Temperature Time	09:11:00
Weather Ceiling	Foggy
Weather Precipitation	Dry
Weather Recent Precipitation	None in 24 hours
Weather Wind	Light Air
Weather Comments	Very low visibility at arrival, gradually clearing up
Comment	Arrive at site Clean gear with liquinox. 6 buckets, 2 sieve trays, 2 brushes, 2 squirt bottles, 2 potters sieves. Plus clean tote lids as table space. Use boat hook to grab main line and nose in with engine running Follow to first basket closest to shore by hand pulling. Haul up, but keep submerged, place kick net under Plus downstream to catch loose inverts. Unhook first basket via carabiner, haul second basket to surface and repeat. Rock baskets can go in waiting tray. Process two baskets at a time. Processing - first brush off basket itself (exterior) into bucket with river water, then open basket and dump rocks into bucket, then complete brushing of basket. then hand clean every rock individually, placing wiped rocks in separate spent bucket. Rocks will go back into baskets and sealed with two zip ties. Bucket contents through stacked sieve tray - can use river water up from below to spread it out. Bucket and tray can have water added to rinse out through potters sieve. Also rinse out out kicknet trap - this can be gone through twice, including using stacked sieves. Use squirt bottles to dislodge contents into lighter tray. Periphyton masses from trays can be divided up and analzyzed in potters sieves. Do a coarse pick for visible inverts into white bottomed container with water. Then finish site by dividing by taxa last. Two baskets take 1.5 to 2 hr to process. Carabiners all left on baskets. Taxa division for this site, with masses Plecoptera big PD1-PB-A - 4.1g (greater then 4cm) Plecoptera big PD1-PB-B - 3.9g Plecoptera big PD1-PB-C - 3.9g Plecoptera small PD1-PS- 2.2g Most plecoptera found in the last / deepest rock baskets Trichoptera big PD1-TB - A - 7.2g (greater than 1.5cm, all were the tree belly species for this site) Trichoptera big PD1-TB - B - 7.1g Trichoptera big PD1-TB - C - 7.1g Trichoptera small PD1 TS-A - 7.1g Trichoptera small PD1-TS-B - 7.1g Trichoptera small PD1-TS-C - 7.2g Trichoptera from casings PD1-TC -7.4g Ephemeroptera PD1-E- 0.4g (34 tiny mayflies- difficult to catch because small and fragile) First couple rock baskets had the most trichoptera and the most detritus P=plecoptera T=trichoptera E=ephemoroptera B=big (greater than 1.5cm for T, greater then 4cm for P) S=small (less than 1.5cm, over 1cm) (give or take T=tiny (less than 1cm) C=casings (trichoptera from casings-different species than main trichoptera) M=miscellaneous A, B and C are replicates Rock sizes Mix of large and small rocks in baskets Small amount of periphyton. High amount of roots and debris. 2 sculpin caught on the first basket grab of the day!

Photos	
iForm Record: ID S293	
Photo Caption	Looking upstream

Photo (Landscape)	 Picture Filename: field_11673646316338ef68993c1.jpg

iForm Record: ID S293	
Photo Caption	Looking downstream
Photo (Landscape)	 Picture Filename: field_15088931796338ef701b438.jpg

iForm Record: ID S293	
Photo Caption	RL to RR
Photo (Landscape)	 Picture Filename: field_10687628006338ef78247b2.jpg

iForm Record: ID S293

Photo (Landscape)	 Picture Filename: field_16252471616338ef7f6a7cc.jpg
Photo Comment	First two baskets - bottom left large trichoptera, bottom right small trichoptera, top case forming trichoptera (bright green, removed from cases) with several mayflies and a plecopteran

iForm Record: ID S293	
Photo (Landscape)	 Picture Filename: field_14290151646338ef872e5cd.jpg
Photo Comment	Total inverts at end of day. After 8 baskets. Top left small trichoptera, top right large trichoptera, bottom miscellaneous (plecoptera, ephemeroptera and trichoptera from casings)

Benthic Data	
iForm Record: ID S293	
Basket Location	Latitude:56.161202, Longitude:-120.743313, Altitude:404.328067, Speed:0.070068, Horizontal Accuracy:4.189810, Vertical Accuracy:7.495021, Time:09/28/2022 09:52:58 PDT
Basket Location UTM	10 640144 6226314

Benthic Data	
iForm Record: ID S65	
Basket Depth (m)	2.7
Removal Date	2022-09-28
Removal Time	08:45:00

Ecofish Research:	RNQA-20053

iForm Record: ID 296	
Form Field ID	2208.2610.0211
Project	1200-25 - Site C Mon 8/9
Existing Waterbody or New Waterbody	Existing Waterbody
Existing Waterbody	Peace River (PCR)
Existing Waypoint or New Site	New
New Site Location	Latitude:56.101872, Longitude:-120.227573, Altitude:392.662348, Speed:0.002447, Horizontal Accuracy:4.571794, Vertical Accuracy:5.878679, Time:09/29/2022 09:28:36 PDT
New Site Location UTM	10 672430 6220882
New Site Name	PD3-invert
Date and Time	2022-09-29 09:00:00
Data Recorder	PBP - Patrick Beaupre
ERL Crew	PBP - Patrick Beaupre, UTW - Tess Ward
Additional Crew	
Air Temperature (Celcius)	11
Air Temperature Time	09:11:00
Weather Ceiling	Overcast
Weather Precipitation	Drizzle
Weather Recent Precipitation	None in 24 hours
Weather Wind	Light Air
Weather Comments	
Comment	Arrive at site Clean gear with liquinox. 6 buckets, 2 sieve trays, 2 brushes, 2 squirt bottles, 2 potters sieves. Plus clean tote lids as table space. Use boat hook to grab main line and nose in with engine running Follow to first basket closest to shore by hand pulling. Haul up, but keep submerged, place kick net under Plus downstream to catch loose inverts. Unhook first basket via carabiner, haul second basket to surface and repeat. Rock baskets can go in waiting tray. Process two baskets at a time. Processing - first brush off basket itself (exterior) into bucket with river water, then open basket and dump rocks into bucket, then complete brushing of basket. then hand clean every rock individually, placing wiped rocks in separate spent bucket. Rocks will go back into baskets and sealed with two zip ties. Bucket contents through stacked sieve tray - can use river water up from below to spread it out. Bucket and tray can have water added to rinse out through potters sieve. Also rinse out out kicknet trap - this can be gone through twice, including using stacked sieves. Use squirt bottles to dislodge contents into lighter tray. Periphyton masses from trays can be divided up and analzyzed in potters sieves. Do a coarse pick for visible inverts into white bottomed container with water. Then finish site by dividing by taxa last. Two baskets take 1.5 to 2 hr to process. Carabiners all left on baskets. Empty vials weigh 3.9g. Taxa division for this site, with masses Plecoptera big PD3-PB- 4.2g (greater than 4cm) Plecoptera small PD3-PS- 0.2g (2cm and smaller) Trichoptera big PD3-TB - 6.5g Trichoptera small PD3-TS- 6.4g Trichoptera from casings PD3-TC -A - 4.2g PD3-TC -B - 5.4g Ephemeroptera PD3-E- 1.0g More mayflies here. Also larger in size. Found in the upper baskets more. More small caddisflies than big. Largest amount of case trichoptera seen. Most of the large plecoptera came from the last/deepest baskets. No medium size plecoptera. P=plecoptera T=trichoptera E=ephemoroptera B=big (greater than 1.5cm for T, greater then 4cm for P) S=small (less than 1.5cm, over 1cm) (give or take T=tiny (less than 1cm) C=casings (trichoptera from casings-different species than main trichoptera) M=miscellaneous A, B and C are replicates Rock sizes: Mix of large and small rocks in baskets Little to no periphyton. Low amount of roots and debris, one basket grab (5 and 6) had lots of sticks and detritus. Detritus and logs stuck on rope line.

Photos	
iForm Record: ID S296	
Photo Caption	Looking upstream

Photo (Landscape)	 Picture Filename: field_7030323276338ef92d205a.jpg

iForm Record: ID S296	
Photo Caption	Looking downstream
Photo (Landscape)	 Picture Filename: field_15398285866338ef9bf3f6b.jpg

iForm Record: ID S296	
Photo Caption	RL to RR
Photo (Landscape)	 Picture Filename: field_532899716338efa36889b.jpg

iForm Record: ID S296

Photo (Landscape)	 Picture Filename: field_12424013856338efaa8b60e.jpg
Photo Comment	First two baskets - right large trichoptera, left small trichoptera, bottom case forming trichoptera (bright green, removed from cases) with several mayflies and a plecopteran

iForm Record: ID S296	
Photo (Landscape)	 Picture Filename: field_5748376436338efb277881.jpg
Photo Comment	Total inverts at end of day. After 8 baskets. Top left trichoptera with casing (TC), top right large trichoptera (TB), bottom left small trichoptera (TS), middle plecoptera, bottom right ephemeroptera.

Benthic Data	
iForm Record: ID S296	
Basket Location	Latitude:56.102882, Longitude:-120.231003, Altitude:392.182224, Speed:11.324138, Horizontal Accuracy:4.049040, Vertical Accuracy:6.569921, Time:09/29/2022 16:57:07 PDT
Basket Location UTM	10 672212 6220985

Benthic Data	
iForm Record: ID S68	
Basket Depth (m)	2.3
Removal Date	2022-09-29
Removal Time	09:35:00

Ecofish Research:	RNQA-20053

iForm Record: ID 299	
Form Field ID	2208.2610.0211
Project	1200-25 - Site C Mon 8/9
Existing Waterbody or New Waterbody	Existing Waterbody
Existing Waterbody	Peace River (PCR)
Existing Waypoint or New Site	New
New Site Location	Latitude:56.222980, Longitude:-120.957178, Altitude:412.474393, Speed:0.005357, Horizontal Accuracy:4.328103, Vertical Accuracy:9.356317, Time:09/30/2022 10:01:52 PDT
New Site Location UTM	10 626662 6232774
New Site Name	PR2.81 -invert
Date and Time	2022-09-30 09:15:00
Data Recorder	UTW - Tess Ward
ERL Crew	NWY - Nicole Wolsey, UTW - Tess Ward
Additional Crew	
Air Temperature (Celcius)	11
Air Temperature Time	09:32:00
Weather Ceiling	Foggy
Weather Precipitation	Dry
Weather Recent Precipitation	None in 24 hours
Weather Wind	Light Air
Weather Comments	
Comment	Arrive at site Clean gear with liquinox. 6 buckets, 2 sieve trays, 2 brushes, 2 squirt bottles, 2 potters sieves. Plus clean tote lids as table space. Use boat hook to grab main line and nose in with engine running Follow to first basket closest to shore by hand pulling. Haul up, but keep submerged, place kick net under Plus downstream to catch loose inverts. Unhook first basket via carabiner, haul second basket to surface and repeat. Rock baskets can go in waiting tray. Process two baskets at a time. Processing - first brush off basket itself (exterior) into bucket with river water, then open basket and dump rocks into bucket, then complete brushing of basket. then hand clean every rock individually, placing wiped rocks in separate spent bucket. Rocks will go back into baskets and sealed with two zip ties. Bucket contents through stacked sieve tray - can use river water up from below to spread it out. Bucket and tray can have water added to rinse out through potters sieve. Also rinse out out kicknet trap - this can be gone through twice, including using stacked sieves. Use squirt bottles to dislodge contents into lighter tray. Periphyton masses from trays can be divided up and analzyzed in potters sieves. Do a coarse pick for visible inverts into white bottomed container with water. Then finish site by dividing by taxa last. Two baskets take 1.5 to 2 hr to process. Carabiners all left on baskets. Empty vials weigh 3.9g. Taxa division for this site, with masses Trichoptera big PR2.81-TB - 6.3g Trichoptera small PR2.81-TS- 6.6g Trichoptera from casings PR2.81-TC - 1.9g Miscellaneous PR2.81-M -0.8g (ephemeroptera, plecoptera, chironomids) More mayflies here. Also larger in size. Found in the upper baskets more. More small caddisflies than big. No medium size plecoptera, only 3 small P found. Tiny chironomids also found. P=plecoptera T=trichoptera E=ephemoroptera B=big (greater than 1.5cm for T, greater then 4cm for P) S=small (less than 1.5cm, over 1cm) (give or take T=tiny (less than 1cm) C=casings (trichoptera from casings-different species than main trichoptera) M=miscellaneous A, B and C are replicates Rock sizes: Mix of large and small rocks in baskets-more large. Little to medium periphyton. Low to nil amount of roots and debris. Detritus and logs stuck on rope line, making collection longer and more difficult. Less cobble here, more vegetative and silty shoreline/bottom. Note for baskets 5 and 6 : huge log caught in anchor, took some time to detangle. Then rope caught around anchor, took some time to detangle. Then rope caught around rock baskets, took some time to detangle, didn't have the ability to use the nets to catch extras. Few bugs in this sample. Baskets 7 and 8 were also tangled around the line and had more time suspended in the current while trying to detangle without the net. Not a lot of inverts found all day. No large plecoptera, more small trichoptera than large. More mayflies than other sites.

Photos	
iForm Record: ID S299	
Photo Caption	Looking upstream
Photo (Landscape)	 Picture Filename: field_139966216338efbd4e7c1.jpg

iForm Record: ID S299	
Photo Caption	Looking downstream
Photo (Landscape)	 Picture Filename: field_15980888806338efc67f1d9.jpg

iForm Record: ID S299	
Photo Caption	RR to RL
Photo (Landscape)	 Picture Filename: field_12111066066338efd279ebf.jpg

iForm Record: ID S299	
Photo (Landscape)	 Picture Filename: field_10308484736338efda2b053.jpg
Photo Comment	First two baskets - top right small trichoptera, top left trichoptera with casings, bottom left large trichoptera, bottom right ephemeroptera. Not as much as other sites.

iForm Record: ID S299	
Photo (Landscape)	 Picture Filename: field_14201504206338efe23c750.jpg
Photo Comment	Total inverts at end of day. After 8 baskets. Top left trichoptera with casing (TC), top right small trichoptera (TS), bottom left large trichoptera (TB), bottom right ephemeroptera and plecoptera

iForm Record: ID S299

Photo (Landscape)	 Picture Filename: field_20266508146338efed4b06a.jpg
Photo Comment	Grab from the first 2 baskets

Benthic Data	
iForm Record: ID S299	
Basket Location	Latitude:56.223167, Longitude:-120.957509, Altitude:413.287149, Speed:2.692066, Horizontal Accuracy:5.692351, Vertical Accuracy:13.201870, Time:09/30/2022 16:31:54 PDT
Basket Location UTM	10 626640 6232794

Benthic Data	
iForm Record: ID S71	
Basket Depth (m)	2.7
Removal Date	2022-09-30
Removal Time	09:35:00

Ecofish Research:	RNQA-20053

iForm Record: ID 302	
Form Field ID	2208.2610.0211
Project	1200-25 - Site C Mon 8/9
Existing Waterbody or New Waterbody	Existing Waterbody
Existing Waterbody	Peace River (PCR)
Existing Waypoint or New Site	New
New Site Location	Latitude:56.309927, Longitude:-119.184708, Altitude:358.791652, Speed:0.017736, Horizontal Accuracy:3.146753, Vertical Accuracy:10.726316, Time:10/01/2022 08:48:35 PDT
New Site Location UTM	11 364850 6242719
New Site Name	PD5-invert
Date and Time	2022-10-01 08:50:00
Data Recorder	UTW - Tess Ward
ERL Crew	NWY - Nicole Wolsey, UTW - Tess Ward
Additional Crew	
Air Temperature (Celcius)	11
Air Temperature Time	08:50:00
Weather Ceiling	Foggy
Weather Precipitation	Dry
Weather Recent Precipitation	None in 24 hours
Weather Wind	Light Air
Weather Comments	Foggy morning clearing to overcast and clouds. No delay
Comment	Arrive at site Clean gear with liquinox. 6 buckets, 2 sieve trays, 2 brushes, 2 squirt bottles, 2 potters sieves. Plus clean tote lids as table space. Use boat hook to grab main line and nose in with engine running Follow to first basket closest to shore by hand pulling. Haul up, but keep submerged, place kick net under Plus downstream to catch loose inverts. Unhook first basket via carabiner, haul second basket to surface and repeat. Rock baskets can go in waiting tray. Process two baskets at a time. Processing - first brush off basket itself (exterior) into bucket with river water, then open basket and dump rocks into bucket, then complete brushing of basket. then hand clean every rock individually, placing wiped rocks in separate spent bucket. Rocks will go back into baskets and sealed with two zip ties. Bucket contents through stacked sieve tray - can use river water up from below to spread it out. Bucket and tray can have water added to rinse out through potters sieve. Also rinse out out kicknet trap - this can be gone through twice, including using stacked sieves. Use squirt bottles to dislodge contents into lighter tray. Periphyton masses from trays can be divided up and analzyzed in potters sieves. Do a coarse pick for visible inverts into white bottomed container with water. Then finish site by dividing by taxa last. Two baskets take 1.5 to 2 hr to process. Carabiners all left on baskets. Empty vials weigh 3.9g. Taxa division for this site, with masses Trichoptera big PD5-TB - 2.5g Trichoptera small PD5-TS-A - 3.4g PD5-TS-B - 3.0g Trichoptera from casings PD3-TC - 2.5g Ephemeroptera PD5-E- 2.2g Miscellaneous PD5 - M - 0.1g (1 plecoptera and 2 tiny midges) More mayflies here. Also larger in size. More small caddisflies than big. 1 plecoptera. P=plecoptera T=trichoptera E=ephemoroptera B=big (greater than 1.5cm for T, greater then 4cm for P) S=small (less than 1.5cm, over 1cm) (give or take T=tiny (less than 1cm) C=casings (trichoptera from casings-different species than main trichoptera) M=miscellaneous A, B and C are replicates Rock sizes: Mix of large and small rocks in baskets- more, large no periphyton. Little to nil roots and debris. Very Little muck and such stuck on rocks, little to sift through.

Photos	
iForm Record: ID S302	
Photo Caption	Looking upstream

Photo (Landscape)	 Picture Filename: field_12086814076338eff7470c1.jpg

iForm Record: ID S302	
Photo Caption	Looking downstream
Photo (Landscape)	 Picture Filename: field_17780708056338effe6e4fc.jpg

iForm Record: ID S302	
Photo Caption	RR to RL
Photo (Landscape)	 Picture Filename: field_1891621246338f0051a858.jpg

iForm Record: ID S302

Photo (Landscape)	 Picture Filename: field_2178041246338f00ebaabe.jpg
Photo Comment	First two baskets - left top large trichoptera, right top small trichoptera, bottom left case forming trichoptera, bottom right ephemeroptera

iForm Record: ID S302	
Photo (Landscape)	 Picture Filename: field_11502572116338f015ec8cf.jpg
Photo Comment	Total inverts at end of day. After 8 baskets. Top left small trichoptera (TS), top right large trichoptera (TB), bottom right trichoptera with casing (TC), bottom left ephemeroptera.

iForm Record: ID S302	
Photo Caption	RR to RL

Photo (Landscape)	 Picture Filename: field_9132011126338f021a3e8f.jpg
Photo Comment	Picture of rope location

Benthic Data	
iForm Record: ID S302	
Basket Location	Latitude:56.309924, Longitude:-119.184723, Altitude:357.906955, Speed:0.055703, Horizontal Accuracy:3.855917, Vertical Accuracy:12.360992, Time:10/01/2022 08:51:39 PDT
Basket Location UTM	11 364849 6242719

Benthic Data	
iForm Record: ID S74	
Basket Depth (m)	2.3
Removal Date	2022-10-01
Removal Time	09:15:00

Ecofish Research:	RNQA-20053

iForm Record: ID 287	
Form Field ID	2208.2610.0211
Project	1200-25 - Site C Mon 8/9
Existing Waterbody or New Waterbody	Existing Waterbody
Existing Waterbody	Peace River (PCR)
Existing Waypoint or New Site	New
New Site Location	Latitude:56.010531, Longitude:-121.939202, Altitude:456.231505, Speed:0.004653, Horizontal Accuracy:4.969795, Vertical Accuracy:9.715848, Time:09/26/2022 10:03:06 PDT
New Site Location UTM	10 566140 6207759
New Site Name	PR1-invert
Date and Time	2022-09-26 09:30:00
Data Recorder	PBP - Patrick Beaupre
ERL Crew	KDG - Kevin Ganshorn, PBP - Patrick Beaupre
Additional Crew	Gary mann
Air Temperature (Celcius)	12
Air Temperature Time	10:06:00
Weather Ceiling	Partly Cloudy
Weather Precipitation	Dry
Weather Recent Precipitation	None in 24 hours
Weather Wind	Light Air
Comment	Arrive at site Remove rope pin down cairn Use boat hook to grab main line Follow to first basket closest to shore by hand pulling. Haul up, but keep submerged, place kick net under Plus downstream to catch loose inverts. Unhook first basket via carabiner, haul second basket to surface and repeat. Rock baskets can go in waiting tray. Process two baskets at a time. Processing - first brush off basket itself (exterior) into bucket with river water, then open basket and dump rocks into bucket, then complete brushing of basket. then hand clean every rock individually, placing wiped rocks in separate spent bucket. Rocks will go back into baskets and sealed with two zip ties. Bucket contents through stacked sieve tray - can use river water up from below to spread it out. Bucket and tray can have water added to rinse out through potters sieve. Also rinse out out kicknet trap - this can be gone through twice, including using stacked sieves. Use squirt bottles to dislodge contents into lighter tray. Periphyton masses from trays can be divided up and analzyzed in potters sieves. Do a coarse pick for visible inverts into white bottomed container with water. Then finish site by dividing by taxa last. Each basket takes about 0.75 1 hr to process. Carabiners all left on baskets. Taxa division for this site Trichoptera-big (PR1 TB on vial) Trichoptera-small (PR1 TS) includes more than one species Miscellaneous (PR1 M) includes ephemeroptera, chironomids, hydracarina, oligochaetes, Gastropoda, other Diptera Masses PR1-TB 1.2 g PR1-TS 6.4 g PR1-M 0.6 g Rock sizes All rocks in baskets were large sizes (greater than 10- 15cm diameter)

Photos	
iForm Record: ID S287	
Photo Caption	Looking upstream

Photo (Landscape)	 Picture Filename: field_6315412866338f043962d8.jpg

iForm Record: ID S287	
Photo Caption	Looking downstream
Photo (Landscape)	 Picture Filename: field_9152717846338f04c9911a.jpg

iForm Record: ID S287	
Photo Caption	RR to RL
Photo (Landscape)	 Picture Filename: field_17903089196338f054c48da.jpg

iForm Record: ID S287

Photo (Landscape)	 Picture Filename: field_20236470986338f05d660a9.jpg
Photo Comment	Large bucket to hand scrub individual rocks, smaller bucket to collect spent rocks, then replace in rock baskets

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_10949219156338f0657c24f.jpg
Photo Comment	Rinsing periphyton through potter sieve

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_8285633236338f06dca540.jpg
Photo Comment	Note water from below

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_17888652546338f076d2ca2.jpg
Photo Comment	First brushing of basket

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_15106597336338f08222a85.jpg
Photo Comment	Stacked trays with water from below

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_8265681616338f08a3dd33.jpg
Photo Comment	Use of headlamp crucial. Picking dry,then wet seems to work well.

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_16233193576338f0919e0db.jpg
Photo Comment	Coarse pickings pre taxa division

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_14422617566338f099c909a.jpg
Photo Comment	Very important step. Main bucket through stacked sieves

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_8391844856338f0a25970e.jpg
Photo Comment	Homogenizing and spreading out bucket contents

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_13885539926338f0a98015f.jpg
Photo Comment	8 baskets worth of inverts (almost entirely trichoptera)

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_7074640646338f0b19ef30.jpg
Photo Comment	Taxa 1 - trichoptera-big

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_18070854636338f0b9a008c.jpg
Photo Comment	Taxa 2 - trichoptera-small Note more than one species

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_9311338746338f0c161327.jpg
Photo Comment	Samples, broken down into three taxa

Benthic Data	
iForm Record: ID S287	
Basket Location	Latitude:56.010576, Longitude:-121.939227, Altitude:457.262675, Speed:0.039837, Horizontal Accuracy:5.941677, Vertical Accuracy:10.606409, Time:09/26/2022 10:41:04 PDT
Basket Location UTM	10 566139 6207764

Benthic Data	
iForm Record: ID S77	
Basket Depth (m)	2.3
Removal Date	2022-09-26
Removal Time	09:45:00

Ecofish Research:	RNQA-20053

iForm Record: ID 290	
Form Field ID	2208.2610.0211
Project	1200-25 - Site C Mon 8/9
Existing Waterbody or New Waterbody	Existing Waterbody
Existing Waterbody	Peace River (PCR)
Existing Waypoint or New Site	New
New Site Location	Latitude:56.202855, Longitude:-121.469783, Altitude:431.633529, Speed:0.084477, Horizontal Accuracy:7.816558, Vertical Accuracy:11.647305, Time:09/27/2022 09:50:17 PDT
New Site Location UTM	10 594931 6229711
New Site Name	PR2-invert
Date and Time	2022-09-27 09:45:00
Data Recorder	PBP - Patrick Beaupre
ERL Crew	KDG - Kevin Ganshorn, PBP - Patrick Beaupre, UTW - Tess Ward
Additional Crew	Gary mann
Air Temperature (Celcius)	10
Air Temperature Time	09:52:00
Weather Ceiling	Foggy
Weather Precipitation	Dry
Weather Recent Precipitation	None in 24 hours
Weather Wind	Light Air
Weather Comments	Very low visibility at arrival, gradually clearing up
Comment	Arrive at site Clean gear with liquinox. 6 buckets, 2 sieve trays, 2 brushes, 2 squirt bottles, 2 potters sieves. Plus clean tote lids as table space. Use boat hook to grab main line and nose in with engine running Follow to first basket closest to shore by hand pulling. Haul up, but keep submerged, place kick net under Plus downstream to catch loose inverts. Unhook first basket via carabiner, haul second basket to surface and repeat. Rock baskets can go in waiting tray. Process two baskets at a time. Processing - first brush off basket itself (exterior) into bucket with river water, then open basket and dump rocks into bucket, then complete brushing of basket. then hand clean every rock individually, placing wiped rocks in separate spent bucket. Rocks will go back into baskets and sealed with two zip ties. Bucket contents through stacked sieve tray - can use river water up from below to spread it out. Bucket and tray can have water added to rinse out through potters sieve. Also rinse out out kicknet trap - this can be gone through twice, including using stacked sieves. Use squirt bottles to dislodge contents into lighter tray. Periphyton masses from trays can be divided up and analzyzed in potters sieves. Do a coarse pick for visible inverts into white bottomed container with water. Then finish site by dividing by taxa last. Two baskets take 1.5 to 2 hr to process. Carabiners all left on baskets. Taxa division for this site, with masses Plecoptera PR2-P 3.9g Trichoptera big PR2-TB -5.5g (greater than 1.5cm, all were the tree belly species for this site) Trichoptera small PR2-TS-A -5.3g Trichoptera small PR2-TS-B - 5.5g Trichoptera tiny PR2-TT-A - 5.9g Trichoptera tiny PR2-TT-B - 6.0g Miscellaneous PR2-M 0.1g Miscellaneous (PR1 M) includes ephemeroptera, oligochaetes P=plecoptera T=trichoptera E=ephemoroptera B=big (greater than 1.5cm) S=small (less than 1.5cm, over 1cm) (give or take T=tiny (less than 1cm) M=miscellaneous A and B are replicates Rock sizes Mix of large and small rocks in baskets Small amount of periphyton and debris

Photos

iForm Record: ID S290	
Photo Caption	Looking upstream

Photo (Landscape)	 Picture Filename: field_16099939826338ef07b32a6.jpg

iForm Record: ID S290	
Photo Caption	Looking downstream
Photo (Landscape)	 Picture Filename: field_10619348516338ef0fcdf37.jpg

iForm Record: ID S290	
Photo Caption	RL to RR
Photo (Landscape)	 Picture Filename: field_10342503376338ef168989c.jpg

iForm Record: ID S290

Photo (Landscape)	 Picture Filename: field_10776277596338ef21ea958.jpg
Photo Comment	Dry picking after first sieving.

iForm Record: ID S290	
Photo (Landscape)	 Picture Filename: field_8697780706338ef2a8b884.jpg
Photo Comment	Plecoptera

iForm Record: ID S290	
Photo (Landscape)	 Picture Filename: field_9695455036338ef342a44f.jpg
Photo Comment	Baskets in buckets

iForm Record: ID S290

Photo (Landscape)	 Picture Filename: field_17454421106338ef3af1144.jpg
Photo Comment	Clipping zip ties from one side of rock basket to open it in cleaning bucket

iForm Record: ID S290	
Photo (Landscape)	 Picture Filename: field_4533840486338ef421b785.jpg
Photo Comment	Large trichoptera. Greater than 1.5 cm

iForm Record: ID S290	
Photo (Landscape)	 Picture Filename: field_7728400306338ef4883326.jpg
Photo Comment	Despite large number of trichoptera and plecoptera, very little Oligochates and Ephemeroptera found

iForm Record: ID S290	
Photo (Landscape)	 Picture Filename: field_15507960816338ef504c226.jpg
Photo Comment	Trichoptera small

iForm Record: ID S290	
Photo (Landscape)	 Picture Filename: field_10151683206338ef5b49d8d.jpg
Photo Comment	Trichoptera tiny

Benthic Data	
iForm Record: ID S290	
Basket Location	Latitude:56.202969, Longitude:-121.469598, Altitude:429.559814, Speed:0.010466, Horizontal Accuracy:4.915706, Vertical Accuracy:10.059930, Time:09/27/2022 10:35:45 PDT
Basket Location UTM	10 594943 6229724

Benthic Data	
iForm Record: ID S62	
Basket Depth (m)	2.4
Removal Date	2022-09-27
Removal Time	10:30:00

Ecofish Research:	RNQA-20053

iForm Record: ID 293	
Form Field ID	2208.2610.0211
Project	1200-25 - Site C Mon 8/9
Existing Waterbody or New Waterbody	Existing Waterbody
Existing Waterbody	Peace River (PCR)
Existing Waypoint or New Site	New
New Site Location	Latitude:56.161194, Longitude:-120.743319, Altitude:403.330516, Speed:0.016088, Horizontal Accuracy:3.835326, Vertical Accuracy:9.338025, Time:09/28/2022 09:08:02 PDT
New Site Location UTM	10 640144 6226313
New Site Name	PD1-invert
Date and Time	2022-09-28 07:45:00
Data Recorder	PBP - Patrick Beaupre
ERL Crew	PBP - Patrick Beaupre, UTW - Tess Ward
Additional Crew	
Air Temperature (Celcius)	13
Air Temperature Time	09:11:00
Weather Ceiling	Foggy
Weather Precipitation	Dry
Weather Recent Precipitation	None in 24 hours
Weather Wind	Light Air
Weather Comments	Very low visibility at arrival, gradually clearing up
Comment	Arrive at site Clean gear with liquinox. 6 buckets, 2 sieve trays, 2 brushes, 2 squirt bottles, 2 potters sieves. Plus clean tote lids as table space. Use boat hook to grab main line and nose in with engine running Follow to first basket closest to shore by hand pulling. Haul up, but keep submerged, place kick net under Plus downstream to catch loose inverts. Unhook first basket via carabiner, haul second basket to surface and repeat. Rock baskets can go in waiting tray. Process two baskets at a time. Processing - first brush off basket itself (exterior) into bucket with river water, then open basket and dump rocks into bucket, then complete brushing of basket. then hand clean every rock individually, placing wiped rocks in separate spent bucket. Rocks will go back into baskets and sealed with two zip ties. Bucket contents through stacked sieve tray - can use river water up from below to spread it out. Bucket and tray can have water added to rinse out through potters sieve. Also rinse out out kicknet trap - this can be gone through twice, including using stacked sieves. Use squirt bottles to dislodge contents into lighter tray. Periphyton masses from trays can be divided up and analzyzed in potters sieves. Do a coarse pick for visible inverts into white bottomed container with water. Then finish site by dividing by taxa last. Two baskets take 1.5 to 2 hr to process. Carabiners all left on baskets. Taxa division for this site, with masses Plecoptera big PD1-PB-A - 4.1g (greater then 4cm) Plecoptera big PD1-PB-B - 3.9g Plecoptera big PD1-PB-C - 3.9g Plecoptera small PD1-PS- 2.2g Most plecoptera found in the last / deepest rock baskets Trichoptera big PD1-TB - A - 7.2g (greater than 1.5cm, all were the tree belly species for this site) Trichoptera big PD1-TB - B - 7.1g Trichoptera big PD1-TB - C - 7.1g Trichoptera small PD1 TS-A - 7.1g Trichoptera small PD1-TS-B - 7.1g Trichoptera small PD1-TS-C - 7.2g Trichoptera from casings PD1-TC -7.4g Ephemeroptera PD1-E- 0.4g (34 tiny mayflies- difficult to catch because small and fragile) First couple rock baskets had the most trichoptera and the most detritus P=plecoptera T=trichoptera E=ephemoroptera B=big (greater than 1.5cm for T, greater then 4cm for P) S=small (less than 1.5cm, over 1cm) (give or take T=tiny (less than 1cm) C=casings (trichoptera from casings-different species than main trichoptera) M=miscellaneous A, B and C are replicates Rock sizes Mix of large and small rocks in baskets Small amount of periphyton. High amount of roots and debris. 2 sculpin caught on the first basket grab of the day!

Photos	
iForm Record: ID S293	
Photo Caption	Looking upstream

Photo (Landscape)	 Picture Filename: field_11673646316338ef68993c1.jpg

iForm Record: ID S293	
Photo Caption	Looking downstream
Photo (Landscape)	 Picture Filename: field_15088931796338ef701b438.jpg

iForm Record: ID S293	
Photo Caption	RL to RR
Photo (Landscape)	 Picture Filename: field_10687628006338ef78247b2.jpg

iForm Record: ID S293

Photo (Landscape)	 Picture Filename: field_16252471616338ef7f6a7cc.jpg
Photo Comment	First two baskets - bottom left large trichoptera, bottom right small trichoptera, top case forming trichoptera (bright green, removed from cases) with several mayflies and a plecopteran

iForm Record: ID S293	
Photo (Landscape)	 Picture Filename: field_14290151646338ef872e5cd.jpg
Photo Comment	Total inverts at end of day. After 8 baskets. Top left small trichoptera, top right large trichoptera, bottom miscellaneous (plecoptera, ephemeroptera and trichoptera from casings)

Benthic Data	
iForm Record: ID S293	
Basket Location	Latitude:56.161202, Longitude:-120.743313, Altitude:404.328067, Speed:0.070068, Horizontal Accuracy:4.189810, Vertical Accuracy:7.495021, Time:09/28/2022 09:52:58 PDT
Basket Location UTM	10 640144 6226314

Benthic Data	
iForm Record: ID S65	
Basket Depth (m)	2.7
Removal Date	2022-09-28
Removal Time	08:45:00

Ecofish Research:	RNQA-20053

iForm Record: ID 287	
Form Field ID	2208.2610.0211
Project	1200-25 - Site C Mon 8/9
Existing Waterbody or New Waterbody	Existing Waterbody
Existing Waterbody	Peace River (PCR)
Existing Waypoint or New Site	New
New Site Location	Latitude:56.010531, Longitude:-121.939202, Altitude:456.231505, Speed:0.004653, Horizontal Accuracy:4.969795, Vertical Accuracy:9.715848, Time:09/26/2022 10:03:06 PDT
New Site Location UTM	10 566140 6207759
New Site Name	PR1-invert
Date and Time	2022-09-26 09:30:00
Data Recorder	PBP - Patrick Beaupre
ERL Crew	KDG - Kevin Ganshorn, PBP - Patrick Beaupre
Additional Crew	Gary mann
Air Temperature (Celcius)	12
Air Temperature Time	10:06:00
Weather Ceiling	Partly Cloudy
Weather Precipitation	Dry
Weather Recent Precipitation	None in 24 hours
Weather Wind	Light Air
Comment	Arrive at site Remove rope pin down cairn Use boat hook to grab main line Follow to first basket closest to shore by hand pulling. Haul up, but keep submerged, place kick net under Plus downstream to catch loose inverts. Unhook first basket via carabiner, haul second basket to surface and repeat. Rock baskets can go in waiting tray. Process two baskets at a time. Processing - first brush off basket itself (exterior) into bucket with river water, then open basket and dump rocks into bucket, then complete brushing of basket. then hand clean every rock individually, placing wiped rocks in separate spent bucket. Rocks will go back into baskets and sealed with two zip ties. Bucket contents through stacked sieve tray - can use river water up from below to spread it out. Bucket and tray can have water added to rinse out through potters sieve. Also rinse out out kicknet trap - this can be gone through twice, including using stacked sieves. Use squirt bottles to dislodge contents into lighter tray. Periphyton masses from trays can be divided up and analzyzed in potters sieves. Do a coarse pick for visible inverts into white bottomed container with water. Then finish site by dividing by taxa last. Each basket takes about 0.75 1 hr to process. Carabiners all left on baskets. Taxa division for this site Trichoptera-big (PR1 TB on vial) Trichoptera-small (PR1 TS) includes more than one species Miscellaneous (PR1 M) includes ephemeroptera, chironomids, hydracarina, oligochaetes, Gastropoda, other Diptera Masses PR1-TB 1.2 g PR1-TS 6.4 g PR1-M 0.6 g Rock sizes All rocks in baskets were large sizes (greater than 10- 15cm diameter)

Photos	
iForm Record: ID S287	
Photo Caption	Looking upstream

Photo (Landscape)	 Picture Filename: field_6315412866338f043962d8.jpg

iForm Record: ID S287	
Photo Caption	Looking downstream
Photo (Landscape)	 Picture Filename: field_9152717846338f04c9911a.jpg

iForm Record: ID S287	
Photo Caption	RR to RL
Photo (Landscape)	 Picture Filename: field_17903089196338f054c48da.jpg

iForm Record: ID S287

Photo (Landscape)	 Picture Filename: field_20236470986338f05d660a9.jpg
Photo Comment	Large bucket to hand scrub individual rocks, smaller bucket to collect spent rocks, then replace in rock baskets

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_10949219156338f0657c24f.jpg
Photo Comment	Rinsing periphyton through potter sieve

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_8285633236338f06dca540.jpg
Photo Comment	Note water from below

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_17888652546338f076d2ca2.jpg
Photo Comment	First brushing of basket

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_15106597336338f08222a85.jpg
Photo Comment	Stacked trays with water from below

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_8265681616338f08a3dd33.jpg
Photo Comment	Use of headlamp crucial. Picking dry,then wet seems to work well.

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_16233193576338f0919e0db.jpg
Photo Comment	Coarse pickings pre taxa division

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_14422617566338f099c909a.jpg
Photo Comment	Very important step. Main bucket through stacked sieves

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_8391844856338f0a25970e.jpg
Photo Comment	Homogenizing and spreading out bucket contents

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_13885539926338f0a98015f.jpg
Photo Comment	8 baskets worth of inverts (almost entirely trichoptera)

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_7074640646338f0b19ef30.jpg
Photo Comment	Taxa 1 - trichoptera-big

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_18070854636338f0b9a008c.jpg
Photo Comment	Taxa 2 - trichoptera-small Note more than one species

iForm Record: ID S287	
Photo (Landscape)	 Picture Filename: field_9311338746338f0c161327.jpg
Photo Comment	Samples, broken down into three taxa

Benthic Data	
iForm Record: ID S287	
Basket Location	Latitude:56.010576, Longitude:-121.939227, Altitude:457.262675, Speed:0.039837, Horizontal Accuracy:5.941677, Vertical Accuracy:10.606409, Time:09/26/2022 10:41:04 PDT
Basket Location UTM	10 566139 6207764

Benthic Data	
iForm Record: ID S77	
Basket Depth (m)	2.3
Removal Date	2022-09-26
Removal Time	09:45:00

Ecofish Research:	RNQA-20053

iForm Record: ID 290	
Form Field ID	2208.2610.0211
Project	1200-25 - Site C Mon 8/9
Existing Waterbody or New Waterbody	Existing Waterbody
Existing Waterbody	Peace River (PCR)
Existing Waypoint or New Site	New
New Site Location	Latitude:56.202855, Longitude:-121.469783, Altitude:431.633529, Speed:0.084477, Horizontal Accuracy:7.816558, Vertical Accuracy:11.647305, Time:09/27/2022 09:50:17 PDT
New Site Location UTM	10 594931 6229711
New Site Name	PR2-invert
Date and Time	2022-09-27 09:45:00
Data Recorder	PBP - Patrick Beaupre
ERL Crew	KDG - Kevin Ganshorn, PBP - Patrick Beaupre, UTW - Tess Ward
Additional Crew	Gary mann
Air Temperature (Celcius)	10
Air Temperature Time	09:52:00
Weather Ceiling	Foggy
Weather Precipitation	Dry
Weather Recent Precipitation	None in 24 hours
Weather Wind	Light Air
Weather Comments	Very low visibility at arrival, gradually clearing up
Comment	Arrive at site Clean gear with liquinox. 6 buckets, 2 sieve trays, 2 brushes, 2 squirt bottles, 2 potters sieves. Plus clean tote lids as table space. Use boat hook to grab main line and nose in with engine running Follow to first basket closest to shore by hand pulling. Haul up, but keep submerged, place kick net under Plus downstream to catch loose inverts. Unhook first basket via carabiner, haul second basket to surface and repeat. Rock baskets can go in waiting tray. Process two baskets at a time. Processing - first brush off basket itself (exterior) into bucket with river water, then open basket and dump rocks into bucket, then complete brushing of basket. then hand clean every rock individually, placing wiped rocks in separate spent bucket. Rocks will go back into baskets and sealed with two zip ties. Bucket contents through stacked sieve tray - can use river water up from below to spread it out. Bucket and tray can have water added to rinse out through potters sieve. Also rinse out out kicknet trap - this can be gone through twice, including using stacked sieves. Use squirt bottles to dislodge contents into lighter tray. Periphyton masses from trays can be divided up and analzyzed in potters sieves. Do a coarse pick for visible inverts into white bottomed container with water. Then finish site by dividing by taxa last. Two baskets take 1.5 to 2 hr to process. Carabiners all left on baskets. Taxa division for this site, with masses Plecoptera PR2-P 3.9g Trichoptera big PR2-TB -5.5g (greater than 1.5cm, all were the tree belly species for this site) Trichoptera small PR2-TS-A -5.3g Trichoptera small PR2-TS-B - 5.5g Trichoptera tiny PR2-TT-A - 5.9g Trichoptera tiny PR2-TT-B - 6.0g Miscellaneous PR2-M 0.1g Miscellaneous (PR1 M) includes ephemeroptera, oligochaetes P=plecoptera T=trichoptera E=ephemoroptera B=big (greater than 1.5cm) S=small (less than 1.5cm, over 1cm) (give or take T=tiny (less than 1cm) M=miscellaneous A and B are replicates Rock sizes Mix of large and small rocks in baskets Small amount of periphyton and debris

Photos

iForm Record: ID S290	
Photo Caption	Looking upstream

Photo (Landscape)	 Picture Filename: field_16099939826338ef07b32a6.jpg

iForm Record: ID S290	
Photo Caption	Looking downstream
Photo (Landscape)	 Picture Filename: field_10619348516338ef0fcdf37.jpg

iForm Record: ID S290	
Photo Caption	RL to RR
Photo (Landscape)	 Picture Filename: field_10342503376338ef168989c.jpg

iForm Record: ID S290

Photo (Landscape)	 Picture Filename: field_10776277596338ef21ea958.jpg
Photo Comment	Dry picking after first sieving.

iForm Record: ID S290	
Photo (Landscape)	 Picture Filename: field_8697780706338ef2a8b884.jpg
Photo Comment	Plecoptera

iForm Record: ID S290	
Photo (Landscape)	 Picture Filename: field_9695455036338ef342a44f.jpg
Photo Comment	Baskets in buckets

iForm Record: ID S290

Photo (Landscape)	 Picture Filename: field_17454421106338ef3af1144.jpg
Photo Comment	Clipping zip ties from one side of rock basket to open it in cleaning bucket

iForm Record: ID S290	
Photo (Landscape)	 Picture Filename: field_4533840486338ef421b785.jpg
Photo Comment	Large trichoptera. Greater than 1.5 cm

iForm Record: ID S290	
Photo (Landscape)	 Picture Filename: field_7728400306338ef4883326.jpg
Photo Comment	Despite large number of trichoptera and plecoptera, very little Oligochates and Ephemeroptera found

iForm Record: ID S290	
Photo (Landscape)	 Picture Filename: field_15507960816338ef504c226.jpg
Photo Comment	Trichoptera small

iForm Record: ID S290	
Photo (Landscape)	 Picture Filename: field_10151683206338ef5b49d8d.jpg
Photo Comment	Trichoptera tiny

Benthic Data	
iForm Record: ID S290	
Basket Location	Latitude:56.202969, Longitude:-121.469598, Altitude:429.559814, Speed:0.010466, Horizontal Accuracy:4.915706, Vertical Accuracy:10.059930, Time:09/27/2022 10:35:45 PDT
Basket Location UTM	10 594943 6229724

Benthic Data	
iForm Record: ID S62	
Basket Depth (m)	2.4
Removal Date	2022-09-27
Removal Time	10:30:00

Ecofish Research:	RNQA-20053

iForm Record: ID 293	
Form Field ID	2208.2610.0211
Project	1200-25 - Site C Mon 8/9
Existing Waterbody or New Waterbody	Existing Waterbody
Existing Waterbody	Peace River (PCR)
Existing Waypoint or New Site	New
New Site Location	Latitude:56.161194, Longitude:-120.743319, Altitude:403.330516, Speed:0.016088, Horizontal Accuracy:3.835326, Vertical Accuracy:9.338025, Time:09/28/2022 09:08:02 PDT
New Site Location UTM	10 640144 6226313
New Site Name	PD1-invert
Date and Time	2022-09-28 07:45:00
Data Recorder	PBP - Patrick Beaupre
ERL Crew	PBP - Patrick Beaupre, UTW - Tess Ward
Additional Crew	
Air Temperature (Celcius)	13
Air Temperature Time	09:11:00
Weather Ceiling	Foggy
Weather Precipitation	Dry
Weather Recent Precipitation	None in 24 hours
Weather Wind	Light Air
Weather Comments	Very low visibility at arrival, gradually clearing up
Comment	Arrive at site Clean gear with liquinox. 6 buckets, 2 sieve trays, 2 brushes, 2 squirt bottles, 2 potters sieves. Plus clean tote lids as table space. Use boat hook to grab main line and nose in with engine running Follow to first basket closest to shore by hand pulling. Haul up, but keep submerged, place kick net under Plus downstream to catch loose inverts. Unhook first basket via carabiner, haul second basket to surface and repeat. Rock baskets can go in waiting tray. Process two baskets at a time. Processing - first brush off basket itself (exterior) into bucket with river water, then open basket and dump rocks into bucket, then complete brushing of basket. then hand clean every rock individually, placing wiped rocks in separate spent bucket. Rocks will go back into baskets and sealed with two zip ties. Bucket contents through stacked sieve tray - can use river water up from below to spread it out. Bucket and tray can have water added to rinse out through potters sieve. Also rinse out out kicknet trap - this can be gone through twice, including using stacked sieves. Use squirt bottles to dislodge contents into lighter tray. Periphyton masses from trays can be divided up and analzyzed in potters sieves. Do a coarse pick for visible inverts into white bottomed container with water. Then finish site by dividing by taxa last. Two baskets take 1.5 to 2 hr to process. Carabiners all left on baskets. Taxa division for this site, with masses Plecoptera big PD1-PB-A - 4.1g (greater then 4cm) Plecoptera big PD1-PB-B - 3.9g Plecoptera big PD1-PB-C - 3.9g Plecoptera small PD1-PS- 2.2g Most plecoptera found in the last / deepest rock baskets Trichoptera big PD1-TB - A - 7.2g (greater than 1.5cm, all were the tree belly species for this site) Trichoptera big PD1-TB - B - 7.1g Trichoptera big PD1-TB - C - 7.1g Trichoptera small PD1 TS-A - 7.1g Trichoptera small PD1-TS-B - 7.1g Trichoptera small PD1-TS-C - 7.2g Trichoptera from casings PD1-TC -7.4g Ephemeroptera PD1-E- 0.4g (34 tiny mayflies- difficult to catch because small and fragile) First couple rock baskets had the most trichoptera and the most detritus P=plecoptera T=trichoptera E=ephemoroptera B=big (greater than 1.5cm for T, greater then 4cm for P) S=small (less than 1.5cm, over 1cm) (give or take T=tiny (less than 1cm) C=casings (trichoptera from casings-different species than main trichoptera) M=miscellaneous A, B and C are replicates Rock sizes Mix of large and small rocks in baskets Small amount of periphyton. High amount of roots and debris. 2 sculpin caught on the first basket grab of the day!

Photos	
iForm Record: ID S293	
Photo Caption	Looking upstream

Photo (Landscape)	 Picture Filename: field_11673646316338ef68993c1.jpg

iForm Record: ID S293	
Photo Caption	Looking downstream
Photo (Landscape)	 Picture Filename: field_15088931796338ef701b438.jpg

iForm Record: ID S293	
Photo Caption	RL to RR
Photo (Landscape)	 Picture Filename: field_10687628006338ef78247b2.jpg

iForm Record: ID S293

Photo (Landscape)	 Picture Filename: field_16252471616338ef7f6a7cc.jpg
Photo Comment	First two baskets - bottom left large trichoptera, bottom right small trichoptera, top case forming trichoptera (bright green, removed from cases) with several mayflies and a plecopteran

iForm Record: ID S293	
Photo (Landscape)	 Picture Filename: field_14290151646338ef872e5cd.jpg
Photo Comment	Total inverts at end of day. After 8 baskets. Top left small trichoptera, top right large trichoptera, bottom miscellaneous (plecoptera, ephemeroptera and trichoptera from casings)

Benthic Data	
iForm Record: ID S293	
Basket Location	Latitude:56.161202, Longitude:-120.743313, Altitude:404.328067, Speed:0.070068, Horizontal Accuracy:4.189810, Vertical Accuracy:7.495021, Time:09/28/2022 09:52:58 PDT
Basket Location UTM	10 640144 6226314

Benthic Data	
iForm Record: ID S65	
Basket Depth (m)	2.7
Removal Date	2022-09-28
Removal Time	08:45:00

Ecofish Research:	RNQA-20053

iForm Record: ID 296	
Form Field ID	2208.2610.0211
Project	1200-25 - Site C Mon 8/9
Existing Waterbody or New Waterbody	Existing Waterbody
Existing Waterbody	Peace River (PCR)
Existing Waypoint or New Site	New
New Site Location	Latitude:56.101872, Longitude:-120.227573, Altitude:392.662348, Speed:0.002447, Horizontal Accuracy:4.571794, Vertical Accuracy:5.878679, Time:09/29/2022 09:28:36 PDT
New Site Location UTM	10 672430 6220882
New Site Name	PD3-invert
Date and Time	2022-09-29 09:00:00
Data Recorder	PBP - Patrick Beaupre
ERL Crew	PBP - Patrick Beaupre, UTW - Tess Ward
Additional Crew	
Air Temperature (Celcius)	11
Air Temperature Time	09:11:00
Weather Ceiling	Overcast
Weather Precipitation	Drizzle
Weather Recent Precipitation	None in 24 hours
Weather Wind	Light Air
Weather Comments	
Comment	Arrive at site Clean gear with liquinox. 6 buckets, 2 sieve trays, 2 brushes, 2 squirt bottles, 2 potters sieves. Plus clean tote lids as table space. Use boat hook to grab main line and nose in with engine running Follow to first basket closest to shore by hand pulling. Haul up, but keep submerged, place kick net under Plus downstream to catch loose inverts. Unhook first basket via carabiner, haul second basket to surface and repeat. Rock baskets can go in waiting tray. Process two baskets at a time. Processing - first brush off basket itself (exterior) into bucket with river water, then open basket and dump rocks into bucket, then complete brushing of basket. then hand clean every rock individually, placing wiped rocks in separate spent bucket. Rocks will go back into baskets and sealed with two zip ties. Bucket contents through stacked sieve tray - can use river water up from below to spread it out. Bucket and tray can have water added to rinse out through potters sieve. Also rinse out out kicknet trap - this can be gone through twice, including using stacked sieves. Use squirt bottles to dislodge contents into lighter tray. Periphyton masses from trays can be divided up and analzyzed in potters sieves. Do a coarse pick for visible inverts into white bottomed container with water. Then finish site by dividing by taxa last. Two baskets take 1.5 to 2 hr to process. Carabiners all left on baskets. Empty vials weigh 3.9g. Taxa division for this site, with masses Plecoptera big PD3-PB- 4.2g (greater than 4cm) Plecoptera small PD3-PS- 0.2g (2cm and smaller) Trichoptera big PD3-TB - 6.5g Trichoptera small PD3-TS- 6.4g Trichoptera from casings PD3-TC -A - 4.2g PD3-TC -B - 5.4g Ephemeroptera PD3-E- 1.0g More mayflies here. Also larger in size. Found in the upper baskets more. More small caddisflies than big. Largest amount of case trichoptera seen. Most of the large plecoptera came from the last/deepest baskets. No medium size plecoptera. P=plecoptera T=trichoptera E=ephemoroptera B=big (greater than 1.5cm for T, greater then 4cm for P) S=small (less than 1.5cm, over 1cm) (give or take T=tiny (less than 1cm) C=casings (trichoptera from casings-different species than main trichoptera) M=miscellaneous A, B and C are replicates Rock sizes: Mix of large and small rocks in baskets Little to no periphyton. Low amount of roots and debris, one basket grab (5 and 6) had lots of sticks and detritus. Detritus and logs stuck on rope line.

Photos	
iForm Record: ID S296	
Photo Caption	Looking upstream

Photo (Landscape)	 Picture Filename: field_7030323276338ef92d205a.jpg

iForm Record: ID S296	
Photo Caption	Looking downstream
Photo (Landscape)	 Picture Filename: field_15398285866338ef9bf3f6b.jpg

iForm Record: ID S296	
Photo Caption	RL to RR
Photo (Landscape)	 Picture Filename: field_532899716338efa36889b.jpg

iForm Record: ID S296

Photo (Landscape)	 Picture Filename: field_12424013856338efaa8b60e.jpg
Photo Comment	First two baskets - right large trichoptera, left small trichoptera, bottom case forming trichoptera (bright green, removed from cases) with several mayflies and a plecopteran

iForm Record: ID S296	
Photo (Landscape)	 Picture Filename: field_5748376436338efb277881.jpg
Photo Comment	Total inverts at end of day. After 8 baskets. Top left trichoptera with casing (TC), top right large trichoptera (TB), bottom left small trichoptera (TS), middle plecoptera, bottom right ephemeroptera.

Benthic Data	
iForm Record: ID S296	
Basket Location	Latitude:56.102882, Longitude:-120.231003, Altitude:392.182224, Speed:11.324138, Horizontal Accuracy:4.049040, Vertical Accuracy:6.569921, Time:09/29/2022 16:57:07 PDT
Basket Location UTM	10 672212 6220985

Benthic Data	
iForm Record: ID S68	
Basket Depth (m)	2.3
Removal Date	2022-09-29
Removal Time	09:35:00

Ecofish Research:	RNQA-20053

iForm Record: ID 299	
Form Field ID	2208.2610.0211
Project	1200-25 - Site C Mon 8/9
Existing Waterbody or New Waterbody	Existing Waterbody
Existing Waterbody	Peace River (PCR)
Existing Waypoint or New Site	New
New Site Location	Latitude:56.222980, Longitude:-120.957178, Altitude:412.474393, Speed:0.005357, Horizontal Accuracy:4.328103, Vertical Accuracy:9.356317, Time:09/30/2022 10:01:52 PDT
New Site Location UTM	10 626662 6232774
New Site Name	PR2.81 -invert
Date and Time	2022-09-30 09:15:00
Data Recorder	UTW - Tess Ward
ERL Crew	NWY - Nicole Wolsey, UTW - Tess Ward
Additional Crew	
Air Temperature (Celcius)	11
Air Temperature Time	09:32:00
Weather Ceiling	Foggy
Weather Precipitation	Dry
Weather Recent Precipitation	None in 24 hours
Weather Wind	Light Air
Weather Comments	
Comment	Arrive at site Clean gear with liquinox. 6 buckets, 2 sieve trays, 2 brushes, 2 squirt bottles, 2 potters sieves. Plus clean tote lids as table space. Use boat hook to grab main line and nose in with engine running Follow to first basket closest to shore by hand pulling. Haul up, but keep submerged, place kick net under Plus downstream to catch loose inverts. Unhook first basket via carabiner, haul second basket to surface and repeat. Rock baskets can go in waiting tray. Process two baskets at a time. Processing - first brush off basket itself (exterior) into bucket with river water, then open basket and dump rocks into bucket, then complete brushing of basket. then hand clean every rock individually, placing wiped rocks in separate spent bucket. Rocks will go back into baskets and sealed with two zip ties. Bucket contents through stacked sieve tray - can use river water up from below to spread it out. Bucket and tray can have water added to rinse out through potters sieve. Also rinse out out kicknet trap - this can be gone through twice, including using stacked sieves. Use squirt bottles to dislodge contents into lighter tray. Periphyton masses from trays can be divided up and analzyzed in potters sieves. Do a coarse pick for visible inverts into white bottomed container with water. Then finish site by dividing by taxa last. Two baskets take 1.5 to 2 hr to process. Carabiners all left on baskets. Empty vials weigh 3.9g. Taxa division for this site, with masses Trichoptera big PR2.81-TB - 6.3g Trichoptera small PR2.81-TS- 6.6g Trichoptera from casings PR2.81-TC - 1.9g Miscellaneous PR2.81-M -0.8g (ephemeroptera, plecoptera, chironomids) More mayflies here. Also larger in size. Found in the upper baskets more. More small caddisflies than big. No medium size plecoptera, only 3 small P found. Tiny chironomids also found. P=plecoptera T=trichoptera E=ephemoroptera B=big (greater than 1.5cm for T, greater then 4cm for P) S=small (less than 1.5cm, over 1cm) (give or take T=tiny (less than 1cm) C=casings (trichoptera from casings-different species than main trichoptera) M=miscellaneous A, B and C are replicates Rock sizes: Mix of large and small rocks in baskets-more large. Little to medium periphyton. Low to nil amount of roots and debris. Detritus and logs stuck on rope line, making collection longer and more difficult. Less cobble here, more vegetative and silty shoreline/bottom. Note for baskets 5 and 6 : huge log caught in anchor, took some time to detangle. Then rope caught around anchor, took some time to detangle. Then rope caught around rock baskets, took some time to detangle, didn't have the ability to use the nets to catch extras. Few bugs in this sample. Baskets 7 and 8 were also tangled around the line and had more time suspended in the current while trying to detangle without the net. Not a lot of inverts found all day. No large plecoptera, more small trichoptera than large. More mayflies than other sites.

Photos	
iForm Record: ID S299	
Photo Caption	Looking upstream
Photo (Landscape)	 Picture Filename: field_139966216338efbd4e7c1.jpg

iForm Record: ID S299	
Photo Caption	Looking downstream
Photo (Landscape)	 Picture Filename: field_15980888806338efc67f1d9.jpg

iForm Record: ID S299	
Photo Caption	RR to RL
Photo (Landscape)	 Picture Filename: field_12111066066338efd279ebf.jpg

iForm Record: ID S299	
Photo (Landscape)	 Picture Filename: field_10308484736338efda2b053.jpg
Photo Comment	First two baskets - top right small trichoptera, top left trichoptera with casings, bottom left large trichoptera, bottom right ephemeroptera. Not as much as other sites.

iForm Record: ID S299	
Photo (Landscape)	 Picture Filename: field_14201504206338efe23c750.jpg
Photo Comment	Total inverts at end of day. After 8 baskets. Top left trichoptera with casing (TC), top right small trichoptera (TS), bottom left large trichoptera (TB), bottom right ephemeroptera and plecoptera

iForm Record: ID S299

Photo (Landscape)	 Picture Filename: field_20266508146338efed4b06a.jpg
Photo Comment	Grab from the first 2 baskets

Benthic Data	
iForm Record: ID S299	
Basket Location	Latitude:56.223167, Longitude:-120.957509, Altitude:413.287149, Speed:2.692066, Horizontal Accuracy:5.692351, Vertical Accuracy:13.201870, Time:09/30/2022 16:31:54 PDT
Basket Location UTM	10 626640 6232794

Benthic Data	
iForm Record: ID S71	
Basket Depth (m)	2.7
Removal Date	2022-09-30
Removal Time	09:35:00

Ecofish Research:	RNQA-20053

iForm Record: ID 302	
Form Field ID	2208.2610.0211
Project	1200-25 - Site C Mon 8/9
Existing Waterbody or New Waterbody	Existing Waterbody
Existing Waterbody	Peace River (PCR)
Existing Waypoint or New Site	New
New Site Location	Latitude:56.309927, Longitude:-119.184708, Altitude:358.791652, Speed:0.017736, Horizontal Accuracy:3.146753, Vertical Accuracy:10.726316, Time:10/01/2022 08:48:35 PDT
New Site Location UTM	11 364850 6242719
New Site Name	PD5-invert
Date and Time	2022-10-01 08:50:00
Data Recorder	UTW - Tess Ward
ERL Crew	NWY - Nicole Wolsey, UTW - Tess Ward
Additional Crew	
Air Temperature (Celcius)	11
Air Temperature Time	08:50:00
Weather Ceiling	Foggy
Weather Precipitation	Dry
Weather Recent Precipitation	None in 24 hours
Weather Wind	Light Air
Weather Comments	Foggy morning clearing to overcast and clouds. No delay
Comment	Arrive at site Clean gear with liquinox. 6 buckets, 2 sieve trays, 2 brushes, 2 squirt bottles, 2 potters sieves. Plus clean tote lids as table space. Use boat hook to grab main line and nose in with engine running Follow to first basket closest to shore by hand pulling. Haul up, but keep submerged, place kick net under Plus downstream to catch loose inverts. Unhook first basket via carabiner, haul second basket to surface and repeat. Rock baskets can go in waiting tray. Process two baskets at a time. Processing - first brush off basket itself (exterior) into bucket with river water, then open basket and dump rocks into bucket, then complete brushing of basket. then hand clean every rock individually, placing wiped rocks in separate spent bucket. Rocks will go back into baskets and sealed with two zip ties. Bucket contents through stacked sieve tray - can use river water up from below to spread it out. Bucket and tray can have water added to rinse out through potters sieve. Also rinse out out kicknet trap - this can be gone through twice, including using stacked sieves. Use squirt bottles to dislodge contents into lighter tray. Periphyton masses from trays can be divided up and analzyzed in potters sieves. Do a coarse pick for visible inverts into white bottomed container with water. Then finish site by dividing by taxa last. Two baskets take 1.5 to 2 hr to process. Carabiners all left on baskets. Empty vials weigh 3.9g. Taxa division for this site, with masses Trichoptera big PD5-TB - 2.5g Trichoptera small PD5-TS-A - 3.4g PD5-TS-B - 3.0g Trichoptera from casings PD3-TC - 2.5g Ephemeroptera PD5-E- 2.2g Miscellaneous PD5 - M - 0.1g (1 plecoptera and 2 tiny midges) More mayflies here. Also larger in size. More small caddisflies than big. 1 plecoptera. P=plecoptera T=trichoptera E=ephemoroptera B=big (greater than 1.5cm for T, greater then 4cm for P) S=small (less than 1.5cm, over 1cm) (give or take T=tiny (less than 1cm) C=casings (trichoptera from casings-different species than main trichoptera) M=miscellaneous A, B and C are replicates Rock sizes: Mix of large and small rocks in baskets- more, large no periphyton. Little to nil roots and debris. Very Little muck and such stuck on rocks, little to sift through.

Photos	
iForm Record: ID S302	
Photo Caption	Looking upstream

Photo (Landscape)	 Picture Filename: field_12086814076338eff7470c1.jpg

iForm Record: ID S302	
Photo Caption	Looking downstream
Photo (Landscape)	 Picture Filename: field_17780708056338effe6e4fc.jpg

iForm Record: ID S302	
Photo Caption	RR to RL
Photo (Landscape)	 Picture Filename: field_1891621246338f0051a858.jpg

iForm Record: ID S302

Photo (Landscape)	 Picture Filename: field_2178041246338f00ebaabe.jpg
Photo Comment	First two baskets - left top large trichoptera, right top small trichoptera, bottom left case forming trichoptera, bottom right ephemeroptera

iForm Record: ID S302	
Photo (Landscape)	 Picture Filename: field_11502572116338f015ec8cf.jpg
Photo Comment	Total inverts at end of day. After 8 baskets. Top left small trichoptera (TS), top right large trichoptera (TB), bottom right trichoptera with casing (TC), bottom left ephemeroptera.

iForm Record: ID S302	
Photo Caption	RR to RL

Photo (Landscape)	 Picture Filename: field_9132011126338f021a3e8f.jpg
Photo Comment	Picture of rope location

Benthic Data	
iForm Record: ID S302	
Basket Location	Latitude:56.309924, Longitude:-119.184723, Altitude:357.906955, Speed:0.055703, Horizontal Accuracy:3.855917, Vertical Accuracy:12.360992, Time:10/01/2022 08:51:39 PDT
Basket Location UTM	11 364849 6242719

Benthic Data	
iForm Record: ID S74	
Basket Depth (m)	2.3
Removal Date	2022-10-01
Removal Time	09:15:00

APPENDIX B5: INVERTEBRATE TISSUE CHEMISTRY ALS REPORTS

CERTIFICATE OF ANALYSIS

Work Order	: **FJ2203485**	Page	: 1 of 7
Amendment	: **2**		
Client	: **Azimuth Consulting Group Inc.**	Laboratory	: ALS Environmental - Fort St. John
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John BC Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: BCH-22-01	Date Samples Received	: 16-Dec-2022 10:50
PO	: ----	Date Analysis Commenced	: 02-Mar-2023
C-O-C number	: ----	Issue Date	: 26-Sep-2023 16:29
Sampler	: Kevin Ganshorn		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 45		
No. of samples analysed	: 45		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Jayden Piattelli	Analyst	Metals, Burnaby, British Columbia
Kenson Lo		Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Ragini Saini	Lab Assistant	Metals, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
%	percent
µg/kg	micrograms per kilogram
µg/kg wwt	micrograms per kilogram wet weight
mg/kg	milligrams per kilogram
mg/kg wwt	milligrams per kilogram wet weight

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Accreditation

Accreditation	*Description*	*Laboratory*	*Address*
A	CALA ISO/IEC 17025:2017	VA ALS Environmental - Vancouver	8081 Lougheed Highway, Burnaby, BC

Applicable accreditations are indicated in the Method/Lab column as superscripts.

Workorder Comments

Amendment (11/07/2023): This report has been amended and re-released to allow the reporting of additional analytical data.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	PR1-TB	PR1-TS	PR1-M	PR2-P	PR2-TB
						Client sampling date / time	26-Sep-2022 00:00	26-Sep-2022 00:00	26-Sep-2022 00:00	27-Sep-2022 00:00	27-Sep-2022 00:00
							FJ2203485-001	FJ2203485-002	FJ2203485-003	FJ2203485-004	FJ2203485-005
							Result	Result	Result	Result	Result
Physical Tests											
Moisture	----	E144A/VA	A	2.0	%		----	----	90.5	----	----
Moisture	----	E144-H/VA	A	2.0	%		78.0	82.2	----	78.7	76.3
Metals											
Mercury	7439-97-6	E511A/VA	A	0.0010	mg/kg wwt		0.0163	0.0135	----	0.0050	0.0084
Mercury	7439-97-6	E512A/VA	A	0.0020	mg/kg wwt		----	----	<0.0037	----	----
Speciated Metals											
Methylmercury (as MeHg)	22967-92-6	E538A/VA	A	1.0	µg/kg wwt		12.7	3.0	3.2	2.8	7.3

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	PR2-TS-A	PR2-TS-B	PR2-TT-A	PR2-TT-B	PD1-PB-A
						Client sampling date / time	27-Sep-2022 00:00	27-Sep-2022 00:00	27-Sep-2022 00:00	27-Sep-2022 00:00	28-Sep-2022 00:00
							FJ2203485-006	FJ2203485-007	FJ2203485-008	FJ2203485-009	FJ2203485-010
							Result	Result	Result	Result	Result
Physical Tests											
Moisture	----	E144-H/VA	A	2.0	%		79.2	76.9	72.2	73.1	73.8
Metals											
Mercury	7439-97-6	E511A/VA	A	0.0010	mg/kg wwt		0.0069	0.0075	0.0084	0.0082	0.0062
Speciated Metals											
Methylmercury (as MeHg)	22967-92-6	E538A/VA	A	1.0	µg/kg wwt		6.3	6.1	5.5	4.4	2.4

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	PD1-PB-B	PD1-PB-C	PD1-PS	PD1-TB-A	PD1-TB-B
						Client sampling date / time	28-Sep-2022 00:00	28-Sep-2022 00:00	28-Sep-2022 00:00	28-Sep-2022 00:00	28-Sep-2022 00:00
							FJ2203485-011	FJ2203485-012	FJ2203485-013	FJ2203485-014	FJ2203485-015
							Result	Result	Result	Result	Result
Physical Tests											
Moisture	----	E144-H/VA	A	2.0	%		71.0	71.6	79.6	83.6	78.5
Metals											
Mercury	7439-97-6	E511A/VA	A	0.0010	mg/kg wwt		0.0064	0.0067	0.0053	0.0055	0.0073
Speciated Metals											
Methylmercury (as MeHg)	22967-92-6	E538A/VA	A	1.0	µg/kg wwt		2.7	2.5	2.5	4.4	4.4

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	PD1-TB-C	PD1-TS-A	PD1-TS-B	PD1-TS-C	PD1-TC-
						Client sampling date / time	28-Sep-2022 00:00	28-Sep-2022 00:00	28-Sep-2022 00:00	28-Sep-2022 00:00	28-Sep-2022 00:00
							FJ2203485-016	FJ2203485-017	FJ2203485-018	FJ2203485-019	FJ2203485-020
							Result	Result	Result	Result	Result
Physical Tests											
Moisture	----	E144-H/VA	A	2.0	%		80.6	73.3	76.7	70.7	72.9
Metals											
Mercury	7439-97-6	E511A/VA	A	0.0010	mg/kg wwt		0.0066	0.0078	0.0077	0.0104	0.0044
Speciated Metals											
Methylmercury (as MeHg)	22967-92-6	E538A/VA	A	1.0	µg/kg wwt		5.3	4.4	3.9	4.5	2.6

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	PD1-E	PD3-PB	PD3-TB	PD3-TS	PD3-TC-A
						Client sampling date / time	28-Sep-2022 00:00	29-Sep-2022 00:00	29-Sep-2022 00:00	29-Sep-2022 00:00	29-Sep-2022 00:00
							FJ2203485-021	FJ2203485-022	FJ2203485-023	FJ2203485-024	FJ2203485-025
							Result	Result	Result	Result	Result
Physical Tests											
Moisture	----	E144A/VA	A	2.0	%		87.7	----	----	----	----
Moisture	----	E144-H/VA	A	2.0	%		----	76.0	81.0	77.2	73.9
Metals											
Mercury	7439-97-6	E511A/VA	A	0.0010	mg/kg wwt		----	0.0049	0.0042	0.0050	0.0041
Mercury	7439-97-6	E512A/VA	A	0.0020	mg/kg wwt		0.0023	----	----	----	----
Speciated Metals											
Methylmercury (as MeHg)	22967-92-6	E538A/VA	A	1.0	µg/kg wwt		2.0	2.0	2.4	2.9	2.1

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	PD3-TC-B	PD3-E	PR3-TB	PR3-TS	PR3-TC
						Client sampling date / time	29-Sep-2022 00:00	29-Sep-2022 00:00	30-Sep-2022 00:00	30-Sep-2022 00:00	30-Sep-2022 00:00
							FJ2203485-026	FJ2203485-027	FJ2203485-028	FJ2203485-029	FJ2203485-030
							Result	Result	Result	Result	Result
Physical Tests											
Moisture	----	E144A/VA	A	2.0	%		----	80.8	----	----	----
Moisture	----	E144-H/VA	A	2.0	%		63.8	----	83.7	73.0	81.8
Metals											
Mercury	7439-97-6	E511A/VA	A	0.0010	mg/kg wwt		0.0059	----	0.0044	0.0072	0.0031
Mercury	7439-97-6	E512A/VA	A	0.0020	mg/kg wwt		----	0.0052	----	----	----
Speciated Metals											
Methylmercury (as MeHg)	22967-92-6	E538A/VA	A	1.0	µg/kg wwt		2.7	1.9	2.8	3.5	2.4

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	PR3-M	PD5-TB	PD5-TS-A	PD5-TS-B	PD5-TC
						Client sampling date / time	30-Sep-2022 00:00	01-Oct-2022 00:00	01-Oct-2022 00:00	01-Oct-2022 00:00	01-Oct-2022 00:00
							FJ2203485-031	FJ2203485-032	FJ2203485-033	FJ2203485-034	FJ2203485-035
							Result	Result	Result	Result	Result
Physical Tests											
Moisture	----	E144A/VA	A	2.0	%		86.9	----	----	----	----
Moisture	----	E144-H/VA	A	2.0	%		----	83.5	76.1	83.4	77.8
Metals											
Mercury	7439-97-6	E511A/VA	A	0.0010	mg/kg wwt		----	0.0033	0.0087	0.0050	0.0040
Mercury	7439-97-6	E512A/VA	A	0.0020	mg/kg wwt		0.0037	----	----	----	----
Speciated Metals											
Methylmercury (as MeHg)	22967-92-6	E538A/VA	A	1.0	µg/kg wwt		2.2	1.3	2.7	1.6	1.1

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID	PD5-E	PR1-Z	W1-Shallow-Z-A	W1-Shallow-Z-B	D1-Shallow-Z
						Client sampling date / time	01-Oct-2022 00:00	20-Aug-2022 00:00	16-Aug-2022 00:00	16-Aug-2022 00:00	21-Aug-2022 00:00
							FJ2203485-036	FJ2203485-037	FJ2203485-038	FJ2203485-039	FJ2203485-040
							Result	Result	Result	Result	Result
Physical Tests											
Moisture	----	E144A/VA	A	2.0	%		----	97.9	98.8	98.9	96.7
Moisture	----	E144-H/VA	A	2.0	%		84.3	----	----	----	----
Metals											
Mercury	7439-97-6	E512/VA	A	0.010	mg/kg		----	0.120	0.058	0.062	0.065
Mercury	7439-97-6	E511A/VA	A	0.0010	mg/kg wwt		0.0042	----	----	----	----
Speciated Metals											
Methylmercury (as MeHg)	22967-92-6	E538A/VA	A	1.0	µg/kg wwt		1.9	1.9	<1.0	<1.0	<1.0

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab		LOR	Unit	Client sample ID: W1-Shallow-Z	D1-Shallow-Z-A	D1-Shallow-Z-B	W1-Shallow-Z-A-DUP	D1-Shallow-Z-DUP
						Client sampling date / time: 19-Oct-2022 00:00	19-Oct-2022 00:00	19-Oct-2022 00:00	16-Aug-2022 00:00	21-Aug-2022 00:00
						FJ2203485-041	FJ2203485-042	FJ2203485-043	FJ2203485-044	FJ2203485-045
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144A/VA	A	2.0	%	97.4	98.7	----	99.1	94.4
Moisture	----	E144-H/VA	A	2.0	%	----	----	93.2	----	----
Metals										
Mercury	7439-97-6	E512/VA	A	0.010	mg/kg	0.049	0.060	----	0.063	0.099
Mercury	7439-97-6	E511A/VA	A	0.0010	mg/kg wwt	----	----	0.0015	----	----
Speciated Metals										
Methylmercury (as MeHg)	22967-92-6	E538/VA	A	5.0	µg/kg	----	----	----	----	25.4
Methylmercury (as MeHg)	22967-92-6	E538A/VA	A	1.0	µg/kg wwt	<1.0	<1.0	<1.0	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **FJ2203485**	Page	: 1 of 21
Amendment	: **2**		
Client	: **Azimuth Consulting Group Inc.**	Laboratory	: ALS Environmental - Fort St. John
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	: ----	Telephone	: 778-370-3279
Project	: BCH-22-01	Date Samples Received	: 16-Dec-2022 10:50
PO	: ----	Issue Date	: 26-Sep-2023 16:29
C-O-C number	: ----		
Sampler	: Kevin Ganshorn		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 45		
No. of samples analysed	: 45		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag D1-Shallow-Z-A	E512	19-Oct-2022	04-Apr-2023	365 days	168 days	✓	05-Apr-2023	365 days	168 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag W1-Shallow-Z	E512	19-Oct-2022	04-Apr-2023	365 days	168 days	✓	05-Apr-2023	365 days	168 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag D1-Shallow-Z	E512	21-Aug-2022	04-Apr-2023	365 days	227 days	✓	05-Apr-2023	365 days	227 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag PR1-Z	E512	20-Aug-2022	04-Apr-2023	365 days	228 days	✓	05-Apr-2023	365 days	228 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag W1-Shallow-Z-A	E512	16-Aug-2022	04-Apr-2023	365 days	232 days	✓	05-Apr-2023	365 days	232 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag W1-Shallow-Z-B	E512	16-Aug-2022	04-Apr-2023	365 days	232 days	✓	05-Apr-2023	365 days	232 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag D1-Shallow-Z-DUP	E512	21-Aug-2022	05-Jun-2023	365 days	289 days	✓	06-Jun-2023	365 days	289 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag										
W1-Shallow-Z-A-DUP	E512	16-Aug-2022	05-Jun-2023	365 days	294 days	✓	06-Jun-2023	365 days	294 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag										
PR3-M	E512A	30-Sep-2022	10-Apr-2023	365 days	193 days	✓	11-Apr-2023	365 days	193 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag										
PD3-E	E512A	29-Sep-2022	10-Apr-2023	365 days	194 days	✓	11-Apr-2023	365 days	194 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag										
PD1-E	E512A	28-Sep-2022	10-Apr-2023	365 days	195 days	✓	11-Apr-2023	365 days	195 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag										
PR1-M	E512A	26-Sep-2022	10-Apr-2023	365 days	197 days	✓	11-Apr-2023	365 days	197 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag										
D1-Shallow-Z-B	E511A	19-Oct-2022	04-Apr-2023	365 days	168 days	✓	05-Apr-2023	365 days	168 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag										
PD5-E	E511A	01-Oct-2022	04-Apr-2023	365 days	186 days	✓	05-Apr-2023	365 days	186 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag										
PD5-TB	E511A	01-Oct-2022	04-Apr-2023	365 days	186 days	✓	05-Apr-2023	365 days	186 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag										
PD5-TC	E511A	01-Oct-2022	04-Apr-2023	365 days	186 days	✓	05-Apr-2023	365 days	186 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PD5-TS-A	E511A	01-Oct-2022	04-Apr-2023	365 days	186 days	✓	05-Apr-2023	365 days	186 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PD5-TS-B	E511A	01-Oct-2022	04-Apr-2023	365 days	186 days	✓	05-Apr-2023	365 days	186 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PR3-TB	E511A	30-Sep-2022	04-Apr-2023	365 days	187 days	✓	05-Apr-2023	365 days	187 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PR3-TC	E511A	30-Sep-2022	04-Apr-2023	365 days	187 days	✓	05-Apr-2023	365 days	187 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PR3-TS	E511A	30-Sep-2022	04-Apr-2023	365 days	187 days	✓	05-Apr-2023	365 days	187 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PD3-PB	E511A	29-Sep-2022	04-Apr-2023	365 days	188 days	✓	05-Apr-2023	365 days	188 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PD3-TB	E511A	29-Sep-2022	04-Apr-2023	365 days	188 days	✓	05-Apr-2023	365 days	188 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PD3-TC-A	E511A	29-Sep-2022	04-Apr-2023	365 days	188 days	✓	05-Apr-2023	365 days	188 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PD3-TC-B	E511A	29-Sep-2022	04-Apr-2023	365 days	188 days	✓	05-Apr-2023	365 days	188 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PD3-TS	E511A	29-Sep-2022	04-Apr-2023	365 days	188 days	✓	05-Apr-2023	365 days	188 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PD1-PB-A	E511A	28-Sep-2022	04-Apr-2023	365 days	188 days	✓	05-Apr-2023	365 days	189 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PD1-PB-B	E511A	28-Sep-2022	04-Apr-2023	365 days	188 days	✓	05-Apr-2023	365 days	189 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PD1-PB-C	E511A	28-Sep-2022	04-Apr-2023	365 days	188 days	✓	05-Apr-2023	365 days	189 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PD1-PS	E511A	28-Sep-2022	04-Apr-2023	365 days	188 days	✓	05-Apr-2023	365 days	189 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PD1-TB-A	E511A	28-Sep-2022	04-Apr-2023	365 days	188 days	✓	05-Apr-2023	365 days	189 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PD1-TB-B	E511A	28-Sep-2022	04-Apr-2023	365 days	188 days	✓	05-Apr-2023	365 days	189 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PD1-TB-C	E511A	28-Sep-2022	04-Apr-2023	365 days	188 days	✓	05-Apr-2023	365 days	189 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PD1-TC-	E511A	28-Sep-2022	04-Apr-2023	365 days	188 days	✓	05-Apr-2023	365 days	189 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PD1-TS-A	E511A	28-Sep-2022	04-Apr-2023	365 days	188 days	✓	05-Apr-2023	365 days	189 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PD1-TS-B	E511A	28-Sep-2022	04-Apr-2023	365 days	188 days	✓	05-Apr-2023	365 days	189 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PD1-TS-C	E511A	28-Sep-2022	04-Apr-2023	365 days	188 days	✓	05-Apr-2023	365 days	189 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PR2-P	E511A	27-Sep-2022	04-Apr-2023	365 days	189 days	✓	05-Apr-2023	365 days	190 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PR2-TB	E511A	27-Sep-2022	04-Apr-2023	365 days	189 days	✓	05-Apr-2023	365 days	190 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PR2-TS-A	E511A	27-Sep-2022	04-Apr-2023	365 days	189 days	✓	05-Apr-2023	365 days	190 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PR2-TS-B	E511A	27-Sep-2022	04-Apr-2023	365 days	189 days	✓	05-Apr-2023	365 days	190 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PR2-TT-A	E511A	27-Sep-2022	04-Apr-2023	365 days	189 days	✓	05-Apr-2023	365 days	190 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PR2-TT-B	E511A	27-Sep-2022	04-Apr-2023	365 days	189 days	✓	05-Apr-2023	365 days	190 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PR1-TB	E511A	26-Sep-2022	04-Apr-2023	365 days	190 days	✓	05-Apr-2023	365 days	191 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag PR1-TS	E511A	26-Sep-2022	04-Apr-2023	365 days	190 days	✓	05-Apr-2023	365 days	191 days	✓
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag D1-Shallow-Z-A	E144A	19-Oct-2022	----	----	----		27-Mar-2023	----	159 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag W1-Shallow-Z	E144A	19-Oct-2022	----	----	----		27-Mar-2023	----	159 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag PR3-M	E144A	30-Sep-2022	----	----	----		06-Apr-2023	----	188 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag PD3-E	E144A	29-Sep-2022	----	----	----		06-Apr-2023	----	189 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag PD1-E	E144A	28-Sep-2022	----	----	----		06-Apr-2023	----	190 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag PR1-M	E144A	26-Sep-2022	----	----	----		06-Apr-2023	----	192 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag D1-Shallow-Z	E144A	21-Aug-2022	----	----	----		27-Mar-2023	----	218 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag PR1-Z	E144A	20-Aug-2022	----	----	----		27-Mar-2023	----	219 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag W1-Shallow-Z-A	E144A	16-Aug-2022	----	----	----		27-Mar-2023	----	223 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag W1-Shallow-Z-B	E144A	16-Aug-2022	----	----	----		27-Mar-2023	----	223 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag D1-Shallow-Z-DUP	E144A	21-Aug-2022	----	----	----		31-May-2023	----	283 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag W1-Shallow-Z-A-DUP	E144A	16-Aug-2022	----	----	----		31-May-2023	----	288 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag D1-Shallow-Z-B	E144-H	19-Oct-2022	----	----	----		04-Apr-2023	----	167 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PD5-E	E144-H	01-Oct-2022	----	----	----		04-Apr-2023	----	185 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PD5-TB	E144-H	01-Oct-2022	----	----	----		04-Apr-2023	----	185 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PD5-TC	E144-H	01-Oct-2022	----	----	----		04-Apr-2023	----	185 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PD5-TS-A	E144-H	01-Oct-2022	----	----	----		04-Apr-2023	----	185 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PD5-TS-B	E144-H	01-Oct-2022	----	----	----		04-Apr-2023	----	185 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PR3-TB	E144-H	30-Sep-2022	----	----	----		04-Apr-2023	----	186 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PR3-TC	E144-H	30-Sep-2022	----	----	----		04-Apr-2023	----	186 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PR3-TS	E144-H	30-Sep-2022	----	----	----		04-Apr-2023	----	186 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PD3-PB	E144-H	29-Sep-2022	----	----	----		04-Apr-2023	----	187 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PD3-TB	E144-H	29-Sep-2022	----	----	----		04-Apr-2023	----	187 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PD3-TC-A	E144-H	29-Sep-2022	----	----	----		04-Apr-2023	----	187 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PD3-TC-B	E144-H	29-Sep-2022	----	----	----		04-Apr-2023	----	187 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PD3-TS	E144-H	29-Sep-2022	----	----	----		04-Apr-2023	----	187 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PD1-PB-A	E144-H	28-Sep-2022	----	----	----		04-Apr-2023	----	188 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PD1-PB-B	E144-H	28-Sep-2022	----	----	----		04-Apr-2023	----	188 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PD1-PB-C	E144-H	28-Sep-2022	----	----	----		04-Apr-2023	----	188 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PD1-PS	E144-H	28-Sep-2022	----	----	----		04-Apr-2023	----	188 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PD1-TB-A	E144-H	28-Sep-2022	----	----	----		04-Apr-2023	----	188 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PD1-TB-B	E144-H	28-Sep-2022	----	----	----		04-Apr-2023	----	188 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PD1-TB-C	E144-H	28-Sep-2022	----	----	----		04-Apr-2023	----	188 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PD1-TC-	E144-H	28-Sep-2022	----	----	----		04-Apr-2023	----	188 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PD1-TS-A	E144-H	28-Sep-2022	----	----	----		04-Apr-2023	----	188 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PD1-TS-B	E144-H	28-Sep-2022	----	----	----		04-Apr-2023	----	188 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PD1-TS-C	E144-H	28-Sep-2022	----	----	----		04-Apr-2023	----	188 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PR2-P	E144-H	27-Sep-2022	----	----	----		04-Apr-2023	----	189 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PR2-TB	E144-H	27-Sep-2022	----	----	----		04-Apr-2023	----	189 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PR2-TS-A	E144-H	27-Sep-2022	----	----	----		04-Apr-2023	----	189 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PR2-TS-B	E144-H	27-Sep-2022	----	----	----		04-Apr-2023	----	189 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PR2-TT-A	E144-H	27-Sep-2022	----	----	----		04-Apr-2023	----	189 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PR2-TT-B	E144-H	27-Sep-2022	----	----	----		04-Apr-2023	----	189 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PR1-TB	E144-H	26-Sep-2022	----	----	----		04-Apr-2023	----	190 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag PR1-TS	E144-H	26-Sep-2022	----	----	----		04-Apr-2023	----	190 days	
Speciated Metals : Methylmercury in Biota by GCAFS (DRY units, Routine)										
LDPE bag D1-Shallow-Z-DUP	E538	21-Aug-2022	15-Jun-2023	365 days	299 days	✓	27-Jun-2023	365 days	12 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag D1-Shallow-Z-A	E538A	19-Oct-2022	03-Mar-2023	365 days	135 days	✓	03-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag D1-Shallow-Z-B	E538A	19-Oct-2022	03-Mar-2023	365 days	135 days	✓	03-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag W1-Shallow-Z	E538A	19-Oct-2022	03-Mar-2023	365 days	135 days	✓	03-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PD5-E	E538A	01-Oct-2022	03-Mar-2023	365 days	153 days	✓	03-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PD5-TB	E538A	01-Oct-2022	03-Mar-2023	365 days	153 days	✓	03-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PD5-TC	E538A	01-Oct-2022	03-Mar-2023	365 days	153 days	✓	03-Mar-2023	365 days	0 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PD5-TS-A	E538A	01-Oct-2022	03-Mar-2023	365 days	153 days	✓	03-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PD5-TS-B	E538A	01-Oct-2022	03-Mar-2023	365 days	153 days	✓	03-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PR3-M	E538A	30-Sep-2022	03-Mar-2023	365 days	154 days	✓	03-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PR3-TB	E538A	30-Sep-2022	03-Mar-2023	365 days	154 days	✓	03-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PR3-TC	E538A	30-Sep-2022	03-Mar-2023	365 days	154 days	✓	03-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PR3-TS	E538A	30-Sep-2022	03-Mar-2023	365 days	154 days	✓	03-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PD1-PB-A	E538A	28-Sep-2022	02-Mar-2023	365 days	155 days	✓	02-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PD1-PB-B	E538A	28-Sep-2022	02-Mar-2023	365 days	155 days	✓	02-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PD1-PB-C	E538A	28-Sep-2022	02-Mar-2023	365 days	155 days	✓	02-Mar-2023	365 days	0 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PD1-PS	E538A	28-Sep-2022	02-Mar-2023	365 days	155 days	✓	02-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PD1-TB-A	E538A	28-Sep-2022	02-Mar-2023	365 days	155 days	✓	02-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PD1-TB-B	E538A	28-Sep-2022	02-Mar-2023	365 days	155 days	✓	02-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PD1-TB-C	E538A	28-Sep-2022	02-Mar-2023	365 days	155 days	✓	02-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PD1-TC-	E538A	28-Sep-2022	02-Mar-2023	365 days	155 days	✓	02-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PD1-TS-A	E538A	28-Sep-2022	02-Mar-2023	365 days	155 days	✓	02-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PD1-TS-B	E538A	28-Sep-2022	02-Mar-2023	365 days	155 days	✓	02-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PD1-TS-C	E538A	28-Sep-2022	02-Mar-2023	365 days	155 days	✓	02-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PD3-E	E538A	29-Sep-2022	03-Mar-2023	365 days	155 days	✓	03-Mar-2023	365 days	0 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PD3-PB	E538A	29-Sep-2022	03-Mar-2023	365 days	155 days	✓	03-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PD3-TB	E538A	29-Sep-2022	03-Mar-2023	365 days	155 days	✓	03-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PD3-TC-A	E538A	29-Sep-2022	03-Mar-2023	365 days	155 days	✓	03-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PD3-TC-B	E538A	29-Sep-2022	03-Mar-2023	365 days	155 days	✓	03-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PD3-TS	E538A	29-Sep-2022	03-Mar-2023	365 days	155 days	✓	03-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PD1-E	E538A	28-Sep-2022	03-Mar-2023	365 days	156 days	✓	03-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PR2-P	E538A	27-Sep-2022	02-Mar-2023	365 days	156 days	✓	02-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PR2-TB	E538A	27-Sep-2022	02-Mar-2023	365 days	156 days	✓	02-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PR2-TS-A	E538A	27-Sep-2022	02-Mar-2023	365 days	156 days	✓	02-Mar-2023	365 days	0 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PR2-TS-B	E538A	27-Sep-2022	02-Mar-2023	365 days	156 days	✓	02-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PR2-TT-A	E538A	27-Sep-2022	02-Mar-2023	365 days	156 days	✓	02-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PR2-TT-B	E538A	27-Sep-2022	02-Mar-2023	365 days	156 days	✓	02-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PR1-M	E538A	26-Sep-2022	02-Mar-2023	365 days	157 days	✓	02-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PR1-TB	E538A	26-Sep-2022	02-Mar-2023	365 days	157 days	✓	02-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PR1-TS	E538A	26-Sep-2022	02-Mar-2023	365 days	157 days	✓	02-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag D1-Shallow-Z	E538A	21-Aug-2022	03-Mar-2023	365 days	194 days	✓	03-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag PR1-Z	E538A	20-Aug-2022	03-Mar-2023	365 days	195 days	✓	03-Mar-2023	365 days	0 days	✓
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag W1-Shallow-Z-A	E538A	16-Aug-2022	03-Mar-2023	365 days	199 days	✓	03-Mar-2023	365 days	0 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Speciated Metals : Methylmercury in Biota by GCAFS (WET units, Routine)										
LDPE bag										
W1-Shallow-Z-B	E538A	16-Aug-2022	03-Mar-2023	365 days	199 days	✓	03-Mar-2023	365 days	0 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Biota**

Evaluation: ✗ = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Mercury in Biota by CVAAS (WET units, Micro)	E511A	885923	0	33	0.0	5.0	✗
Methylmercury in Biota by GCAFS (DRY units, Routine)	E538	990528	0	5	0.0	5.0	✗
Methylmercury in Biota by GCAFS (WET units, Routine)	E538A	844863	0	43	0.0	5.0	✗
Moisture Content by Gravimetry (Micro)	E144-H	886396	0	33	0.0	5.0	✗
Laboratory Control Samples (LCS)							
Mercury in Biota by CVAAS (DRY units, Biopsy)	E512	971527	4	15	26.6	10.0	✓
Mercury in Biota by CVAAS (WET units, Biopsy)	E512A	891378	2	4	50.0	10.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	885923	4	33	12.1	10.0	✓
Methylmercury in Biota by GCAFS (DRY units, Routine)	E538	990528	2	5	40.0	10.0	✓
Methylmercury in Biota by GCAFS (WET units, Routine)	E538A	844866	6	43	13.9	10.0	✓
Moisture Content by Gravimetry (Biopsy)	E144A	963667	3	19	15.7	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	886396	2	33	6.0	5.0	✓
Method Blanks (MB)							
Mercury in Biota by CVAAS (DRY units, Biopsy)	E512	971527	2	15	13.3	5.0	✓
Mercury in Biota by CVAAS (WET units, Biopsy)	E512A	891378	1	4	25.0	5.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	885923	2	33	6.0	5.0	✓
Methylmercury in Biota by GCAFS (DRY units, Routine)	E538	990528	1	5	20.0	5.0	✓
Methylmercury in Biota by GCAFS (WET units, Routine)	E538A	844863	3	43	6.9	5.0	✓
Moisture Content by Gravimetry (Biopsy)	E144A	963667	3	19	15.7	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	886396	2	33	6.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Moisture Content by Gravimetry (Biopsy)	E144A ALS Environmental - Vancouver	Biota	Puget Sound Water Quality Authority/CCME PHC in Soil - Tier 1	This analysis is carried out gravimetrically by drying the sample at < 60 deg. C for a minimum of three days.
Moisture Content by Gravimetry (Micro)	E144-H ALS Environmental - Vancouver	Biota	Puget Sound Water Quality Authority/BC MOE Lab Manual	Moisture is measured gravimetrically by drying the sample at < 60°C for a minimum of 3 days to constant weight. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of soil, expressed as a percentage.
Mercury in Biota by CVAAS (WET units, Micro)	E511A ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.
Mercury in Biota by CVAAS (DRY units, Biopsy)	E512 ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.
Mercury in Biota by CVAAS (WET units, Biopsy)	E512A ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.
Methylmercury in Biota by GCAFS (DRY units, Routine)	E538 ALS Environmental - Vancouver	Biota	Liang et al. (1994)/EPA 1630 (mod)	This method follows the procedures published by Liang, Bloom and Horvat in Clinical Chemistry (Vol 40, No 4, 1994). Samples are homogenized and then digested in a methanolic potassium hydroxide solution. An aliquot of the digestate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic fluorescence spectroscopy. Results are reported "as MeHg".
Methylmercury in Biota by GCAFS (WET units, Routine)	E538A ALS Environmental - Vancouver	Biota	Liang et al. (1994) /EPA 1630 (mod)	This method follows the procedures published by Liang, Bloom and Horvat in Clinical Chemistry (Vol 40, No 4, 1994). Samples are homogenized and then digested in a methanolic potassium hydroxide solution. An aliquot of the digestate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic fluorescence spectroscopy. Results are reported "as MeHg".

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Metals and Mercury Biota Digestion (Micro)	EP472 ALS Environmental - Vancouver	Biota	EPA 200.3	This method, designed for small sample amounts, uses a heated strong acid digestion with HNO3, HCl, and H2O2 and is intended to provide a conservative estimate of bio-available metals.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Metals and Mercury Biota Digestion (Biopsy)	EP475 ALS Environmental - Vancouver	Biota	EPA 200.3/200.8 (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Methylmercury Biota Preparation	EP538 ALS Environmental - Vancouver	Biota	Liang et al. (1994)	This method follows the procedures published by Liang, Bloom and Horvat in Clinical Chemistry (Vol 40, No 4, 1994). Samples are homogenized and then digested in a methanolic potassium hydroxide solution.

QUALITY CONTROL REPORT

Work Order	: **FJ2203485**	Page	: 1 of 5
Amendment	: **2**		
Client	: Azimuth Consulting Group Inc.	Laboratory	: ALS Environmental - Fort St. John
Contact	: Ian McIvor	Account Manager	: Brent Mack
Address	: # 218 - 2902 West Broadway Vancouver BC Canada V6K 2G8	Address	: 11007 Alaska Road Fort St. John, British Columbia Canada V1J 6P3
Telephone	:	Telephone	: 778-370-3279
Project	: BCH-22-01	Date Samples Received	: 16-Dec-2022 10:50
PO	: ----	Date Analysis Commenced	: 02-Mar-2023
C-O-C number	: ----	Issue Date	: 26-Sep-2023 16:29
Sampler	: Kevin Ganshorn		
Site	: ----		
Quote number	: Q75925		
No. of samples received	: 45		
No. of samples analysed	: 45		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Jayden Piattelli	Analyst	Vancouver Metals, Burnaby, British Columbia
Kenson Lo		Vancouver Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Ragini Saini	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 877148)						
Moisture	----	E144A	2	%	<2.0	----
Physical Tests (QCLot: 886373)						
Moisture	----	E144-H	2	%	<2.0	----
Physical Tests (QCLot: 886396)						
Moisture	----	E144-H	2	%	<2.0	----
Physical Tests (QCLot: 888914)						
Moisture	----	E144A	2	%	<2.0	----
Physical Tests (QCLot: 963667)						
Moisture	----	E144A	2	%	<2.0	----
Metals (QCLot: 885888)						
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 885923)						
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 886375)						
Mercury	7439-97-6	E512	0.01	mg/kg	<0.010	----
Metals (QCLot: 891378)						
Mercury	7439-97-6	E512A	0.002	mg/kg wwt	<0.0020	----
Metals (QCLot: 971527)						
Mercury	7439-97-6	E512	0.01	mg/kg	<0.010	----
Speciated Metals (QCLot: 844863)						
Methylmercury (as MeHg)	22967-92-6	E538A	1	µg/kg wwt	<1.0	----
Speciated Metals (QCLot: 844865)						
Methylmercury (as MeHg)	22967-92-6	E538A	1	µg/kg wwt	<1.0	----
Speciated Metals (QCLot: 844866)						
Methylmercury (as MeHg)	22967-92-6	E538A	1	µg/kg wwt	<1.0	----
Speciated Metals (QCLot: 990528)						
Methylmercury (as MeHg)	22967-92-6	E538	5	µg/kg	<5.0	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 877148)									
Moisture	----	E144A	2	%	100 %	100	90.0	110	----
Physical Tests (QCLot: 886373)									
Moisture	----	E144-H	2	%	100 %	100	90.0	110	----
Physical Tests (QCLot: 886396)									
Moisture	----	E144-H	2	%	100 %	100	90.0	110	----
Physical Tests (QCLot: 888914)									
Moisture	----	E144A	2	%	100 %	100	90.0	110	----
Physical Tests (QCLot: 963667)									
Moisture	----	E144A	2	%	100 %	101	90.0	110	----
Metals (QCLot: 885888)									
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	0.02 mg/kg wwt	103	80.0	120	----
Metals (QCLot: 885923)									
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	0.02 mg/kg wwt	95.2	80.0	120	----
Metals (QCLot: 886375)									
Mercury	7439-97-6	E512	0.01	mg/kg	0.05 mg/kg	97.6	80.0	120	----
Metals (QCLot: 891378)									
Mercury	7439-97-6	E512A	0.002	mg/kg wwt	0.05 mg/kg wwt	105	80.0	120	----
Metals (QCLot: 971527)									
Mercury	7439-97-6	E512	0.01	mg/kg	0.05 mg/kg	104	80.0	120	----
Speciated Metals (QCLot: 844863)									
Methylmercury (as MeHg)	22967-92-6	E538A	1	µg/kg wwt	100 µg/kg wwt	111	70.0	130	----
Speciated Metals (QCLot: 844865)									
Methylmercury (as MeHg)	22967-92-6	E538A	1	µg/kg wwt	100 µg/kg wwt	102	70.0	130	----
Speciated Metals (QCLot: 844866)									
Methylmercury (as MeHg)	22967-92-6	E538A	1	µg/kg wwt	100 µg/kg wwt	91.5	70.0	130	----
Speciated Metals (QCLot: 990528)									
Methylmercury (as MeHg)	22967-92-6	E538	5	µg/kg	100 µg/kg	95.1	70.0	130	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 885888)									
	RM	Mercury	7439-97-6	E511A	0.281 mg/kg wwt	93.1	70.0	130	----
Metals (QCLot: 885923)									
	RM	Mercury	7439-97-6	E511A	0.281 mg/kg wwt	98.0	70.0	130	----
Metals (QCLot: 886375)									
	RM	Mercury	7439-97-6	E512	0.281 mg/kg	104	70.0	130	----
Metals (QCLot: 891378)									
	RM	Mercury	7439-97-6	E512A	0.281 mg/kg wwt	102	70.0	130	----
Metals (QCLot: 971527)									
	RM	Mercury	7439-97-6	E512	0.281 mg/kg	102	70.0	130	----
Speciated Metals (QCLot: 844863)									
	RM	Methylmercury (as MeHg)	22967-92-6	E538A	340 µg/kg wwt	91.9	70.0	130	----
Speciated Metals (QCLot: 844865)									
	RM	Methylmercury (as MeHg)	22967-92-6	E538A	340 µg/kg wwt	78.3	70.0	130	----
Speciated Metals (QCLot: 844866)									
	RM	Methylmercury (as MeHg)	22967-92-6	E538A	340 µg/kg wwt	81.6	70.0	130	----
Speciated Metals (QCLot: 990528)									
	RM	Methylmercury (as MeHg)	22967-92-6	E538	340 µg/kg	81.0	70.0	130	----

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 14 -

Report To	
Company:	Azimuth Consulting Group Inc.
Contact:	Gary Mann
Address:	218 – 2902 West Broadway Vancouver, BC V6K 2G8
Phone:	604-730-1220 604-908-0601

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)

Quality Control (QC) Report with Report

☐ Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fa: gmann@azimuthgroup.ca

Email 2 imcivor@azimuthgroup.ca

Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)

- R ☑ Regular (Standard TAT if received by 3 pm - business days)
- P ☐ Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT
- E ☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT
- E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge

Specify Date Required for E2,E or P:

Invoice To	
Same as Report To	☑ YES ☐ NO
Copy of Invoice with Report	☑ YES ☐ NO
Company:	Azimuth Consulting Group Inc.
Contact:	Gary Mann

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fa: gmann@azimuthgroup.ca

Email 2 imcivor@azimuthgroup.ca

Project Information

ALS Quote #:	Q75925
Job #:	BCH-22-01
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)

Approver ID:	Cost Center:
GL Account:	Routing Code:
Activity Code:	
Location:	

ALS Lab Work Order # (lab use only)

ALS Contact: Brent Mack | Sampler: Kevin Ganshorn ECOFISH

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Mercury in Biota by CVAAS (WET units)	Methyl Mercury in Biota by GCAFS (WET u	Moisture content by gravimetry	Stable Isotope analysis (carbon and nitrogen) for SINLAB	Number of Containers
	See two CoC sheets: one for benthic inverts and one for zoops								

FJAE Shipping & Receiving
Call Out — Expedite — Priority
1 # of Coolers ✓ Air
# of Carboys — Ground

Fort St. John
Work Order Reference
FJ2203485
Telephone : +1 250 261 5517

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report (client Use)
Are samples taken from a Regulated DW System?	Sample info sent via email to Brent Mack in Excel file.
Are samples for human drinking water use?	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice packs Yes ☐ No ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES: -8.1° | FINAL COOLER TEMPERATURES °C

SHIPMENT RELEASE (client use)	INITIAL SHIPMENT RECEPTION (lab use only)	FINAL SHIPMENT RECEPTION (lab use only)
Released by: [signature] Date: Dec 16, 2022 Time:	Received by: [signature] Date: 12-16-22 Time: 9:50	Received by: Date: Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NA-FM-0326e v09 Front/04 January 2014

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 back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Site/Waypoin	Date	Sample ID	Wet Weight of IV (g)	ALS Instructions	ALS to SINLAB	SINLAB	Storage location	Comment
PR1-IV	2022-09-26	PR1-TB	1.2	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR1-IV	2022-09-26	PR1-TS	6.4	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR1-IV	2022-09-26	PR1-M	0.6	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2-IV	2022-09-27	PR2-P	3.9	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	all size classes combined
PR2-IV	2022-09-27	PR2-TB	5.5	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2-IV	2022-09-27	PR2-TS-A	5.3	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2-IV	2022-09-27	PR2-TS-B	5.5	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2-IV	2022-09-27	PR2-TT-A	5.9	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2-IV	2022-09-27	PR2-TT-B	6	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
~~PR2-IV~~	~~2022-09-27~~	~~PR2-M~~	~~0.1~~	~~IGNORE - too small~~		~~ALS to send to SINLAB~~	~~FSJ House Freezer~~	
PD1-IV	2022-09-28	PD1-PB-A	4.1	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-PB-B	3.9	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-PB-C	3.9	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-PS	2.2	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-TB-A	7.2	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-TB-B	7.1	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-TB-C	7.1	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-TS-A	7.1	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-TS-B	7.1	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-TS-C	7.2	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-TC	7.4	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-E	0.4	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	sample is made up of 34 tiny mayflies
PD3-IV	2022-09-29	PD3-PB	4.2	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
~~PD3-IV~~	~~2022-09-29~~	~~PD3-PS~~	~~0.5~~	~~IGNORE - too small~~			~~FSJ House Freezer~~	
PD3-IV	2022-09-29	PD3-TB	6.5	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD3-IV	2022-09-29	PD3-TS	6.4	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD3-IV	2022-09-29	PD3-TC-A	4.2	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD3-IV	2022-09-29	PD3-TC-B	5.4	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD3-IV	2022-09-29	PD3-E	1	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	all size classes combined
PR2.81-IV	2022-09-30	PR2.81-TB	6.3	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2.81-IV	2022-09-30	PR2.81-TS	6.6	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2.81 IV	2022-09-30	PR2.81-TC	1.9	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2.81-IV	2022-09-30	PR2.81-M	0.8	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD5-IV	2022-10-01	PD5-TB	2.5	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD5-IV	2022-10-01	PD5-TS-A	3.4	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD5-IV	2022-10-01	PD5-TS B	3	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD5-IV	2022-10-01	PD5-TC	2.5	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD5-IV	2022-10-01	PD5-E	2.2	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	all size classes combined
~~PD5-IV~~	~~2022-10-01~~	~~PD5-M~~	~~0.1~~	~~IGNORE - too small~~			~~FSJ House Freezer~~	~~entire sample is 1 plecoptera and 2 mm nymphs~~

Legend

Abbreviation	Meaning	Comments
P	Plecoptera	
T	Tricoptera	
E	Ephemeroptera	
O	Oligochaetes	
M	Miscellaneaous	includes taxa not specified in separate sample
PB	P Big	greater than 4cm
PS	P small	less than 4cm
TB	T Big	greater than 1.5cm
TS	T small	between 1.5cm and 1cm
TT	T Tiny	less than 1cm
TC	T Casings	T of a distinct species; smaller, green, and resides in casings
A, B, C	replicates	

SampleID	#Vials	Name on Container	Sample Date	Net Drop #	Wet Weight of Zooplankton (g)	ALS Instructions	ALS to SINLAB	SINLAB	Comment
PR1-Z	1	PR1-WQ	2022-08-20	1	4.6	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	everything is in 1 jar
W1-Shallow-Z-A	2	W1-Shallow-A x 2	2022-08-16	1	~30	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	Replicate A for mercury/methylmercury; jar and vial
W1-Shallow-Z-B	2	W1-Shallow-B x 2	2022-08-16	1	~30	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	Replicate B for mercury/methylmercury; jar and vial
D1-Shallow-Z	2	D1-Shallow x 2	2022-08-21	2,3	5.8	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	most of sample is in amber jar, some in a small vial
W1-Shallow-Z	1	W1-Shallow	2022-10-19	n/a	4.5	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	no dup
D1-Shallow-Z-A	1	D1-Shallow-A	2022-10-19	n/a	2.9	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	Replicate A is ~70% zoops and 30% algae
D1-Shallow-Z-B	1	D1-Shallow-B	2022-10-19	n/a	9.7	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	Replicate B is ~20% zoops and 80% algae

2 vials; chlorophytes in samples that could not be separated from the zoops in the sieve stack; Replicate

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 14 -

Page 1 of 3

Report To		Report Format / Distribution		Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)
Company:	Azimuth Consulting Group Inc.	Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)		R ☑ Regular (Standard TAT if received by 3 pm - business days)
Contact:	Gary Mann	Quality Control (QC) Report with Report		P ☐ Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT
Address:	218 – 2902 West Broadway	☐ Criteria on Report - provide details below if box checked		E ☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT
	Vancouver, BC V6K 2G8	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX		E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge
Phone:	604-730-1220	Email 1 or Fa: gmann@azimuthgroup.ca		Specify Date Required for E2,E or P:
	604-908-0601	Email 2 jmcivor@azimuthgroup.ca		**Analysis Request**
Invoice To	Same as Report To ☑ YES ☐ NO	**Invoice Distribution**		Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
	Copy of Invoice with Report ☑ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX		
Company:	Azimuth Consulting Group Inc.	Email 1 or Fa: gmann@azimuthgroup.ca		
Contact:	Gary Mann	Email 2 jmcivor@azimuthgroup.ca		
Project Information		**Oil and Gas Required Fields (client use)**		
ALS Quote #:	Q75925	Approver ID:	Cost Center:	
Job #:	BCH-22-01	GL Account:	Routing Code:	
PO / AFE:		Activity Code:		
LSD:		Location:		
ALS Lab Work Order # (lab use only):		**ALS Contact:** Brent Mack	**Sampler:** Kevin Ganshorn, ECOFISH	

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Mercury in Biota by CVAAS (WET units)	Methyl Mercury in Biota by GCAFS (WET u	Moisture content by gravimetry	Stable Isotope analysis (carbon and nitrogen) for SINLAB	Number of Containers
	See two CoC sheets: one for benthic inverts and one for zoops								

FJAE Shipping & Receiving
— Call Out — Expedite
1 — Priority
— # of Coolers ✓ Air
— # of Carboys — Ground

Fort St. John
Work Order Reference
FJ2203485

Telephone : +1 250 261 5517

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report (client Use)
Are samples taken from a Regulated DW System?	Sample info sent via email to Brent Mack in Excel file.
Are samples for human drinking water use?	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐		SIF Observations Yes ☐ No ☐	
Ice packs Yes ☐ No ☐		Custody seal intact Yes ☐ No ☐	
Cooling Initiated ☐			
INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C	
-8.1		9°C (ave 6)	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: Dec 16, 2022	Time:	Received by:	Date: 12-16-22	Time: 9:50	Received by: DEC 17 2022		Time: 1210pm

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION — WHITE - LABORATORY COPY — YELLOW - CLIENT COPY — NA-FM-0308e v09 Front/04 January 2014

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 back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form

Site/Waypoint	Date	Sample ID	Wet Weight of IV (g)	ALS Instructions	ALS to SINLAB	SINLAB	Storage location	Comment
PR1 IV	2022-09-26	PR1-TB	1.2	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR1-IV	2022-09-26	PR1-TS	6.4	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR1-IV	2022-09-26	PR1-M	0.6	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2-IV	2022-09-27	PR2-P	3.9	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	all size classes combined
PR2-IV	2022-09-27	PR2-TB	5.5	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2-IV	2022-09-27	PR2-TS-A	5.3	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2-IV	2022-09-27	PR2-TS-B	5.5	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2-IV	2022-09-27	PR2-TT-A	5.9	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2-IV	2022-09-27	PR2-TT-B	6	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2-IV	2022-09-27	PR2-M	0.4	IGNORE - too small		ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-PB-A	4.1	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-PB-B	3.9	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1 IV	2022-09-28	PD1-PB-C	3.9	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-PS	2.2	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-TB-A	7.2	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-TB-B	7.1	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-TB-C	7.1	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1 TS-A	7.1	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-TS-B	7.1	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-TS-C	7.2	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-TC	7.4	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-E	0.4	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	sample is made up of 34 tiny mayflies
PD3-IV	2022-09-29	PD3-PB	4.2	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD3-IV	2022-09-29	PD3-PS	0.7	IGNORE - too small			FSJ House Freezer	
PD3-IV	2022-09-29	PD3-TB	6.5	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD3-IV	2022-09-29	PD3-TS	6.4	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD3-IV	2022-09-29	PD3-TC-A	4.2	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD3-IV	2022-09-29	PD3-TC-B	5.4	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD3-IV	2022-09-29	PD3-E	1	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	all size classes combined
PR2.81 IV	2022-09-30	PR2.81-TB	6.3	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2.81-IV	2022-09-30	PR2.81-TS	6.6	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2.81-IV	2022-09-30	PR2.81-TC	1.9	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2.81-IV	2022 09-30	PR2.81-M	0.8	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD5-IV	2022-10-01	PD5-TB	2.5	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD5-IV	2022-10-01	PD5-TS-A	3.4	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD5 IV	2022-10-01	PD5-TS-B	3	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD5-IV	2022-10-01	PD5-TC	2.5	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD5-IV	2022-10-01	PD5-E	2.2	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	all size classes combined
PD5-IV	2022-10-01	PD5-M	0.1	IGNORE - too small			FSJ House Freezer	entire sample is 1 plecoptera and 2 tiny mayfly

Legend

Abbreviation	Meaning	Comments
P	Plecoptera	
T	Tricoptera	
E	Ephemeroptera	
O	Oligochaetes	
M	Miscellaneaous	includes taxa not specified in separate sample
PB	P Big	greater than 4cm
PS	P small	less than 4cm
TB	T Big	greater than 1.5cm
TS	T small	between 1.5cm and 1cm
TT	T Tiny	less than 1cm
TC	T Casings	T of a distinct species; smaller, green, and resides in casings
A, B, C	replicates	

SampleID	#Vials	Name on Container	Sample Date	Net Drop #	Wet Weight of Zooplankton (g)	ALS Instructions	ALS to SINLAB	SINLAB	Comment
PR1-Z	1	PR1-WQ	2022-08-20	1	4.6	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	everything is in 1 jar
W1-Shallow-Z-A	2	W1-Shallow-A x 2	2022-08-16	1	~30	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	Replicate A for mercury/methylmercury; jar and vial
W1-Shallow-Z-B	2	W1-Shallow B x 2	2022-08-16	1	~30	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	Replicate B for mercury/methylmercury; jar and vial
D1-Shallow-Z	2	D1-Shallow x 2	2022-08-21	2,3	5.8	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	most of sample is in amber jar, some in a small vial
W1-Shallow-Z	1	W1-Shallow	2022-10-19	n/a	4.5	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	no dup
D1-Shallow-Z-A	1	D1-Shallow-A	2022-10-19	n/a	2.9	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	Replicate A is ~70% zoops and 30% algae
D1-Shallow-Z-B	1	D1-Shallow-B	2022-10-19	n/a	9.7	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	Replicate B is ~20% zoops and 80% algae

2 vials; chlorophytes in samples that could not be separated from the zoops in the sieve stack; Replicate

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 14 -

Page 1 of 3

Report To		Report Format / Distribution	Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)
Company:	Azimuth Consulting Group Inc.	Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	R ☑ Regular (Standard TAT if received by 3 pm - business days)
Contact:	Gary Mann	Quality Control (QC) Report with Report	P ☐ Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT
Address:	218 – 2902 West Broadway Vancouver, BC V6K 2G8	☐ Criteria on Report - provide details below if box checked	E ☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT
Phone:	604-730-1220 604-908-0601	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge
		Email 1 or Fa: gmann@azimuthgroup.ca	Specify Date Required for E2,E or P:
Invoice To	Same as Report To ☑ YES ☐ NO	Email 2 jmcivor@azimuthgroup.ca	**Analysis Request**
	Copy of Invoice with Report ☑ YES ☐ NO	**Invoice Distribution**	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:	Azimuth Consulting Group Inc.	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	
Contact:	Gary Mann	Email 1 or Fa: gmann@azimuthgroup.ca	
Project Information		Email 2 jmcivor@azimuthgroup.ca	
ALS Quote #:	Q75925	**Oil and Gas Required Fields (client use)**	
Job #:	BCH-22-01	Approver ID: Cost Center:	
PO / AFE:		GL Account: Routing Code:	
LSD:		Activity Code:	
		Location:	
ALS Lab Work Order # (lab use only)		**ALS Contact:** Brent Mack **Sampler:** Kevin Ganshorn ECOFISH	

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Mercury in Biota by CVAAS (WET units)	Methyl Mercury in Biota by GCAFS (WET u	Moisture content by gravimetry	Stable Isotope analysis (carbon and nitrogen) for SINLAB	Number of Containers
	See two CoC sheets: one for benthic inverts and one for zoops								

FJAE Shipping & Receiving
— Call Out — Expedite
— Priority
— # of Coolers ✓ Air
— # of Carboys — Ground

Fort St. John
Work Order Reference
FJ2203485

Telephone : +1 250 261 5517

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report (client Use)
Are samples taken from a Regulated DW System?	Sample info sent via email to Brent Mack in Excel file.
Are samples for human drinking water use?	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice packs Yes ☑ No ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: Dec 16/2022	Time:	Received by:	Date: 12-16-22	Time: 9:50	Received by: DEC 17 2022	Date:	Time: 1210pm

INITIAL COOLER TEMPERATURES °C: -8.1 | FINAL COOLER TEMPERATURES °C: 9.2 (ave 6)

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION — WHITE - LABORATORY COPY — YELLOW - CLIENT COPY

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW)** System, please submit using an **Authorized DW COC form**

Site/Waypoin	Date	Sample ID	Wet Weight of IV (g)	ALS Instructions	ALS to SINLAB	SINLAB	Storage location	Comment
PR1-IV	2022-09-26	PR1 TB	1.2	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR1-IV	2022-09-26	PR1-TS	6.4	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR1-IV	2022-09-26	PR1-M	0.6	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2-IV	2022-09-27	PR2-P	3.9	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	all size classes combined
PR2-IV	2022-09-27	PR2-TB	5.5	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2-IV	2022-09-27	PR2-TS-A	5.3	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2-IV	2022-09-27	PR2-TS-B	5.5	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2-IV	2022-09-27	PR2-TT-A	5.9	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2-IV	2022-09-27	PR2-TT-B	6	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2-IV	2022-09-27	PR2-M	0.4	IGNORE - too small			FSJ House Freezer	
PD1-IV	2022-09-28	PD1-PB-A	4.1	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-PB-B	3.9	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-PB-C	3.9	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-PS	2.2	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-TB-A	7.2	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-TB-B	7.1	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-TB-C	7.1	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-TS-A	7.1	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-TS-B	7.1	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-TS-C	7.2	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-TC	7.4	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD1-IV	2022-09-28	PD1-E	0.4	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	sample is made up of 34 tiny mayflies
PD3-IV	2022-09-29	PD3-PB	4.2	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD3-IV	2022-09-29	PD3-PS	0.2	IGNORE - too small			FSJ House Freezer	
PD3-IV	2022-09-29	PD3-TB	6.5	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD3-IV	2022-09-29	PD3-TS	6.4	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD3-IV	2022-09-29	PD3-TC-A	4.2	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD3-IV	2022-09-29	PD3-TC-B	5.4	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD3-IV	2022-09-29	PD3-E	1	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	all size classes combined
PR2.81-IV	2022-09-30	PR2.81-TB	6.3	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2.81-IV	2022-09-30	PR2.81-TS	6.6	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2.81-IV	2022-09-30	PR2.81-TC	1.9	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PR2.81-IV	2022-09-30	PR2.81-M	0.8	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD5-IV	2022-10-01	PD5-TB	2.5	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD5-IV	2022-10-01	PD5-TS-A	3.4	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD5-IV	2022-10-01	PD5-TS-B	3	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD5-IV	2022-10-01	PD5-TC	2.5	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	
PD5-IV	2022 10-01	PD5-E	2.2	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	FSJ House Freezer	all size classes combined
PD5-IV	2022-10-01	PD5-M	0.4	IGNORE - too small			FSJ House Freezer	cattle sample is 4 plecoptera and 2 tiny midges

Legend

Abbreviation	Meaning	Comments
P	Plecoptera	
T	Tricoptera	
E	Ephemeroptera	
O	Oligochaetes	
M	Miscellaneaous	includes taxa not specified in separate sample
PB	P Big	greater than 4cm
PS	P small	less than 4cm
TB	T Big	greater than 1.5cm
TS	T small	between 1.5cm and 1cm
TT	T Tiny	less than 1cm
TC	T Casings	T of a distinct species; smaller, green, and resides in casings
A, B, C	replicates	

SampleID	#Vials	Name on Container	Sample Date	Net Drop #	Wet Weight of Zooplankton (g)	ALS Instructions	ALS to SINLAB	SINLAB	Comment
PR1-Z	1	PR1-WQ	2022-08-20	1	4.6	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	everything is in 1 jar
W1-Shallow-Z-A	2	W1-Shallow-A x 2	2022-08-16	1	~30	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	Replicate A for mercury/methylmercury; jar and vial
W1-Shallow-Z-B	2	W1-Shallow-B x 2	2022-08-16	1	~30	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	Replicate B for mercury/methylmercury; jar and vial
D1-Shallow-Z	2	D1-Shallow x 2	2022-08-21	2,3	5.8	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	most of sample is in amber jar, some in a small vial
W1-Shallow-Z	1	W1-Shallow	2022-10-19	n/a	4.5	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	no dup
D1-Shallow-Z-A	1	D1-Shallow-A	2022-10-19	n/a	2.9	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	Replicate A is ~70% zoops and 30% algae
D1-Shallow-Z-B	1	D1-Shallow-B	2022-10-19	n/a	9.7	MeHg>SIA>THg	dry/grind > 2 mg dw for SIA	ALS to send to SINLAB	Replicate B is ~20% zoops and 80% algae

2 vials; chlorophytes in samples that could not be separated from the zoops in the sieve stack; Replicate

APPENDIX B6: INVERTEBRATE TISSUE SIA SINLAB REPORTS

CLIENT ID	SINLAB ID	Date	Row	Amount	CO2 Area	N2 Area	d13C	d15N	%C	%N	C/N	Comment	Preparation	Notes
PR1-TB	23AZ 034	10-Aug-23	36	1.202	3.00	2.3	-34.2	6.5	49.9	8.9	5.6		DELTA V-NC2500	
PR1-TS	23AZ 035	10-Aug-23	37	1.184	2.98	2.1	-34.3	6.7	50.2	8.3	6.0		DELTA V-NC2500	
PR2-P	23AZ 036	10-Aug-23	38	1.209	2.75	2.1	-29.3	4.3	45.0	7.9	5.7		DELTA V-NC2500	
PR2-TB	23AZ 037	10-Aug-23	39	0.998	2.64	1.9	-32.1	6.8	52.7	8.7	6.1		DELTA V-NC2500	
PR2-TS-A	23AZ 038	10-Aug-23	40	1.097	2.91	2.1	-32.5	6.3	52.8	8.9	5.9		DELTA V-NC2500	
PR2-TS-B	23AZ 039	10-Aug-23	41	0.983	2.80	1.6	-32.7	6.1	56.8	7.6	7.4		DELTA V-NC2500	
PR2-TT-A	23AZ 040	10-Aug-23	42	1.244	2.46	2.0	-31.6	7.0	39.3	7.6	5.2		DELTA V-NC2500	
PR2-TT-B	23AZ 041	10-Aug-23	43	1.025	2.31	1.8	-29.3	3.2	44.5	8.1	5.5		DELTA V-NC2500	
PD1-PB-A	23AZ 042	10-Aug-23	44	1.171	3.51	2.1	-32.5	7.0	60.3	8.3	7.3		DELTA V-NC2500	
PD1-PB-B	23AZ 043	10-Aug-23	45	1.098	2.48	2.1	-28.8	2.4	44.8	9.0	5.0		DELTA V-NC2500	
PD1-PB-C	23AZ 044	10-Aug-23	46	1.074	2.21	1.9	-28.9	2.5	40.6	8.1	5.0		DELTA V-NC2500	
PD1-PS	23AZ 045R	10-Aug-23	53	1.057	2.21	2.2	-28.2	3.7	41.2	9.7	4.3		DELTA V-NC2500	
PD1-PS	23AZ 045R	10-Aug-23	71	1.106	2.37	2.5	-28.5	4.0	42.7	10.5	4.1		DELTA V-NC2500	
PD1-TB-A	23AZ 046	10-Aug-23	54	1.113	2.47	2.0	-29.6	4.9	43.9	8.2	5.4		DELTA V-NC2500	
PD1-TB-B	23AZ 047	10-Aug-23	55	1.255	3.01	2.5	-29.0	5.2	48.2	9.3	5.2		DELTA V-NC2500	
PD1-TB-C	23AZ 048	10-Aug-23	56	1.004	2.26	2.0	-29.0	5.1	44.6	9.1	4.9		DELTA V-NC2500	
PD1-TS-A	23AZ 049	10-Aug-23	57	1.062	2.57	1.8	-30.5	4.6	48.2	7.9	6.1		DELTA V-NC2500	
PD1-TS-B	23AZ 050	10-Aug-23	58	1.118	2.76	1.9	-30.7	5.3	49.3	8.1	6.1		DELTA V-NC2500	
PD1-TS-C	23AZ 051	10-Aug-23	59	1.083	2.73	1.6	-31.4	4.3	50.4	6.9	7.3		DELTA V-NC2500	
PD1-TC	23AZ 052	10-Aug-23	60	1.203	3.00	1.1	-32.0	5.7	49.7	4.1	12.0		DELTA V-NC2500	
PD3-PB	23AZ 053	10-Aug-23	61	1.227	2.52	2.0	-28.6	2.3	41.0	7.4	5.5		DELTA V-NC2500	
PD3-TB	23AZ 054	10-Aug-23	62	1.115	2.69	2.0	-31.2	4.0	47.9	8.4	5.7		DELTA V-NC2500	
PD3-TS	23AZ 055	10-Aug-23	63	1.138	2.71	1.8	-31.8	4.6	47.5	7.2	6.6		DELTA V-NC2500	
PD3-TC-A	23AZ 056	10-Aug-23	64	1.094	3.08	1.6	-31.9	3.5	56.5	7.0	8.1		DELTA V-NC2500	
PD3-TC-B	23AZ 057	10-Aug-23	65	1.062	3.05	1.0	-33.0	3.1	57.5	4.3	13.3		DELTA V-NC2500	
PR2.81-TB	23AZ 058	10-Aug-23	66	1.221	2.86	2.3	-31.1	4.7	47.1	8.7	5.4		DELTA V-NC2500	
PR2.81-TS	23AZ 059	10-Aug-23	67	1.013	3.24	1.9	-32.3	3.9	64.4	8.7	7.4		DELTA V-NC2500	
PR2.81-TC	23AZ 060	10-Aug-23	68	1.102	2.93	1.6	-31.5	4.4	53.4	6.8	7.9		DELTA V-NC2500	
PD5-TB	23AZ 061	10-Aug-23	69	1.029	2.54	1.7	-32.1	2.7	49.3	7.6	6.5		DELTA V-NC2500	
PD5-TS-A	23AZ 062	10-Aug-23	70	1.076	2.66	1.3	-33.6	2.3	49.2	5.7	8.7		DELTA V-NC2500	
PD5-TS-B	23AZ 063R	10-Aug-23	76	1.024	2.33	1.7	-32.6	3.5	45.4	7.6	6.0		DELTA V-NC2500	
PD5-TS-B	23AZ 063R	10-Aug-23	86	0.973	2.12	1.5	-32.4	3.8	43.4	7.3	6.0		DELTA V-NC2500	
PD5-TC	23AZ 064	10-Aug-23	77	1.143	2.77	1.3	-32.5	2.4	48.5	5.2	9.4		DELTA V-NC2500	
PD5-E	23AZ 065	10-Aug-23	78	1.093	2.64	1.6	-30.6	3.3	48.3	6.7	7.2		DELTA V-NC2500	
PR1-Z	23AZ 066	10-Aug-23	79	1.045	1.90	1.3	-34.2	6.7	36.1	5.9	6.2		DELTA V-NC2500	
W1-Shallow-Z-A	23AZ 067	10-Aug-23	80	1.150	2.59	1.6	-36.5	5.8	44.9	6.7	6.7		DELTA V-NC2500	
W1-Shallow-Z-B	23AZ 068	10-Aug-23	81	1.240	2.84	2.0	-36.9	5.9	45.8	7.4	6.2		DELTA V-NC2500	
D1-Shallow-Z	23AZ 069	10-Aug-23	82	1.018	2.48	1.8	-37.0	9.2	48.6	8.1	6.0		DELTA V-NC2500	
W1-Shallow-Z	23AZ 070	10-Aug-23	83	1.080	2.47	1.6	-35.7	12.0	45.5	6.8	6.7		DELTA V-NC2500	
D1-Shallow-Z-A	23AZ 071	10-Aug-23	84	1.189	1.74	1.0	-35.6	11.2	29.0	3.9	7.5		DELTA V-NC2500	
D1-Shallow-Z-B	23AZ 072	10-Aug-23	85	1.016	0.98	0.6	-37.5	7.4	18.8	2.6	7.2		DELTA V-NC2500	
Hg-2022-3301	23AZ 073R	04-Aug-23	11	1.150	2.97	3.5	-29.0	9.1	44.3	12.8	3.5		DELTA V-NC2500	
Hg-2022-3301	23AZ 073R	04-Aug-23	27	1.132	2.90	3.5	-28.8	9.1	44.1	13.0	3.4		DELTA V-NC2500	
FSJ-18	23AZ 074	04-Aug-23	12	1.005	2.56	3.2	-27.9	7.3	43.7	13.4	3.3		DELTA V-NC2500	
FSJ-18DUP	23AZ 075	04-Aug-23	13	1.065	2.97	3.1	-29.1	7.5	48.0	12.2	3.9		DELTA V-NC2500	
Hg-2022-3302	23AZ 076	04-Aug-23	14	1.188	3.11	3.7	-30.2	10.5	45.2	13.1	3.4		DELTA V-NC2500	
Hg-2022-3311	23AZ 077	04-Aug-23	15	1.193	3.02	3.6	-27.1	7.2	43.7	12.8	3.4		DELTA V-NC2500	
Hg-2022-3312	23AZ 078													no sample
Hg-2022-3320	23AZ 079	04-Aug-23	16	1.218	3.19	3.8	-30.9	10.7	45.2	13.2	3.4		DELTA V-NC2500	
Hg-2022-3321	23AZ 080	04-Aug-23	17	1.123	2.93	3.5	-30.8	10.5	45.0	13.3	3.4		DELTA V-NC2500	
Hg-2022-3332	23AZ 081	04-Aug-23	18	1.151	2.83	3.5	-28.2	6.8	42.4	12.8	3.3		DELTA V-NC2500	
Hg-2022-3338	23AZ 082	04-Aug-23	19	1.185	2.99	3.5	-30.2	6.9	43.5	12.6	3.4		DELTA V-NC2500	
Hg-2022-3342	23AZ 083	04-Aug-23	20	1.042	2.67	3.3	-29.8	7.1	44.1	13.3	3.3		DELTA V-NC2500	
Hg-2022-3343	23AZ 084	04-Aug-23	21	1.121	2.89	3.2	-30.1	11.3	44.4	12.1	3.7		DELTA V-NC2500	
Hg-2022-3366	23AZ 085	04-Aug-23	22	1.022	2.63	3.2	-27.1	7.3	44.1	13.4	3.3		DELTA V-NC2500	
Hg-2022-3367	23AZ 086	04-Aug-23	23	1.154	2.92	3.6	-27.1	7.3	43.6	13.1	3.3		DELTA V-NC2500	
Hg-2022-3384	23AZ 087	04-Aug-23	24	1.098	2.82	3.3	-28.4	6.8	44.2	12.8	3.4		DELTA V-NC2500	
HH-641	23AZ 088	04-Aug-23	25	1.154	3.12	3.4	-28.9	8.7	46.8	12.5	3.7		DELTA V-NC2500	
HH_641Dup	23AZ 089	04-Aug-23	26	1.059	2.76	3.1	-28.8	9.3	44.8	12.4	3.6		DELTA V-NC2500	
HH-696	23AZ 090R	04-Aug-23	31	1.135	3.02	3.5	-28.1	7.8	45.9	13.0	3.5		DELTA V-NC2500	
HH-696	23AZ 090R	04-Aug-23	51	1.155	2.93	3.6	-27.9	7.5	43.7	13.1	3.3		DELTA V-NC2500	
HH-767	23AZ 091	04-Aug-23	32	1.182	3.13	3.6	-29.7	9.2	45.7	12.9	3.5		DELTA V-NC2500	
HH-767Dup	23AZ 092	04-Aug-23	33	1.085	2.93	3.4	-29.8	9.1	46.6	13.1	3.6		DELTA V-NC2500	
Hg-2022-3397	23AZ 093	04-Aug-23	34	1.058	2.74	3.0	-28.7	8.0	44.6	12.1	3.7		DELTA V-NC2500	
Hg-2022-3398	23AZ 094	04-Aug-23	35	1.155	3.24	3.2	-32.5	10.6	48.5	11.9	4.1		DELTA V-NC2500	
HH-797	23AZ 095	04-Aug-23	36	1.223	3.39	3.4	-31.9	10.3	48.0	11.6	4.1		DELTA V-NC2500	
HH-797Dup	23AZ 096	04-Aug-23	37	1.094	2.92	3.3	-31.0	10.4	46.0	12.7	3.6		DELTA V-NC2500	
Hg-2022-3400	23AZ 097	04-Aug-23	38	0.980	2.60	3.1	-30.8	11.6	45.4	13.2	3.4		DELTA V-NC2500	
HH-1037	23AZ 098	04-Aug-23	39	1.158	2.96	3.5	-26.9	8.2	44.0	12.9	3.4		DELTA V-NC2500	
HH-1037Dup	23AZ 099	04-Aug-23	40	1.183	2.94	3.6	-27.0	8.2	42.9	12.9	3.3		DELTA V-NC2500	
FSJ-1066	23AZ 100	04-Aug-23	41	1.058	3.06	2.6	-31.9	11.7	49.8	10.5	4.8		DELTA V-NC2500	
FSJ-1066Dup	23AZ 101	04-Aug-23	42	1.188	3.57	2.9	-32.3	12.0	52.1	10.5	5.0		DELTA V-NC2500	
Hg-2022-3412	23AZ 102	04-Aug-23	43	1.166	3.01	3.5	-28.6	7.0	44.5	12.5	3.5		DELTA V-NC2500	
Hg-2022-3411	23AZ 103	04-Aug-23	44	1.109	2.97	3.3	-29.0	8.0	46.2	12.6	3.7		DELTA V-NC2500	

Hg-2022-3418	23AZ 104	04-Aug-23	45	1.105	2.82	3.5	-26.1	10.9	44.1	13.2	3.3	DELTA V-NC2500
Hg-2022-3419	23AZ 105	04-Aug-23	46	1.149	3.06	3.5	-26.5	11.1	45.9	12.7	3.6	DELTA V-NC2500
Hg-2022-3420	23AZ 106	04-Aug-23	47	1.244	3.11	3.9	-25.6	11.2	43.3	13.5	3.2	DELTA V-NC2500
Hg-2022-3421	23AZ 107	04-Aug-23	48	1.014	2.59	3.3	-25.4	11.0	43.9	13.7	3.2	DELTA V-NC2500
Hg-2022-3425	23AZ 108	04-Aug-23	49	1.174	3.17	3.3	-29.0	9.0	46.7	11.8	4.0	DELTA V-NC2500
Hg-2022-3426	23AZ 109	04-Aug-23	50	1.242	3.44	3.5	-29.0	8.5	48.0	12.1	4.0	DELTA V-NC2500
Hg-2022-3435	23AZ 110R	04-Aug-23	57	0.984	2.56	3.0	-27.4	11.3	44.7	13.0	3.4	DELTA V-NC2500
Hg-2022-3435	23AZ 110R	04-Aug-23	75	1.131	3.00	3.4	-27.7	11.3	45.8	12.9	3.5	DELTA V-NC2500
Hg-2022-3447	23AZ 111	04-Aug-23	58	1.170	2.95	3.7	-27.1	7.5	43.5	13.3	3.3	DELTA V-NC2500
Hg-2022-3448	23AZ 112	04-Aug-23	59	1.059	2.62	3.3	-27.0	7.3	42.7	13.2	3.2	DELTA V-NC2500
Hg-2022-3449	23AZ 113	04-Aug-23	60	1.003	2.55	3.2	-27.9	6.5	43.6	13.4	3.3	DELTA V-NC2500
Hg-2022-3450	23AZ 114	04-Aug-23	61	1.075	2.53	3.2	-27.9	6.3	40.5	12.6	3.2	DELTA V-NC2500
Hg-2022-3452	23AZ 115	04-Aug-23	62	1.094	2.76	3.5	-25.3	7.7	43.5	13.6	3.2	DELTA V-NC2500
Hg-2022-3453	23AZ 116	04-Aug-23	63	1.113	3.04	3.8	-25.8	7.5	47.2	14.5	3.2	DELTA V-NC2500
Hg-2022-3465	23AZ 117	04-Aug-23	64	1.098	2.77	3.5	-26.7	7.1	43.4	13.3	3.3	DELTA V-NC2500
Hg-2022-3466	23AZ 118	04-Aug-23	65	1.001	2.49	3.2	-26.7	7.1	42.8	13.3	3.2	DELTA V-NC2500
Hg-2022-3464	23AZ 119	04-Aug-23	66	1.059	2.66	3.3	-27.9	10.9	43.3	13.1	3.3	DELTA V-NC2500
Hg-2022-3457	23AZ 120	04-Aug-23	67	1.133	2.87	3.6	-26.8	11.1	43.6	13.5	3.2	DELTA V-NC2500
Hg-2022-3458	23AZ 121	04-Aug-23	68	1.156	2.86	3.6	-26.4	11.0	42.6	13.2	3.2	DELTA V-NC2500
Hg-2022-3482	23AZ 122	04-Aug-23	69	1.188	2.97	3.8	-28.2	8.2	43.2	13.4	3.2	DELTA V-NC2500
Hg-2022-3499	23AZ 123	04-Aug-23	70	1.045	2.68	3.2	-28.1	8.5	44.2	12.9	3.4	DELTA V-NC2500
Hg-2022-3674	23AZ 124	04-Aug-23	71	1.079	2.81	3.3	-26.6	9.1	44.6	12.8	3.5	DELTA V-NC2500
Hg-2022-3673	23AZ 125	04-Aug-23	72	1.068	2.74	3.4	-26.3	9.6	44.2	13.4	3.3	DELTA V-NC2500
Hg-2022-3681	23AZ 126	04-Aug-23	73	1.173	3.00	3.6	-26.5	9.5	44.4	13.2	3.4	DELTA V-NC2500
Hg-2022-3200	23AZ 127	04-Aug-23	74	1.117	2.93	3.3	-28.5	10.9	45.3	12.4	3.6	DELTA V-NC2500
HG-2022-3201	23AZ 128R	04-Aug-23	80	1.053	2.74	3.2	-28.7	11.3	45.0	12.9	3.5	DELTA V-NC2500
HG-2022-3201	23AZ 128R	04-Aug-23	96	1.162	2.90	3.5	-28.5	11.3	43.0	12.9	3.3	DELTA V-NC2500
HG-2022-3230	23AZ 129	04-Aug-23	81	1.061	2.63	3.3	-28.1	5.8	42.8	13.3	3.2	DELTA V-NC2500
HG-2022-3232	23AZ 130	04-Aug-23	82	1.109	2.79	3.5	-27.2	7.2	43.2	13.2	3.3	DELTA V-NC2500
HG-2022-3668	23AZ 131	04-Aug-23	83	1.226	3.13	3.9	-30.1	10.9	44.2	13.7	3.2	DELTA V-NC2500
HH-2628	23AZ 132	04-Aug-23	84	1.035	2.59	3.2	-28.0	7.7	43.2	13.3	3.2	DELTA V-NC2500
HH-2628Dup	23AZ 133	04-Aug-23	85	1.145	2.94	3.3	-28.9	8.3	44.4	12.2	3.6	DELTA V-NC2500
HG-2022-3679	23AZ 134	04-Aug-23	86	1.137	2.81	3.6	-28.6	10.2	42.9	13.6	3.2	DELTA V-NC2500
HG-2022-3658	23AZ 135	04-Aug-23	87	1.135	2.82	3.5	-28.3	7.9	43.0	13.2	3.3	DELTA V-NC2500
FSJ-2840	23AZ 136	04-Aug-23	88	1.147	2.98	3.5	-27.8	7.3	44.7	13.1	3.4	DELTA V-NC2500
FSJ-2840Dup	23AZ 137	04-Aug-23	89	1.201	3.02	3.5	-28.0	8.1	43.7	12.4	3.5	DELTA V-NC2500
HG-2022-3652	23AZ 138	04-Aug-23	90	1.223	3.14	4.0	-25.7	11.0	44.4	13.8	3.2	DELTA V-NC2500
HG-2022-3600	23AZ 139	04-Aug-23	91	1.108	2.88	3.4	-27.7	5.7	45.1	13.1	3.4	DELTA V-NC2500
HG-2022-3601	23AZ 140	04-Aug-23	92	1.141	2.86	3.6	-27.5	5.5	43.3	13.4	3.2	DELTA V-NC2500
FSJ-3144	23AZ 141	04-Aug-23	93	1.119	2.99	3.3	-28.9	7.7	46.4	12.5	3.7	DELTA V-NC2500
FSJ-3144Dup	23AZ 142	04-Aug-23	94	1.103	2.85	3.4	-28.2	7.7	44.7	13.1	3.4	DELTA V-NC2500
HG-2022-3604	23AZ 143	04-Aug-23	95	1.111	2.98	3.4	-29.6	11.0	46.5	12.9	3.6	DELTA V-NC2500
HG-2022-3605	23AZ 144R	10-Aug-23	6	1.026	2.48	3.0	-28.6	9.0	47.9	13.4	3.6	DELTA V-NC2500
HG-2022-3605	23AZ 144R	10-Aug-23	23	1.070	2.60	3.1	-28.3	8.8	48.2	13.5	3.6	DELTA V-NC2500
HG-2022-3606	23AZ 145	10-Aug-23	7	1.179	2.83	3.5	-29.4	9.8	47.7	14.0	3.4	DELTA V-NC2500
HG-2022-3607	23AZ 146	10-Aug-23	8	1.022	2.39	3.0	-29.5	9.7	46.4	13.5	3.4	DELTA V-NC2500
FSJ-3456	23AZ 147	10-Aug-23	9	1.063	2.73	2.9	-29.0	9.6	51.0	12.5	4.1	DELTA V-NC2500
FSJ-3456Dup	23AZ 148	10-Aug-23	10	1.095	2.72	3.0	-28.9	9.5	49.4	12.7	3.9	DELTA V-NC2500
HH-3594	23AZ 149	10-Aug-23	11	1.195	2.74	3.7	-28.3	8.0	45.4	14.5	3.1	DELTA V-NC2500
HH-3594Dup	23AZ 150	10-Aug-23	12	1.195	2.74	3.7	-28.3	8.0	45.5	14.6	3.1	DELTA V-NC2500
Hg-2022-3609	23AZ 151	16-Aug-23	46	1.198	2.97	3.4	-28.6	11.7	45.9	12.5	3.7	DELTA V-NC2500
Hg-2022-3129	23AZ 152	16-Aug-23	47	1.031	2.33	3.1	-26.4	11.1	41.2	13.1	3.1	DELTA V-NC2500
Hg-2022-3134	23AZ 153	10-Aug-23	15	1.103	2.54	3.3	-26.6	11.0	45.7	14.2	3.2	DELTA V-NC2500
Hg-2022-3141	23AZ 154	10-Aug-23	16	1.062	2.46	3.1	-28.8	10.9	46.1	13.6	3.4	DELTA V-NC2500
FSJ-5581	23AZ 155	10-Aug-23	17	1.118	2.72	3.3	-27.7	7.7	48.2	13.9	3.5	DELTA V-NC2500
FSJ-5894	23AZ 156	10-Aug-23	18	1.096	2.60	3.2	-27.4	8.6	47.1	13.8	3.4	DELTA V-NC2500
FSJ-5895	23AZ 157	10-Aug-23	19	1.059	2.57	3.0	-27.1	8.7	47.9	13.0	3.7	DELTA V-NC2500
FSJ-5896	23AZ 158	10-Aug-23	20	1.088	2.59	3.3	-27.0	7.8	47.3	14.0	3.4	DELTA V-NC2500
FSJ-5897	23AZ 159	10-Aug-23	21	1.022	2.43	3.1	-27.2	7.2	47.2	14.0	3.4	DELTA V-NC2500
FSJ-5979	23AZ 160	10-Aug-23	22	1.107	2.75	3.2	-27.3	8.8	49.0	13.5	3.6	DELTA V-NC2500
FSJ-5979Dup	23AZ 161R	10-Aug-23	27	1.176	2.76	3.5	-26.8	8.7	46.6	14.0	3.3	DELTA V-NC2500
FSJ-5979Dup	23AZ 161R	10-Aug-23	47	1.042	2.42	3.1	-26.6	8.6	46.3	13.9	3.3	DELTA V-NC2500
FSJ-6385	23AZ 162	10-Aug-23	28	1.136	2.63	3.5	-27.0	7.6	46.0	14.4	3.2	DELTA V-NC2500
FSJ-6385Dup	23AZ 163	10-Aug-23	29	1.235	2.86	3.7	-27.2	7.4	46.3	14.1	3.3	DELTA V-NC2500
FSJ-8391	23AZ 164	10-Aug-23	30	1.078	2.45	3.2	-27.7	8.3	45.0	13.8	3.3	DELTA V-NC2500
FSJ-8391Dup	23AZ 165	10-Aug-23	31	1.098	2.51	3.3	-27.7	7.7	45.3	13.9	3.3	DELTA V-NC2500
Hg-2022-3539	23AZ 166	10-Aug-23	32	0.992	2.38	3.1	-26.8	8.8	47.4	14.5	3.3	DELTA V-NC2500
Hg-2022-3551	23AZ 167	10-Aug-23	33	0.997	2.29	2.8	-28.3	9.2	45.4	13.1	3.5	DELTA V-NC2500
Hg-2022-3589	23AZ 168	10-Aug-23	34	0.999	2.37	2.9	-25.6	7.9	47.2	13.7	3.4	DELTA V-NC2500
Hg-2022-3619	23AZ 169	10-Aug-23	35	1.208	3.03	3.8	-25.8	8.5	50.1	14.8	3.4	DELTA V-NC2500