



THORNHILL LANDFILL & TRANSFER STATION

2022 Annual Report

Prepared for:
British Columbia Ministry of
Environment & Climate Change Strategy
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Executive Summary

The Thornhill Landfill closed in 2016 with the opening of the Forceman Ridge Waste Management Facility (FRWMF). Following the closure of the Thornhill Landfill, the Thornhill Transfer Station was constructed to accept waste from the greater Terrace area, including waste from curbside collection programs, commercial haulers, and the public. The transfer station operates as a scaled facility, and accepts waste for transfer to the FRWMF, and metal waste for recycling.

The closed landfill is authorised under Operational Certificate MR-4057, which includes an environmental effects monitoring program, and the requirement to report on non-compliance events. The landfill is in the final stages of closure with expected completion in 2023.

During 2022, **9,513 tonnes** of refuse, including garbage, construction and demolition materials, and controlled waste, were collected at the Transfer Station and then disposed of in the Forceman Ridge landfill. A total of **1,691 tonnes** of materials were diverted from the landfill. Diverted materials include **72 tonnes** of clean wood, **30 tonnes** of concrete, **30 tonnes** of metal **1,538 tonnes** of organics, and **17 tonnes** of white goods and ozone depleting appliances.

There were no mammalian wildlife incidents or encounters observed during 2022 at the Thornhill Landfill. There was minimal vector activity from birds, including raptor species (bald eagles), and corvid species (crows and ravens).

The annual inspection of the facility found the cover and works system operational, with no major deficiencies identified. There was one non-compliance for the facility for the duration of the reported year. In 2022, the RDKS requested one OC amendment, and had no temporary authorisations. Routine maintenance was carried out for fence and scale maintenance. The scale was calibrated twice in 2022.

The Facility water quality monitoring program, including results of groundwater, surface water, and treated leachate discharge monitoring are discussed in the *Thornhill Landfill 2022 Environmental Effects Monitoring Program Report*, prepared by Morrison Hershfield.



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1 Introduction

This annual report for the closed Thornhill Landfill (TL) covers the period from January to December 2022. It has been prepared to fulfill the requirements of the facility’s Operational Certificate (OC) MR-4057, found in Appendix A, issued by the Ministry of Environment and Climate Change Strategy (ENV), and most recently amended in November 2021. Waste is no longer discharged to the Thornhill Landfill and septage is no longer accepted at the facility. Waste is accepted at the site and is transferred through the Thornhill Transfer Station (TTS). Tracking of waste transferred and recycled at site is included in the OC, and all waste received at the TTS is included in this report.

Refuse and compostable organics are collected, consolidated, and hauled to the Forceman Ridge Waste Management Facility (FRWMF). Metals (including white goods, scrap metals, and propane tanks) and clean wood (including land clearing debris) are collected and kept segregated. Clean wood is segregated and hauled to FRWMF. Metal collected at the Transfer Station is sold as scrap.

The 2022 Annual Report summarizes the following topics presented in Table 1.

Table 1: Report Objectives

<p>Waste Tracking</p> <ul style="list-style-type: none"> Summary of Visits to FRWMF Quantity of Waste Received, Recycled and Composted Quantity of Waste Asbestos Received <p>Wildlife Observations</p> <p>Facility Updates and Maintenance</p> <ul style="list-style-type: none"> Operational Certificate Amendments Non-compliance Reports Scale Maintenance <p>Projected Operational Plans</p> <p>Environmental Monitoring</p>	
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Environmental monitoring was conducted in accordance with the OC. The results of the water quality monitoring program, which includes groundwater, surface water, and leachate monitoring, are discussed in the *Thornhill Landfill 2022 Environmental Effects Monitoring Program Report* by Morrison Hershfield and contained in Appendix B of this report.

2 Background

The TTS opened in November 2016 on the site of the closed Landfill and is owned and operated by the RDKS. The TTS is located about 10 km southeast of the City of Terrace; access is from Old Lakelse Lake Drive. The Thornhill Landfill is in the final stages of closure, with most of the landfill closed in 2015 and



final soil cover application and vegetation seeding occurring currently. The final stages of closure are anticipated to be completed in 2023.



Figure 1 The Thornhill Transfer Station Z-Wall, where waste is accepted.

Most waste generated in the greater Terrace area is hauled to the TTS, consolidated, and then hauled to FRWMF for final disposal. Waste is no longer discharged at the Thornhill landfill. Waste is currently managed in accordance with the updated Regional District Kitimat-Stikine Solid Waste Management Plan (2022).

2.1 Landfill

The TTS operates a residential drop off area for refuse, yard and garden materials, metal (including large appliances and propane tanks), and clean wood. The TTS includes two scales, a scale house, a Z-wall for residential drop-off, a transfer station building for consolidation of commercial loads, and an area to accept and consolidate commercial loads of organics. Several U-bays for metal, yard and garden waste, and clean wood are available for public and commercial use.



The public have access to the facility on Saturday, Sunday and Monday, and commercial account holders have access to the facility Monday through Saturday. Table 2 provides a breakdown of scale transactions at the facility by day and user type for 2022.

Table 2: Count of Users and Tonnes Tipped by Day of the Week at Thornhill Transfer Station in 2022

Day & User Type	Count of Transactions	Tonnes
Monday	5,048	2,247
Commercial	725	1,544
Curbside	93	175
Public	4,230	528
Tuesday	709	985
Commercial	507	398
Curbside	202	587
Wednesday	1,137	2,255
Commercial	744	1,428
Curbside	393	827
Thursday	842	1,746
Commercial	621	1,112
Curbside	221	634
Friday	971	1,987
Commercial	697	1,241
Curbside	274	746
Saturday	6,897	1,041
Commercial	148	113
Public	6,749	928
Sunday	7,325	881
Public	7,325	881
Total	22,929	11,142



In 2022 there was a total of 22,929 transactions across the scale and 11,142 tonnes of waste accepted for disposal, or recycling.

Table 3 provides a summary of tonnes per waste type accepted at the facility by the public and commercial account holders.



Table 3: Landfilled and Diverted Waste Tonnages by In Service-Area and Out of Service-Area Users

Waste Type	Tonnes Public	Tonnes Commercial	Total Tonnes
Landfilled Waste	2,047	5,427	7,474
C&D	713	735	1,448
Carcass	1	1	2
Refuse	1,333	4,691	6,024
Diverted Waste	288	458	746
Clean Wood	27	45	72
Concrete	30	-	30
Metal	27	3	30
Organics	185	408	593
White Goods	16	1	17
Ozone Depleting	3	1	4
Curbside	-	-	2,984
Curbside Organics	-	-	945
Curbside Refuse	-	-	2,039
Total	2,335	5,885	11,204



Of all waste accepted at the TTS, 83% was transferred for landfilling at FRWMF, and 17% was diverted to the FRWMF organics compost facility, the scrap metal pile, or the clean wood pile. All wastes accepted at the TTS are transferred to the FRWMF for final disposal, except for metals, which are sold at market value to local scrap yard.

2.2 Landfilled Wastes

Animal carcasses, C&D, and refuse are consolidated for transport to the FRWMF where they are tipped at the active face of the landfill. A description of each of these wastes is provided below.

Carcass

Carcasses that are delivered in a load of less than 50 kg are accepted for disposal at the TTS, where they are consolidated with refuse. In 2022, **2 tonnes** of carcasses were accepted for disposal.

Construction and Demolition

C&D waste accepted at TTS includes painted and treated wood waste, and demolition waste, in loads less than 5 m³ from within the service area. In 2022, **1,448 tonnes** of construction and demolition waste were accepted for disposal.



Refuse

Refuse includes general municipal solid waste from curbside, commercial account holders, and self hauled refuse. In 2022 **8,063 tonnes** of refuse was collected for disposal.

2.3 Diverted Wastes

Diverted waste includes materials that are recycled such as concrete, metal, organics, white goods, and yard and garden waste. Metal and white goods are collected for recycling through a local metal scrapyard. Broken concrete, organics and yard and garden waste are transferred to the FRWMF for recycling.

Clean Wood Waste

Clean Wood means wood that is free of glue, laminate, paint, treatment, and may include small metal fasteners but does not include plywood or OSB. Clean wood is segregated, and either burned as prescribed in the Operational Certificate or chipped and used as hog fuel in the compost facility. In 2022, **72 tonnes** of clean wood waste were accepted for disposal.

Broken Concrete

Concrete includes concrete with or without rebar, in pieces less than 300mm at their widest width. Broken concrete is used as alternative daily cover for waste at FRWMF. In 2022, **30 tonnes** were accepted for disposal.

Metals

Metals are segregated onsite and sold at market value to scrap yards with the Terrace area. Metals are also accepted for free at several scrapyards within the Terrace area. A total of **30 tonnes** of scrap metal was collected and sold to scrap markets.

Organics

Organics includes food scraps that are received from commercial sources, local farms, and from the curbside programs for the City of Terrace, Electoral Area E, and parts of Electoral Area C. Organics are composted through the compost facility and used for landfill closure projects. In 2022, **1,539 tonnes** of organics were accepted for composting.

White Goods and Ozone Depleting Appliances

White goods and ozone depleting appliances are accepted for disposal at the TTS under the Major Appliance Recycling Roundtable steward. Freon gas is removed from ozone depleting appliances, and all appliances are included in the metal recycling. In 2022, **17 tonnes** of white goods and ozone depleting appliances were segregated for recycling.

2.4 Effluent Discharge

Effluent discharge was sampled and monitored in accordance with section 5.1 of the OC.



2.5 Open Burning

Section 4.3 of the Thornhill Landfill OC states that there is no burning of waste caused by any means, including a deliberate or accidental action by the OC holder or others on site. There were no burns of any source at the TL in 2022.

3 Wildlife Occurrences and Observations

The Thornhill Landfill is located in an area with bears, wolves, coyotes, several species of birds of prey, and many other species of mammals that may attempt access to the facility. To prevent wildlife from gaining access the entire facility is enclosed in an electrified fence. The residential collection area contains wildlife proof bins with lids to prevent bird and rodent access. Commercial garbage is consolidated within the transfer station building, to which there is no bird access. Organics are consolidated in a large wildlife proof bin with lid.

Facility operators are required to inspect the fence line weekly, testing for proper voltage, proper tension on fence stands, overall condition of the fence, and signs of wildlife activity. The results of the inspections are recorded on the Daily Operation Inspection Form. There was minimal vector activity from birds, including raptor species (bald eagles), and corvid species (crows and ravens).

There were no mammalian wildlife incidents or encounters observed during 2022 at the Thornhill Landfill.

3.1 Bird and Vector Control

Birds, such as ravens and crows, are a nuisance at landfills and transfer station sites, as they can scatter litter into the surrounding environment. The landfill itself is nearing completion in closure and currently has no active face. The transfer station is the only portion of the facility that contains waste that could be accessed, however, the transfer of waste from the tip floor to the titan trailer for hauling to Forceman Ridge does not allow for much time for potential vectors to access waste. There was minimal vector activity from birds, including raptor species (bald eagles), and corvid species (crows and ravens).

4 Operations and Maintenance

4.1 Complaints Received

No complaints regarding Thornhill Transfer Station were recorded in 2022.

4.2 Annual Inspection of Cover System and Works

An inspection of the facility cover system and works was completed on December 22nd, 2022, by RDKS staff. There were no major deficiencies identified in the inspection. Minor deficiencies included a small



leachate seep that drains into the leachate collector ditch, and erosion around the surface water diversion ditches.


4.3 OC Amendments and Authorizations

No amendments to the OC or temporary authorisations were received in 2022.

4.4 Non-Compliance Reports

There was one non-compliance report submitted for the Thornhill Landfill in 2022. The non-compliance is summarized below in Table 4.

Table 4 Summary of Non-Compliance at Thornhill Landfill in 2022.

Non-Compliance Report Date	Description of Non-Compliance	
<p>May 11, 2022</p> <p>5.0 Environmental Effects Monitoring Surface Water Monitoring</p>	<p>Monitoring location SW-21 water quality exceeded the BCWQG-DW for total Manganese.</p>	

It was later determined that the BCWQG-DW criteria does not apply to the site because the site is greater than 500 m away from any surface drinking water intakes.

4.5 Landfill Gas Collection

The Thornhill landfill is not a regulated site under the BC Landfill Gas Management Regulation. A flare was proactively installed to flare of landfill gas from the landfill via a low-flow solar spark methane gas collection system and candlestick flare. The system is capable of combusting landfill gas that contains at a minimum 30% methane at rates of 5 scfm (standard cubic ft/minute) to 90 scfm. The data logger had its battery replaced and data pulled once during 2022. The full closure of the landfill with a vegetative cover will further capture potential fugitive gases when completed.

4.6 Leachate Collection System

Leachate from the landfill is collected through a series of toe ditches along the north and west boundaries of the landfill. Leachate passively flows through the ditches and is conveyed to two facultative treatment lagoons. Leachate flows into the upper treatment lagoon, which passively flows through a sand and gravel berm into the lower treatment lagoon. Storm water from the sites is also conveyed through a stormwater ditch into the lower treatment lagoon. Treated effluent from the lower lagoon passively flows into an exfiltration ditch that connects with Thornhill Creek one kilometre downstream.



The leachate system was monitored according to the facility OC. There were no works or maintenance performed on the leachate system in 2022.

4.7 Fence Maintenance

Basic maintenance and repairs were performed as part of regular operations, including regular testing of the fence lines voltage during the spring summer and fall, brushing of vegetation around the fence, and tensioning the fence lines as required.

4.8 Scale Maintenance

Scale maintenance and calibration was performed on the inbound and outbound scales at the Thornhill Transfer Station by a qualified contractor on the following dates:

- March 31, 2022
- November 7, 2022

Scale reports are available in Appendix C.

5 Construction

5.1 Closure Works

Brushing of the site was completed in 2022 to mow *Alnus rubra* (red alder) growing on the landfill and surrounding the lagoons. No additional closure works were completed in 2022. The RDKS plans to procure soil for closure in 2023 to advance to final cover application of a vegetative layer on the landfill.

6 Projected Operational Plan

The projected operational plan outlines the key strategies for the efficient and sustainable operations of the Thornhill Landfill (TL) and Thornhill Transfer Station (TTS) for the next 12 months as required. As a responsible waste management organization, we recognize the significance of managing waste effectively to protect the environment, promote public health, and ensure compliance with relevant regulations.

By implementing this operational plan, we aim to achieve our objectives of meeting the environmental and regulatory requirement, maximizing resource recovery, and maintaining a safe and environmentally responsible operation.

This plan will outline the various projects and improvements intended to be executed in the next 12 months, the processes involved, timeline and expected outcome. It will also outline the various strategies mapped out to reduce contamination and encourage diversion.



By adhering to this operational plan and working collaboratively with our stakeholders, we are confident that we will achieve our goals of efficient waste management, reduced environmental footprint, and a cleaner and healthier community. We are committed to regular evaluation, monitoring, and adaptation of our operations to remain at the forefront of waste management practices and technology.

A list of tasks slated for completion in 2023 is included in Table 5. Tasks are subject to budget approval and may change or be deferred subject to competing priorities following a risk-based approach.

7 Environmental Monitoring

The RDKS performs regular monitoring and sampling of surface water, groundwater, and leachate at the Thornhill Landfill in accordance with the OC. The details of the Facility water quality monitoring program, including results of groundwater, surface water, and treated leachate discharge monitoring are discussed in *Thornhill Landfill 2022 Environmental Effects Monitoring Program Annual Report*, prepared by Morrison Hershfield, and contained in Appendix B of this report.

Groundwater

There are four groundwater monitoring wells located around the facility. One is a background well, and three are down gradient wells. Three of the wells were installed in 2021, including a shallow groundwater well which was recommissioned and added to the program. The wells are sampled and monitored three times per year. In-Situ parameters are monitored using a YSI and TLC Depth Tape. Lab samples are collected by hand or with a Waterra Hydrolift and put in sample bottles and shipped to ALS for analysis.

Surface Water

There are four surface water sampling and monitoring locations for this facility located downgradient to the North of the landfill. They are located on or connected to the Thornhill Creek drainage network. One of the four sites is a facility sample of the leachate prior to treatment. The sites are sampled and monitored three times per year. In-Situ parameters are monitored using a YSI and a LaMotte 20WE Turbidimeter. Lab samples are collected in sample bottles and shipped to ALS for analysis.



Table 5 Summary of operational plans for the facility over the next twelve months

2023 Plan	Description	Strategies	Expected Completion Date	Outcome
Final Cover System	Continue to Advance Completion of the Final Cover System Cap by applying topsoil seeding with grass blend	Import suitable soil to the site, issue RFP for soil and delivery, request quotes for soil application	Sep-23	Final cover system with perennial and annual grass blend
Asbestos Policy	Asbestos policy will be developed to protect residents and workers against potential asbestos materials being tipped at the TTS	Review regulations and develop policy, outreach events with the public for safe disposal of potential asbestos waste, pilot the new program and evaluate	Jul-23	Residential asbestos policy in place
Residential Soil Policy	Policy for the allowance of topsoil from residential premises to be tipped at the transfer station for transfer to FRWMF	Review regulations and develop a screening tool, and declaration form to allow for only residential soils from low risk sites to be tipped at the TTS	Jul-23	New updated Soil Policy, soils to be used as alternative daily cover at FRWMF
Revise Terrace area Bylaw	A revised bylaw will incorporate all amendments, and improve bylaw interpretation for all users of the facility	Repeal and rewrite to remove conflicted or unaddressed issues in the amendments and improve transparency in facility user requirements	Sep-23	New Terrace & Area Facilities Regulation Bylaw

8 Summary

During 2022, **9,513 tonnes** of refuse, including garbage, construction and demolition materials, and controlled waste, were collected at the Transfer Station and then disposed of in the Forceman Ridge landfill. A total of **1,691 tonnes** of materials were diverted from landfilling at Forceman Ridge. Diverted materials included **72 tonnes** of clean wood, **30 tonnes** of concrete, **30 tonnes** of metal **1,538 tonnes** of organics, and **17 tonnes** of white goods and ozone depleting appliances.

The annual inspection of the facility found the cover and works system operational, with no major deficiencies identified. There was one non-compliance for the facility for the duration of the reported year. Routine maintenance was carried out for fence and scale maintenance. The scale was calibrated twice in 2022.



The Facility water quality monitoring program, including results of groundwater, surface water, and treated leachate discharge monitoring are discussed in the *Thornhill Landfill 2022 Environmental Effects Monitoring Program Report*, prepared by Morrison Hershfield.

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Regional District of
Kitimat-Stikine

Appendix A Operational Certificate

November 18, 2021

Tracking Number: 408661
Authorization Number: 4057

KITIMAT-STIKINE REGIONAL DISTRICT
#300-4545 LAZELLE AVE
TERRACE, BC
V8G 4E1

Dear KITIMAT-STIKINE REGIONAL DISTRICT,

Your application for an Authorization amendment under the Environmental Management Act

In response to your emails dated October 6, 2021 and November 15, 2021, to include addition monitoring wells and to remove the reference to amount of leachate given it is not designed for flow measurement. Pursuant to Section 16(4) of the *Environmental Management Act*, I as Director approve the following changes of Section 5.2 and 6.1D.

From: Section 5.2:

Locations	Parameters	Frequency
BH 96-2 E231889	<u>Inorganics</u> Dissolved metals, alkalinity (as CaCO ₃), dissolved hardness (as CaCO ₃), ammonia, chloride, fluoride, conductivity, nitrate, nitrite, total kjeldahl nitrogen, pH, total phosphorus, total dissolved solids, sulphate. <u>Organics</u> Chemical oxygen demand (COD), <u>Field Parameters</u> Conductivity, pH, water elevation, temperature, dissolved oxygen	Once per Season: Spring (March- April) Summer (July –Aug.) Fall (October – Nov.)

To: Section 5.2:

Locations	Parameters	Frequency
BH 96-2 E231889 MW21-01 MW21-02 MW21-03	<u>Inorganics</u> Dissolved metals, alkalinity (as CaCO ₃), dissolved hardness (as CaCO ₃), ammonia, chloride, fluoride, conductivity, nitrate, nitrite, total kjeldahl nitrogen, pH, total phosphorus, total dissolved solids, sulphate. <u>Organics</u> Chemical oxygen demand (COD), <u>Field Parameters</u> Conductivity, pH, water elevation, temperature, dissolved oxygen	Once per Season: Spring (March- April) Summer (July –Aug.) Fall (October – Nov.)

From: Section 6.1D:

The methods and amounts of leachate collection, treatment and disposal, if applicable

To: Section 6.1D:

The methods of leachate collection, treatment and disposal, if applicable

Please note that although a revised Authorization Document has not been produced at this time a copy of this letter is being placed on the Authorization file, as an addendum to the Authorization, to formally reflect the change.

This Authorization does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority rests with the permittee. This Authorization is issued pursuant to the provisions of the *Environmental Management Act* to ensure compliance with Section 120(3) of that statute, which makes it an offence to discharge waste, from a prescribed industry or activity, without proper authorization. It is also the responsibility of the permittee to ensure that all activities conducted under this authorization are carried out with regard to the rights of third parties, and comply with other applicable legislation that may be in force.

This decision may be appealed to the Environmental Appeal Board in accordance with Part 8 of the *Environmental Management Act*. An appeal must be delivered within 30 days from the date that notice of this decision is given. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

Yours truly,



Karen Moores, P.Ag.
Section Head, North Authorizations, Municipal and Smelter Sectors
Environmental Protection Division
Ministry of Environment and Climate Change Strategy
email: Karen.Moores@gov.bc.ca

ENCL: None



December 15, 2020

Tracking Number: 393927

Authorization Number: 4057

REGISTERED MAIL

REGIONAL DISTRICT of KITIMAT-STIKINE
300-4545 Lazelle Avenue
Terrace, BC V8G 4E1

Dear Operational Certificate Holder:

Enclosed is Amended Operational Certificate 4057 issued under the provisions of the *Environmental Management Act*. Your attention is respectfully directed to the terms and conditions outlined in the Operational Certificate. An annual fee will be determined according to the Permit Fees Regulation.

This Operational Certificate does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority rests with the Operational Certificate Holder. This Operational Certificate is issued pursuant to the provisions of the *Environmental Management Act* to ensure compliance with Section 120(3) of that statute, which makes it an offence to discharge waste, from a prescribed industry or activity, without proper authorization. It is also the responsibility of the Operational Certificate Holder to ensure that all activities conducted under this authorization are carried out with regard to the rights of third parties, and comply with other applicable legislation that may be in force.

When a spill occurs, or there is an imminent risk of one occurring, the responsible person must ensure that it is reported in accordance with the Spill Reporting Regulation. Additional information on spill reporting requirements is available at gov.bc.ca/reportaspill

This decision may be appealed to the Environmental Appeal Board in accordance with Part 8 of the *Environmental Management Act*. An appeal must be delivered within 30 days from the date that notice of this decision is given. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

Administration of this Operational Certificate will be carried out by staff from the Environmental Protection Division's Regional Operations Branch. Plans, data and reports pertinent to the Operational Certificate are to be submitted by email or electronic transfer to the Director, designated Officer, or as further instructed. To meet the reporting requirements in a form and manner acceptable to the Director, reports and notifications

related to the administration of this authorization must be submitted electronically to the following ministry email addresses:

- EnvAuthorizationsReporting@gov.bc.ca for monitoring and annual reports
- EnvironmentalCompliance@gov.bc.ca for non-compliance reports.

For further information about how to submit data and reports, please refer to <http://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions>.

Please be reminded that the director may require the Operational Certificate Holder to do one or more of the following at any time:

- repair, alter, remove, improve or add to existing works, or to construct new works, and to submit plans and specifications for works specified in this authorization.
- conduct monitoring, and may specify procedures for monitoring and analysis, and procedures or requirements respecting the handling, treatment, transportation, discharge or storage of waste.
- provide security in the amount and form, and subject to the conditions, specified by the director.
- conduct studies and to report information in accordance with the specifications of the director.
- recycle certain wastes and recover certain reusable resources, including energy potential from wastes, in accordance with the specifications of the director.

For more information about how the Ministry will assess compliance with your Operational Certificate please refer to gov.bc.ca/environmentalcompliance.

For more information about how to make changes to your Operational Certificate and to access waste discharge amendment forms and guidance, please refer to gov.bc.ca/wastedischarge-authorizations.

Yours truly,



Karen Moores, P.Ag.
for Director, *Environmental Management Act*
Authorizations - North Region



MINISTRY OF ENVIRONMENT
AND CLIMATE CHANGE
STRATEGY

OPERATIONAL CERTIFICATE

4057

Under the Provisions of the Environmental Management Act

REGIONAL DISTRICT of KITIMAT-STIKINE

Terrace, British Columbia

V8G 4E1

Is Authorized to discharge refuse to ground from a Landfill located near Thornhill British Columbia, subject to the requirements listed below. Contravention of any of these requirements is a violation of the Environmental Management Act and may lead to prosecution.

Capitalized terms referred to in this authorization are defined in the attached Glossary. Other terms used in this authorization have the same meaning as those defined in the *Environmental Management Act* and applicable regulations.

Where this authorization provides that the Director may require an action to be carried out, the Operational Certificate Holder must carry out the action in accordance with the requirements of the Director.

This Authorization supersedes and replaces all previous versions of Operational Certificate 4057 issued under Section 28 of the Environmental Management Act.

GLOSSARY

"Officer: means: An Officer as defined by Section 1(1) of the *Environmental Management Act*.

"Province" means: Her Majesty the Queen in right of British Columbia;

"Qualified Professional " means: a person who:

(a) Is an engineer, scientist or technologist specializing in a particular applied

Date issued: February 2, 1976
Date amended: December 15, 2020
(most recent)

Karen Moores, P.Ag.
for Director, *Environmental Management Act*
Authorizations - North Region

science or technology;

(b) Is registered in British Columbia with a professional organization, is acting under that organization's code of ethics and is subject to disciplinary action by that organization;

(c) Through suitable education, experience, accreditation and knowledge respecting solid waste management and related engineering disciplines for the management of leachate, surface water, ground water, storm water, and landfill gas and other specialist disciplines, may reasonably be relied upon to provide advice within his or her area of expertise and to carry out duties or functions in those areas; and

(d) Provides the completed Declaration of Competency and Conflict of Interest Disclosure Statements.

All documents submitted to the Director by a Qualified Professional must be signed by the author(s).

“Regulatory Document” means: any document that the Operational Certificate Holder is required to provide to the Director or the Province pursuant to: (i) this Authorization; (ii) any regulation made under the Environmental Management Act that regulates the Facility described in this Authorization or the discharge of waste from that Facility; or (iii) any order issued under the Environmental Management Act directed against the Operational Certificate Holder that is related to the Facility described in this Authorization or the discharge of waste from that Facility

1. **LOCATION OF LANDFILL PROPERTY**

The location of the property where discharges are authorized to occur is described in Land and Water BC License No. 634224 as follows: that part of District Lot 518 and parts of Blocks B and C of District Lot 655, Plan 1304, all of Range 5, Coast District more particularly described as follows:

Commencing at a point 20 meters North and 20 meters East of the Northwest corner of Block C of District lot 518, thence 225 meters North, thence 600 meters West to highway right of way; thence 700 meters Southeast along North side of highway to the point of commencement.

2. **AUTHORIZED DISCHARGE**

2.1 **Authorized Source**

This section applies to the discharge of refuse from a landfill operation. The site reference number for this discharge is E208844. The authorization to

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(most recent)



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discharge municipal solid waste ceased upon commissioning of the Forceman Ridge landfill.

- 2.1.1 The maximum rate of discharge is 0 tonnes per week. Waste discharge to the landfill is not authorized.
- 2.1.2 The characteristics of the waste which was discharged are those of typical municipal waste.
- 2.1.3 The Authorized Works are a Closed Landfill with final cover, a site drainage system to direct any leachate from the closed section of the landfill into the wetland for managing and treating, a drainage system to direct surface runoff from the Transfer Station into the wetland, a passive gas management system and related appurtenances approximately located as shown on Site Plan.
- 2.1.4 The Authorized Works also include fencing of the closed landfill lagoon area.

3. **GENERAL REQUIREMENT**

3.1 **Maintenance of Works and Emergency Procedures**

All works must be complete and intact.

The Operational Certificate Holder must regularly inspect the Authorized Works and maintain them in good working order.

In the event of an emergency or other condition which prevents normal operation of the Authorized Works or leads to an unauthorized discharge, the Operational Certificate Holder must take remedial action immediately to restore the normal operation of the Authorized Works and to prevent any unauthorized discharges. The Operational Certificate Holder must immediately report the emergency or other condition and the remedial action that has and will be taken to the EnvironmentalCompliance@gov.bc.ca email address or as otherwise instructed by the Director.

3.2 **Bypasses**

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The Operational Certificate Holder must not allow any discharge authorized by this authorization to bypass the Authorized Works, except with the prior written approval of the Director.

3.3 **Groundwater and Surface Water Quality**

The landfill must be operated and maintained so that the applicable groundwater or surface water use is not compromised beyond the landfill site boundary, or 150 meters from the landfill footprint, whichever is closer. Any surface water quality must also meet standards for applicable water use(s). The applicable water use is determined on the basis of existing land use and possible future uses for one or more of aquatic life, irrigation, livestock or drinking water. Protocols and/or guidance under the *Environmental Management Act* Part 4 (Contaminated Site Remediation) shall be followed by a qualified professional in determining the applicable water use (i.e. Contaminated Sites Regulation Section 12; Technical Guidance 6 on Contaminated Sites; etc.).

The director may specify other numerical water quality standards and objectives that the operator of the landfill facility must meet.

3.3.1 **Consequence of Exceedance**

Where monitoring shows contaminant concentrations exceed the applicable water use, or other standards, the operator shall notify the Director and take one of the following corrective actions:

- I. Mitigation to meet standards or
- II. Based on the results of a risk assessment carried out in accordance with Contaminated Sites Regulation guidance (i.e. Technical Guidance 7), undertake the warranted mitigation measures to achieve acceptable risk.

4. **OPERATIONAL REQUIREMENT**

4.1 **Site Preparation and Restoration**

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4.1.1 To prevent unauthorized dumping, the Operational Certificate Holder must ensure that the site is made inaccessible to the public in a manner that is acceptable to the Director.

4.1.2 The Operational Certificate Holder must provide surface water diversionary works, firebreaks and site restoration to the satisfaction of the Director.

4.1.3 The Operational Certificate Holder must inspect the landfill site a minimum of annually for any potential berm or slope failures or leachate. The inspection records must be included in the annual report.

4.2 **Wildlife Nuisance**

The Director may require the Operational Certificate Holder to construct or modify works, or follow specific operating instructions, if the Director is of the opinion that there is a possibility of nuisance or hazard being caused by bears or other animals that are attracted to the site.

4.3 **Open Burning Prohibition**

The Operational Certificate Holder must not allow the open burning of waste at the site caused by any means, including a deliberate or accidental action by the Operational Certificate Holder or others. The Operational Certificate Holder must immediately extinguish all fires of this nature and notify the Director within 24 hours.

4.4 **Groundwater Impacts**

The Operational Certificate Holder must not impact groundwater at the property boundary (or as otherwise specified by the Director) by leachate beyond levels specified by the Director.

4.5 **Sampling Procedures**

The Operational Certificate Holder must carry out sampling in accordance with the procedures described in the "British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples, 2013 Edition (Permittee)" or most recent edition, or by alternative procedures as authorized by the Director.

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A copy of the above manual is available on the Ministry web page at <https://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/laboratory-standards-quality-assurance/bc-field-sampling-manual>

4.6 **Analytical Procedures**

The Operational Certificate Holder must carry out analyses in accordance with procedures described in the "British Columbia Laboratory Manual (2015 Permittee Edition)", or the most recent edition or by alternative procedures as authorized by the Director.

A copy of the above manual is available on the Ministry web page at <https://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/laboratory-standards-quality-assurance/bc-field-sampling-manual>.

5. **Environmental Effect Monitoring**

The Operational Certificate Holder shall undertake Environmental Effects Monitoring (EEM) to determine the effects of the landfill on the receiving environment, both during operation and post closure. EEM studies may include surface water, biological and sediment components and shall be performed using documented and validated methods, and their results interpreted and reported on in accordance with generally accepted standards of good scientific practice. The Operational Certificate Holder shall submit the results of the studies, including analysis and interpretation, to the Director, by June 30 of each following year.

5.1 **Surface Water Monitoring**

The following surface water monitoring program shall be carried out:

Locations	Parameters	Frequency
SW-1 Thornhill Creek upstream E231882 SW-3 Leachate seepage E231883 SW-6 Thornhill Creek downstream E231884 SW-21 Leachate Weir E231886	<u>Inorganics</u> Total metals, alkalinity (as CaCO ₃), total and dissolved hardness (as CaCO ₃), ammonia, fluoride, chloride, conductivity, nitrate, nitrite, total kjeldahl nitrogen, pH, total phosphorus, ortho-phosphorus, total suspended solids, sulphate. <u>Organics</u>	Once per Season: Spring (March- April) Summer (July –Aug.) Fall (October – Nov.)

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	Biological oxygen demand (BOD ₅), chemical oxygen demand (COD) <u>Field Parameters</u> Conductivity, pH, temperature, dissolved oxygen, turbidity	
--	---	--

5.2 Groundwater Monitoring

For the purpose of supporting groundwater modeling and to detect any significant impacts on the environment from leachate in the groundwater, the Operational Certificate Holder shall engage a qualified professional, experienced in groundwater hydrogeology, to design a groundwater monitoring program. The groundwater monitoring program shall be submitted for the written approval by the Director on or before October 1, 2021 and shall be implemented by November 30, 2021 (implementation shall be considered to include installation of any additional wells specified in the final groundwater monitoring program design). The Director may specify, from time to time, that the groundwater monitoring program be revised and updated for his/her written approval. The program shall consider the use of existing and if necessary, new groundwater wells.

In the interim, the following groundwater monitoring program shall be carried out:

Locations	Parameters	Frequency
BH 96-2 E231889	<u>Inorganics</u> Dissolved metals, alkalinity (as CaCO ₃), dissolved hardness (as CaCO ₃), ammonia, chloride, fluoride, conductivity, nitrate, nitrite, total kjeldahl nitrogen, pH, total phosphorus, total dissolved solids, sulphate. <u>Organics</u> Chemical oxygen demand (COD), <u>Field Parameters</u> Conductivity, pH, water elevation, temperature, dissolved oxygen	Once per Season: Spring (March- April) Summer (July –Aug.) Fall (October – Nov.)

5.3 Quality assurance/Quality Control (QA/QC)

The Operational Certificate Holder is required to conduct the following Quality Assurance and Control Program to determine the acceptability of data required by this Operational Certificate and Section 2(d) of the Environmental Data Quality Assurance Regulation.

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- a) Obtain and keep current, the laboratory precision, accuracy and blank quality control criteria for each laboratory analysed parameter from the analytical laboratory(ies).
- b) Collect one duplicate sample during each sampling session from one of the discharge points.
- c) Each duplicate sample must be submitted to the laboratory; one of the pairs identified as the regular sample, and the other, as a blind sample identified by a fictitious site-name established solely to identify the duplicate sample.
- d) For each parameter, report the results of the field duplicates in terms of the degree of variation as the relative percent difference.
- e) A sample collection blank must be prepared, containing distilled water, and preservative if required, and submitted as a blank sample with one sample set per session. If any result for any parameter indicates detectable concentrations, then efforts must be made to determine and control the source of contamination.

6. **REPORTING REQUIREMENTS**

The Operational Certificate Holder must submit all data required to be submitted under this section by email to the Ministry's Routine Environmental Reporting Submission Mailbox (RERSM) at envauthorizationsreporting@gov.bc.ca or as otherwise instructed by the Director. For guidelines on how to properly name the files and email subject lines or for more information visit the Ministry website:

<https://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions/routine-environmental-reporting-submission-mailbox>

6.1 **Annual Reporting**

The Operational Certificate Holder must, by June 30th each year, submit to the Director an Annual Report for the previous calendar year. The first Annual Report will be required by June 30, 2021. The report must contain at least the following information if applicable:

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- a) the type and tonnage of waste received, transferred, recycled and discharged for the proceeding such calendar year; “if no waste is received, this must be noted in the annual report”
- b) occurrences or observations of wildlife, including burrowing/scavenging (medium and large carnivores) at the facility;
- c) the results of all monitoring programs as specified in this Authorization. The Operational Certificate Holder must ensure that data interpretation and trend analysis, as well as an evaluation of the impacts of the discharges on the receiving environment in the previous year, is included in such results and carried out by a Qualified Professional;
- d) the methods and amounts of leachate collection, treatment and disposal, if applicable
- e) any unauthorized dumping; and
- f) results from annually inspection for any potential berm or slope failures or leachate.

6.2 **Non-compliance Notification**

The Operational Certificate Holder must immediately notify the Director or designate by email at EnvironmentalCompliance@gov.bc.ca, or as otherwise instructed by the Director of any non-compliance with the requirements of this Authorization and take remedial action to remedy any effects of such non-compliance.

The Operational Certificate Holder must provide the Director with written confirmation of all such non-compliance events, including available test results within 24 hours of the original notification by email at EnvironmentalCompliance@gov.bc.ca, or as otherwise instructed by the Director.

6.3 **Non-compliance Reporting**

If the Operational Certificate Holder fails to comply with any of the requirements of this Authorization, the Operational Certificate Holder must, within 30 days of such non-compliance, submit to the director a written report that includes, but is not necessarily limited to, the following:

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- a) all relevant test results obtained by the Operational Certificate Holder related to the non-compliance,
- b) an explanation of the most probable cause(s) of the non-compliance, and
- c) a description of remedial action planned and/or taken by the Operational Certificate Holder to prevent similar non-compliance(s) in the future.

The Operational Certificate Holder must submit all non-compliance reporting required to be submitted under this section by email to the Ministry's Compliance Reporting Submission Mailbox (CRSM) at EnvironmentalCompliance@gov.bc.ca or as otherwise instructed by the Director. For guidelines on how to report a non-compliance or for more information visit the Ministry website:

<https://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions/compliance-reporting-mailbox>

6.4 **Spill Reporting**

The Operational Certificate Holder must immediately report all spills to the environment (as defined in the Spill Reporting Regulation) in accordance with the Spill Reporting Regulation, which among other things, requires notification to Emergency Management BC at 1-800-663-3456.

6.5 **Landfill Closure Plan**

The Operational Certificate Holder must submit to the Director an updated Closure Plan Assessment prepared by an independent Qualified Professional by March 31, 2021. The Closure Plan Assessment must, as a minimum, include the following:

- i) proposed end-use of the landfill after closure;
- ii) estimated and/or anticipated total volume and tonnes of waste received at the landfill during operations, and life of the landfill (i.e. closure date);

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- iii) current final cover on site, including, the thickness and permeability of barrier layers and drainage layers, and information on topsoil, vegetative cover and erosion prevention controls;
- iv) current description of procedures for alternative waste disposal facilities;
- v) procedures for notifying the public about the closure and about alternative waste disposal facilities;
- vi) rodent and nuisance wildlife control procedures;
- vii) a comprehensive monitoring plan, including groundwater monitoring, surface water monitoring, landfill gas monitoring, leachate monitoring, final cover monitoring, and erosion and settlement monitoring, for a minimum post-closure period of 25 years;
- viii) a plan and accompanying design for the collection, storage and treatment/use of landfill gas for a minimum 25 year post-closure period (if required);
- ix) if applicable, a plan for operation of any required pollution abatement engineering works, such as leachate collection and treatment systems, for a minimum post-closure period of 25 years; and
- x) an estimated cost, updated annually, to carry out closure and post-closure activities for a minimum period of 25 years.

6.6 **Site Decommissioning**

In accordance with Section 40 of the *Environmental Management Act* and Part 2 of the Contaminated Sites Regulation, the Operational Certificate Holder must submit a site profile to the manager at least 10 days prior to decommissioning the facilities authorized in Section 2.

7. **Closure Requirement**

7.1 **Closure Funding**

The Operational Certificate Holder shall ensure that sufficient funds will be available to provide for all closure and post-closure requirements as outlined in the

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closure plan required by Section 6.5, plus a reasonable contingency for any remediation which may be required.

8. **ENVIRONMENTAL IMPACT**

Inspections of the discharge will be carried out by Environmental Protection personnel as a part of the routine operational certificate inspection procedure. Based on these inspections and any other information available to the Director on the effect of the discharge on the receiving environment, the operational certificate holder may be required to undertake additional monitoring, undertake additional studies, install additional pollution control works, or change the method of operation.

9. **PUBLICATION OF DOCUMENTS**

The Ministry of Environment and Climate Change Strategy publishes Regulatory Documents on its website for the purpose of research, public education and to provide transparency in the administration of environmental laws. The Operational Certificate Holder acknowledges that the Province may publish any Regulatory Documents submitted by the Operational Certificate Holder excluding information that would be exempted from disclosure if the document was disclosed pursuant to a request under section 5 of the *Freedom of Information and Protection of Privacy Act*, and the Operational Certificate Holder consents to such publication by the Province.

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Regional District of
Kitimat-Stikine

Appendix B Environmental Effects Monitoring Program Annual Report



MORRISON HERSHFIELD

FINAL REPORT

Thornhill Landfill 2022 Environmental Effects Monitoring Program Annual Report

Prepared for:

Regional District of Kitimat-Stikine
300-4545 Lazelle Avenue
Terrace, BC V7G 4E1

Prepared by:

Morrison Hershfield Limited



Report No. 2301488.00
June 28, 2023

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EXECUTIVE SUMMARY

The Thornhill Landfill (TL) is located approximately 10 km southeast of Terrace, British Columbia, on Old Lakelse Lake Road. The Ministry of Environment and Climate Change Strategy (ENV) requires annual reporting, as per Operational Certificate No. 4057, which was initially granted on February 2nd, 1976, and amended on November 18th, 2021 (the “OC”, Appendix B). Since 2016, the Site has not been utilized as a landfill. The goal of the Environmental Effects Monitoring Program (EEMP) is to assess the potential impact of the closed Thornhill Landfill on the receiving environment, as defined in the OC. The EEMP involves monitoring surface water and groundwater at four stations three times per year (spring, summer, and fall), as well as a Quality Assurance/Quality Control (QAQC) program. RDKS, as the OC holder, is required to conduct the QAQC program to determine the acceptability of the data specified in the OC. An annual report must be submitted to ENV by June 30th of the following year. The Regional District of Kitimat-Stikine (RDKS) retained Morrison Hershfield (MH) to prepare the 2022 Annual Environmental Effects Monitoring Report.

The 2022 monitoring program shows that leachate from TL in surface water is mitigated before it reaches the Thornhill Creek water system, which aligns with past evaluations. Monitoring results show no negative effects on downgradient groundwater quality, which is consistent with the majority of the site's low-permeable clay material. However, numerous exceedances of dissolved and total metals at standpipe MW21-03, a test pit installed northwest of the Site, were observed. These results are not indicative of downgradient groundwater quality since monitoring wells placed in test pits are not the industry norm, and the water sampled from them is likely perched within the upper clay material and/or surface water that has infiltrated the pit.

The following are recommendations for future work at the closed Thornhill Landfill:

- Replace monitoring well MW21-03 with a conventional drilled monitoring well.
- Discontinue total metals analysis in groundwater since it is commonly influenced by particulate matter entrained within the samples, and it is not used in groundwater screening to CSR standards, which are applied to dissolved metals.
- Supply field and travel blanks for all site visits to assist in determining sources of exceedances.

STATEMENT OF LIMITATIONS

The Regional District of Kitimat-Stikine retained Morrison Hershfield to conduct the work described in this report, and this report has been prepared solely for this purpose.

This document, the information it contains, the information and basis on which it relies, and factors associated with implementation of suggestions contained in this report are subject to changes that are beyond the control of the author. The information provided by others is believed to be accurate and may not have been verified.

Morrison Hershfield does not accept responsibility for the use of this report for any purpose other than that stated and does not accept responsibility to any third party for the use, in whole or in part, of the contents of this document. This report should be understood in its entirety, since sections taken out of context could lead to misinterpretation.

ACRONYMS & DEFINITIONS

Name	Acronym
Canadian Association for Laboratory Accreditation	CALA
Contaminated Site Regulation	CSR
Difference Factor	DF
Data Quality Objective	DQO
Environmental Effects Monitoring Program	EEMP
Forceman Ridge Waste Management Facility	FRWMF
Ministry of Environment and Climate Change Strategy	ENV
Operational Certificate	OC
Quality Assurance Quality Control	QAQC
Regional District of Kitimat-Stikine	RDKS
Reported Detection Limit	RDL
Relative Percent Difference	RPD
Thornhill Landfill	TL
Water Quality Guidelines	WQG

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1. INTRODUCTION

Morrison Hershfield Limited has been retained by the Regional District of Kitimat-Stikine (RDKS) to prepare the 2022 Annual Environmental Effects Report for the closed Thornhill Landfill (TL or “the Site”). This report covers the period from January to December 2022. It has been prepared to fulfill the requirements of the facility’s Operational Certificate (OC) MR-4057, issued by the Ministry of Environment and Climate Change Strategy (ENV) and most recently amended in November 2021. Waste is no longer deposited at the Thornhill Landfill and septage is no longer accepted at the facility. Refuse, clean wood, and compostable organics are collected, consolidated, and hauled to the Forceman Ridge Waste Management Facility (FRWMF). Metals (including white goods, scrap metals, and propane tanks) Metals collected at the Transfer Station are sold as scrap. A site map can be found in Appendix A.

2. BACKGROUND

The Thornhill Landfill, authorized under Operational Certificate (OC) MR-4057, is located at 3016 Old Lakelse Lake Dr, Thornhill, BC. The Thornhill Transfer Station, established in 2016, operates on the landfill tenure, receiving waste from the greater Terrace area, and hauling to Forceman Ridge Waste Management Facility for final disposal. The landfill stopped accepting waste in January 2017 and was closed in June 2017. The closed landfill was capped with a low permeability clay cap system during closure construction activities starting in 2016. The landfill is currently undergoing the final stages of closure, which include application of a 300 mm layer of soil and establishing a vegetative cover of grass species. The OC reflects landfill closure, prohibiting the deposition of waste and prescribing an Environmental Effects Monitoring Program (EEMP).

2.1 Site Description

The Site is approximately 10 kilometres east of Terrace, located in Electoral Area C of the RDKS. The site is located on a license of occupation (Crown Lands File No. 0263180, the tenure) within District Lot 518. The tenure is approximately 18.79 ha in size. Within the tenure, 1.8 ha is cleared and includes the landfill footprint, and transfer station infrastructure.

The landfill infrastructure includes a landfill gas flare, stormwater ditches, and leachate treatment system composed of leachate collectors and two treatment ponds. Leachate is discharged at the tenure boundary at the location of SW-21.

The Site is located at the base of a mountain with an approximate elevation of 900 to 1400 meters above sea level (masl). The area surrounding the Site is defined by a rolling topography. The Site slopes to the northwest, with an approximate ground surface elevation of 215 masl on the southeastern portion of the Site and 185 masl on the northwestern portion of the Site. Surface drainage generally follows the slope of the land and drains towards the northwest. The surrounding area also generally slopes to the northwest towards the Skeena River. The nearest major surface water body to the Site is

Thornhill Creek, approximately 600 m northwest of the Site, which drains into the Skeena River, approximately 5 km northwest of the Site.

The regional surficial geology is located near a contact of a glacial outwash gravel deposit and a glaciomarine silt and clay sequence, underlain by glacial till (Clague 1983 and SHA 1997). Test pitting and drilling activities carried out by SHA in 1997 confirmed that the Site is underlain by a glaciomarine silt and clay unit that is up to 16 m in thickness. The only portion of the landfill that is not underlain by this unit is the southern tip of the landfill encompassing an approximate area of 20 x 50 m (SHA 1997). This area is underlain by glacial outwash gravel. The silt and clay unit underlying the landfill was tested by SHA (1997) and yielded a reported average hydraulic conductivity 4.2×10^{-10} m/s based on grain size and proctor permeability laboratory testing of four silt and clay samples.

2.2 Recent Studies & Investigations

Thornhill Landfill Annual Site Inspection

Section 4.1.3 of (OC) MR-4057 requires that the landfill site is inspected a minimum of annually for any potential berm or slope failures or signs of leachate. There were no deficiencies identified regarding any potential berm or slope failures, as well as no signs of venting during the inspection. One area of concern previously identified on site was the breakout on the lower slope of the landfill. Based on the location of this breakout, it is assumed to be captured by the leachate treatment system. The inspection made note to follow up with this breakout and another suspected leachate puddle by monitoring them throughout 2023. The inspection also noted the presence and concerns of *Alnus rubra* (red alder) and *Tanacetum vulgare* (common tansy) found in sections of the landfill. These observations will aid in the informing and carrying out of the remainder of the landfill closure in 2023.

2.3 Non-Compliance Reporting

One non-compliance report was submitted in 2022 for manganese (Mn) exceedances of the BC Water Quality Guidelines (WQG) for drinking water at SW-21 during the spring monitoring event on April 6, 2022. Historical sampling at the site, dating back to 2016, had exceeded Mn drinking water criteria at each sampling event. SW-06 is located on Thornhill Creek and represents the downstream extent of the surface water sampling program. Present and historical Mn results at this location were within compliance of the applicable regulatory framework. Groundwater monitoring well MW21-02 is located adjacent to SW-21. Groundwater was sampled from this well during the same sampling event and was within compliance with the Contaminated Sites Regulation (CSR) Schedule 3.2, including the drinking water (DW) criteria for Mn. Additional detail on specific monitoring locations at the Site is provided in Section 3.1.

3. ENVIRONMENTAL EFFECTS MONITORING PROGRAM

In accordance with the OC, surface water and groundwater monitoring occurs three times per year once per season, apart from winter.

3.1 Monitoring Locations

A summary of the Site’s EEMP monitoring locations per the OC is provided in Table 1. Discontinued stations are also provided for historical context with the tabulated results and report figures.

Table 1: EEMP Monitoring Locations

Location	OC Station ID	Sample Type	Easting UTM	Northing UTM	Inferred Groundwater Gradient
BH96-2	E231889	Groundwater Monitoring Well	533240	6038425	Downgradient
MW21-01	-	Groundwater Monitoring Well	533440	6038299	Cross-gradient
MW21-02	-	Groundwater Monitoring Well	533200	6038533	Downgradient
MW21-03	-	Groundwater Standpipe in Test Pit	533028	6038349	Downgradient/Cross-gradient
SW-1	E231882	Surface Water	533702	6038575	Cross-gradient (background)
SW-3	E231883	Surface Water/Leachate	533198	6038389	Leachate Seep on Landfill
SW-6	E231884	Surface Water	532615	6039310	Downgradient
SW-21	E231886	Surface Water	533182	6038522	Effluent Discharge
Discontinued from the EEMP					
BH96-3	-	Groundwater Monitoring Well	533314	6038203	Upgradient
SW-16	-	Surface Water	533122	6038801	Downgradient
SW-17	-	Surface Water	533031	6038804	Downgradient
SW-18	-	Surface Water	533006	6038901	Downgradient
SW-22	-	Surface Water	533152	6038586	Downgradient
SW-23	-	Surface Water	531755	6039631	Downgradient
Goodwin Well (Well Tag 51068)	-	Domestic Groundwater Well	532315	6037760	Upgradient
Reinhart Well (Well Tag 38440)	-	Domestic Groundwater Well	533558	6038095	Upgradient



3.2 Regulatory Framework

In British Columbia, environmental matters pertaining to contaminated sites generally fall under the jurisdiction of the Ministry of Environment & Climate Change Strategy (ENV), pursuant to the Environmental Management Act (EMA, SBC 2003). The key regulation under the EMA that relates to the assessment and remediation of contaminated sites is the Contaminated Sites Regulation (BC Reg. 375/96). The BC Approved and Working Water Quality Guidelines (WQG) are also considered applicable for surface waters at the Site.

Please note that regulatory standards and guidelines may change over time. For the preparation of this report, Morrison Hershfield has reviewed the Site chemistry data provided by RDKS, including historical results, based on the applicable standards and guidelines at that time. Morrison Hershfield has not examined the screening of historical data, nor compared the screening results with those of previous EEMP reports, but rather included the historical data for completeness. The primary focus of this report is on the screening of the current (2022) chemistry data according to the standards and guidelines described below.

3.2.1 Groundwater

ENV Protocol 21 (BC ENV 2017a) states “Future drinking water use applies to all drinking water aquifers below a site whether or not current drinking water use applies.” Based on the available hydrogeological information from previous investigations at the Site, saturated geological materials underneath the Landfill would be considered an aquifer as defined in Protocol 21. Groundwater quality samples have shown Total Dissolved Solids concentrations less than the CSR-DW threshold of 4000 mg/L; therefore, future drinking water use (DW) is considered applicable for groundwater at the Site and the CSR drinking water (DW) standards, as per Schedule 3.2 of the CSR, are considered applicable to the Site. Additionally, section 3.1 of Protocol 21 outlines that if there is a drinking water well with 500 m of the site boundary or contamination extent then DW applies, and there are four registered water wells located within this radius.

As per Protocol 21, Section 5.0, aquatic life water use (AW) applies to all groundwater located within 500 m of an aquatic receiving environment unless it can be demonstrated that the groundwater does not flow to that receiving environment. The nearest major surface water body to the Site is Thornhill Creek, approximately 600 m northwest of the Site, which drains into the Skeena River, approximately 5 km northwest of the Site. The inferred direction of groundwater flow at the site is approximately north, and although the site itself is 600 m from Thornhill Creek, groundwater monitoring well MW21-02 is within 500 m of the creek, and therefore AW applies. The surface water sampling point SW-06 is located on Thornhill Creek, downstream of MW21-02.

3.2.2 Surface Water

The BC WQGs are considered applicable for surface waters at the Site for the protection freshwater aquatic life (AW-F). The WQGs are comprised of working and approved guidelines with both 30-day mean (chronic) and maximum (acute) applied to the screening. For surface water screening criteria, the WQG threshold for the protection of DW was considered not applicable to the Site based on the understanding that surface water emanating from the Site is not used for drinking water consumption. This was supported by a recent search of the online BC Water Resource Atlas (accessed *March 2023*) which did not find any surface water leases at or within 1 km of the Site registered for human consumption. SW-03 is located at a leachate seep at the lower toe of the landfill. Leachate is collected in a sump and diverted to the leachate conveyance system and into the upper treatment lagoon. The BC-WQG do not apply to this site, water quality at this location is used to evaluate leachate strength and leachate treatment.

Table 2: Regulatory Framework and Applicable Sites

Criteria or Guideline	Applicable Sites
BC WQG AW-F	SW-01, SW-06, SW-21
CSR DW	All groundwater sites

3.3 Methodology

RDKS completed the field monitoring, sampling and field QA/QC during the 2022 monitoring year. Surface water and groundwater samples were collected by RDKS field staff following established sampling procedures as outlined in the British Columbia Field Sampling Manual (ENV 2013). A YSI water quality meter was calibrated before each monitoring event following the manufacturer's instructions. On occasion, a LaMotte in-situ pH kit range 3.0-10.5 was used for verifying pH measurements in the field. Samples were collected in clean, laboratory-supplied sample bottles, stored on ice, and transported to an accredited laboratory for analyses of the parameters outlined in the OC.

3.3.1 Groundwater

The 2022 groundwater program consisted of groundwater monitoring and sampling at four locations at the Site (Figure 1). Monitoring included measurement of in-situ water quality parameters using a YSI meter, and measurement of depth to water table in the groundwater wells. Per the OC, groundwater samples were collected in April (Spring), July (Summer) and October (Fall) 2022 and submitted to a laboratory for analysis of parameters as required by OC 4057. A description of each groundwater monitoring/sampling location (historical to present) is provided in Table 3 below.

Table 3: Groundwater Locations

Location	Description
BH96-2	Installed in the silt and clay unit at the northern edge (downgradient) of the Site.
MW21-01	Installed in sand and gravel at the eastern edge (upgradient) of the Site adjacent to the transfer station building
MW21-02	Installed in clay approximately 100 m north (downgradient) of the edge of the Site.
MW21-03	Standpipe installed at the western (downgradient/side gradient) edge of the Site during test pitting activities.

3.3.2 Surface Water

The 2022 surface water program consisted of surface water monitoring and sampling at four locations at the Site (Figure 1), including raw leachate from a leachate sump on the landfill. Monitoring included measurement of in-situ water quality parameters using a YSI meter. A LaMotte 2020we Turbidity Meter was utilized for measuring turbidity in the field. The Turbidity Meter and accompanying parts are cleaned prior to use in the field and are calibrated just before use. On occasion, a LaMotte in-situ pH kit range 3.0-10.5 was used for verifying pH measurements in the field. Samples were collected as per the requirements of OC 4057, which specifies SW-01, SW-03, SW-06, and SW-21 as sampling points. A description of each surface water sampling location (historical to present) is provided in Table 4 below. The remaining surface water locations are described for reference but are not part of the EEMP as outlined in OC 4057 and were not sampled in 2022. Per the OC, surface water samples were collected in April (Spring), July (Summer) and October (Fall) 2022 and submitted to a laboratory for analysis of parameters as required by OC 4057.

Table 4: Surface Water Locations

Location	Description
SW-01	Cross-gradient to the landfill. Background location
SW-03	Historically sampled from landfill leachate seep. Since 2017, leachate samples from the seep are collected from a leachate sump.
SW-06	Located on Thornhill Creek by Ziegler Bridge
SW-16	Located on Thornhill Creek, downstream of the Thornhill Creek and leachate outfall originating from SW-21 confluence and 100 m upstream of SW-17.
SW-17	Located on Thornhill Creek, 100 m downstream of the confluence of Thornhill Creek and leachate outfall originating from SW-21.
SW-18	Located 100 m downstream from SW-17.
SW-21	Monitoring weir located 200 m downstream of the leachate and stormwater retention pond.
SW-22	Located 60 m downstream of SW-21.
SW-23	Located on Thornhill Creek near the Old Lakelse Rd and Miller Rd intersection.

3.4 QAQC Program

To assess and document that the program's sampling and analytical data are interpretable, meaningful, and reproducible, the QAQC program outlined in the OC was followed. Standard industry field procedures were used in both the collection (field program) and analysis (laboratory) of the samples.

The following data quality objectives (DQO) were considered applicable for the field QAQC program:

- Collection and submission of one field duplicate for each sampling event from one of the discharge points. The results of the field duplicates are used to assess relative percent difference (RPD) or difference factor (DF) if concentrations are less than five times the laboratory reported detection limit (RDL).
- RPD is calculated as follows (where X1 is the original sample's analytical result and X2 is that of the duplicate sample):

$$RPD (\%) = \frac{2(X1 - X2)}{X1 + X2} \times 100\%$$

- For water samples, QAQC targets are RPD less than 20% for inorganics and 30% for organics.
- DF is calculated as follows (where X1 is the original sample result, X2 is the blind field duplicate and LRL is the laboratory reporting limit):

$$DF = \left| \left(\frac{X1 - X2}{LRL} \right) \right|$$

- All media: DF less than two.
- Collection and submission of a field blank sample per sampling event.
 - For water samples, QAQC targets for field blanks are for analytical results less than five times the laboratory RDL.

The following DQOs were considered acceptable for the laboratory QAQC program:

- Analyses were performed by the accredited laboratory ALS Environmental Ltd (ALS). ALS is certified by the Canadian Association for Laboratory Accreditation (CALA) for the analyses of this program.
- Analytical blanks should be below the detection limits used for the specific analysis.
- Laboratory duplicates should fall within the targets set by the laboratory.
- Reference materials or spiked standards should be within the targets specified by the laboratory.

4. RESULTS & DISCUSSION

A set of field photos taken during monitoring in 2022 can be found in Appendix C. Laboratory certificates of analysis for 2022 sampling events are presented in Appendix D. Summary tables of analytical results, including comparison to applicable regulatory standards and guidelines, are presented in Appendix E.

4.1 Groundwater

4.1.1 Monitoring

Five monitoring events occurred between February 4 and October 20, 2022 at the groundwater monitoring locations and on the dates outlined in Table 5.

Table 5: Groundwater monitoring locations and dates

Monitoring Dates	BH96-02	MW21-01	MW21-02	MW21-03
February 4, 2022	✓	✓	✓	✓
April 7, 2022	✓	✓	✓	✓
July 14, 2022	✓	✓	✓	
August 15, 2022				✓
October 20, 2022	✓	✓	✓	✓

During each discrete monitoring event, field measurements were taken of physical water quality parameters. Table 6 presents the field measurements made at each monitoring event. As shown in Table 6, groundwater was found at depths of approximately 22 m below top of well casing upgradient of the landfill at MW21-01 (fall event) and 9 m below the ground surface downgradient of the landfill at BH96-02 and MW21-02 (summer and fall). Water level monitoring at BH96-02 shows little variation in groundwater levels between the silt and clay unit over different seasons, while the water level at MW21-02 increased by approximately 0.3 m between the summer and fall monitoring events. MW21-03, placed in a former test pit, shows water levels at 2.2 m below ground surface. This water level is inferred to be related to perched water within the upper clay material and/or surface water that has infiltrated the well. There is a lack of depth to water measurements to determine seasonal variability.

Table 6: Field measured groundwater quality parameter results

Parameter	Units	BH96-02	MW21-01	MW21-02	MW21-03
<i>4-Feb-22</i>					
Temperature	°C	6.7	6.0	6.2	2.5
Conductivity	µS/cm	232.6	167.3	242.2	129.9
Dissolved Oxygen	mg/L	3.0	8.3	10.6	5.1
pH	units	8.03	4.06	7.97	4.36
Oxidation Reduction Potential	mV	300.9	505.3	317.2	256.1
Depth to Water	m btoc ¹	NR	NR	NR	NR
<i>7-Apr-22</i>					
Temperature	°C	6.1	6.4	6.8	6.1
Conductivity	µS/cm	249.3	172.1	256.6	375.0
Dissolved Oxygen	mg/L	1.3	5.2	2.2	1.7
pH	units	8.00	7.75	8.21	6.00
Oxidation Reduction Potential	mV	213.0	210.9	230.6	25.5
Depth to Water	m btoc ¹	NR	NR	NR	1.33
<i>14-Jul-22</i>					
Temperature	°C		11.4	10.2	
Conductivity	µS/cm		214.1	298.6	
Dissolved Oxygen	mg/L	NR	7.4	8.8	NR
pH	units		7.78	7.84	
Oxidation Reduction Potential	mV		200.2	217.9	
Depth to Water	m btoc ¹	9.37	21.35	8.85	
<i>15-Aug-22</i>					
Temperature	°C				12.4
Conductivity	µS/cm				293.5
Dissolved Oxygen	mg/L	NR	NR	NR	2.7
pH	units				5.92
Oxidation Reduction Potential	mV				193.6
Depth to Water	m btoc ¹				2.47
<i>20-Oct-22</i>					
Temperature	°C	8.3	8.6	8.0	8.7
Conductivity	µS/cm	266.5	288.0	271.4	306.4
Dissolved Oxygen	mg/L	5.7	NR	7.1	3.5
pH	units	7.96	NR	7.76	6.45
Oxidation Reduction Potential	mV	273.3	NR	134.2	132.0
Depth to Water	m btoc ¹	9.45	22.05	9.14	2.20

¹ m btoc: meters below top of casing

² NR: no reading taken



4.1.2 Sampling

Summary tables showing the analytical results for the EEM groundwater sampling locations can be found in Appendix E. These results were compared to the applicable CSR Schedule 3.2 DW and AW standards. A summary of exceedances can be found in Table 7.

While some total metals exceeded the CSR DW standard in monitoring wells MW21-01 and MW21-02, and CSR AW in MW21-02, the presence of these metals both upgradient (MW21-01) and downgradient (MW21-02) of the Site and the absence of these metals in the dissolved phase suggest that they are naturally occurring and likely associated with particulate entrained within the samples. No exceedances of the applicable standards were observed for dissolved metals or other constituents in upgradient groundwater at MW21-01, nor in downgradient groundwater at MW21-02 and BH-96-2.

As per the OC, total metals are not required to be analysed in groundwater. The reason for this is that dissolved metals are more suitable for groundwater analysis as they represent the portion of metals that are bioavailable and can therefore pose a risk to human health and the environment. Total metals, on the other hand, include both dissolved and particulate-bound metals and may not accurately reflect the potential risk to human health and the environment.

Several exceedances of dissolved metals were observed at standpipe MW21-03, which was re-installed during test pitting activities northwest of the Site. Water sampled at this location is not considered representative of local groundwater but rather perched water within the upper clay material and/or surface water that has infiltrated the pit. The fact that only total metals are present at MW-03 further supports the recommendation to discontinue the analysis of total metals in groundwater samples.

Table 7: Exceedances in Groundwater Samples

Parameter	Units	CSR AW	CSR DW	BH96-2	MW21-01		MW21-02		MW21-03		
				14-Jul-22	07-Apr-22	14-Jul-22	06-Apr22	14-Jul-22	06-Apr-22	15-Aug-22	20-Oct-22
				14:51	15:54	13:23	11:28	14:27	02:30	15:00	13:50
Total Metals (Water)											
Aluminum (Al)	mg/L	5	9.5	-	-	-	-	29.2	16.7	-	-
Arsenic (As)	mg/L	0.5	0.01	-	-	-	0.0116	0.0212	0.0116	-	-
Cobalt (Co)	mg/L	0.04	0.001	0.00306	0.00118	0.00326	0.00225	0.0192	0.0126	-	-
Copper (Cu)	mg/L	Variable	1.5	-	-	-	-	0.0746	-	-	-
Iron (Fe)	mg/L	-	6.5	-	-	-	-	-	26.5	-	-
Lead (Pb)	mg/L	Variable	0.01	-	-	-	-	0.014	-	-	-
Manganese (Mn)	mg/L	-	1.5	-	-	-	-	-	4.08	-	-
Vanadium (V)	mg/L	-	0.02	-	-	-	-	0.0645	-	-	-
Dissolved Metals (Water)											
Arsenic (As)	mg/L	0.5	0.01	-	-	-	-	-	-	0.0122	0.0103
Cobalt (Co)	mg/L	0.04	0.001	-	-	-	-	-	0.00302	0.00349	0.00375
Iron (Fe)	mg/L	-	6.5	-	-	-	-	-	9.12	11.3	13.4
Manganese (Mn)	mg/L	-	1.5	-	-	-	-	-	4.56	5.03	6.88



4.2 Surface Water

4.2.1 Monitoring

Three monitoring events occurred between April 6 and October 21, 2022 at the surface water monitoring locations and on the dates outlined in Table 8.

Table 8: Surface water monitoring locations and dates

Monitoring Dates	SW-01	SW-03	SW-06	SW-21
April 6, 2022	✓	✓	✓	✓
July 26, 2022	✓	✓	✓	✓
October 21, 2022	✓	✓	✓	✓

During each discrete monitoring event, field measurements were taken of physical water quality parameters. Table 9 presents the field measurements made on each monitoring event.

Table 9. Field measured surface water quality parameter results

Parameter	Units	SW-01	SW-03	SW-06	SW-21
<i>6-Apr-22</i>					
Temperature	°C	3.2	9.4	3.3	5.6
Conductivity	µS/cm	35.5	1136.0	50.0	422.3
Dissolved Oxygen	mg/L	11.4	0.1	11.5	6.8
pH	units	7.0	7.0	7.0	7.75
Oxidation Reduction Potential	mV	215.9	119.6	758.6	216.0
Turbidity	NTU	1.80	21.5	4.53	4.32
<i>26-Jul-22</i>					
Temperature	°C	11.4	12.1	13.2	17.3
Conductivity	µS/cm	46.5	1034.0	85.2	429.4
Dissolved Oxygen	mg/L	11.0	2.9	12.5	4.4
pH	units	7.12	6.59	7.63	7.80
Oxidation Reduction Potential	mV	293.0	155.6	184.2	260.8
Turbidity	NTU	0.6	28.4	1.6	4.0
<i>21-Oct-22</i>					
Temperature	°C	9.7	14.1	9.0	10.1
Conductivity	µS/cm	67.9	1486.0	80.6	400.7
Dissolved Oxygen	mg/L	14.7	1.2	16.1	9.7
pH	units	7.49	6.40	7.38	7.55
Oxidation Reduction Potential	mV	225.5	-7.8	218.2	225.0
Turbidity	NTU	1.1	59.8	2.9	5.8

4.2.2 Sampling

Summary tables showing analytical results for the EEMP surface water sampling locations can be found in Appendix E. These results were compared to the applicable BC WQG for AW-F. A summary of exceedances can be found in Table 10.

Surface water sampling location SW-03 exhibited elevated concentrations of ammonia, TKN, arsenic, boron, chromium, total and dissolved iron, manganese, and low dissolved oxygen, which are inferred to be a result of the landfill. Although the BC WQG are applied for comparison purposes, the SW-03 sampling point is a sump for collection of landfill seepage, and not a natural watercourse. These elevated concentrations are quickly attenuated downstream, with SW-21 characterized by elevated ammonia, nitrate and dissolved aluminum, and low dissolved oxygen. The dissolved aluminum is not attributed to the landfill because surface water closer to the landfill is not characterized by similar exceedances. No exceedances observed at further downstream locations, SW-06 and SW-01. Similarly, specific conductivity is observed to be highest at SW-03, declining at SW-21 and reaching background concentrations at other downstream locations.

Table 10. Exceedances in Surface water Samples

Parameter	Units	BC WQG AW-F (Long term)	BC WQG AW-F (Short term)	SW-01			SW-03			SW-06			SW-21		
				6-Apr-22	26-Jul-22	21-Oct-22	6-Apr-22	26-Jul-22	21-Oct-22	6-Apr-22	26-Jul-22	21-Oct-22	6-Apr-22	26-Jul-22	21-Oct-22
				12:18	11:30	11:22	13:11	9:11	12:08	15:15	13:00	12:55	9:57	10:30	10:50
Anions and Nutrients (Water)															
Ammonia, total (as N)	mg/L	Variable with T and pH	Variable with T and pH	-	-	-	42.5	47.2	43.6	-	-	-	8.54	-	-
Nitrate (as N)	mg/L	3	32.8	-	-	-	-	-	-	-	-	-	5.12	-	3.72
Total Metals (Water)															
Arsenic (As)	mg/L	0.005	-	-	-	-	0.00921	0.0292	0.0149	-	-	-	-	-	-
Boron (B)	mg/L	1.2	-	-	-	-	1.64	1.57	-	-	-	-	-	-	-
Chromium (Cr)	mg/L	0.001	-	-	-	-	-	0.00128	0.00122	-	-	-	-	-	-
Iron (Fe)	mg/L	-	1	-	-	-	43.3	70.8	45	-	-	-	-	-	-
Manganese (Mn)	mg/L	Variable with H	Variable with H	-	-	-	3.75	3.14	2.58	-	-	-	-	-	-
Dissolved Metals (Water)															
Aluminum (Al)	mg/L	Variable with pH	Variable with pH	-	-	-	-	-	-	-	-	-	0.0520	-	-
Iron (Fe)	mg/L	-	0.35	-	-	-	35.4	60.2	40.2	-	-	-	-	-	-

4.3 QAQC Results

Instances where field duplicates collected in 2022 exceeded the applicable DQO for RPD between original and duplicate samples are shown in Table 11.

Table 11: Field QAQC Results

Parameter Exceeding RPD DQO	Field Duplicate Sample Location & RPD	
	MW21-01 07-Apr-22	MW21-03 15-Aug-22
Phosphorus, Total	35.5% (RPD)	-
Zinc Dissolved	-	2.5 (DF)

For the duplicate samples collected, only 2 parameters were outside the required range, as shown in the table above. Overall, these results suggest that sampling produced reproducible results. Additional samples, including five travel and four field blank samples, were collected in 2022. While some parameters exceeded the LDL in the blank samples, they did not correspond to any exceedances in the DQO.

5. TREND ANALYSIS

Parameters generally indicative of landfill leachate are listed below (Tchobanoglous, Theisen, and Vigil 1993):

- Biochemical oxygen demand (BOD)
- Total organic carbon (TOC)
- Chemical oxygen demand (COD)
- Total suspended solids (TSS)
- Ammonia nitrogen
- Nitrate
- Phosphorus (total)
- Alkalinity as CaCO₃
- pH
- Total hardness as CaCO₃
- Calcium

- Magnesium
- Potassium
- Sodium
- Chloride
- Sulphate
- Total iron

A subset of these parameters was chosen to evaluate the potential environmental impact of the Landfill, based on previous work by SHA (2018) and current analysis of the available data. These parameters are listed below:

- Electrical Conductivity
- Total Ammonia
- Chloride
- Sulphate
- Total/Dissolved Iron

Concentrations for the above-mentioned parameters were plotted for all historical data for both the surface water and groundwater sites. The plots can be found in Appendix F.

Surface water site SW-03 exhibits an increasing trend for total ammonia and total iron, however conductivity, chloride and sulphate values are decreasing through the years. Although total iron and total ammonia are increasing at SW-03, further downstream sites SW-06 and SW-21 do not exhibit the same trend, suggesting that there is some natural attenuation of these parameters as water moves downstream. Site SW-21 is decreasing across all parameters. Site SW-01 and SW-06 both exhibit low values and exhibit a level trend with no obvious increases or decreases.

In terms of groundwater, MW21-01, MW21-02 and MW21-03 do not have sufficient data to provide an indicative trend across the years. Trend lines are shown on the plots for reference; however, it is not recommended to use these trends until more historical data is established. Alternatively, BH96-2 shows increases in conductivity and chloride. BH96-2 also exhibits a gradual decrease in sulphate and a consistent trend in dissolved iron and total ammonia.

6. CONCLUSION & RECOMMENDATIONS

The 2022 monitoring program for the Thornhill Landfill indicates that leachate from the landfill is attenuated before reaching the Thornhill Creek water system. This is consistent with previous assessments, as concentrations at the downgradient location SW-06 are close to background conditions (represented by SW-01). There are no impacts to groundwater quality from the landfill, which is expected due to the low permeability of the underlying clay material.

Exceedances of the CSR standards at MW21-02 downgradient of the landfill were either comparable to the upgradient location (MW21-01) or were only present as total metals, indicating they were associated with particulate matter. The numerous exceedances of dissolved and total metals observed at standpipe MW21-03, installed in a test pit northwest of the Site, are not representative of downgradient groundwater quality.

Morrison Hershfield recommends replacing MW21-03 with a conventional drilled monitoring well and continuing to analyze groundwater samples for dissolved metals while discontinuing the analysis of total metals as it is not used in groundwater screening to CSR standards applied to dissolved metals. Additionally, it is recommended to supply field and travel blanks for all site visits as it would assist in determining the source of parameter exceedances.

7. CLOSURE

We trust the information presented in this report meets RDKS' requirements. If you have any questions or need addition details, please do not hesitate to contact one of the undersigned.

Morrison Hershfield Limited

Prepared by:

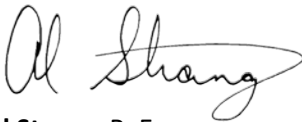


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8. REFERENCES

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APPENDIX A: Figure 1 Site Map



APPENDIX B: Operational Certificate





December 15, 2020

Tracking Number: 393927
Authorization Number: 4057

REGISTERED MAIL

REGIONAL DISTRICT of KITIMAT-STIKINE
300-4545 Lazelle Avenue
Terrace, BC V8G 4E1

Dear Operational Certificate Holder:

Enclosed is Amended Operational Certificate 4057 issued under the provisions of the *Environmental Management Act*. Your attention is respectfully directed to the terms and conditions outlined in the Operational Certificate. An annual fee will be determined according to the Permit Fees Regulation.

This Operational Certificate does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority rests with the Operational Certificate Holder. This Operational Certificate is issued pursuant to the provisions of the *Environmental Management Act* to ensure compliance with Section 120(3) of that statute, which makes it an offence to discharge waste, from a prescribed industry or activity, without proper authorization. It is also the responsibility of the Operational Certificate Holder to ensure that all activities conducted under this authorization are carried out with regard to the rights of third parties, and comply with other applicable legislation that may be in force.

When a spill occurs, or there is an imminent risk of one occurring, the responsible person must ensure that it is reported in accordance with the Spill Reporting Regulation. Additional information on spill reporting requirements is available at gov.bc.ca/reportaspill

This decision may be appealed to the Environmental Appeal Board in accordance with Part 8 of the *Environmental Management Act*. An appeal must be delivered within 30 days from the date that notice of this decision is given. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

Administration of this Operational Certificate will be carried out by staff from the Environmental Protection Division's Regional Operations Branch. Plans, data and reports pertinent to the Operational Certificate are to be submitted by email or electronic transfer to the Director, designated Officer, or as further instructed. To meet the reporting requirements in a form and manner acceptable to the Director, reports and notifications

related to the administration of this authorization must be submitted electronically to the following ministry email addresses:

- EnvAuthorizationsReporting@gov.bc.ca for monitoring and annual reports
- EnvironmentalCompliance@gov.bc.ca for non-compliance reports.

For further information about how to submit data and reports, please refer to <http://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions>.

Please be reminded that the director may require the Operational Certificate Holder to do one or more of the following at any time:

- repair, alter, remove, improve or add to existing works, or to construct new works, and to submit plans and specifications for works specified in this authorization.
- conduct monitoring, and may specify procedures for monitoring and analysis, and procedures or requirements respecting the handling, treatment, transportation, discharge or storage of waste.
- provide security in the amount and form, and subject to the conditions, specified by the director.
- conduct studies and to report information in accordance with the specifications of the director.
- recycle certain wastes and recover certain reusable resources, including energy potential from wastes, in accordance with the specifications of the director.

For more information about how the Ministry will assess compliance with your Operational Certificate please refer to gov.bc.ca/environmentalcompliance.

For more information about how to make changes to your Operational Certificate and to access waste discharge amendment forms and guidance, please refer to gov.bc.ca/wastedischarge-authorizations.

Yours truly,



Karen Moores, P.Ag.
for Director, *Environmental Management Act*
Authorizations - North Region



MINISTRY OF ENVIRONMENT
AND CLIMATE CHANGE
STRATEGY

OPERATIONAL CERTIFICATE

4057

Under the Provisions of the Environmental Management Act

REGIONAL DISTRICT of KITIMAT-STIKINE

Terrace, British Columbia

V8G 4E1

Is Authorized to discharge refuse to ground from a Landfill located near Thornhill British Columbia, subject to the requirements listed below. Contravention of any of these requirements is a violation of the Environmental Management Act and may lead to prosecution.

Capitalized terms referred to in this authorization are defined in the attached Glossary. Other terms used in this authorization have the same meaning as those defined in the *Environmental Management Act* and applicable regulations.

Where this authorization provides that the Director may require an action to be carried out, the Operational Certificate Holder must carry out the action in accordance with the requirements of the Director.

This Authorization supersedes and replaces all previous versions of Operational Certificate 4057 issued under Section 28 of the Environmental Management Act.

GLOSSARY

"Officer: means: An Officer as defined by Section 1(1) of the *Environmental Management Act*.

"Province" means: Her Majesty the Queen in right of British Columbia;

"Qualified Professional " means: a person who:

(a) Is an engineer, scientist or technologist specializing in a particular applied

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for Director, *Environmental Management Act*
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science or technology;

(b) Is registered in British Columbia with a professional organization, is acting under that organization's code of ethics and is subject to disciplinary action by that organization;

(c) Through suitable education, experience, accreditation and knowledge respecting solid waste management and related engineering disciplines for the management of leachate, surface water, ground water, storm water, and landfill gas and other specialist disciplines, may reasonably be relied upon to provide advice within his or her area of expertise and to carry out duties or functions in those areas; and

(d) Provides the completed Declaration of Competency and Conflict of Interest Disclosure Statements.

All documents submitted to the Director by a Qualified Professional must be signed by the author(s).

“Regulatory Document” means: any document that the Operational Certificate Holder is required to provide to the Director or the Province pursuant to: (i) this Authorization; (ii) any regulation made under the Environmental Management Act that regulates the Facility described in this Authorization or the discharge of waste from that Facility; or (iii) any order issued under the Environmental Management Act directed against the Operational Certificate Holder that is related to the Facility described in this Authorization or the discharge of waste from that Facility

1. **LOCATION OF LANDFILL PROPERTY**

The location of the property where discharges are authorized to occur is described in Land and Water BC License No. 634224 as follows: that part of District Lot 518 and parts of Blocks B and C of District Lot 655, Plan 1304, all of Range 5, Coast District more particularly described as follows:

Commencing at a point 20 meters North and 20 meters East of the Northwest corner of Block C of District lot 518, thence 225 meters North, thence 600 meters West to highway right of way; thence 700 meters Southeast along North side of highway to the point of commencement.

2. **AUTHORIZED DISCHARGE**

2.1 **Authorized Source**

This section applies to the discharge of refuse from a landfill operation. The site reference number for this discharge is E208844. The authorization to

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discharge municipal solid waste ceased upon commissioning of the Forceman Ridge landfill.

- 2.1.1 The maximum rate of discharge is 0 tonnes per week. Waste discharge to the landfill is not authorized.
- 2.1.2 The characteristics of the waste which was discharged are those of typical municipal waste.
- 2.1.3 The Authorized Works are a Closed Landfill with final cover, a site drainage system to direct any leachate from the closed section of the landfill into the wetland for managing and treating, a drainage system to direct surface runoff from the Transfer Station into the wetland, a passive gas management system and related appurtenances approximately located as shown on Site Plan.
- 2.1.4 The Authorized Works also include fencing of the closed landfill lagoon area.

3. **GENERAL REQUIREMENT**

3.1 **Maintenance of Works and Emergency Procedures**

All works must be complete and intact.

The Operational Certificate Holder must regularly inspect the Authorized Works and maintain them in good working order.

In the event of an emergency or other condition which prevents normal operation of the Authorized Works or leads to an unauthorized discharge, the Operational Certificate Holder must take remedial action immediately to restore the normal operation of the Authorized Works and to prevent any unauthorized discharges. The Operational Certificate Holder must immediately report the emergency or other condition and the remedial action that has and will be taken to the EnvironmentalCompliance@gov.bc.ca email address or as otherwise instructed by the Director.

3.2 **Bypasses**

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for Director, *Environmental Management Act*
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The Operational Certificate Holder must not allow any discharge authorized by this authorization to bypass the Authorized Works, except with the prior written approval of the Director.

3.3 **Groundwater and Surface Water Quality**

The landfill must be operated and maintained so that the applicable groundwater or surface water use is not compromised beyond the landfill site boundary, or 150 meters from the landfill footprint, whichever is closer. Any surface water quality must also meet standards for applicable water use(s). The applicable water use is determined on the basis of existing land use and possible future uses for one or more of aquatic life, irrigation, livestock or drinking water. Protocols and/or guidance under the *Environmental Management Act* Part 4 (Contaminated Site Remediation) shall be followed by a qualified professional in determining the applicable water use (i.e. Contaminated Sites Regulation Section 12; Technical Guidance 6 on Contaminated Sites; etc.).

The director may specify other numerical water quality standards and objectives that the operator of the landfill facility must meet.

3.3.1 **Consequence of Exceedance**

Where monitoring shows contaminant concentrations exceed the applicable water use, or other standards, the operator shall notify the Director and take one of the following corrective actions:

- I. Mitigation to meet standards or
- II. Based on the results of a risk assessment carried out in accordance with Contaminated Sites Regulation guidance (i.e. Technical Guidance 7), undertake the warranted mitigation measures to achieve acceptable risk.

4. **OPERATIONAL REQUIREMENT**

4.1 **Site Preparation and Restoration**

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4.1.1 To prevent unauthorized dumping, the Operational Certificate Holder must ensure that the site is made inaccessible to the public in a manner that is acceptable to the Director.

4.1.2 The Operational Certificate Holder must provide surface water diversionary works, firebreaks and site restoration to the satisfaction of the Director.

4.1.3 The Operational Certificate Holder must inspect the landfill site a minimum of annually for any potential berm or slope failures or leachate. The inspection records must be included in the annual report.

4.2 Wildlife Nuisance

The Director may require the Operational Certificate Holder to construct or modify works, or follow specific operating instructions, if the Director is of the opinion that there is a possibility of nuisance or hazard being caused by bears or other animals that are attracted to the site.

4.3 Open Burning Prohibition

The Operational Certificate Holder must not allow the open burning of waste at the site caused by any means, including a deliberate or accidental action by the Operational Certificate Holder or others. The Operational Certificate Holder must immediately extinguish all fires of this nature and notify the Director within 24 hours.

4.4 Groundwater Impacts

The Operational Certificate Holder must not impact groundwater at the property boundary (or as otherwise specified by the Director) by leachate beyond levels specified by the Director.

4.5 Sampling Procedures

The Operational Certificate Holder must carry out sampling in accordance with the procedures described in the "British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples, 2013 Edition (Permittee)" or most recent edition, or by alternative procedures as authorized by the Director.

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for Director, *Environmental Management Act*
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A copy of the above manual is available on the Ministry web page at <https://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/laboratory-standards-quality-assurance/bc-field-sampling-manual>

4.6 **Analytical Procedures**

The Operational Certificate Holder must carry out analyses in accordance with procedures described in the "British Columbia Laboratory Manual (2015 Permittee Edition)", or the most recent edition or by alternative procedures as authorized by the Director.

A copy of the above manual is available on the Ministry web page at <https://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/laboratory-standards-quality-assurance/bc-field-sampling-manual>.

5. **Environmental Effect Monitoring**

The Operational Certificate Holder shall undertake Environmental Effects Monitoring (EEM) to determine the effects of the landfill on the receiving environment, both during operation and post closure. EEM studies may include surface water, biological and sediment components and shall be performed using documented and validated methods, and their results interpreted and reported on in accordance with generally accepted standards of good scientific practice. The Operational Certificate Holder shall submit the results of the studies, including analysis and interpretation, to the Director, by June 30 of each following year.

5.1 **Surface Water Monitoring**

The following surface water monitoring program shall be carried out:

Locations	Parameters	Frequency
SW-1 Thornhill Creek upstream E231882 SW-3 Leachate seepage E231883 SW-6 Thornhill Creek downstream E231884 SW-21 Leachate Weir E231886	<u>Inorganics</u> Total metals, alkalinity (as CaCO ₃), total and dissolved hardness (as CaCO ₃), ammonia, fluoride, chloride, conductivity, nitrate, nitrite, total kjeldahl nitrogen, pH, total phosphorus, ortho-phosphorus, total suspended solids, sulphate. <u>Organics</u>	Once per Season: Spring (March- April) Summer (July –Aug.) Fall (October – Nov.)

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	Biological oxygen demand (BOD ₅), chemical oxygen demand (COD) <u>Field Parameters</u> Conductivity, pH, temperature, dissolved oxygen, turbidity	
--	---	--

5.2 Groundwater Monitoring

For the purpose of supporting groundwater modeling and to detect any significant impacts on the environment from leachate in the groundwater, the Operational Certificate Holder shall engage a qualified professional, experienced in groundwater hydrogeology, to design a groundwater monitoring program. The groundwater monitoring program shall be submitted for the written approval by the Director on or before October 1, 2021 and shall be implemented by November 30, 2021 (implementation shall be considered to include installation of any additional wells specified in the final groundwater monitoring program design). The Director may specify, from time to time, that the groundwater monitoring program be revised and updated for his/her written approval. The program shall consider the use of existing and if necessary, new groundwater wells.

In the interim, the following groundwater monitoring program shall be carried out:

Locations	Parameters	Frequency
BH 96-2 E231889	<u>Inorganics</u> Dissolved metals, alkalinity (as CaCO ₃), dissolved hardness (as CaCO ₃), ammonia, chloride, fluoride, conductivity, nitrate, nitrite, total kjeldahl nitrogen, pH, total phosphorus, total dissolved solids, sulphate. <u>Organics</u> Chemical oxygen demand (COD), <u>Field Parameters</u> Conductivity, pH, water elevation, temperature, dissolved oxygen	Once per Season: Spring (March- April) Summer (July –Aug.) Fall (October – Nov.)

5.3 Quality assurance/Quality Control (QA/QC)

The Operational Certificate Holder is required to conduct the following Quality Assurance and Control Program to determine the acceptability of data required by this Operational Certificate and Section 2(d) of the Environmental Data Quality Assurance Regulation.

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- a) Obtain and keep current, the laboratory precision, accuracy and blank quality control criteria for each laboratory analysed parameter from the analytical laboratory(ies).
- b) Collect one duplicate sample during each sampling session from one of the discharge points.
- c) Each duplicate sample must be submitted to the laboratory; one of the pairs identified as the regular sample, and the other, as a blind sample identified by a fictitious site-name established solely to identify the duplicate sample.
- d) For each parameter, report the results of the field duplicates in terms of the degree of variation as the relative percent difference.
- e) A sample collection blank must be prepared, containing distilled water, and preservative if required, and submitted as a blank sample with one sample set per session. If any result for any parameter indicates detectable concentrations, then efforts must be made to determine and control the source of contamination.

6. **REPORTING REQUIREMENTS**

The Operational Certificate Holder must submit all data required to be submitted under this section by email to the Ministry's Routine Environmental Reporting Submission Mailbox (RERSM) at envauthorizationsreporting@gov.bc.ca or as otherwise instructed by the Director. For guidelines on how to properly name the files and email subject lines or for more information visit the Ministry website:

<https://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions/routine-environmental-reporting-submission-mailbox>

6.1 **Annual Reporting**

The Operational Certificate Holder must, by June 30th each year, submit to the Director an Annual Report for the previous calendar year. The first Annual Report will be required by June 30, 2021. The report must contain at least the following information if applicable:

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for Director, *Environmental Management Act*
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- a) the type and tonnage of waste received, transferred, recycled and discharged for the proceeding such calendar year; “if no waste is received, this must be noted in the annual report”
- b) occurrences or observations of wildlife, including burrowing/scavenging (medium and large carnivores) at the facility;
- c) the results of all monitoring programs as specified in this Authorization. The Operational Certificate Holder must ensure that data interpretation and trend analysis, as well as an evaluation of the impacts of the discharges on the receiving environment in the previous year, is included in such results and carried out by a Qualified Professional;
- d) the methods and amounts of leachate collection, treatment and disposal, if applicable
- e) any unauthorized dumping; and
- f) results from annually inspection for any potential berm or slope failures or leachate.

6.2 **Non-compliance Notification**

The Operational Certificate Holder must immediately notify the Director or designate by email at EnvironmentalCompliance@gov.bc.ca, or as otherwise instructed by the Director of any non-compliance with the requirements of this Authorization and take remedial action to remedy any effects of such non-compliance.

The Operational Certificate Holder must provide the Director with written confirmation of all such non-compliance events, including available test results within 24 hours of the original notification by email at EnvironmentalCompliance@gov.bc.ca, or as otherwise instructed by the Director.

6.3 **Non-compliance Reporting**

If the Operational Certificate Holder fails to comply with any of the requirements of this Authorization, the Operational Certificate Holder must, within 30 days of such non-compliance, submit to the director a written report that includes, but is not necessarily limited to, the following:

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- a) all relevant test results obtained by the Operational Certificate Holder related to the non-compliance,
- b) an explanation of the most probable cause(s) of the non-compliance, and
- c) a description of remedial action planned and/or taken by the Operational Certificate Holder to prevent similar non-compliance(s) in the future.

The Operational Certificate Holder must submit all non-compliance reporting required to be submitted under this section by email to the Ministry's Compliance Reporting Submission Mailbox (CRSM) at EnvironmentalCompliance@gov.bc.ca or as otherwise instructed by the Director. For guidelines on how to report a non-compliance or for more information visit the Ministry website:

<https://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions/compliance-reporting-mailbox>

6.4 **Spill Reporting**

The Operational Certificate Holder must immediately report all spills to the environment (as defined in the Spill Reporting Regulation) in accordance with the Spill Reporting Regulation, which among other things, requires notification to Emergency Management BC at 1-800-663-3456.

6.5 **Landfill Closure Plan**

The Operational Certificate Holder must submit to the Director an updated Closure Plan Assessment prepared by an independent Qualified Professional by March 31, 2021. The Closure Plan Assessment must, as a minimum, include the following:

- i) proposed end-use of the landfill after closure;
- ii) estimated and/or anticipated total volume and tonnes of waste received at the landfill during operations, and life of the landfill (i.e. closure date);

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- iii) current final cover on site, including, the thickness and permeability of barrier layers and drainage layers, and information on topsoil, vegetative cover and erosion prevention controls;
- iv) current description of procedures for alternative waste disposal facilities;
- v) procedures for notifying the public about the closure and about alternative waste disposal facilities;
- vi) rodent and nuisance wildlife control procedures;
- vii) a comprehensive monitoring plan, including groundwater monitoring, surface water monitoring, landfill gas monitoring, leachate monitoring, final cover monitoring, and erosion and settlement monitoring, for a minimum post-closure period of 25 years;
- viii) a plan and accompanying design for the collection, storage and treatment/use of landfill gas for a minimum 25 year post-closure period (if required);
- ix) if applicable, a plan for operation of any required pollution abatement engineering works, such as leachate collection and treatment systems, for a minimum post-closure period of 25 years; and
- x) an estimated cost, updated annually, to carry out closure and post-closure activities for a minimum period of 25 years.

6.6 **Site Decommissioning**

In accordance with Section 40 of the *Environmental Management Act* and Part 2 of the Contaminated Sites Regulation, the Operational Certificate Holder must submit a site profile to the manager at least 10 days prior to decommissioning the facilities authorized in Section 2.

7. **Closure Requirement**

7.1 **Closure Funding**

The Operational Certificate Holder shall ensure that sufficient funds will be available to provide for all closure and post-closure requirements as outlined in the

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for Director, *Environmental Management Act*
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closure plan required by Section 6.5, plus a reasonable contingency for any remediation which may be required.

8. **ENVIRONMENTAL IMPACT**

Inspections of the discharge will be carried out by Environmental Protection personnel as a part of the routine operational certificate inspection procedure. Based on these inspections and any other information available to the Director on the effect of the discharge on the receiving environment, the operational certificate holder may be required to undertake additional monitoring, undertake additional studies, install additional pollution control works, or change the method of operation.

9. **PUBLICATION OF DOCUMENTS**

The Ministry of Environment and Climate Change Strategy publishes Regulatory Documents on its website for the purpose of research, public education and to provide transparency in the administration of environmental laws. The Operational Certificate Holder acknowledges that the Province may publish any Regulatory Documents submitted by the Operational Certificate Holder excluding information that would be exempted from disclosure if the document was disclosed pursuant to a request under section 5 of the *Freedom of Information and Protection of Privacy Act*, and the Operational Certificate Holder consents to such publication by the Province.

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Karen Moores, P.Ag.
for Director, *Environmental Management Act*
Authorizations - North Region



November 18, 2021

Tracking Number: 408661
Authorization Number: 4057

KITIMAT-STIKINE REGIONAL DISTRICT
#300-4545 LAZELLE AVE
TERRACE, BC
V8G 4E1

Dear KITIMAT-STIKINE REGIONAL DISTRICT,

Your application for an Authorization amendment under the Environmental Management Act

In response to your emails dated October 6, 2021 and November 15, 2021, to include addition monitoring wells and to remove the reference to amount of leachate given it is not designed for flow measurement. Pursuant to Section 16(4) of the *Environmental Management Act*, I as Director approve the following changes of Section 5.2 and 6.1D.

From: Section 5.2:

Locations	Parameters	Frequency
BH 96-2 E231889	<u>Inorganics</u> Dissolved metals, alkalinity (as CaCO ₃), dissolved hardness (as CaCO ₃), ammonia, chloride, fluoride, conductivity, nitrate, nitrite, total kjeldahl nitrogen, pH, total phosphorus, total dissolved solids, sulphate. <u>Organics</u> Chemical oxygen demand (COD), <u>Field Parameters</u> Conductivity, pH, water elevation, temperature, dissolved oxygen	Once per Season: Spring (March- April) Summer (July –Aug.) Fall (October – Nov.)

To: Section 5.2:

Locations	Parameters	Frequency
BH 96-2 E231889 MW21-01 MW21-02 MW21-03	<u>Inorganics</u> Dissolved metals, alkalinity (as CaCO ₃), dissolved hardness (as CaCO ₃), ammonia, chloride, fluoride, conductivity, nitrate, nitrite, total kjeldahl nitrogen, pH, total phosphorus, total dissolved solids, sulphate. <u>Organics</u> Chemical oxygen demand (COD), <u>Field Parameters</u> Conductivity, pH, water elevation, temperature, dissolved oxygen	Once per Season: Spring (March- April) Summer (July –Aug.) Fall (October – Nov.)

From: Section 6.1D:

The methods and amounts of leachate collection, treatment and disposal, if applicable

To: Section 6.1D:

The methods of leachate collection, treatment and disposal, if applicable

Please note that although a revised Authorization Document has not been produced at this time a copy of this letter is being placed on the Authorization file, as an addendum to the Authorization, to formally reflect the change.

This Authorization does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority rests with the permittee. This Authorization is issued pursuant to the provisions of the *Environmental Management Act* to ensure compliance with Section 120(3) of that statute, which makes it an offence to discharge waste, from a prescribed industry or activity, without proper authorization. It is also the responsibility of the permittee to ensure that all activities conducted under this authorization are carried out with regard to the rights of third parties, and comply with other applicable legislation that may be in force.

This decision may be appealed to the Environmental Appeal Board in accordance with Part 8 of the *Environmental Management Act*. An appeal must be delivered within 30 days from the date that notice of this decision is given. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

Yours truly,



Karen Moores, P.Ag.
Section Head, North Authorizations, Municipal and Smelter Sectors
Environmental Protection Division
Ministry of Environment and Climate Change Strategy
email: Karen.Moores@gov.bc.ca

ENCL: None

APPENDIX C: Field Photos





Photo 1: Thornhill Landfill SW-01, looking upstream, April 6, 2022



Photo 2: Thornhill Landfill SW-01, looking downstream, April 6, 2022



Photo 3: Thornhill Landfill SW-03, April 6, 2022



Photo 4: Thornhill Landfill SW-06, looking upstream, April 6, 2022



Photo 5: Thornhill Landfill SW-06, looking downstream, April 6, 2022



Photo 6: Thornhill Landfill SW-21, looking upstream, April 6, 2022



Photo 7: Thornhill Landfill SW-21, looking downstream, April 6, 2022



Photo 8: Thornhill Landfill SW-01, looking upstream, October 21, 2022



Photo 9: Thornhill Landfill SW-01, looking downstream, October 21, 2022



Photo 10: Thornhill Landfill SW-03, October 21, 2022



Photo 11: Thornhill Landfill SW-06, looking upstream, October 21, 2022



Photo 12: Thornhill Landfill SW-06, looking downstream, October 21, 2022



Photo 13: Thornhill Landfill SW-21, looking upstream, October 21, 2022



Photo 14: Thornhill Landfill SW-21, looking downstream, October 21, 2022



Photo 15: Thornhill Landfill MW21-01, July 15, 2022



Photo 16: Thornhill Landfill MW21-01, October 20, 2022



Photo 17: Thornhill Landfill MW21-02, April 7, 2022



Photo 18: Thornhill Landfill MW21-02, July 14, 2022



Photo 19: Thornhill Landfill MW21-02, October 20, 2022.



Photo 20: Thornhill Landfill MW21-03 April 7, 2022



Photo 21: Thornhill Landfill MW21-03, October 27, 2022



Photo 22: Thornhill Landfill BH96-02, April 7, 2022



Photo 23: Thornhill Landfill BH96-02, July 14, 2022



Photo 24: Thornhill Landfill BH96-02, October 20, 2022

APPENDIX D: Laboratory Reports





CERTIFICATE OF ANALYSIS

Work Order : **VA22A7332**
Client : **Regional District of Kitimat-Stikine**
Contact : Hannah Shinton
Address : # 300 - 4545 Lazelle Avenue
 Terrace BC Canada V8G 4E1
Telephone : ----
Project : Thornhill Groundwater
PO : ----
C-O-C number : ----
Sampler : HS
Site :
Quote number : Q62338
No. of samples received : 2
No. of samples analysed : 2

Page : 1 of 6
Laboratory : Vancouver - Environmental
Account Manager : Amber Springer
Address : 8081 Lougheed Highway
 Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 07-Apr-2022 20:20
Date Analysis Commenced : 08-Apr-2022
Issue Date : 02-May-2022 14:18

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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Ruby Pham	Lab Assistant	Metals, Burnaby, British Columbia
Woochan Song	Lab Analyst	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).

<i>Unit</i>	<i>Description</i>
-	No Unit
µS/cm	Microsiemens per centimetre
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

<i>Qualifier</i>	<i>Description</i>
DLA	Detection Limit adjusted for required dilution.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).



Analytical Results

Sub-Matrix: Water					Client sample ID	MW21-02	MW21-03	----	----	----
(Matrix: Water)					Client sampling date / time	06-Apr-2022 11:28	06-Apr-2022 02:30	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22A7332-001 Result	VA22A7332-002 Result	-----	-----	-----	
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	233	160	----	----	----	
conductivity	----	E100	2.0	µS/cm	411	291	----	----	----	
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	147	152	----	----	----	
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	173	168	----	----	----	
pH	----	E108	0.10	pH units	8.43	7.40	----	----	----	
solids, total dissolved [TDS]	----	E162	10	mg/L	240	183	----	----	----	
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.194	0.692	----	----	----	
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	----	----	----	
fluoride	16984-48-8	E235.F	0.020	mg/L	0.197	0.107	----	----	----	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.306	2.24	----	----	----	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0932	0.0139	----	----	----	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0209	0.0010	----	----	----	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.145	0.810	----	----	----	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	1.19	<0.30	----	----	----	
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	0.73	8.82	----	----	----	
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L	3.35	16.7	----	----	----	
antimony, total	7440-36-0	E420	0.00010	mg/L	0.00015	0.00024	----	----	----	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.0116	0.0116	----	----	----	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0458	0.134	----	----	----	
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	0.000429	----	----	----	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000100 ^{DLA}	----	----	----	
boron, total	7440-42-8	E420	0.010	mg/L	0.158	<0.020 ^{DLA}	----	----	----	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.000139	0.000425	----	----	----	
calcium, total	7440-70-2	E420	0.050	mg/L	24.2	42.9	----	----	----	
cesium, total	7440-46-2	E420	0.000010	mg/L	0.000324	0.00123	----	----	----	
chromium, total	7440-47-3	E420	0.00050	mg/L	0.00392	0.0169	----	----	----	
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00225	0.0126	----	----	----	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW21-02	MW21-03	----	----	----
Client sampling date / time					06-Apr-2022 11:28	06-Apr-2022 02:30	---	---	---	
Analyte	CAS Number	Method	LOR	Unit	VA22A7332-001	VA22A7332-002	-----	-----	-----	
					Result	Result	---	---	---	
Total Metals										
copper, total	7440-50-8	E420	0.00050	mg/L	0.00934	0.0478	---	---	---	
iron, total	7439-89-6	E420	0.010	mg/L	4.57	26.5	---	---	---	
lead, total	7439-92-1	E420	0.000050	mg/L	0.00204	0.00907	---	---	---	
lithium, total	7439-93-2	E420	0.0010	mg/L	0.0046	0.0126	---	---	---	
magnesium, total	7439-95-4	E420	0.0050	mg/L	27.4	14.8	---	---	---	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.231	4.08	---	---	---	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.000050 ^{DLM}	<0.000100 ^{DLM}	---	---	---	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00379	0.000397	---	---	---	
nickel, total	7440-02-0	E420	0.00050	mg/L	0.00469	0.0204	---	---	---	
phosphorus, total	7723-14-0	E420	0.050	mg/L	0.163	0.575	---	---	---	
potassium, total	7440-09-7	E420	0.050	mg/L	11.3	2.10	---	---	---	
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00191	0.00823	---	---	---	
selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	0.000111	---	---	---	
silicon, total	7440-21-3	E420	0.10	mg/L	9.99	26.5	---	---	---	
silver, total	7440-22-4	E420	0.000010	mg/L	0.000024	0.000081	---	---	---	
sodium, total	7440-23-5	E420	0.050	mg/L	28.0	3.26	---	---	---	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.295	0.188	---	---	---	
sulfur, total	7704-34-9	E420	0.50	mg/L	<0.50	<1.00 ^{DLA}	---	---	---	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00040 ^{DLA}	---	---	---	
thallium, total	7440-28-0	E420	0.000010	mg/L	0.000015	0.000060	---	---	---	
thorium, total	7440-29-1	E420	0.00010	mg/L	0.00022	0.00028	---	---	---	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00020 ^{DLA}	---	---	---	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.0941	0.243	---	---	---	
tungsten, total	7440-33-7	E420	0.00010	mg/L	0.00014	<0.00020 ^{DLA}	---	---	---	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.00209	0.000323	---	---	---	
vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00764	0.0400	---	---	---	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0234	0.0756	---	---	---	
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00040 ^{DLA}	---	---	---	
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0035	0.0613	---	---	---	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	---	---	---	



Analytical Results

Sub-Matrix: Water					Client sample ID	MW21-02	MW21-03	----	----	----
(Matrix: Water)					Client sampling date / time	06-Apr-2022 11:28	06-Apr-2022 02:30	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22A7332-001	VA22A7332-002	-----	-----	-----	
					Result	Result	---	---	---	
Dissolved Metals										
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00884	0.00882	----	----	----	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0249	0.0164	----	----	----	
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	----	----	----	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	----	----	----	
boron, dissolved	7440-42-8	E421	0.010	mg/L	0.137	<0.010	----	----	----	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000188	0.0000116	----	----	----	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	20.0	42.3	----	----	----	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	----	----	----	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	0.00302	----	----	----	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00096	0.00021	----	----	----	
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.012	9.12	----	----	----	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	----	----	----	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0017	<0.0010	----	----	----	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	23.6	11.2	----	----	----	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0779	4.56	----	----	----	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	----	----	----	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00449	0.000294	----	----	----	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	0.00094	----	----	----	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	----	----	----	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	10.3	1.12	----	----	----	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00045	0.00072	----	----	----	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	0.000052	----	----	----	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.50	6.52	----	----	----	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
sodium, dissolved	7440-23-5	E421	0.050	mg/L	25.6	3.03	----	----	----	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.247	0.182	----	----	----	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	0.82	<0.50	----	----	----	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	----	----	----	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	----	----	----	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW21-02	MW21-03	----	----	----
Client sampling date / time					06-Apr-2022 11:28	06-Apr-2022 02:30	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22A7332-001	VA22A7332-002	-----	-----	-----	
					Result	Result	---	---	---	
Dissolved Metals										
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	----	----	----	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	0.00188	----	----	----	
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	----	----	----	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.00148	0.000013	----	----	----	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	0.00156	----	----	----	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0010	0.0014	----	----	----	
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	----	----	----	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	----	----	----	
dissolved metals filtration location	----	EP421	-	-	Field	Field	----	----	----	
Aggregate Organics										
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	57	----	----	----	

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA22A7332	Page	: 1 of 13
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Thornhill Groundwater	Date Samples Received	: 07-Apr-2022 20:20
PO	: ----	Issue Date	: 02-May-2022 14:18
C-O-C number	: ----		
Sampler	: HS		
Site	:		
Quote number	: Q62338		
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 Services 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 Matrix Spike outliers occur.
- 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
Laboratory Control Sample (LCS) Recoveries								
Total Metals	QC-468851-002	----	boron, total	7440-42-8	E420	124 % ^{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		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) MW21-02	E559	06-Apr-2022	----	----	----		19-Apr-2022	28 days	13 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) MW21-03	E559	06-Apr-2022	----	----	----		19-Apr-2022	28 days	13 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MW21-02	E298	06-Apr-2022	23-Apr-2022	----	----		25-Apr-2022	28 days	19 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MW21-03	E298	06-Apr-2022	23-Apr-2022	----	----		25-Apr-2022	28 days	19 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MW21-02	E235.Cl	06-Apr-2022	----	----	----		08-Apr-2022	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MW21-03	E235.Cl	06-Apr-2022	----	----	----		08-Apr-2022	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE MW21-02	E235.F	06-Apr-2022	----	----	----		08-Apr-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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Fluoride in Water by IC											
HDPE MW21-03	E235.F	06-Apr-2022	----	----	----		08-Apr-2022	28 days	3 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE MW21-02	E235.NO3-L	06-Apr-2022	----	----	----		08-Apr-2022	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE MW21-03	E235.NO3-L	06-Apr-2022	----	----	----		08-Apr-2022	3 days	3 days	✓	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW21-02	E235.NO2-L	06-Apr-2022	----	----	----		08-Apr-2022	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW21-03	E235.NO2-L	06-Apr-2022	----	----	----		08-Apr-2022	3 days	3 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE MW21-02	E235.SO4	06-Apr-2022	----	----	----		08-Apr-2022	28 days	2 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE MW21-03	E235.SO4	06-Apr-2022	----	----	----		08-Apr-2022	28 days	3 days	✓	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) MW21-02	E318	06-Apr-2022	23-Apr-2022	----	----		27-Apr-2022	28 days	21 days	✓	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) MW21-03	E318	06-Apr-2022	23-Apr-2022	----	----		27-Apr-2022	28 days	21 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		
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) MW21-02	E372-U	06-Apr-2022	23-Apr-2022	----	----		26-Apr-2022	28 days	20 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) MW21-03	E372-U	06-Apr-2022	23-Apr-2022	----	----		26-Apr-2022	28 days	20 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) MW21-02	E509	06-Apr-2022	10-Apr-2022	----	----		10-Apr-2022	28 days	4 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) MW21-03	E509	06-Apr-2022	10-Apr-2022	----	----		10-Apr-2022	28 days	4 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) MW21-02	E421	06-Apr-2022	28-Apr-2022	----	----		29-Apr-2022	180 days	23 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) MW21-03	E421	06-Apr-2022	28-Apr-2022	----	----		29-Apr-2022	180 days	23 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) MW21-02	E358-L	06-Apr-2022	23-Apr-2022	----	----		24-Apr-2022	28 days	18 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) MW21-03	E358-L	06-Apr-2022	23-Apr-2022	----	----		24-Apr-2022	28 days	19 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE MW21-02	E290	06-Apr-2022	----	----	----		08-Apr-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 Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
Physical Tests : Alkalinity Species by Titration										
HDPE MW21-03	E290	06-Apr-2022	----	----	----		08-Apr-2022	14 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE MW21-02	E100	06-Apr-2022	----	----	----		08-Apr-2022	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE MW21-03	E100	06-Apr-2022	----	----	----		08-Apr-2022	28 days	3 days	✓
Physical Tests : pH by Meter										
HDPE MW21-02	E108	06-Apr-2022	----	----	----		08-Apr-2022	0.25 hrs	55 hrs	* EHTR-FM
Physical Tests : pH by Meter										
HDPE MW21-03	E108	06-Apr-2022	----	----	----		08-Apr-2022	0.25 hrs	63 hrs	* EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE MW21-03	E162	06-Apr-2022	----	----	----		13-Apr-2022	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MW21-02	E162	06-Apr-2022	----	----	----		14-Apr-2022	7 days	8 days	* EHT
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) MW21-02	E508	06-Apr-2022	----	----	----		11-Apr-2022	28 days	5 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) MW21-03	E508	06-Apr-2022	----	----	----		11-Apr-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		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) MW21-02	E420	06-Apr-2022	----	----	----		29-Apr-2022	180 days	23 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) MW21-03	E420	06-Apr-2022	----	----	----		29-Apr-2022	180 days	24 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	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	454056	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	466193	1	11	9.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	461936	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	454059	1	17	5.8	5.0	✓
Conductivity in Water	E100	454057	1	12	8.3	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	455082	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	470534	2	23	8.7	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	466190	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	454063	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	454064	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	454061	1	16	6.2	5.0	✓
pH by Meter	E108	454055	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	454058	1	17	5.8	5.0	✓
TDS by Gravimetry	E162	457392	2	34	5.8	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	466187	1	9	11.1	5.0	✓
Total Mercury in Water by CVAAS	E508	455493	1	11	9.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	468851	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	466189	1	15	6.6	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	454056	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	466193	1	11	9.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	461936	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	454059	1	17	5.8	5.0	✓
Conductivity in Water	E100	454057	1	12	8.3	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	455082	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	470534	2	23	8.7	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	466190	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	454063	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	454064	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	454061	1	16	6.2	5.0	✓
pH by Meter	E108	454055	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	454058	1	17	5.8	5.0	✓
TDS by Gravimetry	E162	457392	2	34	5.8	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	466187	1	9	11.1	5.0	✓
Total Mercury in Water by CVAAS	E508	455493	1	11	9.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	468851	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	466189	1	15	6.6	5.0	✓



Matrix: **Water**

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

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Method Blanks (MB)							
Alkalinity Species by Titration	E290	454056	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	466193	1	11	9.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	461936	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	454059	1	17	5.8	5.0	✓
Conductivity in Water	E100	454057	1	12	8.3	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	455082	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	470534	2	23	8.7	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	466190	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	454063	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	454064	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	454061	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	454058	1	17	5.8	5.0	✓
TDS by Gravimetry	E162	457392	2	34	5.8	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	466187	1	9	11.1	5.0	✓
Total Mercury in Water by CVAAS	E508	455493	1	11	9.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	468851	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	466189	1	15	6.6	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	466193	1	11	9.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	461936	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	454059	1	17	5.8	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	455082	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	470534	2	23	8.7	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	466190	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	454063	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	454064	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	454061	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	454058	1	17	5.8	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	466187	1	9	11.1	5.0	✓
Total Mercury in Water by CVAAS	E508	455493	1	11	9.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	468851	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	466189	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.
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.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Total Kjeldahl Nitrogen is determined using block digestion followed by flow-injection analysis with fluorescence detection.
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 Phosphorus by Colourimetry (Ultra Trace)	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 Metals in Water by CRC ICPMS	E420 Vancouver - Environmental	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 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 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
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.
Chemical Oxygen Demand by Colourimetry	E559 Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
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.



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), 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.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
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 using block digestion with Copper Sulfate Digestion Reagent.
Preparation for Dissolved Organic Carbon for Combustion	EP358 Vancouver - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are 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 HNO ₃ .
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.

QUALITY CONTROL REPORT

Work Order : **VA22A7332**

Page : 1 of 22

Client : Regional District of Kitimat-Stikine
Contact : Hannah Shinton
Address : # 300 - 4545 Lazelle Avenue
 Terrace BC Canada V8G 4E1
Telephone : ----
Project : Thornhill Groundwater
PO : ----
C-O-C number : ----
Sampler : HS
Site :
Quote number : Q62338
No. of samples received : 2
No. of samples analysed : 2

Laboratory : Vancouver - Environmental
Account Manager : Amber Springer
Address : 8081 Lougheed Highway
 Burnaby, British Columbia Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 07-Apr-2022 20:20
Date Analysis Commenced : 08-Apr-2022
Issue Date : 02-May-2022 14:20

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 Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Ruby Pham	Lab Assistant	Metals, Burnaby, British Columbia
Woochan Song	Lab Analyst	Metals, Burnaby, British Columbia

Page : 2 of 22
Work Order : VA22A7332
Client : Regional District of Kitimat-Stikine
Project : Thornhill Groundwater



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 Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage 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: 454055)											
VA22A7331-001	Anonymous	pH	----	E108	0.10	pH units	7.58	7.57	0.224%	4%	----
Physical Tests (QC Lot: 454056)											
VA22A7331-001	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	30.7	31.0	0.972%	20%	----
Physical Tests (QC Lot: 454057)											
VA22A7331-001	Anonymous	conductivity	----	E100	2.0	µS/cm	61.9	62.0	0.161%	10%	----
Physical Tests (QC Lot: 457392)											
VA22A7315-012	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	307	267	14.0%	20%	----
Physical Tests (QC Lot: 458415)											
KS2201155-001	Anonymous	solids, total dissolved [TDS]	----	E162	13	mg/L	67	61	6	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 454058)											
VA22A7274-008	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	80.3	80.2	0.184%	20%	----
Anions and Nutrients (QC Lot: 454059)											
VA22A7274-008	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	23.0	22.9	0.483%	20%	----
Anions and Nutrients (QC Lot: 454061)											
VA22A7274-008	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: 454063)											
VA22A7274-008	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.047	0.046	0.001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 454064)											
VA22A7331-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0514	0.0510	0.974%	20%	----
Anions and Nutrients (QC Lot: 466187)											
CG2204261-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.051	<0.050	0.001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 466189)											
VA22A7331-001	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 466193)											
VA22A7331-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 466190)											
VA22A7331-001	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	3.79	4.27	0.48	Diff <2x LOR	----
Total Metals (QC Lot: 455493)											
VA22A7331-002	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Total Metals (QC Lot: 468851)											
VA22A7331-001	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0456	0.0480	5.10%	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: 468851) - continued											
VA22A7331-001	Anonymous	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	0.0180	0.0182	0.862%	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	<0.010	<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	10.2	10.4	1.81%	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	0.000050	mg/L	<0.000050	<0.000050	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	0.000050	mg/L	0.00067	0.00072	0.00006	Diff <2x LOR	----
		iron, total	7439-89-6	E420	0.010	mg/L	0.039	0.039	0.0002	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	0.775	0.790	1.96%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.00185	0.00176	4.68%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000564	0.000558	1.19%	20%	----
		nickel, total	7440-02-0	E420	0.000050	mg/L	<0.000050	<0.000050	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	0.808	0.817	1.09%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00075	0.00071	0.00004	Diff <2x LOR	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000062	<0.000050	0.000012	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	2.78	2.86	2.54%	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	1.09	1.12	2.30%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.0412	0.0420	1.85%	20%	----
		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	0.00096	0.00104	0.00008	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	0.000015	0.000017	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: 468851) - continued											
VA22A7331-001	Anonymous	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: 455082)											
VA22A7331-004	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 470534)											
VA22A7332-002	MW21-03	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0613	0.0637	3.85%	20%	----
		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	0.00882	0.00896	1.48%	20%	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0164	0.0167	1.26%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	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	0.0000116	0.0000112	0.0000004	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	42.3	43.2	1.88%	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	0.00302	0.00317	4.85%	20%	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00021	0.00022	0.00001	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	9.12	9.62	5.39%	20%	----
		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	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	11.2	11.5	2.74%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	4.56	4.73	3.60%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000294	0.000312	0.000018	Diff <2x LOR	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00094	0.00093	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	1.12	1.18	4.63%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00072	0.00071	0.00001	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000052	0.000076	0.000025	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	6.52	6.67	2.21%	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	3.03	3.07	1.52%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.182	0.189	3.89%	20%	----
		sulfur, dissolved	7704-34-9	E421	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
Dissolved Metals (QC Lot: 470534) - continued											
VA22A7332-002	MW21-03	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	0.00188	0.00180	0.00008	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	0.000013	0.000014	0.0000003	Diff <2x LOR	----
		vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00156	0.00162	0.00006	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0014	0.0014	0.0001	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 470541)											
KS2201241-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0111	0.0100	10.0%	20%	----
		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	0.00014	0.00017	0.00003	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00962	0.00954	0.834%	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	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	13.6	13.9	2.51%	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	0.00073	0.00067	0.00006	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	0.031	0.030	0.0010	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	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	2.64	2.67	1.18%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00106	0.00101	4.55%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000818	0.000850	3.78%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00050	<0.00050	0.0000009	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	0.981	1.02	3.57%	20%	----		
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00132	0.00138	0.00006	Diff <2x LOR	----		
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000110	0.000167	0.000056	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: 470541) - continued											
KS2201241-001	Anonymous	silicon, dissolved	7440-21-3	E421	0.050	mg/L	3.25	3.16	2.87%	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	2.93	2.94	0.495%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0862	0.0873	1.22%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	3.25	2.90	0.35	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	0.00034	<0.00030	0.00004	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	0.000376	0.000378	0.704%	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	0.0016	<0.0010	0.0006	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 461936)											
VA22A7331-007	Anonymous	chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	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: 454056)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 454057)						
conductivity	----	E100	1	µS/cm	1.0	----
Physical Tests (QCLot: 457392)						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 458415)						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 454058)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 454059)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 454061)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 454063)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 454064)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 466187)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 466189)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 466193)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Organic / Inorganic Carbon (QCLot: 466190)						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 455493)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 468851)						
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	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 468851) - continued						
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	---
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: 455082)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	---



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 470534)						
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	---
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	---



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 470534) - continued						
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: 470541)						
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	----
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	----



Sub-Matrix: **Water**

<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Result</i>	<i>Qualifier</i>
Dissolved Metals (QCLot: 470541) - continued						
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	----
Aggregate Organics (QCLot: 461936)						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----



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 Concentration	Recovery (%) LCS	Recovery Limits (%)		Qualifier
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 454055)									
pH	----	E108	----	pH units	7 pH units	99.7	98.0	102	----
Physical Tests (QCLot: 454056)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	101	85.0	115	----
Physical Tests (QCLot: 454057)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	100	90.0	110	----
Physical Tests (QCLot: 457392)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	96.4	85.0	115	----
Physical Tests (QCLot: 458415)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	95.6	85.0	115	----
Anions and Nutrients (QCLot: 454058)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 454059)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 454061)									
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: 454063)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 454064)									
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: 466187)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	97.2	75.0	125	----
Anions and Nutrients (QCLot: 466189)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	98.1	80.0	120	----
Anions and Nutrients (QCLot: 466193)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	97.2	85.0	115	----
Organic / Inorganic Carbon (QCLot: 466190)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	107	80.0	120	----
Total Metals (QCLot: 455493)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	101	80.0	120	----
Total Metals (QCLot: 468851)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	107	80.0	120	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Total Metals (QCLot: 468851) - continued									
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	107	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	105	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	99.8	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	102	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	# 124	80.0	120	MES
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	103	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	107	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	102	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	115	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	103	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	103	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	103	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	107	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	107	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	105	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	101	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	100	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	105	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	110	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	98.3	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	103	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	102	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	96.7	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	104	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	106	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	102	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	102	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	101	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	102	80.0	120	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	105	80.0	120	----
Dissolved Metals (QCLot: 470534)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	109	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	105	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	99.7	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	98.8	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	99.3	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	102	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	99.5	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	99.8	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	102	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	102	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	100	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	102	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	98.4	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	101	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	103	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	106	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	100	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	105	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	92.3	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	106	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	86.2	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	98.2	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	102	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	100	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	97.0	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	101	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	97.3	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	107	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: 470534) - continued									
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	105	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	99.3	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	94.9	80.0	120	----
Dissolved Metals (QCLot: 470541)									
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	107	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	99.9	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	99.1	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	94.0	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	102	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	99.3	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	102	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	97.1	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	97.4	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	98.1	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	97.6	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	97.3	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	96.7	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	105	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	96.9	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	102	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	100	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	99.1	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	105	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	100	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	102	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	104	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	107	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	100	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	92.1	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	102	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: 470541) - continued									
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	94.4	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	95.8	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	96.1	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	100	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	108	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	98.8	80.0	120	----
Aggregate Organics (QCLot: 461936)									
chemical oxygen demand [COD]	----	E559	20	mg/L	100 mg/L	110	85.0	115	----

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: 454058)										
VA22A7274-009	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	1030 mg/L	1000 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 454059)										
VA22A7274-009	Anonymous	chloride	16887-00-6	E235.Cl	1030 mg/L	1000 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 454061)										
VA22A7274-009	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	5.06 mg/L	5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 454063)										
VA22A7274-009	Anonymous	fluoride	16984-48-8	E235.F	10.3 mg/L	10 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 454064)										
VA22A7331-002	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: 466187)										
VA22A7331-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.48 mg/L	2.5 mg/L	99.3	70.0	130	----
Anions and Nutrients (QCLot: 466189)										
VA22A7331-002	Anonymous	phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 466193)										
VA22A7331-002	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: 466190)										
VA22A7331-002	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Total Metals (QCLot: 455493)										
VA22A7331-003	Anonymous	mercury, total	7439-97-6	E508	0.0000899 mg/L	0.0001 mg/L	89.9	70.0	130	----
Total Metals (QCLot: 468851)										
VA22A7331-002	Anonymous	aluminum, total	7429-90-5	E420	0.207 mg/L	0.2 mg/L	104	70.0	130	----
		antimony, total	7440-36-0	E420	0.0209 mg/L	0.02 mg/L	104	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0213 mg/L	0.02 mg/L	107	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	0.0405 mg/L	0.04 mg/L	101	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00904 mg/L	0.01 mg/L	90.4	70.0	130	----
		boron, total	7440-42-8	E420	ND mg/L	0.1 mg/L	ND	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00394 mg/L	0.004 mg/L	98.6	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: 468851) - continued										
VA22A7331-002	Anonymous	calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E420	0.0107 mg/L	0.01 mg/L	107	70.0	130	----
		chromium, total	7440-47-3	E420	0.0399 mg/L	0.04 mg/L	99.7	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0192 mg/L	0.02 mg/L	96.3	70.0	130	----
		copper, total	7440-50-8	E420	0.0182 mg/L	0.02 mg/L	90.9	70.0	130	----
		iron, total	7439-89-6	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		lead, total	7439-92-1	E420	0.0188 mg/L	0.02 mg/L	93.8	70.0	130	----
		lithium, total	7439-93-2	E420	0.0989 mg/L	0.1 mg/L	98.9	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	0.0223 mg/L	0.02 mg/L	111	70.0	130	----
		nickel, total	7440-02-0	E420	0.0370 mg/L	0.04 mg/L	92.6	70.0	130	----
		phosphorus, total	7723-14-0	E420	11.1 mg/L	10 mg/L	111	70.0	130	----
		potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		rubidium, total	7440-17-7	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		selenium, total	7782-49-2	E420	0.0412 mg/L	0.04 mg/L	103	70.0	130	----
		silicon, total	7440-21-3	E420	ND mg/L	10 mg/L	ND	70.0	130	----
		silver, total	7440-22-4	E420	0.00427 mg/L	0.004 mg/L	107	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	23.4 mg/L	20 mg/L	117	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0404 mg/L	0.04 mg/L	101	70.0	130	----
		thallium, total	7440-28-0	E420	0.00371 mg/L	0.004 mg/L	92.8	70.0	130	----
		thorium, total	7440-29-1	E420	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		tin, total	7440-31-5	E420	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		titanium, total	7440-32-6	E420	0.0419 mg/L	0.04 mg/L	105	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		uranium, total	7440-61-1	E420	0.00395 mg/L	0.004 mg/L	98.8	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	0.367 mg/L	0.4 mg/L	91.8	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0432 mg/L	0.04 mg/L	108	70.0	130	----
Dissolved Metals (QCLot: 455082)										
VA22A7331-005	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000918 mg/L	0.0001 mg/L	91.8	70.0	130	----
Dissolved Metals (QCLot: 470534)										
VA22A7334-002	Anonymous	aluminum, dissolved	7429-90-5	E421	0.213 mg/L	0.2 mg/L	107	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0196 mg/L	0.02 mg/L	98.1	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
Dissolved Metals (QCLot: 470534) - continued										
VA22A7334-002	Anonymous	arsenic, dissolved	7440-38-2	E421	0.0214 mg/L	0.02 mg/L	107	70.0	130	----
		barium, dissolved	7440-39-3	E421	0.0195 mg/L	0.02 mg/L	97.7	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0402 mg/L	0.04 mg/L	100	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00970 mg/L	0.01 mg/L	97.0	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.099 mg/L	0.1 mg/L	98.7	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00413 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	0.0103 mg/L	0.01 mg/L	103	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	0.0207 mg/L	0.02 mg/L	104	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0207 mg/L	0.02 mg/L	104	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.95 mg/L	2 mg/L	97.6	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.0990 mg/L	0.1 mg/L	99.0	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	1.01 mg/L	1 mg/L	101	70.0	130	----
		manganese, dissolved	7439-96-5	E421	0.0207 mg/L	0.02 mg/L	103	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0199 mg/L	0.02 mg/L	99.6	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0411 mg/L	0.04 mg/L	103	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.6 mg/L	10 mg/L	106	70.0	130	----
		potassium, dissolved	7440-09-7	E421	4.20 mg/L	4 mg/L	105	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0199 mg/L	0.02 mg/L	99.3	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0404 mg/L	0.04 mg/L	101	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.84 mg/L	10 mg/L	98.4	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00401 mg/L	0.004 mg/L	100	70.0	130	----
		sodium, dissolved	7440-23-5	E421	2.20 mg/L	2 mg/L	110	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	20.6 mg/L	20 mg/L	103	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0397 mg/L	0.04 mg/L	99.2	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00399 mg/L	0.004 mg/L	99.7	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0211 mg/L	0.02 mg/L	106	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0194 mg/L	0.02 mg/L	96.8	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0409 mg/L	0.04 mg/L	102	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0194 mg/L	0.02 mg/L	97.2	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00426 mg/L	0.004 mg/L	106	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	0.403 mg/L	0.4 mg/L	101	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0400 mg/L	0.04 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: 470541)										
KS2201261-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.202 mg/L	0.2 mg/L	101	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0210 mg/L	0.02 mg/L	105	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0207 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	0.0407 mg/L	0.04 mg/L	102	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00884 mg/L	0.01 mg/L	88.4	70.0	130	----
		boron, dissolved	7440-42-8	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00400 mg/L	0.004 mg/L	100	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	0.0107 mg/L	0.01 mg/L	107	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0397 mg/L	0.04 mg/L	99.4	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0192 mg/L	0.02 mg/L	95.9	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0191 mg/L	0.02 mg/L	95.6	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.96 mg/L	2 mg/L	97.8	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0192 mg/L	0.02 mg/L	96.1	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	0.0236 mg/L	0.02 mg/L	118	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0213 mg/L	0.02 mg/L	107	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0386 mg/L	0.04 mg/L	96.6	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.6 mg/L	10 mg/L	106	70.0	130	----
		potassium, dissolved	7440-09-7	E421	3.56 mg/L	4 mg/L	89.0	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0193 mg/L	0.02 mg/L	96.7	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0438 mg/L	0.04 mg/L	110	70.0	130	----
		silicon, dissolved	7440-21-3	E421	ND mg/L	10 mg/L	ND	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00429 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	21.0 mg/L	20 mg/L	105	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0394 mg/L	0.04 mg/L	98.5	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00374 mg/L	0.004 mg/L	93.6	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0189 mg/L	0.02 mg/L	94.4	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0207 mg/L	0.02 mg/L	104	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0394 mg/L	0.04 mg/L	98.4	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0194 mg/L	0.02 mg/L	97.1	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	0.103 mg/L	0.1 mg/L	103	70.0	130	----

Page : 22 of 22
 Work Order : VA22A7332
 Client : Regional District of Kitimat-Stikine
 Project : Thornhill Groundwater



Sub-Matrix: **Water**

					<i>Matrix Spike (MS) Report</i>					
					<i>Spike</i>		<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>Concentration</i>	<i>Target</i>	<i>MS</i>	<i>Low</i>	<i>High</i>	<i>Qualifier</i>
Dissolved Metals (QCLot: 470541) - continued										
KS2201261-001	Anonymous	zinc, dissolved	7440-66-6	E421	0.438 mg/L	0.4 mg/L	109	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0409 mg/L	0.04 mg/L	102	70.0	130	----
Aggregate Organics (QCLot: 461936)										
VA22A7331-001	Anonymous	chemical oxygen demand [COD]	----	E559	110 mg/L	100 mg/L	110	75.0	125	----

Qualifiers

<i>Qualifier</i>	<i>Description</i>
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.



Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 17 -

Page of

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Report To		Report Format / Distribution				Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)																																																																								
Company:	Regional District of Kitimat-Stikine	Select Report Format:	<input checked="" type="checkbox"/> PDF	<input checked="" type="checkbox"/> EXCEL	<input checked="" type="checkbox"/> EDD (DIGITAL)	Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply																																																																								
Contact:	Hannah Shinton	Quality Control (QC) Report with Report	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			PRIORITY (Business Days)	4 day [P4-20%] <input type="checkbox"/>			3 day [P3-25%] <input type="checkbox"/>			2 day [P2-50%] <input type="checkbox"/>			EMERGENCY	1 Business day [E1 - 100%] <input type="checkbox"/>						Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/>																																																							
Phone:	250-615-8100	<input checked="" type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked	Select Distribution:	<input checked="" type="checkbox"/> EMAIL	<input type="checkbox"/> MAIL		<input type="checkbox"/> FAX	Date and Time Required for all E&P TATs:																																																																						
Company address below will appear on the final report		Street:	4545 Lazelle Avenue				For tests that can not be performed according to the service level selected, you will be contacted.																																																																							
City/Province:	Terrace/BC	Email 1 or Fax:	hshinton@rdks.bc.ca				Analysis Request																																																																							
Postal Code:	V8G4E1	Email 2:	nlavoie@rdks.bc.ca				Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																																																																							
Invoice To	Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Email 3:	eblaney@rdks.bc.ca				<table border="1"> <tr> <th>F/P</th><th></th><th></th><th>P</th><th></th><th></th><th></th><th></th><th>P</th><th>P</th><th>P</th><th></th><th></th><th>F/P</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>																		F/P			P					P	P	P			F/P																																								
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Company:	Regional District of Kitimat-Stikine	Invoice Distribution	<input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				<table border="1"> <tr> <td>Disolved metals</td><td>Conductivity</td><td>disolved hardness (as CaCO3)</td><td>Ammonia</td><td>Chloride</td><td>Fluoride, Sulphate</td><td>Nitrate & Nitrite</td><td>Total Metals</td><td>Total Kjeldahl Nitrogen</td><td>Total phosphorus</td><td>COD</td><td>Total Dissolved Solids</td><td>Dissolved Organic Carbon</td><td>Alkalinity</td><td>pH</td> <td>SAMPLES ON HOLD</td> <td>Sample is hazardous (please provide further detail)</td> <td>NUMBER OF CONTAINERS</td> </tr> <tr> <td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td></td><td></td><td></td> </tr> </table>																		Disolved metals	Conductivity	disolved hardness (as CaCO3)	Ammonia	Chloride	Fluoride, Sulphate	Nitrate & Nitrite	Total Metals	Total Kjeldahl Nitrogen	Total phosphorus	COD	Total Dissolved Solids	Dissolved Organic Carbon	Alkalinity	pH	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R																					
Disolved metals	Conductivity	disolved hardness (as CaCO3)	Ammonia	Chloride	Fluoride, Sulphate	Nitrate & Nitrite	Total Metals	Total Kjeldahl Nitrogen	Total phosphorus	COD	Total Dissolved Solids	Dissolved Organic Carbon	Alkalinity	pH	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS																																																													
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R																																																																
Contact:	Hannah Shinton	Email 1 or Fax:	anne-maries@rdks.bc.ca				Project Information																																																																							
Copy of Invoice with Report	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Email 2:	hshinton@rdks.bc.ca				Oil and Gas Required Fields (client use)																																																																							
ALS Account # / Quote #:		AFE/Cost Center:					ALS Lab Work Order # (lab use only):																																																																							
Job #:	Thornhill Groundwater	Major/Minor Code:					ALS Contact:																																																																							
PO / AFE:		Routing Code:					Sampler: H. Shinton																																																																							
LSD:		Requisitioner:					Date																																																																							
		Location:					(dd-mm-yy)																																																																							
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date	Time (hh:mm)	Sample Type																																																																										
	MW21-02	6-Apr-22	11:28	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R																																																				
	MW21-03	6-Apr-22	2:30	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R																																																				
<p>Environmental Division Vancouver Work Order Reference VA22A7332</p> <p>Telephone : +1 604 253 4188</p>																																																																														
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?					British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)					Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/> Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/> Cooling Initiated <input type="checkbox"/>																																																																				
Are samples for human consumption/ use?										INITIAL COOLER TEMPERATURES °C FINAL COOLER TEMPERATURES °C 6.6 6.7 6.5 7																																																																				
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:																																																																		
Hannah Shinton		April 7 th 2022			Chris		7 Apr 22		10:20	HP		4/7																																																																		

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.
 WHITE - LABORATORY COPY YELLOW - CLIENT COPY SEPT 2017 FROM



CERTIFICATE OF ANALYSIS

Work Order : **VA22A7532**
Client : **Regional District of Kitimat-Stikine**
Contact : Hannah Shinton
Address : # 300 - 4545 Lazelle Avenue
 Terrace BC Canada V8G 4E1
Telephone : ----
Project : Thornhill Groundwater
PO : ----
C-O-C number : ----
Sampler : HS
Site :
Quote number : Q62338
No. of samples received : 3
No. of samples analysed : 3

Page : 1 of 6
Laboratory : Vancouver - Environmental
Account Manager : Amber Springer
Address : 8081 Lougheed Highway
 Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 09-Apr-2022 12:30
Date Analysis Commenced : 12-Apr-2022
Issue Date : 02-May-2022 12:58

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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Christopher Li	Lab Assistant	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Inorganics, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Owen Cheng		Metals, 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).

<i>Unit</i>	<i>Description</i>
-	No Unit
µS/cm	Microsiemens per centimetre
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

<i>Qualifier</i>	<i>Description</i>
DTMF	Dissolved concentration exceeds total for field-filtered metals sample. Metallic contaminants may have been introduced to dissolved sample during field filtration.



Analytical Results

Sub-Matrix: Water					Client sample ID	BH-96-2	MW21-01	MW-21	----	----
(Matrix: Water)					Client sampling date / time	07-Apr-2022 14:27	07-Apr-2022 15:54	07-Apr-2022 12:00	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22A7532-001	VA22A7532-002	VA22A7532-003	-----	-----	
					Result	Result	Result	----	----	
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	214	122	120	----	----	
conductivity	----	E100	2.0	µS/cm	399	263	257	----	----	
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	94.4	128	130	----	----	
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	98.3	130	133	----	----	
pH	----	E108	0.10	pH units	8.48	8.22	8.20	----	----	
solids, total dissolved [TDS]	----	E162	10	mg/L	239	136	164	----	----	
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0917	<0.0050	<0.0050	----	----	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	----	----	
chloride	16887-00-6	E235.Cl	0.50	mg/L	1.30	5.17	5.19	----	----	
fluoride	16984-48-8	E235.F	0.020	mg/L	0.149	0.048	0.047	----	----	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.180	0.133	0.141	----	----	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.231	0.890	0.898	----	----	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0119	<0.0010	<0.0010	----	----	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0718	0.0580	0.0405	----	----	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	4.70	4.57	4.67	----	----	
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	1.57	0.61	0.54	----	----	
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.854	0.638	0.588	----	----	
antimony, total	7440-36-0	E420	0.00010	mg/L	0.00020	0.00014	0.00013	----	----	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00380	0.00088	0.00076	----	----	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0259	0.0631	0.0619	----	----	
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	<0.000100	----	----	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----	
boron, total	7440-42-8	E420	0.010	mg/L	0.167	<0.010	<0.010	----	----	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000792	0.0000353	0.0000335	----	----	
calcium, total	7440-70-2	E420	0.050	mg/L	15.3	39.3	40.5	----	----	
cesium, total	7440-46-2	E420	0.000010	mg/L	0.000080	0.000081	0.000073	----	----	
chromium, total	7440-47-3	E420	0.00050	mg/L	0.00106	0.00152	0.00142	----	----	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	BH-96-2	MW21-01	MW-21	----	----
Client sampling date / time					07-Apr-2022 14:27	07-Apr-2022 15:54	07-Apr-2022 12:00	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22A7532-001	VA22A7532-002	VA22A7532-003	-----	-----	
					Result	Result	Result	---	---	
Total Metals										
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00098	0.00118	0.00100	----	----	
copper, total	7440-50-8	E420	0.00050	mg/L	0.00236	0.00336	0.00294	----	----	
iron, total	7439-89-6	E420	0.010	mg/L	1.20	1.37	1.26	----	----	
lead, total	7439-92-1	E420	0.000050	mg/L	0.000454	0.000484	0.000412	----	----	
lithium, total	7439-93-2	E420	0.0010	mg/L	0.0026	0.0030	0.0032	----	----	
magnesium, total	7439-95-4	E420	0.0050	mg/L	14.6	7.63	7.80	----	----	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.0845	0.0809	0.0691	----	----	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	----	----	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00376	0.000746	0.000826	----	----	
nickel, total	7440-02-0	E420	0.00050	mg/L	0.00181	0.00092	0.00087	----	----	
phosphorus, total	7723-14-0	E420	0.050	mg/L	0.062	0.060	<0.050	----	----	
potassium, total	7440-09-7	E420	0.050	mg/L	10.8	2.32	2.39	----	----	
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00072	0.00129	0.00126	----	----	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000181	<0.000050	<0.000050	----	----	
silicon, total	7440-21-3	E420	0.10	mg/L	5.70	5.72	6.18	----	----	
silver, total	7440-22-4	E420	0.000010	mg/L	0.000012	0.000010	<0.000010	----	----	
sodium, total	7440-23-5	E420	0.050	mg/L	50.1	3.10	3.25	----	----	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.184	0.199	0.202	----	----	
sulfur, total	7704-34-9	E420	0.50	mg/L	1.74	1.55	1.71	----	----	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	----	----	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----	
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	0.00033	0.00030	----	----	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.0207	0.0221	0.0208	----	----	
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	0.00048	0.00054	----	----	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.00182	0.000649	0.000641	----	----	
vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00260	0.00214	0.00201	----	----	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0050	0.0046	0.0058	----	----	
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	----	----	
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0038	0.0102	0.0089	----	----	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	BH-96-2	MW21-01	MW-21	----	----
Client sampling date / time					07-Apr-2022 14:27	07-Apr-2022 15:54	07-Apr-2022 12:00	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22A7532-001	VA22A7532-002	VA22A7532-003	-----	-----	
					Result	Result	Result	---	---	
Dissolved Metals										
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00017	0.00011	0.00010	----	----	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00319	0.00046	0.00047	----	----	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0216	0.0536	0.0524	----	----	
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	<0.000100	----	----	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----	
boron, dissolved	7440-42-8	E421	0.010	mg/L	0.166	<0.010	<0.010	----	----	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000421	0.0000091	0.0000090	----	----	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	14.7	38.5	39.2	----	----	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----	
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	0.00012	0.00012	----	----	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00201	0.00083	0.00050	----	----	
iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	<0.010	----	----	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0018	0.0024	0.0024	----	----	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	14.0	7.66	7.68	----	----	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0207	0.0134	0.0109	----	----	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	----	----	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00453	0.00103 ^{DTMF}	0.000992	----	----	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	----	----	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	11.3	2.29	2.30	----	----	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00038	0.00095	0.00091	----	----	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000141	<0.000050	<0.000050	----	----	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.29	5.02	5.03	----	----	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----	
sodium, dissolved	7440-23-5	E421	0.050	mg/L	50.5	3.11	3.15	----	----	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.181	0.188	0.190	----	----	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	1.87	1.47	1.44	----	----	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	----	----	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	BH-96-2	MW21-01	MW-21	----	----
Client sampling date / time					07-Apr-2022 14:27	07-Apr-2022 15:54	07-Apr-2022 12:00	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22A7532-001	VA22A7532-002	VA22A7532-003	-----	-----	
					Result	Result	Result	---	---	
Dissolved Metals										
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	----	----	
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	0.00083 ^{DTMF}	0.00081 ^{DTMF}	----	----	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.00176	0.000608	0.000583	----	----	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00065	<0.00050	<0.00050	----	----	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0013	<0.0010	<0.0010	----	----	
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	----	----	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	----	----	
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	----	----	
Aggregate Organics										
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	<20	----	----	

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA22A7532	Page	: 1 of 14
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Thornhill Groundwater	Date Samples Received	: 09-Apr-2022 12:30
PO	: ----	Issue Date	: 02-May-2022 12:58
C-O-C number	: ----		
Sampler	: HS		
Site	:		
Quote number	: Q62338		
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 Services 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		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) BH-96-2	E559	07-Apr-2022	----	----	----		20-Apr-2022	28 days	13 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) MW-21	E559	07-Apr-2022	----	----	----		20-Apr-2022	28 days	13 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) MW21-01	E559	07-Apr-2022	----	----	----		20-Apr-2022	28 days	13 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) BH-96-2	E298	07-Apr-2022	26-Apr-2022	----	----		27-Apr-2022	28 days	20 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MW-21	E298	07-Apr-2022	26-Apr-2022	----	----		27-Apr-2022	28 days	20 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MW21-01	E298	07-Apr-2022	26-Apr-2022	----	----		27-Apr-2022	28 days	20 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE BH-96-2	E235.Br-L	07-Apr-2022	----	----	----		21-Apr-2022	28 days	14 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		
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE MW-21	E235.Br-L	07-Apr-2022	----	----	----		21-Apr-2022	28 days	14 days	✓	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE MW21-01	E235.Br-L	07-Apr-2022	----	----	----		21-Apr-2022	28 days	14 days	✓	
Anions and Nutrients : Chloride in Water by IC											
HDPE BH-96-2	E235.Cl	07-Apr-2022	----	----	----		21-Apr-2022	28 days	14 days	✓	
Anions and Nutrients : Chloride in Water by IC											
HDPE MW-21	E235.Cl	07-Apr-2022	----	----	----		21-Apr-2022	28 days	14 days	✓	
Anions and Nutrients : Chloride in Water by IC											
HDPE MW21-01	E235.Cl	07-Apr-2022	----	----	----		21-Apr-2022	28 days	14 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE BH-96-2	E235.F	07-Apr-2022	----	----	----		21-Apr-2022	28 days	14 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE MW-21	E235.F	07-Apr-2022	----	----	----		21-Apr-2022	28 days	14 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE MW21-01	E235.F	07-Apr-2022	----	----	----		21-Apr-2022	28 days	14 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE MW-21	E235.NO3-L	07-Apr-2022	----	----	----		21-Apr-2022	3 days	14 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 : Nitrate in Water by IC (Low Level)											
HDPE MW21-01	E235.NO3-L	07-Apr-2022	----	----	----		21-Apr-2022	72 hrs	339 hrs	*	EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE BH-96-2	E235.NO3-L	07-Apr-2022	----	----	----		21-Apr-2022	72 hrs	341 hrs	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW-21	E235.NO2-L	07-Apr-2022	----	----	----		21-Apr-2022	3 days	14 days	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW21-01	E235.NO2-L	07-Apr-2022	----	----	----		21-Apr-2022	72 hrs	339 hrs	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE BH-96-2	E235.NO2-L	07-Apr-2022	----	----	----		21-Apr-2022	72 hrs	341 hrs	*	EHT
Anions and Nutrients : Sulfate in Water by IC											
HDPE BH-96-2	E235.SO4	07-Apr-2022	----	----	----		21-Apr-2022	28 days	14 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE MW-21	E235.SO4	07-Apr-2022	----	----	----		21-Apr-2022	28 days	14 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE MW21-01	E235.SO4	07-Apr-2022	----	----	----		21-Apr-2022	28 days	14 days	✓	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) BH-96-2	E318	07-Apr-2022	26-Apr-2022	----	----		28-Apr-2022	28 days	21 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		
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) MW-21	E318	07-Apr-2022	26-Apr-2022	----	----		28-Apr-2022	28 days	21 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) MW21-01	E318	07-Apr-2022	26-Apr-2022	----	----		28-Apr-2022	28 days	21 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) BH-96-2	E372-U	07-Apr-2022	26-Apr-2022	----	----		28-Apr-2022	28 days	21 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) MW-21	E372-U	07-Apr-2022	26-Apr-2022	----	----		28-Apr-2022	28 days	21 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) MW21-01	E372-U	07-Apr-2022	26-Apr-2022	----	----		28-Apr-2022	28 days	21 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) BH-96-2	E509	07-Apr-2022	14-Apr-2022	----	----		14-Apr-2022	28 days	7 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) MW-21	E509	07-Apr-2022	14-Apr-2022	----	----		14-Apr-2022	28 days	7 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) MW21-01	E509	07-Apr-2022	14-Apr-2022	----	----		14-Apr-2022	28 days	7 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) BH-96-2	E421	07-Apr-2022	21-Apr-2022	----	----		26-Apr-2022	180 days	19 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) MW-21	E421	07-Apr-2022	28-Apr-2022	----	----		29-Apr-2022	180 days	22 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) MW21-01	E421	07-Apr-2022	28-Apr-2022	----	----		29-Apr-2022	180 days	22 days	✓	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) BH-96-2	E358-L	07-Apr-2022	26-Apr-2022	----	----		26-Apr-2022	28 days	19 days	✓	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) MW-21	E358-L	07-Apr-2022	26-Apr-2022	----	----		26-Apr-2022	28 days	19 days	✓	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) MW21-01	E358-L	07-Apr-2022	26-Apr-2022	----	----		26-Apr-2022	28 days	19 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE BH-96-2	E290	07-Apr-2022	----	----	----		27-Apr-2022	14 days	20 days	* EHT	
Physical Tests : Alkalinity Species by Titration											
HDPE MW-21	E290	07-Apr-2022	----	----	----		27-Apr-2022	14 days	20 days	* EHT	
Physical Tests : Alkalinity Species by Titration											
HDPE MW21-01	E290	07-Apr-2022	----	----	----		27-Apr-2022	14 days	20 days	* EHT	
Physical Tests : Conductivity in Water											
HDPE BH-96-2	E100	07-Apr-2022	----	----	----		27-Apr-2022	28 days	20 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		
Physical Tests : Conductivity in Water											
HDPE MW-21	E100	07-Apr-2022	----	----	----		27-Apr-2022	28 days	20 days	✓	
Physical Tests : Conductivity in Water											
HDPE MW21-01	E100	07-Apr-2022	----	----	----		27-Apr-2022	28 days	20 days	✓	
Physical Tests : pH by Meter											
HDPE MW21-01	E108	07-Apr-2022	----	----	----		27-Apr-2022	0.25 hrs	474 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE BH-96-2	E108	07-Apr-2022	----	----	----		27-Apr-2022	0.25 hrs	475 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE MW-21	E108	07-Apr-2022	----	----	----		27-Apr-2022	0.25 hrs	478 hrs	* EHTR-FM	
Physical Tests : TDS by Gravimetry											
HDPE BH-96-2	E162	07-Apr-2022	----	----	----		14-Apr-2022	7 days	7 days	✓	
Physical Tests : TDS by Gravimetry											
HDPE MW-21	E162	07-Apr-2022	----	----	----		14-Apr-2022	7 days	7 days	✓	
Physical Tests : TDS by Gravimetry											
HDPE MW21-01	E162	07-Apr-2022	----	----	----		14-Apr-2022	7 days	7 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) BH-96-2	E508	07-Apr-2022	----	----	----		12-Apr-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		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) MW-21	E508	07-Apr-2022	----	----	----		12-Apr-2022	28 days	5 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) MW21-01	E508	07-Apr-2022	----	----	----		12-Apr-2022	28 days	5 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) BH-96-2	E420	07-Apr-2022	----	----	----		30-Apr-2022	180 days	23 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) MW-21	E420	07-Apr-2022	----	----	----		30-Apr-2022	180 days	23 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) MW21-01	E420	07-Apr-2022	----	----	----		30-Apr-2022	180 days	23 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	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	464561	1	19	5.2	5.0	✓
Ammonia by Fluorescence	E298	468750	1	9	11.1	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	464557	1	17	5.8	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	463158	1	3	33.3	5.0	✓
Chloride in Water by IC	E235.Cl	464556	1	18	5.5	5.0	✓
Conductivity in Water	E100	464562	1	17	5.8	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	458653	1	18	5.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	464686	2	30	6.6	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	468748	1	6	16.6	5.0	✓
Fluoride in Water by IC	E235.F	464555	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	464553	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	464554	1	19	5.2	5.0	✓
pH by Meter	E108	464560	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	464558	1	18	5.5	5.0	✓
TDS by Gravimetry	E162	458416	2	38	5.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	468747	1	8	12.5	5.0	✓
Total Mercury in Water by CVAAS	E508	456972	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	469302	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	468751	1	15	6.6	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	464561	1	19	5.2	5.0	✓
Ammonia by Fluorescence	E298	468750	1	9	11.1	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	464557	1	17	5.8	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	463158	1	3	33.3	5.0	✓
Chloride in Water by IC	E235.Cl	464556	1	18	5.5	5.0	✓
Conductivity in Water	E100	464562	1	17	5.8	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	458653	1	18	5.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	464686	2	30	6.6	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	468748	1	6	16.6	5.0	✓
Fluoride in Water by IC	E235.F	464555	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	464553	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	464554	1	19	5.2	5.0	✓
pH by Meter	E108	464560	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	464558	1	18	5.5	5.0	✓
TDS by Gravimetry	E162	458416	2	38	5.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	468747	1	8	12.5	5.0	✓
Total Mercury in Water by CVAAS	E508	456972	1	20	5.0	5.0	✓



Matrix: **Water**

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

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Control Samples (LCS) - Continued							
Total Metals in Water by CRC ICPMS	E420	469302	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	468751	1	15	6.6	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	464561	1	19	5.2	5.0	✓
Ammonia by Fluorescence	E298	468750	1	9	11.1	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	464557	1	17	5.8	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	463158	1	3	33.3	5.0	✓
Chloride in Water by IC	E235.Cl	464556	1	18	5.5	5.0	✓
Conductivity in Water	E100	464562	1	17	5.8	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	458653	1	18	5.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	464686	2	30	6.6	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	468748	1	6	16.6	5.0	✓
Fluoride in Water by IC	E235.F	464555	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	464553	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	464554	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	464558	1	18	5.5	5.0	✓
TDS by Gravimetry	E162	458416	2	38	5.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	468747	1	8	12.5	5.0	✓
Total Mercury in Water by CVAAS	E508	456972	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	469302	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	468751	1	15	6.6	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	468750	1	9	11.1	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	464557	1	17	5.8	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	463158	1	3	33.3	5.0	✓
Chloride in Water by IC	E235.Cl	464556	1	18	5.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	458653	1	18	5.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	464686	2	30	6.6	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	468748	1	6	16.6	5.0	✓
Fluoride in Water by IC	E235.F	464555	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	464553	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	464554	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	464558	1	18	5.5	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	468747	1	8	12.5	5.0	✓
Total Mercury in Water by CVAAS	E508	456972	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	469302	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	468751	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.
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.
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
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Total Kjeldahl Nitrogen is determined using block digestion followed by flow-injection analysis with fluorescence detection.
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 Phosphorus by Colourimetry (Ultra Trace)	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 Metals in Water by CRC ICPMS	E420 Vancouver - Environmental	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 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 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
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.
Chemical Oxygen Demand by Colourimetry	E559 Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
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.



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), 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.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
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 using block digestion with Copper Sulfate Digestion Reagent.
Preparation for Dissolved Organic Carbon for Combustion	EP358 Vancouver - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are 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 HNO ₃ .
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.

QUALITY CONTROL REPORT

Work Order : **VA22A7532**

Page : 1 of 22

Client : Regional District of Kitimat-Stikine
Contact : Hannah Shinton
Address : # 300 - 4545 Lazelle Avenue
 Terrace BC Canada V8G 4E1
Telephone : ----
Project : Thornhill Groundwater
PO : ----
C-O-C number : ----
Sampler : HS
Site :
Quote number : Q62338
No. of samples received : 3
No. of samples analysed : 3

Laboratory : Vancouver - Environmental
Account Manager : Amber Springer
Address : 8081 Lougheed Highway
 Burnaby, British Columbia Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 09-Apr-2022 12:30
Date Analysis Commenced : 12-Apr-2022
Issue Date : 02-May-2022 12:58

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 Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Christopher Li	Lab Assistant	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Inorganics, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Parnian Sane	Analyst	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

Page : 2 of 22
Work Order : VA22A7532
Client : Regional District of Kitimat-Stikine
Project : Thornhill Groundwater



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 Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage 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: 458416)											
VA22A7422-006	Anonymous	solids, total dissolved [TDS]	----	E162	13	mg/L	126	136	8.15%	20%	----
Physical Tests (QC Lot: 459324)											
VA22A7506-011	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	331	306	7.85%	20%	----
Physical Tests (QC Lot: 464560)											
VA22A7532-003	MW-21	pH	----	E108	0.10	pH units	8.20	8.20	0.00%	4%	----
Physical Tests (QC Lot: 464561)											
VA22A7532-003	MW-21	alkalinity, total (as CaCO ₃)	----	E290	1.0	mg/L	120	113	5.66%	20%	----
Physical Tests (QC Lot: 464562)											
VA22A7532-003	MW-21	conductivity	----	E100	2.0	µS/cm	257	257	0.00%	10%	----
Anions and Nutrients (QC Lot: 464553)											
VA22A7532-001	BH-96-2	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.231	0.231	0.0601%	20%	----
Anions and Nutrients (QC Lot: 464554)											
VA22A7532-001	BH-96-2	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0119	0.0123	3.40%	20%	----
Anions and Nutrients (QC Lot: 464555)											
VA22A7532-001	BH-96-2	fluoride	16984-48-8	E235.F	0.020	mg/L	0.149	0.152	0.003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 464556)											
VA22A7532-001	BH-96-2	chloride	16887-00-6	E235.Cl	0.50	mg/L	1.30	1.31	0.004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 464557)											
VA22A7532-001	BH-96-2	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 464558)											
VA22A7532-001	BH-96-2	sulfate (as SO ₄)	14808-79-8	E235.SO4	0.30	mg/L	4.70	4.70	0.125%	20%	----
Anions and Nutrients (QC Lot: 468747)											
KS2201220-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.090	0.116	0.026	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 468750)											
KS2201220-001	Anonymous	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: 468751)											
KS2201220-001	Anonymous	phosphorus, total	7723-14-0	E372-U	0.100	mg/L	0.558	0.557	0.0007	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 468748)											
VA22A7531-001	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	5.00	mg/L	291	318	8.80%	20%	----
Total Metals (QC Lot: 456972)											
CG2204016-001	Anonymous	mercury, total	7439-97-6	E508	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
Total Metals (QC Lot: 469302)											
VA22A7532-001	BH-96-2	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.854	0.897	4.84%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	0.00020	0.00020	0.0000006	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00380	0.00376	1.14%	20%	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.0259	0.0259	0.103%	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	0.167	0.164	1.66%	20%	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000792	0.0000734	7.61%	20%	----
		calcium, total	7440-70-2	E420	0.050	mg/L	15.3	15.0	1.50%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	0.000080	0.000093	0.000012	Diff <2x LOR	----
		chromium, total	7440-47-3	E420	0.00050	mg/L	0.00106	0.00109	0.00002	Diff <2x LOR	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00098	0.00101	0.00003	Diff <2x LOR	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.00236	0.00235	0.00001	Diff <2x LOR	----
		iron, total	7439-89-6	E420	0.010	mg/L	1.20	1.28	6.58%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.000454	0.000460	0.000006	Diff <2x LOR	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0026	0.0027	0.0001	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	14.6	14.4	0.834%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.0845	0.0853	0.889%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00376	0.00404	7.18%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00181	0.00186	0.00005	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	0.062	0.068	0.006	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	10.8	10.7	0.110%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00072	0.00078	0.00006	Diff <2x LOR	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000181	0.000147	0.000034	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	5.70	5.88	3.17%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	0.000012	0.000012	0.0000003	Diff <2x LOR	----
		sodium, total	7440-23-5	E420	0.050	mg/L	50.1	50.3	0.459%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.184	0.189	2.96%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	1.74	1.70	0.04	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	0.0207	0.0228	9.63%	20%	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	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: 469302) - continued											
VA22A7532-001	BH-96-2	uranium, total	7440-61-1	E420	0.000010	mg/L	0.00182	0.00182	0.0818%	20%	----
		vanadium, total	7440-62-2	E420	0.000050	mg/L	0.00260	0.00271	0.00011	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.0050	0.0050	0.00004	Diff <2x LOR	----
		zirconium, total	7440-67-7	E420	0.000020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 458653)											
VA22A7479-001	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 464686)											
VA22A7532-001	BH-96-2	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0038	0.0037	0.0002	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00017	0.00018	0.000001	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00319	0.00326	1.99%	20%	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0216	0.0226	4.30%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	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	0.166	0.161	3.31%	20%	----
		cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000421	0.0000388	0.0000032	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	14.7	15.1	2.98%	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	0.000050	mg/L	<0.000050	<0.000050	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	0.00201	0.00203	0.877%	20%	----
		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	0.0018	0.0018	0.00002	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	14.0	14.0	0.250%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0207	0.0212	2.57%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00453	0.00464	2.26%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	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	11.3	11.8	4.55%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00038	0.00036	0.00001	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000141	0.000161	0.000020	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.29	4.30	0.303%	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	50.5	51.0	0.831%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.181	0.188	3.81%	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: 464686) - continued											
VA22A7532-001	BH-96-2	sulfur, dissolved	7704-34-9	E421	0.50	mg/L	1.87	1.83	0.04	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	0.00176	0.00177	0.964%	20%	----
		vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00065	0.00066	0.00001	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0013	0.0012	0.0002	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 471340)											
VA22A7528-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.116	0.0973	17.4%	20%	----
		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	0.00018	0.00021	0.00003	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00234	0.00231	1.04%	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	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	9.81	9.84	0.287%	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	0.00726	0.00616	16.4%	20%	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	0.105	0.098	6.92%	20%	----
		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	0.0016	0.0016	0.00002	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.100	mg/L	3.13	3.05	2.50%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00111	0.00103	7.44%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00415	0.00427	2.84%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	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	0.100	mg/L	0.866	0.869	0.003	Diff <2x LOR	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00068	0.00064	0.00004	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: 471340) - continued											
VA22A7528-001	Anonymous	selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000226	0.000272	0.000047	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	10.7	10.6	1.39%	20%	----
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	0.000011	0.0000010	Diff <2x LOR	----
		sodium, dissolved	7440-23-5	E421	0.050	mg/L	2.58	2.56	0.694%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0395	0.0409	3.39%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	1.90	1.98	0.08	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	0.00333	0.00287	14.9%	20%	----
		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	0.000023	0.000022	0.000002	Diff <2x LOR	----
		vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00084	0.00084	0.000004	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0020	0.0021	0.00005	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	0.00048	0.00051	0.00002	Diff <2x LOR	----
Aggregate Organics (QC Lot: 463158)											
VA22A7532-001	BH-96-2	chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	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: 458416)						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 459324)						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 464561)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 464562)						
conductivity	----	E100	1	µS/cm	<1.0	----
Anions and Nutrients (QCLot: 464553)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 464554)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 464555)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 464556)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 464557)						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 464558)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 468747)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 468750)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 468751)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Organic / Inorganic Carbon (QCLot: 468748)						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 456972)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 469302)						
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	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 469302) - continued						
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	----
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	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 458653)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	---
Dissolved Metals (QCLot: 464686)						
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	---
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	---



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 464686) - continued						
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: 471340)						
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	----
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	----



Sub-Matrix: **Water**

<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Result</i>	<i>Qualifier</i>
Dissolved Metals (QCLot: 471340) - continued						
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	----
Aggregate Organics (QCLot: 463158)						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----



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				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 458416)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	96.5	85.0	115	----
Physical Tests (QCLot: 459324)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	102	85.0	115	----
Physical Tests (QCLot: 464560)									
pH	----	E108	----	pH units	7 pH units	99.8	98.0	102	----
Physical Tests (QCLot: 464561)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	102	85.0	115	----
Physical Tests (QCLot: 464562)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	101	90.0	110	----
Anions and Nutrients (QCLot: 464553)									
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: 464554)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 464555)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	99.4	90.0	110	----
Anions and Nutrients (QCLot: 464556)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 464557)									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 464558)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 468747)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	97.0	75.0	125	----
Anions and Nutrients (QCLot: 468750)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 468751)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	102	80.0	120	----
Organic / Inorganic Carbon (QCLot: 468748)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	106	80.0	120	----
Total Metals (QCLot: 456972)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	97.0	80.0	120	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Total Metals (QCLot: 469302)									
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	109	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	101	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	104	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	99.6	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	103	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	104	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	106	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	99.9	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	99.0	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	108	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	108	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	99.8	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	100	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	108	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	100	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	101	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	101	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	104	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	100	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	101	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	108	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	91.2	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	104	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	107	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	102	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	102	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	101	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	108	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	107	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	101	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	103	80.0	120	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Total Metals (QCLot: 469302) - continued									
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	94.4	80.0	120	----
Dissolved Metals (QCLot: 464686)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	104	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	106	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	100	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	102	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	102	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	99.7	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	99.8	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	102	80.0	120	----
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	102	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	99.0	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	98.2	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	102	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	101	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	102	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	108	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	98.1	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	113	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	107	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	99.9	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	100	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	98.1	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	106	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	95.0	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	104	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	101	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	100	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	96.2	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
Dissolved Metals (QCLot: 464686) - continued									
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	101	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	96.3	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	96.8	80.0	120	----
Dissolved Metals (QCLot: 471340)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	98.0	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	99.0	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	97.9	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	93.0	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	98.2	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	92.2	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	101	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	95.8	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	97.0	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	99.4	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	97.8	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	98.9	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	98.5	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	94.0	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	102	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	97.6	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	98.3	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	98.8	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	104	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	99.6	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	99.8	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	105	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	90.7	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	94.4	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	89.3	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	105	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	97.2	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
Dissolved Metals (QCLot: 471340) - continued									
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	88.5	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	93.7	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	95.4	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	94.0	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	100	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	97.0	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	91.0	80.0	120	----
Aggregate Organics (QCLot: 463158)									
chemical oxygen demand [COD]	----	E559	20	mg/L	100 mg/L	113	85.0	115	----



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 $\geq 1x$ 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: 464553)										
VA22A7532-002	MW21-01	nitrate (as N)	14797-55-8	E235.NO3-L	2.60 mg/L	2.5 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 464554)										
VA22A7532-002	MW21-01	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: 464555)										
VA22A7532-002	MW21-01	fluoride	16984-48-8	E235.F	1.02 mg/L	1 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 464556)										
VA22A7532-002	MW21-01	chloride	16887-00-6	E235.Cl	105 mg/L	100 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 464557)										
VA22A7532-002	MW21-01	bromide	24959-67-9	E235.Br-L	0.528 mg/L	0.5 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 464558)										
VA22A7532-002	MW21-01	sulfate (as SO4)	14808-79-8	E235.SO4	105 mg/L	100 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 468747)										
KS2201220-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.49 mg/L	2.5 mg/L	99.5	70.0	130	----
Anions and Nutrients (QCLot: 468750)										
KS2201220-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.105 mg/L	0.1 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 468751)										
KS2201220-002	Anonymous	phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 468748)										
VA22A7532-001	BH-96-2	carbon, dissolved organic [DOC]	----	E358-L	4.84 mg/L	5 mg/L	96.8	70.0	130	----
Total Metals (QCLot: 456972)										
CG2204016-002	Anonymous	mercury, total	7439-97-6	E508	0.0000900 mg/L	0.0001 mg/L	90.0	70.0	130	----
Total Metals (QCLot: 469302)										
VA22A7532-002	MW21-01	aluminum, total	7429-90-5	E420	ND mg/L	0.2 mg/L	ND	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	0.0209 mg/L	0.02 mg/L	104	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	0.0383 mg/L	0.04 mg/L	95.9	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00982 mg/L	0.01 mg/L	98.2	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: 469302) - continued										
VA22A7532-002	MW21-01	boron, total	7440-42-8	E420	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00411 mg/L	0.004 mg/L	103	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	0.0102 mg/L	0.01 mg/L	102	70.0	130	----
		chromium, total	7440-47-3	E420	0.0392 mg/L	0.04 mg/L	98.0	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0195 mg/L	0.02 mg/L	97.7	70.0	130	----
		copper, total	7440-50-8	E420	0.0193 mg/L	0.02 mg/L	96.6	70.0	130	----
		iron, total	7439-89-6	E420	2.10 mg/L	2 mg/L	105	70.0	130	----
		lead, total	7439-92-1	E420	0.0197 mg/L	0.02 mg/L	98.3	70.0	130	----
		lithium, total	7439-93-2	E420	0.0961 mg/L	0.1 mg/L	96.1	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	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		nickel, total	7440-02-0	E420	0.0387 mg/L	0.04 mg/L	96.7	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	3.86 mg/L	4 mg/L	96.6	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0197 mg/L	0.02 mg/L	98.5	70.0	130	----
		selenium, total	7782-49-2	E420	0.0440 mg/L	0.04 mg/L	110	70.0	130	----
		silicon, total	7440-21-3	E420	8.96 mg/L	10 mg/L	89.6	70.0	130	----
		silver, total	7440-22-4	E420	0.00423 mg/L	0.004 mg/L	106	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	21.1 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	0.00390 mg/L	0.004 mg/L	97.6	70.0	130	----
		thorium, total	7440-29-1	E420	0.0196 mg/L	0.02 mg/L	98.2	70.0	130	----
		tin, total	7440-31-5	E420	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		titanium, total	7440-32-6	E420	0.0430 mg/L	0.04 mg/L	108	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		uranium, total	7440-61-1	E420	0.00396 mg/L	0.004 mg/L	99.0	70.0	130	----
		vanadium, total	7440-62-2	E420	0.100 mg/L	0.1 mg/L	100	70.0	130	----
		zinc, total	7440-66-6	E420	0.398 mg/L	0.4 mg/L	99.4	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0406 mg/L	0.04 mg/L	102	70.0	130	----
Dissolved Metals (QCLot: 458653)										
VA22A7532-001	BH-96-2	mercury, dissolved	7439-97-6	E509	0.0000894 mg/L	0.0001 mg/L	89.4	70.0	130	----
Dissolved Metals (QCLot: 464686)										



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: 464686) - continued										
VA22A7560-011	Anonymous	aluminum, dissolved	7429-90-5	E421	0.203 mg/L	0.2 mg/L	101	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0199 mg/L	0.02 mg/L	99.3	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	0.0404 mg/L	0.04 mg/L	101	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00894 mg/L	0.01 mg/L	89.4	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.094 mg/L	0.1 mg/L	94.3	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00401 mg/L	0.004 mg/L	100	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	0.0100 mg/L	0.01 mg/L	100	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0395 mg/L	0.04 mg/L	98.8	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0195 mg/L	0.02 mg/L	97.7	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0194 mg/L	0.02 mg/L	97.2	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.94 mg/L	2 mg/L	97.3	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0195 mg/L	0.02 mg/L	97.6	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.0992 mg/L	0.1 mg/L	99.2	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	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0211 mg/L	0.02 mg/L	106	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0385 mg/L	0.04 mg/L	96.4	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.8 mg/L	10 mg/L	108	70.0	130	----
		potassium, dissolved	7440-09-7	E421	4.18 mg/L	4 mg/L	104	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0203 mg/L	0.02 mg/L	102	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0425 mg/L	0.04 mg/L	106	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.69 mg/L	10 mg/L	96.9	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00412 mg/L	0.004 mg/L	103	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	20.4 mg/L	20 mg/L	102	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0411 mg/L	0.04 mg/L	103	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00390 mg/L	0.004 mg/L	97.6	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0209 mg/L	0.02 mg/L	104	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0198 mg/L	0.02 mg/L	98.9	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0407 mg/L	0.04 mg/L	102	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0196 mg/L	0.02 mg/L	98.1	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00397 mg/L	0.004 mg/L	99.2	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.101 mg/L	0.1 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: 464686) - continued										
VA22A7560-011	Anonymous	zinc, dissolved	7440-66-6	E421	0.379 mg/L	0.4 mg/L	94.9	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0412 mg/L	0.04 mg/L	103	70.0	130	----
Dissolved Metals (QCLot: 471340)										
VA22A7529-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.156 mg/L	0.2 mg/L	77.8	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0191 mg/L	0.02 mg/L	95.7	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0197 mg/L	0.02 mg/L	98.7	70.0	130	----
		barium, dissolved	7440-39-3	E421	0.0194 mg/L	0.02 mg/L	97.0	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0381 mg/L	0.04 mg/L	95.4	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00888 mg/L	0.01 mg/L	88.8	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.096 mg/L	0.1 mg/L	96.5	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00408 mg/L	0.004 mg/L	102	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	0.00977 mg/L	0.01 mg/L	97.7	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0400 mg/L	0.04 mg/L	99.9	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	0.0194 mg/L	0.02 mg/L	97.3	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.92 mg/L	2 mg/L	96.0	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	0.0948 mg/L	0.1 mg/L	94.8	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	0.0195 mg/L	0.02 mg/L	97.3	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0197 mg/L	0.02 mg/L	98.6	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0394 mg/L	0.04 mg/L	98.6	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	9.70 mg/L	10 mg/L	97.0	70.0	130	----
		potassium, dissolved	7440-09-7	E421	3.94 mg/L	4 mg/L	98.4	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0198 mg/L	0.02 mg/L	99.2	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0417 mg/L	0.04 mg/L	104	70.0	130	----
		silicon, dissolved	7440-21-3	E421	ND mg/L	10 mg/L	ND	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	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	18.9 mg/L	20 mg/L	94.4	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0411 mg/L	0.04 mg/L	103	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00373 mg/L	0.004 mg/L	93.3	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	0.0186 mg/L	0.02 mg/L	93.1	70.0	130	----



Sub-Matrix: **Water**

					<i>Matrix Spike (MS) Report</i>					
					<i>Spike</i>		<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>Concentration</i>	<i>Target</i>	<i>MS</i>	<i>Low</i>	<i>High</i>	<i>Qualifier</i>
Dissolved Metals (QCLot: 471340) - continued										
VA22A7529-001	Anonymous	titanium, dissolved	7440-32-6	E421	0.0362 mg/L	0.04 mg/L	90.5	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0185 mg/L	0.02 mg/L	92.6	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00390 mg/L	0.004 mg/L	97.5	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	0.400 mg/L	0.4 mg/L	100.0	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0389 mg/L	0.04 mg/L	97.4	70.0	130	----
Aggregate Organics (QCLot: 463158)										
VA22A7532-002	MW21-01	chemical oxygen demand [COD]	----	E559	102 mg/L	100 mg/L	102	75.0	125	----



CERTIFICATE OF ANALYSIS

Work Order : **VA22A7331**
Client : **Regional District of Kitimat-Stikine**
Contact : Hannah Shinton
Address : # 300 - 4545 Lazelle Avenue
 Terrace BC Canada V8G 4E1
Telephone : ----
Project : Thornhill Transfer Station Surface Water
PO : ----
C-O-C number : ----
Sampler : HS
Site :
Quote number : Q62338
No. of samples received : 7
No. of samples analysed : 7

Page : 1 of 10
Laboratory : Vancouver - Environmental
Account Manager : Amber Springer
Address : 8081 Lougheed Highway
 Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 07-Apr-2022 20:20
Date Analysis Commenced : 08-Apr-2022
Issue Date : 04-May-2022 11:39

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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Delson Resende	Lab Assistant	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, 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
Ruby Pham	Lab Assistant	Metals, Burnaby, British Columbia
Woochan Song	Lab Analyst	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).

<i>Unit</i>	<i>Description</i>
-	No Unit
µS/cm	Microsiemens per centimetre
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

<i>Qualifier</i>	<i>Description</i>
DLCI	Detection Limit Raised: Chromatographic interference due to co-elution.
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
RRV	Reported result verified by repeat analysis.



Analytical Results

Sub-Matrix: Water					Client sample ID	SW-1	SW-3	SW-6	SW-21	SW-X
(Matrix: Water)					Client sampling date / time	06-Apr-2022 12:18	06-Apr-2022 01:11	06-Apr-2022 03:15	06-Apr-2022 09:57	06-Apr-2022 12:00
Analyte	CAS Number	Method	LOR	Unit	VA22A7331-001	VA22A7331-002	VA22A7331-003	VA22A7331-004	VA22A7331-005	
					Result	Result	Result	Result	Result	
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	30.7	810	42.7	314	42.6	
conductivity	----	E100	2.0	µS/cm	61.9	1550	87.1	656	86.2	
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	27.5	460	38.2	230	39.1	
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	28.7	500	39.9	240	39.4	
pH	----	E108	0.10	pH units	7.58	7.27	7.81	8.34	7.78	
solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	86.9	<3.0	<3.0	<3.0	
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	42.5	0.0055	8.54	0.0064	
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	53.2	0.85	20.2	0.85	
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.030 ^{DLCI}	0.021	0.117	0.020	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.070	43.5	0.091	9.59	0.100	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0514	0.0610	0.242	5.12	0.243	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	0.0066	<0.0010	0.0490	<0.0010	
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0014	<0.0010	0.0015	0.0018	0.0017	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	0.203	0.0057	0.0252	0.0054	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	1.20	2.93	1.51	5.01	1.51	
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	3.79	27.1	3.72	14.0	3.64	
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0456	0.0280	0.111	0.0898	0.109	
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	0.00010	<0.00010	<0.00010	<0.00010	
arsenic, total	7440-38-2	E420	0.00010	mg/L	<0.00010	0.00921	0.00013	0.00043	0.00013	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0180	0.614	0.0148	0.123	0.0150	
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	1.64	0.011	0.698	0.016	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	0.0000118	<0.0000050	0.0000106	<0.0000050	
calcium, total	7440-70-2	E420	0.050	mg/L	10.2	154	14.4	74.5	14.2	
cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	0.000186	<0.000010	0.000062	<0.000010	
chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	0.00091	<0.00050	<0.00050	<0.00050	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	SW-1	SW-3	SW-6	SW-21	SW-X
Client sampling date / time					06-Apr-2022 12:18	06-Apr-2022 01:11	06-Apr-2022 03:15	06-Apr-2022 09:57	06-Apr-2022 12:00	
Analyte	CAS Number	Method	LOR	Unit	VA22A7331-001	VA22A7331-002	VA22A7331-003	VA22A7331-004	VA22A7331-005	
					Result	Result	Result	Result	Result	
Total Metals										
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	0.00213	<0.00010	0.00055	<0.00010	
copper, total	7440-50-8	E420	0.00050	mg/L	0.00067	<0.00050	0.00094	0.00184	0.00093	
iron, total	7439-89-6	E420	0.010	mg/L	0.039	43.3	0.168	0.266	0.169	
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	0.0018	<0.0010	<0.0010	<0.0010	
magnesium, total	7439-95-4	E420	0.0050	mg/L	0.775	28.0	0.952	13.2	0.955	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.00185	3.75	0.0114	0.387	0.0114	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000564	0.000264	0.000421	0.000177	0.000444	
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	0.00407	<0.00050	0.00168	<0.00050	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	0.242	<0.050	<0.050	<0.050	
potassium, total	7440-09-7	E420	0.050	mg/L	0.808	45.9	0.960	17.7	0.961	
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00075	0.0344	0.00082	0.0115	0.00087	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000062	0.000078	0.000070	0.000081	<0.000050	
silicon, total	7440-21-3	E420	0.10	mg/L	2.78	11.7	3.19	5.27	3.26	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, total	7440-23-5	E420	0.050	mg/L	1.09	75.0	1.69	33.2	1.68	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.0412	1.04	0.0420	0.445	0.0424	
sulfur, total	7704-34-9	E420	0.50	mg/L	<0.50	2.18	0.60	2.48	0.56	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	0.00023	<0.00020	<0.00020	<0.00020	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00096	0.00178	0.00220	0.00242	0.00226	
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000015	0.000056	0.000050	0.000109	0.000047	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	0.00129	0.00061	<0.00050	0.00061	
zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	0.00031	<0.00020	<0.00020	<0.00020	
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0212	0.0077	0.0308	0.0520	0.0337	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	SW-1	SW-3	SW-6	SW-21	SW-X
Client sampling date / time					06-Apr-2022 12:18	06-Apr-2022 01:11	06-Apr-2022 03:15	06-Apr-2022 09:57	06-Apr-2022 12:00	
Analyte	CAS Number	Method	LOR	Unit	VA22A7331-001	VA22A7331-002	VA22A7331-003	VA22A7331-004	VA22A7331-005	
					Result	Result	Result	Result	Result	
Dissolved Metals										
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	0.00819	<0.00010	0.00037	<0.00010	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0172	0.578	0.0138	0.125	0.0145	
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	1.54	0.012	0.594	0.018	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	0.0000163	<0.0000050	0.0000068	<0.0000050	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	9.84	142	13.9	71.1	14.2	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	0.000164	<0.000010	0.000053	<0.000010	
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	0.00068	<0.00050	<0.00050	<0.00050	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	0.00189	<0.00010	0.00057	<0.00010	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00128	0.00085 ^{DTC}	0.00068	0.00207	0.00074	
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.011	35.4	0.049	0.159	0.052	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	0.0016	<0.0010	<0.0010	<0.0010	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	0.709	25.6	0.837	12.8	0.888	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00098	3.50	0.00833	0.381	0.00911	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000577	0.000220	0.000472	0.000200	0.000481	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	0.00385	<0.00050	0.00161	<0.00050	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	0.052	<0.050	<0.050	<0.050	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.767	41.7	0.924	17.7	0.991	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00065	0.0314	0.00072	0.0108	0.00079	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	0.000091	<0.000050	0.000136	0.000073	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	2.65	11.0	2.89	4.84	2.94	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, dissolved	7440-23-5	E421	0.050	mg/L	1.07	68.6	1.63	33.2	1.82	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0373	0.926	0.0389	0.409	0.0400	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	0.78	2.16	0.84	3.26	0.86	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	SW-1	SW-3	SW-6	SW-21	SW-X
Client sampling date / time					06-Apr-2022 12:18	06-Apr-2022 01:11	06-Apr-2022 03:15	06-Apr-2022 09:57	06-Apr-2022 12:00	
Analyte	CAS Number	Method	LOR	Unit	VA22A7331-001	VA22A7331-002	VA22A7331-003	VA22A7331-004	VA22A7331-005	
					Result	Result	Result	Result	Result	
Dissolved Metals										
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	0.00014	<0.00010	<0.00010	<0.00010	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	0.00069	0.00053	0.00109	0.00047	
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000014	0.000050	0.000042	0.000109	0.000044	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	0.00090	<0.00050	<0.00050	<0.00050	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	0.0020	<0.0010	<0.0010	<0.0010	
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	0.00026	<0.00020	<0.00020	<0.00020	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field	
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field	
Aggregate Organics										
biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	5.9	<2.0	4.4	<2.0	
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	97	<20	40	<20	

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



Analytical Results

Sub-Matrix: Water					Client sample ID	Field Blank	Travel Blank	---	---	---
(Matrix: Water)					Client sampling date / time	06-Apr-2022 03:56	06-Apr-2022	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA22A7331-006	VA22A7331-007	-----	-----	-----	
					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	<0.60	---	---	---	---	---
hardness (as CaCO3), from total Ca/Mg	---	EC100A	0.60	mg/L	<0.60	<0.60	---	---	---	---
pH	---	E108	0.10	pH units	5.43	---	---	---	---	---
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	<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	<0.020	<0.020	---	---	---	---
Kjeldahl nitrogen, total [TKN]	---	E318	0.050	mg/L	<0.050	---	---	---	---	---
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	---	---	---	---	---
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	<0.0020	---	---	---	---	---
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	<0.30	<0.30	---	---	---	---
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L	<0.0030	<0.0030	---	---	---	---
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	---	---	---	---
arsenic, total	7440-38-2	E420	0.00010	mg/L	<0.00010	<0.00010	---	---	---	---
barium, total	7440-39-3	E420	0.00010	mg/L	<0.00010	<0.00010	---	---	---	---
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	---	---	---	---
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	---	---	---	---
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	---	---	---	---
cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	<0.0000050	---	---	---	---
calcium, total	7440-70-2	E420	0.050	mg/L	<0.050	<0.050	---	---	---	---
cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	---	---	---	---
chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	---	---	---	---
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	---	---	---	---
copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	<0.00050	---	---	---	---
iron, total	7439-89-6	E420	0.010	mg/L	<0.010	<0.010	---	---	---	---



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Field Blank	Travel Blank	---	---	---
Client sampling date / time					06-Apr-2022 03:56	06-Apr-2022	---	---	---	
Analyte	CAS Number	Method	LOR	Unit	VA22A7331-006 Result	VA22A7331-007 Result	-----	-----	-----	
Total Metals										
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	---	---	---	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	---	---	---	
magnesium, total	7439-95-4	E420	0.0050	mg/L	<0.0050	<0.0050	---	---	---	
manganese, total	7439-96-5	E420	0.00010	mg/L	<0.00010	<0.00010	---	---	---	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	---	---	---	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	<0.000050	<0.000050	---	---	---	
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	---	---	---	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	---	---	---	
potassium, total	7440-09-7	E420	0.050	mg/L	<0.050	<0.050	---	---	---	
rubidium, total	7440-17-7	E420	0.00020	mg/L	<0.00020	<0.00020	---	---	---	
selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	<0.000050	---	---	---	
silicon, total	7440-21-3	E420	0.10	mg/L	<0.10	<0.10	---	---	---	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	---	---	---	
sodium, total	7440-23-5	E420	0.050	mg/L	<0.050	<0.050	---	---	---	
strontium, total	7440-24-6	E420	0.00020	mg/L	<0.00020	<0.00020	---	---	---	
sulfur, total	7704-34-9	E420	0.50	mg/L	<0.50	<0.50	---	---	---	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	---	---	---	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	---	---	---	
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	---	---	---	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	---	---	---	
titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	---	---	---	
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	---	---	---	
uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	<0.000010	---	---	---	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	---	---	---	
zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	---	---	---	
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	---	---	---	
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0010 ^{RRV}	---	---	---	---	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	---	---	---	---	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	---	---	---	---	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	<0.00010	---	---	---	---	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Field Blank	Travel Blank	---	---	---
Client sampling date / time					06-Apr-2022 03:56	06-Apr-2022	---	---	---	
Analyte	CAS Number	Method	LOR	Unit	VA22A7331-006 Result	VA22A7331-007 Result	-----	-----	-----	
Dissolved Metals										
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	---	---	---	---	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	---	---	---	---	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	---	---	---	---	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	---	---	---	---	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	<0.050	---	---	---	---	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	---	---	---	---	
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	---	---	---	---	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	---	---	---	---	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	---	---	---	---	
iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	---	---	---	---	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	---	---	---	---	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	---	---	---	---	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	<0.0050	---	---	---	---	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	<0.00010	---	---	---	---	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	---	---	---	---	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	<0.000050	---	---	---	---	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	---	---	---	---	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	---	---	---	---	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	<0.050	---	---	---	---	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	<0.00020	---	---	---	---	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	---	---	---	---	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	<0.050	---	---	---	---	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	---	---	---	---	
sodium, dissolved	7440-23-5	E421	0.050	mg/L	<0.050	---	---	---	---	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	<0.00020	---	---	---	---	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	<0.50	---	---	---	---	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	---	---	---	---	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	---	---	---	---	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	---	---	---	---	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	---	---	---	---	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	---	---	---	---	



Analytical Results

Sub-Matrix: Water					Client sample ID	Field Blank	Travel Blank	---	---	---
(Matrix: Water)					Client sampling date / time	06-Apr-2022 03:56	06-Apr-2022	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA22A7331-006	VA22A7331-007	-----	-----	-----	
					Result	Result	---	---	---	
Dissolved Metals										
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	---	---	---	---	---
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	---	---	---	---	---
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	---	---	---	---	---
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	---	---	---	---	---
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	---	---	---	---	---
dissolved mercury filtration location	---	EP509	-	-	Field	---	---	---	---	---
dissolved metals filtration location	---	EP421	-	-	Field	---	---	---	---	---
Aggregate Organics										
biochemical oxygen demand [BOD]	---	E550	2.0	mg/L	<2.0	<2.0	---	---	---	---
chemical oxygen demand [COD]	---	E559	20	mg/L	<20	<20	---	---	---	---

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA22A7331	Page	: 1 of 23
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Thornhill Transfer Station Surface Water	Date Samples Received	: 07-Apr-2022 20:20
PO	: ----	Issue Date	: 04-May-2022 11:40
C-O-C number	: ----		
Sampler	: HS		
Site	:		
Quote number	: Q62338		
No. of samples received	: 7		
No. of samples analysed	: 7		

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 Services 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 Matrix Spike outliers occur.
- 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
Laboratory Control Sample (LCS) Recoveries								
Total Metals	QC-468851-002	----	boron, total	7440-42-8	E420	124 % ^{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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Aggregate Organics : Biochemical Oxygen Demand - 5 day											
HDPE [BOD HT 3d] Field Blank	E550	06-Apr-2022	----	----	----		09-Apr-2022	3 days	3 days	✓	
Aggregate Organics : Biochemical Oxygen Demand - 5 day											
HDPE [BOD HT 3d] SW-1	E550	06-Apr-2022	----	----	----		09-Apr-2022	3 days	3 days	✓	
Aggregate Organics : Biochemical Oxygen Demand - 5 day											
HDPE [BOD HT 3d] SW-21	E550	06-Apr-2022	----	----	----		09-Apr-2022	3 days	3 days	✓	
Aggregate Organics : Biochemical Oxygen Demand - 5 day											
HDPE [BOD HT 3d] SW-3	E550	06-Apr-2022	----	----	----		09-Apr-2022	3 days	3 days	✓	
Aggregate Organics : Biochemical Oxygen Demand - 5 day											
HDPE [BOD HT 3d] SW-6	E550	06-Apr-2022	----	----	----		09-Apr-2022	3 days	3 days	✓	
Aggregate Organics : Biochemical Oxygen Demand - 5 day											
HDPE [BOD HT 3d] SW-X	E550	06-Apr-2022	----	----	----		09-Apr-2022	3 days	3 days	✓	
Aggregate Organics : Biochemical Oxygen Demand - 5 day											
HDPE [BOD HT 3d] Travel Blank	E550	06-Apr-2022	----	----	----		09-Apr-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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Aggregate Organics : Chemical Oxygen Demand by Colourimetry											
Amber glass total (sulfuric acid) Field Blank	E559	06-Apr-2022	----	----	----		19-Apr-2022	28 days	13 days	✓	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry											
Amber glass total (sulfuric acid) SW-1	E559	06-Apr-2022	----	----	----		19-Apr-2022	28 days	13 days	✓	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry											
Amber glass total (sulfuric acid) SW-21	E559	06-Apr-2022	----	----	----		19-Apr-2022	28 days	13 days	✓	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry											
Amber glass total (sulfuric acid) SW-3	E559	06-Apr-2022	----	----	----		19-Apr-2022	28 days	13 days	✓	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry											
Amber glass total (sulfuric acid) SW-6	E559	06-Apr-2022	----	----	----		19-Apr-2022	28 days	13 days	✓	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry											
Amber glass total (sulfuric acid) SW-X	E559	06-Apr-2022	----	----	----		19-Apr-2022	28 days	13 days	✓	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry											
Amber glass total (sulfuric acid) Travel Blank	E559	06-Apr-2022	----	----	----		19-Apr-2022	28 days	14 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Field Blank	E298	06-Apr-2022	23-Apr-2022	----	----		25-Apr-2022	28 days	19 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SW-1	E298	06-Apr-2022	23-Apr-2022	----	----		25-Apr-2022	28 days	19 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		
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SW-21	E298	06-Apr-2022	23-Apr-2022	----	----		25-Apr-2022	28 days	19 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SW-6	E298	06-Apr-2022	23-Apr-2022	----	----		25-Apr-2022	28 days	19 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SW-X	E298	06-Apr-2022	23-Apr-2022	----	----		25-Apr-2022	28 days	19 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SW-3	E298	06-Apr-2022	23-Apr-2022	----	----		25-Apr-2022	28 days	20 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Travel Blank	E298	06-Apr-2022	23-Apr-2022	----	----		25-Apr-2022	28 days	20 days	✓	
Anions and Nutrients : Chloride in Water by IC											
HDPE SW-1	E235.Cl	06-Apr-2022	----	----	----		08-Apr-2022	28 days	2 days	✓	
Anions and Nutrients : Chloride in Water by IC											
HDPE SW-21	E235.Cl	06-Apr-2022	----	----	----		08-Apr-2022	28 days	2 days	✓	
Anions and Nutrients : Chloride in Water by IC											
HDPE SW-X	E235.Cl	06-Apr-2022	----	----	----		08-Apr-2022	28 days	2 days	✓	
Anions and Nutrients : Chloride in Water by IC											
HDPE Field Blank	E235.Cl	06-Apr-2022	----	----	----		08-Apr-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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Chloride in Water by IC											
HDPE SW-3	E235.Cl	06-Apr-2022	----	----	----		08-Apr-2022	28 days	3 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE SW-6	E235.Cl	06-Apr-2022	----	----	----		08-Apr-2022	28 days	3 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE Travel Blank	E235.Cl	06-Apr-2022	----	----	----		08-Apr-2022	28 days	3 days	✔	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)											
HDPE SW-1	E378-U	06-Apr-2022	----	----	----		08-Apr-2022	3 days	2 days	✔	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)											
HDPE SW-X	E378-U	06-Apr-2022	----	----	----		08-Apr-2022	3 days	2 days	✔	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)											
HDPE Field Blank	E378-U	06-Apr-2022	----	----	----		08-Apr-2022	3 days	3 days	✔	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)											
HDPE SW-21	E378-U	06-Apr-2022	----	----	----		08-Apr-2022	3 days	3 days	✔	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)											
HDPE SW-3	E378-U	06-Apr-2022	----	----	----		08-Apr-2022	3 days	3 days	✔	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)											
HDPE SW-6	E378-U	06-Apr-2022	----	----	----		08-Apr-2022	3 days	3 days	✔	



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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 : Fluoride in Water by IC											
HDPE SW-1	E235.F	06-Apr-2022	----	----	----		08-Apr-2022	28 days	2 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE SW-21	E235.F	06-Apr-2022	----	----	----		08-Apr-2022	28 days	2 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE SW-X	E235.F	06-Apr-2022	----	----	----		08-Apr-2022	28 days	2 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE Field Blank	E235.F	06-Apr-2022	----	----	----		08-Apr-2022	28 days	3 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE SW-3	E235.F	06-Apr-2022	----	----	----		08-Apr-2022	28 days	3 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE SW-6	E235.F	06-Apr-2022	----	----	----		08-Apr-2022	28 days	3 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE Travel Blank	E235.F	06-Apr-2022	----	----	----		08-Apr-2022	28 days	3 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SW-1	E235.NO3-L	06-Apr-2022	----	----	----		08-Apr-2022	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SW-21	E235.NO3-L	06-Apr-2022	----	----	----		08-Apr-2022	3 days	2 days	✓	



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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 : Nitrate in Water by IC (Low Level)											
HDPE SW-X	E235.NO3-L	06-Apr-2022	----	----	----		08-Apr-2022	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE Field Blank	E235.NO3-L	06-Apr-2022	----	----	----		08-Apr-2022	3 days	3 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SW-3	E235.NO3-L	06-Apr-2022	----	----	----		08-Apr-2022	3 days	3 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SW-6	E235.NO3-L	06-Apr-2022	----	----	----		08-Apr-2022	3 days	3 days	✓	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SW-1	E235.NO2-L	06-Apr-2022	----	----	----		08-Apr-2022	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SW-21	E235.NO2-L	06-Apr-2022	----	----	----		08-Apr-2022	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SW-X	E235.NO2-L	06-Apr-2022	----	----	----		08-Apr-2022	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE Field Blank	E235.NO2-L	06-Apr-2022	----	----	----		08-Apr-2022	3 days	3 days	✓	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SW-3	E235.NO2-L	06-Apr-2022	----	----	----		08-Apr-2022	3 days	3 days	✓	



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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 : Nitrite in Water by IC (Low Level)											
HDPE SW-6	E235.NO2-L	06-Apr-2022	----	----	----		08-Apr-2022	3 days	3 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SW-1	E235.SO4	06-Apr-2022	----	----	----		08-Apr-2022	28 days	2 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SW-21	E235.SO4	06-Apr-2022	----	----	----		08-Apr-2022	28 days	2 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SW-X	E235.SO4	06-Apr-2022	----	----	----		08-Apr-2022	28 days	2 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Field Blank	E235.SO4	06-Apr-2022	----	----	----		08-Apr-2022	28 days	3 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SW-3	E235.SO4	06-Apr-2022	----	----	----		08-Apr-2022	28 days	3 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SW-6	E235.SO4	06-Apr-2022	----	----	----		08-Apr-2022	28 days	3 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Travel Blank	E235.SO4	06-Apr-2022	----	----	----		08-Apr-2022	28 days	3 days	✓	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) Field Blank	E318	06-Apr-2022	23-Apr-2022	----	----		27-Apr-2022	28 days	21 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		
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SW-1	E318	06-Apr-2022	23-Apr-2022	----	----		27-Apr-2022	28 days	21 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SW-21	E318	06-Apr-2022	23-Apr-2022	----	----		27-Apr-2022	28 days	21 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SW-6	E318	06-Apr-2022	23-Apr-2022	----	----		27-Apr-2022	28 days	21 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SW-X	E318	06-Apr-2022	23-Apr-2022	----	----		27-Apr-2022	28 days	21 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SW-3	E318	06-Apr-2022	23-Apr-2022	----	----		27-Apr-2022	28 days	22 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) Field Blank	E372-U	06-Apr-2022	23-Apr-2022	----	----		26-Apr-2022	28 days	20 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) SW-1	E372-U	06-Apr-2022	23-Apr-2022	----	----		26-Apr-2022	28 days	20 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) SW-21	E372-U	06-Apr-2022	23-Apr-2022	----	----		26-Apr-2022	28 days	20 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) SW-6	E372-U	06-Apr-2022	23-Apr-2022	----	----		26-Apr-2022	28 days	20 days	✔	



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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 : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) SW-X	E372-U	06-Apr-2022	23-Apr-2022	----	----		26-Apr-2022	28 days	20 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) SW-3	E372-U	06-Apr-2022	23-Apr-2022	----	----		26-Apr-2022	28 days	21 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) Field Blank	E509	06-Apr-2022	10-Apr-2022	----	----		10-Apr-2022	28 days	4 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) SW-1	E509	06-Apr-2022	10-Apr-2022	----	----		10-Apr-2022	28 days	4 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) SW-21	E509	06-Apr-2022	10-Apr-2022	----	----		10-Apr-2022	28 days	4 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) SW-6	E509	06-Apr-2022	10-Apr-2022	----	----		10-Apr-2022	28 days	4 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) SW-X	E509	06-Apr-2022	10-Apr-2022	----	----		10-Apr-2022	28 days	4 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) SW-3	E509	06-Apr-2022	10-Apr-2022	----	----		10-Apr-2022	28 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SW-21	E421	06-Apr-2022	20-Apr-2022	----	----		23-Apr-2022	180 days	17 days	✔	



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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) SW-X	E421	06-Apr-2022	20-Apr-2022	----	----		23-Apr-2022	180 days	17 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) Field Blank	E421	06-Apr-2022	28-Apr-2022	----	----		29-Apr-2022	180 days	23 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SW-1	E421	06-Apr-2022	28-Apr-2022	----	----		29-Apr-2022	180 days	23 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SW-3	E421	06-Apr-2022	28-Apr-2022	----	----		29-Apr-2022	180 days	23 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SW-6	E421	06-Apr-2022	28-Apr-2022	----	----		29-Apr-2022	180 days	23 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) SW-1	E358-L	06-Apr-2022	23-Apr-2022	----	----		24-Apr-2022	28 days	18 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) SW-21	E358-L	06-Apr-2022	23-Apr-2022	----	----		24-Apr-2022	28 days	18 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) SW-6	E358-L	06-Apr-2022	23-Apr-2022	----	----		24-Apr-2022	28 days	18 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) SW-X	E358-L	06-Apr-2022	23-Apr-2022	----	----		24-Apr-2022	28 days	18 days	✔	



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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		
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) SW-3	E358-L	06-Apr-2022	23-Apr-2022	----	----		24-Apr-2022	28 days	19 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE SW-1	E290	06-Apr-2022	----	----	----		08-Apr-2022	14 days	2 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE SW-21	E290	06-Apr-2022	----	----	----		08-Apr-2022	14 days	2 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE SW-X	E290	06-Apr-2022	----	----	----		08-Apr-2022	14 days	2 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE Field Blank	E290	06-Apr-2022	----	----	----		08-Apr-2022	14 days	3 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE SW-3	E290	06-Apr-2022	----	----	----		08-Apr-2022	14 days	3 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE SW-6	E290	06-Apr-2022	----	----	----		08-Apr-2022	14 days	3 days	✔	
Physical Tests : Conductivity in Water											
HDPE SW-1	E100	06-Apr-2022	----	----	----		08-Apr-2022	28 days	2 days	✔	
Physical Tests : Conductivity in Water											
HDPE SW-21	E100	06-Apr-2022	----	----	----		08-Apr-2022	28 days	2 days	✔	



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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		
Physical Tests : Conductivity in Water											
HDPE SW-X	E100	06-Apr-2022	----	----	----		08-Apr-2022	28 days	2 days		✓
Physical Tests : Conductivity in Water											
HDPE Field Blank	E100	06-Apr-2022	----	----	----		08-Apr-2022	28 days	3 days		✓
Physical Tests : Conductivity in Water											
HDPE SW-3	E100	06-Apr-2022	----	----	----		08-Apr-2022	28 days	3 days		✓
Physical Tests : Conductivity in Water											
HDPE SW-6	E100	06-Apr-2022	----	----	----		08-Apr-2022	28 days	3 days		✓
Physical Tests : pH by Meter											
HDPE SW-1	E108	06-Apr-2022	----	----	----		08-Apr-2022	0.25 hrs	54 hrs		* EHTR-FM
Physical Tests : pH by Meter											
HDPE SW-X	E108	06-Apr-2022	----	----	----		08-Apr-2022	0.25 hrs	54 hrs		* EHTR-FM
Physical Tests : pH by Meter											
HDPE SW-21	E108	06-Apr-2022	----	----	----		08-Apr-2022	0.25 hrs	56 hrs		* EHTR-FM
Physical Tests : pH by Meter											
HDPE Field Blank	E108	06-Apr-2022	----	----	----		08-Apr-2022	0.25 hrs	62 hrs		* EHTR-FM
Physical Tests : pH by Meter											
HDPE SW-6	E108	06-Apr-2022	----	----	----		08-Apr-2022	0.25 hrs	63 hrs		* EHTR-FM



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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		
Physical Tests : pH by Meter											
HDPE SW-3	E108	06-Apr-2022	----	----	----		08-Apr-2022	0.25 hrs	65 hrs	*	EHTR-FM
Physical Tests : TSS by Gravimetry											
HDPE Field Blank	E160	06-Apr-2022	----	----	----		13-Apr-2022	7 days	7 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE SW-3	E160	06-Apr-2022	----	----	----		13-Apr-2022	7 days	7 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE SW-6	E160	06-Apr-2022	----	----	----		13-Apr-2022	7 days	7 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE SW-1	E160	06-Apr-2022	----	----	----		14-Apr-2022	7 days	8 days	*	EHT
Physical Tests : TSS by Gravimetry											
HDPE SW-21	E160	06-Apr-2022	----	----	----		14-Apr-2022	7 days	8 days	*	EHT
Physical Tests : TSS by Gravimetry											
HDPE SW-X	E160	06-Apr-2022	----	----	----		14-Apr-2022	7 days	8 days	*	EHT
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Field Blank	E508	06-Apr-2022	----	----	----		11-Apr-2022	28 days	5 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SW-1	E508	06-Apr-2022	----	----	----		11-Apr-2022	28 days	5 days	✓	



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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 (hydrochloric acid) SW-21	E508	06-Apr-2022	----	----	----		11-Apr-2022	28 days	5 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SW-3	E508	06-Apr-2022	----	----	----		11-Apr-2022	28 days	5 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SW-6	E508	06-Apr-2022	----	----	----		11-Apr-2022	28 days	5 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SW-X	E508	06-Apr-2022	----	----	----		11-Apr-2022	28 days	5 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial - total (lab preserved) Travel Blank	E508	06-Apr-2022	----	----	----		11-Apr-2022	28 days	5 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) SW-1	E420	06-Apr-2022	----	----	----		29-Apr-2022	180 days	23 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) SW-21	E420	06-Apr-2022	----	----	----		29-Apr-2022	180 days	23 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) SW-X	E420	06-Apr-2022	----	----	----		29-Apr-2022	180 days	23 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) Field Blank	E420	06-Apr-2022	----	----	----		29-Apr-2022	180 days	24 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) SW-3	E420	06-Apr-2022	----	----	----		29-Apr-2022	180 days	24 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) SW-6	E420	06-Apr-2022	----	----	----		29-Apr-2022	180 days	24 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Travel Blank	E420	06-Apr-2022	----	----	----		29-Apr-2022	180 days	24 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	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	454056	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	466193	1	11	9.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	454441	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	461936	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	454059	1	17	5.8	5.0	✓
Conductivity in Water	E100	454057	1	12	8.3	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	455081	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	463156	2	34	5.8	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	466190	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	454065	1	10	10.0	5.0	✓
Fluoride in Water by IC	E235.F	454063	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	454064	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	454061	1	16	6.2	5.0	✓
pH by Meter	E108	454055	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	454058	1	17	5.8	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	466187	1	9	11.1	5.0	✓
Total Mercury in Water by CVAAS	E508	455492	2	31	6.4	5.0	✓
Total Metals in Water by CRC ICPMS	E420	468851	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	466189	1	15	6.6	5.0	✓
TSS by Gravimetry	E160	457398	3	56	5.3	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	454056	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	466193	1	11	9.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	454441	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	461936	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	454059	1	17	5.8	5.0	✓
Conductivity in Water	E100	454057	1	12	8.3	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	455081	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	463156	2	34	5.8	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	466190	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	454065	1	10	10.0	5.0	✓
Fluoride in Water by IC	E235.F	454063	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	454064	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	454061	1	16	6.2	5.0	✓
pH by Meter	E108	454055	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	454058	1	17	5.8	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	466187	1	9	11.1	5.0	✓



Matrix: **Water**

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

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Control Samples (LCS) - Continued							
Total Mercury in Water by CVAAS	E508	455492	2	31	6.4	5.0	✓
Total Metals in Water by CRC ICPMS	E420	468851	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	466189	1	15	6.6	5.0	✓
TSS by Gravimetry	E160	457398	3	56	5.3	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	454056	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	466193	1	11	9.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	454441	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	461936	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	454059	1	17	5.8	5.0	✓
Conductivity in Water	E100	454057	1	12	8.3	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	455081	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	463156	2	34	5.8	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	466190	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	454065	1	10	10.0	5.0	✓
Fluoride in Water by IC	E235.F	454063	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	454064	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	454061	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	454058	1	17	5.8	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	466187	1	9	11.1	5.0	✓
Total Mercury in Water by CVAAS	E508	455492	2	31	6.4	5.0	✓
Total Metals in Water by CRC ICPMS	E420	468851	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	466189	1	15	6.6	5.0	✓
TSS by Gravimetry	E160	457398	3	56	5.3	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	466193	1	11	9.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	461936	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	454059	1	17	5.8	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	455081	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	463156	2	34	5.8	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	466190	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	454065	1	10	10.0	5.0	✓
Fluoride in Water by IC	E235.F	454063	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	454064	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	454061	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	454058	1	17	5.8	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	466187	1	9	11.1	5.0	✓
Total Mercury in Water by CVAAS	E508	455492	2	31	6.4	5.0	✓
Total Metals in Water by CRC ICPMS	E420	468851	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	466189	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.
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.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Total Kjeldahl Nitrogen is determined using block digestion followed by flow-injection analysis with fluorescence detection.
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 Phosphorus by Colourimetry (Ultra Trace)	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.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	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.
Total Metals in Water by CRC ICPMS	E420 Vancouver - Environmental	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 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 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
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.
Biochemical Oxygen Demand - 5 day	E550 Vancouver - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter. Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Chemical Oxygen Demand by Colourimetry	E559	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
	Vancouver - Environmental			
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.
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), 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.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
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 using block digestion with Copper Sulfate Digestion Reagent.
Preparation for Dissolved Organic Carbon for Combustion	EP358 Vancouver - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are 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 HNO ₃ .
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.

QUALITY CONTROL REPORT

Work Order : **VA22A7331**

Page : 1 of 22

Client : Regional District of Kitimat-Stikine
Contact : Hannah Shinton
Address : # 300 - 4545 Lazelle Avenue
 Terrace BC Canada V8G 4E1
Telephone : ----
Project : Thornhill Transfer Station Surface Water
PO : ----
C-O-C number : ----
Sampler : HS
Site :
Quote number : Q62338
No. of samples received : 7
No. of samples analysed : 7

Laboratory : Vancouver - Environmental
Account Manager : Amber Springer
Address : 8081 Lougheed Highway
 Burnaby, British Columbia Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 07-Apr-2022 20:20
Date Analysis Commenced : 08-Apr-2022
Issue Date : 04-May-2022 11:39

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 Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Delson Resende	Lab Assistant	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
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Ruby Pham	Lab Assistant	Metals, Burnaby, British Columbia
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Page : 2 of 22
Work Order : VA22A7331
Client : Regional District of Kitimat-Stikine
Project : Thornhill Transfer Station Surface Water



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 Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage 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: 454055)											
VA22A7331-001	SW-1	pH	----	E108	0.10	pH units	7.58	7.57	0.224%	4%	----
Physical Tests (QC Lot: 454056)											
VA22A7331-001	SW-1	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	30.7	31.0	0.972%	20%	----
Physical Tests (QC Lot: 454057)											
VA22A7331-001	SW-1	conductivity	----	E100	2.0	µS/cm	61.9	62.0	0.161%	10%	----
Physical Tests (QC Lot: 457398)											
VA22A7315-003	Anonymous	solids, total suspended [TSS]	----	E160	75.0	mg/L	31500	33000	4.58%	20%	----
Physical Tests (QC Lot: 458417)											
KS2201143-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	28.9	28.3	0.6	Diff <2x LOR	----
Physical Tests (QC Lot: 458418)											
VA22A7331-004	SW-21	solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 454058)											
VA22A7274-008	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	80.3	80.2	0.184%	20%	----
Anions and Nutrients (QC Lot: 454059)											
VA22A7274-008	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	23.0	22.9	0.483%	20%	----
Anions and Nutrients (QC Lot: 454061)											
VA22A7274-008	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: 454063)											
VA22A7274-008	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.047	0.046	0.001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 454064)											
VA22A7331-001	SW-1	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0514	0.0510	0.974%	20%	----
Anions and Nutrients (QC Lot: 454065)											
VA22A7274-010	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0014	0.0011	0.0003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 466187)											
CG2204261-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.051	<0.050	0.001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 466189)											
VA22A7331-001	SW-1	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 466193)											
VA22A7331-001	SW-1	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 466190)											
VA22A7331-001	SW-1	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	3.79	4.27	0.48	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: 455492)											
VA22A7177-001	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	0.0000053	0.0000086	0.0000034	Diff <2x LOR	----
Total Metals (QC Lot: 455493)											
VA22A7331-002	SW-3	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Total Metals (QC Lot: 468851)											
VA22A7331-001	SW-1	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0456	0.0480	5.10%	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	<0.00010	<0.00010	0	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.0180	0.0182	0.862%	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	<0.010	<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	10.2	10.4	1.81%	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	0.000050	mg/L	<0.000050	<0.000050	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	0.000050	mg/L	0.00067	0.00072	0.00006	Diff <2x LOR	----
		iron, total	7439-89-6	E420	0.010	mg/L	0.039	0.039	0.0002	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	0.775	0.790	1.96%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.00185	0.00176	4.68%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000564	0.000558	1.19%	20%	----
		nickel, total	7440-02-0	E420	0.000050	mg/L	<0.000050	<0.000050	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	0.808	0.817	1.09%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00075	0.00071	0.00004	Diff <2x LOR	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000062	<0.000050	0.000012	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	2.78	2.86	2.54%	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	1.09	1.12	2.30%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.0412	0.0420	1.85%	20%	----
		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	----



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: 468851) - continued											
VA22A7331-001	SW-1	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	0.00096	0.00104	0.00008	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	0.000015	0.000017	0.000002	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: 455081)											
CG2203888-001	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 455082)											
VA22A7331-004	SW-21	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 463156)											
VA22A7286-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0069	0.0083	0.0014	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	0.00026	0.00026	0.000006	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00686	0.00695	1.40%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	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	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	6.32	6.37	0.814%	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	0.00165	0.00168	0.00003	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	0.0014	0.0014	0.000008	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	2.74	2.78	1.34%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00027	0.00035	0.00008	Diff <2x LOR	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00194	0.00192	0.719%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00050	<0.00050	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	0.528	0.527	0.272%	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: 463156) - continued											
VA22A7286-001	Anonymous	rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00035	0.00031	0.00004	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000130	0.000106	0.000024	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	2.18	2.18	0.0718%	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	1.92	1.96	1.66%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0473	0.0471	0.415%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	<0.50	<0.50	0	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	0.000052	0.000052	0.00000002	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	0.00804	0.00807	0.368%	20%	----
		uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000094	0.000094	0.0000002	Diff <2x LOR	----
		vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00212	0.00218	0.00006	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0034	0.0018	0.0015	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 470541)											
KS2201241-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0111	0.0100	10.0%	20%	----
		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	0.00014	0.00017	0.00003	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00962	0.00954	0.834%	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	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	13.6	13.9	2.51%	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	0.00073	0.00067	0.00006	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	0.031	0.030	0.0010	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	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	2.64	2.67	1.18%	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: 470541) - continued											
KS2201241-001	Anonymous	manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00106	0.00101	4.55%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000818	0.000850	3.78%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00050	<0.00050	0.0000009	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	0.981	1.02	3.57%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00132	0.00138	0.00006	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000110	0.000167	0.000056	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	3.25	3.16	2.87%	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	2.93	2.94	0.495%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0862	0.0873	1.22%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	3.25	2.90	0.35	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	0.00034	<0.00030	0.00004	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	0.000376	0.000378	0.704%	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	0.0016	<0.0010	0.0006	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 454441)											
KS2201147-008	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----
Aggregate Organics (QC Lot: 461936)											
VA22A7331-007	Travel Blank	chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	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: 454056)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 454057)						
conductivity	----	E100	1	µS/cm	1.0	----
Physical Tests (QCLot: 457398)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 458417)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 458418)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 454058)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 454059)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 454061)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 454063)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 454064)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 454065)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 466187)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 466189)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 466193)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Organic / Inorganic Carbon (QCLot: 466190)						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 455492)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 455493)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 468851)						
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	---
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	---



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 468851) - continued						
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: 455081)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 455082)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 463156)						
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	----
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	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 463156) - continued						
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: 470541)						
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	---
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	---
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	---



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 470541) - continued						
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	----
Aggregate Organics (QCLot: 454441)						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----
Aggregate Organics (QCLot: 461936)						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----



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				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 454055)									
pH	----	E108	----	pH units	7 pH units	99.7	98.0	102	----
Physical Tests (QCLot: 454056)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	101	85.0	115	----
Physical Tests (QCLot: 454057)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	100	90.0	110	----
Physical Tests (QCLot: 457398)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	99.8	85.0	115	----
Physical Tests (QCLot: 458417)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	106	85.0	115	----
Physical Tests (QCLot: 458418)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	99.6	85.0	115	----
Anions and Nutrients (QCLot: 454058)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 454059)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 454061)									
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: 454063)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 454064)									
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: 454065)									
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: 466187)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	97.2	75.0	125	----
Anions and Nutrients (QCLot: 466189)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	98.1	80.0	120	----
Anions and Nutrients (QCLot: 466193)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	97.2	85.0	115	----
Organic / Inorganic Carbon (QCLot: 466190)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	107	80.0	120	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				Qualifier
					Spike Concentration	Recovery (%) LCS	Recovery Limits (%)		
						Low	High		
Total Metals (QCLot: 455492)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	106	80.0	120	----
Total Metals (QCLot: 455493)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	101	80.0	120	----
Total Metals (QCLot: 468851)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	107	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	107	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	105	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	99.8	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	102	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	# 124	80.0	120	MES
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	103	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	107	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	102	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	115	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	103	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	103	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	103	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	107	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	107	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	105	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	101	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	100	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	105	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	110	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	98.3	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	103	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	102	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	96.7	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	104	80.0	120	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Total Metals (QCLot: 468851) - continued									
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	106	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	102	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	102	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	101	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	90.4	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	105	80.0	120	----
Dissolved Metals (QCLot: 463156)									
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	106	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	95.3	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	101	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	95.8	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	101	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	99.0	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	98.5	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	101	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	91.7	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	102	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	103	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	101	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	102	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	102	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	103	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	104	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	94.9	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	114	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	98.0	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: 463156) - continued									
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	107	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	111	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	102	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	99.0	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	99.7	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	94.7	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	106	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	99.8	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	95.2	80.0	120	----
Dissolved Metals (QCLot: 470541)									
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	107	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	99.9	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	99.1	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	94.0	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	102	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	99.3	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	102	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	97.1	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	97.4	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	98.1	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	97.6	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	97.3	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	96.7	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	105	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	96.9	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	102	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	100	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	99.1	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	105	80.0	120	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Dissolved Metals (QCLot: 470541) - continued									
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	100	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	102	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	104	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	107	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	100	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	92.1	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	102	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	94.4	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	95.8	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	96.1	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	100	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	108	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	98.8	80.0	120	----
Aggregate Organics (QCLot: 454441)									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	105	85.0	115	----
Aggregate Organics (QCLot: 461936)									
chemical oxygen demand [COD]	----	E559	20	mg/L	100 mg/L	110	85.0	115	----

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 $\geq 1 \times$ 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: 454058)										
VA22A7274-009	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	1030 mg/L	1000 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 454059)										
VA22A7274-009	Anonymous	chloride	16887-00-6	E235.Cl	1030 mg/L	1000 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 454061)										
VA22A7274-009	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	5.06 mg/L	5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 454063)										
VA22A7274-009	Anonymous	fluoride	16984-48-8	E235.F	10.3 mg/L	10 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 454064)										
VA22A7331-002	SW-3	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: 454065)										
VA22A7331-001	SW-1	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0305 mg/L	0.03 mg/L	102	70.0	130	----
Anions and Nutrients (QCLot: 466187)										
VA22A7331-001	SW-1	Kjeldahl nitrogen, total [TKN]	----	E318	2.48 mg/L	2.5 mg/L	99.3	70.0	130	----
Anions and Nutrients (QCLot: 466189)										
VA22A7331-002	SW-3	phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 466193)										
VA22A7331-002	SW-3	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: 466190)										
VA22A7331-002	SW-3	carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Total Metals (QCLot: 455492)										
VA22A7177-002	Anonymous	mercury, total	7439-97-6	E508	0.0000944 mg/L	0.0001 mg/L	94.4	70.0	130	----
Total Metals (QCLot: 455493)										
VA22A7331-003	SW-6	mercury, total	7439-97-6	E508	0.0000899 mg/L	0.0001 mg/L	89.9	70.0	130	----
Total Metals (QCLot: 468851)										
VA22A7331-002	SW-3	aluminum, total	7429-90-5	E420	0.207 mg/L	0.2 mg/L	104	70.0	130	----
		antimony, total	7440-36-0	E420	0.0209 mg/L	0.02 mg/L	104	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0213 mg/L	0.02 mg/L	107	70.0	130	----
		barium, total	7440-39-3	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: 468851) - continued										
VA22A7331-002	SW-3	beryllium, total	7440-41-7	E420	0.0405 mg/L	0.04 mg/L	101	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00904 mg/L	0.01 mg/L	90.4	70.0	130	----
		boron, total	7440-42-8	E420	ND mg/L	0.1 mg/L	ND	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00394 mg/L	0.004 mg/L	98.6	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	0.0107 mg/L	0.01 mg/L	107	70.0	130	----
		chromium, total	7440-47-3	E420	0.0399 mg/L	0.04 mg/L	99.7	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0192 mg/L	0.02 mg/L	96.3	70.0	130	----
		copper, total	7440-50-8	E420	0.0182 mg/L	0.02 mg/L	90.9	70.0	130	----
		iron, total	7439-89-6	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		lead, total	7439-92-1	E420	0.0188 mg/L	0.02 mg/L	93.8	70.0	130	----
		lithium, total	7439-93-2	E420	0.0989 mg/L	0.1 mg/L	98.9	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	0.0223 mg/L	0.02 mg/L	111	70.0	130	----
		nickel, total	7440-02-0	E420	0.0370 mg/L	0.04 mg/L	92.6	70.0	130	----
		phosphorus, total	7723-14-0	E420	11.1 mg/L	10 mg/L	111	70.0	130	----
		potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		rubidium, total	7440-17-7	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		selenium, total	7782-49-2	E420	0.0412 mg/L	0.04 mg/L	103	70.0	130	----
		silicon, total	7440-21-3	E420	ND mg/L	10 mg/L	ND	70.0	130	----
		silver, total	7440-22-4	E420	0.00427 mg/L	0.004 mg/L	107	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	23.4 mg/L	20 mg/L	117	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0404 mg/L	0.04 mg/L	101	70.0	130	----
		thallium, total	7440-28-0	E420	0.00371 mg/L	0.004 mg/L	92.8	70.0	130	----
		thorium, total	7440-29-1	E420	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		tin, total	7440-31-5	E420	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		titanium, total	7440-32-6	E420	0.0419 mg/L	0.04 mg/L	105	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		uranium, total	7440-61-1	E420	0.00395 mg/L	0.004 mg/L	98.8	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	0.367 mg/L	0.4 mg/L	91.8	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0432 mg/L	0.04 mg/L	108	70.0	130	----
Dissolved Metals (QCLot: 455081)										



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: 455081) - continued										
CG2203888-002	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000848 mg/L	0.0001 mg/L	84.8	70.0	130	----
Dissolved Metals (QCLot: 455082)										
VA22A7331-005	SW-X	mercury, dissolved	7439-97-6	E509	0.0000918 mg/L	0.0001 mg/L	91.8	70.0	130	----
Dissolved Metals (QCLot: 463156)										
VA22A7286-002	Anonymous	aluminum, dissolved	7429-90-5	E421	0.198 mg/L	0.2 mg/L	99.2	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0207 mg/L	0.02 mg/L	103	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0208 mg/L	0.02 mg/L	104	70.0	130	----
		barium, dissolved	7440-39-3	E421	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0391 mg/L	0.04 mg/L	97.7	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00899 mg/L	0.01 mg/L	89.9	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.098 mg/L	0.1 mg/L	97.7	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00414 mg/L	0.004 mg/L	104	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	0.00990 mg/L	0.01 mg/L	99.0	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0413 mg/L	0.04 mg/L	103	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		iron, dissolved	7439-89-6	E421	2.03 mg/L	2 mg/L	101	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0195 mg/L	0.02 mg/L	97.5	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.0920 mg/L	0.1 mg/L	92.0	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	0.0212 mg/L	0.02 mg/L	106	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	0.0406 mg/L	0.04 mg/L	101	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.1 mg/L	10 mg/L	101	70.0	130	----
		potassium, dissolved	7440-09-7	E421	4.05 mg/L	4 mg/L	101	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	0.0416 mg/L	0.04 mg/L	104	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.84 mg/L	10 mg/L	98.4	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	2.17 mg/L	2 mg/L	109	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	19.6 mg/L	20 mg/L	98.1	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0454 mg/L	0.04 mg/L	114	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00395 mg/L	0.004 mg/L	98.8	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0224 mg/L	0.02 mg/L	112	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: 463156) - continued										
VA22A7286-002	Anonymous	tin, dissolved	7440-31-5	E421	0.0201 mg/L	0.02 mg/L	101	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0413 mg/L	0.04 mg/L	103	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0198 mg/L	0.02 mg/L	98.8	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00418 mg/L	0.004 mg/L	104	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.103 mg/L	0.1 mg/L	103	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.426 mg/L	0.4 mg/L	106	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0418 mg/L	0.04 mg/L	104	70.0	130	----
Dissolved Metals (QCLot: 470541)										
KS2201261-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.202 mg/L	0.2 mg/L	101	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0210 mg/L	0.02 mg/L	105	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0207 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	0.0407 mg/L	0.04 mg/L	102	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00884 mg/L	0.01 mg/L	88.4	70.0	130	----
		boron, dissolved	7440-42-8	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00400 mg/L	0.004 mg/L	100	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	0.0107 mg/L	0.01 mg/L	107	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0397 mg/L	0.04 mg/L	99.4	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0192 mg/L	0.02 mg/L	95.9	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0191 mg/L	0.02 mg/L	95.6	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.96 mg/L	2 mg/L	97.8	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0192 mg/L	0.02 mg/L	96.1	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	0.0236 mg/L	0.02 mg/L	118	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0213 mg/L	0.02 mg/L	107	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0386 mg/L	0.04 mg/L	96.6	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.6 mg/L	10 mg/L	106	70.0	130	----
		potassium, dissolved	7440-09-7	E421	3.56 mg/L	4 mg/L	89.0	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0193 mg/L	0.02 mg/L	96.7	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0438 mg/L	0.04 mg/L	110	70.0	130	----
		silicon, dissolved	7440-21-3	E421	ND mg/L	10 mg/L	ND	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00429 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	----



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: 470541) - continued										
KS2201261-001	Anonymous	sulfur, dissolved	7704-34-9	E421	21.0 mg/L	20 mg/L	105	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0394 mg/L	0.04 mg/L	98.5	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00374 mg/L	0.004 mg/L	93.6	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0189 mg/L	0.02 mg/L	94.4	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0207 mg/L	0.02 mg/L	104	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0394 mg/L	0.04 mg/L	98.4	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0194 mg/L	0.02 mg/L	97.1	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	0.103 mg/L	0.1 mg/L	103	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.438 mg/L	0.4 mg/L	109	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0409 mg/L	0.04 mg/L	102	70.0	130	----
Aggregate Organics (QCLot: 461936)										
VA22A7331-001	SW-1	chemical oxygen demand [COD]	----	E559	110 mg/L	100 mg/L	110	75.0	125	----

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

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 -

Page 1 of 1

www.alsglobal.com

Report To Contact and company name below will appear on the final report Company: Regional District of Kitimat-Stikine Contact: Hannah Shinton Phone: 250-615-6100 Company address below will appear on the final report Street: 4545 Lazelle Avenue City/Province: Terrace/BC Postal Code: V8G4E1		Report Format / Distribution Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL) Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX Email 1 or Fax: hshinton@rdks.bc.ca Email 2: nlavoie@rdks.bc.ca Email 3: eblaney@rdks.bc.ca		Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply) Regular <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply PRIORITY (Business Days): 4 day (P4-20%) <input type="checkbox"/> 3 day (P3-25%) <input type="checkbox"/> 2 day (P2-50%) <input type="checkbox"/> EMERGENCY: 1 Business day [E1 - 100%] <input type="checkbox"/> Same Day, Weekend or Statutory holiday [E2 - 200%] (Laboratory opening fees may apply) <input type="checkbox"/> Date and Time Required for all E&P TATs:																																																																																																																																																	
Invoice To Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO Company: Regional District of Kitimat-Stikine Contact: Hannah Shinton		Invoice Distribution Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX Email 1 or Fax: anne-maries@rdks.bc.ca Email 2: hshinton@rdks.bc.ca		Analysis Request Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below <table border="1"> <tr> <td>F/P</td><td>P</td><td></td><td></td><td></td><td></td><td>P</td><td></td><td>P</td><td></td><td>F/P</td><td></td><td>P</td><td></td><td>P</td><td></td><td>P</td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>		F/P	P					P		P		F/P		P		P		P																																																																																																																															
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Project Information ALS Account # / Quote #: Job #: Thornhill Transfer Station Surf PO / AFE: LSD: ALS Lab Work Order # (lab use only): ALS Sample # (lab use only) Sample Id (This desc)		Oil and Gas Required Fields (client use) AFE/Cost Center: PO#: Routing Code: Sampler: H.Shinton		Environmental Division Vancouver Work Order Reference VA22A7331 Telephone: +1 804 253 4188																																																																																																																																																	
SW-1 SW-3 SW-6 SW-21 SW-x Field Blank Travel Blank		<table border="1"> <thead> <tr> <th>Date (dd-mmm-yy)</th> <th>Time (hh:mm)</th> <th>Sample Type</th> <th>Disolved metals</th> <th>Total metals</th> <th>alkalinity (as CaCO3)</th> <th>Total Hardness</th> <th>Dissolved Hardness</th> <th>Ammonia</th> <th>BOD, Chloride, Fluoride, Sulphate</th> <th>COD</th> <th>Dissolved Organic Carbon</th> <th>Nitrate and Nitrite</th> <th>TSS</th> <th>total Kjeldahl nitrogen</th> <th>pH, Conductivity</th> <th>Total phosphorus</th> <th>ortho-phosphorus</th> </tr> </thead> <tbody> <tr> <td>6-Apr-22</td> <td>12:18</td> <td>Water</td> <td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td> </tr> <tr> <td>6-Apr-22</td> <td>1:11</td> <td>Effluent</td> <td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td> </tr> <tr> <td>6-Apr-22</td> <td>3:15</td> <td>Water</td> <td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td> </tr> <tr> <td>6-Apr-22</td> <td>9:57</td> <td>Water</td> <td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td> </tr> <tr> <td>6-Apr-22</td> <td>12:00</td> <td>Water</td> <td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td> </tr> <tr> <td>6-Apr-22</td> <td>3:56</td> <td>Water</td> <td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td> </tr> <tr> <td>6-Apr-22</td> <td></td> <td>Water</td> <td></td><td>R</td><td></td><td></td><td></td><td>R</td><td>R</td><td>R</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </tbody> </table>		Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Disolved metals	Total metals	alkalinity (as CaCO3)	Total Hardness	Dissolved Hardness	Ammonia	BOD, Chloride, Fluoride, Sulphate	COD	Dissolved Organic Carbon	Nitrate and Nitrite	TSS	total Kjeldahl nitrogen	pH, Conductivity	Total phosphorus	ortho-phosphorus	6-Apr-22	12:18	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	6-Apr-22	1:11	Effluent	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	6-Apr-22	3:15	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	6-Apr-22	9:57	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	6-Apr-22	12:00	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	6-Apr-22	3:56	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	6-Apr-22		Water		R				R	R	R								SAMPLES ON HOLD Sample is hazardous (please provide further detail) NUMBER OF CONTAINERS	
Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Disolved metals	Total metals	alkalinity (as CaCO3)	Total Hardness	Dissolved Hardness	Ammonia	BOD, Chloride, Fluoride, Sulphate	COD	Dissolved Organic Carbon	Nitrate and Nitrite	TSS	total Kjeldahl nitrogen	pH, Conductivity	Total phosphorus	ortho-phosphorus																																																																																																																																				
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Drinking Water (DW) Samples¹ (client use) Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO Are samples for human consumption/ use? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only) British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)		SAMPLE CONDITION AS RECEIVED (lab use only) Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/> Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/> Cooling Initiated <input type="checkbox"/> INITIAL COOLER TEMPERATURES °C: 6.6 6.7 6.6 FINAL COOLER TEMPERATURES °C: 7																																																																																																																																																	
SHIPMENT RELEASE (client use) Released by: Hannah Shinton Date: April 7 th 2022 Time:		INITIAL SHIPMENT RECEPTION (lab use only) Received by: Chris Date: 7 Apr 22 Time: 1030		FINAL SHIPMENT RECEPTION (lab use only) Received by: DA Date: 9/7 Time: 8:10P																																																																																																																																																	

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.



CERTIFICATE OF ANALYSIS

Work Order : **VA22B6362**
Client : **Regional District of Kitimat-Stikine**
Contact : Hannah Shinton
Address : # 300 - 4545 Lazelle Avenue
Terrace BC Canada V8G 4E1
Telephone : ----
Project : Thornhill Groundwater
PO : ----
C-O-C number : ----
Sampler : HS
Site :
Quote number : Default Water Testing (Q62338)
No. of samples received : 4
No. of samples analysed : 4

Page : 1 of 6
Laboratory : Vancouver - Environmental
Account Manager : Amber Springer
Address : 8081 Lougheed Highway
Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 16-Jul-2022 11:00
Date Analysis Commenced : 18-Jul-2022
Issue Date : 02-Aug-2022 11:58

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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Thornton	Analyst	Metals, Burnaby, British Columbia
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Owen Cheng		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).

<i>Unit</i>	<i>Description</i>
-	No Unit
µS/cm	Microsiemens per centimetre
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

<i>Qualifier</i>	<i>Description</i>
DLA	Detection Limit adjusted for required dilution.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DTMF	Dissolved concentration exceeds total for field-filtered metals sample. Metallic contaminants may have been introduced to dissolved sample during field filtration.
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.



Analytical Results

Sub-Matrix: Water					Client sample ID	BH-96-2	MW21-01	MW21-02	Travel Blank	----
(Matrix: Water)					Client sampling date / time	14-Jul-2022 14:51	14-Jul-2022 13:23	14-Jul-2022 14:00	14-Jul-2022	----
Analyte	CAS Number	Method	LOR	Unit	VA22B6362-001	VA22B6362-002	VA22B6362-003	VA22B6362-004	-----	
					Result	Result	Result	Result	----	
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	222	125	230	----	----	
conductivity	----	E100	2.0	µS/cm	401	292	417	----	----	
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	112	129	154	----	----	
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	127	143	257	<0.60	----	
pH	----	E108	0.10	pH units	8.39	8.16	8.37	----	----	
solids, total dissolved [TDS]	----	E162	10	mg/L	274	166	388	----	----	
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.207	<0.0050	0.197	<0.0050	----	
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	10.9	<0.50	<0.50	----	
fluoride	16984-48-8	E235.F	0.020	mg/L	0.157	0.027	0.194	----	----	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.374	0.173 ^{TKN}	0.786	----	----	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0290	1.75	0.0663	<0.0050	----	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0046	<0.0010	0.0074	<0.0010	----	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.126	0.0961	0.903	----	----	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	1.38	7.71	1.49	----	----	
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	1.30	<0.50	0.85	----	----	
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L	4.03	2.22	29.2	<0.0030	----	
antimony, total	7440-36-0	E420	0.00010	mg/L	0.00024	0.00019	0.00049	<0.00010	----	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00781	0.00162	0.0212	<0.00010	----	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0473	0.0768	0.197	<0.00010	----	
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	0.000627	<0.000100	----	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0.000214	<0.000050	----	
boron, total	7440-42-8	E420	0.010	mg/L	0.138	<0.010	0.144	<0.010	----	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.000325	0.0000435	0.00212	<0.0000050	----	
calcium, total	7440-70-2	E420	0.050	mg/L	18.9	47.2	38.4	<0.050	----	
cesium, total	7440-46-2	E420	0.000010	mg/L	0.000394	0.000219	0.00249	<0.000010	----	
chromium, total	7440-47-3	E420	0.00050	mg/L	0.00460	0.00432	0.0338	<0.00050	----	
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00306	0.00326	0.0192	<0.00010	----	
copper, total	7440-50-8	E420	0.00050	mg/L	0.00736	0.00667	0.0746	<0.00050	----	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	BH-96-2	MW21-01	MW21-02	Travel Blank	----
Client sampling date / time					14-Jul-2022 14:51	14-Jul-2022 13:23	14-Jul-2022 14:00	14-Jul-2022	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22B6362-001	VA22B6362-002	VA22B6362-003	VA22B6362-004	-----	-----
					Result	Result	Result	Result	-----	-----
Total Metals										
iron, total	7439-89-6	E420	0.010	mg/L	5.50	4.25	40.0	<0.010	----	----
lead, total	7439-92-1	E420	0.000050	mg/L	0.00147	0.00108	0.0140	<0.000050	----	----
lithium, total	7439-93-2	E420	0.0010	mg/L	0.0051	0.0034	0.0249	<0.0010	----	----
magnesium, total	7439-95-4	E420	0.0050	mg/L	19.3	6.07	39.2	<0.0050	----	----
manganese, total	7439-96-5	E420	0.00010	mg/L	0.282	0.157	1.20	<0.00010	----	----
mercury, total	7439-97-6	E508	0.0000050	mg/L	0.0000108	<0.0000050	<0.000100 ^{DLM}	<0.0000050	----	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00350	0.000715	0.00294	<0.000050	----	----
nickel, total	7440-02-0	E420	0.00050	mg/L	0.00630	0.00265	0.0412	<0.00050	----	----
phosphorus, total	7723-14-0	E420	0.050	mg/L	0.140	0.107	0.807	<0.050	----	----
potassium, total	7440-09-7	E420	0.050	mg/L	12.0	1.87	13.1	<0.050	----	----
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00210	0.00226	0.0120	<0.00020	----	----
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000069	<0.000050	0.000292	<0.000050	----	----
silicon, total	7440-21-3	E420	0.10	mg/L	10.6	9.26	41.3	<0.10	----	----
silver, total	7440-22-4	E420	0.000010	mg/L	0.000038	0.000042	0.000222	<0.000010	----	----
sodium, total	7440-23-5	E420	0.050	mg/L	39.5	3.56	27.3	<0.050	----	----
strontium, total	7440-24-6	E420	0.00020	mg/L	0.220	0.182	0.347	<0.00020	----	----
sulfur, total	7704-34-9	E420	0.50	mg/L	<0.50	2.36	<1.00 ^{DLA}	<0.50	----	----
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00040 ^{DLA}	<0.00020	----	----
thallium, total	7440-28-0	E420	0.000010	mg/L	0.000018	0.000012	0.000150	<0.000010	----	----
thorium, total	7440-29-1	E420	0.00010	mg/L	0.00021	0.00030	0.00214	<0.00010	----	----
tin, total	7440-31-5	E420	0.00010	mg/L	0.00012	0.00021	<0.00020 ^{DLA}	<0.00010	----	----
titanium, total	7440-32-6	E420	0.00030	mg/L	0.106	0.0948	0.500	<0.00030	----	----
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	0.00062	<0.00020 ^{DLA}	<0.00010	----	----
uranium, total	7440-61-1	E420	0.000010	mg/L	0.00183	0.000402	0.00306	<0.000010	----	----
vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00964	0.00606	0.0645	<0.00050	----	----
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0248	0.0112	0.132	<0.0030	----	----
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	0.00037	<0.00040 ^{DLA}	<0.00020	----	----
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0142	0.0042	0.0028	----	----	----
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	----
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00578	0.00037	0.00818	----	----	----
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0204	0.0502	0.0303	----	----	----



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	BH-96-2	MW21-01	MW21-02	Travel Blank	----
Client sampling date / time					14-Jul-2022 14:51	14-Jul-2022 13:23	14-Jul-2022 14:00	14-Jul-2022	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22B6362-001	VA22B6362-002	VA22B6362-003	VA22B6362-004	-----	-----
					Result	Result	Result	Result	-----	-----
Dissolved Metals										
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	<0.000100	----	-----	----
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	-----	----
boron, dissolved	7440-42-8	E421	0.010	mg/L	0.137	<0.010	0.141	----	-----	----
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000330	0.0000064	0.0000249	----	-----	----
calcium, dissolved	7440-70-2	E421	0.050	mg/L	16.9	43.2	21.0	----	-----	----
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	-----	----
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	-----	----
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00013	0.00022	<0.00010	----	-----	----
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00025	0.00127	0.00126	----	-----	----
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.015	<0.010	<0.010	----	-----	----
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	-----	----
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0017	0.0018	0.0018	----	-----	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	17.0	5.08	24.6	----	-----	----
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0892	0.00486	0.0806	----	-----	----
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	----	-----	----
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00362	0.000423	0.00435 ^{DTMF}	----	-----	----
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0.00051	----	-----	----
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	----	-----	----
potassium, dissolved	7440-09-7	E421	0.050	mg/L	11.3	1.48	10.5	----	-----	----
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00039	0.00053	0.00043	----	-----	----
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	-----	----
silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.24	5.24	4.26	----	-----	----
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	-----	----
sodium, dissolved	7440-23-5	E421	0.050	mg/L	37.0	3.15	25.2	----	-----	----
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.202	0.166	0.243	----	-----	----
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	0.57	2.48	<0.50	----	-----	----
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	----	-----	----
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	-----	----
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	-----	----
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	-----	----
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	----	-----	----
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	0.00027	<0.00010	----	-----	----



Analytical Results

Sub-Matrix: Water					Client sample ID	BH-96-2	MW21-01	MW21-02	Travel Blank	----
(Matrix: Water)					Client sampling date / time	14-Jul-2022 14:51	14-Jul-2022 13:23	14-Jul-2022 14:00	14-Jul-2022	----
Analyte	CAS Number	Method	LOR	Unit	VA22B6362-001	VA22B6362-002	VA22B6362-003	VA22B6362-004	-----	-----
					Result	Result	Result	Result	-----	-----
Dissolved Metals										
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.00184	0.000341	0.00175	----	----	----
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00073	<0.00050	<0.00050	----	----	----
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	0.0015	0.0021	----	----	----
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	----	----	----
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	----	----	----
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	----	----	----
Aggregate Organics										
chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	<10	33	----	----	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA22B6362	Page	: 1 of 14
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Thornhill Groundwater	Date Samples Received	: 16-Jul-2022 11:00
PO	: ----	Issue Date	: 02-Aug-2022 11:58
C-O-C number	: ----		
Sampler	: HS		
Site	:		
Quote number	: Default Water Testing (Q62338)		
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

- 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		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) BH-96-2	E559-L	14-Jul-2022	----	----	----		28-Jul-2022	28 days	14 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) MW21-01	E559-L	14-Jul-2022	----	----	----		28-Jul-2022	28 days	14 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) MW21-02	E559-L	14-Jul-2022	----	----	----		28-Jul-2022	28 days	14 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) BH-96-2	E298	14-Jul-2022	22-Jul-2022	----	----		29-Jul-2022	28 days	15 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MW21-01	E298	14-Jul-2022	22-Jul-2022	----	----		29-Jul-2022	28 days	15 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MW21-02	E298	14-Jul-2022	22-Jul-2022	----	----		29-Jul-2022	28 days	15 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Travel Blank	E298	14-Jul-2022	22-Jul-2022	----	----		29-Jul-2022	28 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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Chloride in Water by IC											
HDPE BH-96-2	E235.Cl	14-Jul-2022	----	----	----		18-Jul-2022	28 days	4 days	✓	
Anions and Nutrients : Chloride in Water by IC											
HDPE MW21-01	E235.Cl	14-Jul-2022	----	----	----		18-Jul-2022	28 days	4 days	✓	
Anions and Nutrients : Chloride in Water by IC											
HDPE MW21-02	E235.Cl	14-Jul-2022	----	----	----		18-Jul-2022	28 days	4 days	✓	
Anions and Nutrients : Chloride in Water by IC											
HDPE Travel Blank	E235.Cl	14-Jul-2022	----	----	----		18-Jul-2022	28 days	5 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE BH-96-2	E235.F	14-Jul-2022	----	----	----		18-Jul-2022	28 days	4 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE MW21-01	E235.F	14-Jul-2022	----	----	----		18-Jul-2022	28 days	4 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE MW21-02	E235.F	14-Jul-2022	----	----	----		18-Jul-2022	28 days	4 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE BH-96-2	E235.NO3-L	14-Jul-2022	----	----	----		18-Jul-2022	3 days	4 days	* EHT	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE MW21-01	E235.NO3-L	14-Jul-2022	----	----	----		18-Jul-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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE MW21-02	E235.NO3-L	14-Jul-2022	----	----	----		18-Jul-2022	3 days	4 days	*	EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE Travel Blank	E235.NO3-L	14-Jul-2022	----	----	----		18-Jul-2022	3 days	5 days	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE BH-96-2	E235.NO2-L	14-Jul-2022	----	----	----		18-Jul-2022	3 days	4 days	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW21-01	E235.NO2-L	14-Jul-2022	----	----	----		18-Jul-2022	3 days	4 days	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW21-02	E235.NO2-L	14-Jul-2022	----	----	----		18-Jul-2022	3 days	4 days	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE Travel Blank	E235.NO2-L	14-Jul-2022	----	----	----		18-Jul-2022	3 days	5 days	*	EHT
Anions and Nutrients : Sulfate in Water by IC											
HDPE BH-96-2	E235.SO4	14-Jul-2022	----	----	----		18-Jul-2022	28 days	4 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE MW21-01	E235.SO4	14-Jul-2022	----	----	----		18-Jul-2022	28 days	4 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE MW21-02	E235.SO4	14-Jul-2022	----	----	----		18-Jul-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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) BH-96-2	E318	14-Jul-2022	22-Jul-2022	----	----		29-Jul-2022	28 days	15 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) MW21-01	E318	14-Jul-2022	22-Jul-2022	----	----		29-Jul-2022	28 days	15 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) MW21-02	E318	14-Jul-2022	22-Jul-2022	----	----		29-Jul-2022	28 days	15 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)											
Amber glass total (sulfuric acid) BH-96-2	E372-U	14-Jul-2022	22-Jul-2022	----	----		23-Jul-2022	28 days	9 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)											
Amber glass total (sulfuric acid) MW21-01	E372-U	14-Jul-2022	22-Jul-2022	----	----		23-Jul-2022	28 days	9 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)											
Amber glass total (sulfuric acid) MW21-02	E372-U	14-Jul-2022	22-Jul-2022	----	----		23-Jul-2022	28 days	9 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) BH-96-2	E509	14-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	14 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) MW21-01	E509	14-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	14 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) MW21-02	E509	14-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	14 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) BH-96-2	E421	14-Jul-2022	25-Jul-2022	----	----		25-Jul-2022	180 days	11 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) MW21-01	E421	14-Jul-2022	25-Jul-2022	----	----		25-Jul-2022	180 days	11 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) MW21-02	E421	14-Jul-2022	25-Jul-2022	----	----		25-Jul-2022	180 days	11 days	✓	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) BH-96-2	E358-L	14-Jul-2022	22-Jul-2022	----	----		22-Jul-2022	28 days	8 days	✓	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) MW21-01	E358-L	14-Jul-2022	22-Jul-2022	----	----		22-Jul-2022	28 days	8 days	✓	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) MW21-02	E358-L	14-Jul-2022	22-Jul-2022	----	----		22-Jul-2022	28 days	8 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE BH-96-2	E290	14-Jul-2022	----	----	----		18-Jul-2022	14 days	4 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE MW21-01	E290	14-Jul-2022	----	----	----		18-Jul-2022	14 days	4 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE MW21-02	E290	14-Jul-2022	----	----	----		18-Jul-2022	14 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							
Physical Tests : Conductivity in Water											
HDPE BH-96-2	E100	14-Jul-2022	----	----	----		18-Jul-2022	28 days	4 days	✓	
Physical Tests : Conductivity in Water											
HDPE MW21-01	E100	14-Jul-2022	----	----	----		18-Jul-2022	28 days	4 days	✓	
Physical Tests : Conductivity in Water											
HDPE MW21-02	E100	14-Jul-2022	----	----	----		18-Jul-2022	28 days	4 days	✓	
Physical Tests : pH by Meter											
HDPE BH-96-2	E108	14-Jul-2022	----	----	----		18-Jul-2022	0.25 hrs	102 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE MW21-02	E108	14-Jul-2022	----	----	----		18-Jul-2022	0.25 hrs	103 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE MW21-01	E108	14-Jul-2022	----	----	----		18-Jul-2022	0.25 hrs	104 hrs	* EHTR-FM	
Physical Tests : TDS by Gravimetry											
HDPE BH-96-2	E162	14-Jul-2022	----	----	----		20-Jul-2022	7 days	5 days	✓	
Physical Tests : TDS by Gravimetry											
HDPE MW21-01	E162	14-Jul-2022	----	----	----		20-Jul-2022	7 days	6 days	✓	
Physical Tests : TDS by Gravimetry											
HDPE MW21-02	E162	14-Jul-2022	----	----	----		20-Jul-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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) BH-96-2	E508	14-Jul-2022	----	----	----		26-Jul-2022	28 days	12 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) MW21-01	E508	14-Jul-2022	----	----	----		26-Jul-2022	28 days	12 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) MW21-02	E508	14-Jul-2022	----	----	----		26-Jul-2022	28 days	12 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial - total (lab preserved) Travel Blank	E508	14-Jul-2022	----	----	----		26-Jul-2022	28 days	13 days	✓	
Total Metals : Total Metals in Water by CRC ICNMS											
HDPE total (nitric acid) BH-96-2	E420	14-Jul-2022	----	----	----		25-Jul-2022	180 days	11 days	✓	
Total Metals : Total Metals in Water by CRC ICNMS											
HDPE total (nitric acid) MW21-01	E420	14-Jul-2022	----	----	----		25-Jul-2022	180 days	11 days	✓	
Total Metals : Total Metals in Water by CRC ICNMS											
HDPE total (nitric acid) MW21-02	E420	14-Jul-2022	----	----	----		25-Jul-2022	180 days	11 days	✓	
Total Metals : Total Metals in Water by CRC ICNMS											
HDPE - total (lab preserved) Travel Blank	E420	14-Jul-2022	----	----	----		25-Jul-2022	180 days	12 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	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	567375	1	19	5.2	5.0	✔
Ammonia by Fluorescence	E298	572807	1	20	5.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	581045	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	567382	1	19	5.2	5.0	✔
Conductivity in Water	E100	567373	1	19	5.2	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	580656	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	572236	1	19	5.2	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	572804	1	19	5.2	5.0	✔
Fluoride in Water by IC	E235.F	567378	1	18	5.5	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	567380	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	567381	1	19	5.2	5.0	✔
pH by Meter	E108	567374	1	19	5.2	5.0	✔
Sulfate in Water by IC	E235.SO4	567379	1	18	5.5	5.0	✔
TDS by Gravimetry	E162	569414	1	19	5.2	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	572803	1	19	5.2	5.0	✔
Total Mercury in Water by CVAAS	E508	577444	1	20	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	572136	1	24	4.1	5.0	✖
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	572806	1	19	5.2	5.0	✔
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	567375	1	19	5.2	5.0	✔
Ammonia by Fluorescence	E298	572807	1	20	5.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	581045	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	567382	1	19	5.2	5.0	✔
Conductivity in Water	E100	567373	1	19	5.2	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	580656	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	572236	1	19	5.2	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	572804	1	19	5.2	5.0	✔
Fluoride in Water by IC	E235.F	567378	1	18	5.5	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	567380	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	567381	1	19	5.2	5.0	✔
pH by Meter	E108	567374	1	19	5.2	5.0	✔
Sulfate in Water by IC	E235.SO4	567379	1	18	5.5	5.0	✔
TDS by Gravimetry	E162	569414	1	19	5.2	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	572803	1	19	5.2	5.0	✔
Total Mercury in Water by CVAAS	E508	577444	1	20	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	572136	1	24	4.1	5.0	✖
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	572806	1	19	5.2	5.0	✔



Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Method Blanks (MB)							
Alkalinity Species by Titration	E290	567375	1	19	5.2	5.0	✔
Ammonia by Fluorescence	E298	572807	1	20	5.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	581045	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	567382	1	19	5.2	5.0	✔
Conductivity in Water	E100	567373	1	19	5.2	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	580656	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	572236	1	19	5.2	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	572804	1	19	5.2	5.0	✔
Fluoride in Water by IC	E235.F	567378	1	18	5.5	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	567380	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	567381	1	19	5.2	5.0	✔
Sulfate in Water by IC	E235.SO4	567379	1	18	5.5	5.0	✔
TDS by Gravimetry	E162	569414	1	19	5.2	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	572803	1	19	5.2	5.0	✔
Total Mercury in Water by CVAAS	E508	577444	1	20	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	572136	1	24	4.1	5.0	✖
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	572806	1	19	5.2	5.0	✔
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	572807	1	20	5.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	581045	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	567382	1	19	5.2	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	580656	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	572236	1	19	5.2	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	572804	1	19	5.2	5.0	✔
Fluoride in Water by IC	E235.F	567378	1	18	5.5	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	567380	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	567381	1	19	5.2	5.0	✔
Sulfate in Water by IC	E235.SO4	567379	1	18	5.5	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	572803	1	19	5.2	5.0	✔
Total Mercury in Water by CVAAS	E508	577444	1	20	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	572136	1	24	4.1	5.0	✖
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	572806	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.
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.
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)



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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).
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 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 Metals in Water by CRC ICPMS	E420 Vancouver - Environmental	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 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 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
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.
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
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.



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), 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.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
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 Dissolved Organic Carbon for Combustion	EP358 Vancouver - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are 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 HNO ₃ .
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.

QUALITY CONTROL REPORT

Work Order : **VA22B6362**
Client : Regional District of Kitimat-Stikine
Contact : Hannah Shinton
Address : # 300 - 4545 Lazelle Avenue
 Terrace BC Canada V8G 4E1
Telephone : ----
Project : Thornhill Groundwater
PO : ----
C-O-C number : ----
Sampler : HS
Site :
Quote number : Default Water Testing (Q62338)
No. of samples received : 4
No. of samples analysed : 4

Page : 1 of 18
Laboratory : Vancouver - Environmental
Account Manager : Amber Springer
Address : 8081 Lougheed Highway
 Burnaby, British Columbia Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 16-Jul-2022 11:00
Date Analysis Commenced : 18-Jul-2022
Issue Date : 02-Aug-2022 11:56

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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Thornton	Analyst	Vancouver Metals, Burnaby, British Columbia
Angela Ren	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Owen Cheng		Vancouver Metals, Burnaby, British Columbia

Page : 2 of 18
Work Order : VA22B6362
Client : Regional District of Kitimat-Stikine
Project : Thornhill Groundwater



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: 567373)											
VA22B6404-001	Anonymous	conductivity	----	E100	2.0	µS/cm	42300	42300	0.00%	10%	----
Physical Tests (QC Lot: 567374)											
VA22B6404-001	Anonymous	pH	----	E108	0.10	pH units	7.94	7.94	0.101%	4%	----
Physical Tests (QC Lot: 567375)											
VA22B6404-001	Anonymous	alkalinity, total (as CaCO3)	----	E290	2.0	mg/L	96.5	96.6	0.104%	20%	----
Physical Tests (QC Lot: 569414)											
KS2202565-001	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	870	902	3.61%	20%	----
Anions and Nutrients (QC Lot: 567378)											
VA22B6365-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.028	0.029	0.0008	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 567379)											
VA22B6365-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	23.9	23.9	0.0224%	20%	----
Anions and Nutrients (QC Lot: 567380)											
VA22B6365-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0664	0.0656	1.15%	20%	----
Anions and Nutrients (QC Lot: 567381)											
VA22B6365-001	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: 567382)											
VA22B6365-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 572803)											
VA22B6360-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.198	0.220	0.022	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 572806)											
VA22B6360-001	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0065	0.0068	0.0003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 572807)											
VA22B6360-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0054	0.0064	0.0010	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 572804)											
VA22B6360-001	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	7.86	7.72	1.75%	20%	----
Total Metals (QC Lot: 572136)											
YL2200914-001	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0108	0.0097	0.0012	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	0.00021	0.00020	0.000005	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.116	0.115	1.19%	20%	----
		beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	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: 572136) - continued											
YL2200914-001	Anonymous	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	0.534	0.533	0.167%	20%	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000264	0.0000248	0.0000016	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	0.050	mg/L	80.6	79.6	1.24%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	0.000044	0.000044	0.0000001	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	0.00017	0.00016	0.00001	Diff <2x LOR	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.00055	0.00055	0.000003	Diff <2x LOR	----
		iron, total	7439-89-6	E420	0.010	mg/L	0.010	0.010	0.0003	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	0.0163	0.0166	2.30%	20%	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	23.7	23.4	1.16%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.0343	0.0340	1.02%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00466	0.00464	0.519%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00582	0.00570	2.05%	20%	----
		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	15.9	15.8	0.731%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.0170	0.0168	1.04%	20%	----
		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	0.70	0.71	0.004	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	65.0	65.2	0.229%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	1.16	1.15	0.788%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	20.1	19.9	0.934%	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	0.000034	0.000033	0.000001	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	0.00022	0.00021	0.000007	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	0.000984	0.000980	0.493%	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: 577444)



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: 577444) - continued											
VA22B6362-001	BH-96-2	mercury, total	7439-97-6	E508	0.0000050	mg/L	0.0000108	0.0000113	0.0000005	Diff <2x LOR	----
Dissolved Metals (QC Lot: 572236)											
VA22B6360-002	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0026	0.0025	0.00007	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00021	0.00020	0.000008	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00292	0.00287	1.60%	20%	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0101	0.0101	0.0980%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	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	<0.0000050	0.0000056	0.0000006	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	39.6	38.8	1.96%	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	0.00077	0.00078	0.000010	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	0.058	0.058	0.0004	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	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	13.4	13.0	2.97%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0202	0.0203	0.874%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000624	0.000643	3.00%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	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	0.483	0.471	0.012	Diff <2x LOR	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00021	<0.00020	0.00001	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000583	0.000528	9.96%	20%	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	3.22	3.15	2.08%	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	1.79	1.82	1.59%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.272	0.277	1.80%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	5.20	4.94	5.14%	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	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD(%) or Difference</i>	<i>Duplicate Limits</i>	<i>Qualifier</i>
Dissolved Metals (QC Lot: 572236) - continued											
VA22B6360-002	Anonymous	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	0.000225	0.000231	2.37%	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	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 580656)											
VA22B6360-013	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 581045)											
FJ2201979-001	Anonymous	chemical oxygen demand [COD]	----	E559-L	10	mg/L	32	34	2	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: 567373)						
conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 567375)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 569414)						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 567378)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 567379)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 567380)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 567381)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 567382)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 572803)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 572806)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 572807)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Organic / Inorganic Carbon (QCLot: 572804)						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 572136)						
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	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 572136) - continued						
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	---
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: 577444)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	---
Dissolved Metals (QCLot: 572236)						
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	---



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 572236) - continued						
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	----
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	----



Sub-Matrix: **Water**

<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Result</i>	<i>Qualifier</i>
Dissolved Metals (QCLot: 580656)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 581045)						
chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	----



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 Concentration	Recovery (%)	Recovery Limits (%)		Qualifier
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 567373)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.7	90.0	110	----
Physical Tests (QCLot: 567374)									
pH	----	E108	----	pH units	7 pH units	99.8	98.0	102	----
Physical Tests (QCLot: 567375)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	108	85.0	115	----
Physical Tests (QCLot: 569414)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	100	85.0	115	----
Anions and Nutrients (QCLot: 567378)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 567379)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 567380)									
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: 567381)									
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: 567382)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 572803)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 572806)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	93.8	80.0	120	----
Anions and Nutrients (QCLot: 572807)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	100	85.0	115	----
Organic / Inorganic Carbon (QCLot: 572804)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	102	80.0	120	----
Total Metals (QCLot: 572136)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	98.0	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	105	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	97.5	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	102	80.0	120	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Total Metals (QCLot: 572136) - continued									
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	98.3	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	95.8	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	100	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	97.6	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	99.0	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	97.6	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	96.9	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	100.0	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	97.3	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	102	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	101	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	99.4	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	102	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	98.4	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	110	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	102	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	99.3	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	101	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	102	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	94.4	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	105	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	100	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	93.3	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	100	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	93.4	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	100	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	97.1	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	98.9	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	101	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	99.0	80.0	120	----
Total Metals (QCLot: 577444)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	97.9	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: 572236)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	96.1	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	97.6	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	98.2	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	95.7	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	96.2	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	100	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	95.2	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	96.6	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	97.4	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	93.1	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	99.1	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	97.7	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	97.6	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	113	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	104	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	95.0	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	97.0	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	98.0	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	97.5	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	99.5	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	97.5	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	97.9	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	98.4	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	93.6	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	89.8	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	99.8	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	99.0	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	99.6	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	101	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	92.5	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	95.5	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	92.5	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	98.0	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	105	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	98.7	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	102	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: 572236) - continued									
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	98.0	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	97.8	80.0	120	----
Aggregate Organics (QCLot: 581045)									
chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	110	85.0	115	----



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 $\geq 1x$ 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: 567378)										
VA22B6365-002	Anonymous	fluoride	16984-48-8	E235.F	1.06 mg/L	1 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 567379)										
VA22B6365-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	108 mg/L	100 mg/L	108	75.0	125	----
Anions and Nutrients (QCLot: 567380)										
VA22B6365-002	Anonymous	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: 567381)										
VA22B6365-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.510 mg/L	0.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 567382)										
VA22B6365-002	Anonymous	chloride	16887-00-6	E235.Cl	107 mg/L	100 mg/L	107	75.0	125	----
Anions and Nutrients (QCLot: 572803)										
VA22B6360-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.55 mg/L	2.5 mg/L	102	70.0	130	----
Anions and Nutrients (QCLot: 572806)										
VA22B6360-002	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0506 mg/L	0.05 mg/L	101	70.0	130	----
Anions and Nutrients (QCLot: 572807)										
VA22B6360-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0992 mg/L	0.1 mg/L	99.2	75.0	125	----
Organic / Inorganic Carbon (QCLot: 572804)										
VA22B6360-002	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	4.98 mg/L	5 mg/L	99.6	70.0	130	----
Total Metals (QCLot: 572136)										
YL2200914-002	Anonymous	aluminum, total	7429-90-5	E420	0.190 mg/L	0.2 mg/L	95.0	70.0	130	----
		antimony, total	7440-36-0	E420	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0200 mg/L	0.02 mg/L	99.8	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	0.0392 mg/L	0.04 mg/L	98.1	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00893 mg/L	0.01 mg/L	89.3	70.0	130	----
		boron, total	7440-42-8	E420	ND mg/L	0.1 mg/L	ND	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00384 mg/L	0.004 mg/L	96.0	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	0.00969 mg/L	0.01 mg/L	96.9	70.0	130	----
		chromium, total	7440-47-3	E420	0.0392 mg/L	0.04 mg/L	98.1	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0187 mg/L	0.02 mg/L	93.3	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: 572136) - continued										
YL2200914-002	Anonymous	copper, total	7440-50-8	E420	0.0181 mg/L	0.02 mg/L	90.6	70.0	130	----
		iron, total	7439-89-6	E420	1.94 mg/L	2 mg/L	96.8	70.0	130	----
		lead, total	7439-92-1	E420	0.0182 mg/L	0.02 mg/L	91.2	70.0	130	----
		lithium, total	7439-93-2	E420	0.0953 mg/L	0.1 mg/L	95.3	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	0.0205 mg/L	0.02 mg/L	103	70.0	130	----
		nickel, total	7440-02-0	E420	0.0367 mg/L	0.04 mg/L	91.6	70.0	130	----
		phosphorus, total	7723-14-0	E420	9.92 mg/L	10 mg/L	99.2	70.0	130	----
		potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0183 mg/L	0.02 mg/L	91.6	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	9.30 mg/L	10 mg/L	93.0	70.0	130	----
		silver, total	7440-22-4	E420	0.00393 mg/L	0.004 mg/L	98.3	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	0.0394 mg/L	0.04 mg/L	98.6	70.0	130	----
		thallium, total	7440-28-0	E420	0.00362 mg/L	0.004 mg/L	90.5	70.0	130	----
		thorium, total	7440-29-1	E420	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		tin, total	7440-31-5	E420	0.0200 mg/L	0.02 mg/L	99.9	70.0	130	----
		titanium, total	7440-32-6	E420	0.0384 mg/L	0.04 mg/L	96.1	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0192 mg/L	0.02 mg/L	96.3	70.0	130	----
		uranium, total	7440-61-1	E420	0.00376 mg/L	0.004 mg/L	93.9	70.0	130	----
		vanadium, total	7440-62-2	E420	0.100 mg/L	0.1 mg/L	100	70.0	130	----
		zinc, total	7440-66-6	E420	0.372 mg/L	0.4 mg/L	92.9	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0416 mg/L	0.04 mg/L	104	70.0	130	----
Total Metals (QCLot: 577444)										
VA22B6362-002	MW21-01	mercury, total	7439-97-6	E508	0.000100 mg/L	0.0001 mg/L	100	70.0	130	----
Dissolved Metals (QCLot: 572236)										
VA22B6360-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.189 mg/L	0.2 mg/L	94.6	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0192 mg/L	0.02 mg/L	96.2	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0192 mg/L	0.02 mg/L	95.8	70.0	130	----
		barium, dissolved	7440-39-3	E421	0.0189 mg/L	0.02 mg/L	94.4	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0398 mg/L	0.04 mg/L	99.6	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00944 mg/L	0.01 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
Dissolved Metals (QCLot: 572236) - continued										
VA22B6360-001	Anonymous	boron, dissolved	7440-42-8	E421	0.096 mg/L	0.1 mg/L	96.4	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00376 mg/L	0.004 mg/L	94.1	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	0.00941 mg/L	0.01 mg/L	94.1	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0391 mg/L	0.04 mg/L	97.8	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0189 mg/L	0.02 mg/L	94.6	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0186 mg/L	0.02 mg/L	92.8	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.97 mg/L	2 mg/L	98.7	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.0966 mg/L	0.1 mg/L	96.6	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	0.0197 mg/L	0.02 mg/L	98.6	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0195 mg/L	0.02 mg/L	97.3	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0376 mg/L	0.04 mg/L	94.0	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.5 mg/L	10 mg/L	105	70.0	130	----
		potassium, dissolved	7440-09-7	E421	3.82 mg/L	4 mg/L	95.5	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0198 mg/L	0.02 mg/L	98.9	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0383 mg/L	0.04 mg/L	95.7	70.0	130	----
		silicon, dissolved	7440-21-3	E421	8.55 mg/L	10 mg/L	85.5	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00385 mg/L	0.004 mg/L	96.3	70.0	130	----
		sodium, dissolved	7440-23-5	E421	1.85 mg/L	2 mg/L	92.5	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	21.0 mg/L	20 mg/L	105	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0377 mg/L	0.04 mg/L	94.3	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00388 mg/L	0.004 mg/L	96.9	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0215 mg/L	0.02 mg/L	107	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0187 mg/L	0.02 mg/L	93.3	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0388 mg/L	0.04 mg/L	96.9	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0199 mg/L	0.02 mg/L	99.4	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00419 mg/L	0.004 mg/L	105	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.0959 mg/L	0.1 mg/L	95.9	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.389 mg/L	0.4 mg/L	97.4	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0387 mg/L	0.04 mg/L	96.9	70.0	130	----
Dissolved Metals (QCLot: 580656)										
VA22B6360-014	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000772 mg/L	0.0001 mg/L	77.2	70.0	130	----
Aggregate Organics (QCLot: 581045)										

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 Work Order : VA22B6362
 Client : Regional District of Kitimat-Stikine
 Project : Thornhill Groundwater



Sub-Matrix: **Water**

					<i>Matrix Spike (MS) Report</i>					
					<i>Spike</i>		<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>Concentration</i>	<i>Target</i>	<i>MS</i>	<i>Low</i>	<i>High</i>	<i>Qualifier</i>
Aggregate Organics (QCLot: 581045) - continued										
FJ2201979-002	Anonymous	chemical oxygen demand [COD]	----	E559-L	114 mg/L	100 mg/L	114	75.0	125	----



Chain of Custody (COC) / Analytical Request Form

Affix ALS barcode label here (lab use only)

COC Number: 17 -

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Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Report To Contact and company name below will appear on the final report Company: Regional District of Kitimat-Stikine Contact: Hannah Shinton Phone: 250-615-8100 <small>Company address below will appear on the final report</small> Street: 4545 Lazelle Avenue City/Province: Terrace/BC Postal Code: V8G4E1		Report Format / Distribution Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL) Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX Email 1 or Fax: hshinton@rdks.bc.ca Email 2: enviro.dept@rdks.bc.ca Email 3: eblaney@rdks.bc.ca		Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply). Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply PRIORITY (Business Days): 4 day [P4-20%] <input type="checkbox"/> 3 day [P3-25%] <input type="checkbox"/> 2 day [P2-50%] <input type="checkbox"/> EMERGENCY: 1 Business day [E1 - 100%] <input type="checkbox"/> Same Day, Weekend or Statutory holiday [E2 -200%] (Laboratory opening fees may apply) <input type="checkbox"/> 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.																																																																																																																																																				
Invoice To Same as Report To <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO Company: Regional District of Kitimat-Stikine Contact: Nicole Lavoie		Invoice Distribution Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX Email 1 or Fax: anne-maries@rdks.bc.ca, eblaney@rdks.bc.ca Email 2: hshinton@rdks.bc.ca, enviro.dept@rdks.bc.ca		Analysis Request Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																																																																																																																																																				
Project Information ALS Account # / Quote #: _____ Job #: Thornhill Groundwater PO / AFE: _____ LSD: _____		Oil and Gas Required Fields (client use) AFE/Cost Center: _____ PO#: _____ Major/Minor Code: _____ Routing Code: _____ Requisitioner: _____ Location: _____		<table border="1" style="width:100%; border-collapse: collapse; font-size: 8px;"> <thead> <tr> <th>F/P</th> <th></th> <th>P</th> <th></th> <th></th> <th></th> <th>P</th> <th>P</th> <th>P</th> <th></th> <th>F/P</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> </tr> <tr> <td></td> <td>Disolved metals</td> <td>Conductivity</td> <td>disolved hardness (as CaCO3)</td> <td>Ammonia</td> <td>Chloride</td> <td>Fluoride, Sulphate</td> <td>Nitrate & Nitrite</td> <td>Total Metals</td> <td>Total Kjeldahl Nitrogen</td> <td>Total phosphorus</td> <td>COD</td> <td>Total Dissolved Solids</td> <td>Dissolved Organic Carbon</td> <td>Alkalinity</td> <td>pH</td> <td colspan="2">SAMPLES ON HOLD</td> <td colspan="2">Sample is hazardous (please provide further detail)</td> <td colspan="2">NUMBER OF CONTAINERS</td> </tr> </thead> <tbody> <tr> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>R</td> <td>R</td> <td></td> <td></td> <td>R</td> <td>R</td> <td></td> <td>R</td> <td>R</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>												F/P		P				P	P	P		F/P														Disolved metals	Conductivity	disolved hardness (as CaCO3)	Ammonia	Chloride	Fluoride, Sulphate	Nitrate & Nitrite	Total Metals	Total Kjeldahl Nitrogen	Total phosphorus	COD	Total Dissolved Solids	Dissolved Organic Carbon	Alkalinity	pH	SAMPLES ON HOLD		Sample is hazardous (please provide further detail)		NUMBER OF CONTAINERS		R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R								R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R								R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R								R	R			R	R		R	R														
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ALS Lab Work Order # (lab use only): ALS Sample # (lab use only) Sample Identification and/or Coordinates (This description will appear on the report) Date (dd-mm-yy) Time (hh:mm) Sample Type		ALS Contact: H. Shinton Sampler: H. Shinton		<table border="1" style="width:100%; border-collapse: collapse; font-size: 8px;"> <tr> <td>BH-96-2</td> <td></td> <td>14-Jul-22</td> <td>14:51</td> <td>Water</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> </tr> <tr> <td>MW21-01</td> <td></td> <td>14-Jul-22</td> <td>13:23</td> <td>Water</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> </tr> <tr> <td>MW21-02</td> <td></td> <td>14-Jul-22</td> <td>14:00</td> <td>Water</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> <td>R</td> </tr> <tr> <td>Travel Blank</td> <td></td> <td>14-Jul-22</td> <td>—</td> <td>Water</td> <td></td> <td></td> <td></td> <td>R</td> <td>R</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>												BH-96-2		14-Jul-22	14:51	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	MW21-01		14-Jul-22	13:23	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	MW21-02		14-Jul-22	14:00	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	Travel Blank		14-Jul-22	—	Water				R	R																																																										
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Drinking Water (DW) Samples (Criteria to add on report by clicking on the drop-down list below (electronic COC only)) Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO Are samples for human consumption/ use? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)		Terrace Shipping # _____ Coolers Ground <input type="checkbox"/> # _____ Carboys Air <input checked="" type="checkbox"/> SFX <input type="checkbox"/>																																																																																																																																																				
SHIPMENT RELEASE (client use) Released by: Hannah Shinton Date: July 15 th 2022 Time: _____		INITIAL SHIPMENT RECEPTION (lab use only) Received by: Chris Date: 15 July 22 Time: 1000		FINAL SHIPMENT RECEPTION (lab use only) Received by: CA Date: 7/16/2022 Time: 11am																																																																																																																																																				

Environmental Division
Vancouver
Work Order Reference
VA22B6362



Telephone : +1 604 263 4188



CERTIFICATE OF ANALYSIS

Work Order : **VA22B7341**
Client : **Regional District of Kitimat-Stikine**
Contact : Hannah Shinton
Address : # 300 - 4545 Lazelle Avenue
 Terrace BC Canada V8G 4E1
Telephone : ----
Project : Thornhill Transfer Station Surface Water
PO : ----
C-O-C number : ----
Sampler : H. Shinton
Site :
Quote number : Default Water Testing (Q62338)
No. of samples received : 7
No. of samples analysed : 7

Page : 1 of 10
Laboratory : Vancouver - Environmental
Account Manager : Amber Springer
Address : 8081 Lougheed Highway
 Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 27-Jul-2022 21:00
Date Analysis Commenced : 28-Jul-2022
Issue Date : 10-Aug-2022 15:43

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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Ann Joby	Lab Assistant	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Parnian Sane	Analyst	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia
Woochan Song	Lab Analyst	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).

<i>Unit</i>	<i>Description</i>
-	No Unit
µS/cm	Microsiemens per centimetre
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

<i>Qualifier</i>	<i>Description</i>
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
RRV	Reported result verified by repeat analysis.



Analytical Results

Sub-Matrix: Water					Client sample ID	SW-3	SW-45	SW-6	SW-21	SW-01
(Matrix: Water)					Client sampling date / time	26-Jul-2022 09:11	26-Jul-2022 12:00	26-Jul-2022 13:00	26-Jul-2022 10:30	26-Jul-2022 11:30
Analyte	CAS Number	Method	LOR	Unit	VA22B7341-001	VA22B7341-002	VA22B7341-003	VA22B7341-004	VA22B7341-005	
					Result	Result	Result	Result	Result	
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	859	850	58.8	253	33.7	
conductivity	----	E100	2.0	µS/cm	1610	1590	109	481	63.3	
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	515	516	52.8	186	28.0	
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	529	518	49.2	186	28.6	
pH	----	E108	0.10	pH units	7.10	7.07	7.39	8.25	7.28	
solids, total suspended [TSS]	----	E160	3.0	mg/L	176	172	<3.0	3.7	10.5	
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	47.2	47.4	<0.0050	0.0991	<0.0050	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	0.561	0.562	<0.050	0.144	<0.050	
chloride	16887-00-6	E235.Cl	0.50	mg/L	59.8	59.7	<0.50	15.1	<0.50	
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.200 ^{DLDS}	<0.200 ^{DLDS}	<0.020	0.074	<0.020	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	52.9	52.5	0.075	0.809	0.056	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0500 ^{DLDS}	<0.0500 ^{DLDS}	0.0233	0.862	0.0170	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0100 ^{DLDS}	<0.0100 ^{DLDS}	<0.0010	0.0015	<0.0010	
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0.0017	0.0075	<0.0010	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.382	0.405	0.0110	0.0301	0.0186	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	<3.00 ^{DLDS}	<3.00 ^{DLDS}	1.31	1.77	0.75	
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	32.3	32.5	2.82	11.1	1.93	
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0460	0.0460	0.0762	0.0822	0.0377	
antimony, total	7440-36-0	E420	0.00010	mg/L	0.00011	0.00010	<0.00010	0.00012	<0.00010	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.0292	0.0292	0.00016	0.00066	<0.00010	
barium, total	7440-39-3	E420	0.00010	mg/L	0.894	0.922	0.0181	0.0852	0.0211	
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	1.57	1.59	<0.010	0.571	<0.010	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000059	<0.0000050	
calcium, total	7440-70-2	E420	0.050	mg/L	162	160	18.5	56.0	10.3	
cesium, total	7440-46-2	E420	0.000010	mg/L	0.000194	0.000194	<0.000010	0.000019	<0.000010	
chromium, total	7440-47-3	E420	0.000050	mg/L	0.00128	0.00134	<0.000050	<0.000050	<0.000050	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	SW-3	SW-45	SW-6	SW-21	SW-01
Client sampling date / time					26-Jul-2022 09:11	26-Jul-2022 12:00	26-Jul-2022 13:00	26-Jul-2022 10:30	26-Jul-2022 11:30	
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					Result	Result	Result	Result	Result	
Total Metals										
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00281	0.00275	<0.00010	0.00042	<0.00010	
copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	<0.00050	0.00069	0.00144	0.00053	
iron, total	7439-89-6	E420	0.010	mg/L	70.8	69.9	0.130	0.448	0.031	
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
lithium, total	7439-93-2	E420	0.0010	mg/L	0.0021	0.0022	<0.0010	<0.0010	<0.0010	
magnesium, total	7439-95-4	E420	0.0050	mg/L	30.2	28.9	0.719	11.1	0.711	
manganese, total	7439-96-5	E420	0.00010	mg/L	3.14	3.23	0.0117	0.379	0.00261	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000297	0.000292	0.000520	0.000389	0.000270	
nickel, total	7440-02-0	E420	0.00050	mg/L	0.00352	0.00346	<0.00050	0.00136	<0.00050	
phosphorus, total	7723-14-0	E420	0.050	mg/L	0.411	0.432	<0.050	<0.050	<0.050	
potassium, total	7440-09-7	E420	0.050	mg/L	50.1	49.2	0.780	13.8	0.755	
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.0358	0.0356	0.00107	0.00820	0.00095	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000136	0.000093	<0.000050	0.000058	<0.000050	
silicon, total	7440-21-3	E420	0.10	mg/L	13.9	13.7	3.18	3.87	2.46	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, total	7440-23-5	E420	0.050	mg/L	79.5	77.1	1.08	26.8	0.942	
strontium, total	7440-24-6	E420	0.00020	mg/L	1.12	1.07	0.0481	0.371	0.0423	
sulfur, total	7704-34-9	E420	0.50	mg/L	0.94	0.81	<0.50	1.08	<0.50	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
tin, total	7440-31-5	E420	0.00010	mg/L	0.00016	0.00016	<0.00010	<0.00010	<0.00010	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00361	0.00371	0.00188	<0.00210 ^{DLM}	<0.00090 ^{DLM}	
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000025	0.000027	0.000068	0.000114	0.000014	
vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00296	0.00281	0.00063	<0.00050	<0.00050	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0035	0.0033	<0.0030	<0.0030	<0.0030	
zirconium, total	7440-67-7	E420	0.00020	mg/L	0.00052	0.00045	<0.00020	<0.00020	<0.00020	
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0087	0.0094	0.0277	0.0103	0.0246	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	SW-3	SW-45	SW-6	SW-21	SW-01
Client sampling date / time					26-Jul-2022 09:11	26-Jul-2022 12:00	26-Jul-2022 13:00	26-Jul-2022 10:30	26-Jul-2022 11:30	
Analyte	CAS Number	Method	LOR	Unit	VA22B7341-001	VA22B7341-002	VA22B7341-003	VA22B7341-004	VA22B7341-005	
					Result	Result	Result	Result	Result	
Dissolved Metals										
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.0161	0.0166	0.00015	0.00061	<0.00010	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.726	0.751	0.0172	0.0834	0.0204	
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, dissolved	7440-42-8	E421	0.010	mg/L	1.67	1.66	<0.010	0.579	<0.010	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	158	158	19.9	56.2	9.99	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000202	0.000204	<0.000010	0.000015	<0.000010	
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	0.00089	0.00099	<0.00050	<0.00050	<0.00050	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00245	0.00244	<0.00010	0.00039	<0.00010	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	0.00065	0.00136	0.00057	
iron, dissolved	7439-89-6	E421	0.010	mg/L	60.2	58.9	0.070	0.170	0.019	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0022	0.0022	<0.0010	<0.0010	<0.0010	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	29.3	29.6	0.754	11.1	0.732	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	3.09	3.06	0.0109	0.383	0.00227	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000277	0.000286	0.000557	0.000424	0.000271	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00358	0.00369	<0.00050	0.00139	<0.00050	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.098	0.089	<0.050	<0.050	<0.050	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	48.5	49.4	0.863	13.6	0.829	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.0385	0.0390	0.00120	0.00862	0.00101	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000142	0.000139	<0.000050	0.000074	<0.000050	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	12.6	12.8	3.07	3.63	2.36	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, dissolved	7440-23-5	E421	0.050	mg/L	79.7	81.5	1.21	27.9	0.999	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	1.07	1.11	0.0511	0.383	0.0435	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	0.81	0.82	0.57	1.06	<0.50	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	0.00013	0.00014	<0.00010	<0.00010	<0.00010	



Analytical Results

Sub-Matrix: Water					Client sample ID	SW-3	SW-45	SW-6	SW-21	SW-01
(Matrix: Water)					Client sampling date / time	26-Jul-2022 09:11	26-Jul-2022 12:00	26-Jul-2022 13:00	26-Jul-2022 10:30	26-Jul-2022 11:30
Analyte	CAS Number	Method	LOR	Unit	VA22B7341-001	VA22B7341-002	VA22B7341-003	VA22B7341-004	VA22B7341-005	
					Result	Result	Result	Result	Result	
Dissolved Metals										
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00140	0.00139	0.00051	0.00034	0.00030	
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000026	0.000027	0.000063	0.000110	0.000013	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00157	0.00159	0.00050	<0.00050	<0.00050	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0032	0.0036	<0.0010	<0.0010	0.0030	
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	0.00044	0.00045	<0.00020	<0.00020	<0.00020	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field	
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field	
Aggregate Organics										
biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	10.9	9.2	8.4	<2.0	<2.0	
chemical oxygen demand [COD]	----	E559-L	10	mg/L	138	136	<10	36	<10	

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



Analytical Results

Sub-Matrix: Water					Client sample ID	Field Blank	Travel Blank	---	---	---
(Matrix: Water)					Client sampling date / time	26-Jul-2022 13:30	26-Jul-2022	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA22B7341-006	VA22B7341-007	-----	-----	-----	
					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	<0.60	---	---	---	---	---
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	<0.60	<0.60	---	---	---	---
pH	----	E108	0.10	pH units	5.24	---	---	---	---	---
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	<0.0050	---	---	---	---
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	---	---	---	---
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	---	---	---	---
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	---	---	---	---
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	---	---	---	---	---
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	---	---	---	---
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	---	---	---	---
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	<0.0020	---	---	---	---	---
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	<0.30	<0.30	---	---	---	---
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	<0.50	---	---	---	---	---
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L	<0.0030	<0.0030	---	---	---	---
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	---	---	---	---
arsenic, total	7440-38-2	E420	0.00010	mg/L	<0.00010	<0.00010	---	---	---	---
barium, total	7440-39-3	E420	0.00010	mg/L	<0.00010	<0.00010	---	---	---	---
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	---	---	---	---
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	---	---	---	---
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	---	---	---	---
cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	<0.0000050	---	---	---	---
calcium, total	7440-70-2	E420	0.050	mg/L	<0.050	<0.050	---	---	---	---
cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	---	---	---	---
chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	---	---	---	---
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	---	---	---	---



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Field Blank	Travel Blank	---	---	---
Client sampling date / time					26-Jul-2022 13:30	26-Jul-2022	---	---	---	
Analyte	CAS Number	Method	LOR	Unit	VA22B7341-006	VA22B7341-007	-----	-----	-----	
					Result	Result	---	---	---	
Total Metals										
copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	<0.00050	---	---	---	
iron, total	7439-89-6	E420	0.010	mg/L	<0.010	<0.010	---	---	---	
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	---	---	---	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	---	---	---	
magnesium, total	7439-95-4	E420	0.0050	mg/L	<0.0050	0.0176 ^{RRV}	---	---	---	
manganese, total	7439-96-5	E420	0.00010	mg/L	<0.00010	<0.00010	---	---	---	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	---	---	---	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	<0.000050	<0.000050	---	---	---	
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	---	---	---	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	---	---	---	
potassium, total	7440-09-7	E420	0.050	mg/L	<0.050	<0.050	---	---	---	
rubidium, total	7440-17-7	E420	0.00020	mg/L	<0.00020	<0.00020	---	---	---	
selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	<0.000050	---	---	---	
silicon, total	7440-21-3	E420	0.10	mg/L	<0.10	<0.10	---	---	---	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	---	---	---	
sodium, total	7440-23-5	E420	0.050	mg/L	<0.050	0.145 ^{RRV}	---	---	---	
strontium, total	7440-24-6	E420	0.00020	mg/L	<0.00020	<0.00020	---	---	---	
sulfur, total	7704-34-9	E420	0.50	mg/L	<0.50	<0.50	---	---	---	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	---	---	---	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	---	---	---	
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	---	---	---	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	---	---	---	
titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	---	---	---	
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	---	---	---	
uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	<0.000010	---	---	---	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	---	---	---	
zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	---	---	---	
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	---	---	---	
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	<0.0010	---	---	---	---	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	---	---	---	---	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	---	---	---	---	



Analytical Results

Sub-Matrix: Water					Client sample ID	Field Blank	Travel Blank	---	---	---
(Matrix: Water)					Client sampling date / time	26-Jul-2022 13:30	26-Jul-2022	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA22B7341-006	VA22B7341-007	-----	-----	-----	
					Result	Result	---	---	---	
Dissolved Metals										
barium, dissolved	7440-39-3	E421	0.00010	mg/L	<0.00010	---	---	---	---	
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	---	---	---	---	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	---	---	---	---	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	---	---	---	---	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	---	---	---	---	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	<0.050	---	---	---	---	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	---	---	---	---	
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	---	---	---	---	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	---	---	---	---	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	---	---	---	---	
iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	---	---	---	---	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	---	---	---	---	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	---	---	---	---	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	<0.0050	---	---	---	---	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	<0.00010	---	---	---	---	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	---	---	---	---	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	<0.000050	---	---	---	---	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	---	---	---	---	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	---	---	---	---	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	<0.050	---	---	---	---	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	<0.00020	---	---	---	---	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	---	---	---	---	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	<0.050	---	---	---	---	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	---	---	---	---	
sodium, dissolved	7440-23-5	E421	0.050	mg/L	<0.050	---	---	---	---	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	<0.00020	---	---	---	---	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	<0.50	---	---	---	---	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	---	---	---	---	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	---	---	---	---	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	---	---	---	---	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	---	---	---	---	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	---	---	---	---	



Analytical Results

Sub-Matrix: Water					Client sample ID	Field Blank	Travel Blank	---	---	---
(Matrix: Water)					Client sampling date / time	26-Jul-2022 13:30	26-Jul-2022	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA22B7341-006	VA22B7341-007	-----	-----	-----	
					Result	Result	---	---	---	
Dissolved Metals										
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	---	---	---	---	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	---	---	---	---	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	---	---	---	---	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	---	---	---	---	
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	---	---	---	---	
dissolved mercury filtration location	----	EP509	-	-	Field	---	---	---	---	
dissolved metals filtration location	----	EP421	-	-	Field	---	---	---	---	
Aggregate Organics										
biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	---	---	---	
chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	<10	---	---	---	

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA22B7341	Page	: 1 of 25
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Thornhill Transfer Station Surface Water	Date Samples Received	: 27-Jul-2022 21:00
PO	: ----	Issue Date	: 10-Aug-2022 15:43
C-O-C number	: ----		
Sampler	: H. Shinton		
Site	:		
Quote number	: Default Water Testing (Q62338)		
No. of samples received	: 7		
No. of samples analysed	: 7		

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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Aggregate Organics : Biochemical Oxygen Demand - 5 day											
HDPE [BOD HT 3d] Field Blank	E550	26-Jul-2022	----	----	----		29-Jul-2022	3 days	3 days	✓	
Aggregate Organics : Biochemical Oxygen Demand - 5 day											
HDPE [BOD HT 3d] SW-01	E550	26-Jul-2022	----	----	----		29-Jul-2022	3 days	3 days	✓	
Aggregate Organics : Biochemical Oxygen Demand - 5 day											
HDPE [BOD HT 3d] SW-21	E550	26-Jul-2022	----	----	----		29-Jul-2022	3 days	3 days	✓	
Aggregate Organics : Biochemical Oxygen Demand - 5 day											
HDPE [BOD HT 3d] SW-3	E550	26-Jul-2022	----	----	----		29-Jul-2022	3 days	3 days	✓	
Aggregate Organics : Biochemical Oxygen Demand - 5 day											
HDPE [BOD HT 3d] SW-45	E550	26-Jul-2022	----	----	----		29-Jul-2022	3 days	3 days	✓	
Aggregate Organics : Biochemical Oxygen Demand - 5 day											
HDPE [BOD HT 3d] SW-6	E550	26-Jul-2022	----	----	----		29-Jul-2022	3 days	3 days	✓	
Aggregate Organics : Biochemical Oxygen Demand - 5 day											
HDPE Travel Blank	E550	26-Jul-2022	----	----	----		29-Jul-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		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Field Blank	E559-L	26-Jul-2022	----	----	----		09-Aug-2022	28 days	14 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) SW-01	E559-L	26-Jul-2022	----	----	----		09-Aug-2022	28 days	14 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) SW-21	E559-L	26-Jul-2022	----	----	----		09-Aug-2022	28 days	14 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) SW-3	E559-L	26-Jul-2022	----	----	----		09-Aug-2022	28 days	14 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) SW-45	E559-L	26-Jul-2022	----	----	----		09-Aug-2022	28 days	14 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) SW-6	E559-L	26-Jul-2022	----	----	----		09-Aug-2022	28 days	14 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Travel Blank	E559-L	26-Jul-2022	----	----	----		09-Aug-2022	28 days	15 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Field Blank	E298	26-Jul-2022	02-Aug-2022	----	----		07-Aug-2022	28 days	12 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) SW-01	E298	26-Jul-2022	02-Aug-2022	----	----		07-Aug-2022	28 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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SW-21	E298	26-Jul-2022	02-Aug-2022	----	----		07-Aug-2022	28 days	12 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SW-3	E298	26-Jul-2022	02-Aug-2022	----	----		07-Aug-2022	28 days	12 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SW-45	E298	26-Jul-2022	02-Aug-2022	----	----		07-Aug-2022	28 days	12 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SW-6	E298	26-Jul-2022	02-Aug-2022	----	----		07-Aug-2022	28 days	12 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Travel Blank	E298	26-Jul-2022	02-Aug-2022	----	----		07-Aug-2022	28 days	12 days	✓	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE Field Blank	E235.Br-L	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✓	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE SW-01	E235.Br-L	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✓	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE SW-21	E235.Br-L	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✓	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE SW-3	E235.Br-L	26-Jul-2022	28-Jul-2022	----	----		28-Jul-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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE SW-45	E235.Br-L	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE SW-6	E235.Br-L	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE Travel Blank	E235.Br-L	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	3 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE Field Blank	E235.Cl	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE SW-01	E235.Cl	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE SW-21	E235.Cl	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE SW-3	E235.Cl	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE SW-45	E235.Cl	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE SW-6	E235.Cl	26-Jul-2022	28-Jul-2022	----	----		28-Jul-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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Chloride in Water by IC											
HDPE Travel Blank	E235.Cl	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	3 days	✓	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001											
HDPE Field Blank	E378-U	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	3 days	2 days	✓	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001											
HDPE SW-01	E378-U	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	3 days	2 days	✓	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001											
HDPE SW-21	E378-U	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	3 days	2 days	✓	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001											
HDPE SW-3	E378-U	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	3 days	2 days	✓	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001											
HDPE SW-45	E378-U	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	3 days	2 days	✓	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001											
HDPE SW-6	E378-U	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	3 days	2 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE Field Blank	E235.F	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✓	



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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 : Fluoride in Water by IC											
HDPE SW-01	E235.F	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE SW-21	E235.F	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE SW-3	E235.F	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE SW-45	E235.F	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE SW-6	E235.F	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE Travel Blank	E235.F	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	3 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE Field Blank	E235.NO3-L	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SW-01	E235.NO3-L	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SW-21	E235.NO3-L	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	3 days	2 days	✓	



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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 : Nitrate in Water by IC (Low Level)											
HDPE SW-3	E235.NO3-L	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SW-45	E235.NO3-L	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SW-6	E235.NO3-L	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE Travel Blank	E235.NO3-L	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	3 days	3 days	✓	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE Field Blank	E235.NO2-L	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SW-01	E235.NO2-L	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SW-21	E235.NO2-L	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SW-3	E235.NO2-L	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SW-45	E235.NO2-L	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	3 days	2 days	✓	



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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 : Nitrite in Water by IC (Low Level)											
HDPE SW-6	E235.NO2-L	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE Travel Blank	E235.NO2-L	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	3 days	3 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Field Blank	E235.SO4	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SW-01	E235.SO4	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SW-21	E235.SO4	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SW-3	E235.SO4	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SW-45	E235.SO4	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SW-6	E235.SO4	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Travel Blank	E235.SO4	26-Jul-2022	28-Jul-2022	----	----		28-Jul-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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) Field Blank	E318	26-Jul-2022	02-Aug-2022	----	----		08-Aug-2022	28 days	13 days	✓	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SW-01	E318	26-Jul-2022	02-Aug-2022	----	----		08-Aug-2022	28 days	13 days	✓	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SW-21	E318	26-Jul-2022	02-Aug-2022	----	----		08-Aug-2022	28 days	13 days	✓	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SW-3	E318	26-Jul-2022	02-Aug-2022	----	----		08-Aug-2022	28 days	13 days	✓	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SW-45	E318	26-Jul-2022	02-Aug-2022	----	----		08-Aug-2022	28 days	13 days	✓	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SW-6	E318	26-Jul-2022	02-Aug-2022	----	----		08-Aug-2022	28 days	13 days	✓	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)											
Amber glass total (sulfuric acid) Field Blank	E372-U	26-Jul-2022	02-Aug-2022	----	----		03-Aug-2022	28 days	8 days	✓	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)											
Amber glass total (sulfuric acid) SW-01	E372-U	26-Jul-2022	02-Aug-2022	----	----		03-Aug-2022	28 days	8 days	✓	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)											
Amber glass total (sulfuric acid) SW-21	E372-U	26-Jul-2022	02-Aug-2022	----	----		03-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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)											
Amber glass total (sulfuric acid) SW-3	E372-U	26-Jul-2022	02-Aug-2022	----	----		03-Aug-2022	28 days	8 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)											
Amber glass total (sulfuric acid) SW-45	E372-U	26-Jul-2022	02-Aug-2022	----	----		03-Aug-2022	28 days	8 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)											
Amber glass total (sulfuric acid) SW-6	E372-U	26-Jul-2022	02-Aug-2022	----	----		03-Aug-2022	28 days	8 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) Field Blank	E509	26-Jul-2022	09-Aug-2022	----	----		09-Aug-2022	28 days	14 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) SW-01	E509	26-Jul-2022	09-Aug-2022	----	----		09-Aug-2022	28 days	14 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) SW-21	E509	26-Jul-2022	09-Aug-2022	----	----		09-Aug-2022	28 days	14 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) SW-3	E509	26-Jul-2022	09-Aug-2022	----	----		09-Aug-2022	28 days	14 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) SW-45	E509	26-Jul-2022	09-Aug-2022	----	----		09-Aug-2022	28 days	14 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) SW-6	E509	26-Jul-2022	09-Aug-2022	----	----		09-Aug-2022	28 days	14 days	✔	



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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) Field Blank	E421	26-Jul-2022	31-Jul-2022	----	----		02-Aug-2022	180 days	7 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SW-01	E421	26-Jul-2022	31-Jul-2022	----	----		02-Aug-2022	180 days	7 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SW-21	E421	26-Jul-2022	31-Jul-2022	----	----		02-Aug-2022	180 days	7 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SW-3	E421	26-Jul-2022	31-Jul-2022	----	----		02-Aug-2022	180 days	7 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SW-45	E421	26-Jul-2022	31-Jul-2022	----	----		02-Aug-2022	180 days	7 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SW-6	E421	26-Jul-2022	31-Jul-2022	----	----		02-Aug-2022	180 days	7 days	✓	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) Field Blank	E358-L	26-Jul-2022	02-Aug-2022	----	----		05-Aug-2022	28 days	10 days	✓	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) SW-01	E358-L	26-Jul-2022	02-Aug-2022	----	----		05-Aug-2022	28 days	10 days	✓	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) SW-21	E358-L	26-Jul-2022	02-Aug-2022	----	----		05-Aug-2022	28 days	10 days	✓	



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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		
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) SW-3	E358-L	26-Jul-2022	02-Aug-2022	----	----		05-Aug-2022	28 days	10 days	✓	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) SW-45	E358-L	26-Jul-2022	02-Aug-2022	----	----		05-Aug-2022	28 days	10 days	✓	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (sulfuric acid) SW-6	E358-L	26-Jul-2022	02-Aug-2022	----	----		05-Aug-2022	28 days	10 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE Field Blank	E290	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	14 days	2 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE SW-01	E290	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	14 days	2 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE SW-21	E290	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	14 days	2 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE SW-3	E290	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	14 days	2 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE SW-45	E290	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	14 days	2 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE SW-6	E290	26-Jul-2022	28-Jul-2022	----	----		28-Jul-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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Conductivity in Water											
HDPE Field Blank	E100	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✓	
Physical Tests : Conductivity in Water											
HDPE SW-01	E100	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✓	
Physical Tests : Conductivity in Water											
HDPE SW-21	E100	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✓	
Physical Tests : Conductivity in Water											
HDPE SW-3	E100	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✓	
Physical Tests : Conductivity in Water											
HDPE SW-45	E100	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✓	
Physical Tests : Conductivity in Water											
HDPE SW-6	E100	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	28 days	2 days	✓	
Physical Tests : pH by Meter											
HDPE Field Blank	E108	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	0.25 hrs	53 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE SW-6	E108	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	0.25 hrs	54 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE SW-01	E108	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	0.25 hrs	55 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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter											
HDPE SW-45	E108	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	0.25 hrs	55 hrs	*	EHTR-FM
Physical Tests : pH by Meter											
HDPE SW-21	E108	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	0.25 hrs	56 hrs	*	EHTR-FM
Physical Tests : pH by Meter											
HDPE SW-3	E108	26-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	0.25 hrs	58 hrs	*	EHTR-FM
Physical Tests : TSS by Gravimetry											
HDPE Field Blank	E160	26-Jul-2022	----	----	----		30-Jul-2022	7 days	4 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE SW-01	E160	26-Jul-2022	----	----	----		30-Jul-2022	7 days	4 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE SW-21	E160	26-Jul-2022	----	----	----		30-Jul-2022	7 days	4 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE SW-3	E160	26-Jul-2022	----	----	----		30-Jul-2022	7 days	4 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE SW-45	E160	26-Jul-2022	----	----	----		30-Jul-2022	7 days	4 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE SW-6	E160	26-Jul-2022	----	----	----		30-Jul-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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Field Blank	E508	26-Jul-2022	09-Aug-2022	----	----		09-Aug-2022	28 days	14 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SW-01	E508	26-Jul-2022	09-Aug-2022	----	----		09-Aug-2022	28 days	14 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SW-21	E508	26-Jul-2022	09-Aug-2022	----	----		09-Aug-2022	28 days	14 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SW-3	E508	26-Jul-2022	09-Aug-2022	----	----		09-Aug-2022	28 days	14 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SW-45	E508	26-Jul-2022	09-Aug-2022	----	----		09-Aug-2022	28 days	14 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SW-6	E508	26-Jul-2022	09-Aug-2022	----	----		09-Aug-2022	28 days	14 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial - total (lab preserved) Travel Blank	E508	26-Jul-2022	09-Aug-2022	----	----		09-Aug-2022	28 days	15 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) Field Blank	E420	26-Jul-2022	30-Jul-2022	----	----		31-Jul-2022	180 days	5 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) SW-01	E420	26-Jul-2022	30-Jul-2022	----	----		31-Jul-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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) SW-21	E420	26-Jul-2022	30-Jul-2022	----	----		31-Jul-2022	180 days	5 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) SW-3	E420	26-Jul-2022	30-Jul-2022	----	----		31-Jul-2022	180 days	5 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) SW-45	E420	26-Jul-2022	30-Jul-2022	----	----		31-Jul-2022	180 days	5 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) SW-6	E420	26-Jul-2022	30-Jul-2022	----	----		31-Jul-2022	180 days	5 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE - total (lab preserved) Travel Blank	E420	26-Jul-2022	30-Jul-2022	----	----		31-Jul-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	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	581233	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	585239	1	13	7.6	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	582077	1	19	5.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	581226	1	14	7.1	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	594788	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	581225	1	16	6.2	5.0	✓
Conductivity in Water	E100	581234	1	17	5.8	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	595269	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	583758	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	585237	1	17	5.8	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	581231	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	581224	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	581227	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	581228	1	19	5.2	5.0	✓
pH by Meter	E108	581232	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	581229	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	585236	1	12	8.3	5.0	✓
Total Mercury in Water by CVAAS	E508	595006	1	15	6.6	5.0	✓
Total Metals in Water by CRC ICPMS	E420	583458	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	585238	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	584044	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	581233	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	585239	1	13	7.6	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	582077	1	19	5.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	581226	1	14	7.1	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	594788	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	581225	1	16	6.2	5.0	✓
Conductivity in Water	E100	581234	1	17	5.8	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	595269	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	583758	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	585237	1	17	5.8	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	581231	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	581224	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	581227	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	581228	1	19	5.2	5.0	✓
pH by Meter	E108	581232	1	17	5.8	5.0	✓



Matrix: **Water**

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

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Control Samples (LCS) - Continued							
Sulfate in Water by IC	E235.SO4	581229	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	585236	1	12	8.3	5.0	✓
Total Mercury in Water by CVAAS	E508	595006	1	15	6.6	5.0	✓
Total Metals in Water by CRC ICPMS	E420	583458	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	585238	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	584044	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	581233	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	585239	1	13	7.6	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	582077	1	19	5.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	581226	1	14	7.1	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	594788	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	581225	1	16	6.2	5.0	✓
Conductivity in Water	E100	581234	1	17	5.8	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	595269	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	583758	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	585237	1	17	5.8	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	581231	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	581224	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	581227	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	581228	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	581229	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	585236	1	12	8.3	5.0	✓
Total Mercury in Water by CVAAS	E508	595006	1	15	6.6	5.0	✓
Total Metals in Water by CRC ICPMS	E420	583458	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	585238	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	584044	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	585239	1	13	7.6	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	581226	1	14	7.1	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	594788	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	581225	1	16	6.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	595269	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	583758	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	585237	1	17	5.8	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	581231	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	581224	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	581227	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	581228	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	581229	1	16	6.2	5.0	✓



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

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
Matrix Spikes (MS) - Continued							
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	585236	1	12	8.3	5.0	✓
Total Mercury in Water by CVAAS	E508	595006	1	15	6.6	5.0	✓
Total Metals in Water by CRC ICPMS	E420	583458	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	585238	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.
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
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).
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 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.
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.
Total Metals in Water by CRC ICPMS	E420 Vancouver - Environmental	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 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 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
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.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Biochemical Oxygen Demand - 5 day	E550 Vancouver - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter. Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
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.
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), 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.

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 Dissolved Organic Carbon for Combustion	EP358 Vancouver - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are 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 HNO ₃ .
Dissolved Mercury Water Filtration	EP509	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.

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Work Order : VA22B7341
Client : Regional District of Kitimat-Stikine
Project : Thornhill Transfer Station Surface Water



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
	Vancouver - Environmental			

QUALITY CONTROL REPORT

Work Order : **VA22B7341**
Client : Regional District of Kitimat-Stikine
Contact : Hannah Shinton
Address : # 300 - 4545 Lazelle Avenue
 Terrace BC Canada V8G 4E1
Telephone : ----
Project : Thornhill Transfer Station Surface Water
PO : ----
C-O-C number : ----
Sampler : H. Shinton
Site :
Quote number : Default Water Testing (Q62338)
No. of samples received : 7
No. of samples analysed : 7

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Laboratory : Vancouver - Environmental
Account Manager : Amber Springer
Address : 8081 Lougheed Highway
 Burnaby, British Columbia Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 27-Jul-2022 21:00
Date Analysis Commenced : 28-Jul-2022
Issue Date : 10-Aug-2022 15:47

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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Ann Joby	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Inorganics, Burnaby, British Columbia
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Tracy Harley	Supervisor - Water Quality Instrumentation	Vancouver Inorganics, Burnaby, British Columbia
Woochan Song	Lab Analyst	Vancouver Metals, Burnaby, British Columbia

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Work Order : VA22B7341
Client : Regional District of Kitimat-Stikine
Project : Thornhill Transfer Station Surface Water



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: 581232)											
VA22B7276-003	Anonymous	pH	----	E108	0.10	pH units	7.86	7.87	0.127%	4%	----
Physical Tests (QC Lot: 581233)											
VA22B7276-003	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	43.2	42.8	0.930%	20%	----
Physical Tests (QC Lot: 581234)											
VA22B7276-003	Anonymous	conductivity	----	E100	2.0	µS/cm	97.5	96.9	0.617%	10%	----
Physical Tests (QC Lot: 584044)											
VA22B7036-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	12.3	12.5	0.2	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 581224)											
VA22B7276-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.034	0.032	0.001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 581225)											
VA22B7276-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	5.66	5.65	0.131%	20%	----
Anions and Nutrients (QC Lot: 581226)											
VA22B7276-001	Anonymous	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 581227)											
VA22B7276-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0402	0.0415	0.0013	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 581228)											
VA22B7276-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0011	0.0013	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 581229)											
VA22B7276-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	7.14	7.14	0.0352%	20%	----
Anions and Nutrients (QC Lot: 581231)											
VA22B7276-001	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0019	0.0023	0.0004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 585236)											
VA22B7341-001	SW-3	Kjeldahl nitrogen, total [TKN]	----	E318	2.50	mg/L	52.9	54.4	2.74%	20%	----
Anions and Nutrients (QC Lot: 585238)											
VA22B7341-001	SW-3	phosphorus, total	7723-14-0	E372-U	0.0200	mg/L	0.382	0.380	0.433%	20%	----
Anions and Nutrients (QC Lot: 585239)											
VA22B7341-001	SW-3	ammonia, total (as N)	7664-41-7	E298	0.250	mg/L	47.2	45.6	3.49%	20%	----
Organic / Inorganic Carbon (QC Lot: 585237)											
VA22B7341-001	SW-3	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	32.3	32.7	1.37%	20%	----
Total Metals (QC Lot: 583458)											
VA22B7341-001	SW-3	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0460	0.0438	4.77%	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: 583458) - continued											
VA22B7341-001	SW-3	antimony, total	7440-36-0	E420	0.00010	mg/L	0.00011	0.00011	0.0000002	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.0292	0.0294	0.863%	20%	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.894	0.913	2.11%	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	1.57	1.66	5.94%	20%	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	0.0000061	0.0000011	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	0.050	mg/L	162	162	0.373%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	0.000194	0.000190	2.37%	20%	----
		chromium, total	7440-47-3	E420	0.000050	mg/L	0.00128	0.00139	0.00011	Diff <2x LOR	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00281	0.00275	2.31%	20%	----
		copper, total	7440-50-8	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		iron, total	7439-89-6	E420	0.010	mg/L	70.8	70.2	0.905%	20%	----
		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	0.0021	0.0021	0.00004	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	30.2	30.5	0.967%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	3.14	3.13	0.0633%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000297	0.000290	0.000007	Diff <2x LOR	----
		nickel, total	7440-02-0	E420	0.000050	mg/L	0.00352	0.00354	0.00001	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	0.411	0.398	0.013	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	50.1	50.1	0.105%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.0358	0.0360	0.784%	20%	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000136	0.000127	0.000008	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	13.9	13.9	0.0420%	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	79.5	77.3	2.82%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	1.12	1.13	1.22%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	0.94	0.87	0.07	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	0.00016	0.00015	0.000008	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	0.00361	0.00351	2.75%	20%	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	0.00010	0.0000008	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.000025	0.000029	0.000004	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: 583458) - continued											
VA22B7341-001	SW-3	vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00296	0.00291	0.00005	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.0035	<0.0030	0.0005	Diff <2x LOR	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	0.00052	0.00050	0.00003	Diff <2x LOR	----
Total Metals (QC Lot: 595006)											
VA22B7299-001	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 583758)											
VA22B7310-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0050	mg/L	0.0127	0.0112	0.0015	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00050	mg/L	0.0499	0.0511	2.33%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.000250	mg/L	<0.000250	<0.000250	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	0.050	mg/L	0.345	0.350	0.006	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0000250	mg/L	<0.0000250	<0.0000250	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.250	mg/L	49.6	50.0	0.902%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000050	mg/L	<0.000050	<0.000050	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	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.000250	mg/L	<0.000250	<0.000250	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0050	mg/L	0.0115	0.0114	0.0002	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.100	mg/L	109	112	2.33%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00050	mg/L	0.314	0.315	0.372%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000250	mg/L	0.000923	0.000964	0.000041	Diff <2x LOR	----
		nickel, dissolved	7440-02-0	E421	0.00250	mg/L	<0.00250	<0.00250	0	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.250	mg/L	<0.250	<0.250	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.250	mg/L	32.2	32.5	0.802%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00100	mg/L	0.00682	0.00680	0.00002	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000250	mg/L	<0.000250	<0.000250	0	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.250	mg/L	6.49	6.52	0.547%	20%	----
		silver, dissolved	7440-22-4	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		sodium, dissolved	7440-23-5	E421	0.250	mg/L	866	868	0.217%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00100	mg/L	0.718	0.725	1.02%	20%	----
		sulfur, dissolved	7704-34-9	E421	2.50	mg/L	74.9	75.3	0.491%	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: 583758) - continued											
VA22B7310-001	Anonymous	tellurium, dissolved	13494-80-9	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00150	mg/L	<0.00150	<0.00150	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000050	mg/L	0.000166	0.000162	0.000004	Diff <2x LOR	----
		vanadium, dissolved	7440-62-2	E421	0.00250	mg/L	<0.00250	<0.00250	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 595269)											
VA22B7341-001	SW-3	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 582077)											
VA22B7341-006	Field Blank	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----
Aggregate Organics (QC Lot: 594788)											
VA22B7310-001	Anonymous	chemical oxygen demand [COD]	----	E559-L	40	mg/L	62	70	8	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: 581233)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	1.1	----
Physical Tests (QCLot: 581234)						
conductivity	----	E100	1	µS/cm	1.6	----
Physical Tests (QCLot: 584044)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 581224)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 581225)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 581226)						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 581227)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 581228)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 581229)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 581231)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 585236)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 585238)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 585239)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Organic / Inorganic Carbon (QCLot: 585237)						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 583458)						
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	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 583458) - continued						
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	---
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: 595006)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	---



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 583758)						
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	---
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	---



Sub-Matrix: **Water**

<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Result</i>	<i>Qualifier</i>
Dissolved Metals (QCLot: 583758) - continued						
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: 595269)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 582077)						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----
Aggregate Organics (QCLot: 594788)						
chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	----



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 Concentration	Recovery (%) LCS	Recovery Limits (%)		Qualifier
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 581232)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 581233)									
alkalinity, total (as CaCO ₃)	----	E290	1	mg/L	500 mg/L	107	85.0	115	----
Physical Tests (QCLot: 581234)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	97.5	90.0	110	----
Physical Tests (QCLot: 584044)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	106	85.0	115	----
Anions and Nutrients (QCLot: 581224)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	99.4	90.0	110	----
Anions and Nutrients (QCLot: 581225)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 581226)									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	100	85.0	115	----
Anions and Nutrients (QCLot: 581227)									
nitrate (as N)	14797-55-8	E235.NO ₃ -L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 581228)									
nitrite (as N)	14797-65-0	E235.NO ₂ -L	0.001	mg/L	0.5 mg/L	98.8	90.0	110	----
Anions and Nutrients (QCLot: 581229)									
sulfate (as SO ₄)	14808-79-8	E235.SO ₄	0.3	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 581231)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	94.9	80.0	120	----
Anions and Nutrients (QCLot: 585236)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	98.7	75.0	125	----
Anions and Nutrients (QCLot: 585238)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	88.5	80.0	120	----
Anions and Nutrients (QCLot: 585239)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	100	85.0	115	----
Organic / Inorganic Carbon (QCLot: 585237)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	107	80.0	120	----
Total Metals (QCLot: 583458)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	96.8	80.0	120	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Total Metals (QCLot: 583458) - continued									
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	109	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	97.0	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	97.5	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	91.7	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	99.8	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	89.5	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	98.1	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	93.5	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	95.8	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	94.9	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	92.9	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	109	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	98.6	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	91.7	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	95.8	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	93.5	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	99.3	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	93.5	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	90.2	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	93.7	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	95.1	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	96.3	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	102	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	95.4	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	97.0	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	97.1	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	91.7	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	98.6	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	98.5	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	90.2	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	97.1	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	90.3	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	94.4	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	97.9	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	98.4	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	93.0	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	94.9	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: 595006)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	108	80.0	120	----
Dissolved Metals (QCLot: 583758)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	104	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	102	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	100	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	99.0	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	98.8	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	103	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	101	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	100	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	97.8	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	98.9	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	107	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	101	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	102	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	100	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	99.0	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	113	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	106	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	98.0	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	92.9	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	106	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	98.5	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	98.6	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	100	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	97.4	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	98.9	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	96.4	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: 583758) - continued									
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	103	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	99.3	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	103	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	97.9	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	103	80.0	120	----
Aggregate Organics (QCLot: 582077)									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	104	85.0	115	----
Aggregate Organics (QCLot: 594788)									
chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	105	85.0	115	----



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: 581224)										
VA22B7276-002	Anonymous	fluoride	16984-48-8	E235.F	0.993 mg/L	1 mg/L	99.3	75.0	125	----
Anions and Nutrients (QCLot: 581225)										
VA22B7276-002	Anonymous	chloride	16887-00-6	E235.Cl	100 mg/L	100 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 581226)										
VA22B7276-002	Anonymous	bromide	24959-67-9	E235.Br-L	0.496 mg/L	0.5 mg/L	99.3	75.0	125	----
Anions and Nutrients (QCLot: 581227)										
VA22B7276-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.50 mg/L	2.5 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 581228)										
VA22B7276-002	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: 581229)										
VA22B7276-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	100 mg/L	100 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 581231)										
VA22B7276-002	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0278 mg/L	0.03 mg/L	92.5	70.0	130	----
Anions and Nutrients (QCLot: 585236)										
VA22B7341-002	SW-45	Kjeldahl nitrogen, total [TKN]	----	E318	ND mg/L	2.5 mg/L	ND	70.0	130	MS-B
Anions and Nutrients (QCLot: 585238)										
VA22B7341-002	SW-45	phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 585239)										
VA22B7341-002	SW-45	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: 585237)										
VA22B7341-002	SW-45	carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Total Metals (QCLot: 583458)										
VA22B7341-002	SW-45	aluminum, total	7429-90-5	E420	0.183 mg/L	0.2 mg/L	91.4	70.0	130	----
		antimony, total	7440-36-0	E420	0.0192 mg/L	0.02 mg/L	95.9	70.0	130	----
		arsenic, total	7440-38-2	E420	ND mg/L	0.02 mg/L	ND	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	0.0382 mg/L	0.04 mg/L	95.6	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00872 mg/L	0.01 mg/L	87.2	70.0	130	----
		boron, total	7440-42-8	E420	ND mg/L	0.1 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: 583458) - continued										
VA22B7341-002	SW-45	cadmium, total	7440-43-9	E420	0.00349 mg/L	0.004 mg/L	87.3	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	0.00887 mg/L	0.01 mg/L	88.7	70.0	130	----
		chromium, total	7440-47-3	E420	0.0356 mg/L	0.04 mg/L	88.9	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0170 mg/L	0.02 mg/L	85.0	70.0	130	----
		copper, total	7440-50-8	E420	0.0164 mg/L	0.02 mg/L	81.8	70.0	130	----
		iron, total	7439-89-6	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		lead, total	7439-92-1	E420	0.0180 mg/L	0.02 mg/L	89.8	70.0	130	----
		lithium, total	7439-93-2	E420	0.0938 mg/L	0.1 mg/L	93.8	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	0.0197 mg/L	0.02 mg/L	98.4	70.0	130	----
		nickel, total	7440-02-0	E420	0.0334 mg/L	0.04 mg/L	83.4	70.0	130	----
		phosphorus, total	7723-14-0	E420	9.68 mg/L	10 mg/L	96.8	70.0	130	----
		potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		rubidium, total	7440-17-7	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		selenium, total	7782-49-2	E420	0.0368 mg/L	0.04 mg/L	92.0	70.0	130	----
		silicon, total	7440-21-3	E420	ND mg/L	10 mg/L	ND	70.0	130	----
		silver, total	7440-22-4	E420	0.00359 mg/L	0.004 mg/L	89.8	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	20.0 mg/L	20 mg/L	100.0	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0364 mg/L	0.04 mg/L	91.0	70.0	130	----
		thallium, total	7440-28-0	E420	0.00353 mg/L	0.004 mg/L	88.3	70.0	130	----
		thorium, total	7440-29-1	E420	0.0215 mg/L	0.02 mg/L	108	70.0	130	----
		tin, total	7440-31-5	E420	0.0185 mg/L	0.02 mg/L	92.3	70.0	130	----
		titanium, total	7440-32-6	E420	0.0351 mg/L	0.04 mg/L	87.8	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0191 mg/L	0.02 mg/L	95.4	70.0	130	----
		uranium, total	7440-61-1	E420	0.00390 mg/L	0.004 mg/L	97.4	70.0	130	----
		vanadium, total	7440-62-2	E420	0.0944 mg/L	0.1 mg/L	94.4	70.0	130	----
		zinc, total	7440-66-6	E420	0.332 mg/L	0.4 mg/L	83.0	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0384 mg/L	0.04 mg/L	96.0	70.0	130	----
Total Metals (QCLot: 595006)										
VA22B7299-002	Anonymous	mercury, total	7439-97-6	E508	0.000107 mg/L	0.0001 mg/L	107	70.0	130	----
Dissolved Metals (QCLot: 583758)										
VA22B7310-002	Anonymous	aluminum, dissolved	7429-90-5	E421	0.990 mg/L	1 mg/L	99.0	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: 583758) - continued										
VA22B7310-002	Anonymous	antimony, dissolved	7440-36-0	E421	0.0991 mg/L	0.1 mg/L	99.1	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0985 mg/L	0.1 mg/L	98.5	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	0.202 mg/L	0.2 mg/L	101	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.0434 mg/L	0.05 mg/L	86.9	70.0	130	----
		boron, dissolved	7440-42-8	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.0194 mg/L	0.02 mg/L	96.9	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	0.0499 mg/L	0.05 mg/L	99.8	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.188 mg/L	0.2 mg/L	94.1	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0931 mg/L	0.1 mg/L	93.1	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0908 mg/L	0.1 mg/L	90.8	70.0	130	----
		iron, dissolved	7439-89-6	E421	9.65 mg/L	10 mg/L	96.5	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0909 mg/L	0.1 mg/L	90.9	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.474 mg/L	0.5 mg/L	94.8	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	0.104 mg/L	0.1 mg/L	104	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.183 mg/L	0.2 mg/L	91.5	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	54.9 mg/L	50 mg/L	110	70.0	130	----
		potassium, dissolved	7440-09-7	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0995 mg/L	0.1 mg/L	99.5	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.196 mg/L	0.2 mg/L	98.1	70.0	130	----
		silicon, dissolved	7440-21-3	E421	ND mg/L	10 mg/L	ND	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.0157 mg/L	0.02 mg/L	78.5	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	----
		tellurium, dissolved	13494-80-9	E421	0.197 mg/L	0.2 mg/L	98.5	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.0179 mg/L	0.02 mg/L	89.4	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.104 mg/L	0.1 mg/L	104	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0976 mg/L	0.1 mg/L	97.6	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.200 mg/L	0.2 mg/L	100	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0938 mg/L	0.1 mg/L	93.8	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.0193 mg/L	0.02 mg/L	96.3	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.490 mg/L	0.5 mg/L	98.0	70.0	130	----
		zinc, dissolved	7440-66-6	E421	1.90 mg/L	2 mg/L	95.0	70.0	130	----



Sub-Matrix: **Water**

					<i>Matrix Spike (MS) Report</i>					
					<i>Spike</i>		<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>Concentration</i>	<i>Target</i>	<i>MS</i>	<i>Low</i>	<i>High</i>	<i>Qualifier</i>
Dissolved Metals (QCLot: 583758) - continued										
VA22B7310-002	Anonymous	zirconium, dissolved	7440-67-7	E421	0.206 mg/L	0.2 mg/L	103	70.0	130	----
Dissolved Metals (QCLot: 595269)										
VA22B7341-002	SW-45	mercury, dissolved	7439-97-6	E509	0.0000930 mg/L	0.0001 mg/L	93.0	70.0	130	----
Aggregate Organics (QCLot: 594788)										
VA22B7310-007	Anonymous	chemical oxygen demand [COD]	----	E559-L	106 mg/L	100 mg/L	106	75.0	125	----

Qualifiers

<i>Qualifier</i>	<i>Description</i>
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.



CERTIFICATE OF ANALYSIS

Work Order : **VA22B9188**
Client : **Regional District of Kitimat-Stikine**
Contact : Hannah Shinton
Address : # 300 - 4545 Lazelle Avenue
Terrace BC Canada V8G 4E1
Telephone : ----
Project : Thornhill Groundwater
PO : ----
C-O-C number : ----
Sampler : Hannah Shinton
Site :
Quote number : Default Water Testing (Q62338)
No. of samples received : 4
No. of samples analysed : 4

Page : 1 of 5
Laboratory : Vancouver - Environmental
Account Manager : Amber Springer
Address : 8081 Lougheed Highway
Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 16-Aug-2022 22:20
Date Analysis Commenced : 17-Aug-2022
Issue Date : 25-Aug-2022 16:24

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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Cindy Tang	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Erin Sanchez		Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Inorganics, Burnaby, British Columbia
Parnian Sane	Analyst	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).

<i>Unit</i>	<i>Description</i>
-	No Unit
µS/cm	Microsiemens per centimetre
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

<i>Qualifier</i>	<i>Description</i>
DLA	Detection Limit adjusted for required dilution.



Analytical Results

Sub-Matrix: Water					Client sample ID	MW21-03	MW-21	Field Blank	Travel Blank	----
(Matrix: Water)					Client sampling date / time	15-Aug-2022 15:00	15-Aug-2022 12:00	15-Aug-2022 15:25	15-Aug-2022	----
Analyte	CAS Number	Method	LOR	Unit	VA22B9188-001	VA22B9188-002	VA22B9188-003	VA22B9188-004	-----	
					Result	Result	Result	Result	----	
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	194	194	<1.0	----	----	
conductivity	----	E100	2.0	µS/cm	357	359	<2.0	<2.0	----	
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	178	173	<0.60	----	----	
pH	----	E108	0.10	pH units	6.85	6.78	5.62	----	----	
solids, total dissolved [TDS]	----	E162	10	mg/L	235	227	<10	----	----	
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.902	0.869	----	----	----	
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	<0.50	<0.50	----	
fluoride	16984-48-8	E235.F	0.020	mg/L	0.098	0.091	<0.020	<0.020	----	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	1.50	1.64	----	----	----	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	----	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0010	<0.0010	<0.0010	<0.0010	----	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.527	0.494	<0.0020	----	----	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	<0.30	<0.30	<0.30	<0.30	----	
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0706	0.0748	----	----	----	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00020 ^{DLA}	<0.00020 ^{DLA}	----	----	----	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.0122	0.0121	----	----	----	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0190	0.0190	----	----	----	
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	----	----	----	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000100 ^{DLA}	<0.000100 ^{DLA}	----	----	----	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.020 ^{DLA}	<0.020 ^{DLA}	----	----	----	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000275	0.0000205	----	----	----	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	51.3	49.8	<0.050	----	----	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000020 ^{DLA}	<0.000020 ^{DLA}	----	----	----	
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	----	----	----	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00349	0.00342	----	----	----	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00040 ^{DLA}	<0.00040 ^{DLA}	----	----	----	
iron, dissolved	7439-89-6	E421	0.010	mg/L	11.3	11.2	----	----	----	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW21-03	MW-21	Field Blank	Travel Blank	----
Client sampling date / time					15-Aug-2022 15:00	15-Aug-2022 12:00	15-Aug-2022 15:25	15-Aug-2022	----	
Analyte	CAS Number	Method	LOR	Unit	VA22B9188-001	VA22B9188-002	VA22B9188-003	VA22B9188-004	-----	
					Result	Result	Result	Result	---	
Dissolved Metals										
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000100 ^{DLA}	<0.000100 ^{DLA}	----	----	----	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0020 ^{DLA}	<0.0020 ^{DLA}	----	----	----	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	12.0	11.9	<0.0050	----	----	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	5.03	4.92	----	----	----	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	----	----	----	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000404	0.000410	----	----	----	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00117	0.00113	----	----	----	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.100 ^{DLA}	<0.100 ^{DLA}	----	----	----	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	1.34	1.32	----	----	----	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00096	0.00094	----	----	----	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000100 ^{DLA}	<0.000100 ^{DLA}	----	----	----	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	7.98	7.88	----	----	----	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000020 ^{DLA}	<0.000020 ^{DLA}	----	----	----	
sodium, dissolved	7440-23-5	E421	0.050	mg/L	3.70	3.48	----	----	----	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.195	0.191	----	----	----	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	<1.00 ^{DLA}	<1.00 ^{DLA}	----	----	----	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00040 ^{DLA}	<0.00040 ^{DLA}	----	----	----	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000020 ^{DLA}	<0.000020 ^{DLA}	----	----	----	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00020 ^{DLA}	<0.00020 ^{DLA}	----	----	----	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00020 ^{DLA}	<0.00020 ^{DLA}	----	----	----	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00218	0.00198	----	----	----	
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00020 ^{DLA}	<0.00020 ^{DLA}	----	----	----	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000020 ^{DLA}	<0.000020 ^{DLA}	----	----	----	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00160	0.00162	----	----	----	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0070	0.0020	----	----	----	
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00040 ^{DLA}	<0.00040 ^{DLA}	----	----	----	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	----	----	----	
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	----	----	
Aggregate Organics										
chemical oxygen demand [COD]	----	E559-L	10	mg/L	38	44	----	----	----	



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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA22B9188	Page	: 1 of 13
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Thornhill Groundwater	Date Samples Received	: 16-Aug-2022 22:20
PO	: ----	Issue Date	: 25-Aug-2022 16:24
C-O-C number	: ----		
Sampler	: Hannah Shinton		
Site	:		
Quote number	: Default Water Testing (Q62338)		
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		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) MW-21	E559-L	15-Aug-2022	----	----	----		23-Aug-2022	28 days	8 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) MW21-03	E559-L	15-Aug-2022	----	----	----		23-Aug-2022	28 days	8 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MW-21	E298	15-Aug-2022	23-Aug-2022	----	----		24-Aug-2022	28 days	9 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MW21-03	E298	15-Aug-2022	23-Aug-2022	----	----		24-Aug-2022	28 days	9 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE Field Blank	E235.Br-L	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE MW21-03	E235.Br-L	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE Travel Blank	E235.Br-L	15-Aug-2022	18-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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE MW-21	E235.Br-L	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	28 days	3 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE Field Blank	E235.Cl	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE MW21-03	E235.Cl	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE Travel Blank	E235.Cl	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE MW-21	E235.Cl	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	28 days	3 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE Field Blank	E235.F	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	28 days	2 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE MW21-03	E235.F	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	28 days	2 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE Travel Blank	E235.F	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	28 days	2 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE MW-21	E235.F	15-Aug-2022	18-Aug-2022	----	----		18-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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE Field Blank	E235.NO3-L	15-Aug-2022	18-Aug-2022	3 days	2 days	✓	18-Aug-2022	3 days	0 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE MW21-03	E235.NO3-L	15-Aug-2022	18-Aug-2022	3 days	2 days	✓	18-Aug-2022	3 days	0 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE Travel Blank	E235.NO3-L	15-Aug-2022	18-Aug-2022	3 days	2 days	✓	18-Aug-2022	3 days	0 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE MW-21	E235.NO3-L	15-Aug-2022	18-Aug-2022	3 days	3 days	✓	18-Aug-2022	3 days	0 days	✓	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE Field Blank	E235.NO2-L	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW21-03	E235.NO2-L	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE Travel Blank	E235.NO2-L	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW-21	E235.NO2-L	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	3 days	3 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Field Blank	E235.SO4	15-Aug-2022	18-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		Eval	Analysis Date	Holding Times		Eval	
Rec	Actual	Rec		Actual							
Anions and Nutrients : Sulfate in Water by IC											
HDPE MW21-03	E235.SO4	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	28 days	2 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Travel Blank	E235.SO4	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	28 days	2 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE MW-21	E235.SO4	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	28 days	3 days	✓	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) MW-21	E318	15-Aug-2022	23-Aug-2022	----	----		24-Aug-2022	28 days	9 days	✓	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) MW21-03	E318	15-Aug-2022	23-Aug-2022	----	----		24-Aug-2022	28 days	9 days	✓	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)											
Amber glass total (sulfuric acid) Field Blank	E372-U	15-Aug-2022	24-Aug-2022	----	----		25-Aug-2022	28 days	10 days	✓	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)											
Amber glass total (sulfuric acid) MW-21	E372-U	15-Aug-2022	23-Aug-2022	----	----		25-Aug-2022	28 days	10 days	✓	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)											
Amber glass total (sulfuric acid) MW21-03	E372-U	15-Aug-2022	23-Aug-2022	----	----		25-Aug-2022	28 days	10 days	✓	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) MW-21	E509	15-Aug-2022	23-Aug-2022	----	----		23-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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) MW21-03	E509	15-Aug-2022	23-Aug-2022	----	----		23-Aug-2022	28 days	8 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) Field Blank	E421	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	180 days	3 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) MW-21	E421	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	180 days	3 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) MW21-03	E421	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	180 days	3 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE Field Blank	E290	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	14 days	2 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE MW21-03	E290	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	14 days	2 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE MW-21	E290	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	14 days	3 days	✓	
Physical Tests : Conductivity in Water											
HDPE Field Blank	E100	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	28 days	2 days	✓	
Physical Tests : Conductivity in Water											
HDPE MW21-03	E100	15-Aug-2022	18-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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Conductivity in Water											
HDPE Travel Blank	E100	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	28 days	2 days	✓	
Physical Tests : Conductivity in Water											
HDPE MW-21	E100	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	28 days	3 days	✓	
Physical Tests : pH by Meter											
HDPE Field Blank	E108	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	0.25 hrs	6.25 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE MW-21	E108	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	0.25 hrs	6.25 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE MW21-03	E108	15-Aug-2022	18-Aug-2022	----	----		18-Aug-2022	0.25 hrs	6.25 hrs	* EHTR-FM	
Physical Tests : TDS by Gravimetry											
HDPE Field Blank	E162	15-Aug-2022	----	----	----		19-Aug-2022	7 days	4 days	✓	
Physical Tests : TDS by Gravimetry											
HDPE MW-21	E162	15-Aug-2022	----	----	----		19-Aug-2022	7 days	4 days	✓	
Physical Tests : TDS by Gravimetry											
HDPE MW21-03	E162	15-Aug-2022	----	----	----		19-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	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	607445	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	615303	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	607439	1	9	11.1	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	614853	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	607438	1	18	5.5	5.0	✓
Conductivity in Water	E100	607446	1	17	5.8	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	614535	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	608595	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	607437	1	11	9.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	607440	1	10	10.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	607441	1	18	5.5	5.0	✓
pH by Meter	E108	607444	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	607442	1	18	5.5	5.0	✓
TDS by Gravimetry	E162	610786	1	19	5.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	615298	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	615301	2	28	7.1	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	607445	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	615303	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	607439	1	9	11.1	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	614853	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	607438	1	18	5.5	5.0	✓
Conductivity in Water	E100	607446	1	17	5.8	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	614535	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	608595	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	607437	1	11	9.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	607440	1	10	10.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	607441	1	18	5.5	5.0	✓
pH by Meter	E108	607444	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	607442	1	18	5.5	5.0	✓
TDS by Gravimetry	E162	610786	1	19	5.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	615298	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	615301	2	28	7.1	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	607445	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	615303	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	607439	1	9	11.1	5.0	✓



Matrix: **Water**

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

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Method Blanks (MB) - Continued							
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	614853	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	607438	1	18	5.5	5.0	✓
Conductivity in Water	E100	607446	1	17	5.8	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	614535	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	608595	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	607437	1	11	9.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	607440	1	10	10.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	607441	1	18	5.5	5.0	✓
Sulfate in Water by IC	E235.SO4	607442	1	18	5.5	5.0	✓
TDS by Gravimetry	E162	610786	1	19	5.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	615298	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	615301	2	28	7.1	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	615303	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	607439	1	9	11.1	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	614853	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	607438	1	18	5.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	614535	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	608595	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	607437	1	11	9.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	607440	1	10	10.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	607441	1	18	5.5	5.0	✓
Sulfate in Water by IC	E235.SO4	607442	1	18	5.5	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	615298	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	615301	2	28	7.1	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.
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.
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
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).
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.
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.
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
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 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.
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
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	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.

QUALITY CONTROL REPORT

Work Order : **VA22B9188**
Client : Regional District of Kitimat-Stikine
Contact : Hannah Shinton
Address : # 300 - 4545 Lazelle Avenue
 Terrace BC Canada V8G 4E1
Telephone : ----
Project : Thornhill Groundwater
PO : ----
C-O-C number : ----
Sampler : Hannah Shinton
Site :
Quote number : Default Water Testing (Q62338)
No. of samples received : 4
No. of samples analysed : 4

Page : 1 of 14
Laboratory : Vancouver - Environmental
Account Manager : Amber Springer
Address : 8081 Lougheed Highway
 Burnaby, British Columbia Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 16-Aug-2022 22:20
Date Analysis Commenced : 17-Aug-2022
Issue Date : 25-Aug-2022 16:24

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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Cindy Tang	Team Leader - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Erin Sanchez		Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Vancouver Inorganics, Burnaby, British Columbia
Parnian Sane	Analyst	Vancouver Metals, Burnaby, British Columbia

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Work Order : VA22B9188
Client : Regional District of Kitimat-Stikine
Project : Thornhill Groundwater



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: 607444)											
KS2202978-003	Anonymous	pH	----	E108	0.10	pH units	5.66	5.51	2.68%	4%	----
Physical Tests (QC Lot: 607445)											
KS2202978-003	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 607446)											
KS2202978-003	Anonymous	conductivity	----	E100	2.0	µS/cm	<2.0	<2.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 610786)											
VA22B9188-001	MW21-03	solids, total dissolved [TDS]	----	E162	20	mg/L	235	235	0.00%	20%	----
Anions and Nutrients (QC Lot: 607437)											
KS2202978-001	Anonymous	fluoride	16984-48-8	E235.F	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 607438)											
KS2202978-001	Anonymous	chloride	16887-00-6	E235.Cl	2.50	mg/L	4.17	4.13	0.04	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 607439)											
KS2202978-001	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: 607440)											
KS2202978-001	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: 607441)											
KS2202978-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	0.0071	0.0085	0.0014	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 607442)											
KS2202978-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	460	460	0.169%	20%	----
Anions and Nutrients (QC Lot: 615298)											
FJ2202223-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.140	0.129	0.010	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 615301)											
FJ2202223-001	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0033	0.0029	0.0004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 615303)											
FJ2202223-001	Anonymous	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: 616259)											
FJ2202196-001	Anonymous	phosphorus, total	7723-14-0	E372-U	0.200	mg/L	4.69	4.86	3.49%	20%	----
Dissolved Metals (QC Lot: 608595)											
VA22B9169-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.160	0.155	2.69%	20%	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00600	0.00576	4.15%	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: 608595) - continued											
VA22B9169-001	Anonymous	barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0294	0.0274	6.97%	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	0.027	0.026	0.0008	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000088	0.0000094	0.0000006	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	84.1	81.0	3.67%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000510	0.000513	0.643%	20%	----
		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	0.00047	0.00045	0.00002	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00030	0.00029	0.00001	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	0.0343	0.0332	3.19%	20%	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	91.5	88.3	3.57%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0482	0.0461	4.32%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00775	0.00751	3.19%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.0125	0.0119	4.49%	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	5.65	5.46	3.36%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00417	0.00426	2.02%	20%	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.00261	0.00271	3.63%	20%	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.32	4.20	2.81%	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	6.18	5.88	5.04%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.276	0.269	2.57%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	87.8	85.7	2.41%	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	0.000071	0.000071	0.0000002	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	0.00081	0.00080	0.000008	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.0250	0.0251	0.536%	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	0.103	0.0977	5.05%	20%	----

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 Work Order : VA22B9188
 Client : Regional District of Kitimat-Stikine
 Project : Thornhill Groundwater



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: 608595) - continued											
VA22B9169-001	Anonymous	zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 614535)											
VA22B9055-002	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 614853)											
VA22B9064-001	Anonymous	chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	<10	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: 607445)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 607446)						
conductivity	----	E100	1	µS/cm	1.1	----
Physical Tests (QCLot: 610786)						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 607437)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 607438)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 607439)						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 607440)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 607441)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 607442)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 615298)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 615301)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 615303)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 616259)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Dissolved Metals (QCLot: 608595)						
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	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 608595) - continued						
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	----
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: 614535)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 614853)						
chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	----





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 Concentration	Recovery (%) LCS	Recovery Limits (%)		Qualifier
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 607444)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 607445)									
alkalinity, total (as CaCO ₃)	----	E290	1	mg/L	500 mg/L	108	85.0	115	----
Physical Tests (QCLot: 607446)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	98.7	90.0	110	----
Physical Tests (QCLot: 610786)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	97.4	85.0	115	----
Anions and Nutrients (QCLot: 607437)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	99.8	90.0	110	----
Anions and Nutrients (QCLot: 607438)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	100.0	90.0	110	----
Anions and Nutrients (QCLot: 607439)									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	106	85.0	115	----
Anions and Nutrients (QCLot: 607440)									
nitrate (as N)	14797-55-8	E235.NO ₃ -L	0.005	mg/L	2.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 607441)									
nitrite (as N)	14797-65-0	E235.NO ₂ -L	0.001	mg/L	0.5 mg/L	97.9	90.0	110	----
Anions and Nutrients (QCLot: 607442)									
sulfate (as SO ₄)	14808-79-8	E235.SO ₄	0.3	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 615298)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	97.5	75.0	125	----
Anions and Nutrients (QCLot: 615301)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	87.6	80.0	120	----
Anions and Nutrients (QCLot: 615303)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 616259)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	94.3	80.0	120	----
Dissolved Metals (QCLot: 608595)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	94.7	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	96.5	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	97.4	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	97.5	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: 608595) - continued									
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	88.1	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	91.5	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	90.0	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	92.8	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	92.4	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	94.1	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	94.2	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	93.2	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	94.3	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	92.7	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	86.2	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	93.5	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	97.3	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	95.0	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	96.2	80.0	120	----
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	95.6	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	92.1	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	98.3	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	87.9	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	94.6	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	95.8	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	100	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	98.9	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	89.8	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	85.0	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	94.9	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	97.1	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	90.0	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	83.5	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	95.8	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	95.0	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	95.6	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	103	80.0	120	----
Aggregate Organics (QCLot: 614853)									

Page : 11 of 14
 Work Order : VA22B9188
 Client : Regional District of Kitimat-Stikine
 Project : Thornhill Groundwater



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Aggregate Organics (QCLot: 614853) - continued									
chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	101	85.0	115	----



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: 607437)										
KS2202978-002	Anonymous	fluoride	16984-48-8	E235.F	8.78 mg/L	10 mg/L	87.8	75.0	125	----
Anions and Nutrients (QCLot: 607438)										
KS2202978-002	Anonymous	chloride	16887-00-6	E235.Cl	873 mg/L	1000 mg/L	87.3	75.0	125	----
Anions and Nutrients (QCLot: 607439)										
KS2202978-002	Anonymous	bromide	24959-67-9	E235.Br-L	5.08 mg/L	5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 607440)										
KS2202978-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	22.0 mg/L	25 mg/L	87.9	75.0	125	----
Anions and Nutrients (QCLot: 607441)										
KS2202978-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	4.26 mg/L	5 mg/L	85.3	75.0	125	----
Anions and Nutrients (QCLot: 607442)										
KS2202978-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	874 mg/L	1000 mg/L	87.4	75.0	125	----
Anions and Nutrients (QCLot: 615298)										
FJ2202223-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.47 mg/L	2.5 mg/L	98.6	70.0	130	----
Anions and Nutrients (QCLot: 615301)										
FJ2202223-002	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0456 mg/L	0.05 mg/L	91.2	70.0	130	----
Anions and Nutrients (QCLot: 615303)										
FJ2202223-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.107 mg/L	0.1 mg/L	107	75.0	125	----
Anions and Nutrients (QCLot: 616259)										
FJ2202196-002	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0471 mg/L	0.05 mg/L	94.3	70.0	130	----
Dissolved Metals (QCLot: 608595)										
VA22B9169-002	Anonymous	aluminum, dissolved	7429-90-5	E421	0.200 mg/L	0.2 mg/L	100.0	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0210 mg/L	0.02 mg/L	105	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0215 mg/L	0.02 mg/L	107	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	0.0420 mg/L	0.04 mg/L	105	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00920 mg/L	0.01 mg/L	92.0	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.107 mg/L	0.1 mg/L	107	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00402 mg/L	0.004 mg/L	100	70.0	130	----
		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: 608595) - continued										
VA22B9169-002	Anonymous	cesium, dissolved	7440-46-2	E421	0.0101 mg/L	0.01 mg/L	101	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0409 mg/L	0.04 mg/L	102	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0201 mg/L	0.02 mg/L	101	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0206 mg/L	0.02 mg/L	103	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	0.102 mg/L	0.1 mg/L	102	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	0.0209 mg/L	0.02 mg/L	105	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0212 mg/L	0.02 mg/L	106	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0407 mg/L	0.04 mg/L	102	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.2 mg/L	10 mg/L	102	70.0	130	----
		potassium, dissolved	7440-09-7	E421	4.16 mg/L	4 mg/L	104	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0452 mg/L	0.04 mg/L	113	70.0	130	----
		silicon, dissolved	7440-21-3	E421	10.4 mg/L	10 mg/L	104	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00397 mg/L	0.004 mg/L	99.3	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	20.8 mg/L	20 mg/L	104	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0455 mg/L	0.04 mg/L	114	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00388 mg/L	0.004 mg/L	96.9	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0421 mg/L	0.04 mg/L	105	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	0.00363 mg/L	0.004 mg/L	90.8	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.103 mg/L	0.1 mg/L	103	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.423 mg/L	0.4 mg/L	106	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0436 mg/L	0.04 mg/L	109	70.0	130	----
Dissolved Metals (QCLot: 614535)										
VA22B9055-003	Anonymous	mercury, dissolved	7439-97-6	E509	0.000100 mg/L	0.0001 mg/L	100	70.0	130	----
Aggregate Organics (QCLot: 614853)										
VA22B9064-002	Anonymous	chemical oxygen demand [COD]	----	E559-L	107 mg/L	100 mg/L	107	75.0	125	----





Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 -

Page of

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Report To Contact and company name below will appear on the final report Company: Regional District of Kitimat-Stikine Contact: Hannah Shinton Phone: 250-815-6100 Company address below will appear on the final report Street: 4545 Lazelle Avenue City/Province: Terrace/BC Postal Code: V8G4E1		Report Format / Distribution Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL) Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX Email 1 or Fax: hshinton@rdks.bc.ca Email 2: enviro.dept@rdks.bc.ca Email 3: eblaney@rdks.bc.ca		Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply) Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply PRIORITY (Business Days) 4 day [P4-20%] <input type="checkbox"/> 3 day [P3-25%] <input type="checkbox"/> 2 day [P2-50%] <input type="checkbox"/> EMERGENCY 1 Business day [E1 - 100%] <input type="checkbox"/> Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/>																																																																																	
Invoice To Same as Report To <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO Company: Regional District of Kitimat-Stikine Contact: Nicole Lavoie		Invoice Distribution Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX Email 1 or Fax: anne-maries@rdks.bc.ca, eblaney@rdks.bc.ca Email 2: hshinton@rdks.bc.ca, enviro.dept@rdks.bc.ca		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 #: Job #: Thornhill Groundwater PO / AFE: VA19-RDKS100-001 LSD:		Oil and Gas Required Fields (client use) AFE/Cost Center: PO# Major/Minor Code: Routing Code: Requisitioner: Location:		Analysis Request Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																																																																																	
ALS Lab Work Order # (lab use only): 9188 ALS Contact: ALS Contact: Sampler: H. Shinton		<table border="1"> <thead> <tr> <th>F/P</th> <th>Conductivity</th> <th>dissolved hardness (as CaCO3)</th> <th>Ammonia</th> <th>Chloride</th> <th>Fluoride, Sulphate</th> <th>Nitrate & Nitrite</th> <th>Alkalinity</th> <th>Total Kjeldahl Nitrogen</th> <th>Total phosphorus</th> <th>COD</th> <th>Total Dissolved Solids</th> <th>pH</th> <th>SAMPLES ON HOLD</th> <th>Sample is hazardous (please provide further detail)</th> <th>NUMBER OF CONTAINERS</th> </tr> </thead> <tbody> <tr> <td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td></td><td></td><td></td> </tr> <tr> <td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td></td><td></td><td></td> </tr> <tr> <td>R</td><td>R</td><td></td><td></td><td></td><td></td><td>R</td><td>R</td><td></td><td>R</td><td></td><td>R</td><td>R</td><td></td><td></td><td></td> </tr> <tr> <td>R</td><td></td><td></td><td></td><td>R</td><td></td><td>R</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </tbody> </table>		F/P	Conductivity	dissolved hardness (as CaCO3)	Ammonia	Chloride	Fluoride, Sulphate	Nitrate & Nitrite	Alkalinity	Total Kjeldahl Nitrogen	Total phosphorus	COD	Total Dissolved Solids	pH	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS	R	R	R	R	R	R	R	R	R	R	R	R	R				R	R	R	R	R	R	R	R	R	R	R	R	R				R	R					R	R		R		R	R				R				R		R										Terrace Shipping # <u>1</u> Coolers Ground <input type="checkbox"/> # <u> </u> Carboys Air <input checked="" type="checkbox"/> SFX <input type="checkbox"/>	
F/P	Conductivity	dissolved hardness (as CaCO3)	Ammonia	Chloride	Fluoride, Sulphate	Nitrate & Nitrite	Alkalinity	Total Kjeldahl Nitrogen	Total phosphorus	COD	Total Dissolved Solids	pH	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS																																																																						
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Drinking Water (DW) Samples¹ (client use) Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO Are samples for human consumption/ use? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only) British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)		SAMPLE CONDITION AS RECEIVED (lab use only) Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/> Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/> Cooling Initiated <input type="checkbox"/>																																																																																	
SHIPMENT RELEASE (client use) Released by: <i>Hannah Shinton</i> Date: <i>August 25, 2012</i> Time:		INITIAL SHIPMENT RECEPTION (lab use only) Received by: <i>Chris</i> Date: <i>15 Aug 22</i> Time: <i>15:00</i>		FINAL SHIPMENT RECEPTION (lab use only) Received by: <i>RJ</i> Date: <i>Aug -16</i> Time: <i>2220</i>																																																																																	

Environmental Division
Vancouver
 Work Order Reference
VA22B9188

 Telephone : +1 604 253 4188

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.

CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

<p>Work Order : VA22C5658</p> <p>Client : Regional District of Kitimat-Stikine</p> <p>Contact : Hannah Shinton</p> <p>Address : # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1</p> <p>Telephone : ----</p> <p>Project : Thornhill Groundwater</p> <p>PO : ----</p> <p>C-O-C number : ----</p> <p>Sampler : HS</p> <p>Site :</p> <p>Quote number : Default Water Testing (Q62338)</p> <p>No. of samples received : 6</p> <p>No. of samples analysed : 6</p>	<p>Page : 1 of 3</p> <p>Laboratory : Vancouver - Environmental</p> <p>Account Manager : Amber Springer</p> <p>Address : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 22-Oct-2022 13:30</p> <p>Date Analysis Commenced : 25-Oct-2022</p> <p>Issue Date : 04-Nov-2022 08:56</p>
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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
- Guideline Comparison

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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Thornton	Analyst	Metals, Burnaby, British Columbia
Ann Joby	Lab Assistant	Metals, Burnaby, British Columbia
Benjamin Oke	Lab Assistant	Metals, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, 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.

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guidelines are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Key : LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-------------	--------------------

>: greater than.

<: less than.

Red shading is applied where the result is greater than the Guideline Upper Limit or the result is lower than the Guideline Lower Limit.

For drinking water samples, Red shading is applied where the result for E.coli, fecal or total coliforms is greater than or equal to the Guideline Upper Limit .

Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLA	Detection Limit adjusted for required dilution.
RRV	Reported result verified by repeat analysis.



CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

<p>Work Order : VA22C5659</p> <p>Client : Regional District of Kitimat-Stikine</p> <p>Contact : Hannah Shinton</p> <p>Address : # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1</p> <p>Telephone : ----</p> <p>Project : Thornhill Transfer Station Surface Water</p> <p>PO : ----</p> <p>C-O-C number : ----</p> <p>Sampler : HS</p> <p>Site :</p> <p>Quote number : Default Water Testing (Q62338)</p> <p>No. of samples received : 5</p> <p>No. of samples analysed : 5</p>	<p>Page : 1 of 24</p> <p>Laboratory : Vancouver - Environmental</p> <p>Account Manager : Amber Springer</p> <p>Address : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 22-Oct-2022 13:30</p> <p>Date Analysis Commenced : 24-Oct-2022</p> <p>Issue Date : 07-Nov-2022 15:41</p>
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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
- Guideline Comparison

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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Thornton	Analyst	Metals, Burnaby, British Columbia
Ann Joby	Lab Assistant	Metals, Burnaby, British Columbia
Benjamin Oke	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
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.

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guidelines are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Key : LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µS/cm	Microsiemens per centimetre
mg/L	milligrams per litre
pH units	pH units

>: greater than.

<: less than.

Red shading is applied where the result is greater than the Guideline Upper Limit or the result is lower than the Guideline Lower Limit.

For drinking water samples, Red shading is applied where the result for E.coli, fecal or total coliforms is greater than or equal to the Guideline Upper Limit .

Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLDS	<i>Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.</i>
DLM	<i>Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).</i>



Analytical Results

Analyte	Method	LOR	Unit	Client sample ID	BCAAWWQG	BCAAWWQG				
				SW-06	FAL-LT	FAL-ST				
Sub-Matrix: Water (Matrix: Water)				Sampling date/time	21-Oct-2022 12:55					
				VA22C5659-001						
Physical Tests										
alkalinity, total (as CaCO3)	E290	1.0	mg/L	52.1	<20 mg/L	--	--	--	--	--
conductivity	E100	2.0	µS/cm	118	--	--	--	--	--	--
hardness (as CaCO3), dissolved	EC100	0.60	mg/L	50.0	--	--	--	--	--	--
hardness (as CaCO3), from total Ca/Mg	EC100A	0.60	mg/L	52.2	--	--	--	--	--	--
pH	E108	0.10	pH units	7.84	6.5 - 9 pH units	--	--	--	--	--
solids, total suspended [TSS]	E160	3.0	mg/L	<3.0	--	--	--	--	--	--
Anions and Nutrients										
ammonia, total (as N)	E298	0.0050	mg/L	0.0100	0.102 mg/L	0.752 mg/L	--	--	--	--
bromide	E235.Br-L	0.050	mg/L	<0.050	--	--	--	--	--	--
chloride	E235.Cl	0.50	mg/L	1.14	150 mg/L	600 mg/L	--	--	--	--
fluoride	E235.F	0.020	mg/L	0.022	--	0.4 mg/L	--	--	--	--
Kjeldahl nitrogen, total [TKN]	E318	0.050	mg/L	0.145	--	--	--	--	--	--
nitrate (as N)	E235.NO3-L	0.0050	mg/L	0.136	3 mg/L	32.8 mg/L	--	--	--	--
nitrite (as N)	E235.NO2-L	0.0010	mg/L	<0.0010	0.02 mg/L	0.06 mg/L	--	--	--	--
phosphate, ortho-, dissolved (as P)	E378-U	0.0010	mg/L	0.0014	--	--	--	--	--	--
phosphorus, total	E372-U	0.0020	mg/L	0.0070	--	--	--	--	--	--
sulfate (as SO4)	E235.SO4	0.30	mg/L	1.55	--	--	--	--	--	--
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	E358-L	0.50	mg/L	3.64	--	--	--	--	--	--
Total Metals										
aluminum, total	E420	0.0030	mg/L	0.131	0.007 mg/L	0.023 mg/L	--	--	--	--
antimony, total	E420	0.00010	mg/L	<0.00010	0.009 mg/L	--	--	--	--	--
arsenic, total	E420	0.00010	mg/L	0.00021	0.005 mg/L	--	--	--	--	--
barium, total	E420	0.00010	mg/L	0.0197	1 mg/L	--	--	--	--	--
beryllium, total	E420	0.000100	mg/L	<0.000100	0.00013 mg/L	--	--	--	--	--
bismuth, total	E420	0.000050	mg/L	<0.000050	--	--	--	--	--	--
boron, total	E420	0.010	mg/L	0.011	1.2 mg/L	--	--	--	--	--
cadmium, total	E420	0.0000050	mg/L	<0.0000050	1.8E-05 mg/L	3E-05 mg/L	--	--	--	--



Analyte	Method	LOR	Unit	VA22C5659-001 (Continued)	BCAWWQG FAL-LT	BCAWWQG FAL-ST				
Total Metals - Continued										
calcium, total	E420	0.050	mg/L	19.2	--	--	--	--	--	--
cesium, total	E420	0.000010	mg/L	0.000015	--	--	--	--	--	--
chromium, total	E420	0.00050	mg/L	<0.00050	0.001 mg/L	--	--	--	--	--
cobalt, total	E420	0.00010	mg/L	<0.00010	0.004 mg/L	0.11 mg/L	--	--	--	--
copper, total	E420	0.00050	mg/L	0.00095	--	0.0009 mg/L	--	--	--	--
iron, total	E420	0.010	mg/L	0.229	--	1 mg/L	--	--	--	--
lead, total	E420	0.000050	mg/L	<0.000050	0.00344 mg/L	0.003 mg/L	--	--	--	--
lithium, total	E420	0.0010	mg/L	<0.0010	--	--	--	--	--	--
magnesium, total	E420	0.0050	mg/L	1.03	--	--	--	--	--	--
manganese, total	E420	0.00010	mg/L	0.0195	0.768 mg/L	0.816 mg/L	--	--	--	--
mercury, total	E508	0.0000050	mg/L	<0.0000050	1E-05 mg/L	--	--	--	--	--
molybdenum, total	E420	0.000050	mg/L	0.000565	5.1 mg/L	46 mg/L	--	--	--	--
nickel, total	E420	0.00050	mg/L	<0.00050	0.025 mg/L	--	--	--	--	--
phosphorus, total	E420	0.050	mg/L	<0.050	--	--	--	--	--	--
potassium, total	E420	0.050	mg/L	1.23	373 mg/L	--	--	--	--	--
rubidium, total	E420	0.00020	mg/L	0.00142	--	--	--	--	--	--
selenium, total	E420	0.000050	mg/L	<0.000050	0.001 mg/L	--	--	--	--	--
silicon, total	E420	0.10	mg/L	3.23	--	--	--	--	--	--
silver, total	E420	0.000010	mg/L	<0.000010	5E-05 mg/L	0.0001 mg/L	--	--	--	--
sodium, total	E420	0.050	mg/L	1.62	--	--	--	--	--	--
strontium, total	E420	0.00020	mg/L	0.0580	--	--	--	--	--	--
sulfur, total	E420	0.50	mg/L	<0.50	--	--	--	--	--	--
tellurium, total	E420	0.00020	mg/L	<0.00020	--	--	--	--	--	--
thallium, total	E420	0.000010	mg/L	<0.000010	0.0008 mg/L	--	--	--	--	--
thorium, total	E420	0.00010	mg/L	<0.00010	--	--	--	--	--	--
tin, total	E420	0.00010	mg/L	0.00017	--	--	--	--	--	--
titanium, total	E420	0.00030	mg/L	0.00369	2 mg/L	--	--	--	--	--
tungsten, total	E420	0.00010	mg/L	<0.00010	--	--	--	--	--	--
uranium, total	E420	0.000010	mg/L	0.000077	0.0085 mg/L	--	--	--	--	--
vanadium, total	E420	0.00050	mg/L	0.00062	0.006 mg/L	--	--	--	--	--
zinc, total	E420	0.0030	mg/L	<0.0030	0.0075 mg/L	0.033 mg/L	--	--	--	--
zirconium, total	E420	0.00020	mg/L	<0.00020	--	--	--	--	--	--
Dissolved Metals										
aluminum, dissolved	E421	0.0010	mg/L	0.0301	0.007 mg/L	0.023 mg/L	--	--	--	--
antimony, dissolved	E421	0.00010	mg/L	<0.00010	0.009 mg/L	--	--	--	--	--
arsenic, dissolved	E421	0.00010	mg/L	0.00014	0.005 mg/L	--	--	--	--	--



Analyte	Method	LOR	Unit	VA22C5659-001 (Continued)	BCAWWQG FAL-LT	BCAWWQG FAL-ST				
Dissolved Metals - Continued										
barium, dissolved	E421	0.00010	mg/L	0.0180	1 mg/L	--	--	--	--	--
beryllium, dissolved	E421	0.000100	mg/L	<0.000100	0.00013 mg/L	--	--	--	--	--
bismuth, dissolved	E421	0.000050	mg/L	<0.000050	--	--	--	--	--	--
boron, dissolved	E421	0.010	mg/L	0.010	1.2 mg/L	--	--	--	--	--
cadmium, dissolved	E421	0.0000050	mg/L	<0.0000050	1.8E-05 mg/L	3E-05 mg/L	--	--	--	--
calcium, dissolved	E421	0.050	mg/L	18.4	<8 mg/L	--	--	--	--	--
cesium, dissolved	E421	0.000010	mg/L	<0.000010	--	--	--	--	--	--
chromium, dissolved	E421	0.00050	mg/L	<0.00050	0.001 mg/L	--	--	--	--	--
cobalt, dissolved	E421	0.00010	mg/L	<0.00010	0.004 mg/L	0.11 mg/L	--	--	--	--
copper, dissolved	E421	0.00020	mg/L	0.00069	0.0002 mg/L	0.0009 mg/L	--	--	--	--
iron, dissolved	E421	0.010	mg/L	0.087	--	0.35 mg/L	--	--	--	--
lead, dissolved	E421	0.000050	mg/L	<0.000050	0.00344 mg/L	0.003 mg/L	--	--	--	--
lithium, dissolved	E421	0.0010	mg/L	<0.0010	--	--	--	--	--	--
magnesium, dissolved	E421	0.0050	mg/L	0.999	--	--	--	--	--	--
manganese, dissolved	E421	0.00010	mg/L	0.0156	0.768 mg/L	0.816 mg/L	--	--	--	--
mercury, dissolved	E509	0.0000050	mg/L	<0.0000050	1E-05 mg/L	--	--	--	--	--
molybdenum, dissolved	E421	0.000050	mg/L	0.000532	5.1 mg/L	46 mg/L	--	--	--	--
nickel, dissolved	E421	0.00050	mg/L	<0.00050	0.025 mg/L	--	--	--	--	--
phosphorus, dissolved	E421	0.050	mg/L	<0.050	--	--	--	--	--	--
potassium, dissolved	E421	0.050	mg/L	1.22	373 mg/L	--	--	--	--	--
rubidium, dissolved	E421	0.00020	mg/L	0.00128	--	--	--	--	--	--
selenium, dissolved	E421	0.000050	mg/L	<0.000050	0.001 mg/L	--	--	--	--	--
silicon, dissolved	E421	0.050	mg/L	2.99	--	--	--	--	--	--
silver, dissolved	E421	0.000010	mg/L	<0.000010	5E-05 mg/L	0.0001 mg/L	--	--	--	--
sodium, dissolved	E421	0.050	mg/L	1.63	--	--	--	--	--	--
strontium, dissolved	E421	0.00020	mg/L	0.0539	--	--	--	--	--	--
sulfur, dissolved	E421	0.50	mg/L	<0.50	--	--	--	--	--	--
tellurium, dissolved	E421	0.00020	mg/L	<0.00020	--	--	--	--	--	--
thallium, dissolved	E421	0.000010	mg/L	<0.000010	0.0008 mg/L	--	--	--	--	--
thorium, dissolved	E421	0.00010	mg/L	<0.00010	--	--	--	--	--	--
tin, dissolved	E421	0.00010	mg/L	<0.00010	--	--	--	--	--	--
titanium, dissolved	E421	0.00030	mg/L	0.00059	2 mg/L	--	--	--	--	--
tungsten, dissolved	E421	0.00010	mg/L	<0.00010	--	--	--	--	--	--
uranium, dissolved	E421	0.000010	mg/L	0.000066	0.0085 mg/L	--	--	--	--	--
vanadium, dissolved	E421	0.00050	mg/L	<0.00050	0.006 mg/L	--	--	--	--	--
zinc, dissolved	E421	0.0010	mg/L	0.0012	0.0075 mg/L	0.033 mg/L	--	--	--	--



Analyte	Method	LOR	Unit	VA22C5659-001 (Continued)	BCAWWQG FAL-LT	BCAWWQG FAL-ST				
Dissolved Metals - Continued										
zirconium, dissolved	E421	0.00020	mg/L	<0.00020	--	--	--	--	--	--
dissolved mercury filtration location	EP509		-	Field	--	--	--	--	--	--
dissolved metals filtration location	EP421		-	Field	--	--	--	--	--	--
Aggregate Organics										
biochemical oxygen demand [BOD]	E550	2.0	mg/L	<2.0	--	--	--	--	--	--
chemical oxygen demand [COD]	E559-L	10	mg/L	<10	--	--	--	--	--	--

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

Summary of Guideline Breaches by Sample

SampleID/Client ID	Matrix	Analyte	Analyte Summary	Guideline	Category	Result	Limit
SW-06	Water	aluminum, total	WQG applies to dissolved metal result. WQG for pH<6.5. For pH>6.5 WQG is 0.05 mg/L.	BCAWWQG	FAL-LT	0.131 mg/L	0.007 mg/L
	Water	aluminum, dissolved	WQG for pH<6.5. For pH>6.5 WQG is 0.05 mg/L	BCAWWQG	FAL-LT	0.0301 mg/L	0.007 mg/L
	Water	copper, dissolved	0.2 ug/L is considered to be the lowest concentration routinely measured. Refer to https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/copper/bc_blm_users_manual.pdf for calculation of site specific WQG.	BCAWWQG	FAL-LT	0.00069 mg/L	0.0002 mg/L
	Water	aluminum, total	WQG applies to dissolved metal result. WQG based on median pH = 5.0. WQG for pH >=6.5 is 0.1 mg/L	BCAWWQG	FAL-ST	0.131 mg/L	0.023 mg/L
	Water	copper, total	WQG applies to dissolved metal result. WQG based on T = 15, hardness = 30 mg/L, DOC = 3 mg/L and pH = 6.5 using the BC BLM.	BCAWWQG	FAL-ST	0.00095 mg/L	0.0009 mg/L
	Water	aluminum, dissolved	WQG based on median pH = 5.0. WQG for pH >=6.5 is 0.1 mg/L	BCAWWQG	FAL-ST	0.0301 mg/L	0.023 mg/L

Key:

- BCAWWQG British Columbia Approved and Working Water Quality Guidelines (FEB, 2021)
- FAL-LT Freshwater Aquatic Life - Long-Term Chronic
- FAL-ST Freshwater Aquatic Life - Short-Term Acute



Analytical Results

Analyte	Method	LOR	Unit	Client sample ID	BCAAWWQG	BCAAWWQG				
				SW-52	FAL-LT	FAL-ST				
Sub-Matrix: Water (Matrix: Water)				Sampling date/time	21-Oct-2022 12:00					
				VA22C5659-002						
Physical Tests										
alkalinity, total (as CaCO3)	E290	1.0	mg/L	52.1	<20 mg/L	--	--	--	--	--
conductivity	E100	2.0	µS/cm	118	--	--	--	--	--	--
hardness (as CaCO3), dissolved	EC100	0.60	mg/L	51.5	--	--	--	--	--	--
hardness (as CaCO3), from total Ca/Mg	EC100A	0.60	mg/L	52.0	--	--	--	--	--	--
pH	E108	0.10	pH units	7.86	6.5 - 9 pH units	--	--	--	--	--
solids, total suspended [TSS]	E160	3.0	mg/L	<3.0	--	--	--	--	--	--
Anions and Nutrients										
ammonia, total (as N)	E298	0.0050	mg/L	0.0053	0.102 mg/L	0.752 mg/L	--	--	--	--
bromide	E235.Br-L	0.050	mg/L	<0.050	--	--	--	--	--	--
chloride	E235.Cl	0.50	mg/L	1.12	150 mg/L	600 mg/L	--	--	--	--
fluoride	E235.F	0.020	mg/L	0.021	--	0.4 mg/L	--	--	--	--
Kjeldahl nitrogen, total [TKN]	E318	0.050	mg/L	0.142	--	--	--	--	--	--
nitrate (as N)	E235.NO3-L	0.0050	mg/L	0.134	3 mg/L	32.8 mg/L	--	--	--	--
nitrite (as N)	E235.NO2-L	0.0010	mg/L	<0.0010	0.02 mg/L	0.06 mg/L	--	--	--	--
phosphate, ortho-, dissolved (as P)	E378-U	0.0010	mg/L	0.0015	--	--	--	--	--	--
phosphorus, total	E372-U	0.0020	mg/L	0.0072	--	--	--	--	--	--
sulfate (as SO4)	E235.SO4	0.30	mg/L	1.54	--	--	--	--	--	--
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	E358-L	0.50	mg/L	3.42	--	--	--	--	--	--
Total Metals										
aluminum, total	E420	0.0030	mg/L	0.125	0.007 mg/L	0.023 mg/L	--	--	--	--
antimony, total	E420	0.00010	mg/L	<0.00010	0.009 mg/L	--	--	--	--	--
arsenic, total	E420	0.00010	mg/L	0.00022	0.005 mg/L	--	--	--	--	--
barium, total	E420	0.00010	mg/L	0.0198	1 mg/L	--	--	--	--	--
beryllium, total	E420	0.000100	mg/L	<0.000100	0.00013 mg/L	--	--	--	--	--
bismuth, total	E420	0.000050	mg/L	<0.000050	--	--	--	--	--	--
boron, total	E420	0.010	mg/L	0.011	1.2 mg/L	--	--	--	--	--
cadmium, total	E420	0.0000050	mg/L	<0.0000050	1.8E-05 mg/L	3E-05 mg/L	--	--	--	--



Analyte	Method	LOR	Unit	VA22C5659-002 (Continued)	BCAWWQG FAL-LT	BCAWWQG FAL-ST				
Total Metals - Continued										
calcium, total	E420	0.050	mg/L	19.1	--	--	--	--	--	--
cesium, total	E420	0.000010	mg/L	0.000013	--	--	--	--	--	--
chromium, total	E420	0.00050	mg/L	<0.00050	0.001 mg/L	--	--	--	--	--
cobalt, total	E420	0.00010	mg/L	<0.00010	0.004 mg/L	0.11 mg/L	--	--	--	--
copper, total	E420	0.00050	mg/L	0.00094	--	0.0009 mg/L	--	--	--	--
iron, total	E420	0.010	mg/L	0.227	--	1 mg/L	--	--	--	--
lead, total	E420	0.000050	mg/L	<0.000050	0.00344 mg/L	0.003 mg/L	--	--	--	--
lithium, total	E420	0.0010	mg/L	<0.0010	--	--	--	--	--	--
magnesium, total	E420	0.0050	mg/L	1.04	--	--	--	--	--	--
manganese, total	E420	0.00010	mg/L	0.0199	0.768 mg/L	0.816 mg/L	--	--	--	--
mercury, total	E508	0.0000050	mg/L	<0.0000050	1E-05 mg/L	--	--	--	--	--
molybdenum, total	E420	0.000050	mg/L	0.000584	5.1 mg/L	46 mg/L	--	--	--	--
nickel, total	E420	0.00050	mg/L	<0.00050	0.025 mg/L	--	--	--	--	--
phosphorus, total	E420	0.050	mg/L	<0.050	--	--	--	--	--	--
potassium, total	E420	0.050	mg/L	1.25	373 mg/L	--	--	--	--	--
rubidium, total	E420	0.00020	mg/L	0.00142	--	--	--	--	--	--
selenium, total	E420	0.000050	mg/L	<0.000050	0.001 mg/L	--	--	--	--	--
silicon, total	E420	0.10	mg/L	3.19	--	--	--	--	--	--
silver, total	E420	0.000010	mg/L	<0.000010	5E-05 mg/L	0.0001 mg/L	--	--	--	--
sodium, total	E420	0.050	mg/L	1.62	--	--	--	--	--	--
strontium, total	E420	0.00020	mg/L	0.0560	--	--	--	--	--	--
sulfur, total	E420	0.50	mg/L	<0.50	--	--	--	--	--	--
tellurium, total	E420	0.00020	mg/L	<0.00020	--	--	--	--	--	--
thallium, total	E420	0.000010	mg/L	<0.000010	0.0008 mg/L	--	--	--	--	--
thorium, total	E420	0.00010	mg/L	<0.00010	--	--	--	--	--	--
tin, total	E420	0.00010	mg/L	<0.00010	--	--	--	--	--	--
titanium, total	E420	0.00030	mg/L	0.00359	2 mg/L	--	--	--	--	--
tungsten, total	E420	0.00010	mg/L	<0.00010	--	--	--	--	--	--
uranium, total	E420	0.000010	mg/L	0.000076	0.0085 mg/L	--	--	--	--	--
vanadium, total	E420	0.00050	mg/L	0.00061	0.006 mg/L	--	--	--	--	--
zinc, total	E420	0.0030	mg/L	<0.0030	0.0075 mg/L	0.033 mg/L	--	--	--	--
zirconium, total	E420	0.00020	mg/L	<0.00020	--	--	--	--	--	--
Dissolved Metals										
aluminum, dissolved	E421	0.0010	mg/L	0.0309	0.007 mg/L	0.023 mg/L	--	--	--	--
antimony, dissolved	E421	0.00010	mg/L	<0.00010	0.009 mg/L	--	--	--	--	--
arsenic, dissolved	E421	0.00010	mg/L	0.00016	0.005 mg/L	--	--	--	--	--



Analyte	Method	LOR	Unit	VA22C5659-002 (Continued)	BCAWWQG FAL-LT	BCAWWQG FAL-ST				
Dissolved Metals - Continued										
barium, dissolved	E421	0.00010	mg/L	0.0185	1 mg/L	--	--	--	--	--
beryllium, dissolved	E421	0.000100	mg/L	<0.000100	0.00013 mg/L	--	--	--	--	--
bismuth, dissolved	E421	0.000050	mg/L	<0.000050	--	--	--	--	--	--
boron, dissolved	E421	0.010	mg/L	0.010	1.2 mg/L	--	--	--	--	--
cadmium, dissolved	E421	0.0000050	mg/L	<0.0000050	1.8E-05 mg/L	3E-05 mg/L	--	--	--	--
calcium, dissolved	E421	0.050	mg/L	19.0	<8 mg/L	--	--	--	--	--
cesium, dissolved	E421	0.000010	mg/L	<0.000010	--	--	--	--	--	--
chromium, dissolved	E421	0.00050	mg/L	<0.00050	0.001 mg/L	--	--	--	--	--
cobalt, dissolved	E421	0.00010	mg/L	<0.00010	0.004 mg/L	0.11 mg/L	--	--	--	--
copper, dissolved	E421	0.00020	mg/L	0.00069	0.0002 mg/L	0.0009 mg/L	--	--	--	--
iron, dissolved	E421	0.010	mg/L	0.089	--	0.35 mg/L	--	--	--	--
lead, dissolved	E421	0.000050	mg/L	<0.000050	0.00344 mg/L	0.003 mg/L	--	--	--	--
lithium, dissolved	E421	0.0010	mg/L	<0.0010	--	--	--	--	--	--
magnesium, dissolved	E421	0.0050	mg/L	0.987	--	--	--	--	--	--
manganese, dissolved	E421	0.00010	mg/L	0.0155	0.768 mg/L	0.816 mg/L	--	--	--	--
mercury, dissolved	E509	0.0000050	mg/L	<0.0000050	1E-05 mg/L	--	--	--	--	--
molybdenum, dissolved	E421	0.000050	mg/L	0.000511	5.1 mg/L	46 mg/L	--	--	--	--
nickel, dissolved	E421	0.00050	mg/L	<0.00050	0.025 mg/L	--	--	--	--	--
phosphorus, dissolved	E421	0.050	mg/L	<0.050	--	--	--	--	--	--
potassium, dissolved	E421	0.050	mg/L	1.21	373 mg/L	--	--	--	--	--
rubidium, dissolved	E421	0.00020	mg/L	0.00130	--	--	--	--	--	--
selenium, dissolved	E421	0.000050	mg/L	<0.000050	0.001 mg/L	--	--	--	--	--
silicon, dissolved	E421	0.050	mg/L	2.98	--	--	--	--	--	--
silver, dissolved	E421	0.000010	mg/L	<0.000010	5E-05 mg/L	0.0001 mg/L	--	--	--	--
sodium, dissolved	E421	0.050	mg/L	1.62	--	--	--	--	--	--
strontium, dissolved	E421	0.00020	mg/L	0.0550	--	--	--	--	--	--
sulfur, dissolved	E421	0.50	mg/L	<0.50	--	--	--	--	--	--
tellurium, dissolved	E421	0.00020	mg/L	<0.00020	--	--	--	--	--	--
thallium, dissolved	E421	0.000010	mg/L	<0.000010	0.0008 mg/L	--	--	--	--	--
thorium, dissolved	E421	0.00010	mg/L	<0.00010	--	--	--	--	--	--
tin, dissolved	E421	0.00010	mg/L	<0.00010	--	--	--	--	--	--
titanium, dissolved	E421	0.00030	mg/L	0.00059	2 mg/L	--	--	--	--	--
tungsten, dissolved	E421	0.00010	mg/L	<0.00010	--	--	--	--	--	--
uranium, dissolved	E421	0.000010	mg/L	0.000068	0.0085 mg/L	--	--	--	--	--
vanadium, dissolved	E421	0.00050	mg/L	<0.00050	0.006 mg/L	--	--	--	--	--
zinc, dissolved	E421	0.0010	mg/L	0.0011	0.0075 mg/L	0.033 mg/L	--	--	--	--



Analyte	Method	LOR	Unit	VA22C5659-002 (Continued)	BCAWWQG FAL-LT	BCAWWQG FAL-ST				
Dissolved Metals - Continued										
zirconium, dissolved	E421	0.00020	mg/L	<0.00020	--	--	--	--	--	--
dissolved mercury filtration location	EP509		-	Field	--	--	--	--	--	--
dissolved metals filtration location	EP421		-	Field	--	--	--	--	--	--
Aggregate Organics										
biochemical oxygen demand [BOD]	E550	2.0	mg/L	<2.0	--	--	--	--	--	--
chemical oxygen demand [COD]	E559-L	10	mg/L	<10	--	--	--	--	--	--

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

Summary of Guideline Breaches by Sample

SampleID/Client ID	Matrix	Analyte	Analyte Summary	Guideline	Category	Result	Limit
SW-52	Water	aluminum, total	WQG applies to dissolved metal result. WQG for pH<6.5. For pH>6.5 WQG is 0.05 mg/L.	BCAWWQG	FAL-LT	0.125 mg/L	0.007 mg/L
	Water	aluminum, dissolved	WQG for pH<6.5. For pH>6.5 WQG is 0.05 mg/L	BCAWWQG	FAL-LT	0.0309 mg/L	0.007 mg/L
	Water	copper, dissolved	0.2 ug/L is considered to be the lowest concentration routinely measured. Refer to https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/copper/bc_blm_users_manual.pdf for calculation of site specific WQG.	BCAWWQG	FAL-LT	0.00069 mg/L	0.0002 mg/L
	Water	aluminum, total	WQG applies to dissolved metal result. WQG based on median pH = 5.0. WQG for pH >=6.5 is 0.1 mg/L	BCAWWQG	FAL-ST	0.125 mg/L	0.023 mg/L
	Water	copper, total	WQG applies to dissolved metal result. WQG based on T = 15, hardness = 30 mg/L, DOC = 3 mg/L and pH = 6.5 using the BC BLM.	BCAWWQG	FAL-ST	0.00094 mg/L	0.0009 mg/L
	Water	aluminum, dissolved	WQG based on median pH = 5.0. WQG for pH >=6.5 is 0.1 mg/L	BCAWWQG	FAL-ST	0.0309 mg/L	0.023 mg/L

Key:

- BCAWWQG British Columbia Approved and Working Water Quality Guidelines (FEB, 2021)
- FAL-LT Freshwater Aquatic Life - Long-Term Chronic
- FAL-ST Freshwater Aquatic Life - Short-Term Acute



Analytical Results

Analyte	Method	LOR	Unit	Client sample ID	BCAAWWQG	BCAAWWQG				
				SW-01	FAL-LT	FAL-ST				
Sub-Matrix: Water (Matrix: Water)				Sampling date/time	21-Oct-2022 11:22					
				VA22C5659-003						
Physical Tests										
alkalinity, total (as CaCO3)	E290	1.0	mg/L	36.3	<20 mg/L	--	--	--	--	--
conductivity	E100	2.0	µS/cm	83.9	--	--	--	--	--	--
hardness (as CaCO3), dissolved	EC100	0.60	mg/L	36.5	--	--	--	--	--	--
hardness (as CaCO3), from total Ca/Mg	EC100A	0.60	mg/L	37.2	--	--	--	--	--	--
pH	E108	0.10	pH units	7.67	6.5 - 9 pH units	--	--	--	--	--
solids, total suspended [TSS]	E160	3.0	mg/L	<3.0	--	--	--	--	--	--
Anions and Nutrients										
ammonia, total (as N)	E298	0.0050	mg/L	<0.0050	0.102 mg/L	0.752 mg/L	--	--	--	--
bromide	E235.Br-L	0.050	mg/L	<0.050	--	--	--	--	--	--
chloride	E235.Cl	0.50	mg/L	<0.50	150 mg/L	600 mg/L	--	--	--	--
fluoride	E235.F	0.020	mg/L	<0.020	--	0.4 mg/L	--	--	--	--
Kjeldahl nitrogen, total [TKN]	E318	0.050	mg/L	0.091	--	--	--	--	--	--
nitrate (as N)	E235.NO3-L	0.0050	mg/L	0.167	3 mg/L	32.8 mg/L	--	--	--	--
nitrite (as N)	E235.NO2-L	0.0010	mg/L	<0.0010	0.02 mg/L	0.06 mg/L	--	--	--	--
phosphate, ortho-, dissolved (as P)	E378-U	0.0010	mg/L	<0.0010	--	--	--	--	--	--
phosphorus, total	E372-U	0.0020	mg/L	0.0036	--	--	--	--	--	--
sulfate (as SO4)	E235.SO4	0.30	mg/L	1.13	--	--	--	--	--	--
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	E358-L	0.50	mg/L	2.50	--	--	--	--	--	--
Total Metals										
aluminum, total	E420	0.0030	mg/L	0.0794	0.007 mg/L	0.023 mg/L	--	--	--	--
antimony, total	E420	0.00010	mg/L	<0.00010	0.009 mg/L	--	--	--	--	--
arsenic, total	E420	0.00010	mg/L	<0.00010	0.005 mg/L	--	--	--	--	--
barium, total	E420	0.00010	mg/L	0.0279	1 mg/L	--	--	--	--	--
beryllium, total	E420	0.000100	mg/L	<0.000100	0.00013 mg/L	--	--	--	--	--
bismuth, total	E420	0.000050	mg/L	<0.000050	--	--	--	--	--	--
boron, total	E420	0.010	mg/L	<0.010	1.2 mg/L	--	--	--	--	--
cadmium, total	E420	0.0000050	mg/L	<0.0000050	1.8E-05 mg/L	3E-05 mg/L	--	--	--	--



Analyte	Method	LOR	Unit	VA22C5659-003 (Continued)	BCAWWQG FAL-LT	BCAWWQG FAL-ST				
Total Metals - Continued										
calcium, total	E420	0.050	mg/L	13.3	--	--	--	--	--	--
cesium, total	E420	0.000010	mg/L	<0.000010	--	--	--	--	--	--
chromium, total	E420	0.00050	mg/L	<0.00050	0.001 mg/L	--	--	--	--	--
cobalt, total	E420	0.00010	mg/L	<0.00010	0.004 mg/L	0.11 mg/L	--	--	--	--
copper, total	E420	0.00050	mg/L	0.00083	--	0.0009 mg/L	--	--	--	--
iron, total	E420	0.010	mg/L	0.079	--	1 mg/L	--	--	--	--
lead, total	E420	0.000050	mg/L	<0.000050	0.00344 mg/L	0.003 mg/L	--	--	--	--
lithium, total	E420	0.0010	mg/L	<0.0010	--	--	--	--	--	--
magnesium, total	E420	0.0050	mg/L	0.969	--	--	--	--	--	--
manganese, total	E420	0.00010	mg/L	0.00624	0.768 mg/L	0.816 mg/L	--	--	--	--
mercury, total	E508	0.0000050	mg/L	<0.0000050	1E-05 mg/L	--	--	--	--	--
molybdenum, total	E420	0.000050	mg/L	0.000346	5.1 mg/L	46 mg/L	--	--	--	--
nickel, total	E420	0.00050	mg/L	<0.00050	0.025 mg/L	--	--	--	--	--
phosphorus, total	E420	0.050	mg/L	<0.050	--	--	--	--	--	--
potassium, total	E420	0.050	mg/L	1.09	373 mg/L	--	--	--	--	--
rubidium, total	E420	0.00020	mg/L	0.00123	--	--	--	--	--	--
selenium, total	E420	0.000050	mg/L	<0.000050	0.001 mg/L	--	--	--	--	--
silicon, total	E420	0.10	mg/L	2.86	--	--	--	--	--	--
silver, total	E420	0.000010	mg/L	<0.000010	5E-05 mg/L	0.0001 mg/L	--	--	--	--
sodium, total	E420	0.050	mg/L	1.20	--	--	--	--	--	--
strontium, total	E420	0.00020	mg/L	0.0586	--	--	--	--	--	--
sulfur, total	E420	0.50	mg/L	<0.50	--	--	--	--	--	--
tellurium, total	E420	0.00020	mg/L	<0.00020	--	--	--	--	--	--
thallium, total	E420	0.000010	mg/L	<0.000010	0.0008 mg/L	--	--	--	--	--
thorium, total	E420	0.00010	mg/L	<0.00010	--	--	--	--	--	--
tin, total	E420	0.00010	mg/L	<0.00010	--	--	--	--	--	--
titanium, total	E420	0.00030	mg/L	0.00264	2 mg/L	--	--	--	--	--
tungsten, total	E420	0.00010	mg/L	<0.00010	--	--	--	--	--	--
uranium, total	E420	0.000010	mg/L	0.000018	0.0085 mg/L	--	--	--	--	--
vanadium, total	E420	0.00050	mg/L	<0.00050	0.006 mg/L	--	--	--	--	--
zinc, total	E420	0.0030	mg/L	0.0033	0.0075 mg/L	0.033 mg/L	--	--	--	--
zirconium, total	E420	0.00020	mg/L	<0.00020	--	--	--	--	--	--
Dissolved Metals										
aluminum, dissolved	E421	0.0010	mg/L	0.0303	0.007 mg/L	0.023 mg/L	--	--	--	--
antimony, dissolved	E421	0.00010	mg/L	<0.00010	0.009 mg/L	--	--	--	--	--
arsenic, dissolved	E421	0.00010	mg/L	<0.00010	0.005 mg/L	--	--	--	--	--



Analyte	Method	LOR	Unit	VA22C5659-003 (Continued)	BCAWWQG FAL-LT	BCAWWQG FAL-ST				
Dissolved Metals - Continued										
barium, dissolved	E421	0.00010	mg/L	0.0267	1 mg/L	--	--	--	--	--
beryllium, dissolved	E421	0.000100	mg/L	<0.000100	0.00013 mg/L	--	--	--	--	--
bismuth, dissolved	E421	0.000050	mg/L	<0.000050	--	--	--	--	--	--
boron, dissolved	E421	0.010	mg/L	<0.010	1.2 mg/L	--	--	--	--	--
cadmium, dissolved	E421	0.0000050	mg/L	<0.0000050	1.8E-05 mg/L	3E-05 mg/L	--	--	--	--
calcium, dissolved	E421	0.050	mg/L	13.1	<8 mg/L	--	--	--	--	--
cesium, dissolved	E421	0.000010	mg/L	<0.000010	--	--	--	--	--	--
chromium, dissolved	E421	0.00050	mg/L	<0.00050	0.001 mg/L	--	--	--	--	--
cobalt, dissolved	E421	0.00010	mg/L	<0.00010	0.004 mg/L	0.11 mg/L	--	--	--	--
copper, dissolved	E421	0.00020	mg/L	0.00060	0.0002 mg/L	0.0009 mg/L	--	--	--	--
iron, dissolved	E421	0.010	mg/L	0.021	--	0.35 mg/L	--	--	--	--
lead, dissolved	E421	0.000050	mg/L	<0.000050	0.00344 mg/L	0.003 mg/L	--	--	--	--
lithium, dissolved	E421	0.0010	mg/L	<0.0010	--	--	--	--	--	--
magnesium, dissolved	E421	0.0050	mg/L	0.920	--	--	--	--	--	--
manganese, dissolved	E421	0.00010	mg/L	0.00326	0.768 mg/L	0.816 mg/L	--	--	--	--
mercury, dissolved	E509	0.0000050	mg/L	<0.0000050	1E-05 mg/L	--	--	--	--	--
molybdenum, dissolved	E421	0.000050	mg/L	0.000324	5.1 mg/L	46 mg/L	--	--	--	--
nickel, dissolved	E421	0.00050	mg/L	<0.00050	0.025 mg/L	--	--	--	--	--
phosphorus, dissolved	E421	0.050	mg/L	<0.050	--	--	--	--	--	--
potassium, dissolved	E421	0.050	mg/L	1.06	373 mg/L	--	--	--	--	--
rubidium, dissolved	E421	0.00020	mg/L	0.00115	--	--	--	--	--	--
selenium, dissolved	E421	0.000050	mg/L	<0.000050	0.001 mg/L	--	--	--	--	--
silicon, dissolved	E421	0.050	mg/L	2.70	--	--	--	--	--	--
silver, dissolved	E421	0.000010	mg/L	<0.000010	5E-05 mg/L	0.0001 mg/L	--	--	--	--
sodium, dissolved	E421	0.050	mg/L	1.14	--	--	--	--	--	--
strontium, dissolved	E421	0.00020	mg/L	0.0557	--	--	--	--	--	--
sulfur, dissolved	E421	0.50	mg/L	<0.50	--	--	--	--	--	--
tellurium, dissolved	E421	0.00020	mg/L	<0.00020	--	--	--	--	--	--
thallium, dissolved	E421	0.000010	mg/L	<0.000010	0.0008 mg/L	--	--	--	--	--
thorium, dissolved	E421	0.00010	mg/L	<0.00010	--	--	--	--	--	--
tin, dissolved	E421	0.00010	mg/L	<0.00010	--	--	--	--	--	--
titanium, dissolved	E421	0.00030	mg/L	<0.00030	2 mg/L	--	--	--	--	--
tungsten, dissolved	E421	0.00010	mg/L	<0.00010	--	--	--	--	--	--
uranium, dissolved	E421	0.000010	mg/L	0.000015	0.0085 mg/L	--	--	--	--	--
vanadium, dissolved	E421	0.00050	mg/L	<0.00050	0.006 mg/L	--	--	--	--	--
zinc, dissolved	E421	0.0010	mg/L	0.0014	0.0075 mg/L	0.033 mg/L	--	--	--	--



Analyte	Method	LOR	Unit	VA22C5659-003 (Continued)	BCAWWQG FAL-LT	BCAWWQG FAL-ST				
Dissolved Metals - Continued										
zirconium, dissolved	E421	0.00020	mg/L	<0.00020	--	--	--	--	--	--
dissolved mercury filtration location	EP509		-	Field	--	--	--	--	--	--
dissolved metals filtration location	EP421		-	Field	--	--	--	--	--	--
Aggregate Organics										
biochemical oxygen demand [BOD]	E550	2.0	mg/L	<2.0	--	--	--	--	--	--
chemical oxygen demand [COD]	E559-L	10	mg/L	12	--	--	--	--	--	--

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

Summary of Guideline Breaches by Sample

SampleID/Client ID	Matrix	Analyte	Analyte Summary	Guideline	Category	Result	Limit
SW-01	Water	aluminum, total	WQG applies to dissolved metal result. WQG for pH<6.5. For pH>6.5 WQG is 0.05 mg/L.	BCAWWQG	FAL-LT	0.0794 mg/L	0.007 mg/L
	Water	aluminum, dissolved	WQG for pH<6.5. For pH>6.5 WQG is 0.05 mg/L	BCAWWQG	FAL-LT	0.0303 mg/L	0.007 mg/L
	Water	copper, dissolved	0.2 ug/L is considered to be the lowest concentration routinely measured. Refer to https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/copper/bc_blm_users_manual.pdf for calculation of site specific WQG.	BCAWWQG	FAL-LT	0.00060 mg/L	0.0002 mg/L
	Water	aluminum, total	WQG applies to dissolved metal result. WQG based on median pH = 5.0. WQG for pH >=6.5 is 0.1 mg/L	BCAWWQG	FAL-ST	0.0794 mg/L	0.023 mg/L
	Water	aluminum, dissolved	WQG based on median pH = 5.0. WQG for pH >=6.5 is 0.1 mg/L	BCAWWQG	FAL-ST	0.0303 mg/L	0.023 mg/L

Key:

- BCAWWQG British Columbia Approved and Working Water Quality Guidelines (FEB, 2021)
- FAL-LT Freshwater Aquatic Life - Long-Term Chronic
- FAL-ST Freshwater Aquatic Life - Short-Term Acute



Analytical Results

Analyte	Method	LOR	Unit	Client sample ID	BCAAWWQG	BCAAWWQG				
				SW-03	FAL-LT	FAL-ST				
Sub-Matrix: Water (Matrix: Water)				Sampling date/time	21-Oct-2022 12:08					
				VA22C5659-004						
Physical Tests										
alkalinity, total (as CaCO3)	E290	1.0	mg/L	686	<20 mg/L	--	--	--	--	--
conductivity	E100	2.0	µS/cm	1480	--	--	--	--	--	--
hardness (as CaCO3), dissolved	EC100	0.60	mg/L	424	--	--	--	--	--	--
hardness (as CaCO3), from total Ca/Mg	EC100A	0.60	mg/L	437	--	--	--	--	--	--
pH	E108	0.10	pH units	7.30	6.5 - 9 pH units	--	--	--	--	--
solids, total suspended [TSS]	E160	3.0	mg/L	116	--	--	--	--	--	--
Anions and Nutrients										
ammonia, total (as N)	E298	0.0050	mg/L	43.6	0.102 mg/L	0.752 mg/L	--	--	--	--
bromide	E235.Br-L	0.050	mg/L	0.437	--	--	--	--	--	--
chloride	E235.Cl	0.50	mg/L	51.5	150 mg/L	600 mg/L	--	--	--	--
fluoride	E235.F	0.020	mg/L	<0.100 DLDS	--	0.4 mg/L	--	--	--	--
Kjeldahl nitrogen, total [TKN]	E318	0.050	mg/L	46.6	--	--	--	--	--	--
nitrate (as N)	E235.NO3-L	0.0050	mg/L	<0.0250 DLDS	3 mg/L	32.8 mg/L	--	--	--	--
nitrite (as N)	E235.NO2-L	0.0010	mg/L	<0.0050 DLDS	0.02 mg/L	0.06 mg/L	--	--	--	--
phosphate, ortho-, dissolved (as P)	E378-U	0.0010	mg/L	<0.0010	--	--	--	--	--	--
phosphorus, total	E372-U	0.0020	mg/L	0.392	--	--	--	--	--	--
sulfate (as SO4)	E235.SO4	0.30	mg/L	<1.50 DLDS	--	--	--	--	--	--
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	E358-L	0.50	mg/L	26.9	--	--	--	--	--	--
Total Metals										
aluminum, total	E420	0.0030	mg/L	0.298	0.007 mg/L	0.023 mg/L	--	--	--	--
antimony, total	E420	0.00010	mg/L	0.00012	0.009 mg/L	--	--	--	--	--
arsenic, total	E420	0.00010	mg/L	0.0149	0.005 mg/L	--	--	--	--	--
barium, total	E420	0.00010	mg/L	0.592	1 mg/L	--	--	--	--	--
beryllium, total	E420	0.000100	mg/L	<0.000100	0.00013 mg/L	--	--	--	--	--
bismuth, total	E420	0.000050	mg/L	<0.000050	--	--	--	--	--	--
boron, total	E420	0.010	mg/L	1.16	1.2 mg/L	--	--	--	--	--
cadmium, total	E420	0.0000050	mg/L	0.0000152	1.8E-05 mg/L	3E-05 mg/L	--	--	--	--



Analyte	Method	LOR	Unit	VA22C5659-004 (Continued)	BCAWWQG FAL-LT	BCAWWQG FAL-ST				
Total Metals - Continued										
calcium, total	E420	0.050	mg/L	132	--	--	--	--	--	--
cesium, total	E420	0.000010	mg/L	0.000218	--	--	--	--	--	--
chromium, total	E420	0.00050	mg/L	0.00122	0.001 mg/L	--	--	--	--	--
cobalt, total	E420	0.00010	mg/L	0.00203	0.004 mg/L	0.11 mg/L	--	--	--	--
copper, total	E420	0.00050	mg/L	0.00104	--	0.0009 mg/L	--	--	--	--
iron, total	E420	0.010	mg/L	45.0	--	1 mg/L	--	--	--	--
lead, total	E420	0.000050	mg/L	0.000114	0.00344 mg/L	0.003 mg/L	--	--	--	--
lithium, total	E420	0.0010	mg/L	0.0024	--	--	--	--	--	--
magnesium, total	E420	0.0050	mg/L	26.0	--	--	--	--	--	--
manganese, total	E420	0.00010	mg/L	2.58	0.768 mg/L	0.816 mg/L	--	--	--	--
mercury, total	E508	0.0000050	mg/L	<0.0000050	1E-05 mg/L	--	--	--	--	--
molybdenum, total	E420	0.000050	mg/L	0.000278	5.1 mg/L	46 mg/L	--	--	--	--
nickel, total	E420	0.00050	mg/L	0.00348	0.025 mg/L	--	--	--	--	--
phosphorus, total	E420	0.050	mg/L	0.443	--	--	--	--	--	--
potassium, total	E420	0.050	mg/L	44.8	373 mg/L	--	--	--	--	--
rubidium, total	E420	0.00020	mg/L	0.0341	--	--	--	--	--	--
selenium, total	E420	0.000050	mg/L	0.000091	0.001 mg/L	--	--	--	--	--
silicon, total	E420	0.10	mg/L	11.5	--	--	--	--	--	--
silver, total	E420	0.000010	mg/L	<0.000010	5E-05 mg/L	0.0001 mg/L	--	--	--	--
sodium, total	E420	0.050	mg/L	67.1	--	--	--	--	--	--
strontium, total	E420	0.00020	mg/L	0.966	--	--	--	--	--	--
sulfur, total	E420	0.50	mg/L	<0.50	--	--	--	--	--	--
tellurium, total	E420	0.00020	mg/L	<0.00020	--	--	--	--	--	--
thallium, total	E420	0.000010	mg/L	<0.000010	0.0008 mg/L	--	--	--	--	--
thorium, total	E420	0.00010	mg/L	<0.00010	--	--	--	--	--	--
tin, total	E420	0.00010	mg/L	0.00017	--	--	--	--	--	--
titanium, total	E420	0.00030	mg/L	0.00872	2 mg/L	--	--	--	--	--
tungsten, total	E420	0.00010	mg/L	<0.00010	--	--	--	--	--	--
uranium, total	E420	0.000010	mg/L	0.000029	0.0085 mg/L	--	--	--	--	--
vanadium, total	E420	0.00050	mg/L	0.00209	0.006 mg/L	--	--	--	--	--
zinc, total	E420	0.0030	mg/L	0.0042	0.0075 mg/L	0.033 mg/L	--	--	--	--
zirconium, total	E420	0.00020	mg/L	0.00043	--	--	--	--	--	--
Dissolved Metals										
aluminum, dissolved	E421	0.0010	mg/L	0.0178	0.007 mg/L	0.023 mg/L	--	--	--	--
antimony, dissolved	E421	0.00010	mg/L	<0.00010	0.009 mg/L	--	--	--	--	--
arsenic, dissolved	E421	0.00010	mg/L	0.0142	0.005 mg/L	--	--	--	--	--



Analyte	Method	LOR	Unit	VA22C5659-004 (Continued)	BCAWWQG FAL-LT	BCAWWQG FAL-ST				
Dissolved Metals - Continued										
barium, dissolved	E421	0.00010	mg/L	0.547	1 mg/L	--	--	--	--	--
beryllium, dissolved	E421	0.000100	mg/L	<0.000100	0.00013 mg/L	--	--	--	--	--
bismuth, dissolved	E421	0.000050	mg/L	<0.000050	--	--	--	--	--	--
boron, dissolved	E421	0.010	mg/L	1.09	1.2 mg/L	--	--	--	--	--
cadmium, dissolved	E421	0.0000050	mg/L	0.0000065	1.8E-05 mg/L	3E-05 mg/L	--	--	--	--
calcium, dissolved	E421	0.050	mg/L	129	<8 mg/L	--	--	--	--	--
cesium, dissolved	E421	0.000010	mg/L	0.000183	--	--	--	--	--	--
chromium, dissolved	E421	0.00050	mg/L	0.00072	0.001 mg/L	--	--	--	--	--
cobalt, dissolved	E421	0.00010	mg/L	0.00191	0.004 mg/L	0.11 mg/L	--	--	--	--
copper, dissolved	E421	0.00020	mg/L	<0.00020	0.0002 mg/L	0.0009 mg/L	--	--	--	--
iron, dissolved	E421	0.010	mg/L	40.2	--	0.35 mg/L	--	--	--	--
lead, dissolved	E421	0.000050	mg/L	<0.000050	0.00344 mg/L	0.003 mg/L	--	--	--	--
lithium, dissolved	E421	0.0010	mg/L	0.0022	--	--	--	--	--	--
magnesium, dissolved	E421	0.0050	mg/L	24.7	--	--	--	--	--	--
manganese, dissolved	E421	0.00010	mg/L	2.46	0.768 mg/L	0.816 mg/L	--	--	--	--
mercury, dissolved	E509	0.0000050	mg/L	<0.0000050	1E-05 mg/L	--	--	--	--	--
molybdenum, dissolved	E421	0.000050	mg/L	0.000250	5.1 mg/L	46 mg/L	--	--	--	--
nickel, dissolved	E421	0.00050	mg/L	0.00298	0.025 mg/L	--	--	--	--	--
phosphorus, dissolved	E421	0.050	mg/L	0.133	--	--	--	--	--	--
potassium, dissolved	E421	0.050	mg/L	42.6	373 mg/L	--	--	--	--	--
rubidium, dissolved	E421	0.00020	mg/L	0.0326	--	--	--	--	--	--
selenium, dissolved	E421	0.000050	mg/L	0.000134	0.001 mg/L	--	--	--	--	--
silicon, dissolved	E421	0.050	mg/L	10.8	--	--	--	--	--	--
silver, dissolved	E421	0.000010	mg/L	<0.000010	5E-05 mg/L	0.0001 mg/L	--	--	--	--
sodium, dissolved	E421	0.050	mg/L	64.7	--	--	--	--	--	--
strontium, dissolved	E421	0.00020	mg/L	0.875	--	--	--	--	--	--
sulfur, dissolved	E421	0.50	mg/L	<0.50	--	--	--	--	--	--
tellurium, dissolved	E421	0.00020	mg/L	<0.00020	--	--	--	--	--	--
thallium, dissolved	E421	0.000010	mg/L	<0.000010	0.0008 mg/L	--	--	--	--	--
thorium, dissolved	E421	0.00010	mg/L	<0.00010	--	--	--	--	--	--
tin, dissolved	E421	0.00010	mg/L	0.00010	--	--	--	--	--	--
titanium, dissolved	E421	0.00030	mg/L	0.00133	2 mg/L	--	--	--	--	--
tungsten, dissolved	E421	0.00010	mg/L	<0.00010	--	--	--	--	--	--
uranium, dissolved	E421	0.000010	mg/L	0.000027	0.0085 mg/L	--	--	--	--	--
vanadium, dissolved	E421	0.00050	mg/L	0.00126	0.006 mg/L	--	--	--	--	--
zinc, dissolved	E421	0.0010	mg/L	0.0032	0.0075 mg/L	0.033 mg/L	--	--	--	--



Analyte	Method	LOR	Unit	VA22C5659-004 (Continued)	BCAWWQG FAL-LT	BCAWWQG FAL-ST				
Dissolved Metals - Continued										
zirconium, dissolved	E421	0.00020	mg/L	0.00029	--	--	--	--	--	--
dissolved mercury filtration location	EP509		-	Field	--	--	--	--	--	--
dissolved metals filtration location	EP421		-	Field	--	--	--	--	--	--
Aggregate Organics										
biochemical oxygen demand [BOD]	E550	2.0	mg/L	<6.0 DLM	--	--	--	--	--	--
chemical oxygen demand [COD]	E559-L	10	mg/L	103	--	--	--	--	--	--

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

Summary of Guideline Breaches by Sample

SampleID/Client ID	Matrix	Analyte	Analyte Summary	Guideline	Category	Result	Limit
SW-03	Water	ammonia, total (as N)	WQG based on pH=9.0 and T=20 oC	BCAWWQG	FAL-LT	43.6 mg/L	0.102 mg/L
	Water	aluminum, total	WQG applies to dissolved metal result. WQG for pH<6.5. For pH>6.5 WQG is 0.05 mg/L.	BCAWWQG	FAL-LT	0.298 mg/L	0.007 mg/L
	Water	arsenic, total		BCAWWQG	FAL-LT	0.0149 mg/L	0.005 mg/L
	Water	chromium, total		BCAWWQG	FAL-LT	0.00122 mg/L	0.001 mg/L
	Water	manganese, total	WQG applies to water hardness between 37 - 450 mg/L. Limiti based on a hardness of 37 mg/L.	BCAWWQG	FAL-LT	2.58 mg/L	0.768 mg/L
	Water	aluminum, dissolved	WQG for pH<6.5. For pH>6.5 WQG is 0.05 mg/L	BCAWWQG	FAL-LT	0.0178 mg/L	0.007 mg/L
	Water	arsenic, dissolved	WQG applies to total metal result.	BCAWWQG	FAL-LT	0.0142 mg/L	0.005 mg/L
	Water	manganese, dissolved	WQG applies to water hardness between 37 - 450 mg/L. Limiti based on a hardness of 37 mg/L.	BCAWWQG	FAL-LT	2.46 mg/L	0.768 mg/L
	Water	ammonia, total (as N)	WQG based on pH = 9.0 and T = 20 °C	BCAWWQG	FAL-ST	43.6 mg/L	0.752 mg/L
	Water	aluminum, total	WQG applies to dissolved metal result. WQG based on median pH = 5.0. WQG for pH >=6.5 is 0.1 mg/L	BCAWWQG	FAL-ST	0.298 mg/L	0.023 mg/L
	Water	copper, total	WQG applies to dissolved metal result. WQG based on T = 15, hardness = 30 mg/L, DOC = 3 mg/L and pH = 6.5 using the BC BLM.	BCAWWQG	FAL-ST	0.00104 mg/L	0.0009 mg/L
	Water	iron, total		BCAWWQG	FAL-ST	45.0 mg/L	1 mg/L
	Water	manganese, total	WQG applies to water harnesses between 25 - 259 mg/L. WQG is based on a hardness = 25 mg/L	BCAWWQG	FAL-ST	2.58 mg/L	0.816 mg/L
	Water	iron, dissolved		BCAWWQG	FAL-ST	40.2 mg/L	0.35 mg/L
	Water	manganese, dissolved	WQG applies to water harnesses between 25 - 259 mg/L. WQG is based on a hardness = 25 mg/L	BCAWWQG	FAL-ST	2.46 mg/L	0.816 mg/L



Key:

BCAWWQG	British Columbia Approved and Working Water Quality Guidelines (FEB, 2021)
FAL-LT	Freshwater Aquatic Life - Long-Term Chronic
FAL-ST	Freshwater Aquatic Life - Short-Term Acute



Analytical Results

Analyte	Method	LOR	Unit	Client sample ID	BCAAWWQG	BCAAWWQG				
				SW-21	FAL-LT	FAL-ST				
Sub-Matrix: Water (Matrix: Water)				21-Oct-2022 10:50						
				VA22C5659-005						
Physical Tests										
alkalinity, total (as CaCO3)	E290	1.0	mg/L	243	<20 mg/L	--	--	--	--	--
conductivity	E100	2.0	µS/cm	556	--	--	--	--	--	--
hardness (as CaCO3), dissolved	EC100	0.60	mg/L	203	--	--	--	--	--	--
hardness (as CaCO3), from total Ca/Mg	EC100A	0.60	mg/L	208	--	--	--	--	--	--
pH	E108	0.10	pH units	8.30	6.5 - 9 pH units	--	--	--	--	--
solids, total suspended [TSS]	E160	3.0	mg/L	<3.0	--	--	--	--	--	--
Anions and Nutrients										
ammonia, total (as N)	E298	0.0050	mg/L	0.574	0.102 mg/L	0.752 mg/L	--	--	--	--
bromide	E235.Br-L	0.050	mg/L	0.136	--	--	--	--	--	--
chloride	E235.Cl	0.50	mg/L	19.5	150 mg/L	600 mg/L	--	--	--	--
fluoride	E235.F	0.020	mg/L	0.064	--	0.4 mg/L	--	--	--	--
Kjeldahl nitrogen, total [TKN]	E318	0.050	mg/L	1.71	--	--	--	--	--	--
nitrate (as N)	E235.NO3-L	0.0050	mg/L	3.72	3 mg/L	32.8 mg/L	--	--	--	--
nitrite (as N)	E235.NO2-L	0.0010	mg/L	0.0706	0.02 mg/L	0.06 mg/L	--	--	--	--
phosphate, ortho-, dissolved (as P)	E378-U	0.0010	mg/L	0.0032	--	--	--	--	--	--
phosphorus, total	E372-U	0.0020	mg/L	0.391	--	--	--	--	--	--
sulfate (as SO4)	E235.SO4	0.30	mg/L	1.81	--	--	--	--	--	--
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	E358-L	0.50	mg/L	13.7	--	--	--	--	--	--
Total Metals										
aluminum, total	E420	0.0030	mg/L	0.183	0.007 mg/L	0.023 mg/L	--	--	--	--
antimony, total	E420	0.00010	mg/L	<0.00010	0.009 mg/L	--	--	--	--	--
arsenic, total	E420	0.00010	mg/L	0.00074	0.005 mg/L	--	--	--	--	--
barium, total	E420	0.00010	mg/L	0.107	1 mg/L	--	--	--	--	--
beryllium, total	E420	0.000100	mg/L	<0.000100	0.00013 mg/L	--	--	--	--	--
bismuth, total	E420	0.000050	mg/L	<0.000050	--	--	--	--	--	--
boron, total	E420	0.010	mg/L	0.472	1.2 mg/L	--	--	--	--	--
cadmium, total	E420	0.0000050	mg/L	0.0000084	1.8E-05 mg/L	3E-05 mg/L	--	--	--	--



Analyte	Method	LOR	Unit	VA22C5659-005 (Continued)	BCAWWQG FAL-LT	BCAWWQG FAL-ST				
Total Metals - Continued										
calcium, total	E420	0.050	mg/L	61.7	--	--	--	--	--	--
cesium, total	E420	0.000010	mg/L	0.000042	--	--	--	--	--	--
chromium, total	E420	0.00050	mg/L	<0.00050	0.001 mg/L	--	--	--	--	--
cobalt, total	E420	0.00010	mg/L	0.00054	0.004 mg/L	0.11 mg/L	--	--	--	--
copper, total	E420	0.00050	mg/L	0.00164	--	0.0009 mg/L	--	--	--	--
iron, total	E420	0.010	mg/L	0.620	--	1 mg/L	--	--	--	--
lead, total	E420	0.000050	mg/L	0.000085	0.00344 mg/L	0.003 mg/L	--	--	--	--
lithium, total	E420	0.0010	mg/L	<0.0010	--	--	--	--	--	--
magnesium, total	E420	0.0050	mg/L	13.1	--	--	--	--	--	--
manganese, total	E420	0.00010	mg/L	0.241	0.768 mg/L	0.816 mg/L	--	--	--	--
mercury, total	E508	0.0000050	mg/L	<0.0000050	1E-05 mg/L	--	--	--	--	--
molybdenum, total	E420	0.000050	mg/L	0.000193	5.1 mg/L	46 mg/L	--	--	--	--
nickel, total	E420	0.00050	mg/L	0.00141	0.025 mg/L	--	--	--	--	--
phosphorus, total	E420	0.050	mg/L	<0.050	--	--	--	--	--	--
potassium, total	E420	0.050	mg/L	17.3	373 mg/L	--	--	--	--	--
rubidium, total	E420	0.00020	mg/L	0.0107	--	--	--	--	--	--
selenium, total	E420	0.000050	mg/L	0.000073	0.001 mg/L	--	--	--	--	--
silicon, total	E420	0.10	mg/L	4.73	--	--	--	--	--	--
silver, total	E420	0.000010	mg/L	<0.000010	5E-05 mg/L	0.0001 mg/L	--	--	--	--
sodium, total	E420	0.050	mg/L	26.6	--	--	--	--	--	--
strontium, total	E420	0.00020	mg/L	0.435	--	--	--	--	--	--
sulfur, total	E420	0.50	mg/L	0.79	--	--	--	--	--	--
tellurium, total	E420	0.00020	mg/L	<0.00020	--	--	--	--	--	--
thallium, total	E420	0.000010	mg/L	<0.000010	0.0008 mg/L	--	--	--	--	--
thorium, total	E420	0.00010	mg/L	<0.00010	--	--	--	--	--	--
tin, total	E420	0.00010	mg/L	<0.00010	--	--	--	--	--	--
titanium, total	E420	0.00030	mg/L	0.00551	2 mg/L	--	--	--	--	--
tungsten, total	E420	0.00010	mg/L	<0.00010	--	--	--	--	--	--
uranium, total	E420	0.000010	mg/L	0.000087	0.0085 mg/L	--	--	--	--	--
vanadium, total	E420	0.00050	mg/L	<0.00050	0.006 mg/L	--	--	--	--	--
zinc, total	E420	0.0030	mg/L	0.0038	0.0075 mg/L	0.033 mg/L	--	--	--	--
zirconium, total	E420	0.00020	mg/L	<0.00020	--	--	--	--	--	--
Dissolved Metals										
aluminum, dissolved	E421	0.0010	mg/L	0.0096	0.007 mg/L	0.023 mg/L	--	--	--	--
antimony, dissolved	E421	0.00010	mg/L	<0.00010	0.009 mg/L	--	--	--	--	--
arsenic, dissolved	E421	0.00010	mg/L	0.00052	0.005 mg/L	--	--	--	--	--



Analyte	Method	LOR	Unit	VA22C5659-005 (Continued)	BCAWWQG FAL-LT	BCAWWQG FAL-ST				
Dissolved Metals - Continued										
barium, dissolved	E421	0.00010	mg/L	0.103	1 mg/L	--	--	--	--	--
beryllium, dissolved	E421	0.000100	mg/L	<0.000100	0.00013 mg/L	--	--	--	--	--
bismuth, dissolved	E421	0.000050	mg/L	<0.000050	--	--	--	--	--	--
boron, dissolved	E421	0.010	mg/L	0.433	1.2 mg/L	--	--	--	--	--
cadmium, dissolved	E421	0.0000050	mg/L	<0.0000050	1.8E-05 mg/L	3E-05 mg/L	--	--	--	--
calcium, dissolved	E421	0.050	mg/L	60.8	<8 mg/L	--	--	--	--	--
cesium, dissolved	E421	0.000010	mg/L	0.000031	--	--	--	--	--	--
chromium, dissolved	E421	0.00050	mg/L	<0.00050	0.001 mg/L	--	--	--	--	--
cobalt, dissolved	E421	0.00010	mg/L	0.00041	0.004 mg/L	0.11 mg/L	--	--	--	--
copper, dissolved	E421	0.00020	mg/L	0.00115	0.0002 mg/L	0.0009 mg/L	--	--	--	--
iron, dissolved	E421	0.010	mg/L	0.157	--	0.35 mg/L	--	--	--	--
lead, dissolved	E421	0.000050	mg/L	<0.000050	0.00344 mg/L	0.003 mg/L	--	--	--	--
lithium, dissolved	E421	0.0010	mg/L	<0.0010	--	--	--	--	--	--
magnesium, dissolved	E421	0.0050	mg/L	12.4	--	--	--	--	--	--
manganese, dissolved	E421	0.00010	mg/L	0.197	0.768 mg/L	0.816 mg/L	--	--	--	--
mercury, dissolved	E509	0.0000050	mg/L	<0.0000050	1E-05 mg/L	--	--	--	--	--
molybdenum, dissolved	E421	0.000050	mg/L	0.000191	5.1 mg/L	46 mg/L	--	--	--	--
nickel, dissolved	E421	0.00050	mg/L	0.00114	0.025 mg/L	--	--	--	--	--
phosphorus, dissolved	E421	0.050	mg/L	<0.050	--	--	--	--	--	--
potassium, dissolved	E421	0.050	mg/L	16.7	373 mg/L	--	--	--	--	--
rubidium, dissolved	E421	0.00020	mg/L	0.0101	--	--	--	--	--	--
selenium, dissolved	E421	0.000050	mg/L	0.000064	0.001 mg/L	--	--	--	--	--
silicon, dissolved	E421	0.050	mg/L	4.24	--	--	--	--	--	--
silver, dissolved	E421	0.000010	mg/L	<0.000010	5E-05 mg/L	0.0001 mg/L	--	--	--	--
sodium, dissolved	E421	0.050	mg/L	25.4	--	--	--	--	--	--
strontium, dissolved	E421	0.00020	mg/L	0.412	--	--	--	--	--	--
sulfur, dissolved	E421	0.50	mg/L	0.69	--	--	--	--	--	--
tellurium, dissolved	E421	0.00020	mg/L	<0.00020	--	--	--	--	--	--
thallium, dissolved	E421	0.000010	mg/L	<0.000010	0.0008 mg/L	--	--	--	--	--
thorium, dissolved	E421	0.00010	mg/L	<0.00010	--	--	--	--	--	--
tin, dissolved	E421	0.00010	mg/L	<0.00010	--	--	--	--	--	--
titanium, dissolved	E421	0.00030	mg/L	<0.00030	2 mg/L	--	--	--	--	--
tungsten, dissolved	E421	0.00010	mg/L	<0.00010	--	--	--	--	--	--
uranium, dissolved	E421	0.000010	mg/L	0.000082	0.0085 mg/L	--	--	--	--	--
vanadium, dissolved	E421	0.00050	mg/L	<0.00050	0.006 mg/L	--	--	--	--	--
zinc, dissolved	E421	0.0010	mg/L	<0.0010	0.0075 mg/L	0.033 mg/L	--	--	--	--



Analyte	Method	LOR	Unit	VA22C5659-005 (Continued)	BCAWWQG FAL-LT	BCAWWQG FAL-ST				
Dissolved Metals - Continued										
zirconium, dissolved	E421	0.00020	mg/L	<0.00020	--	--	--	--	--	--
dissolved mercury filtration location	EP509		-	Field	--	--	--	--	--	--
dissolved metals filtration location	EP421		-	Field	--	--	--	--	--	--
Aggregate Organics										
biochemical oxygen demand [BOD]	E550	2.0	mg/L	2.3	--	--	--	--	--	--
chemical oxygen demand [COD]	E559-L	10	mg/L	42	--	--	--	--	--	--

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

Summary of Guideline Breaches by Sample

SampleID/Client ID	Matrix	Analyte	Analyte Summary	Guideline	Category	Result	Limit
SW-21	Water	ammonia, total (as N)	WQG based on pH=9.0 and T=20 oC	BCAWWQG	FAL-LT	0.574 mg/L	0.102 mg/L
	Water	nitrate (as N)		BCAWWQG	FAL-LT	3.72 mg/L	3 mg/L
	Water	nitrite (as N)	WQG based on a chloride < 2 mg/L	BCAWWQG	FAL-LT	0.0706 mg/L	0.02 mg/L
	Water	aluminum, total	WQG applies to dissolved metal result. WQG for pH<6.5. For pH>6.5 WQG is 0.05 mg/L.	BCAWWQG	FAL-LT	0.183 mg/L	0.007 mg/L
	Water	aluminum, dissolved	WQG for pH<6.5. For pH>6.5 WQG is 0.05 mg/L	BCAWWQG	FAL-LT	0.0096 mg/L	0.007 mg/L
	Water	copper, dissolved	0.2 ug/L is considered to be the lowest concentration routinely measured. Refer to https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/copper/bc_blm_users_manual.pdf for calculation of site specific WQG.	BCAWWQG	FAL-LT	0.00115 mg/L	0.0002 mg/L
	Water	nitrite (as N)	WQG based on chloride <= 2 mg/L	BCAWWQG	FAL-ST	0.0706 mg/L	0.06 mg/L
	Water	aluminum, total	WQG applies to dissolved metal result. WQG based on median pH = 5.0. WQG for pH >=6.5 is 0.1 mg/L	BCAWWQG	FAL-ST	0.183 mg/L	0.023 mg/L
	Water	copper, total	WQG applies to dissolved metal result. WQG based on T = 15, hardness = 30 mg/L, DOC = 3 mg/L and pH = 6.5 using the BC BLM.	BCAWWQG	FAL-ST	0.00164 mg/L	0.0009 mg/L
	Water	copper, dissolved	WQG based on T = 15, hardness = 30 mg/L, DOC = 3 mg/L and pH = 6.5 using the BC BLM.	BCAWWQG	FAL-ST	0.00115 mg/L	0.0009 mg/L



Key:

BCAWWQG	British Columbia Approved and Working Water Quality Guidelines (FEB, 2021)
FAL-LT	Freshwater Aquatic Life - Long-Term Chronic
FAL-ST	Freshwater Aquatic Life - Short-Term Acute



CERTIFICATE OF ANALYSIS

<p>Work Order : VA22C5659</p> <p>Client : Regional District of Kitimat-Stikine</p> <p>Contact : Hannah Shinton</p> <p>Address : # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1</p> <p>Telephone : ----</p> <p>Project : Thornhill Transfer Station Surface Water</p> <p>PO : ----</p> <p>C-O-C number : ----</p> <p>Sampler : HS</p> <p>Site :</p> <p>Quote number : Default Water Testing (Q62338)</p> <p>No. of samples received : 5</p> <p>No. of samples analysed : 5</p>	<p>Page : 1 of 6</p> <p>Laboratory : Vancouver - Environmental</p> <p>Account Manager : Amber Springer</p> <p>Address : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 22-Oct-2022 13:30</p> <p>Date Analysis Commenced : 24-Oct-2022</p> <p>Issue Date : 07-Nov-2022 15:41</p>
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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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Thornton	Analyst	Metals, Burnaby, British Columbia
Ann Joby	Lab Assistant	Metals, Burnaby, British Columbia
Benjamin Oke	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
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).

<i>Unit</i>	<i>Description</i>
-	No Unit
µS/cm	Microsiemens per centimetre
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

<i>Qualifier</i>	<i>Description</i>
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					SW-06	SW-52	SW-01	SW-03	SW-21
Client sampling date / time					21-Oct-2022 12:55	21-Oct-2022 12:00	21-Oct-2022 11:22	21-Oct-2022 12:08	21-Oct-2022 10:50
Analyte	CAS Number	Method	LOR	Unit	VA22C5659-001	VA22C5659-002	VA22C5659-003	VA22C5659-004	VA22C5659-005
					Result	Result	Result	Result	Result
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	52.1	52.1	36.3	686	243
conductivity	----	E100	2.0	µS/cm	118	118	83.9	1480	556
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	50.0	51.5	36.5	424	203
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	52.2	52.0	37.2	437	208
pH	----	E108	0.10	pH units	7.84	7.86	7.67	7.30	8.30
solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	<3.0	116	<3.0
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0100	0.0053	<0.0050	43.6	0.574
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	0.437	0.136
chloride	16887-00-6	E235.Cl	0.50	mg/L	1.14	1.12	<0.50	51.5	19.5
fluoride	16984-48-8	E235.F	0.020	mg/L	0.022	0.021	<0.020	<0.100 ^{DLDS}	0.064
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.145	0.142	0.091	46.6	1.71
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.136	0.134	0.167	<0.0250 ^{DLDS}	3.72
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0050 ^{DLDS}	0.0706
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0014	0.0015	<0.0010	<0.0010	0.0032
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0070	0.0072	0.0036	0.392	0.391
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	1.55	1.54	1.13	<1.50 ^{DLDS}	1.81
Organic / Inorganic Carbon									
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	3.64	3.42	2.50	26.9	13.7
Total Metals									
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.131	0.125	0.0794	0.298	0.183
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	0.00012	<0.00010
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00021	0.00022	<0.00010	0.0149	0.00074
barium, total	7440-39-3	E420	0.00010	mg/L	0.0197	0.0198	0.0279	0.592	0.107
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
boron, total	7440-42-8	E420	0.010	mg/L	0.011	0.011	<0.010	1.16	0.472
cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000152	0.0000084
calcium, total	7440-70-2	E420	0.050	mg/L	19.2	19.1	13.3	132	61.7



Analytical Results

Sub-Matrix: Water					Client sample ID	SW-06	SW-52	SW-01	SW-03	SW-21
(Matrix: Water)					Client sampling date / time	21-Oct-2022 12:55	21-Oct-2022 12:00	21-Oct-2022 11:22	21-Oct-2022 12:08	21-Oct-2022 10:50
Analyte	CAS Number	Method	LOR	Unit	VA22C5659-001	VA22C5659-002	VA22C5659-003	VA22C5659-004	VA22C5659-005	
					Result	Result	Result	Result	Result	
Total Metals										
cesium, total	7440-46-2	E420	0.000010	mg/L	0.000015	0.000013	<0.000010	0.000218	0.000042	
chromium, total	7440-47-3	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	0.00122	<0.00050	
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	0.00203	0.00054	
copper, total	7440-50-8	E420	0.000050	mg/L	0.000095	0.000094	0.00083	0.00104	0.00164	
iron, total	7439-89-6	E420	0.010	mg/L	0.229	0.227	0.079	45.0	0.620	
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	0.000114	0.000085	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	<0.0010	0.0024	<0.0010	
magnesium, total	7439-95-4	E420	0.0050	mg/L	1.03	1.04	0.969	26.0	13.1	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.0195	0.0199	0.00624	2.58	0.241	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000565	0.000584	0.000346	0.000278	0.000193	
nickel, total	7440-02-0	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	0.00348	0.00141	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	0.443	<0.050	
potassium, total	7440-09-7	E420	0.050	mg/L	1.23	1.25	1.09	44.8	17.3	
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00142	0.00142	0.00123	0.0341	0.0107	
selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	0.000091	0.000073	
silicon, total	7440-21-3	E420	0.10	mg/L	3.23	3.19	2.86	11.5	4.73	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, total	7440-23-5	E420	0.050	mg/L	1.62	1.62	1.20	67.1	26.6	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.0580	0.0560	0.0586	0.966	0.435	
sulfur, total	7704-34-9	E420	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	0.79	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
tin, total	7440-31-5	E420	0.00010	mg/L	0.00017	<0.00010	<0.00010	0.00017	<0.00010	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00369	0.00359	0.00264	0.00872	0.00551	
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000077	0.000076	0.000018	0.000029	0.000087	
vanadium, total	7440-62-2	E420	0.000050	mg/L	0.00062	0.00061	<0.00050	0.00209	<0.00050	
zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0.0033	0.0042	0.0038	



Analytical Results

Sub-Matrix: Water					Client sample ID	SW-06	SW-52	SW-01	SW-03	SW-21
(Matrix: Water)					Client sampling date / time	21-Oct-2022 12:55	21-Oct-2022 12:00	21-Oct-2022 11:22	21-Oct-2022 12:08	21-Oct-2022 10:50
Analyte	CAS Number	Method	LOR	Unit	VA22C5659-001	VA22C5659-002	VA22C5659-003	VA22C5659-004	VA22C5659-005	
					Result	Result	Result	Result	Result	
Total Metals										
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	0.00043	<0.00020	
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0301	0.0309	0.0303	0.0178	0.0096	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00014	0.00016	<0.00010	0.0142	0.00052	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0180	0.0185	0.0267	0.547	0.103	
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, dissolved	7440-42-8	E421	0.010	mg/L	0.010	0.010	<0.010	1.09	0.433	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000065	<0.0000050	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	18.4	19.0	13.1	129	60.8	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	0.000183	0.000031	
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	0.00072	<0.00050	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	0.00191	0.00041	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00069	0.00069	0.00060	<0.00020	0.00115	
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.087	0.089	0.021	40.2	0.157	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	0.0022	<0.0010	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	0.999	0.987	0.920	24.7	12.4	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0156	0.0155	0.00326	2.46	0.197	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000532	0.000511	0.000324	0.000250	0.000191	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	0.00298	0.00114	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	0.133	<0.050	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	1.22	1.21	1.06	42.6	16.7	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00128	0.00130	0.00115	0.0326	0.0101	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	0.000134	0.000064	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	2.99	2.98	2.70	10.8	4.24	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, dissolved	7440-23-5	E421	0.050	mg/L	1.63	1.62	1.14	64.7	25.4	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	SW-06	SW-52	SW-01	SW-03	SW-21
Client sampling date / time					21-Oct-2022 12:55	21-Oct-2022 12:00	21-Oct-2022 11:22	21-Oct-2022 12:08	21-Oct-2022 10:50	
Analyte	CAS Number	Method	LOR	Unit	VA22C5659-001	VA22C5659-002	VA22C5659-003	VA22C5659-004	VA22C5659-005	
					Result	Result	Result	Result	Result	
Dissolved Metals										
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0539	0.0550	0.0557	0.875	0.412	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	0.69	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	0.00010	<0.00010	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00059	0.00059	<0.00030	0.00133	<0.00030	
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000066	0.000068	0.000015	0.000027	0.000082	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	0.00126	<0.00050	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0012	0.0011	0.0014	0.0032	<0.0010	
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	0.00029	<0.00020	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field	
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field	
Aggregate Organics										
biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	<2.0	<6.0 ^{DLM}	2.3	
chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	<10	12	103	42	

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

QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : VA22C5659</p> <p>Client : Regional District of Kitimat-Stikine</p> <p>Contact : Hannah Shinton</p> <p>Address : # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1</p> <p>Telephone : ----</p> <p>Project : Thornhill Transfer Station Surface Water</p> <p>PO : ----</p> <p>C-O-C number : ----</p> <p>Sampler : HS</p> <p>Site :</p> <p>Quote number : Default Water Testing (Q62338)</p> <p>No. of samples received : 5</p> <p>No. of samples analysed : 5</p>	<p>Page : 1 of 22</p> <p>Laboratory : Vancouver - Environmental</p> <p>Account Manager : Amber Springer</p> <p>Address : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 22-Oct-2022 13:30</p> <p>Issue Date : 07-Nov-2022 15:41</p>
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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		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] SW-01	E550	21-Oct-2022	----	----	----		24-Oct-2022	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] SW-03	E550	21-Oct-2022	----	----	----		24-Oct-2022	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] SW-06	E550	21-Oct-2022	----	----	----		24-Oct-2022	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] SW-21	E550	21-Oct-2022	----	----	----		24-Oct-2022	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] SW-52	E550	21-Oct-2022	----	----	----		24-Oct-2022	3 days	3 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) SW-01	E559-L	21-Oct-2022	----	----	----		31-Oct-2022	28 days	10 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) SW-03	E559-L	21-Oct-2022	----	----	----		31-Oct-2022	28 days	10 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	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) SW-06	E559-L	21-Oct-2022	----	----	----		31-Oct-2022	28 days	10 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) SW-21	E559-L	21-Oct-2022	----	----	----		31-Oct-2022	28 days	10 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) SW-52	E559-L	21-Oct-2022	----	----	----		31-Oct-2022	28 days	10 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) SW-01	E298	21-Oct-2022	27-Oct-2022	----	----		28-Oct-2022	28 days	7 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) SW-03	E298	21-Oct-2022	27-Oct-2022	----	----		28-Oct-2022	28 days	7 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) SW-06	E298	21-Oct-2022	27-Oct-2022	----	----		28-Oct-2022	28 days	7 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) SW-21	E298	21-Oct-2022	27-Oct-2022	----	----		28-Oct-2022	28 days	7 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) SW-52	E298	21-Oct-2022	27-Oct-2022	----	----		28-Oct-2022	28 days	7 days	✔
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE SW-01	E235.Br-L	21-Oct-2022	24-Oct-2022	----	----		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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE SW-03	E235.Br-L	21-Oct-2022	24-Oct-2022	----	----		25-Oct-2022	28 days	3 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE SW-06	E235.Br-L	21-Oct-2022	24-Oct-2022	----	----		25-Oct-2022	28 days	3 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE SW-21	E235.Br-L	21-Oct-2022	24-Oct-2022	----	----		25-Oct-2022	28 days	3 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE SW-52	E235.Br-L	21-Oct-2022	24-Oct-2022	----	----		25-Oct-2022	28 days	3 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE SW-01	E235.Cl	21-Oct-2022	24-Oct-2022	----	----		25-Oct-2022	28 days	3 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE SW-03	E235.Cl	21-Oct-2022	24-Oct-2022	----	----		25-Oct-2022	28 days	3 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE SW-06	E235.Cl	21-Oct-2022	24-Oct-2022	----	----		25-Oct-2022	28 days	3 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE SW-21	E235.Cl	21-Oct-2022	24-Oct-2022	----	----		25-Oct-2022	28 days	3 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE SW-52	E235.Cl	21-Oct-2022	24-Oct-2022	----	----		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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)											
HDPE SW-01	E378-U	21-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	3 days	3 days	*	EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)											
HDPE SW-03	E378-U	21-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	3 days	3 days	*	EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)											
HDPE SW-06	E378-U	21-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	3 days	3 days	*	EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)											
HDPE SW-21	E378-U	21-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	3 days	3 days	*	EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)											
HDPE SW-52	E378-U	21-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	3 days	3 days	*	EHT
Anions and Nutrients : Fluoride in Water by IC											
HDPE SW-01	E235.F	21-Oct-2022	24-Oct-2022	----	----		25-Oct-2022	28 days	3 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE SW-03	E235.F	21-Oct-2022	24-Oct-2022	----	----		25-Oct-2022	28 days	3 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE SW-06	E235.F	21-Oct-2022	24-Oct-2022	----	----		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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Fluoride in Water by IC											
HDPE SW-21	E235.F	21-Oct-2022	24-Oct-2022	----	----		25-Oct-2022	28 days	3 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE SW-52	E235.F	21-Oct-2022	24-Oct-2022	----	----		25-Oct-2022	28 days	3 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SW-01	E235.NO3-L	21-Oct-2022	24-Oct-2022	3 days	3 days	✓	25-Oct-2022	3 days	0 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SW-03	E235.NO3-L	21-Oct-2022	24-Oct-2022	3 days	3 days	✓	25-Oct-2022	3 days	0 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SW-06	E235.NO3-L	21-Oct-2022	24-Oct-2022	3 days	3 days	✓	25-Oct-2022	3 days	0 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SW-21	E235.NO3-L	21-Oct-2022	24-Oct-2022	3 days	3 days	✓	25-Oct-2022	3 days	0 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SW-52	E235.NO3-L	21-Oct-2022	24-Oct-2022	3 days	3 days	✓	25-Oct-2022	3 days	0 days	✓	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SW-01	E235.NO2-L	21-Oct-2022	24-Oct-2022	----	----		25-Oct-2022	3 days	3 days	* EHT	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SW-03	E235.NO2-L	21-Oct-2022	24-Oct-2022	----	----		25-Oct-2022	3 days	3 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 : Nitrite in Water by IC (Low Level)											
HDPE SW-06	E235.NO2-L	21-Oct-2022	24-Oct-2022	----	----		25-Oct-2022	3 days	3 days	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SW-21	E235.NO2-L	21-Oct-2022	24-Oct-2022	----	----		25-Oct-2022	3 days	3 days	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SW-52	E235.NO2-L	21-Oct-2022	24-Oct-2022	----	----		25-Oct-2022	3 days	3 days	*	EHT
Anions and Nutrients : Sulfate in Water by IC											
HDPE SW-01	E235.SO4	21-Oct-2022	24-Oct-2022	----	----		25-Oct-2022	28 days	3 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SW-03	E235.SO4	21-Oct-2022	24-Oct-2022	----	----		25-Oct-2022	28 days	3 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SW-06	E235.SO4	21-Oct-2022	24-Oct-2022	----	----		25-Oct-2022	28 days	3 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SW-21	E235.SO4	21-Oct-2022	24-Oct-2022	----	----		25-Oct-2022	28 days	3 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SW-52	E235.SO4	21-Oct-2022	24-Oct-2022	----	----		25-Oct-2022	28 days	3 days	✓	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SW-01	E318	21-Oct-2022	27-Oct-2022	----	----		31-Oct-2022	28 days	10 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		
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SW-03	E318	21-Oct-2022	27-Oct-2022	----	----		31-Oct-2022	28 days	10 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SW-06	E318	21-Oct-2022	27-Oct-2022	----	----		31-Oct-2022	28 days	10 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SW-21	E318	21-Oct-2022	27-Oct-2022	----	----		31-Oct-2022	28 days	10 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SW-52	E318	21-Oct-2022	27-Oct-2022	----	----		31-Oct-2022	28 days	10 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)											
Amber glass total (sulfuric acid) SW-01	E372-U	21-Oct-2022	27-Oct-2022	----	----		28-Oct-2022	28 days	7 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)											
Amber glass total (sulfuric acid) SW-03	E372-U	21-Oct-2022	27-Oct-2022	----	----		28-Oct-2022	28 days	7 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)											
Amber glass total (sulfuric acid) SW-06	E372-U	21-Oct-2022	27-Oct-2022	----	----		28-Oct-2022	28 days	7 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)											
Amber glass total (sulfuric acid) SW-21	E372-U	21-Oct-2022	27-Oct-2022	----	----		28-Oct-2022	28 days	7 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)											
Amber glass total (sulfuric acid) SW-52	E372-U	21-Oct-2022	27-Oct-2022	----	----		28-Oct-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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) SW-01	E509	21-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	28 days	5 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) SW-03	E509	21-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	28 days	5 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) SW-06	E509	21-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	28 days	5 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) SW-21	E509	21-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	28 days	5 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) SW-52	E509	21-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	28 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SW-01	E421	21-Oct-2022	31-Oct-2022	----	----		02-Nov-2022	180 days	11 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SW-03	E421	21-Oct-2022	31-Oct-2022	----	----		02-Nov-2022	180 days	11 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SW-06	E421	21-Oct-2022	31-Oct-2022	----	----		02-Nov-2022	180 days	11 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) SW-21	E421	21-Oct-2022	31-Oct-2022	----	----		02-Nov-2022	180 days	11 days	✔	



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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) SW-52	E421	21-Oct-2022	31-Oct-2022	----	----		02-Nov-2022	180 days	11 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) SW-01	E358-L	21-Oct-2022	27-Oct-2022	----	----		28-Oct-2022	28 days	6 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) SW-03	E358-L	21-Oct-2022	27-Oct-2022	----	----		28-Oct-2022	28 days	6 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) SW-06	E358-L	21-Oct-2022	27-Oct-2022	----	----		28-Oct-2022	28 days	6 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) SW-21	E358-L	21-Oct-2022	27-Oct-2022	----	----		28-Oct-2022	28 days	6 days	✔
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) SW-52	E358-L	21-Oct-2022	27-Oct-2022	----	----		28-Oct-2022	28 days	6 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE SW-01	E290	21-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	14 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE SW-03	E290	21-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	14 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE SW-06	E290	21-Oct-2022	24-Oct-2022	----	----		24-Oct-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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Alkalinity Species by Titration											
HDPE SW-21	E290	21-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	14 days	3 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE SW-52	E290	21-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	14 days	3 days	✓	
Physical Tests : Conductivity in Water											
HDPE SW-01	E100	21-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	28 days	3 days	✓	
Physical Tests : Conductivity in Water											
HDPE SW-03	E100	21-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	28 days	3 days	✓	
Physical Tests : Conductivity in Water											
HDPE SW-06	E100	21-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	28 days	3 days	✓	
Physical Tests : Conductivity in Water											
HDPE SW-21	E100	21-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	28 days	3 days	✓	
Physical Tests : Conductivity in Water											
HDPE SW-52	E100	21-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	28 days	3 days	✓	
Physical Tests : pH by Meter											
HDPE SW-01	E108	21-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	0.25 hrs	3.25 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE SW-03	E108	21-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	0.25 hrs	3.25 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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter											
HDPE SW-06	E108	21-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	0.25 hrs	3.25 hrs	*	EHTR-FM
Physical Tests : pH by Meter											
HDPE SW-21	E108	21-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	0.25 hrs	3.25 hrs	*	EHTR-FM
Physical Tests : pH by Meter											
HDPE SW-52	E108	21-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	0.25 hrs	3.25 hrs	*	EHTR-FM
Physical Tests : TSS by Gravimetry											
HDPE SW-01	E160	21-Oct-2022	----	----	----		26-Oct-2022	7 days	5 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE SW-03	E160	21-Oct-2022	----	----	----		26-Oct-2022	7 days	5 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE SW-06	E160	21-Oct-2022	----	----	----		26-Oct-2022	7 days	5 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE SW-21	E160	21-Oct-2022	----	----	----		26-Oct-2022	7 days	5 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE SW-52	E160	21-Oct-2022	----	----	----		26-Oct-2022	7 days	5 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SW-01	E508	21-Oct-2022	27-Oct-2022	----	----		27-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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SW-03	E508	21-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	6 days	✔	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SW-06	E508	21-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	6 days	✔	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SW-21	E508	21-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	6 days	✔	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SW-52	E508	21-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	6 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE total (nitric acid) SW-01	E420	21-Oct-2022	31-Oct-2022	----	----		02-Nov-2022	180 days	12 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE total (nitric acid) SW-03	E420	21-Oct-2022	31-Oct-2022	----	----		02-Nov-2022	180 days	12 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE total (nitric acid) SW-06	E420	21-Oct-2022	31-Oct-2022	----	----		02-Nov-2022	180 days	12 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE total (nitric acid) SW-21	E420	21-Oct-2022	31-Oct-2022	----	----		02-Nov-2022	180 days	12 days	✔	
Total Metals : Total metals in Water by CRC ICPMS											
HDPE total (nitric acid) SW-52	E420	21-Oct-2022	31-Oct-2022	----	----		02-Nov-2022	180 days	12 days	✔	

[Legend & Qualifier Definitions](#)

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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	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	712291	1	5	20.0	5.0	✔
Ammonia by Fluorescence	E298	718196	1	18	5.5	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	711861	1	6	16.6	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	712287	1	5	20.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	723237	1	19	5.2	5.0	✔
Chloride in Water by IC	E235.Cl	712284	1	11	9.0	5.0	✔
Conductivity in Water	E100	712292	1	5	20.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	715343	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	722390	1	19	5.2	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	718197	1	8	12.5	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	712293	1	5	20.0	5.0	✔
Fluoride in Water by IC	E235.F	712286	1	5	20.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	712285	1	7	14.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	712288	1	5	20.0	5.0	✔
pH by Meter	E108	712290	1	8	12.5	5.0	✔
Sulfate in Water by IC	E235.SO4	712289	1	5	20.0	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	718194	1	12	8.3	5.0	✔
Total Mercury in Water by CVAAS	E508	717678	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	714031	1	20	5.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	718195	1	13	7.6	5.0	✔
TSS by Gravimetry	E160	716458	1	19	5.2	5.0	✔
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	712291	1	5	20.0	5.0	✔
Ammonia by Fluorescence	E298	718196	1	18	5.5	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	711861	1	6	16.6	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	712287	1	5	20.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	723237	1	19	5.2	5.0	✔
Chloride in Water by IC	E235.Cl	712284	1	11	9.0	5.0	✔
Conductivity in Water	E100	712292	1	5	20.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	715343	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	722390	1	19	5.2	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	718197	1	8	12.5	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	712293	1	5	20.0	5.0	✔
Fluoride in Water by IC	E235.F	712286	1	5	20.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	712285	1	7	14.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	712288	1	5	20.0	5.0	✔



Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Control Samples (LCS) - Continued							
pH by Meter	E108	712290	1	8	12.5	5.0	✔
Sulfate in Water by IC	E235.SO4	712289	1	5	20.0	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	718194	1	12	8.3	5.0	✔
Total Mercury in Water by CVAAS	E508	717678	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	714031	1	20	5.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	718195	1	13	7.6	5.0	✔
TSS by Gravimetry	E160	716458	1	19	5.2	5.0	✔
Method Blanks (MB)							
Alkalinity Species by Titration	E290	712291	1	5	20.0	5.0	✔
Ammonia by Fluorescence	E298	718196	1	18	5.5	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	711861	1	6	16.6	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	712287	1	5	20.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	723237	1	19	5.2	5.0	✔
Chloride in Water by IC	E235.Cl	712284	1	11	9.0	5.0	✔
Conductivity in Water	E100	712292	1	5	20.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	715343	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	722390	1	19	5.2	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	718197	1	8	12.5	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	712293	1	5	20.0	5.0	✔
Fluoride in Water by IC	E235.F	712286	1	5	20.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	712285	1	7	14.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	712288	1	5	20.0	5.0	✔
Sulfate in Water by IC	E235.SO4	712289	1	5	20.0	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	718194	1	12	8.3	5.0	✔
Total Mercury in Water by CVAAS	E508	717678	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	714031	1	20	5.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	718195	1	13	7.6	5.0	✔
TSS by Gravimetry	E160	716458	1	19	5.2	5.0	✔
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	718196	1	18	5.5	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	712287	1	5	20.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	723237	1	19	5.2	5.0	✔
Chloride in Water by IC	E235.Cl	712284	1	11	9.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	715343	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	722390	1	19	5.2	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	718197	1	8	12.5	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	712293	1	5	20.0	5.0	✔
Fluoride in Water by IC	E235.F	712286	1	5	20.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	712285	1	7	14.2	5.0	✔



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
Matrix Spikes (MS) - Continued							
Nitrite in Water by IC (Low Level)	E235.NO2-L	712288	1	5	20.0	5.0	✔
Sulfate in Water by IC	E235.SO4	712289	1	5	20.0	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	718194	1	12	8.3	5.0	✔
Total Mercury in Water by CVAAS	E508	717678	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	714031	1	20	5.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	718195	1	13	7.6	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.



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).
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 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.
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.
Total metals in Water by CRC ICPMS	E420 Vancouver - Environmental	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 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 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



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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.
Biochemical Oxygen Demand - 5 day	E550 Vancouver - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter. Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
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.
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), 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.

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 Dissolved Organic Carbon for Combustion	EP358 Vancouver - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

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<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO ₃ .
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.

QUALITY CONTROL REPORT

<p>Work Order : VA22C5659</p> <p>Client : Regional District of Kitimat-Stikine</p> <p>Contact : Hannah Shinton</p> <p>Address : # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1</p> <p>Telephone :</p> <p>Project : Thornhill Transfer Station Surface Water</p> <p>PO : ----</p> <p>C-O-C number : ----</p> <p>Sampler : HS</p> <p>Site :</p> <p>Quote number : Default Water Testing (Q62338)</p> <p>No. of samples received : 5</p> <p>No. of samples analysed : 5</p>	<p>Page : 1 of 18</p> <p>Laboratory : Vancouver - Environmental</p> <p>Account Manager : Amber Springer</p> <p>Address : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 22-Oct-2022 13:30</p> <p>Date Analysis Commenced : 24-Oct-2022</p> <p>Issue Date : 07-Nov-2022 15:41</p>
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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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Thornton	Analyst	Vancouver Metals, Burnaby, British Columbia
Ann Joby	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Benjamin Oke	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
Qammar Almas	Lab Assistant	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: 712290)											
VA22C5659-003	SW-01	pH	----	E108	0.10	pH units	7.67	7.66	0.130%	4%	----
Physical Tests (QC Lot: 712291)											
VA22C5659-003	SW-01	alkalinity, total (as CaCO ₃)	----	E290	1.0	mg/L	36.3	36.0	0.812%	20%	----
Physical Tests (QC Lot: 712292)											
VA22C5659-003	SW-01	conductivity	----	E100	2.0	µS/cm	83.9	83.1	0.958%	10%	----
Physical Tests (QC Lot: 716458)											
VA22C5659-001	SW-06	solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 712284)											
VA22C5659-001	SW-06	chloride	16887-00-6	E235.Cl	0.50	mg/L	1.14	1.14	0.004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 712285)											
VA22C5659-001	SW-06	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.136	0.135	0.978%	20%	----
Anions and Nutrients (QC Lot: 712286)											
VA22C5659-001	SW-06	fluoride	16984-48-8	E235.F	0.020	mg/L	0.022	0.021	0.0001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 712287)											
VA22C5659-001	SW-06	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 712288)											
VA22C5659-001	SW-06	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: 712289)											
VA22C5659-001	SW-06	sulfate (as SO ₄)	14808-79-8	E235.SO4	0.30	mg/L	1.55	1.58	0.03	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 712293)											
VA22C5659-001	SW-06	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0014	0.0015	0.00003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 718194)											
VA22C5658-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.322	0.309	0.012	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 718195)											
VA22C5635-021	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 718196)											
VA22C5635-021	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 718197)											
VA22C5640-022	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	0.58	0.66	0.08	Diff <2x LOR	----
Total Metals (QC Lot: 714031)											



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: 714031) - continued											
KS2204025-001	Anonymous	aluminum, total	7429-90-5	E420	0.0100	mg/L	<0.0100	<0.0100	0	Diff <2x LOR	----
		antimony, total	7440-36-0	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00162	0.00164	1.84%	20%	----
		barium, total	7440-39-3	E420	0.0200	mg/L	<0.0200	<0.0200	0	Diff <2x LOR	----
		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	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.000200	mg/L	<0.000200	<0.000200	0	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	0.100	mg/L	0.392	0.386	0.006	Diff <2x LOR	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	0.000097	0.000107	9.31%	20%	----
		chromium, total	7440-47-3	E420	0.00200	mg/L	<0.00200	<0.00200	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	0.00100	mg/L	0.0221	0.0225	1.72%	20%	----
		iron, total	7439-89-6	E420	0.030	mg/L	<0.030	<0.030	0	Diff <2x LOR	----
		lead, total	7439-92-1	E420	0.000500	mg/L	<0.000500	<0.000500	0	Diff <2x LOR	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0507	0.0516	1.93%	20%	----
		magnesium, total	7439-95-4	E420	0.100	mg/L	0.207	0.213	0.0058	Diff <2x LOR	----
		manganese, total	7439-96-5	E420	0.00200	mg/L	<0.00200	<0.00200	0	Diff <2x LOR	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00798	0.00800	0.192%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00089	0.00087	0.00002	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	0.100	mg/L	2.07	2.16	3.97%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00094	0.00094	0.000003	Diff <2x LOR	----
		selenium, total	7782-49-2	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	9.69	10.1	4.50%	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	2.00	mg/L	226	234	3.06%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.0136	0.0140	2.48%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	40.4	42.3	4.58%	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	<0.00030	<0.00030	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: 714031) - continued											
KS2204025-001	Anonymous	tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000100	mg/L	0.00138	0.00138	0.339%	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	0.0500	mg/L	<0.0500	<0.0500	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: 717678)											
KS2204055-001	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 715343)											
VA22C5656-001	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 722390)											
VA22C5656-005	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0048	0.0047	0.0001	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00043	0.00043	0.0000009	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00011	0.00012	0.000008	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.149	0.147	1.38%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	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	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	1.97	2.02	2.74%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000318	0.000317	0.337%	20%	----
		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	0.00018	0.00018	0.000008	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00072	0.00077	0.00004	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	0.0017	0.0018	0.00009	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	120	121	1.31%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00116	0.00120	3.18%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000383	0.000382	0.000001	Diff <2x LOR	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00431	0.00441	0.00010	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	4.96	5.16	3.98%	20%	----		
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.0155	0.0156	0.669%	20%	----		
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000177	0.000173	0.000005	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: 722390) - continued											
VA22C5656-005	Anonymous	silicon, dissolved	7440-21-3	E421	0.050	mg/L	0.164	0.174	0.010	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	0.093	0.093	0.00007	Diff <2x LOR	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.00841	0.00854	1.54%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	0.89	1.25	0.36	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	0.000080	0.000082	0.000001	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	0.00013	0.00014	0.000009	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		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	0.0013	0.0015	0.0002	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 711861)											
VA22C5635-021	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----
Aggregate Organics (QC Lot: 723237)											
VA22C5622-002	Anonymous	chemical oxygen demand [COD]	----	E559-L	10	mg/L	250	271	7.91%	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: 712291)						
alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
Physical Tests (QCLot: 712292)						
conductivity	---	E100	1	µS/cm	<1.0	---
Physical Tests (QCLot: 716458)						
solids, total suspended [TSS]	---	E160	3	mg/L	<3.0	---
Anions and Nutrients (QCLot: 712284)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
Anions and Nutrients (QCLot: 712285)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
Anions and Nutrients (QCLot: 712286)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 712287)						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	---
Anions and Nutrients (QCLot: 712288)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 712289)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
Anions and Nutrients (QCLot: 712293)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 718194)						
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	<0.050	---
Anions and Nutrients (QCLot: 718195)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	---
Anions and Nutrients (QCLot: 718196)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
Organic / Inorganic Carbon (QCLot: 718197)						
carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	<0.50	---
Total Metals (QCLot: 714031)						
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	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 714031) - continued						
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	----
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	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 717678)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 715343)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 722390)						
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	----
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	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 722390) - continued						
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	----
Aggregate Organics (QCLot: 711861)						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----
Aggregate Organics (QCLot: 723237)						
chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	----



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				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 712290)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 712291)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	109	85.0	115	----
Physical Tests (QCLot: 712292)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	98.4	90.0	110	----
Physical Tests (QCLot: 716458)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	92.8	85.0	115	----
Anions and Nutrients (QCLot: 712284)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 712285)									
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: 712286)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	97.9	90.0	110	----
Anions and Nutrients (QCLot: 712287)									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	106	85.0	115	----
Anions and Nutrients (QCLot: 712288)									
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: 712289)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	106	90.0	110	----
Anions and Nutrients (QCLot: 712293)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	97.5	80.0	120	----
Anions and Nutrients (QCLot: 718194)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	110	75.0	125	----
Anions and Nutrients (QCLot: 718195)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	92.4	80.0	120	----
Anions and Nutrients (QCLot: 718196)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	94.6	85.0	115	----
Organic / Inorganic Carbon (QCLot: 718197)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	108	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: 714031)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	106	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	106	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	105	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	99.9	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	83.2	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	101	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	99.2	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	99.8	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	99.6	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	101	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	101	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	103	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	103	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	99.8	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	100	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	108	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	105	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	104	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	113	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	96.0	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	102	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	103	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	95.5	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	105	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	96.9	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	102	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	103	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	100	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 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
Total Metals (QCLot: 714031) - continued									
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	101	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	102	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
Total Metals (QCLot: 717678)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	94.6	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	104	80.0	120	----
Dissolved Metals (QCLot: 722390)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	105	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	102	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	96.4	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	95.6	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	83.8	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	96.8	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	97.7	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	98.6	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	96.0	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	95.4	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	95.5	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	97.4	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	101	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	102	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	98.4	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	101	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	97.0	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	106	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	107	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	100	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	99.7	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	109	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	92.4	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	98.7	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	99.3	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
Dissolved Metals (QCLot: 722390) - continued									
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	99.8	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	94.7	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	102	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	93.6	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	97.3	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	99.6	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	98.2	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	99.3	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	96.2	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	100	80.0	120	----
Aggregate Organics (QCLot: 711861)									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	87.0	85.0	115	----
Aggregate Organics (QCLot: 723237)									
chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	104	85.0	115	----



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: 712284)										
VA22C5659-002	SW-52	chloride	16887-00-6	E235.Cl	105 mg/L	100 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 712285)										
VA22C5659-002	SW-52	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: 712286)										
VA22C5659-002	SW-52	fluoride	16984-48-8	E235.F	1.02 mg/L	1 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 712287)										
VA22C5659-002	SW-52	bromide	24959-67-9	E235.Br-L	0.540 mg/L	0.5 mg/L	108	75.0	125	----
Anions and Nutrients (QCLot: 712288)										
VA22C5659-002	SW-52	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: 712289)										
VA22C5659-002	SW-52	sulfate (as SO4)	14808-79-8	E235.SO4	106 mg/L	100 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 712293)										
VA22C5659-002	SW-52	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0328 mg/L	0.03 mg/L	109	70.0	130	----
Anions and Nutrients (QCLot: 718194)										
VA22C5658-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.66 mg/L	2.5 mg/L	106	70.0	130	----
Anions and Nutrients (QCLot: 718195)										
VA22C5658-001	Anonymous	phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 718196)										
VA22C5640-013	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0882 mg/L	0.1 mg/L	88.2	75.0	125	----
Organic / Inorganic Carbon (QCLot: 718197)										
VA22C5640-023	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	5.32 mg/L	5 mg/L	106	70.0	130	----
Total Metals (QCLot: 714031)										
KS2204028-001	Anonymous	aluminum, total	7429-90-5	E420	0.222 mg/L	0.2 mg/L	111	70.0	130	----
		antimony, total	7440-36-0	E420	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0202 mg/L	0.02 mg/L	101	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	0.0392 mg/L	0.04 mg/L	98.0	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00962 mg/L	0.01 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: 714031) - continued										
KS2204028-001	Anonymous	boron, total	7440-42-8	E420	0.078 mg/L	0.1 mg/L	77.7	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00402 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	0.0103 mg/L	0.01 mg/L	103	70.0	130	----
		chromium, total	7440-47-3	E420	0.0402 mg/L	0.04 mg/L	100	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0199 mg/L	0.02 mg/L	99.4	70.0	130	----
		copper, total	7440-50-8	E420	0.0201 mg/L	0.02 mg/L	101	70.0	130	----
		iron, total	7439-89-6	E420	2.06 mg/L	2 mg/L	103	70.0	130	----
		lead, total	7439-92-1	E420	0.0195 mg/L	0.02 mg/L	97.5	70.0	130	----
		lithium, total	7439-93-2	E420	0.0973 mg/L	0.1 mg/L	97.3	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	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		nickel, total	7440-02-0	E420	0.0400 mg/L	0.04 mg/L	100	70.0	130	----
		phosphorus, total	7723-14-0	E420	9.78 mg/L	10 mg/L	97.8	70.0	130	----
		potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	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	0.0418 mg/L	0.04 mg/L	105	70.0	130	----
		silicon, total	7440-21-3	E420	ND mg/L	10 mg/L	ND	70.0	130	----
		silver, total	7440-22-4	E420	0.00420 mg/L	0.004 mg/L	105	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	20.9 mg/L	20 mg/L	105	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0408 mg/L	0.04 mg/L	102	70.0	130	----
		thallium, total	7440-28-0	E420	0.00386 mg/L	0.004 mg/L	96.4	70.0	130	----
		thorium, total	7440-29-1	E420	0.0205 mg/L	0.02 mg/L	103	70.0	130	----
		tin, total	7440-31-5	E420	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		titanium, total	7440-32-6	E420	0.0421 mg/L	0.04 mg/L	105	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0198 mg/L	0.02 mg/L	98.8	70.0	130	----
		uranium, total	7440-61-1	E420	0.00396 mg/L	0.004 mg/L	98.9	70.0	130	----
		vanadium, total	7440-62-2	E420	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		zinc, total	7440-66-6	E420	0.405 mg/L	0.4 mg/L	101	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0419 mg/L	0.04 mg/L	105	70.0	130	----
Total Metals (QCLot: 717678)										
KS2204056-001	Anonymous	mercury, total	7439-97-6	E508	0.0000888 mg/L	0.0001 mg/L	88.8	70.0	130	----



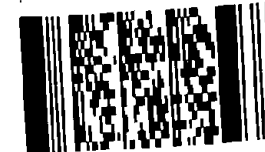
Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 715343)										
VA22C5656-002	Anonymous	mercury, dissolved	7439-97-6	E509	0.000106 mg/L	0.0001 mg/L	106	70.0	130	----
Dissolved Metals (QCLot: 722390)										
VA22C5656-006	Anonymous	aluminum, dissolved	7429-90-5	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0995 mg/L	0.1 mg/L	99.5	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0988 mg/L	0.1 mg/L	98.8	70.0	130	----
		barium, dissolved	7440-39-3	E421	0.1000 mg/L	0.1 mg/L	100.0	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.194 mg/L	0.2 mg/L	97.2	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.0453 mg/L	0.05 mg/L	90.6	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.383 mg/L	0.5 mg/L	76.5	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.0193 mg/L	0.02 mg/L	96.7	70.0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	20 mg/L	ND	70.0	130	----
		cesium, dissolved	7440-46-2	E421	0.0496 mg/L	0.05 mg/L	99.2	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.191 mg/L	0.2 mg/L	95.3	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		copper, dissolved	7440-50-8	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		iron, dissolved	7439-89-6	E421	ND mg/L	10 mg/L	ND	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0969 mg/L	0.1 mg/L	96.9	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.459 mg/L	0.5 mg/L	91.9	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	5 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0993 mg/L	0.1 mg/L	99.3	70.0	130	----
		nickel, dissolved	7440-02-0	E421	ND mg/L	0.2 mg/L	ND	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	48.0 mg/L	50 mg/L	96.1	70.0	130	----
		potassium, dissolved	7440-09-7	E421	18.9 mg/L	20 mg/L	94.5	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.212 mg/L	0.2 mg/L	106	70.0	130	----
		silicon, dissolved	7440-21-3	E421	48.9 mg/L	50 mg/L	97.7	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.0198 mg/L	0.02 mg/L	99.2	70.0	130	----
		sodium, dissolved	7440-23-5	E421	9.77 mg/L	10 mg/L	97.7	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	ND mg/L	100 mg/L	ND	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.192 mg/L	0.2 mg/L	95.9	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.0192 mg/L	0.02 mg/L	95.8	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0963 mg/L	0.1 mg/L	96.3	70.0	130	----



Sub-Matrix: **Water**

					<i>Matrix Spike (MS) Report</i>					
					<i>Spike</i>		<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>Concentration</i>	<i>Target</i>	<i>MS</i>	<i>Low</i>	<i>High</i>	<i>Qualifier</i>
Dissolved Metals (QCLot: 722390) - continued										
VA22C5656-006	Anonymous	titanium, dissolved	7440-32-6	E421	0.200 mg/L	0.2 mg/L	99.9	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0978 mg/L	0.1 mg/L	97.8	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.0193 mg/L	0.02 mg/L	96.4	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.494 mg/L	0.5 mg/L	98.9	70.0	130	----
		zinc, dissolved	7440-66-6	E421	1.95 mg/L	2 mg/L	97.3	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.198 mg/L	0.2 mg/L	99.1	70.0	130	----
Aggregate Organics (QCLot: 723237)										
VA22C5622-001	Anonymous	chemical oxygen demand [COD]	----	E559-L	105 mg/L	100 mg/L	105	75.0	125	----



Report To Contact and company name below will appear on the final report		Report Format / Distribution			Select Service Level Below - Contact your AM to confirm all																	
Company: Regional District of Kitimat-Stikine		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business																	
Contact: Hannah Shinton		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			4 day [P4-20%] <input type="checkbox"/>			EMERGENCY 1 Business day [E1 -														
Phone: 250-615-6100		<input checked="" type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			3 day [P3-25%] <input type="checkbox"/>			Same Day, Weekend (Laboratory opening														
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			2 day [P2-50%] <input type="checkbox"/>																	
Street: 4545 Lazelle Avenue		Email 1 or Fax hshinton@rdks.bc.ca			Date and Time Required for all E&P TATs:																	
City/Province: Terrace/BC		Email 2 enviro.dept@rdks.bc.ca			For tests that can not be performed according to the service level selected, you will																	
Postal Code: V8G4E1		Email 3			Analysis Request																	
Invoice To		Invoice Distribution			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																	
Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			F/P	P					P		P	F/P		P		P	P			
Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Email 1 or Fax anne-maries@rdks.bc.ca																				
Company: Regional District of Kitimat-Stikine		Email 2 hshinton@rdks.bc.ca, enviro.dept@rdks.bc.a																				
Contact: Hannah Shinton																						
Project Information		Oil and Gas Required Fields (client use)																				
ALS Account # / Quote #:		AFE/Cost Center: PO#																				
Job #: Thornhill Transfer Station Surface Water		Major/Minor Code: Routing Code:																				
PO / AFE:		Requisitioner:																				
LSD:		Location:																				
ALS Lab Work Order # (lab use only): 5758		ALS Contact:		Sampler: H.Shinton																		
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type	Dissolved metals	Total metals	alkalinity (as CaCO3)	Total Hardness	Dissolved Hardness	Ammonia	BOD, Chloride, Fluoride, Sulphate	COD	Dissolved Organic Carbon	Nitrate and Nitrite	TSS	total Kjeldahl nitrogen	pH, Conductivity	Total phosphorus	ortho-phosphorus	SAMPLES ON HOLD	Sample in hazardous (please provide further detail)	NUMBER OF CONTAINERS
	SW-06	21-Oct-22	12:55	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		
	SW-52	21-Oct-22	12:00	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		
	SW-01	21-Oct-22	11:22	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		
	SW-03	21-Oct-22	12:08	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		
	SW-21	21-Oct-22	10:50	Effluent	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		
					<div style="border: 1px solid black; padding: 5px; display: inline-block;"> Terrace Shipping # <u>2</u> Coolers Ground <input type="checkbox"/> # <u> </u> Carboys Air <input checked="" type="checkbox"/> SFX <input type="checkbox"/> </div>																	
Drinking Water (DW) Samples¹ (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? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)			Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>																	
Are samples for human consumption/ use? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO					Ice Packs <input type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>																	
					Cooling initiated <input type="checkbox"/>																	
					INITIAL COOLER TEMPERATURES °C						FINAL COOLER TEMPERATURES °C											
					8.0 8.9						3 5											
SHIPMENT RELEASE (client use)				INITIAL SHIPMENT RECEPTION (lab use only)				FINAL SHIPMENT RECEPTION (lab use only)														
Released by: Hannah Shinton		Date: Oct. 21, 2022		Time:		Received by: Chris		Date: 21 Oct 22		Time: 1340		Received by: IC pk (B) JC		Date: 22/10/22		Time: 1330						

CERTIFICATE OF ANALYSIS

<p>Work Order : VA22C5658</p> <p>Client : Regional District of Kitimat-Stikine</p> <p>Contact : Hannah Shinton</p> <p>Address : # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1</p> <p>Telephone : ----</p> <p>Project : Thornhill Groundwater</p> <p>PO : ----</p> <p>C-O-C number : ----</p> <p>Sampler : HS</p> <p>Site :</p> <p>Quote number : Default Water Testing (Q62338)</p> <p>No. of samples received : 6</p> <p>No. of samples analysed : 6</p>	<p>Page : 1 of 5</p> <p>Laboratory : Vancouver - Environmental</p> <p>Account Manager : Amber Springer</p> <p>Address : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 22-Oct-2022 13:30</p> <p>Date Analysis Commenced : 25-Oct-2022</p> <p>Issue Date : 04-Nov-2022 08:56</p>
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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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Thornton	Analyst	Metals, Burnaby, British Columbia
Ann Joby	Lab Assistant	Metals, Burnaby, British Columbia
Benjamin Oke	Lab Assistant	Metals, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, 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).

<i>Unit</i>	<i>Description</i>
-	No Unit
µS/cm	Microsiemens per centimetre
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

<i>Qualifier</i>	<i>Description</i>
DLA	Detection Limit adjusted for required dilution.
RRV	Reported result verified by repeat analysis.



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					BH-96-2	MW22-01	MW21-02	MW21-03	Field Blank
Client sampling date / time					20-Oct-2022 15:00	20-Oct-2022 12:00	20-Oct-2022 14:27	20-Oct-2022 13:50	20-Oct-2022 15:22
Analyte	CAS Number	Method	LOR	Unit	VA22C5658-001	VA22C5658-002	VA22C5658-003	VA22C5658-004	VA22C5658-005
					Result	Result	Result	Result	Result
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	205	214	210	241	----
conductivity	----	E100	2.0	µS/cm	382	391	391	455	<2.0
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	108	150	149	219	<0.60
pH	----	E108	0.10	pH units	8.35	8.36	8.38	7.03	5.33
solids, total dissolved [TDS]	----	E162	10	mg/L	258	278	298	302	----
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.173	0.180	0.185	0.984	0.0074 ^{RRV}
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	<0.50	0.84	<0.50
fluoride	16984-48-8	E235.F	0.020	mg/L	0.144	0.184	0.179	0.105	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.322	0.373	0.438	2.94	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.142	0.110	0.115	0.0464	<0.0050
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0114	0.0175	0.0181	0.0051	<0.0010
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.105	0.251	0.250	0.793	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	1.67	0.95	0.94	<0.30	----
Dissolved Metals									
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0237	0.0376	0.0393	0.0249	0.0056 ^{RRV}
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00020 ^{DLA}	<0.00010
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00576	0.00893	0.00887	0.0103	<0.00010
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0210	0.0250	0.0250	0.0245	0.00087 ^{RRV}
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000100 ^{DLA}	<0.000050
boron, dissolved	7440-42-8	E421	0.010	mg/L	0.108	0.108	0.110	<0.020 ^{DLA}	<0.010
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000212	0.0000075	0.0000117	<0.0000100 ^{DLA}	<0.0000050
calcium, dissolved	7440-70-2	E421	0.050	mg/L	15.7	20.4	20.1	60.9	<0.050
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000020 ^{DLA}	<0.000010
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	0.00375	<0.00010
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00022	<0.00020	<0.00020	<0.00040 ^{DLA}	<0.00020



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	BH-96-2	MW22-01	MW21-02	MW21-03	Field Blank
Client sampling date / time					20-Oct-2022 15:00	20-Oct-2022 12:00	20-Oct-2022 14:27	20-Oct-2022 13:50	20-Oct-2022 15:22	
Analyte	CAS Number	Method	LOR	Unit	VA22C5658-001	VA22C5658-002	VA22C5658-003	VA22C5658-004	VA22C5658-005	
					Result	Result	Result	Result	Result	
Dissolved Metals										
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.022	0.044	0.045	13.4	<0.010	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000100 ^{DLA}	<0.000050	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0018	0.0018	0.0018	<0.0020 ^{DLA}	<0.0010	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	16.6	24.2	24.0	16.3	<0.0050	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0456	0.0780	0.0777	6.88	<0.00010	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00350	0.00423	0.00421	0.000410	<0.000050	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	0.00054	<0.00050	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.100 ^{DLA}	<0.050	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	11.4	11.1	10.6	1.61	<0.050	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00042	0.00049	0.00048	0.00103	<0.00020	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000081	<0.000050	<0.000050	<0.000100 ^{DLA}	<0.000050	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.40	4.48	4.59	8.61	<0.050	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000020 ^{DLA}	<0.000010	
sodium, dissolved	7440-23-5	E421	0.050	mg/L	37.4	24.4	24.1	3.93	<0.050	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.204	0.255	0.260	0.258	<0.00020	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	0.62	<0.50	<0.50	<1.00 ^{DLA}	<0.50	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00040 ^{DLA}	<0.00020	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000020 ^{DLA}	<0.000010	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00020 ^{DLA}	<0.00010	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00020 ^{DLA}	<0.00010	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00036	0.00061	0.00059	0.00096	<0.00030	
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00020 ^{DLA}	<0.00010	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.00162	0.00152	0.00157	<0.000020 ^{DLA}	<0.000010	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	0.00110	<0.00050	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0020 ^{DLA}	<0.0010	
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00040 ^{DLA}	<0.00020	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field	
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field	

Aggregate Organics



Analytical Results

Sub-Matrix: Water					Client sample ID	BH-96-2	MW22-01	MW21-02	MW21-03	Field Blank
(Matrix: Water)										
					Client sampling date / time	20-Oct-2022 15:00	20-Oct-2022 12:00	20-Oct-2022 14:27	20-Oct-2022 13:50	20-Oct-2022 15:22
Analyte	CAS Number	Method	LOR	Unit	VA22C5658-001	VA22C5658-002	VA22C5658-003	VA22C5658-004	VA22C5658-005	
					Result	Result	Result	Result	Result	
Aggregate Organics										
chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	17	19	92	----	

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

Analytical Results

Sub-Matrix: Water					Client sample ID	Travel Blank	----	----	----	----
(Matrix: Water)										
					Client sampling date / time	20-Oct-2022	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22C5658-006	-----	-----	-----	-----	
					Result	----	----	----	----	
Physical Tests										
conductivity	----	E100	2.0	µS/cm	<2.0	----	----	----	----	
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0072 ^{RRV}	----	----	----	----	
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	----	----	----	----	
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	----	----	----	----	

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

QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : VA22C5658</p> <p>Client : Regional District of Kitimat-Stikine</p> <p>Contact : Hannah Shinton</p> <p>Address : # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1</p> <p>Telephone : ----</p> <p>Project : Thornhill Groundwater</p> <p>PO : ----</p> <p>C-O-C number : ----</p> <p>Sampler : HS</p> <p>Site :</p> <p>Quote number : Default Water Testing (Q62338)</p> <p>No. of samples received : 6</p> <p>No. of samples analysed : 6</p>	<p>Page : 1 of 16</p> <p>Laboratory : Vancouver - Environmental</p> <p>Account Manager : Amber Springer</p> <p>Address : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 22-Oct-2022 13:30</p> <p>Issue Date : 04-Nov-2022 08:56</p>
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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		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) BH-96-2	E559-L	20-Oct-2022	----	----	----		31-Oct-2022	28 days	11 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) MW21-02	E559-L	20-Oct-2022	----	----	----		31-Oct-2022	28 days	11 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) MW21-03	E559-L	20-Oct-2022	----	----	----		31-Oct-2022	28 days	11 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) MW22-01	E559-L	20-Oct-2022	----	----	----		31-Oct-2022	28 days	11 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) BH-96-2	E298	20-Oct-2022	27-Oct-2022	----	----		28-Oct-2022	28 days	8 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Field Blank	E298	20-Oct-2022	27-Oct-2022	----	----		28-Oct-2022	28 days	8 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MW21-02	E298	20-Oct-2022	27-Oct-2022	----	----		28-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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) MW21-03	E298	20-Oct-2022	27-Oct-2022	----	----		28-Oct-2022	28 days	8 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) MW22-01	E298	20-Oct-2022	27-Oct-2022	----	----		28-Oct-2022	28 days	8 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Travel Blank	E298	20-Oct-2022	27-Oct-2022	----	----		28-Oct-2022	28 days	8 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE BH-96-2	E235.Br-L	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	7 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE MW21-02	E235.Br-L	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	7 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE MW21-03	E235.Br-L	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	7 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE MW22-01	E235.Br-L	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	7 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE BH-96-2	E235.Cl	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	7 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE Field Blank	E235.Cl	20-Oct-2022	27-Oct-2022	----	----		27-Oct-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		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Chloride in Water by IC										
HDPE MW21-02	E235.Cl	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	7 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MW21-03	E235.Cl	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	7 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MW22-01	E235.Cl	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	7 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Travel Blank	E235.Cl	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	7 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE BH-96-2	E235.F	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	7 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE MW21-02	E235.F	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	7 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE MW21-03	E235.F	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	7 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE MW22-01	E235.F	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	7 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE BH-96-2	E235.NO3-L	20-Oct-2022	27-Oct-2022	3 days	7 days	* EHT	27-Oct-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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE Field Blank	E235.NO3-L	20-Oct-2022	27-Oct-2022	3 days	7 days	* EHT	27-Oct-2022	3 days	0 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE MW21-02	E235.NO3-L	20-Oct-2022	27-Oct-2022	3 days	7 days	* EHT	27-Oct-2022	3 days	0 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE MW21-03	E235.NO3-L	20-Oct-2022	27-Oct-2022	3 days	7 days	* EHT	27-Oct-2022	3 days	0 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE MW22-01	E235.NO3-L	20-Oct-2022	27-Oct-2022	3 days	7 days	* EHT	27-Oct-2022	3 days	0 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE Travel Blank	E235.NO3-L	20-Oct-2022	27-Oct-2022	3 days	7 days	* EHT	27-Oct-2022	3 days	0 days	✓	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE BH-96-2	E235.NO2-L	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	3 days	7 days	* EHT	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE Field Blank	E235.NO2-L	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	3 days	7 days	* EHT	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW21-02	E235.NO2-L	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	3 days	7 days	* EHT	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW21-03	E235.NO2-L	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	3 days	7 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 : Nitrite in Water by IC (Low Level)											
HDPE MW22-01	E235.NO2-L	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	3 days	7 days	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE Travel Blank	E235.NO2-L	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	3 days	7 days	*	EHT
Anions and Nutrients : Sulfate in Water by IC											
HDPE BH-96-2	E235.SO4	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	7 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE MW21-02	E235.SO4	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	7 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE MW21-03	E235.SO4	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	7 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE MW22-01	E235.SO4	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	7 days	✓	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) BH-96-2	E318	20-Oct-2022	27-Oct-2022	----	----		31-Oct-2022	28 days	11 days	✓	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) MW21-02	E318	20-Oct-2022	27-Oct-2022	----	----		31-Oct-2022	28 days	11 days	✓	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) MW21-03	E318	20-Oct-2022	27-Oct-2022	----	----		31-Oct-2022	28 days	11 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	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) MW22-01	E318	20-Oct-2022	27-Oct-2022	----	----		31-Oct-2022	28 days	11 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) BH-96-2	E372-U	20-Oct-2022	27-Oct-2022	----	----		28-Oct-2022	28 days	8 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MW21-02	E372-U	20-Oct-2022	27-Oct-2022	----	----		28-Oct-2022	28 days	8 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MW21-03	E372-U	20-Oct-2022	27-Oct-2022	----	----		28-Oct-2022	28 days	8 days	✔
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MW22-01	E372-U	20-Oct-2022	27-Oct-2022	----	----		28-Oct-2022	28 days	8 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) BH-96-2	E509	20-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	28 days	6 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) Field Blank	E509	20-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	28 days	6 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) MW21-02	E509	20-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	28 days	6 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) MW21-03	E509	20-Oct-2022	26-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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) MW22-01	E509	20-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	28 days	6 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) BH-96-2	E421	20-Oct-2022	31-Oct-2022	----	----		02-Nov-2022	180 days	12 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) Field Blank	E421	20-Oct-2022	31-Oct-2022	----	----		02-Nov-2022	180 days	12 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) MW21-02	E421	20-Oct-2022	31-Oct-2022	----	----		02-Nov-2022	180 days	12 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) MW21-03	E421	20-Oct-2022	31-Oct-2022	----	----		02-Nov-2022	180 days	12 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) MW22-01	E421	20-Oct-2022	31-Oct-2022	----	----		02-Nov-2022	180 days	12 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE BH-96-2	E290	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	14 days	7 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE MW21-02	E290	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	14 days	7 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE MW21-03	E290	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	14 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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Alkalinity Species by Titration											
HDPE MW22-01	E290	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	14 days	7 days	✓	
Physical Tests : Conductivity in Water											
HDPE BH-96-2	E100	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	7 days	✓	
Physical Tests : Conductivity in Water											
HDPE Field Blank	E100	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	7 days	✓	
Physical Tests : Conductivity in Water											
HDPE MW21-02	E100	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	7 days	✓	
Physical Tests : Conductivity in Water											
HDPE MW21-03	E100	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	7 days	✓	
Physical Tests : Conductivity in Water											
HDPE MW22-01	E100	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	7 days	✓	
Physical Tests : Conductivity in Water											
HDPE Travel Blank	E100	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	28 days	7 days	✓	
Physical Tests : pH by Meter											
HDPE BH-96-2	E108	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	0.25 hrs	3.25 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE Field Blank	E108	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	0.25 hrs	3.25 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		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter											
HDPE MW21-02	E108	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	0.25 hrs	3.25 hrs	*	EHTR-FM
Physical Tests : pH by Meter											
HDPE MW21-03	E108	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	0.25 hrs	3.25 hrs	*	EHTR-FM
Physical Tests : pH by Meter											
HDPE MW22-01	E108	20-Oct-2022	27-Oct-2022	----	----		27-Oct-2022	0.25 hrs	3.25 hrs	*	EHTR-FM
Physical Tests : TDS by Gravimetry											
HDPE BH-96-2	E162	20-Oct-2022	----	----	----		25-Oct-2022	7 days	5 days	✓	
Physical Tests : TDS by Gravimetry											
HDPE MW21-02	E162	20-Oct-2022	----	----	----		25-Oct-2022	7 days	5 days	✓	
Physical Tests : TDS by Gravimetry											
HDPE MW21-03	E162	20-Oct-2022	----	----	----		25-Oct-2022	7 days	5 days	✓	
Physical Tests : TDS by Gravimetry											
HDPE MW22-01	E162	20-Oct-2022	----	----	----		25-Oct-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	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	716947	1	8	12.5	5.0	✓
Ammonia by Fluorescence	E298	718196	1	18	5.5	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	716938	1	10	10.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	723237	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	716937	1	14	7.1	5.0	✓
Conductivity in Water	E100	716948	1	16	6.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	715343	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	722390	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	716941	1	10	10.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	716942	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	716939	1	12	8.3	5.0	✓
pH by Meter	E108	716946	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	716936	1	12	8.3	5.0	✓
TDS by Gravimetry	E162	714348	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	718194	1	12	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	718195	1	13	7.6	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	716947	1	8	12.5	5.0	✓
Ammonia by Fluorescence	E298	718196	1	18	5.5	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	716938	1	10	10.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	723237	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	716937	1	14	7.1	5.0	✓
Conductivity in Water	E100	716948	1	16	6.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	715343	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	722390	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	716941	1	10	10.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	716942	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	716939	1	12	8.3	5.0	✓
pH by Meter	E108	716946	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	716936	1	12	8.3	5.0	✓
TDS by Gravimetry	E162	714348	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	718194	1	12	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	718195	1	13	7.6	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	716947	1	8	12.5	5.0	✓



Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Method Blanks (MB) - Continued							
Ammonia by Fluorescence	E298	718196	1	18	5.5	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	716938	1	10	10.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	723237	1	19	5.2	5.0	✔
Chloride in Water by IC	E235.Cl	716937	1	14	7.1	5.0	✔
Conductivity in Water	E100	716948	1	16	6.2	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	715343	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	722390	1	19	5.2	5.0	✔
Fluoride in Water by IC	E235.F	716941	1	10	10.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	716942	1	16	6.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	716939	1	12	8.3	5.0	✔
Sulfate in Water by IC	E235.SO4	716936	1	12	8.3	5.0	✔
TDS by Gravimetry	E162	714348	1	14	7.1	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	718194	1	12	8.3	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	718195	1	13	7.6	5.0	✔
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	718196	1	18	5.5	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	716938	1	10	10.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	723237	1	19	5.2	5.0	✔
Chloride in Water by IC	E235.Cl	716937	1	14	7.1	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	715343	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	722390	1	19	5.2	5.0	✔
Fluoride in Water by IC	E235.F	716941	1	10	10.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	716942	1	16	6.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	716939	1	12	8.3	5.0	✔
Sulfate in Water by IC	E235.SO4	716936	1	12	8.3	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	718194	1	12	8.3	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	718195	1	13	7.6	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.
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.
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
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).
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.
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.
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
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 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.
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

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Work Order : VA22C5658
Client : Regional District of Kitimat-Stikine
Project : Thornhill Groundwater



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO ₃ .
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.

QUALITY CONTROL REPORT

<p>Work Order : VA22C5658</p> <p>Client : Regional District of Kitimat-Stikine</p> <p>Contact : Hannah Shinton</p> <p>Address : # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1</p> <p>Telephone :</p> <p>Project : Thornhill Groundwater</p> <p>PO : ----</p> <p>C-O-C number : ----</p> <p>Sampler : HS</p> <p>Site :</p> <p>Quote number : Default Water Testing (Q62338)</p> <p>No. of samples received : 6</p> <p>No. of samples analysed : 6</p>	<p>Page : 1 of 14</p> <p>Laboratory : Vancouver - Environmental</p> <p>Account Manager : Amber Springer</p> <p>Address : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 22-Oct-2022 13:30</p> <p>Date Analysis Commenced : 25-Oct-2022</p> <p>Issue Date : 04-Nov-2022 08:56</p>
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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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Thornton	Analyst	Vancouver Metals, Burnaby, British Columbia
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Benjamin Oke	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
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Client : Regional District of Kitimat-Stikine
Project : Thornhill Groundwater



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: 714348)											
VA22C5633-003	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	280	272	2.90%	20%	----
Physical Tests (QC Lot: 716946)											
VA22C5658-001	BH-96-2	pH	----	E108	0.10	pH units	8.35	8.38	0.359%	4%	----
Physical Tests (QC Lot: 716947)											
VA22C5658-001	BH-96-2	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	205	199	2.82%	20%	----
Physical Tests (QC Lot: 716948)											
VA22C5658-001	BH-96-2	conductivity	----	E100	2.0	µS/cm	382	378	1.05%	10%	----
Anions and Nutrients (QC Lot: 716936)											
VA22C5622-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	21.4	21.4	0.0886%	20%	----
Anions and Nutrients (QC Lot: 716937)											
VA22C5622-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 716938)											
VA22C5622-001	Anonymous	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 716939)											
VA22C5622-001	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: 716941)											
VA22C5622-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.047	0.050	0.002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 716942)											
VA22C5661-001	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: 718194)											
VA22C5658-001	BH-96-2	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.322	0.309	0.012	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 718195)											
VA22C5635-021	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 718196)											
VA22C5635-021	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 715343)											
VA22C5656-001	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 722390)											
VA22C5656-005	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0048	0.0047	0.0001	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00043	0.00043	0.0000009	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: 722390) - continued											
VA22C5656-005	Anonymous	arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00011	0.00012	0.000008	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.149	0.147	1.38%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	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	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	1.97	2.02	2.74%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000318	0.000317	0.337%	20%	----
		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	0.00018	0.00018	0.000008	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00072	0.00077	0.00004	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	0.0017	0.0018	0.00009	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	120	121	1.31%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00116	0.00120	3.18%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000383	0.000382	0.000001	Diff <2x LOR	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00431	0.00441	0.00010	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	4.96	5.16	3.98%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.0155	0.0156	0.669%	20%	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000177	0.000173	0.000005	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	0.164	0.174	0.010	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	0.093	0.093	0.00007	Diff <2x LOR	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.00841	0.00854	1.54%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	0.89	1.25	0.36	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	0.000080	0.000082	0.000001	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	0.00013	0.00014	0.000009	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----

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Sub-Matrix: Water					<i>Laboratory Duplicate (DUP) Report</i>						
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD(%) or Difference</i>	<i>Duplicate Limits</i>	<i>Qualifier</i>
Dissolved Metals (QC Lot: 722390) - continued											
VA22C5656-005	Anonymous	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	0.0013	0.0015	0.0002	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 723237)											
VA22C5622-002	Anonymous	chemical oxygen demand [COD]	----	E559-L	10	mg/L	250	271	7.91%	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: 714348)						
solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
Physical Tests (QCLot: 716947)						
alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
Physical Tests (QCLot: 716948)						
conductivity	---	E100	1	µS/cm	1.2	---
Anions and Nutrients (QCLot: 716936)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
Anions and Nutrients (QCLot: 716937)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
Anions and Nutrients (QCLot: 716938)						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	---
Anions and Nutrients (QCLot: 716939)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 716941)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 716942)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
Anions and Nutrients (QCLot: 718194)						
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	<0.050	---
Anions and Nutrients (QCLot: 718195)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	---
Anions and Nutrients (QCLot: 718196)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
Dissolved Metals (QCLot: 715343)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	---
Dissolved Metals (QCLot: 722390)						
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	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 722390) - continued						
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	----
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	----
Aggregate Organics (QCLot: 723237)						
chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	----

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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				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 714348)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	98.4	85.0	115	----
Physical Tests (QCLot: 716946)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 716947)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	98.1	85.0	115	----
Physical Tests (QCLot: 716948)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	98.0	90.0	110	----
Anions and Nutrients (QCLot: 716936)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 716937)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 716938)									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	98.0	85.0	115	----
Anions and Nutrients (QCLot: 716939)									
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: 716941)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	99.9	90.0	110	----
Anions and Nutrients (QCLot: 716942)									
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: 718194)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	110	75.0	125	----
Anions and Nutrients (QCLot: 718195)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	92.4	80.0	120	----
Anions and Nutrients (QCLot: 718196)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	94.6	85.0	115	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	104	80.0	120	----
Dissolved Metals (QCLot: 722390)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	105	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	102	80.0	120	----



Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Dissolved Metals (QCLot: 722390) - continued									
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	96.4	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	95.6	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	83.8	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	96.8	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	97.7	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	98.6	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	96.0	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	95.4	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	95.5	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	97.4	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	101	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	102	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	98.4	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	101	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	97.0	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	106	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	107	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	100	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	99.7	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	109	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	92.4	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	98.7	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	99.3	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	99.8	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	94.7	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	102	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	93.6	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	97.3	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	99.6	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	98.2	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	99.3	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	96.2	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	100	80.0	120	----



Sub-Matrix: **Water**

					<i>Laboratory Control Sample (LCS) Report</i>				
					<i>Spike</i>	<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		
<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Concentration</i>	<i>LCS</i>	<i>Low</i>	<i>High</i>	<i>Qualifier</i>
Aggregate Organics (QCLot: 723237)									
chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	104	85.0	115	----



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: 716936)										
VA22C5622-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	2090 mg/L	2000 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 716937)										
VA22C5622-002	Anonymous	chloride	16887-00-6	E235.Cl	2090 mg/L	2000 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 716938)										
VA22C5622-002	Anonymous	bromide	24959-67-9	E235.Br-L	9.98 mg/L	10 mg/L	99.8	75.0	125	----
Anions and Nutrients (QCLot: 716939)										
VA22C5622-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	9.99 mg/L	10 mg/L	99.9	75.0	125	----
Anions and Nutrients (QCLot: 716941)										
VA22C5622-002	Anonymous	fluoride	16984-48-8	E235.F	20.5 mg/L	20 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 716942)										
VA22C5661-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.64 mg/L	2.5 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 718194)										
VA22C5658-002	MW22-01	Kjeldahl nitrogen, total [TKN]	----	E318	2.66 mg/L	2.5 mg/L	106	70.0	130	----
Anions and Nutrients (QCLot: 718195)										
VA22C5658-001	BH-96-2	phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 718196)										
VA22C5640-013	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0882 mg/L	0.1 mg/L	88.2	75.0	125	----
Dissolved Metals (QCLot: 715343)										
VA22C5656-002	Anonymous	mercury, dissolved	7439-97-6	E509	0.000106 mg/L	0.0001 mg/L	106	70.0	130	----
Dissolved Metals (QCLot: 722390)										
VA22C5656-006	Anonymous	aluminum, dissolved	7429-90-5	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0995 mg/L	0.1 mg/L	99.5	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0988 mg/L	0.1 mg/L	98.8	70.0	130	----
		barium, dissolved	7440-39-3	E421	0.1000 mg/L	0.1 mg/L	100.0	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.194 mg/L	0.2 mg/L	97.2	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.0453 mg/L	0.05 mg/L	90.6	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.383 mg/L	0.5 mg/L	76.5	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.0193 mg/L	0.02 mg/L	96.7	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	
Dissolved Metals (QCLot: 722390) - continued										
VA22C5656-006	Anonymous	calcium, dissolved	7440-70-2	E421	ND mg/L	20 mg/L	ND	70.0	130	----
		cesium, dissolved	7440-46-2	E421	0.0496 mg/L	0.05 mg/L	99.2	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.191 mg/L	0.2 mg/L	95.3	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		copper, dissolved	7440-50-8	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		iron, dissolved	7439-89-6	E421	ND mg/L	10 mg/L	ND	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0969 mg/L	0.1 mg/L	96.9	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.459 mg/L	0.5 mg/L	91.9	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	5 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0993 mg/L	0.1 mg/L	99.3	70.0	130	----
		nickel, dissolved	7440-02-0	E421	ND mg/L	0.2 mg/L	ND	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	48.0 mg/L	50 mg/L	96.1	70.0	130	----
		potassium, dissolved	7440-09-7	E421	18.9 mg/L	20 mg/L	94.5	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.212 mg/L	0.2 mg/L	106	70.0	130	----
		silicon, dissolved	7440-21-3	E421	48.9 mg/L	50 mg/L	97.7	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.0198 mg/L	0.02 mg/L	99.2	70.0	130	----
		sodium, dissolved	7440-23-5	E421	9.77 mg/L	10 mg/L	97.7	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	ND mg/L	100 mg/L	ND	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.192 mg/L	0.2 mg/L	95.9	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.0192 mg/L	0.02 mg/L	95.8	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0963 mg/L	0.1 mg/L	96.3	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.200 mg/L	0.2 mg/L	99.9	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0978 mg/L	0.1 mg/L	97.8	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.0193 mg/L	0.02 mg/L	96.4	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.494 mg/L	0.5 mg/L	98.9	70.0	130	----
		zinc, dissolved	7440-66-6	E421	1.95 mg/L	2 mg/L	97.3	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.198 mg/L	0.2 mg/L	99.1	70.0	130	----
Aggregate Organics (QCLot: 723237)										
VA22C5622-001	Anonymous	chemical oxygen demand [COD]	----	E559-L	105 mg/L	100 mg/L	105	75.0	125	----





Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 -

Page

Environmental Division
Vancouver
Work Order Reference
VA22C5658



Telephone : + 1 604 253 4188

Report To Contact and company name below will appear on the final report		Report Format / Distribution			Select Service Level Below - Contact your AM to confirm															
Company:	Regional District of Kitimat-Stikine	Select Report Format: <input type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - busin															
Contact:	Hannah Shinton	Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			4 day [P4-20%] <input type="checkbox"/>			EMERGENCY			1 Business day [E]									
Phone:	250-615-6100	<input checked="" type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			3 day [P3-25%] <input type="checkbox"/>						Same Day, Week (Laboratory open)									
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			2 day [P2-50%] <input type="checkbox"/>															
Street:	4545 Lazelle Avenue	Email 1 or Fax hshinton@rdks.bc.ca			Date and Time Required for all E&P TATs:															
City/Province:	Terrace/BC	Email 2 enviro.dept@rdks.bc.ca			For tests that can not be performed according to the service level selected, you															
Postal Code:	V8G4E1	Email 3			Analysis Request															
Invoice To		Invoice Distribution			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below															
Same as Report To <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			F/P															
Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Email 1 or Fax anne-maries@rdks.bc.ca																		
Company: Regional District of Kitimat-Stikine		Email 2 hshinton@rdks.bc.ca, enviro.dept@rdks.bc.ca																		
Contact: Nicole Lavoie		Oil and Gas Required Fields (client use)																		
Project Information		Oil and Gas Required Fields (client use)																		
ALS Account # / Quote #: VA19-RDKS100-001		AFE/Cost Center:		PO#																
Job #: Thornhill Groundwater		Major/Minor Code:		Routing Code:																
PO / AFE:		Requisitioner:																		
LSD:		Location:																		
ALS Lab Work Order # (lab use only): 5658		ALS Contact:		Sampler: H. Shinton																
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mm-yy)	Time (h:mm)	Sample Type	Dissolved metals	Conductivity	dissolved hardness (as CaCO3)	Ammonia	Chloride	Fluoride, Sulphate	Nitrate & Nitrite	Total Kjeldahl Nitrogen	Total phosphorus	COD	Total Dissolved Solids	Alkalinity	pH	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
	BH-96-2	20-Oct-22	15:00	Water	R	R	R	R	R	R	R	R	R	R	R	R	R			
	MW22-01	20-Oct-22	12:00	Water	R	R	R	R	R	R	R	R	R	R	R	R	R			
	MW21-02	20-Oct-22	14:27	Water	R	R	R	R	R	R	R	R	R	R	R	R	R			
	MW21-03	20-Oct-22	13:50	Water	R	R	R	R	R	R	R	R	R	R	R	R	R			
	Field Blank	20-Oct-22	15:22	Water	R	R		R	R		R						R			
	Travel Blank	20-Oct-22	-	Water		R		R	R		R									
Drinking Water (DW) Samples¹ (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? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)			Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>															
Are samples for human consumption/ use? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO					Ice Packs <input type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>															
					Cooling Initiated <input type="checkbox"/>															
					INITIAL COOLER TEMPERATURES °C						FINAL COOLER TEMPERATURES °C									
					4.2 4.6						4 6									
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)															
Released by: Hannah Shinton	Date: Oct 20, 2022	Time:	Received by: Chris	Date: 21 Oct 22	Time: 1010	Received by: AJ JC	Date: 22/10/22	Time: 1330												

Terrace Shipping
12 Coolers Ground
Carbouys Air
SFX

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2017 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 E: Data Summary Tables



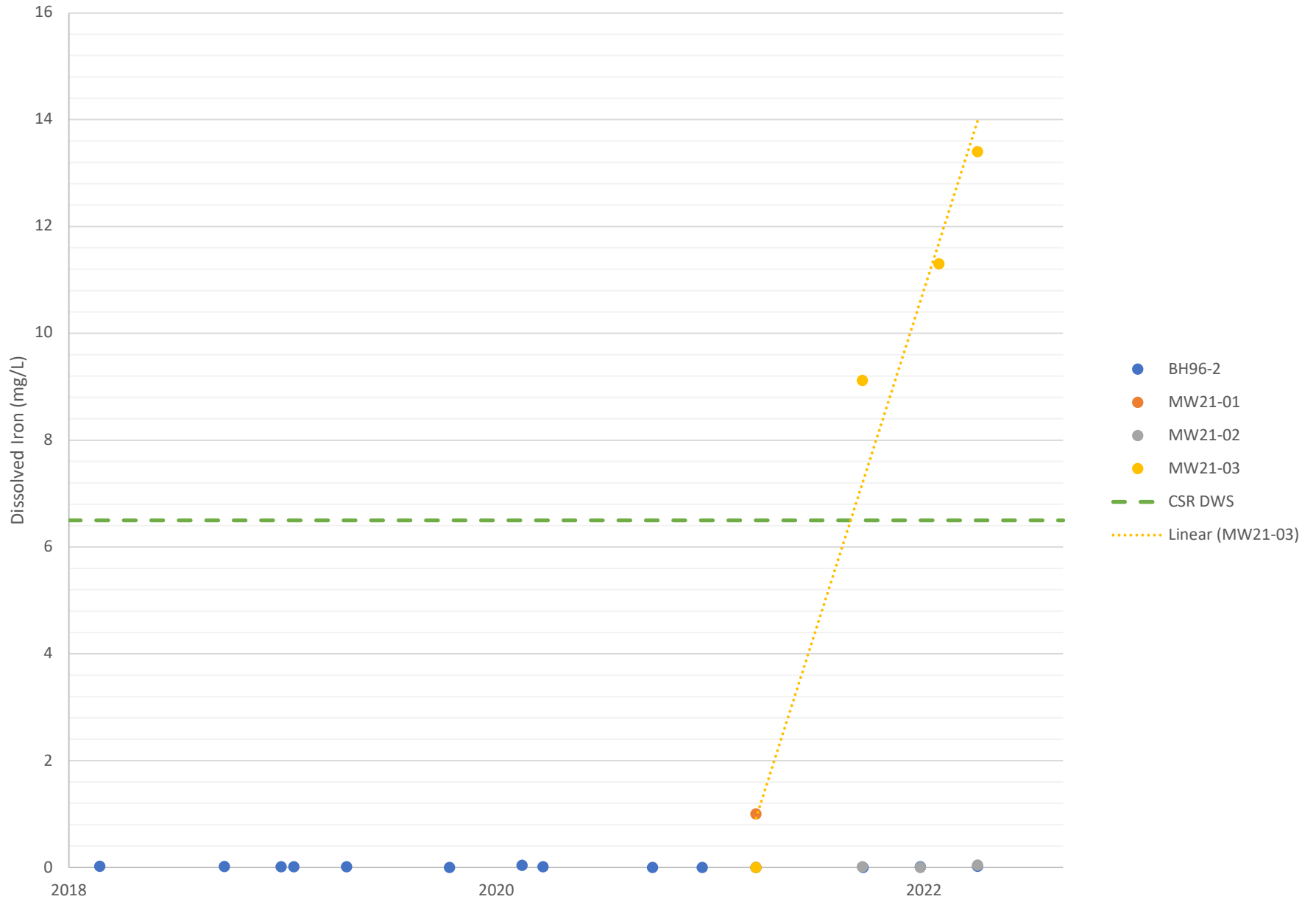
Surface Water Quality Results Summary

Parameter	Lowest Detection Limit	Units	BC WQG-AW-F		SW-01	SW-01	SW-01	SW-03	SW-03	SW-03	SW-06	SW-06	SW-06	SW-21	SW-21	SW-21
			Long-term	Short-term	4/6/2022	7/26/2022	10/21/2022	4/6/2022	7/26/2022	10/21/2022	4/6/2022	7/26/2022	10/21/2022	4/6/2022	7/26/2022	10/21/2022
					12:18	11:30	11:22	13:11	9:11	12:08	15:15	13:00	12:55	9:57	10:30	10:50
Physical Tests (Water)																
Alkalinity, total (as CaCO3)	2	µS/cm	-	-	30.7	33.7	36.3	810	859	686	42.7	58.8	52.1	314	253	243
Conductivity	1	mg/L	-	-	61.9	63.3	83.9	1550	1610	1480	87.1	109	118	656	481	556
Hardness (as CaCO3), dissolved	0.6	mg/L	-	-	27.5	28	36.5	460	515	424	38.2	52.8	50	230	186	203
Hardness (as CaCO3), from total Ca/Mg	0.6	mg/L	-	-	28.7	28.6	37.2	500	529	437	39.9	49.2	52.2	240	186	208
pH	0.1	pH units	-	-	7.58	7.28	7.67	7.27	7.1	7.3	7.81	7.39	7.84	8.34	8.25	8.3
Solids, total dissolved [TDS]	10	mg/L	-	-	<3.0	10.5	<3.0	86.9	176	116	<3.0	<3.0	<3.0	<3.0	3.7	<3.0
Anions and Nutrients (Water)																
Ammonia, total (as N)	0.05	mg/L	-	Variable with T and pH	<0.0050	<0.0050	<0.0050	42.5	47.2	43.6	0.0055	<0.0050	0.01	8.54	0.0991	0.574
Bromide	0.005	mg/L	-	-	<0.050	<0.050	<0.050	0.561	0.437	0.437	<0.050	<0.050	<0.050	0.144	0.136	
Chloride	0.05	mg/L	150	600	<0.50	<0.50	<0.50	53.2	59.8	51.5	0.85	<0.50	1.14	20.2	15.1	19.5
Fluoride	0.5	mg/L	-	Variable with Hardness	<0.020	<0.020	<0.020	<0.030	<0.200	<0.100	0.021	<0.020	0.022	0.117	0.074	0.064
Kjeldahl nitrogen, total [TKN]	0.02	mg/L	-	-	0.07	0.056	0.091	43.5	52.9	46.6	0.091	0.075	0.145	9.59	0.809	1.71
Nitrate (as N)	0.005	mg/L	3	32.8	0.0514	0.017	0.167	0.061	<0.0500	<0.0250	0.242	0.0233	0.136	5.12	0.862	3.72
Nitrite (as N)	0.001	mg/L	Variable with Cl	Variable with Cl	<0.0010	<0.0010	<0.0010	0.0066	<0.0100	<0.0050	<0.0010	<0.0010	<0.0010	0.049	0.0015	0.0706
Phosphate, ortho-, dissolved (as P)	mg/L	0.001	-	-	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	0.903	0.0015	0.017	0.0014	0.0018	0.0075	0.0032
Phosphorus, total	0.002	mg/L	-	-	<0.0020	0.0186	0.0036	0.203	0.382	0.392	0.0057	0.011	0.007	0.0252	0.0301	0.391
Sulfate (as SO4)	0.3	mg/L	Variable with Hardness	-	1.2	0.75	1.13	2.93	<3.00	<1.50	1.51	1.31	1.55	5.01	1.77	1.81
Carbon, dissolved organic [DOC]																
carbon, dissolved organic [DOC]	0.5	mg/L	-	-	3.79	1.93	2.5	27.1	32.3	26.9	3.72	2.82	3.64	14	11.1	13.7
Total Metals (Water)																
Aluminum (Al)	0.003	mg/L	Variable with DOC, Hardness, and pH	Variable with DOC, Hardness, and pH	0.0456	0.0377	0.0794	0.028	0.046	0.298	0.111	0.0762	0.131	0.0898	0.0822	0.183
Antimony (Sb)	0.0001	mg/L	-	-	<0.00010	<0.00010	<0.00010	0.0001	0.00011	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	<0.00010
Arsenic (As)	0.0001	mg/L	0.005	-	<0.00010	<0.00010	<0.00010	0.00921	0.0292	0.0149	0.00013	0.00016	0.00021	0.00043	0.00066	0.00074
Barium (Ba)	0.0001	mg/L	1	-	0.018	0.0211	0.0279	0.614	0.894	0.592	0.0148	0.0181	0.0197	0.123	0.0852	0.107
Beryllium (Be)	0.0001	mg/L	0.00013	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
Bismuth (Bi)	0.00005	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.01	mg/L	1.2	-	<0.010	<0.010	<0.010	1.64	1.57	1.16	0.011	<0.010	0.011	0.698	0.571	0.472
Cadmium (Cd)	0.000005	mg/L	Variable with Hardness	-	<0.0000050	<0.0000050	<0.0000050	0.0000118	<0.0000050	0.0000152	<0.0000050	<0.0000050	<0.0000050	0.0000106	0.0000059	0.0000084
Calcium (Ca)	0.05	mg/L	-	-	10.2	10.3	13.3	154	162	132	14.4	18.5	19.2	74.5	56	61.7
Cesium (Cs)	0.00001	mg/L	-	-	<0.000010	<0.000010	<0.000010	0.000186	0.000194	0.000218	<0.000010	<0.000010	0.000015	0.000062	0.000019	0.000042
Chromium (Cr)	0.0005	mg/L	0.001	-	<0.00050	<0.00050	<0.00050	0.00091	0.00128	0.00122	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)	0.0001	mg/L	0.004	0.11	<0.00010	<0.00010	<0.00010	0.00213	0.00281	0.00203	<0.00010	<0.00010	<0.00010	0.00055	0.00042	0.00054
Copper (Cu)	0.0005	mg/L	Variable with Hardness	-	0.00067	0.00053	0.00083	<0.00050	<0.00050	0.00104	0.00094	0.00069	0.00095	0.00184	0.00144	0.00164
Iron (Fe)	0.01	mg/L	-	1	0.039	0.031	0.079	43.3	70.8	45	0.168	0.13	0.229	0.266	0.448	0.62
Lead (Pb)	0.00005	mg/L	Variable with Hardness	Variable with Hardness	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000114	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000085
Lithium (Li)	0.001	mg/L	-	-	<0.0010	<0.0010	<0.0010	0.0018	0.0021	0.0024	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)	0.005	mg/L	-	-	0.775	0.711	0.969	28	30.2	26	0.952	0.719	1.03	13.2	11.1	13.1
Manganese (Mn)	0.0001	mg/L	Variable with Hardness	Variable with Hardness	0.00185	0.00261	0.00624	3.75	3.14	2.58	0.0114	0.0117	0.0195	0.387	0.379	0.241
Mercury (Hg)	0.000005	mg/L	0.00001	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)	0.00005	mg/L	7.6	46	0.000564	0.00027	0.000346	0.000264	0.000297	0.000278	0.000421	0.00052	0.000565	0.000177	0.000389	0.000193
Nickel (Ni)	0.0005	mg/L	Variable with Hardness	-	<0.00050	<0.00050	<0.00050	0.00407	0.00352	0.00348	<0.00050	<0.00050	<0.00050	0.00168	0.00136	0.00141
Phosphorus (P)	0.05	mg/L	-	-	<0.050	<0.050	<0.050	0.242	0.411	0.443	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)	0.05	mg/L	-	-	0.808	0.755	1.09	45.9	50.1	44.8	0.96	0.78	1.23	17.7	13.8	17.3
Rubidium (Rb)	0.0002	mg/L	-	-	0.00075	0.00095	0.00123	0.0344	0.0358	0.0341	0.00082	0.00107	0.00142	0.0115	0.0082	0.0107
Selenium (Se)	0.00005	mg/L	0.002	-	0.000062	<0.000050	<0.000050	0.000078	0.000136	0.000091	0.00007	<0.000050	<0.000050	0.000081	0.000058	0.000073
Silicon (Si)	0.1	mg/L	-	-	2.78	2.46	2.86	11.7	13.9	11.5	3.19	3.18	3.23	5.27	3.87	4.73
Silver (Ag)	0.00001	mg/L	Variable with Hardness	Variable with Hardness	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	0.05	mg/L	-	-	1.09	0.942	1.2	75	79.5	67.1	1.69	1.08	1.62	33.2	26.8	26.6
Strontium (Sr)	0.0002	mg/L	-	-	0.0412	0.0423	0.0586	1.04	1.12	0.966	0.042	0.0481	0.058	0.445	0.371	0.435
Sulfur (S)	0.5	mg/L	-	-	<0.50	<0.50	<0.50	2.18	0.94	<0.50	0.6	<0.50	<0.50	2.48	1.08	0.79
Tellurium (Te)	0.0002	mg/L	-	-	<0.00020	<0.00020	<0.00020	0.00023	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)	<0.00001	mg/L	0.0008	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)	0.0001	mg/L	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)	0.0001	mg/L	-	-	<0.00010	<0.00010	<0.00010	0.00012	0.00016	0.00017	<0.00010	<0.00010	0.00017	<0.00010	<0.00010	<0.00010
Titanium (Ti)	0.0003	mg/L	-	-	0.00096	<0.00090	0.00264	0.00178	0.00361	0.00872	0.0022	0.00188	0.00369	0.00242	<0.00210	0.00551
Tungsten (W)	0.0001	mg/L	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)	0.00001	mg/L	0.0085	-	0.000015	0.000014	0.000018	0.000056	0.000025	0.000029	0.00005	0.000068	0.000077	0.000109	0.000114	0.000087
Vanadium (V)	0.0005	mg/L	-	-	<0.00050	<0.00050	<0.00050	0.00129	0.00296	0.00209	0.00061	0.00063	0.00062	<0.00050	<0.00050	<0.00050
Zinc (Zn)	0.003	mg/L	Variable with Hardness	Variable with Hardness	<0.0030	<0.0030	<0.0030	<0.0030	0.0035	0.0042	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0038
Zirconium (Zr)	0.00020	mg/L	-	-	<0.00020	<0.00020	<0.00020	0.00031	0.00052	0.00043	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Metals (Water)																
Aluminum (Al)	0.003	mg/L	Variable with pH	Variable with pH	0.0212	0.0246	0.0303	0.0077								

APPENDIX F: Trend Analysis



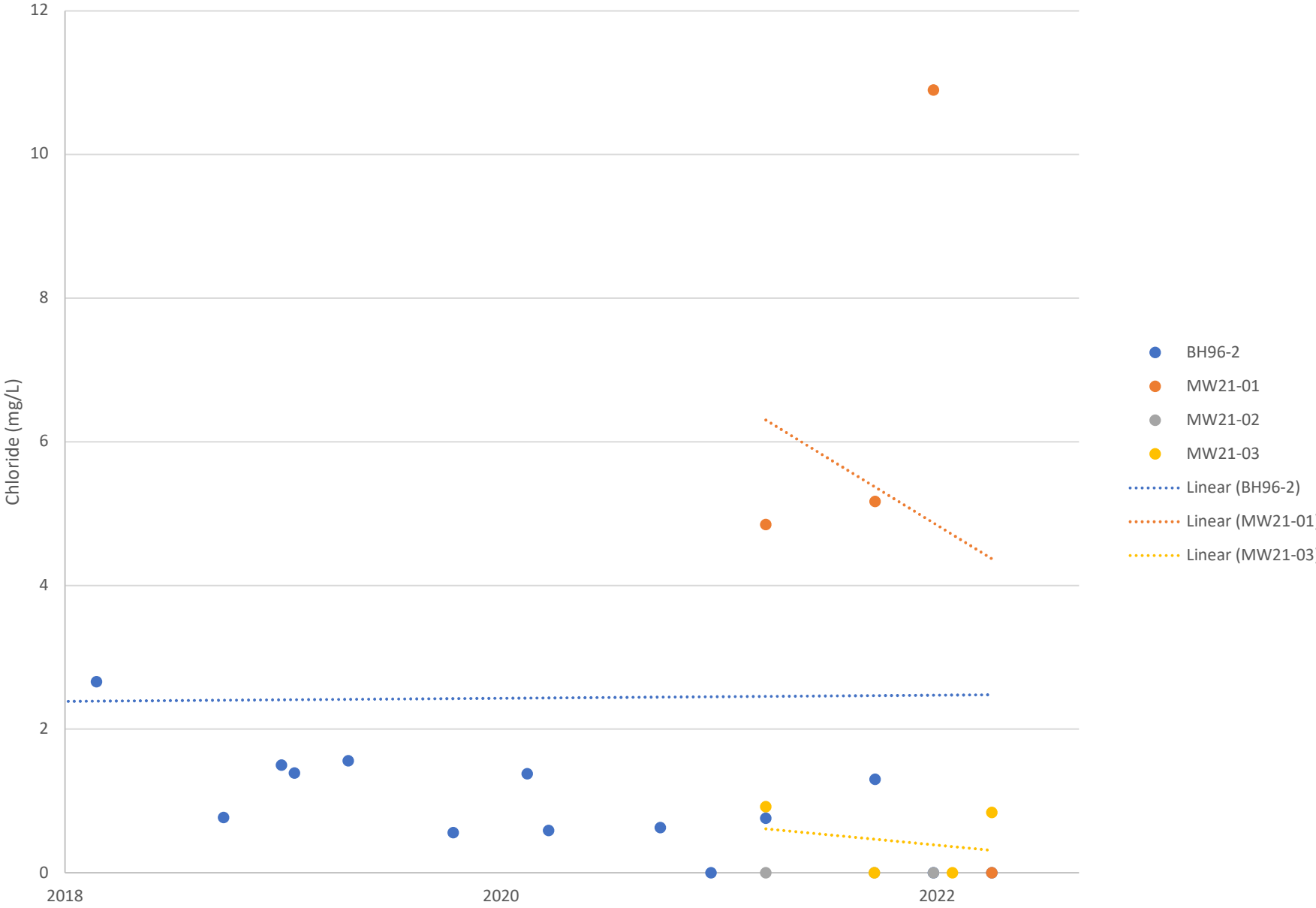
Groundwater - Dissolved Iron Historical Plot



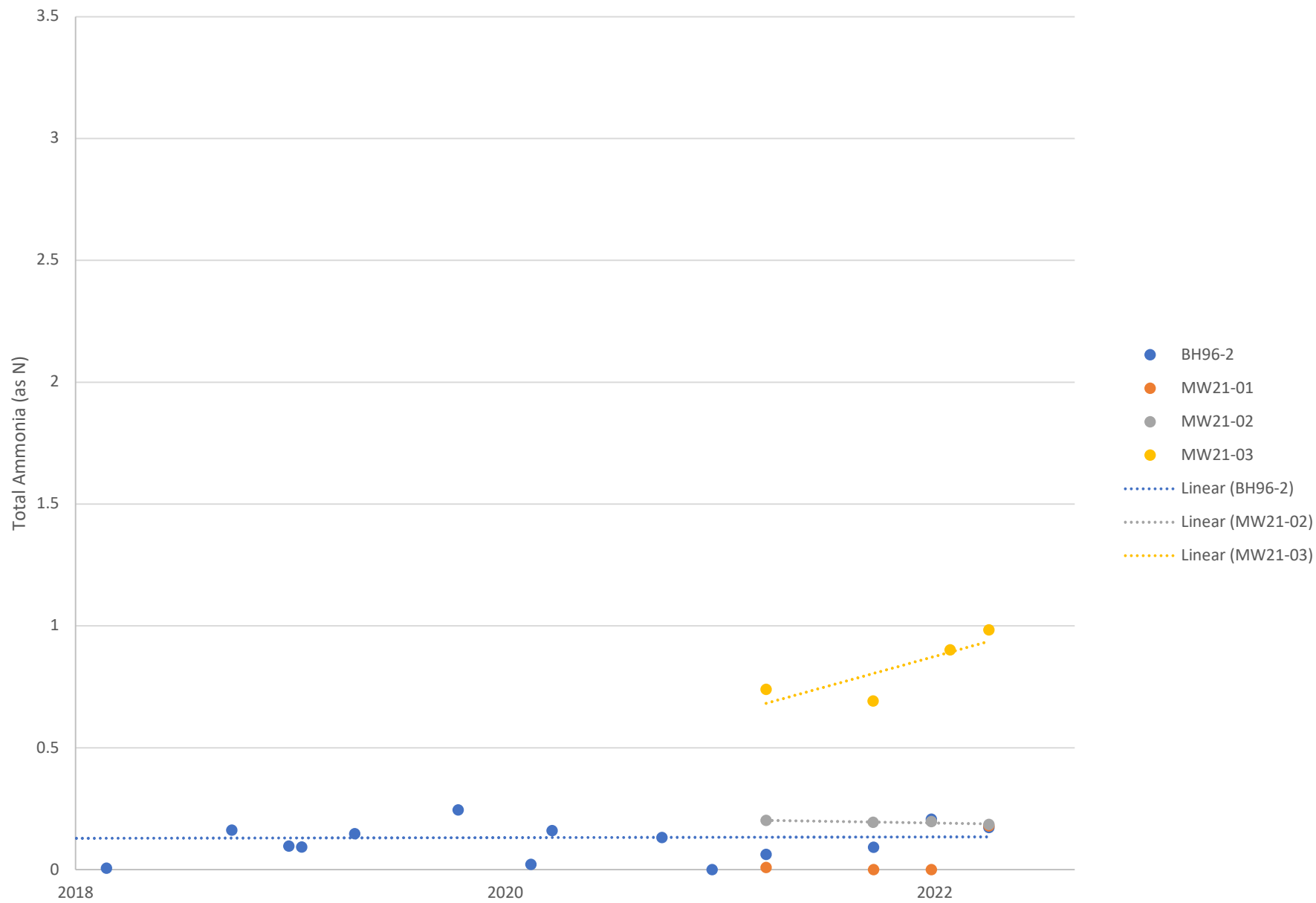
Groundwater - Sulphate Historical Plot



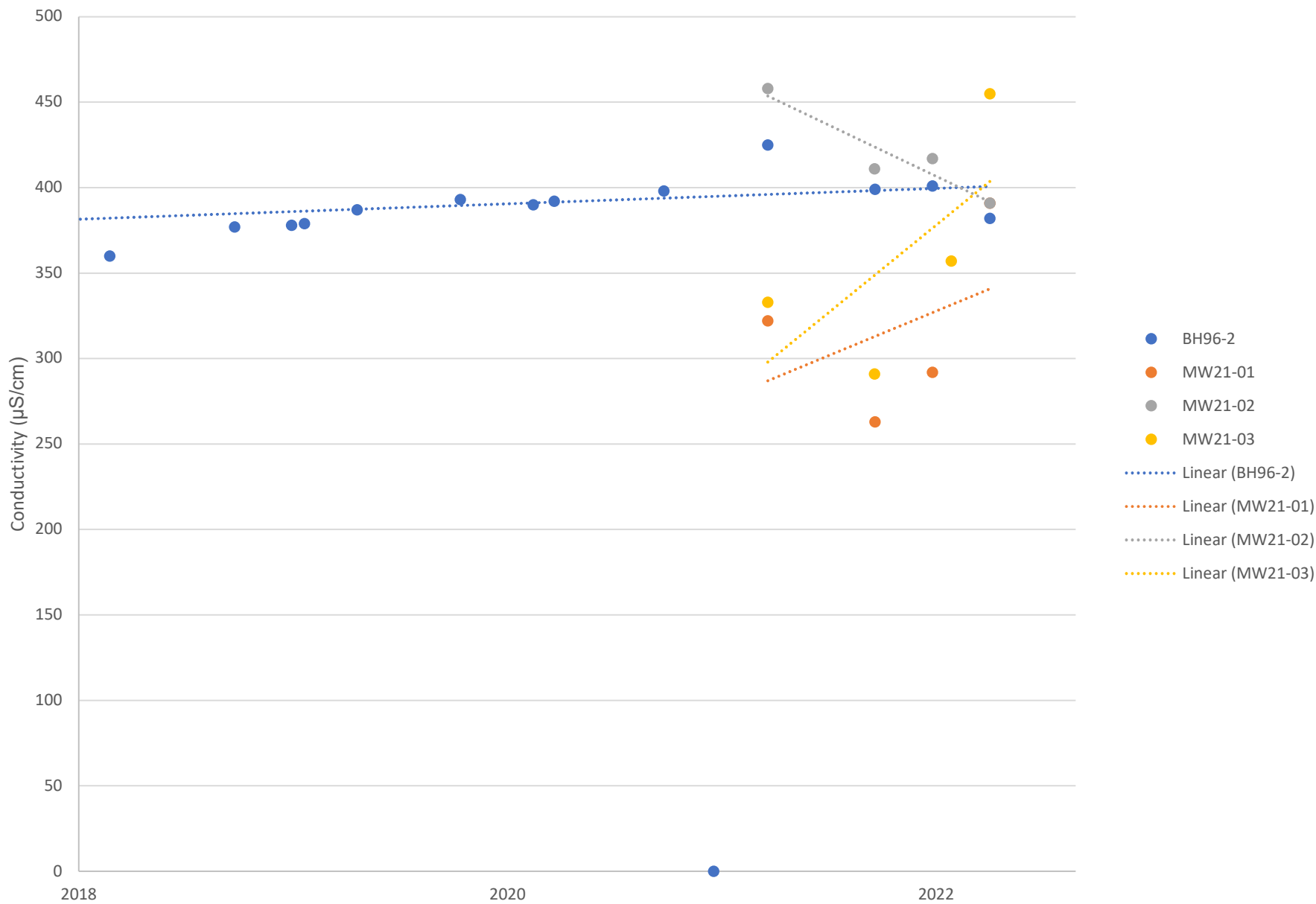
Groundwater - Chloride Historical Plot



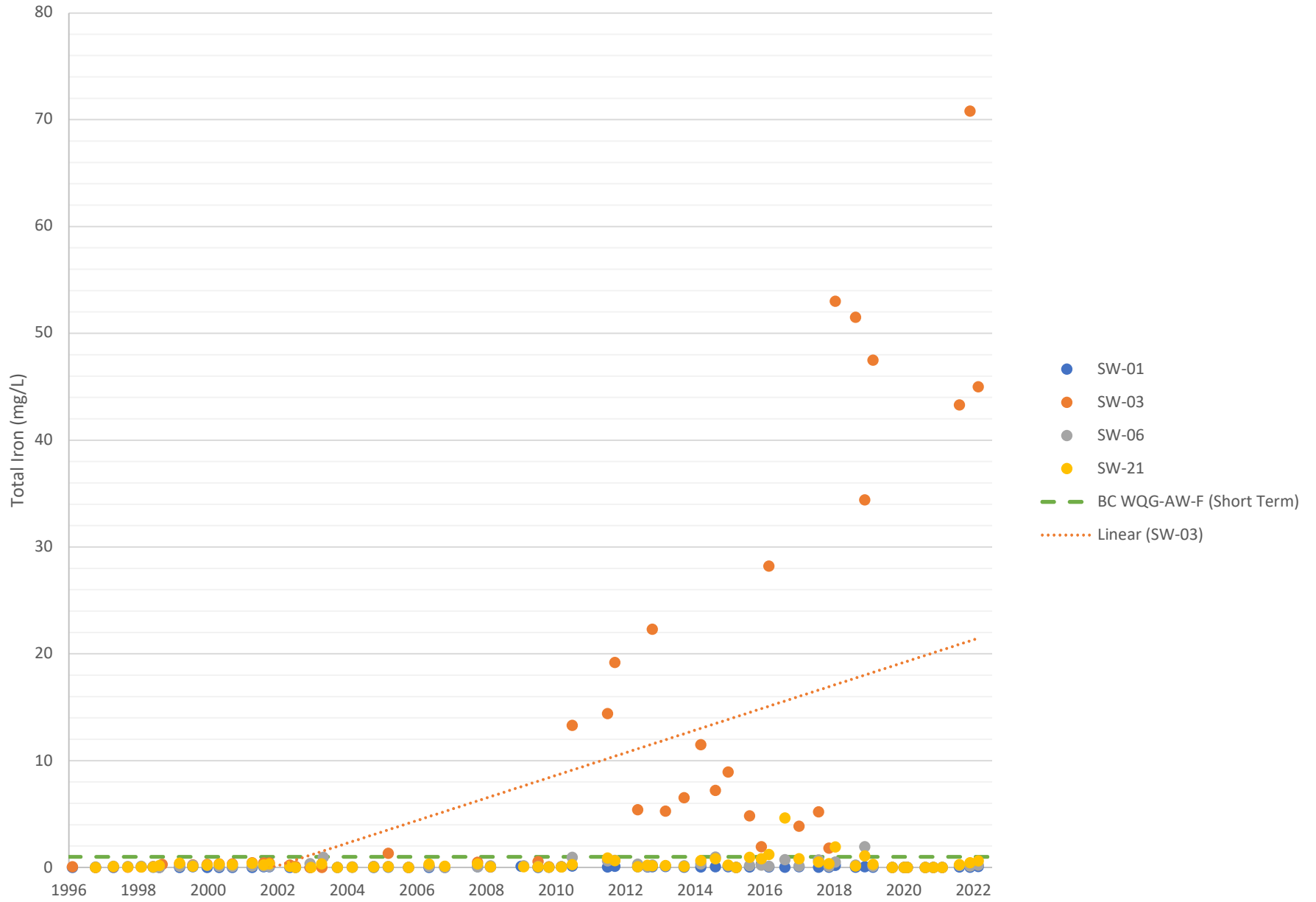
Groundwater - Total Ammonia Historical Plot



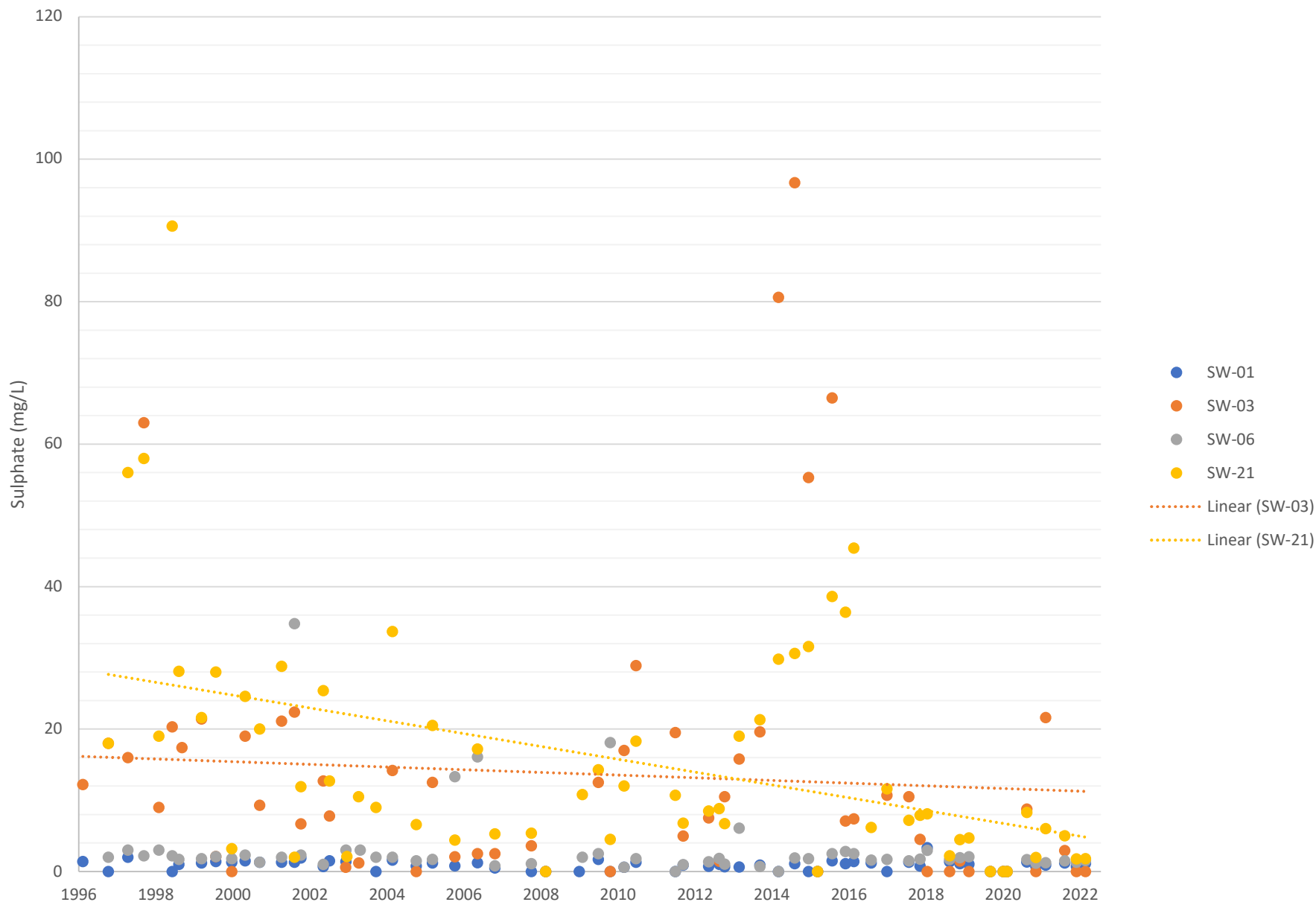
Groundwater - Conductivity Historical Plot



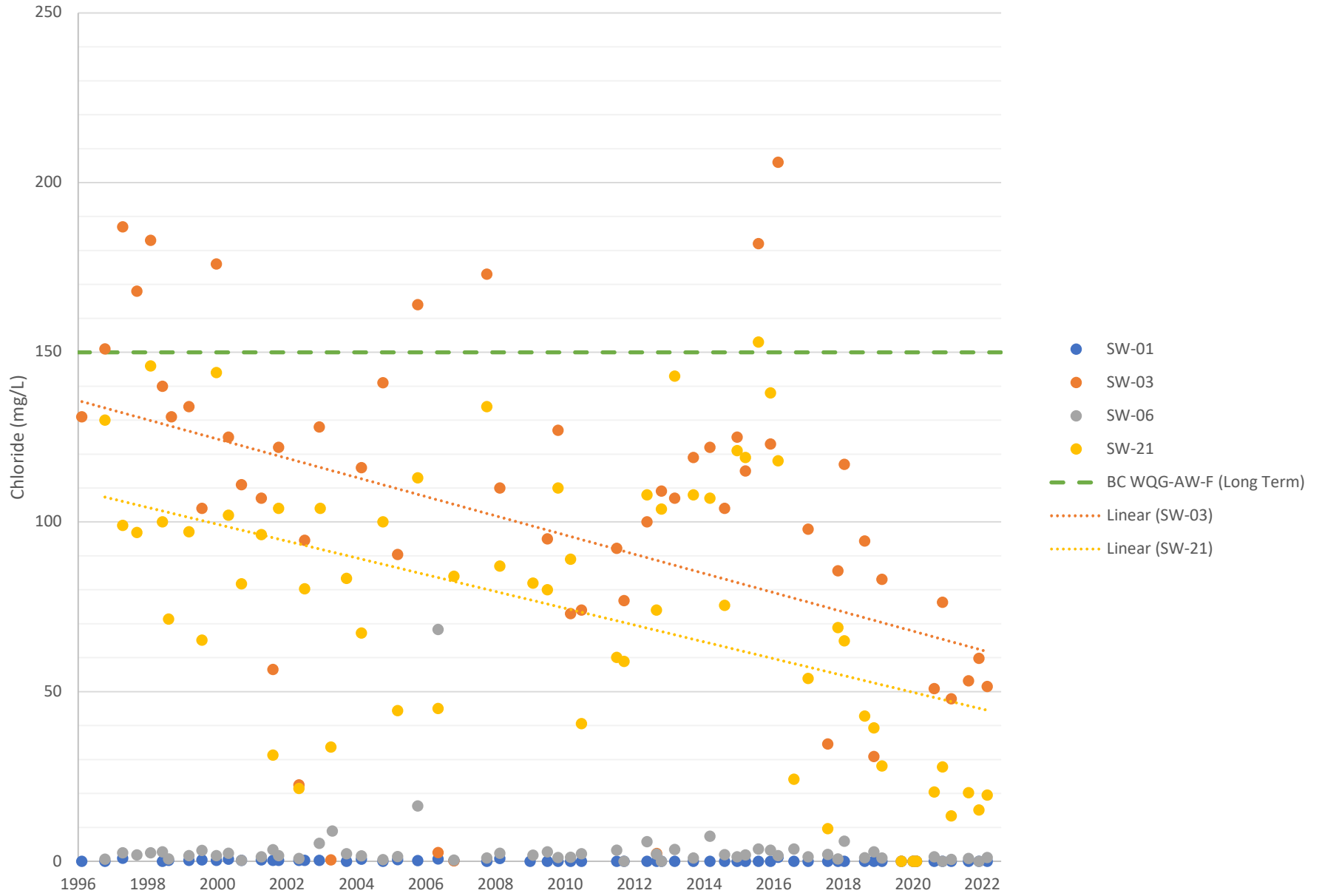
Surface Water - Total Iron Historical Plot



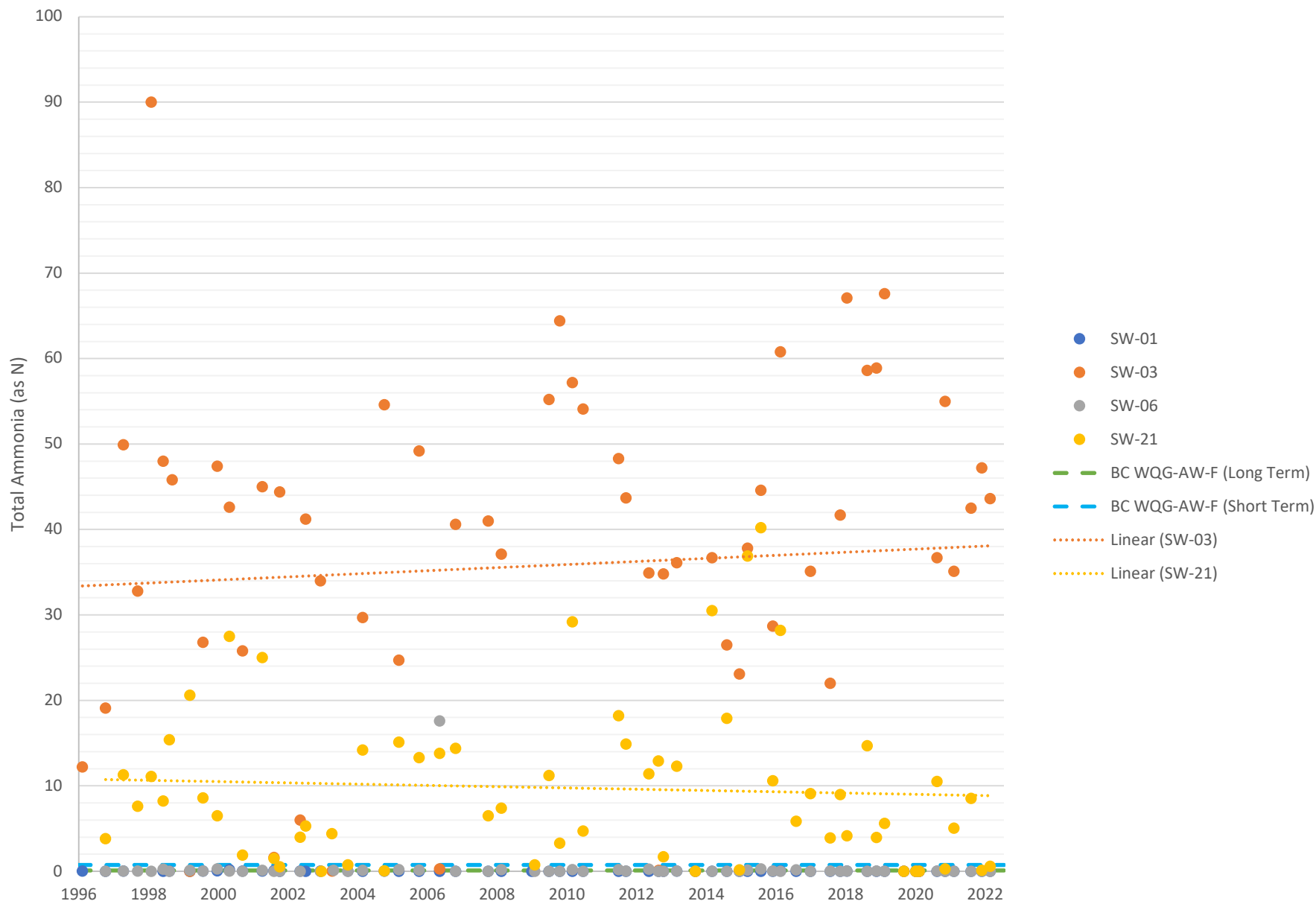
Surface Water - Sulphate Historical Plot



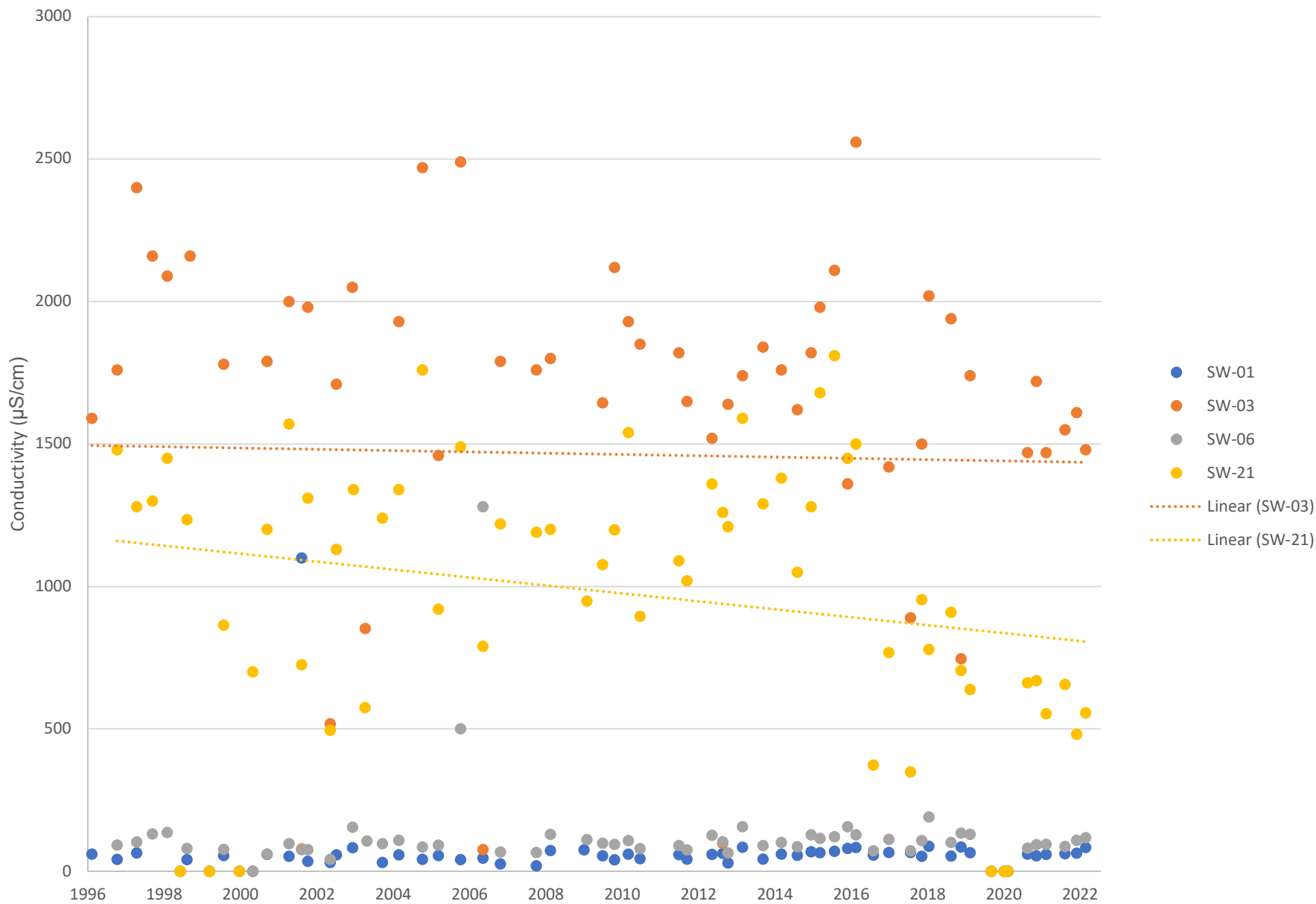
Surface Water - Chloride Historical Plot



Surface Water - Total Ammonia Historical Plot



Surface Water - Conductivity Historical Plot





Regional District of
Kitimat-Stikine

Appendix C Scale Maintenance Reports

Avery Weigh-Tronix

T – DATA SHEET REV.5

Unit 101A
 1546 Derwent Way
 Delta, BC
 V3M 6M4
 Tel. (604) 273-9401
 Fax. (604) 273-8467

M.C. Inspection Certificate No.
Work Order Number.
Internal Certificate No.

Trade Establishment Name		Operating as (if different than Trade Name)		
Address		City	Province	Postal Code
Contact Name	Contact Title	Telephone Number	Email	
Location Address (if different from Trade Establishment Name Address)		City	Province	Postal Code
Measurement Canada Notice of Approval Head: Base:	Manufacturer Head: Base:	Model Head: Base:	Serial Number Head: Base:	
Device Type: Legal For Trade: <input type="checkbox"/> Yes <input type="checkbox"/> No Sealed on Arrival: <input type="checkbox"/> Yes <input type="checkbox"/> No		Capacity (resolution required)		Seasonal (Open Season)

Installation: Temporary Permanent

Is the scale installed at a permanent business location? Yes No Has the scale been in the same location for more than 1 year? Yes No

If the scale is using a portable or temporary installation and you answered yes to any of the questions above, do you have a copy the approval document from Measurement Canada? (Approval is required before an inspection can proceed) Yes N/A

VISUAL INSPECTION	Load cell condition	_____	Junction boxes & connections	_____
	Load cell wiring	_____	Bumper bolt clearance	_____
	Load cell mounting assembly	_____	Condition of levers	_____
	Dirt & debris around cells	_____	Condition of pivots & bearings	_____

SECTION TESTS		Section 1	Section 2	Section 3	Section 4	Section 5	Section 6
		As Found					
_____ kg	As Left						

STANDARDS USED:	WEIGHT – kg	AS FOUND ± GRADUATIONS		AS LEFT ± GRADUATIONS	
		UP	DOWN	UP	DOWN
STRAIN TEST AND LINEARITY TEST	Strain #1				
	Strain #2				
	Strain #3				
	Strain #4				
	Strain #5				

Scale was calibrated with Weights Traceable to N.I.S.T. and/or Measurement Canada Standards

Scale ID Number:	Type: <input type="checkbox"/> Calibration <input type="checkbox"/> Initial Inspection <input type="checkbox"/> Subsequent Inspection	Inspection Location: <input type="checkbox"/> Factory <input type="checkbox"/> Field
Standards used, list all serial numbers and capacities (If owned by others, include certificates with inspection report):		For inspections only As Found: <input type="checkbox"/> Compliant <input type="checkbox"/> Installation <input type="checkbox"/> > than LOE <input type="checkbox"/> Non-Measurement <input type="checkbox"/> Other
		Inspection Result: <input type="checkbox"/> Verified <input type="checkbox"/> Warning <input type="checkbox"/> Rejected

Comments (additional notes use back of form):

Technician/Inspector's Signature <i>Tom Kinwig</i>	Print Name	Date
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Avery Weigh-Tronix

T – DATA SHEET REV.5

Unit 101A
 1546 Derwent Way
 Delta, BC
 V3M 6M4
 Tel. (604) 273-9401
 Fax. (604) 273-8467

M.C. Inspection Certificate No.
Work Order Number.
Internal Certificate No.

Trade Establishment Name		Operating as (if different than Trade Name)		
Address		City	Province	Postal Code
Contact Name	Contact Title	Telephone Number	Email	
Location Address (if different from Trade Establishment Name Address)		City	Province	Postal Code
Measurement Canada Notice of Approval Head: Base:	Manufacturer Head: Base:	Model Head: Base:	Serial Number Head: Base:	
Device Type: Legal For Trade: <input type="checkbox"/> Yes <input type="checkbox"/> No Sealed on Arrival: <input type="checkbox"/> Yes <input type="checkbox"/> No		Capacity (resolution required)		Seasonal (Open Season)

Installation: Temporary Permanent

Is the scale installed at a permanent business location? Yes No Has the scale been in the same location for more than 1 year? Yes No

If the scale is using a portable or temporary installation and you answered yes to any of the questions above, do you have a copy the approval document from Measurement Canada? (Approval is required before an inspection can proceed) Yes N/A

VISUAL INSPECTION	Load cell condition	_____	Junction boxes & connections	_____
	Load cell wiring	_____	Bumper bolt clearance	_____
	Load cell mounting assembly	_____	Condition of levers	_____
	Dirt & debris around cells	_____	Condition of pivots & bearings	_____

SECTION TESTS		Section 1	Section 2	Section 3	Section 4	Section 5	Section 6
		_____ kg	As Found				
	As Left						

STANDARDS USED:	WEIGHT – kg	AS FOUND ± GRADUATIONS		AS LEFT ± GRADUATIONS	
		UP	DOWN	UP	DOWN
_____kg	Strain #1				
	Strain #2				
	Strain #3				
	Strain #4				
	Strain #5				

Scale was calibrated with Weights Traceable to N.I.S.T. and/or Measurement Canada Standards

Scale ID Number:	Type: <input type="checkbox"/> Calibration <input type="checkbox"/> Initial Inspection <input type="checkbox"/> Subsequent Inspection	Inspection Location: <input type="checkbox"/> Factory <input type="checkbox"/> Field
Standards used, list all serial numbers and capacities (If owned by others, include certificates with inspection report):		For inspections only As Found: <input type="checkbox"/> Compliant <input type="checkbox"/> Installation <input type="checkbox"/> > than LOE <input type="checkbox"/> Non-Measurement <input type="checkbox"/> Other
		Inspection Result: <input type="checkbox"/> Verified <input type="checkbox"/> Warning <input type="checkbox"/> Rejected
Comments (additional notes use back of form):		

Technician/Inspector's Signature <i>Tom Kinwig</i>	Print Name	Date
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