



# MEZIADIN LANDFILL

## 2022 Annual Report

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

During 2022, 4,697 tonnes of solid waste consisting of 2,031 tonnes of refuse and 2,666 tonnes of C&D waste was disposed of in the Meziadin landfill. Approximately 3,994 tonnes of materials were diverted from the landfill. Diverted materials included 12 tonnes of clean wood, 83 tonnes of metal, and tires.

There were three instances of mammalian wildlife breaching the facility during 2022 at the Meziadin Landfill which involved a Grizzly Bear digging under and damaging the Northwest portion of the facility fence. Improvements were made to the facility fence and solar power unit to bring the Meziadin Landfill into compliance with its OC. All four groundwater and three surface water sites were sampled and monitored according to their prescribed bi-annual schedule. The compiled data, interpretation, and recommendations from Stantec will be contained in the Meziadin Landfill 2022 Annual Environmental Effects Monitoring (EEM) Report.

The RDKS intends to complete an environmental assessment at the landfill in 2023 to inform the design of leachate treatment system options to expand the treatment capacity at the facility. Brushing of the site is planned to be completed in 2023 to improve sight lines and safety for users of the facility.



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## 1 Introduction

This annual report covers the period from January to December 2022 and has been prepared to fulfill the requirements of Meziadin Landfill Operational Certificate (OC) MR-15681 (Appendix A). The Meziadin OC was issued in 2002 and was recently updated in 2022. The OC authorizes the discharge of municipal solid and liquid wastes and outlines the criteria for environmental and human protection at the landfill.

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

**Table 1: Report Objectives**

<p><b>Waste Tracking</b></p> <ul style="list-style-type: none"> <li>Quantity of MSW Received, Recycled and Composted</li> <li>Quantity of Liquid Waste Received</li> </ul> <p><b>Wildlife Observations</b></p> <p><b>Facility Updates and Maintenance</b></p> <ul style="list-style-type: none"> <li>Phytoremediation</li> <li>Operational Certificate Amendments</li> <li>Environmental Monitoring</li> </ul>	
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Environmental monitoring requirements for surface water, groundwater and leachate are prescribed in the Environmental Effects Monitoring Program of the OC. The results of the EEMP are discussed in the Environmental Effects Monitoring Report by Stantec Consulting Ltd and contained in Appendix B of this report.

## 2 Background

The Meziadin Landfill is owned and operated by the Regional District of Kitimat-Stikine (Regional District or RDKS). It is located approximately 15 km south of Meziadin Junction, accessed from the Stewart-Cassiar Highway as seen in Figure 1.

The Landfill is responsible for the management of municipal solid and liquid waste generated from commercial, residential and industrial sources in the Meziadin area and the Stewart Transfer Station, in accordance with the Regional District Kitimat-Stikine Solid Waste Management Plan (2022). Landfill operations are regulated by the Ministry of Environment and Climate Change Strategy’s Operational Certificate (OC) MR-15681, issued in August 2002.

The footprint for the entire Meziadin Facility is 12 hectares, which includes a landfill, septage lagoon, and a settling lagoon for collected leachate from the landfill. There is also a designated area for the diversion of metal, clean wood, and tires. Metal is collected by a scrap recycler and tires are collected by



the Tire Stewardship of British Columbia. Clean wood is burned on site as outlined in the Operational Certificate.



**Figure 1 Location of the Meziadin Landfill.**

## **2.1 Landfill**

The Meziadin Landfill is located on the Tintina Main logging road. It is situated on a high point of land that is approximately 800m from the Nass River and 900m from the Meziadin River. The landfill itself occupies less than a hectare on the relatively flat, 12-hectare site. The landfill relies on the low permeability of the underlying dense sand, silt and gravel till layer approximately two metres below the ground surface to contain leachate without an engineered liner.

The Landfill is sited on the topographic high between the Meziadin and Nass Rivers, with the watershed divide between the two rivers crossing through the landfill tenure. The water table at the site is shallow, ranging from approximately 1.5 to 4.5 metres below the surface. There are numerous water features on, and surrounding, the tenure in the form of ditches, wetlands, and watercourses. Drainage is generally directed to the southeast towards to the Nass River, with some drainage directed southwest towards the Meziadin River.

The Hanna-Tintina Conservation Area abuts the landfill tenure to the north and west. The Gitanyow Wilp Wii Litsxw declared the entire Meziadin River watershed an Indigenous Protected Area (IPA) in 2021 and published a management plan for the IPA in June of 2022, with the bounds of the new IPA abutting the landfill tenure to the west and north boundaries.

Leachate treatment works at the site currently consist of an exfiltration facultative treatment lagoon which receives leachate from the landfill and discharges to a biological filter bed. The facultative treatment lagoon is leaking on the east side and in need of repair.



The DOCP outlines the current operation of the landfill and the proposed conceptual plan for future expansion. Construction of the wetland system prescribed in the DOCP will require studies to re-assess the suitability of the proposed conceptual design, identifying any environmental constraints. Of specific concern is the formation of a wetland where the next phase of the treatment lagoon is specified in the conceptual design. Design and consultation services for the wetland expansion are projected for completion in 2023.

### 3 Waste Disposal


The Meziadin Facility receives waste from residents and businesses, as well as waste generated by industry (such as mining) camps in the area. Industry is required to divert all recyclable and Extended Producer Responsibility materials from waste prior to disposal.

In June 2019, the Meziadin Landfill began receiving waste from the newly constructed Stewart Transfer Station. Waste received from the Stewart Transfer Station is comprised of residential and commercial municipal solid waste generated within the District of Stewart (population of approximately 517).

The annual totals for 2022 of each type of permitted waste discharged at the Meziadin Landfill are shown in Table 2. Additional details about each of these materials is described below.

**Table 2 Refuse and Diverted Material Volumes for 2022**

Waste Type	Cubic Metres	Tonnes
<b>Landfilled Waste</b>	<b>21,734</b>	<b>4,697</b>
Refuse	12,450	2,031
C&D	9,284	2,666
<b>Diverted Waste</b>	<b>3,994</b>	<b>7,296</b>
Metal	619	83
Septage	3,207	3,207
Clean Wood	120	12



#### 3.1 Landfilled Wastes

Landfilled waste is disposed in the active face of the landfill. This waste includes C&D, land clearing waste, and refuse.

##### *Construction and Demolition*

C&D waste accepted at Meziadin Landfill includes painted and treated wood waste, demolition waste, construction waste products. In 2022, **9,284 cubic metres** of construction and demolition waste was disposed of in the Meziadin Landfill.



### *Refuse*

Refuse includes general municipal solid waste transferred from the STS (curbside refuse, commercial and self hauled refuse, and small loads of C&D waste), and industrial work camp refuse received at Meziadin Landfill through the controlled waste permitting process. In 2022 **21,734 cubic metres** of refuse was received at the Meziadin Landfill.

## **3.2 Diverted Wastes**

Diverted metals, tires, and large appliances are collected and held at the landfill until collected by the designated Stewardship or metal salvage company. Clean wood is diverted from the landfill and burned, as outlined in the Operation Certificate.

### *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 burned as prescribed in the Operational Certificate.

In 2022, **120 cubic metres** of clean wood was segregated as outlined in the Operational Certificate. This volume is a visual estimate based on tracked volume of wood waste.

### *Metal*

In 2022, a total of **619 cubic metres** of metal were collected at the Meziadin Landfill as scrap for recycling. This volume is an estimate of on-site segregated metals. All ozone depleting substances were removed from applicable appliances prior to collection by the scrap metal recycler.

### *Septage*

Septage is defined as septic tank pumpage and treated sewage sludge, but does not include other sewage wastes (wastewater, sewage or slurry, including catch basins, oil water separators, shop floor drains). In 2022, an estimated **3,207 cubic metres** of septage was received at the Meziadin Facility.

### *Tires*

Tires are accepted at the facility; however no records were collected for tires in 2022.

## **4 Wildlife Occurrences and Observations**

The Meziadin Facility is in an area with bears, wolves, coyotes, several species of birds of prey, and many other species of mammals that may attempt to access the facility. To prevent wildlife from gaining access, the entire facility is fenced, and the active part of the landfill is enclosed in an electric fence. Wolf tracks are frequently seen in the area immediately surrounding the facility fence. Signs of wolves and grizzly bears attempting to burrow under the fence are noted throughout the year. Site Operators deter burrowing by piling rocks at the fence where burrowing has begun. The RDKS is working to develop a long-term solution to wildlife burrowing.



As of November 2018, a Revelstoke Iron Grizzly (RIG) plate is used as an alternative daily cover to prevent vectors from gaining access to the landfill active face. It is positioned each day to cover waste on the landfill active face. Soil from the Regional District borrow area is used as daily and intermediate cover.

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.

There were three instances of mammalian wildlife breaching the facility during 2022 at the Meziadin Landfill. All the occurrences involved a Grizzly Bear digging under and damaging the Northwest portion of the facility fence before entering the active landfill during the months of June, July and November 2022. The Conservation Officer was informed of each breach. The fence was found to have digging at and damage done to it on other occasions throughout the year, with no sign of the facility being breached. The damaged portions of the facility fence were repaired in a timely manner, with the electric wires being a priority to restore.

#### **4.1 Bird and Vector Control**

Birds, such as ravens and crows, are a nuisance at landfill sites, as they can scatter litter into the surrounding environment. Bird control at the Meziadin landfill is based on thorough and complete cover of waste. The active face is only exposed when a load of waste is delivered to the landfill. Between loads, the active face is covered with the RIG plates or alternative daily cover.

There was minimal vector activity from birds, including raptor species (bald eagles), and corvid species (crows and ravens).

### **5 Operations and Maintenance**

#### **5.1 Complaints Received**

There were no complaints received regarding Meziadin Landfill in 2022.

#### **5.2 OC Amendments and Authorizations**

The OC for Meziadin Landfill was updated in February 2022. No temporary authorization were obtained for the landfill in 2022.

#### **5.3 Non-Compliance Reports**

Three non-compliance reports were submitted in 2022. Non-compliance events were related to fence maintenance, wildlife nuisance, and exceedances to the BCWQG-AW for surface water at the site. Corrective actions included repairs to the fence and prescribing additional sampling for 2023. A summary of these non-compliance events are provided in Table 3.



**Table 3 Summary of the non-compliance for the facility during 2021.**

Non-Compliance Report Date	Description of Non-Compliance
<b>April 14, 2023</b>	
3.15.1 Fence Design, Construction and Maintenance	Fence was not electrified
3.15.3 Wildlife Nuisance	Bear penetrated the fence
3.15.5 Fence Operating Period	Fence was in disrepair
3.15.7 Gates	Fence not at required tension
<b>October 26, 2022</b>	
s.10.7 Surface Water Monitoring	Exceeded the BCWQGAW
<b>December 5, 2022</b>	
3.3 Wildlife Nuisance	Bear penetrated the fence
3.15.1 Fence Design, Construction and Maintenance	Fence was in disrepair
3.15.3 Fence Tension	Fence not at required tension



## 5.4 Leachate Collection System

There was no major works performed on the Leachate Collection System in 2022.

## 5.5 Fence Maintenance

No major upgrades or repairs were performed on the fence at Meziadin Landfill. Fence inspections and minor repairs are performed as part of regular operations.

## 5.6 Operational and Maintenance Expenditures

For 2022 there were no major capital works performed. The cost of Operations and routine Maintenance was \$224,179.39, which included the operations contract, environmental sampling, and reporting.

# 6 Construction

## 6.1 Expansion Works

No expansion works were performed in 2022.

## 6.2 Closure Works

No closure works were performed in 2022.





## **7 Projected Operational Plan**

The projected operational plan outlines the key strategies for the efficient and sustainable operations of the Meziadin Landfill (ML) 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 4. Tasks are subject to budget approval and may change or be deferred subject to competing priorities following a risk-based approach.



**Table 4: Projected Operational Tasks for 2023**

2023 Plan	Description	Strategies	Expected Completion Date	Outcome
Wetland Expansion	Wetland leachate treatment infrastructure upgrades are prescribed in the DOCP to increase leachate treatment capacity	RFP to be issued for an environmental assessment, and design options, planning for construction in 2024.	Dec-23	Select an appropriate design option to tender for construction in 2024
Environmental Effects Monitoring Program Review	The EEMP requires a review to determine if changes are required to surface water and groundwater monitoring at the site	Improve monitoring, confirm background conditions for surface water by establishing a new background site	Dec-23	Updated EEMP to be incorporated into the OC
Brushing of the shrubs on the tenure	Maintenance of brush on the cleared tender to increase safety and prevent establishment of timber on the site	Perform a bird nesting survey to identify any buffers, brushing contractor to brush the site immediately following the survey	Aug-23	Improved site lines for safety, management of vegetation at lagoons
Metal Pile relocation	Metal relocation to the proximity of the operator as well as containing leachate from he pile is the aim for this project.	Metal pile will be moved to improve operator inspection (positioned close to the operator shack) and inclined to drain by gravity to lagoon.	Dec-23	Better positioned metal drop off location that will improve contamination and inspection.

## 8 Environmental Monitoring

Environmental monitoring for the Meziadin Facility was conducted by a Regional District of Kitimat-Stikine Environmental Services Technician, following Ministry of Environment and Climate Change Strategy, 2013 British Columbia Field Sampling Manual. Sperling Hansen Associates has been retained to compile and analyze in-situ monitoring and surface water sampling results. The compiled data, interpretation, and recommendations from Stantec will be contained in the *Meziadin Landfill 2022 Annual Environmental Effects Monitoring (EEM) Report*.

### *Groundwater*

Four groundwater monitoring wells were monitored, one with a nested well which taps into a deeper aquifer. Monitoring wells were monitored twice yearly during the spring and fall months. In-Situ



parameters were monitored using a TLC Depth Tape and YSI. Lab samples were collected in sample bottles and shipped to ALS for analysis.

### *Surface Water*

Three surface water sites were monitored which included a leachate sample from the Treatment Lagoon Outlet, and a background sample and downgradient sample from watercourses that meander around the site. Sites were sampled and monitored twice yearly during the spring and fall. In-Situ parameters were monitored using a YSI. Lab parameters were collected in sample bottles and shipped to ALS for analysis.

The Fall sample and monitor included collection of samples from three historic surface water sample sites and one new site. The historical sites included two on the stormwater retention pond, one at the receiving end of the pond and the other at the exit apron of the pond. These were added to the sampling regime to potentially identify if there are any concerns of contaminants migrating off site from the metal pile. The other historical sample location was located at the west side of the treatment lagoon where there is a leak that drains into the surface water that leads to the downstream sampling location. The new sample location is downgradient of the facility on the west side of where the land begins to slope. This location was chosen because there were no monitoring location for water that migrates off site into the Meziadin River.

The sample obtained from the area the lagoon was leaking exceeded the British Columbia Water Quality Guidelines (BCWQG-AW) for Aquatic Wildlife for Ammonia, dissolved iron, total cobalt, total iron, and total manganese. The sample obtained from the tributary to Meziadin River exceeded the BCWQG-AW for dissolved aluminum, alkalinity, and total zinc. A representative background site is required to assist in the interpretation of background concentrations.

The environmental effects monitoring program will be reviewed in 2023 to evaluate the surface and groundwater monitoring programs and impacts to the environment.

## **9 Summary**

The Meziadin Landfill received an estimated 4,697 tonnes of waste into the landfill in 2022, and an estimated 7,296 tonnes of waste that was diverted from the landfill. The facultative lagoon is leaking, and requires repairs to bring the works into compliance with the OC. In 2023 the RDKS will have an environmental assessment completed at the facility to inform design options for leachate infrastructure upgrades, and will have the EEMP reviewed to Improve monitoring, confirm background conditions for surface water by establishing a new background site.



**Compiled by:**

A handwritten signature in black ink that reads "Hannah Shinton".

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**Technical Review by:**

A handwritten signature in blue ink that reads "Nicole Lavoie".

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**Document Certified by:**

A handwritten signature in black ink that reads "Robert Wickie".

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**Robert Wickie, P.Eng**  
Director of Works and Services  
Regional District of Kitimat-Stikine  
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Regional District of  
**Kitimat-Stikine**

## Appendix A Operational Certificate





February 24, 2022

Tracking Number: 405466  
Authorization Number: 15681

**REGISTERED MAIL**

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

Dear Operational Certificate Holder:

Enclosed is Amended Operational Certificate 15681 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 and Approval Fees and Charges 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. 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.

Requirements may also be specified by the *Environmental Management Act* and regulations including, but not limited to, the Contaminated Sites Regulation, Environmental Data Quality Assurance Regulation, Hazardous Waste Regulation, Landfill Gas Management Regulation, Organic Matter Recycling Regulation, Ozone Depleting Substances and Other Halocarbons Regulation, Recycling Regulation, Spill Reporting Regulation, Storage of Recyclable Material Regulation, Waste Discharge Regulation and Codes of Practice.

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. Documents pertinent to the operational certificate are to be submitted by email or electronic transfer to the director, in accordance with the ministry Data & Report Submissions website at: <http://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions>, 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 Operational Certificate 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 more information about how the Ministry will assess compliance with your operational certificate please refer to <https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/natural-resource-law-enforcement/environmental-compliance>.

For more information about how to make changes to your operational certificate and to access waste discharge amendment forms and guidance, please refer to <http://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

15681

*Under the Provisions of the Environmental Management Act*

*In Accordance with the*

*Approved Regional District of Kitimat-Stikine's Solid Waste Management Plan*

REGIONAL DISTRICT of KITIMAT-STIKINE

#300-4545 LAZELLE AVE  
TERRACE BC V8G 4E1

Is authorized to manage waste from the Regional District of Kitimat-Stikine and surroundings at the Facility located near Meziadin, British Columbia, subject to the requirements listed below. Contravention of any of these requirements is a violation of the *Environmental Management Act* and may result in prosecution.

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

This operational certificate supersedes and replaces all previous versions of Operational Certificate 15681 issued under Section 28 of the *Environmental Management Act*.

**GLOSSARY**

**“Attractant” means:** food or food waste, compost, carcass or part of an animal, fish, or other meat, or other waste or garbage, that could attract bears, birds, rodents, insects, vectors or wildlife, but does not include grass, leaves, weeds, branches and woodwaste;

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

Date issued: August 8, 2002  
Date amended: February 24, 2022  
(most recent)

A handwritten signature in blue ink, appearing to read "Karen Moores".

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

**"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 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).

**"Free Liquid"** means: liquids which readily separate from the solid portion of a waste under ambient temperature and pressure.

**"Municipal Solid Waste"** means: (a) refuse that originates from residential, commercial, institutional, demolition, land clearing or construction sources, or (b) refuse specified by a director to be included in a waste management plan;

**"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.

**"Significant Works"** means: the Landfill and Stormwater Management Works;

## 1. AUTHORIZED DISCHARGES AND WORKS

### 1.1 Landfill

This section applies to the discharge of refuse from the Meziadin Landfill. The site reference number for this discharge is E245720.

- 1.1.1 The maximum rate of waste discharge to the Landfill is 3300 tonnes per calendar year.

Date issued: August 8, 2002  
Date amended: February 24, 2022  
(most recent)



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

- 1.1.2 Subject to sections 3.6, 3.7 and 3.8, the characteristics of the waste discharge to the Landfill must be:
- (a) municipal solid waste,
  - (b) controlled waste consisting solely of animal carcasses, semi-solid sludge and asbestos, with special handling and control measures, as specified in the most recent Design, Operations and Closure Plan (DOCP), or,
  - (c) other waste as authorized in writing by the director.
- 1.1.3 The authorized works are a landfill and related appurtenances located approximately as shown on the attached Site Plan A.

1.2 **Open Burning Air Contaminants**

This section applies to the discharge of air contaminants to the atmosphere from the regulated open burning of selected combustibles. The site reference number for this discharge is E245760.

- 1.2.1 The maximum authorized quantity of discharge of air contaminants is indeterminate.
- 1.2.2 The characteristics of the discharge must be typical of those resulting from the regulated open burning of selected combustibles as per section 8.3.
- 1.2.3 The authorized works are a separate burn area associated with a landfill operation and related appurtenances located approximately as shown on the attached Site Plan A

1.3 **Liquid Wastes**

This section applies to the discharge of selected liquid wastes to the ground. The site reference number for this discharge is E245721.

- 1.3.1 The maximum authorized quantity of discharge is indeterminate.
- 1.3.2 The characteristics of the discharge must be those typical of septic tank pumpage, holding tank effluent, sewage treatment plant sludges, and wash water and grit from drain sumps at car and light truck wash facilities and parking lots.

Date issued: August 8, 2002  
Date amended: February 24, 2022  
(most recent)



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

- 1.3.3 The authorized works are liquid waste exfiltration lagoons and related appurtenances located approximately as shown on the attached Site Plan A.

1.4 **Leachate**

This section applies to the discharge of leachate to a facultative leachate pond and two engineered treatment wetlands. The site reference number for this discharge is E245722.

- 1.4.1 The maximum authorized rate of discharge is indeterminate. The discharge may occur 24 hours/day, 7 days/week.
- 1.4.2 The characteristics of the leachate discharge must be typical of leachate treated by a facultative lagoon with a minimum retention time of 30 days.
- 1.4.3 The authorized works are leachate collection and treatment facilities, including a facultative leachate pond, wetland#1, wetland#2 and related appurtenances located approximately as shown on the attached Site Plan A.

1.5 **Facility Entrance**

This section applies to the Facility Entrance.

- 1.5.1 The authorized works are perimeter fencing, controlled access, sign(s), gate and related appurtenances approximately located as shown on Site Plan A.

1.6 **Location of Facility**

This section applies to the location of the Facility.

- 1.6.1 The location of the property where discharges are authorized to occur is Block A of District Lots 2458 and 2459, Cassiar District.

2. **GENERAL REQUIREMENTS**

2.1 **Use of Qualified Professional(s)**

Date issued: August 8, 2002  
Date amended: February 24, 2022  
(most recent)



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for Director, *Environmental Management Act*  
Authorizations - North Region

The operational certificate holder must cause a Qualified Professional to:

- (a) Design and inspect the construction of the Facility,
- (b) Certify documents related to the Facility including plans, specifications, drawings, construction reports, assessments, reviews, investigations, studies, surveys, programs, reports and as-built record drawings, and,
- (c) Submit a completed Declaration of Competency and a Conflict of Interest Disclosure Statement with each document.

2.2 **Design, Operations and Closure Plan (DOCP)**

- (a) The landfill must be operated at all times by the operational certificate holder in accordance with the “Meziadin Landfill Design, Operations and Closure Plan” by Sperling Hansen Associates, dated October 25, 2020.
- (b) The DOCP must comply with the requirements of this operational certificate, include the information specified in all the items listed in the Landfill Criteria Section 10.3 Design, Operations and Closure Plan.
- (c) The operational certificate holder must cause a Qualified Professional to certify and submit an updated DOCP to the director, as necessary to keep the DOCP up to date, at least once every five years after the date specified in the preceding (a).
- (d) The operational certificate holder must carry out the design, construction, operation, inspections, maintenance, monitoring, and closure of the facility, in compliance with most recent DOCP and this operational certificate.

2.3 **Construction Report(s)**

- (a) The operational certificate holder must cause a Qualified Professional to:
  - (i) carry out inspections during the construction or modification of Significant Works, and,
  - (ii) certify construction report(s) on or before 30 days after the completion of construction or modification of Significant Works.

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- (b) The construction report(s) must demonstrate that the Significant Works have been constructed in accordance with this operational certificate and the most recent DOCP, as described in the Landfill Criteria section 10.2 Construction Report(s).

#### 2.4 Landfill Criteria Conformance Review

- (a) The operational certificate holder must cause a Qualified Professional to certify and submit a Landfill Criteria Conformance Review to the director, in conjunction with the next required DOCP due October 25, 2025 as per section 2.2 c).
- (b) The Landfill Criteria Conformance Review must be in accordance with the Landfill Criteria Section 2.2 Conformance of Existing Landfills, and include:
  - (i) A comparison and evaluation of the conformance status of the Facility with all applicable sections of the Landfill Criteria, and,
  - (ii) If non-conformance(s) with the Landfill Criteria are identified, a Landfill Criteria Upgrading Plan, including an action plan and schedule for all proposed upgrades to conform to the Landfill Criteria, and technical and environmental justification for any proposed exceptions from the Landfill Criteria.

### 3. OPERATING AND PERFORMANCE REQUIREMENTS

#### 3.1 Maintenance of Work and Emergency Procedures

- (a) The operational certificate holder must cause persons that are qualified and trained, to operate, regularly inspect, and maintain the Facility, in good working order. If components of the Facility have a manufacturer's recommended maintenance schedule, then those components must, at a minimum, be maintained in accordance with that schedule.
- (b) The operational certificate holder must prepare documents of the qualification and training of the persons operating, inspecting and maintaining the Facility, and of Facility inspections, operation and maintenance.

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- (c) In the events of an unauthorized discharge or malfunction of the authorized works, the director may require the operational certificate holder to reduce or suspend operations until the Authorized Works have been restored, and/or corrective steps have been taken to prevent unauthorized discharges.
- (d) In the event of an emergency or condition beyond the control of the operational certificate holder including, but not limited to, unauthorized fires arising from spontaneous combustion or other causes, or detection of leachate on the site of the Facility, the operational certificate holder must take remedial action to prevent any unauthorized discharges. The operational certificate holder must immediately report the emergency or condition after being aware of it 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 **Nuisance**

The operational certificate holder must ensure that the Facility does not cause a nuisance including with regard to birds, rodents, insects, odour, noise, dust, litter, vector and wildlife attraction.

### 3.3 **Wildlife Nuisance**

The operational certificate holder must not allow a bear to access Attractants at the Facility. The operational certificate holder must immediately report any bear access to Attractants at the Facility, to the Conservation Officer Service, and implement immediate corrective action.

### 3.4 **Complaints**

The operational certificate holder must prepare documents of complaints with regard to matters relevant to this operational certificate, including environmental and nuisance complaints. These documents must include the source and nature of the complaint, actions, responses, and corresponding dates and times.

### 3.5 **Site Identification**

The operational certificate holder must erect a sign at the main entrance to the site which identifies the following: site name, owner, contact phone number and address, hours of operation and prohibition of hazardous special wastes.

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The lettering on the sign must be such that it is clearly readable from a distance of 3 meters by the public when they approach the entrance of the landfill site.

### 3.6 **Prohibited Wastes**

The operational certificate holder must not receive, store, or dispose of "Hazardous wastes" as defined by the Hazardous Waste Regulation at this site except as authorized by the director. The operational certificate holder must not land fill lead-acid batteries at the site, but the operational certificate holder may salvage/recycle lead-acid batteries at the site provided they are stored, handled and shipped in compliance with the Hazardous Waste Regulation and with section 28) of authorization. The operational certificate holder must not landfill auto hulks or tires equal to or less than 43.2 centimeters (17 inches) in rim size.

### 3.7 **Waste Asbestos**

The operational certificate holder is authorized to dispose of waste asbestos at the site. Subject to compliance with the requirements of section 40 of the Hazardous Waste Regulation and the following conditions:

- (a) The asbestos waste may not be mixed with any other hazardous waste.
- (b) The operational certificate holder must comply with all other applicable requirements of the Hazardous Waste Regulation, including but limited to, manifesting and waste record keeping.
- (c) The asbestos waste must be covered immediately buried with a minimum of 0.5 m of cover material.

### 3.8 **Contaminated Soil**

The operational certificate holder may dispose of soil at the landfill site if such soil contains contaminants in concentrations that are insufficient to cause such soil to be "hazardous waste" as defined by the Hazardous Waste Regulation. Permitted disposal includes monofilling, co-disposal with other wastes, use as a refuse cell berm material and use as a refuse cell cover material. Disposal of such soil must occur within a disposal area as authorized by sections 1.1 of this authorization. For greater certainty, such soil may not be used as final cover material.

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### 3.9 **Dead Animal Disposal**

The operational certificate holder may dispose of dead animals and animal parts in the disposal area mentioned in the most recent DOCP. The operational certificate holder must, as soon as reasonably practicable after such material is placed in the disposal area, apply cover of at least 60 centimeters of soil and/or refuse material such that flies and scavenging animals are prevented from accessing the carrion.

### 3.10 **Ozone Depleting Substances**

Release of ozone depleting substances from the storage, handling and disposal of used refrigerator equipment, freezers, motor vehicle air conditioners and other air conditioning equipment, fire extinguishers or other equipment containing ozone depleting substances is strictly forbidden as per the requirements of the Ozone Depleting Substances Regulation.

### 3.11 **Buffer Zone**

The operational holder must not landfill material within 50 meters of the boundary of the property on which the facility is located.

### 3.12 **Litter Control**

The operational certificate holder must use the best practical means available to prevent the scatter of litter at the site. The operational certificate holder must clean up any litter scattered into the neighboring property, along access roads, in drainage ditches, along litter control fences, into surrounding trees or elsewhere on the landfill site. The director may require the operational certificate holder to implement a specified frequency of clean-up and other additional requirements for refuse scatter control.

### 3.13 **Water Table Restriction**

The operational certificate holder must not permit wastes to be deposited or stored at the site at less than 1.2 meters above the highest groundwater level at the site.

### 3.14 **Inert Materials**

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The director may exempt specific inert materials from the requirements of section 3.13. The operational certificate holder must obtain the written permission of the director prior to any disposal or handling of inert materials on the bases of any such exemption.

### 3.15 Electric Fencing

#### 3.15.1 Design, Construction and Maintenance

The electric fencing must be designed, constructed, and maintained such that bears are prevented from penetrating the fence throughout the operating period. The director must be advised of any modifications to the fence.

#### 3.15.2 Fence Type - Fabric, Spacing, Posts

Fencing may be either high tensile smooth wire or fence fabric (e.g., mesh-wire, page-wire, chain link or the like). The configuration of a high tensile smooth wire fence must consist of a minimum of eight strands, with four energized strands alternating with four grounded strands. The bottom strand must be a grounded or (-) strand and must not be more than 10 cm from the ground (soil) at any location. The strands must be spaced apart, starting from the bottom strand, as follows (tolerance 2cm): 15, 15, 15, 20, 20, 20, and 25.

A fence fabric may be used instead of high tensile smooth wire. The fence fabric must: be a minimum of 1.22 meter high; be constructed of a minimum wire thickness of 11 gauge, and have a maximum mesh size of 15 cm. The bottom of the fabric must not be more than 10 cm from the ground (soil) at any location. Any uncharged fence fabric must have a minimum of four strands of charged wires on an outrigger system, spaced as follows: the first strand must not be higher than 25 cm from the ground; and each of the remaining three strands must be spaced approximately 25 cm apart from adjacent charged strands.

Fence posts must be spaced a maximum of 7.5 (tolerance 0.5 meters apart).

#### 3.15.3 Fence Tension

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The electric fence strands must be tightened to a minimum of 125 lbs. tension at 20 degrees Celsius. The required tension is to be corrected for temperature by use of the following formula for 12 1/2 gauge high tensile steel wire:

$$\text{Tension} = 125 - 2.5(\text{Temperature} - 20)$$

where: Tension is in pounds force; Temperature is in degrees Celsius

#### 3.15.4 Fence Grounding

A grounding system must be installed consisting of solid grounding rods (i.e., not pipe) with a minimum diameter of 16 mm (5/8 inch) that have a buried length of at least 2 meters. A minimum of three grounding rods (spaced at least 3 meters apart) must be installed and connected to the energizer. Alternative energizer grounding systems (e.g., grounding plates, or a deep-driven grounding system) may be used provided the grounding is equivalent to or better than three grounding rods. A grounding rod (or equivalent) must be installed at least once every 450 meters along the fence and connected to the grounded wire stands or uncharged fence fabric. Additional grounding may be required for dry sites or if other conditions affect proper grounding.

#### 3.15.5 Operating Period

The electric fence must be fully operational during the period of April 1 to October 31 inclusive each year and at any other time of year when there is bear activity in the immediate surrounding area. If snow is present during this period, any electrified strands above snow line must be isolated from the remainder of the system and energised. The director may vary the operating period with prior written authorization.

#### 3.15.6 Minimum Voltage

The electric fence must be operated with a minimum voltage of 6,000 volts. The entire perimeter of the electric fence must be inspected each week during the operating period and the voltage of the fencing measured at several points along the fence. The results of the voltage testing must be recorded in a logbook. Any results less than the minimum 6,000 volts must be immediately investigated for the cause of the low voltage (e.g., low battery, litter, vegetation, loose or crossed

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wires, broken insulators, breaks in the grounding system, etc.). Any problems that affect operation of the fence are to be immediately corrected (e.g. replacement of broken insulators, brush and litter removal to prevent grounding, etc.).

3.15.7 Gate(s)

Any access through electric fencing for vehicles, equipment and personnel must consist of an electrified gate system that is closed during non-operating hours. The gate system must be electrified to a minimum voltage of 6,000 volts at all times except when being opened or closed. Any gate that is open during operating hours must be periodically checked by the attendant for bear activity during hours of operation. Gaps between the gate and the fence and ground, and between gate panels (for a double-hung gate) must not exceed 10 cm.

3.15.8 Recording of Bear Activity near Fencing

Signs of digging or other attempts to penetrate electric fencing must be recorded in a log book. Any penetrations through electric fencing by bears must be immediately reported to the Conservation Officer Service.

3.16 Waste Measurement

The operational certificate holder must measure or estimate the quantity of waste material landfilled at the site by means acceptable to the director. The operational certificate holder must, by June 30<sup>th</sup> of each year, submit to the director a summary of such measures or estimations for the previous calendar year expressed in tonnes/yr and/or m<sup>3</sup>/yr.

4. LANDFILL GAS MANAGEMENT

The operational certificate holder must ensure that:

- (a) The Facility does not cause:
  - (i) combustible gas concentrations to exceed the lower explosive limit of methane (5 percent by volume), or a lower concentration specified by the director, in soil at the Facility Site Boundary;
  - (ii) combustible gas concentrations to exceed 20 percent of the lower explosive limit of methane (1 percent by volume) in any building;

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(iii) federal, provincial, or local ambient air quality objectives and standards to be exceeded in air at the Facility Site Boundary.

(b) Landfill gas is managed in accordance with all migration and health and safety requirements.

## 5. LEACHATE MANAGEMENT REQUIREMENTS

### 5.1 Leachate Containment and Collection

The operational certificate holder must ensure that leachate is contained and collected, as much as practicable, through the use of a natural soil barrier system.

### 5.2 Facultative Lagoon

Contained and collected leachate must be treated in a facultative lagoon subject to the following conditions:

#### 5.2.1 Size

The facultative lagoon must be sized to provide for winter storage of leachate and to maintain a minimum of 30 days retention time during the remaining seasons.

#### 5.2.2 Location

The facultative lagoon must be located approximately as shown on the attached site plan.

#### 5.2.3 Seepage Control

Design and construction of the facultative lagoon must be such that seepage through the berms must not occur.

#### 5.2.4 Signage and Fencing

The facultative leachate treatment lagoon area must be clearly identified at the landfill site and must be fenced with a chainlink or steel woven-wire (e.g., page wire) fence a minimum of 1.2 meters high to keep out children and animals. Signs identifying the nature of the leachate

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treatment lagoon must be erected on all sides of the fence such that the lagoon is easily identifiable from any approach. The lettering on the sign must be such that it is clearly readable by the public when they approach the liquid waste disposal area.

5.2.5 Freeboard

A minimum freeboard of 50 centimetres must be maintained at all times. The lagoon berms must be maintained in good working order and the Director must be notified immediately of any failure, seepage or overflow.

5.2.6 Sludge Removal and Disposal

Sludge levels must be monitored and sludge removal conducted as necessary to ensure for the proper functioning of the facultative treatment of leachate. Sludge removed from the leachate treatment lagoon must not be used for composting. Notwithstanding section 3.6 of this operational certificate, the disposal of sludge from the facultative leachate treatment pond may occur under section 1.1. Leachate sludge deposited at an active face of a designated solid waste disposal area under sections 1.1 must be covered immediately with a minimum of 30 centimeters of cover material and then the area of sludge disposal compacted immediately after cover is applied.

6. **OPERATIONAL REQUIREMENTS FOR COMPOSTING**

6.1 **Location**

The operational certificate holder may identify an area for composting (herein referred to as the composting area). Any composting must be restricted to the designated composting area. This area must be clearly identified at the landfill site. Signs which identify the nature of the waste acceptable at the designated composting area must be erected and maintained. The lettering on the sign must be such that it is clearly readable by the public when they approach the composting area.

6.2 **On-Site Usage of Compost Product**

Composting may be conducted passively by static pile (i.e., no aeration, etc.) provided the compost product is used on-site at the landfill for cover,

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reclamation or landscaping purposes. The compost piles must be rested at least one year after the last addition of organic waste prior to use.

### 6.3 Use of Sewage Sludge

Dewatered sludge from the liquid waste disposal lagoons authorized by section 1.3 may be included in static compost piles provided: the sludge is first blended with carbonaceous material (e.g., sawdust and/or wood shavings); and the public is prohibited from accessing any composting area that includes sludge.

### 6.4 Off-site Usage of Compost Product

If compost product is to be made available to the public or otherwise-used offsite, composting operations must comply with the requirements of the Organic Matter Recycling Regulation and any other relevant composting legislation.

## 7. OPERATIONAL REQUIREMENT FOR STORAGE OF SELECTED WASTES FOR SALVAGE AND RECYCLING

### 7.1 Location

The operational certificate holder may identify an area at the site for the storage of selected wastes for salvage and recycling (herein referred to as the salvage/recycling area). The operational certificate holder must restrict any salvage/recycling to the designated salvage/recycling area. The operational certificate holder must clearly identify the salvage/recycling area at the landfill site. The operational certificate holder must erect and maintain signs which identify the nature of the materials acceptable at the designated salvage/recycling area. The lettering on the signs must be such that it is clearly readable by the public when they approach the salvage/recycling area.

### 7.2 Nature of Waste

The operational certificate holder may salvage/recycle any wastes with potential salvage or recycling value such as tires, lead-acid batteries, auto hulks, white goods, furniture, used lumber, used goods and the like, but must not accept for salvage or recycling any refuse consisting of or containing putrescibles, any liquid wastes, hot ashes or materials otherwise restricted by section 3.6.

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### 7.3 **Compliance**

Salvage/recycling must comply with the requirements of the Storage of Recyclable Material Regulation and any other relevant legislation and any additional requirements contained in this operational certificate.

### 7.4 **Contamination**

Contamination of any of the designated salvage/recycling storage piles with putrescible wastes must be cleaned up immediately. Contamination of any of the storage piles with materials other than the intended salvageable/recyclable material (e.g., scrap metal with wood waste, or white goods with demolition debris, etc.) may result in a requirement to clean up the contamination or to landfill the contaminated material.

## 8. **OPERATIONAL REQUIREMENTS FOR REGULATED OPEN BURNING**

### 8.1 **Designated Area for Open Burning at Landfill**

The operational certificate holder may identify an area at the landfill site for the use of open burning to treat wood and associated products (herein referred to as the “open burning area”).

The operational certificate holder must ensure that:

- (i) any open burning is restricted to the open burning area,
- (ii) the open burning area is clearly identified at the landfill site,
- (iii) signs which identify the nature of the waste acceptable at the open burning area are erected and maintained, and
- (iv) the lettering on such signs is clearly readable by the public when they approach the open burning area.

### 8.2 **Sources of Wastes**

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Acceptable sources of selected combustibles include typical residential, commercial and institutional sources but does not include any industrial wood processing facilities (sawmills, pulpmills, re-manufacturing plants, etc.).

### 8.3 **Waste Types Allowed for Open Burning**

The operational certificate holder must not burn waste unless it is acceptable to the director. Acceptable materials include unpainted, untreated demolition and construction wood wastes, pallets, brush, stumps, paper and cardboard, but excluding nuisance causing combustibles such as painted and treated wood, plywood, particle board, sawdust, yard wastes, mulch, wood chips, rubber, plastics, tars, insulation, etc.

### 8.4 **Duration and Frequency**

A burning session is defined as a continuous burning period with a maximum duration of 48 hours. Burning sessions must take place at a frequency not to exceed 12 per year.

### 8.5 **Authorization for Open Burning**

The operational certificate holder may only conduct an open burn in accordance with the following:

#### (a) **Fire Control**

Burning must take place only when conditions promote rapid combustion and dispersion of emissions. No burning must take place during periods of fire hazard nor when burning is prohibited by other government agencies.

#### (b) **Prevention of Spread of Fire**

The operational certificate holder may only conduct an open burn when the proposed burn has been approved by the Ministry of Forests, Lands and Natural Resource Operations and/or Fire Chief of the local municipality who will determine whether it is safe to burn and may specify conditions under which burning may take place. Prior to initiating an open burn, the operational certificate holder must obtain a burn registration number from the Ministry of Forests, Lands and Natural Resource Operations for each burn (1-888-797-1717).

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(c) Fire Accelerant

The operational certificate holder must ignite the open burn using an approved fire accelerant such as diesel fuel or commercial fire starter gel, or a flame-thrower to ensure efficient and rapid ignition of the waste material.

(d) Minimization of Smoke

The operational certificate holder must manage, and add combustible material to, each open burn in a manner that minimizes smoke emissions. Measures to minimize smoke emissions must include: stacking of waste that will be burned in a manner that eliminates dirt; stacking and drying any green or wet wastes that will be burned until reasonably dry; delaying the burning of waste until such waste is reasonably dry after any significant rainfall; and having satisfactory control of adding waste into the fire through use of adequate equipment and staff. Burning material at the edge of the burn must be periodically pushed into the center of the burn to promote rapid combustion.

(e) Smoke Reduction if Weather Changes

The operational certificate holder must ensure that wastes are not added to the open burn pile and burning residue is extinguished as soon as is practical if:

- (i) local winds make the dispersion of the smoke inadequate;
- (ii) an inversion forms, trapping smoke near the surface; and/or
- (iii) the director imposes an open burning restriction.

8.6 **Combustion Residue Disposal**

The operational certificate holder must incorporate the residue of combustion from a burn into the landfill authorized in Section 1.1 as soon as such residue has cooled to ambient temperature.

8.7 **Attendant**

The operational certificate holder must ensure that an attendant is on duty at the [site/Facility] at all times for the duration of any open burn.

8.8 **Fire Prevention**

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The operational certificate holder must make all reasonable efforts to prevent unauthorized fires from occurring at the landfill site. The operational certificate holder must maintain a fire break that is clear of all combustible materials and at least 15 metres wide around all disposal, treatment and individual storage areas which have received or are receiving combustible materials. Disposal areas that have had 30 cm of compacted mineral soil cell cover or final cover applied are exempt. The operational certificate holder must maintain water supply and pumping capabilities and/or soil and earth moving equipment at a sufficient level to extinguish fires. The operational certificate holder must have a Fire Prevention and Response Plan in place at all times.

#### 8.9 **Extinguishing Fires**

In the event of an unauthorized fire, including any smoldering fire, the operational certificate holder must immediately make all reasonable efforts to extinguish the fire. The operational certificate holder must immediately report any fire which poses a threat to public health or to neighboring property to the BC Environmental Emergency Program (phone: 1-800-663-3456) and any local fire authority.

#### 8.10 **Cessation of Burn**

The operational certificate holder must immediately extinguish an active burn if instructed to do so by the Director or his/her authorized representative.

#### 8.11 **Open Burning Smoke Control Regulation**

The operational certificate holder must follow the *Open Burning Smoke Control Regulation* available at the following web address: <https://www2.gov.bc.ca/gov/content/environment/air-land-water/air/air-pollution/smoke-burning/regulations/openburningregulation>. Notably that before debris can be ignited, the Ventilation Index must be predicted to be both **GOOD (55-100)** this afternoon as well as **FAIR or GOOD (34-100)** tomorrow afternoon. Here is a link to the ventilation index <http://www.env.gov.bc.ca/epd/epdpa/venting/>

### 9. **OPERATIONAL REQUIREMENTS FOR DISPOSAL OF LIQUID WASTES**

#### 9.1 **Location**

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The operational certificate holder may identify an area for the controlled disposal of selected liquid wastes (herein referred to as the liquid waste disposal area). Disposal of any liquid wastes (from pumper trucks, holding tanks or the like) must be restricted to the designated liquid waste disposal area.

### 9.2 **Liquid Waste Disposal Lagoons**

Disposal of any liquid wastes must be to properly designed and constructed lagoon(s) located in the liquid waste disposal area. The lagoon(s) may function as exfiltration lagoons, decant lagoons (with decant discharged to an authorized liquid waste handling system such as a leachate treatment system) or as part of an organic matter composting system. Construction of any new lagoons must require the written permission of the Director. Non-exfiltration lagoons must be of an impervious design that prevents the escapement of liquid to the ground. In all cases, design and construction of the liquid waste disposal lagoon(s) must be such that seepage through the berms must not occur.

### 9.3 **Signage and Fencing**

The liquid waste disposal area must be clearly identified at the landfill site and s must be fenced with a chainlink or steel woven-wire (e.g., page wire) fence a minimum of 1.2 metres high to keep out children and animals. Signs which identify the nature of the waste acceptable at the designated lagoons must be erected and maintained at the entrance to the lagoon area. Signs identifying the nature of the lagoon disposal area must be erected on all sides of the fence such that the lagoons are easily identifiable from any approach. The lettering on the sign must be such that it is clearly readable by the public when they approach the liquid waste disposal area.

### 9.4 **Freeboard**

A minimum freeboard of 50 centimetres must be maintained at all times. The lagoon berms must be maintained in good working order and the Director must be notified immediately of any failure or overflow.

### 9.5 **Nature of Wastes**

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The nature of wastes which may be discharged to a designated lagoon is that of typical septic tank pumpage, sewage holding tank waste, sewage treatment plant sludge, and wash water and grit from drain sumps at automobile wash facilities (intended primarily for cars and light trucks) and parking lots. Industrial liquid wastes and sludges must be excluded.

9.6 **Off-Loading Chute**

An off-loading chute must be provided to ensure that all effluent enters the lagoon and does not spill on the ground in the unloading area.

9.7 **Sludge Removal**

If the sludge is to be removed from a lagoon for final disposal at an active face of a landfill (under section 1.1) or for composting (under section 6), then the lagoon must be rested for a sufficient amount of time to allow the wastes to dewater. Semi-solid sludge may be removed and stockpiled above ground for further dewatering provided: the sludge stockpile is located on impervious ground; drainage from the stockpile area is directed into the lagoon or other approved liquid waste disposal system (e.g., a leachate collection and treatment system) and provided the sludge stockpile is contained within a signed and fenced area as per section 9.3. Once the solidified sludge is deposited at an active face of a designated solid waste disposal area, it must be covered immediately with a minimum of 30 centimetres of cover material and then the area of sludge disposal compacted immediately after cover is applied.

9.8 **Lagoon Closure**

If a lagoon is to be closed without removal of sludge as per section 9.7, the sludge must be allowed to dewater to a moisture content that will support final cover. The lagoon must then be covered with a minimum of 1 meter of compacted soil and sloped to promote runoff.

9.9 **Volume Measurement**

The operational certificate holder must maintain in a log book a record of quantities of sewage wastes discharged to the lagoons.

10. **MONITORING AND SAMPLING REQUIREMENTS**

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### 10.1 Monitoring and Sampling Facilities

The operational certificate holder must install and maintain, measurement, monitoring and sampling facilities for leachate, surface water and groundwater, in compliance with, and including at locations specified in, the most recent DOCP.

### 10.2 Monitoring and Sampling

The operational certificate holder must carry out measurement, monitoring and sampling of leachate, stormwater, surface water and groundwater, in compliance with, and including at frequencies and for substances specified in, the most recent DOCP.

### 10.3 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.

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>

### 10.4 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>.

### 10.5 Quality Assurance

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- (a) The operational certificate holder must obtain from the analytical laboratory(ies) their precision, accuracy and blank data for each sample set submitted by the operational certificate holder and an evaluation of the data acceptability, based on criteria set by such laboratory.
- (b) The operational certificate holder must prepare and submit for analysis by the analytical laboratory(ies) a duplicate sample for each sampling event.
- (c) The operational certificate holder must submit samples to analytical laboratory(ies) that meet the definition of a qualified laboratory under the Environmental Data Quality Assurance Regulation.

**10.6 Groundwater Monitoring**

The operational certificate holder must cause a qualified professional to develop a monitoring program and identify potential environmental impacts of the discharge to the receiving environment. The operational certificate holder must conduct a groundwater monitoring program that is satisfactory to the director. The operational certificate holder must install and maintain groundwater monitoring wells, with the numbers, locations and design and installation details that are satisfactory to the director. At minimum the following table requirement must be completed.

Location	Parameter	Frequency
MW-1A (E251536), MW-1B (E251537), MW-2 (E251538), MW-3 (E251539), MW-4 (E251540),	<u>Field Measurements</u> pH, conductivity, temperature, water elevation  <u>Lab Measurements</u> pH, Conductivity, Specific Conductance, TSS, TDS, Alkalinity Total (CaCO <sub>3</sub> ), bromide, chloride, fluoride, sulphate, hardness, BOD, COD, Ammonia, Nitrate + Nitrite, Nitrate, Nitrite, Orthophosphate and Dissolved metals	Bi-annual

**10.7 Surface Water Monitoring**

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 Authorizations - North Region

The operational certificate holder must cause a qualified professional to develop a monitoring program and identify potential environmental impacts of the discharge to the receiving environment. The operational certificate holder must conduct a surface water monitoring program that is satisfactory to the director. The operational certificate holder must install and maintain surface water monitoring locations and design and installation details that are satisfactory to the director. At minimum the following table requirement must be completed.

Location	Parameter	Frequency
SW2017-01 (Downstream) (E326534),  SW2017-02 (Upstream) (E326533) &  SW-3 (Treatment Lagoon outlet) (E245722)	<u>Field Measurements</u>  pH, conductivity, temperature, water elevation  <u>Lab Measurements</u>  pH, Conductivity, Specific Conductance, TSS, TDS, Alkalinity Total (CaCO <sub>3</sub> ), bromide, chloride, fluoride, sulphate, hardness, BOD, COD, Ammonia, Nitrate + Nitrite, Nitrate, Nitrite, Orthophosphate and Total metals	Bi-annual

### 10.8 Data Uploading

The operational certificate holder must cause the analytical laboratory(ies) to upload monitoring and analytical data required by this operational certificate, to the Ministry’s Environmental Monitoring System (EMS) database, on or before 30 days after the data is available, or as further instructed by the director.

## 11. REPORTING REQUIREMENTS

### 11.1 Non-compliance Notification

The operational certificate holder must immediately notify the director by email at [EnvironmentalCompliance@gov.bc.ca](mailto:EnvironmentalCompliance@gov.bc.ca), or as otherwise instructed by the director of any non-compliance with the requirements of this

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Authorization and must immediately take remedial action to remedy any effects of such non-compliance.

### 11.2 **Non-compliance Reporting**

The operational certificate holder must, within 30 days of any non-compliance event, submit to the director a written report that includes, but is not necessarily limited to, the following:

- (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](mailto: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: <http://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions/non-compliance-reporting-mailbox>.

### 11.3 **Annual Operations and Monitoring Report**

(a) The operational certificate holder must submit an Annual Operations and Monitoring Report which has been prepared and certified by a Qualified Professional, for the preceding calendar year, to the director on or before June 30<sup>th</sup> of each year.

(b) The operational certificate holder must submit Annual Operations and Monitoring Report by email to the Ministry's Routine Environmental Reporting Submission Mailbox (RERSM) at [Envauthorizationsreporting@gov.bc.ca](mailto: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->

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[discharge-authorization/data-and-report-submissions/routine-environmental-reporting-submission-mailbox.](#)

(c) The Annual Operations and Monitoring Report must include the following information:

Operations Report:

- (i) Tonnages and categories of waste and recyclable material received at the Facility, and how they were managed,
- (ii) Tonnages and categories of waste discharged to the Landfill,
- (iii) Remaining volume and life of the Landfill,
- (iv) Summary of leachate quality,
- (v) Summary of DOCP implementation,
- (vi) Summary of construction report(s),
- (vii) Summary of nuisances, wildlife nuisances, and complaints,
- (viii) Summary of non-compliance notifications and non-compliance reporting,
- (ix) Annual status form in accordance with the instructions and template at the ministry website  
<https://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions/annual-status-form>
- (x) For the next calendar year, summary of planned DOCP implementation and construction of Significant Works,

## 12. **CLOSURE REQUIREMENTS**

### 12.1 **Notification of Closure**

The operational certificate holder must notify the Director of final closure of the landfill 6 month prior in writing with an updated final closure plan.

### 12.2 **Final Cover**

The operational certificate holder must apply final cap and cover to all areas of the site that have reached final landfill elevations as soon as practical thereafter. Final cap and cover requirements must be in accordance with the most recent DOCP and will require a minimum of 0.6 meter of compact soil with a maximum hydraulic conductivity of  $1 \times 10^{-7}$  cm/sec and a minimum

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of 0.15 meters of topsoil with vegetation, or a functionally equivalent cover system.

### 12.3 **Progressive Application of Final Cover**

The landfill must progressively receive final cap & cover during the active life of the landfill. The maximum area of disposed refuse that has not yet received final cap and cover must not exceed 25% of the total final footprint area. Final cover is to be applied according to the specifications identified in “Meziadin Landfill Design, Operations and Closure Plan” by Sperling Hansen Associates, dated October 25, 2020.

## 13. **PUBLICATION OF DOCUMENTS**

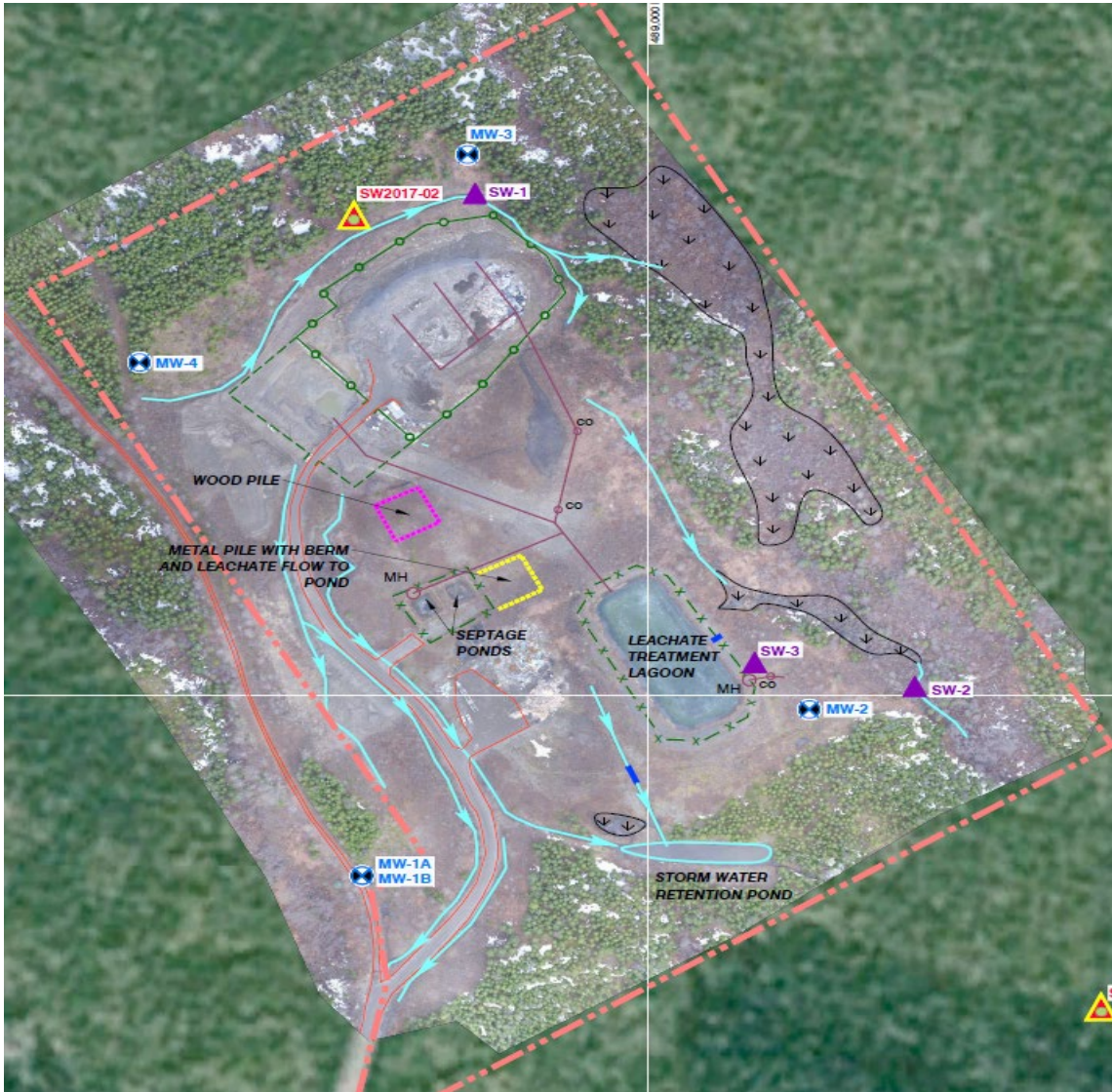
The Ministry of Environment and Climate Change Strategy publishes Regulatory Documents on its website for the purpose of research, public education and to provide transparency in the administration of environmental laws. The operational certificate holder acknowledges that the Province may publish any 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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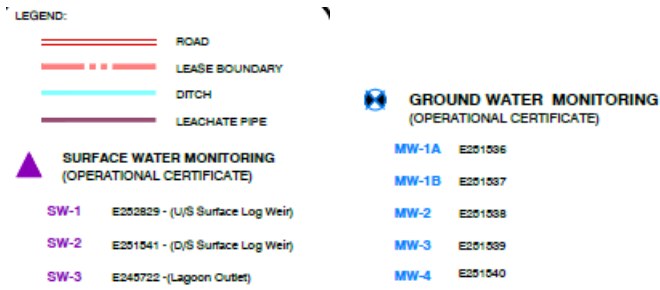
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**SITE PLAN A**



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Regional District of  
**Kitimat-Stikine**

## **Appendix B Environmental Monitoring Report**







## **2022 Annual Environmental Effects Monitoring Report**

Meziadin Waste Management Facility

June 23, 2023

Prepared for:  
Regional District of Kitimat-Stikine  
Suite 300 - 4545 Lazelle Avenue  
Terrace, BC, V8G 4E1

Prepared by:  
Stantec Consulting Ltd.  
#500 - 4515 Central Blvd.  
Burnaby, BC V5H 0C6

Project Number:  
12322272

## Limitations and Sign-off

This document entitled Annual Environmental Effects Monitoring (EEM) was prepared by Stantec Consulting Ltd. ("Stantec") for the account of the Regional District of Kitimat-Stikine (RDKS). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by: \_\_\_\_\_  
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Printed Name

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Signature  
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\_\_\_\_\_  
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Reviewed by: \_\_\_\_\_  
**Matthew Deane, P.Ag., PMP**  
\_\_\_\_\_  
Printed Name



## Executive Summary

Stantec Consulting Ltd. (Stantec) was retained by the Regional District of Kitimat-Stikine (RDKS) to prepare the 2022 Annual Environmental Effects Monitoring (EEM) Report for the Meziadin Waste Management Facility (WMF), herein referred to as the “Site”. A site plan is provided as Figure 1 in Appendix A.

The EEM was completed to satisfy the conditions of Operational Certificate (OC) # 15681 issued in August 2002 and amended in February 2022. Copies of the certificate and the amendment are provided in Appendix B.

The objective of the EEM was to identify impacts on the receiving environment from discharges that occurred under permit at the Site in 2022. The scope of work of the EEM reporting consisted of the following:

- Completing a review of analytical data from groundwater and surface water compared to the following regulatory criteria:
  - Contaminated Sites Regulation (CSR) standards;
  - BC Working and Approved Water Quality Guidelines (WQGs);
  - OC #15681 discharge characteristics.
- Evaluating impacts to the receiving environment.
- Completing a trend analysis on select geochemical parameters in groundwater to assess impacts from Site operations on the surrounding area.
- Providing recommendations for further sampling and analysis, if any.

Data used to generate the EEM Report was provided by RDKS and included:

- Biannual sampling of five groundwater monitoring wells;
- Biannual sampling of two surface water monitoring locations; and
- Biannual sampling and monitoring of a lagoon outlet.

Based on the information gathered and observations made during the EEM monitoring program, Stantec offers the following conclusions:

Six groundwater samples, including one blind field duplicate, were collected and submitted for laboratory analysis. The reported concentrations for all parameters analysed were less than the applicable CSR standards.

Two surface water locations were sampled in 2022 (SW2017-01 and SW2017-02). The following exceedances of the WQGs were identified:

- SW2017-01 (Downstream) – dissolved aluminum (October 2022)



- SW2017-02 (Upstream) – pH (April/October 2022), dissolved aluminum (October 2022), dissolved cadmium (October 2022), dissolved copper (October 2022)

Reported concentrations of dissolved aluminum were greater than the BC WQG at both the upstream site (SW2017-02), and downstream site (SW2017-01). The reported concentrations were similar (0.412 compared with 0.216 mg/L) between the upgradient and downgradient sampling locations; therefore, it has been interpreted that the dissolved aluminum concentrations above the minimum WQG in 2022 are not attributed to the Site.

SW-03 (Lagoon Outlet) was sampled twice in 2022, reported concentrations of ammonia in both the samples (sampled in April and October 2022) were greater than the applicable CSR  $AW_{FW}$  standard.

Based on the analytical results and observations made during the 2022 monitoring program, Stantec recommends that the current monitoring and sampling program should be continued in 2023.

Stantec recommends that hydraulic conductivity is measured from three groundwater wells across the Site. This will help screen if future drinking water use is applicable to the Site or could be removed. If the results of the hydraulic conductivity testing indicates that drinking water use is not applicable, additional hydrogeological data would still need to be obtained to determine if shallow groundwater could impact a deeper aquifer that could be used for drinking water.

The statements made in this Executive Summary are subject to the same limitations included in the Limitations of this Report (Section 10) and are to be read in conjunction with the remainder of this report.



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## Acronyms / Abbreviations

AW	Aquatic Life
BC	British Columbia
BC ENV	BC Ministry of Environment and Climate Change Strategy
BC WQG	BC Water Quality Guidelines
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
BOD	Biological Oxygen Demand
CALA	Canadian Association for Laboratory Accreditation
CSR	Contaminated Sites Regulation
COD	Chemical Oxygen Demand
ENV	British Columbia Ministry of Environment and Climate Change
ESA	Environmental Site Assessment
GWPR	Groundwater Protection Regulation
HSVL	Headspace vapour levels
IL	Industrial Land Use Standards
m	Metre
mm	Millimetre
masl	Metres above sea level
mbg	Metres below ground surface
NAPL	Non-aqueous phase liquid
PAH	Polycyclic aromatic hydrocarbon
PCOC	Potential contaminant of concern
ppm	Parts per million
QA/QC	Quality Control and Quality Assurance
RPD	Relative Percent Difference
TDS	Total Dissolved Solids
TSS	Total Suspended Solids



# 1 Introduction

Stantec Consulting Ltd. (Stantec) was retained by the Regional District of Kitimat-Stikine (RDKS) to prepare the 2022 Annual Environmental Effects Monitoring (EEM) Report for the Meziadin Waste Management Facility (WMF), herein referred to as the “Site”. A site plan is provided as Figure 1 in Appendix A.

The EEM was completed to satisfy the conditions of Operational Certificate (OC) # 15681 issued in August 2002 and amended in February 2022. Copies of the certificate and the amendment are provided in Appendix B.

## 1.1 Objective and Scope of Work

The objective of the EEM was to identify impacts on the receiving environment from discharges that occurred under permit at the Site in 2022. The scope of work of the EEM reporting consisted of the following:

- Completing a review of analytical data from groundwater and surface water compared to the following regulatory criteria:
  - Contaminated Sites Regulation (CSR) standards;
  - BC Working and Approved Water Quality Guidelines (WQGs);
  - OC #15681 discharge characteristics.
- Evaluating impacts to the receiving environment.
- Completing a trend analysis on select geochemical parameters in groundwater to assess impacts from Site operations on the surrounding area.
- Providing recommendations for further sampling and analysis, if any.

Data used to generate the EEM Report was provided by RDKS and included:

- Biannual sampling of five groundwater monitoring wells;
- Biannual sampling of two surface water monitoring locations; and
- Biannual sampling and monitoring of a lagoon outlet.





## 2 Background

The following sections provide a description of the Site and a summary of relevant environmental reports and inspections previously completed for the Site.

### 2.1 Site Description

The following maps and reports were reviewed to identify the topographic, geologic, and hydrologic setting of the Site:

- GeoBC's web-based mapping tool iMapBC (accessed April 2023)
- Google Earth (accessed April 2023)

The location of the Site is approximately 9 km southeast of the Meziadin Junction on the western side of the Stewart-Cassiar Highway, as shown in Figure 1 in Appendix A. The Site is located approximately 800 meters west of the Nass River and approximately 900 meters east of the Meziadin River. The landfill covers an approximate area of 12 hectares and is situated on relatively flat land.

The Site is surrounded by two ridges to the east and west. The local topography has a gentle slope towards the south, causing surface drainage to flow towards the Meziadin River in the south and the Nass River in the southeast according to Sperling Hansen Associates 2022 report (SHA 2022). The Site's subsurface is comprised of a layer of sand and gravel with a thickness of 1 to 2 meters, underlain by a dense layer of sand, silt, and gravel glacial till that ranges in thickness from 2 to 7 meters (SHA 2022).

The Site functions as a facility for natural attenuation. The impact on the surrounding environment is minimized through dilution by precipitation. To mitigate potential leachate impact on the environment, a leachate collection system is in place, which drains to a facultative leachate treatment lagoon. This lagoon has a natural liner system (SHA 2022). The water from the lagoon is discharged through a solid pipe, which passes through a gravel biofilter and ultimately discharges to surface water on the eastern portion of the Site.



## 2.2 Previous Environmental Reports

Previous EEM reports for the Site have been completed by SHA and WSP Golder (WSP). The most recent EEM report provided was for 2021 and was prepared by SHA. Prior to the construction of the Site, a hydrogeological and geotechnical investigation was carried out by Associated Engineering (AE) in 1999.

Stantec has reviewed the 2021 report titled “2021 Meziadin Landfill Annual Monitoring Report”, SHA, dated June 2022 and the 2020 report titled “Meziadin Landfill, Meziadin Junction, BC, 2020 Annual Environmental Effects Monitoring Report”, Golder, dated June 2021.

The 2021 EEM report concluded that low levels of ammonia, below applicable standards and guidelines, were detected in on-Site groundwater as well as at upstream and downstream surface water sampling locations SW2017-02 and SW2017-01, respectively. The detections of ammonia in groundwater were indicated to represent slight impacts from on-Site operations.

SHA recommended the following for future work at the Site:

- Maintain consistent diversion of upstream clean surface water from landfill leachate as low ammonia levels were detected in upgradient surface water;
- Continue adequate ditch works and the use of mechanisms such as straw bales and check dams to control turbidity and sediment in surface water flow through the Site; and
- Wetlands construction to remove nutrients, provide a polishing effect, and further removing pollutants attached to suspended solids in the leachate.

### 2.2.1 Non-Compliance Reporting

The RDKS collected samples from additional surface water sample sites during the October 2022 sampling event to characterize discharge from the leaking exfiltration lagoon, and to monitor surface water that discharges to the Meziadin River. Samples were collected from a constructed ditch on site (SW22-03), and two tributaries to the Meziadin River (SW22-01 and SW22-04). A sample was also taken from leak location of the exfiltration lagoon (SW-05) where effluent is discharging into a wetland east of the site.

Water samples from the leaking lagoon (SW22-05), exceeded the WQG-AW for dissolved and total iron, total cobalt and total manganese and SW-DS exceeded the guideline for dissolved aluminum. Down gradient site SW22-01 exceeded the guideline for dissolved aluminum and dissolved iron. Down gradient site SW22-03 exceeded the guideline for total manganese and dissolved aluminum. All exceedances were observed in the October 2022 sampling event.

The RDKS has drafted a Request for Proposals (RFP) for design and engineering of leachate treatment works for the Meziadin landfill, including an environmental review of the site and repairs to the exfiltration treatment lagoon, and awarded the work. Construction is expected to take place in the summer and fall of 2024, pending any environmental permits or authorisations that may be required. A copy of the Non-Compliance report is provided in Appendix C.



## **2.2.2 Historical Data Tables**

Historical data tables have been provided by RDKS and are included as Appendix D. The data tables contain historical results for previous groundwater and surface water sampling. These data tables are presented as received and the standards, guidelines and criteria within these tables have not been modified or updated. These tables are included for the purposes of maintaining a record of historical data.



## 3 Regulatory Framework

Contaminated sites in BC are governed by the *Environmental Management Act* (the Act) and administered by the BC ENV. The *Contaminated Sites Regulation* (CSR) is the enabling regulation under the Act that outlines procedures for the investigation and reporting of contaminated sites and includes numerical standards for soil and groundwater quality for specific land and water uses.

The applicable groundwater and surface water standards and/or guidelines are summarized below.

### 3.1 Groundwater Standards

Leachate generated by the Site is managed under OC #15681. Groundwater outside of the landfill and leachate collection areas is regulated under the BC CSR. The CSR includes generic numerical standards for groundwater quality for specific water uses (i.e., aquatic life, irrigation, livestock, and drinking water).

Per the BC ENV *Protocol 21 (P21): Water Use Determination* (BC ENV, 2017), site-specific factors are used to determine if CSR standards protective of drinking water (DW) apply at the Site, with current and future uses evaluated separately. Based on section 3.2 of Protocol 21, the drinking water standards applies regardless of whether drinking water wells currently exist near the Site to protect aquifers that could support future drinking water wells. Therefore, the DW standards for groundwater are considered applicable to the Site based on the potential for future drinking water use.

A search of the BC Water Atlas through iMap BC (accessed April 2023) indicated that there are several nearby creeks located within 500 m of the Site. Therefore, the BC CSR groundwater standards for the protection of aquatic life in freshwater (CSR  $AW_{FW}$ ) water bodies are considered applicable to groundwater at the Site.

In summary the CSR  $AW_{FW}$  standards are applicable to the Site.

### 3.2 Surface Water Quality Guidelines and Standards

For the assessment of surface water quality within a freshwater waterbody, the BC ENV WQGs, both approved and working, were considered applicable. A search of the BC Water Atlas through iMap BC (accessed April 2023) indicated that registered surface water intakes (points of diversion) are not located within 500 m of the Site. Residential buildings have not been identified within 1 km of the Site. Based on this information, it is not anticipated that surface water within 1 km of the Site is used for drinking water on a permanent basis.

#### 3.2.1 Hazardous Waste Regulation

The HWR outlines siting standards for facilities that receive hazardous waste for treatment, storage, or disposal. Additionally, the HWR details operational and management requirements for facilities or businesses that generate, transport, or receive hazardous waste. Hazardous waste is generally defined as a dangerous good under the Federal Transportation of Dangerous Goods Act that no longer is



suitable for their intended purpose. Hazardous waste can also include, but not limited to waste containing polychlorinated biphenyls (PCBs), pesticides or residues, biomedical waste, oil, asbestos, polycyclic aromatic hydrocarbons (PAHs), leachable toxic waste and waste streams prescribed in Schedule 7 of the HWR.

Under the OC #15681, the Site is permitted to receive Waste Asbestos with quantities below 1000 kilograms over a 24 hour period.



## 4 Environmental Effects Monitoring Program

Sampling and monitoring for the 2022 EEM field program was completed by RDKS Environmental Technicians and overseen by the RDKS Environmental Services Coordinator. Groundwater and surface water samples were collected by RDKS field staff using procedures outlined in the BC Field Sampling Manual (BCFSM) Part D – Solids and Part E – Water and Wastewater Sampling. Field QA/QC procedures followed the BCFSM Part A – Quality Control and Quality Assurance.

Methodologies, field observations and well monitoring data documented from the field program are presented and discussed in the following sub-sections. Site photographs collected during the field investigation are presented in Appendix E.

### 4.1 Monitoring Locations

A summary of the monitoring and sampling, as well as the locations outlined in OC #15681 are discussed in the following sections.

#### 4.1.1 Groundwater

Groundwater was sampled from the existing monitoring wells in April and October 2022. Observations made during the groundwater monitoring program are summarized in Table 1 included in Appendix F.

The groundwater wells were monitored for depth to groundwater. Groundwater levels were measured using a Temperature, level and Conductivity meter (TLC meter) and the TLC meter was cleansed with a mixture of Alconox® and water prior to each measurement to prevent cross-contamination from well to well.

Groundwater purging and sample collection was performed with the use of a Waterra tubing. Prior to sampling, the monitoring wells were purged while monitoring the pH, conductivity, and temperature of the groundwater using a YSI water quality meter that was calibrated before each event following manufacturer's instructions. Water was removed (purged) from each well (up to three well casing volumes), until the monitored parameters stabilized. The samples were stored in ice-chilled coolers prior to delivery to ALS Laboratories (ALS) in Burnaby, BC for analysis under chain of custody protocol. ALS is accredited by the Canadian Association for Laboratory Accreditation (CALA).

Hydrocarbon-like odours or sheens were not observed in groundwater recovered from the monitoring wells.

Groundwater monitoring of geophysical parameters was completed using a YSI water quality meter that was calibrated before each event following manufacture's instructions. Samples were collected in clean, laboratory-supplied sample bottles, and transported to an accredited laboratory for analyses.

A summary of the groundwater monitoring and sampling locations and the parameters and frequency of analysis required by OC #15681 is provided in Table 4-1 below.



**Table 4-1: Groundwater Monitoring Locations and Parameters**

Sample Type	Monitoring Location	OC Station ID	Parameters/Frequency	Easting UTM <sup>1</sup>	Northing UTM <sup>1</sup>
Groundwater	MW-1A	E251536	<b>Bi-annually</b> <b>Laboratory</b> - pH, Conductivity, Specific Conductance, TSS, TDS, Alkalinity Total (CaCO <sub>3</sub> ), bromide, chloride, fluoride, sulphate, hardness, BOD, COD, Ammonia, Nitrate + Nitrite, Nitrate, Nitrite, Orthophosphate and Dissolved metals	488879	6211884
	MW-1B	E251537		488879	6211884
	MW-2	E251538		489100	6212015
	MW-3	E251539		488895	6212329
	MW-4	E251540		488730	6212188
	SW-03 (Effluent treatment Lagoon Outlet)	E245722		<b>Field</b> – pH, conductivity, temperature, water elevation	489054

Notes:

<sup>1</sup> Coordinates obtained by RDKS during the Annual Environmental Effects Monitoring 2022. Coordinates are reported to be approximate.

Where:

BOD = Biological Oxygen Demand

TOC = Total Dissolved Carbon

COD = Chemical Oxygen Demand

TSS=Total Suspended Solids

TDS= Total Dissolved Solids

#### 4.1.2 Surface Water

Surface water samples were collected two times in 2022. The surface water samples were observed to be clear during both sampling events. Hydrocarbon-like sheen and/or odours were not observed during the sampling events. Surface water samples were collected to minimize sediment disturbance.

Surface water samples were stored in ice-chilled coolers prior to delivery to ALS in Burnaby, BC for analysis under chain of custody protocol.

A summary of the surface water monitoring and sampling locations and the parameters and frequency of analysis required by OC #15681 is provided in Table 4-2 below. Dissolved Organic Carbon (DOC) and dissolved metals were added to the surface water analysis in 2022 to facilitate the interpretation of the WQG-AW for dissolved aluminum, dissolved cadmium, dissolved copper, and dissolved iron.



**Table 4-2: Surface Water Sample Locations and Parameter**

Monitoring Location	OC Station ID	Parameters/Frequency	Easting UTM <sup>1</sup>	Northing UTM <sup>1</sup>
SW2017-01 <sup>2</sup> (Downstream)	E326534	<b>Bi-annually</b> <b>Laboratory</b> – pH, Conductivity, Specific Conductance, TSS, TDS, Alkalinity Total (CaCO <sub>3</sub> ), bromide, chloride, fluoride, sulphate, hardness, BOD, COD, Ammonia, Nitrate + Nitrite, Nitrate, Nitrite, Orthophosphate and Total metals <b>Bi-annually</b> <b>Field</b> – pH, conductivity, temperature, water elevation	489271	6211781
SW2017-02 (Upstream)	E326533		488830	6212292

Notes:

<sup>1</sup> Coordinates obtained by RDKS during the Annual Environmental Effects Monitoring 2022. Coordinates are reported to be approximate.

<sup>2</sup> SW2017-01 was not sampled or monitored in April due to frozen conditions.

Where:

BOD = Biological Oxygen Demand

COD = Chemical Oxygen Demand

TSS=Total Suspended Solids

TDS= Total Dissolved Solids

## 4.2 Quality Assurance/ Quality Control Program

### 4.2.1 Field Duplicates and Relative Percent Difference (RPD)

A field duplicate sample is a split of a homogenized soil, groundwater, or surface water sample that is prepared and analyzed following the same procedure as the original sample. The relative percent different (RPD) is calculated for the results of the pair of samples. The RPD for two data points is equal to the difference divided by the mean multiplied by 100 percent, as shown below. The RPD is used to evaluate the precision of the laboratory analysis.

$$\left( \frac{|X_i - X_{ii}|}{\bar{X}} \right) \times 100 \%$$

**NOTES:**

$X_i$  Concentration in Original Sample

$X_{ii}$  Concentration in Duplicate Sample

$\bar{X}$  Mean of Sample Concentrations





Throughout the investigation, blind field duplicates (BFDs) were collected during the sampling event. These BFDs were collected at the same location, at the same time, by the same person utilizing the same equipment during field activities. The BC ENV suggests that BFDs should be collected at a rate of 10% of the total primary samples collected, and the following Table 4-3 summarizes the percent of BFDs obtained for surface water and groundwater.

**Table 4-3: Sample and Blind Field Duplicate Summary**

Sampled Media	Number of Samples	Number of BFDs	Percentage of BFDs	Total Samples Collected
Groundwater	10	1	10	11
Surface Water	5	1	0	5

Once RPD values were calculated for analytical results of original and field duplicate samples, RPD values were compared to recommended BC ENV RPD targets, categorized by analytical parameter. These RPD targets are presented in Table 4-4 below and were obtained from Q.#36 of the Q&A section (Category: Standards, Sub-Category: General) on the BC ENV Land Remediation website. The BC ENV recommends that the RPD for duplicate field samples not exceed 1.5 times the acceptable lab RPD for the same compound. The lab RPDs can be found in the BC Environmental Laboratory Manual<sup>1</sup>.

**Table 4-4: Recommended RPD Targets**

Parameter Category	Recommended RPD
<b>Organics in Soil</b>	
Polycyclic Aromatic Hydrocarbons (PAH)	75%
Volatile organics (including F1, BTEX and VH)	60%
F2-F4 (Similar to Extractable Petroleum Hydrocarbons (EPH))	60%
Most Other Typical Organic Parameters	60%
<b>Organics in Water<sup>2</sup></b>	
Volatile Organics (including F1, BTEX and VH)	45%
Most other Typical Organic Parameters	45%
<b>Others</b>	
High variability metals in soil: Ag, Al, Ba, Hg, K, Mo, Na, Pb, Sn, Sr, Ti	60%
Other metals in soil and sediment	45%
Metals in Water	30%
General Inorganics in Soil and Sediment	45%
General Inorganics in Water	30%

<sup>1</sup> BC ENV, 2016. British Columbia Environmental Laboratory Manual, 2015 Edition.

<sup>2</sup> The BC ENV manual does not specifically list soil vapour, therefore the water recommended RPDs were applied to soil vapour.



## 5 Summary of Results

A summary of the results of the groundwater and surface water sampling are provided in the following sections.

### 5.1 Groundwater

Based on the inferred groundwater flow direction (north to the south across the site), monitoring wells MW-3 and MW-4 represent upgradient groundwater conditions and monitoring wells MW-1A, MW-1B and MW-2 are considered to be downgradient of the Landfill.

Groundwater at five locations was monitored bi-annually in 2022. The Table 1 in Appendix F summarizes the monitoring data collected during the 2022 program.

Five groundwater samples, and one blind field duplicate, were collected in April 2022 and submitted for laboratory analysis of the parameters listed in Section 4.1.1.

Reported concentrations of dissolved cobalt and manganese were greater than the applicable CSR DW standards in groundwater samples collected from MW-1B in April and October 2022.

The reported concentrations of other analysed parameters in the groundwater samples were less than the applicable CSR AW<sub>FW</sub> and DW standards.

SW-03 (Lagoon Outlet) was sampled twice in 2022 and submitted for laboratory analysis of the parameters listed in Section 4.1.1. Surface water sample SW-03 was collected from a manhole and represents both the pond, and the discharged effluent and as such was compared to the CSR AW<sub>FW</sub> standards. Reported concentrations of ammonia in both the samples were greater than the applicable CSR AW<sub>FW</sub> standard.

The groundwater lagoon outlet analytical results from this investigation are summarized in Table 3 in Appendix F. Laboratory analytical certificates are provided in Appendix G.

### 5.2 Surface Water

Surface water at two locations were monitored bi-annually in 2022 except for SW2017-01; surface water at this location was frozen during the April 2022 monitoring program and therefore a sample was not collected and the location was not monitored. Table 2 in Appendix F summarizes the monitoring data collected during the 2022 program. The following exceedances were identified:

**Table 5-1: Surface Water Analytical Results Exceedances Summary**

Sample Location	BC WQG AW Chronic	BC WQG AW Acute	BC WQG Working
SW2017-01 (Downstream)	<ul style="list-style-type: none"> <li>Dissolved Aluminum (Oct)</li> </ul>	<ul style="list-style-type: none"> <li>Dissolved Aluminum (Oct)</li> </ul>	<ul style="list-style-type: none"> <li>No Exceedances</li> </ul>



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Sample Location	BC WQG AW Chronic	BC WQG AW Acute	BC WQG Working
<p align="center"><b>SW2017-02</b> <b>(Upstream)</b></p>	<ul style="list-style-type: none"> <li>• pH (Apr/Oct)</li> <li>• Dissolved Aluminum (Oct)</li> <li>• Dissolved Cadmium (Oct)</li> <li>• Dissolved Copper (Oct)</li> </ul>	<ul style="list-style-type: none"> <li>• Dissolved Aluminum (Oct)</li> <li>• Dissolved Copper (Oct)</li> <li>• Dissolved Silver (Oct)</li> </ul>	<ul style="list-style-type: none"> <li>• No Exceedances</li> </ul>

The surface water analytical results from this investigation are summarized in Table 4 in Appendix F. Laboratory analytical certificates are provided in Appendix G.



## 6 QA/QC Summary

The RPDs were less than the DQOs for the sample and its duplicate for all parameters tested during this program.

### 6.1 Laboratory QA/QC

Stantec reviewed the laboratory QA/QC data and identified the following outliers.

#### Work Order VA22A7804

- The laboratory reported that DUP, MW1A, MW1B, MW2, MW3 and MW4 exceeded ALS recommended hold times for dissolved orthophosphate prior to sample analysis. However, the dissolved orthophosphate is not regulated under BC CSR.
- The laboratory reported that DUP, MW1A, MW1B, MW2, MW3 and MW4 exceeded ALS recommended hold times for nitrite and nitrate prior to sample analysis. However, the reported concentrations of nitrite and nitrate were below the applicable BC CSR standards. The recommended hold times was 3 days and the samples were analyzed on the 4<sup>th</sup> day.
- The laboratory reported that DUP, Field Blank, MW1A, MW1B, MW2, MW3 and MW4 samples exceeded ALS recommended hold times for pH prior to sample reception. However, pH is not regulated under the BC CSR for comparison.

#### Work Order VA22A7805

- The laboratory reported that Lagoon Outlet and SW2017-02-US samples exceeded ALS recommended hold times for pH prior to sample reception. However, pH in the above sample was measured in the field and the pH values met the applicable BC WQGs. Further, it is practically not possible to submit the sample to ALS within the recommended hold time of 15 minutes.
- The laboratory reported that matrix spike recovery of total ammonia in QC Lot: 465965 could not be accurately calculated due to high analyte background in sample.

#### Work Order VA22C6348

- The laboratory reported that biochemical oxygen demand (BOD) and orthophosphate in MW-02, MW-03, MW-04, MW-1A and MW-1B samples exceeded ALS recommended hold time for BOD and orthophosphate prior to sample analysis. However, BOD and orthophosphate are not regulated under the BC CSR for comparison.
- The laboratory reported that MW-02, MW-03, MW-04, MW-1A and MW-1B samples exceeded ALS recommended hold times for nitrite prior to sample analysis. However, the reported concentrations of nitrite were below the applicable BC CSR standards. The recommended hold times was 3 days and the samples were analyzed on the 7<sup>th</sup> day.



- The laboratory reported that MW-02, MW-03, MW-04, MW-1A and MW-1B samples exceeded ALS recommended hold times for pH prior to sample reception. However, pH is not regulated under the BC CSR for comparison.
- The laboratory reported that matrix spike recovery of total ammonia in QC Lot: 728860 could not be accurately calculated due to high analyte background in sample.

**Work Order VA22C6296**

- The laboratory reported that BOD and orthophosphate in SW2017-01 DS, SW2017-02 US, SW22-01, SW22-03, SW22-04, SW22-05, SW22-09 and treatment lagoon samples exceeded ALS recommended hold time for BOD and orthophosphate prior to sample analysis. However, BOD and orthophosphate are not regulated under the BC WQGs for comparison.
- The laboratory reported that SW2017-01 DS, SW2017-02 US, SW22-01, SW22-03, SW22-04, SW22-05, SW22-09 and treatment lagoon samples exceeded ALS recommended hold time for nitrite prior to sample analysis. However, reported concentrations of nitrite were below the BC WQGs.
- The laboratory reported that SW2017-01 DS, SW2017-02 US, SW22-01, SW22-03, SW22-04, SW22-05, SW22-09 and treatment lagoon samples exceeded ALS recommended hold times for pH prior to sample reception. However, pH in the above sample was measured in the field and the pH values met the applicable BC WQGs. Further, it is practically not possible to submit the sample to ALS within the recommended hold time of 15 minutes.
- The laboratory reported that matrix spike recovery of total ammonia in QC Lot: 728860 could not be accurately calculated due to high analyte background in sample.



## 7 Trend Analysis

To assess the changes in water quality over time, a temporal graph of select EEM data for groundwater and surface water was completed and presented in Appendix H. Non-detectable results were plotted at the detection limit where applicable. The time frame represented in the temporal graphs is 2017 to 2022. For consistency purposes, the parameters selected for trend analysis follow previous EEM reports and include the following:

- Concentrations
- Ammonia
- Electrical Conductivity
- Chloride
- Sulphate
- Iron

These geochemical parameters are used as a screening list to assist in identifying if something likely originating from the Site may have been introduced into an aquifer or surface water and is influencing the geochemistry or surface water chemistry. The following upward trends were identified in the temporal plots.

- Concentrations of sulphate in groundwater appear to be slightly trending upward in all monitoring wells sampled except for MW-1B. This trend was observed in both hydraulically upgradient and downgradient monitoring wells.
- Reported concentrations appear to be trending upward for SW-03 (lagoon outlet location) for all plotted analyzed parameters.

## 8 Discussion

Upon reviewing the trend plots, the values of the parameters have remained relatively stable during the monitoring years for groundwater.

In groundwater, concentrations of dissolved cobalt and manganese were greater than the applicable CSR DW standards in groundwater samples collected from MW-1B in April and October 2022. Further, higher levels of ammonia, chloride, pH, and conductivity have been detected historically at monitoring well MW-1A compared to other monitoring wells at the Site. This difference in concentrations is evident in the trend analysis in Appendix H, which appears to be trending downwards.

In surface water, SW2017-01 (downstream) and SW2017-02 (upstream) had low levels of ammonia and chloride. Ammonia was present in surface water downgradient of the Site at concentrations slightly higher than the upgradient concentration.



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### 8 Discussion

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The lagoon outlet location (SW-03) had higher levels of ammonia, chloride, conductivity, iron, and manganese during the 2022 program than previous years; historically, these parameters have been increasing over time. Most notably, the total iron concentration in SW-03 reached 96 mg/L during the April 2022 sampling program. Historically, total iron concentration in SW-03 ranged between 0.36 mg/L in 2020 and 5.13 in 2021.



## 9 Conclusion and Recommendations

Based on the information gathered and observations made during the EEM monitoring program, Stantec offers the following conclusions:

Six groundwater samples, including one blind field duplicate, were collected and submitted for laboratory analysis. Concentrations of dissolved cobalt and manganese were greater than the applicable CSR DW standards in groundwater samples collected from MW-1B in April and October 2022. The reported concentrations for remaining parameters in groundwater samples analysed were less than the CSR  $AW_{FW}$  and DW standards.

Three surface water locations were sampled in 2022 (SW2017-01, SW2017-02 and blind field duplicate SW22-09). The following exceedances of the WQGs were identified:

- SW2017-01 (Downstream) – dissolved aluminum (October 2022)
- SW2017-02 (Upstream) – pH (April/October 2022), dissolved aluminum (October 2022), dissolved cadmium (October 2022), dissolved copper (October 2022)

Reported concentrations of dissolved aluminum were greater than the BC WQG at both the upstream (SW2017-02), and downstream site (SW2017-01). The reported concentrations were similar (0.412 compared with 0.216 mg/L) between the upgradient and downgradient sampling locations; therefore, it has been interpreted that the dissolved aluminum concentrations above the minimum WQG in 2022 are not attributed to the Site.

SW-03 (Lagoon Outlet) was sampled twice in 2022, reported concentrations of ammonia in both the samples (sampled in April and October 2022) were greater than the applicable CSR  $AW_{FW}$  standard.

Based on the analytical results and observations made during the 2022 monitoring program, Stantec recommends that the current monitoring and sampling program should be continued in 2023.

In the 2021 EEM report completed by SHA, and the 2020 report completed by Golder, both consultants concluded that DW standards were not applicable for the Site. Golder concluded that there is no current drinking water use at or near the Site, and none of the underlying saturated geological materials beneath the Site are considered an aquifer as defined in Protocol 21. This does not appear to be inline with the current Protocol 21 that requires information on the maximum or bulk hydraulic conductivity across the site. Stantec recommends that hydraulic conductivity is measured from three groundwater wells across the Site. This will help screen if future drinking water use is applicable to the Site or could be removed. If the results of the hydraulic conductivity testing indicates that drinking water use is not applicable, additional hydrogeological data would still need to be obtained to determine if shallow groundwater could impact a deeper aquifer that could be used for drinking water.





## 10 Limitations

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential liabilities associated with the identified property.

This report provides an evaluation of selected environmental conditions associated with the identified portion of the property that was assessed at the time the work was conducted and is based on information obtained by and/or provided to Stantec at that time. There are no assurances regarding the accuracy and completeness of this information. All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

The opinions in this report can only be relied upon as they relate to the condition of the portion of the identified property that was assessed at the time the work was conducted. Activities at the property subsequent to Stantec's assessment may have significantly altered the property's condition. Stantec cannot comment on other areas of the property that were not assessed.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report and are based solely on the scope of work described in the report, the limited data available and the results of the work. They are not a certification of the property's environmental condition. This report should not be construed as legal advice.

This report has been prepared for the exclusive use of the client identified herein and any use by any third party is prohibited. Stantec assumes no responsibility for losses, damages, liabilities or claims, howsoever arising, from third party use of this report. The locations of any utilities, buildings and structures, and property boundaries illustrated in or described within this report, if any, including pole lines, conduits, water mains, sewers and other surface or sub-surface utilities and structures are not guaranteed. Before starting work, the exact location of all such utilities and structures should be confirmed and Stantec assumes no liability for damage to them.

This report is limited by the following:

- Stantec did not conduct, nor was present, for the sampling and monitoring events in 2022
- Historical data was provided to Stantec by RDKS, and is presumed to be accurate

The conclusions are based on the site conditions encountered by Stantec at the time the work was performed at the specific testing and/or sampling locations, and conditions may vary among sampling locations. Factors such as areas of potential concern identified in previous studies, site conditions (e.g., utilities) and cost may have constrained the sampling locations used in this assessment. In addition, analysis has been carried out for only a limited number of chemical parameters, and it should not be inferred that other chemical species are not present. Due to the nature of the investigation and the limited



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### **10 Limitations**

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data available, Stantec does not warrant against undiscovered environmental liabilities nor that the sampling results are indicative of the condition of the entire site. As the purpose of this report is to identify site conditions which may pose an environmental risk; the identification of non-environmental risks to structures or people on the site is beyond the scope of this assessment.

Should additional information become available which differs significantly from our understanding of conditions presented in this report, Stantec specifically disclaims any responsibility to update the conclusions in this report.



## 11 References

- BC ENV Field Sampling Manual , Version: 2013, Accessed at <https://www2.gov.bc.ca/gov/content/environment/research-monitoringreporting/monitoring/laboratory-standards-quality-assurance/bc-field-sampling-manual>, on April 20, 2023
- BC ENV. Protocol 21 For Contaminated Sites: Water Use Determination, Version 1 November 2017, Accessed at: [https://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-remediation/docs/protocols/protocol\\_21.pdf](https://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-remediation/docs/protocols/protocol_21.pdf), on April 20, 2023
- BC ENV. BC Ministry of Environment and Climate Change Strategy
- BC ENV Protocol 4 For Contaminated Sites: Establishing local background concentrations in soil, Version: 1 February 2023, Accessed at <https://www2.gov.bc.ca/assets/gov/environment/airland-water/site-remediation/docs/protocols/protocol04.pdf>, on April 20, 2023
- BC ENV. Contaminated Sites Regulation (2021), B.C. Reg. 179/2021
- BC ENV. Hazardous Waste Regulation (2022), B.C. Reg. 63/88
- Environmental Management Act. RSBC 2003 Chapter 53. Victoria, BC.
- EMA Operational Certificate #15681, (2019)
- iMapBC, Accessed at <https://www2.gov.bc.ca/gov/content/data/geographic-data-services/web-based-mapping/imapbc>, on April, 2023
- Sperling Hansen Associates, 2021 Meziadin Landfill Annual Monitoring Report, (2022)



# Appendices



# Appendix A      Site Plan









## Appendix B      Operational Certificate





MINISTRY OF WATER, LAND  
AND AIR PROTECTION

OPERATIONAL CERTIFICATE  
MR-15681

for the

MEZIADAN LANDFILL

*Under the Provisions of the Waste Management Act  
and in Accordance with the  
Regional District of Kitimat-Stikine's Solid Waste Management Plan*

**Regional District of Kitimat-Stikine**

**Suite 300 – 4545 Lazelle Avenue**

**Terrace, British Columbia**

**V8J 4E1**

is authorized to store, handle, treat and discharge municipal waste at a sanitary landfill facility located near Meziadan, British Columbia, subject to the terms and conditions listed below. Contravention of any of these conditions is a violation of the *Waste Management Act* and may result in prosecution.

This operational certificate does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works.

Date Issued: **AUG 08 2002**  
Date Amended:  
(most recent)  
Page: 1 of 22

A handwritten signature in blue ink, appearing to read 'J. Hofweber', written over a horizontal line.

J. Hofweber, P. Eng.  
Assistant Regional Waste Manager



1. **LOCATION OF LANDFILL PROPERTY**

The location of the property where discharges are authorized to occur is Block A of District Lots 2458 and 2459, Cassiar District.

2. **AUTHORIZED DISCHARGES**

2.1. **Municipal Solid Waste**

This section applies to the discharge of municipal solid waste to ground. The site reference number for this discharge is E245720.

2.1.1. **Quantity of Discharge**

The quantity of solid wastes discharged to ground shall not exceed the design capacity of the landfill facility specified as follows: (1) by an engineered final design footprint (see section 3.3); and (2) by engineered excavation and final grade contours (see section 3.4).

2.1.2. **Characteristics of the Discharge**

Subject to sections 6.2, 6.3 and 6.4, the characteristics of the discharge shall be typical of municipal solid waste.

2.1.3. **Authorized Works**

The authorized works are a separate municipal solid waste disposal area and related appurtenances located approximately as shown on the attached Site Plan A.

2.2. **Open Burning Air Contaminants**

This section applies to the discharge of air contaminants to the atmosphere from the regulated open burning of selected combustibles. The site reference number for this discharge is E245760.

2.2.1. **Quantity of Discharge**

The maximum authorized quantity of discharge of air contaminants is indeterminate.

2.2.2. **Characteristics of the Discharge**

The characteristics of the discharge shall be typical of those resulting from the regulated open burning of selected combustibles as per section 11.3.

2.2.3. Authorized Works

The authorized works are a separate burn area associated with a landfill operation and related appurtenances located approximately as shown on the attached Site Plan A.

2.3. Liquid Wastes

This section applies to the discharge of selected liquid wastes to the ground. The site reference number for this discharge is E245721.

2.3.1. Quantity of Discharge

The maximum authorized quantity of discharge is indeterminate.

2.3.2. Characteristics of the Discharge

The characteristics of the discharge shall be those typical of septic tank pumpage, holding tank effluent, sewage treatment plant sludges, and wash water and grit from drain sumps at car and light truck wash facilities and parking lots.

2.3.3. Authorized Works

The authorized works are liquid waste exfiltration lagoons and related appurtenances located approximately as shown on the attached Site Plan A.

2.4. Leachate

This section applies to the discharge of leachate to a biological filter. The site reference number for this discharge is E245722.

2.4.1. Quantity of Discharge

The maximum authorized rate of discharge is indeterminate. The discharge may occur 24 hours/day, 7 days/week.

2.4.2. Characteristics of the Discharge

The characteristics of the leachate discharge shall be typical of leachate treated by a facultative lagoon with a minimum retention time of 30 days.

2.4.3. Authorized Works

The authorized works are leachate collection and treatment facilities and related appurtenances located approximately as shown on the attached Site Plan A.

3. LANDFILL DESIGN

3.1. Design by Qualified Professional(s)

The landfill and associated works [including but not limited to the size(s) and location(s) of disposal area(s), maximum allowable slopes of disposal area(s), leachate management system, progressive and final closure details, etc.] shall be designed by qualified professionals [such as engineer(s) and/or geoscientist(s)] registered in the Province of British Columbia who have expertise in the field of landfill design. Where a design feature prepared by a qualified professional is in conflict with any requirement of this operational certificate, it shall be brought to the attention of the Regional Waste Manager who shall determine a resolution to the conflict.

3.2. Construction

The landfill and associated works shall be constructed in accordance with the design prepared by qualified professionals.

3.3. Engineered Footprint

The landfill design shall include preparation of an engineered footprint delineating the maximum extent of solid waste disposal allowable at the facility horizontally (in plan view). The engineered footprint shall be clearly shown on a scaled plan of the site and the plan shall be made available in an electronic format as a computer aided design (CAD) drawing (see section 3.5).

3.4. Engineered Excavation and Final Grade Contours

The landfill design shall include preparation of engineered excavation grade and final grade contours delineating the maximum extent of solid waste disposal allowable at the facility vertically (in cross-sectional view). The engineered excavation and final grade contours shall be clearly shown on scaled drawings (accompanied with typical cross sections to aid in depicting the landfill profile) and the drawings shall be made available in an electronic format as computer aided design (CAD) drawings (see section 3.5).

**3.5. Scaled Drawings**

A scaled site plan accurately showing the legal survey, the engineered footprint, and final design contours shall be submitted to the Regional Waste Manager on or before March 31, 2003 in hardcopy and in electronic format (in a standard CAD drawing file format). Additional scaled drawings showing excavation contours and typical cross sectional views of the site shall also be submitted to the Regional Waste Manager on or before March 31, 2003 in hardcopy and in electronic format (in a standard CAD drawing file format).

**4. LANDFILL GAS MANAGEMENT**

**4.1. Lower Explosive Limit**

The landfill shall be designed and operated such that combustible gas concentrations do not exceed the lower explosive limit in soils at the property boundary or 25% of the lower explosive limit in any on-site or off-site structure or facility, including any services (water, sewer, electrical, etc.).

**4.2. Gas Venting or Recovery and Management Systems**

If the emission of non-methane organic compounds (NMOC's) exceeds 150 tonnes/year, the installation and operation of a landfill gas recovery system is required.

**5. LEACHATE MANAGEMENT REQUIREMENTS**

**5.1. Leachate Containment and Collection**

The operational certificate holder shall ensure that leachate is contained and collected, as much as practicable, through the use of a natural soil barrier system.

**5.2. Facultative Lagoon**

Contained and collected leachate shall be treated in a facultative lagoon subject to the following conditions:

**5.2.1. Size**

The facultative lagoon shall be sized to provide for winter storage of leachate and to maintain a minimum of 30 days retention time during the remaining seasons.



5.2.2. Location

The facultative lagoon shall be located approximately as shown on the attached site plan.

5.2.3. Seepage Control

Design and construction of the facultative lagoon shall be such that seepage through the berms shall not occur.

5.2.4. Signage and Fencing

The facultative leachate treatment lagoon area shall be clearly identified at the landfill site and shall be fenced with a chainlink or steel woven-wire (e.g., page wire) fence a minimum of 1.2 metres high to keep out children and animals. Signs identifying the nature of the leachate treatment lagoon shall be erected on all sides of the fence such that the lagoon is easily identifiable from any approach. The lettering on the sign shall be such that it is clearly readable by the public when they approach the liquid waste disposal area.

5.2.5. Freeboard

A minimum freeboard of 50 centimetres shall be maintained at all times. The lagoon berms shall be maintained in good working order and the Regional Waste Manager shall be notified immediately of any failure, seepage or overflow.

5.2.6. Sludge Removal and Disposal

Sludge levels shall be monitored and sludge removal conducted as necessary to ensure for the proper functioning of the facultative treatment of leachate. Sludge removed from the leachate treatment lagoon shall not be used for composting. Notwithstanding section 6.2 of this operational certificate, the disposal of sludge from the facultative leachate treatment pond may occur under section 2.1. Leachate sludge deposited at an active face of a designated solid waste disposal area under sections 7 or 8 must be covered immediately with a minimum of 30 centimetres of cover material and then the area of sludge disposal compacted immediately after cover is applied.

6. **GENERAL REQUIREMENTS**

6.1. **Site Identification**

A sign shall be erected at the main entrance to the site which identifies the following: site name, owner and operator, contact phone number and address, hours of operation, tipping fees (if applicable) and prohibition of special wastes. The lettering on the sign shall be such that it is clearly readable by the public when they approach the entrance of the landfill site.

6.2. **Prohibited Wastes**

No wastes as defined by the *Special Waste Regulation* shall be received, stored or disposed of at this site except as authorized by the Regional Waste Manager. Lead-acid batteries shall not be landfilled but may be salvaged/recycled provided they are stored, handled and shipped in compliance with the *Special Waste Regulation* and with section 10 of this operational certificate. Tires equal to or less than 43.2 centimetres (17") in rim size and autohulks shall not be landfilled.

6.3. **Waste Asbestos**

Notwithstanding section 6.2 of this operational certificate, the disposal of waste asbestos under section 2.1 of this operational certificate and in compliance with the requirements of section 40 of the *Special Waste Regulation* is hereby authorized.

6.4. **Contaminated Soil**

Soil that contains contaminants in concentrations less than "special waste" as defined by the *Special Waste Regulation* may be disposed at the landfill site. Disposal includes monofilling, co-disposal with other wastes, use as a refuse cell berm material and use as a refuse cell cover material. Disposal must occur within a disposal area as authorized by sections 7 and 8 of this operational certificate. Disposal does not include use as final cover material. A Contaminated Soil Relocation Agreement (CSRA) as defined by the *Waste Management Act* is required if the soil contamination exceeds industrial and/or commercial levels and the soil volume being relocated from a specific site exceeds 5 (five) m<sup>3</sup>.

6.5. **Waste Measurement**

The quantity of waste material landfilled at the site shall be measured or estimated by means suitable to the Regional Waste Manager. The results shall be submitted once per year on or before January 31 for the previous year expressed in tonnes/yr and/or m<sup>3</sup>/y.



**6.6. Ozone Depleting Substances**

Release of ozone depleting substances from the storage, handling and disposal of used refrigerator equipment, freezers, motor vehicle air conditioners and other air conditioning equipment, fire extinguishers or other equipment containing ozone depleting substances is strictly forbidden as per the requirements of the *Ozone Depleting Substances Regulation*.

**6.7. Fire Prevention**

The operational certificate holder shall make all reasonable efforts to prevent unauthorized fires from occurring at the landfill site. As a minimum, a fire break clear of all combustible materials at least 15 metres wide shall surround all disposal, treatment and individual storage areas which have received or are receiving combustible materials. Disposal areas that have had 30 cm of compacted mineral soil cell cover or final cover applied are exempt. Water supply and pumping capabilities and/or soil and earth moving equipment shall be maintained at a sufficient level to extinguish fires. In addition, reasonable efforts shall include, but are not necessarily limited to, the preparation of a Fire Prevention and Response Plan.

**6.8. Extinguishment of Fires**

In the event of an unauthorized fire (including any smouldering fire), the operational certificate holder shall immediately make all reasonable efforts to extinguish the fire. Any fire which poses a threat to public health or to neighboring property shall be reported to the Provincial Emergency Program (phone: 1-800-663-3456) and any local fire authority.

**6.9. Buffer Zone**

No material shall be landfilled within 50 metres of the property boundary.

**6.10. Litter Control**

The operational certificate holder shall make all reasonable efforts to prevent litter from scattering. Any litter scattered on neighbouring property shall be cleaned up as soon as practicable.

**6.11. Water Table Restriction**

Wastes shall not be deposited or stored less than 1.2 metres above the highest groundwater level.

**6.12. Inert Materials**

Specific inert materials may be exempted from the requirements of section 6.11 by the Regional Waste Manager. The permission of the Regional Waste Manager must be obtained in writing prior to any disposal or handling of inert materials on an exemption basis.

**6.13. Bear-Proof Containment of Putrescibles**

All putrescible wastes that arrive at the landfill facility must be immediately contained within a bear-proof bin (i.e., on-site transfer station of bear-proof design and construction) or within an area enclosed by an electric fence. Grass, leaves, weeds, branches and ground woodwaste are not considered putrescible for the purposes of this operational certificate.

**6.14. Electric Fencing**

**6.14.1. Design, Construction and Maintenance**

Wherever required, electric fencing at the landfill site shall be designed, constructed, and maintained such that bears are prevented from penetrating the fence.

**6.14.2. Fence Type**

Fencing may be either high tensile smooth wire or fence fabric (e.g., mesh-wire, page-wire, chainlink or the like). The configuration of a high tensile smooth wire fence shall consist of a minimum of eight strands, with four energized strands alternating with four grounded strands as follows: the bottom strand shall be a grounded or (-) strand and shall not be more than 10 cm from the ground (soil) at any location; and thence starting from the bottom strand, the other seven strands shall be spaced  $15 \pm 2$  cm,  $15 \pm 2$  cm,  $15 \pm 2$  cm,  $20 \pm 2$  cm,  $20 \pm 2$  cm,  $20 \pm 2$  cm, and  $25 \pm 2$  cm. Additional strands to this minimum configuration may be used.

A fence fabric may be used instead of high tensile smooth wire. The fence fabric shall: be a minimum of 1.22 metre high; be constructed of a minimum wire thickness of 11 gauge, and have a maximum mesh size of 15 cm. The bottom of the fabric shall not be more than 10 cm from the ground (soil) at any location. Any uncharged fence fabric must have a minimum of four strands of charged wires on an outrigger system, spaced as follows: the first strand shall not be higher than 25 cm from the ground; and each of the remaining three strands shall be spaced approximately 25 cm apart from adjacent charged strands.





6.14.3. Wire Tension

For a high tensile smooth wire fence construction, all strands shall be tightened to a minimum of 125 lbs tension at 20°C. The required tension is to be corrected for temperature by use of the following formula for 12-½ gauge high tensile steel wire:

$$Tension = 125 - 2.5(Temperature - 20)$$

where: *Tension* is in lbs force

*Temperature* is in °C

6.14.4. Post Spacing

Fence posts shall be spaced a maximum of 7.5 metres apart.

6.14.5. Grounding System

A grounding system shall be installed consisting of solid grounding rods (i.e., not pipe) with a minimum diameter of 16 mm (5/8 inch) that have a buried length of at least 2 metres. A minimum of three grounding rods (spaced at least 3 metres apart) shall be installed and connected to the energizer.

Alternative energizer grounding systems (e.g., grounding plates, or a deep-driven grounding system) may be used provided the grounding is equivalent to or better than three grounding rods. A grounding rod (or equivalent) shall be installed at least once every 450 metres along the fence and connected to the grounded wire stands or uncharged fence fabric. Additional grounding may be required for dry sites or if other conditions affect proper grounding.

6.14.6. Period of Operation

Electric fencing shall be fully operational during the period of April 1 to October 31 inclusive each year and at any other time of year when there is bear activity in the immediate surrounding area. If snow is present during this period, any electrified strands above snow line shall be isolated from the remainder of the system and energized.

6.14.7. Minimum Voltage

Electric fencing shall be operated with a minimum voltage of 6,000 volts.

6.14.8. Gate(s)

Any access through electric fencing for vehicles, equipment and personnel shall consist of an electrified gate system that is closed during non-operating hours. The gate system shall be electrified to a minimum voltage of 6,000

volts at all times except when being opened or closed. Any gate that is open during operating hours shall be periodically checked by the attendant for bear activity during hours of operation. Gaps between the gate and the fence and ground, and between gate panels (for a double-hung gate) shall not exceed 10 cm.

#### 6.14.9. Fence Inspections

The entire perimeter of the electric fencing shall be inspected at least once every seven days and the voltage of the fencing measured at several points along the fencing and at each gate using a proper electric fence voltmeter matched to the brand of the fence charging unit. The results of voltage testing shall be recorded in a log book. Any results less than the minimum 6,000 volts shall be immediately investigated for the cause of the low voltage (e.g., low battery, litter, vegetation, loose or crossed wires, broken insulators, breaks in the grounding system, etc.). Corrective actions to restore proper voltage shall be immediately undertaken.

Signs of digging or other attempts by bears to penetrate electric fencing shall be recorded in a log book. Any penetrations through electric fencing by bears shall be immediately reported to the Conservation Officer Service.

In cases of low voltage or signs of penetration attempts, inspections shall be increased from once per week to once per day until proper voltage is fully restored and until there are no new signs of penetration attempts, respectively.

#### 6.15. Municipal Solid Waste Separation

Municipal solid waste may be separated into the following streams: (1) a mixed waste stream including putrescibles for disposal; (2) a mixed waste stream not including any putrescibles for disposal; (3) an organic waste stream, including untreated wood wastes, for composting; (4) a selected waste stream for salvage and recycling; and (5) a selected combustibles waste stream for open burning. Each of these waste streams is subject to all of the general requirements contained in sections 6.1 through 6.14 above, as well as being subject to specific requirements as outlined in a separate section for each below.

### 7. OPERATIONAL REQUIREMENTS FOR DISPOSAL OF SOLID WASTES CONTAINING PUTRESCIBLES

#### 7.1. Location

The operational certificate holder shall identify an area for disposal of putrescible refuse (herein referred to as the putrescible disposal area) that is within the authorized municipal solid waste disposal footprint (see section 2.1.1). Disposal of any solid wastes consisting of or mixed with putrescibles shall be restricted to

the designated putrescible disposal area. Signs which identify the nature of the waste acceptable at the designated putrescible disposal area shall be erected and maintained. The lettering on the sign shall be such that it is clearly readable by the public when they approach the putrescible disposal area.

**7.2. Nature of Wastes**

Wastes disposed at the active face of the putrescible disposal area may include any municipal solid waste except liquid wastes and hot ashes or as otherwise restricted by section 6.2.

**7.3. Bear-Proofing**

The putrescible waste disposal area shall be maintained inside an electric fence. The electric fence shall comply with all requirements of section 6.14.

**7.4. Waste Compaction**

Wastes at the active face of the putrescible disposal area shall be spread in layers of 60 centimetres or less on the active face and then compacted with a minimum of three (3) passes with heavy equipment.

**7.5. Maximum Lift Height**

The maximum height of any lift of compacted refuse in the putrescible disposal area shall not exceed 3 metres.

**7.6. Waste Cover**

Cover shall be applied to refuse as specified below. The operational certificate holder shall maintain a log book to record all dates of cover application.

**7.6.1. Active Face Cover**

Except as otherwise stated in 7.6.2, the active face does not normally require cover. Based on information concerning environmental or public health concerns related to exposed refuse at the active face, however, the Regional Waste Manager may require that the active face be covered completely at a specified frequency with 0.15 m of soil (or functional equivalent) for a specified period.

**7.6.2. Cell Cover**

A uniform cover of 30 cm compacted soil shall be applied to all sides of the active refuse cell such that no more than 300 m<sup>2</sup> of refuse are exposed at the active face at any time and such that the volume of refuse in the cell

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does not exceed 2500 m<sup>3</sup>. Once the maximum volume of refuse has been reached in a cell, the active face shall be covered with 30 cm of compacted soil and a new refuse cell begun.

7.6.3. Final Cover

Completed portions of the landfill shall progressively receive final cover during the active life of the landfill (see section 15.4).

7.7. Dead Animal Disposal

Dead animals and animal parts shall be disposed of in the putrescible disposal area and covered as soon as practicable with a minimum of 60 centimetres of soil and/or refuse material such that flies and scavenging animals are prevented from accessing the carrion.

8. OPERATIONAL REQUIREMENTS FOR DISPOSAL OF NON-PUTRESCIBLE SOLID WASTES

8.1. Location

The operational certificate holder may identify an area for the disposal of non-putrescible wastes (herein referred to as the non-putrescible disposal area) that is within the authorized municipal solid waste disposal footprint (see section 2.1.1). Signs which identify the nature of the waste acceptable at the designated non-putrescible disposal area shall be erected and maintained. The lettering on the sign shall be such that it is clearly readable by the public when they approach the non-putrescible disposal area.

8.2. Nature of Wastes

Wastes disposed at the active face of the non-putrescible disposal area may include any municipal solid waste except putrescibles, liquid wastes and hot ashes or materials otherwise restricted by section 6.2.

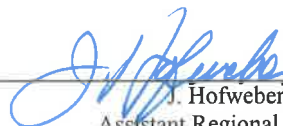
8.3. Waste Compaction

Wastes at the active face of the non-putrescible disposal area shall be spread in layers of 60 centimetres or less on the active face and then compacted with a minimum of three (3) passes with heavy equipment.

8.4. Maximum Lift Height

The maximum height of any lift of compacted refuse in the non-putrescible disposal area shall not exceed 3 metres.

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## 8.5. Waste Cover

Cover shall be applied to refuse as specified below. The operational certificate holder shall maintain a log book to record all dates of cover application.

### 8.5.1. Active Face Cover

Except as otherwise stated in 8.5.2, the active face does not normally require cover. Based on information concerning environmental or public health concerns related to exposed refuse at the active face, however, the Regional Waste Manager may require that the active face be covered completely at a specified frequency with 0.15 m of soil (or functional equivalent) for a specified period.

### 8.5.2. Cell Cover

A uniform cover of 30 cm compacted soil shall be applied to all sides of the active refuse cell such that no more than 300 m<sup>2</sup> of refuse are exposed at the active face at any time and such that the volume of refuse in the cell does not exceed 2500 m<sup>3</sup>. Once the maximum volume of refuse has been reached in a cell, the active face shall be covered with 30 cm of compacted soil and a new refuse cell begun.

### 8.5.3. Final Cover

Completed portions of the landfill shall progressively receive final cover during the active life of the landfill (see section 15.4).

## 9. OPERATIONAL REQUIREMENTS FOR COMPOSTING

### 9.1. Location

The operational certificate holder may identify an area for composting (herein referred to as the composting area). Any composting shall be restricted to the designated composting area. This area shall be clearly identified at the landfill site. Signs which identify the nature of the waste acceptable at the designated composting area shall be erected and maintained. The lettering on the sign shall be such that it is clearly readable by the public when they approach the composting area.

### 9.2. On-Site Usage of Compost Product

Composting may be conducted passively by static pile (i.e., no aeration, etc.) provided the compost product is used on-site at the landfill for cover, reclamation



or landscaping purposes. The compost piles must be rested at least one year after the last addition of organic waste prior to use.

**9.3. Use of Sewage Sludge**

Dewatered sludge from the liquid waste disposal lagoons authorized by section 2.3 may be included in static compost piles provided: the sludge is first blended with carbonaceous material (e.g., sawdust and/or wood shavings); and the public is prohibited from accessing any composting area that includes sludge.

**9.4. Off-site Usage of Compost Product**

If compost product is to be made available to the public or otherwise used offsite, composting operations shall comply with the requirements of the *Production and Use of Compost Regulation* and any other relevant composting legislation.

**9.5. Bear-Proofing**

If the composting operation is to receive any organic wastes that are potential attractants to bears, then composting shall be completely enclosed by an electric fence or contained in a bear-proof structure (building or composting vessel). The electric fence shall comply with all requirements of section 6.14.

**10. OPERATIONAL REQUIREMENTS FOR STORAGE OF SELECTED WASTES FOR SALVAGE AND RECYCLING**

**10.1. Location**

The operational certificate holder may identify an area for the storage of selected wastes for salvage and recycling (herein referred to as the salvage/recycling area). Any salvage/recycling shall be restricted to the designated salvage/recycling area. This area shall be clearly identified at the landfill site. Signs which identify the nature of the materials acceptable at the designated salvage/recycling area shall be erected and maintained. The lettering on the sign shall be such that it is clearly readable by the public when they approach the salvage/recycling area.

**10.2. Nature of Wastes**

Wastes to be salvaged/recycled may be any items with potential salvage or recycling value such as tires, lead-acid batteries, auto hulks, white goods, furniture, used lumber, used goods and the like, but shall not include any refuse consisting of or containing putrescibles, any liquid wastes, hot ashes or materials otherwise restricted by section 6.2.

**10.3. Compliance**

Salvage/recycling shall comply with the requirements of the *Storage of Recyclable Material Regulation* and any other relevant legislation and any additional requirements contained in this operational certificate.

**10.4. Contamination**

Contamination of any of the designated salvage/recycling storage piles with putrescible wastes shall be cleaned up immediately. Contamination of any of the storage piles with materials other than the intended salvageable/recyclable material (e.g., scrap metal with wood waste, or white goods with demolition debris, etc.) may result in a requirement to clean up the contamination or to landfill the contaminated material.

**11. OPERATIONAL REQUIREMENTS FOR REGULATED OPEN BURNING**

**11.1. Location**

The operational certificate holder may identify an area for the use of open burning to treat selected combustibles (herein referred to as the open burning area). Any open burning of selected wastes shall be restricted to the designated open burning area. This area shall be clearly identified at the landfill site. Signs which identify the nature of the waste acceptable at the designated open burning area shall be erected and maintained. The lettering on the sign shall be such that it is clearly readable by the public when they approach the burning area.

**11.2. Sources of Wastes**

Acceptable sources of selected combustibles include typical residential, commercial and institutional sources but does not include any industrial wood processing facilities (sawmills, pulpmills, re-manufacturing plants, etc.).

**11.3. Nature of Wastes**

Generally, no waste shall be burned which is unacceptable to the Regional Waste Manager. Acceptable materials include demolition and construction wood wastes, stumps, branches, trees, cardboard, and similar items, but excluding nuisance causing combustibles such as sawdust, rubber, plastics, tars, insulation, etc.

**11.4. Authorization of Burning**

Each burn event requires separate authorization with respect to adequate dispersion of smoke and prevention of spread of fire as follows:

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11.4.1. Adequate Smoke Dispersion

The procedures for gaining authorization to proceed with a burn event with respect to smoke dispersion are outlined in the document "Smoke Dispersion Authorization Procedures for Regulated Burning at Municipal Refuse Facilities in the Skeena Region". Notwithstanding these procedures, burning must not be initiated if the local air flow will cause the smoke to negatively impact a nearby population and/or atmospheric mixing at the site is insufficient to provide rapid dispersion of the smoke.

11.4.2. Prevention of Spread of Fire

Burning shall take place only when approved by the Ministry of Forests and/or Fire Chief of the local municipality who will determine whether it is safe to burn and may specify conditions under which burning may take place.

11.5. Fire Accelerant

An approved fire accelerant such as diesel fuel or commercial fire starter gel or a flame-thrower shall be used to ensure efficient and rapid ignition of the waste material.

11.6. Minimization of Smoke

Each burn shall be tended and fed in a manner that ensures smoke emissions are minimized. Measures to minimize smoke shall include, but not necessarily be limited to: stacking of waste in a manner that eliminates dirt; stacking and drying any green or wet wastes until reasonably dry; waiting to burn until wastes are reasonably dry after any significant rainfall; and having satisfactory control of feeding waste into the fire through use of adequate equipment and staff. Burning material at the edge of the burn shall be periodically pushed into the centre of the burn to promote rapid combustion.

11.7. Smoke Reduction if Weather Changes

Wastes must not be added to the open burn pile and burning residue must be extinguished as soon as is practical if: (a) local winds make the dispersion of the smoke inadequate; (b) an inversion forms, trapping smoke near the surface; and/or (c) the Regional Waste Manager imposes an open burning restriction.





**11.8. Residue of Combustion**

After the residue of combustion has cooled to ambient temperature it shall be incorporated into an active face of a designated solid waste disposal area (under section 7 or section 8).

**11.9. Documentation**

Each open burn event shall be documented on a standardized reporting form (entitled "Skeena Region Municipal Refuse Facility Regulated Open Burning Reporting Form") and submitted to the Regional Waste Manager via fax (1-250-847-7591) within 2 weeks of the completion of each open burn session.

**12. OPERATIONAL REQUIREMENTS FOR DISPOSAL OF LIQUID WASTES**

**12.1. Location**

The operational certificate holder may identify an area for the controlled disposal of selected liquid wastes (herein referred to as the liquid waste disposal area). Disposal of any liquid wastes (from pumper trucks, holding tanks or the like) shall be restricted to the designated liquid waste disposal area.

**12.2. Liquid Waste Disposal Lagoons**

Disposal of any liquid wastes shall be to properly designed and constructed lagoon(s) located in the liquid waste disposal area. The lagoon(s) may function as exfiltration lagoons, decant lagoons (with decant discharged to an authorized liquid waste handling system such as a leachate treatment system) or as part of an organic matter composting system. Construction of any new lagoons shall require the written permission of the Regional Waste Manager. Non-exfiltration lagoons shall be of an impervious design that prevents the escapement of liquid to the ground. In all cases, design and construction of the liquid waste disposal lagoon(s) shall be such that seepage through the berms shall not occur.

**12.3. Signage and Fencing**

The liquid waste disposal area shall be clearly identified at the landfill site and shall be fenced with a chainlink or steel woven-wire (e.g., page wire) fence a minimum of 1.2 metres high to keep out children and animals. Signs which identify the nature of the waste acceptable at the designated lagoons shall be erected and maintained at the entrance to the lagoon area. Signs identifying the nature of the lagoon disposal area shall be erected on all sides of the fence such that the lagoons are easily identifiable from any approach. The lettering on the sign shall be such that it is clearly readable by the public when they approach the liquid waste disposal area.

**12.4. Freeboard**

A minimum freeboard of 50 centimetres shall be maintained at all times. The lagoon berms shall be maintained in good working order and the Regional Waste Manager shall be notified immediately of any failure or overflow.

**12.5. Nature of Wastes**

The nature of wastes which may be discharged to a designated lagoon is that of typical septic tank pumpage, sewage holding tank waste, sewage treatment plant sludge, and wash water and grit from drain sumps at automobile wash facilities (intended primarily for cars and light trucks) and parking lots. Industrial liquid wastes and sludges shall be excluded.

**12.6. Off-Loading Chute**

An off-loading chute shall be provided to ensure that all effluent enters the lagoon and does not spill on the ground in the unloading area.

**12.7. Sludge Removal**

If the sludge is to be removed from a lagoon for final disposal at an active face of a designated solid waste disposal area (under section 7) or for composting (under section 9), then the lagoon must be rested for a sufficient amount of time to allow the wastes to dewater. Semi-solid sludge may be removed and stockpiled above ground for further dewatering provided: the sludge stockpile is located on impervious ground; drainage from the stockpile area is directed into the lagoon or other approved liquid waste disposal system (e.g., a leachate collection and treatment system) and provided the sludge stockpile is contained within a signed and fenced area as per section 12.3. Once the solidified sludge is deposited at an active face of a designated solid waste disposal area, it must be covered immediately with a minimum of 30 centimetres of cover material and then the area of sludge disposal compacted immediately after cover is applied.

**12.8. Lagoon Closure**

If a lagoon is to be closed without removal of sludge as per section 12.7, the sludge must be allowed to dewater to a moisture content that will support final cover. The lagoon must then be covered with a minimum of 1 metre of compacted soil and sloped to promote runoff.

**12.9. Volume Measurement**

The operational certificate holder shall maintain in a log book a record of quantities of sewage wastes discharged to the lagoons.

**13. MONITORING REQUIREMENTS**

The operational certificate holder shall carry out an environmental monitoring program, including reporting of results, as required by the Regional Waste Manager in a separate letter. The monitoring program may include, but not necessarily be limited to, sampling and testing raw and treated leachate, groundwater and surface waters, sampling and testing fish and other organisms, sampling and testing landfill gas, etc.

**14. DATA ANALYSES AND REPORTING**

**14.1. Log Book**

As required by sections 6.14.9, 7.6, 8.5, and 12.9, the operational certificate holder shall maintain a log book. The log book shall be made available for inspection upon request by Ministry staff.

**14.2. Reporting**

As required by sections 6.5, 11.9 and any requirements of separate letters for monitoring, impact assessment, etc., the operational certificate holder shall submit data, studies and the like to the Regional Waste Manager.

**15. CLOSURE REQUIREMENTS**

**15.1. Notification of Closure**

The operational certificate holder shall notify the Regional Waste Manager in writing of intentions to close the landfill site.

**15.2. Closure Plan**

A Closure Plan shall be submitted to the Regional Waste Manager upon request. The Closure Plan shall, as a minimum, include the following:

- proposed end-use of the landfill property after closure;
- anticipated total waste volume and tonnage, and life of the landfill (i.e., closure date);
- a topographic plan showing the final elevation contours of the landfill and surface water diversion and drainage controls;
- design of the final cover suited to the intended end-use of the site, including the thickness and permeability of barrier layers and drainage layers, and information on topsoil, vegetative cover and erosion prevention controls;
- procedures for notifying the public about the closure and about alternative waste disposal facilities;
- rodent and nuisance wildlife control procedures;

- 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;
- 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 by section 4.2);
- 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
- an estimated cost, updated annually, to carry out closure and post-closure activities for a minimum period of 25 years.

### 15.3. Final Cover

The final cover system shall be designed by a qualified professional to match the intended end-use of the landfill site and to match the needs of any required environmental management systems (leachate minimization or recirculation, as the case may be, landfill gas collection and treatment, etc.). Generally, the final cover shall consist of a layer of 1 metre of low permeability ( $<1 \times 10^{-5}$  cm/s) compacted soil followed by a layer of topsoil suitable for establishment of vegetation. Use of higher permeability soil must first be approved by the Regional Waste Manager. The final cover shall be constructed with minimum and maximum slopes as specified by a qualified professional (see section 3.4) to promote runoff and minimize erosion, with appropriate runoff drainage controls, erosion controls, and gas venting controls. The site shall be seeded with a grass/legume mixture suited to the local climate.

### 15.4. Progressive Application of Final Cover

Completed portions of the landfill shall progressively receive final cover during the active life of the landfill. The maximum area of disposed refuse that has not yet received final cover shall not exceed 25% of the total final footprint area. Final cover is to be applied according to the specifications identified in section 15.3.

## 16. ENVIRONMENTAL IMPACT

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

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Assistant Regional Waste Manager

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17. MAINTENANCE OF WORKS, EMERGENCY PROCEDURES AND NON-COMPLIANCE REPORTING

The operational certificate holder shall inspect the operation regularly and maintain it in good order. The operational certificate holder shall immediately notify the Regional Waste Manager or designate of any circumstance which prevents continuing operation in the approved manner or results in noncompliance with the requirements of this operational certificate.

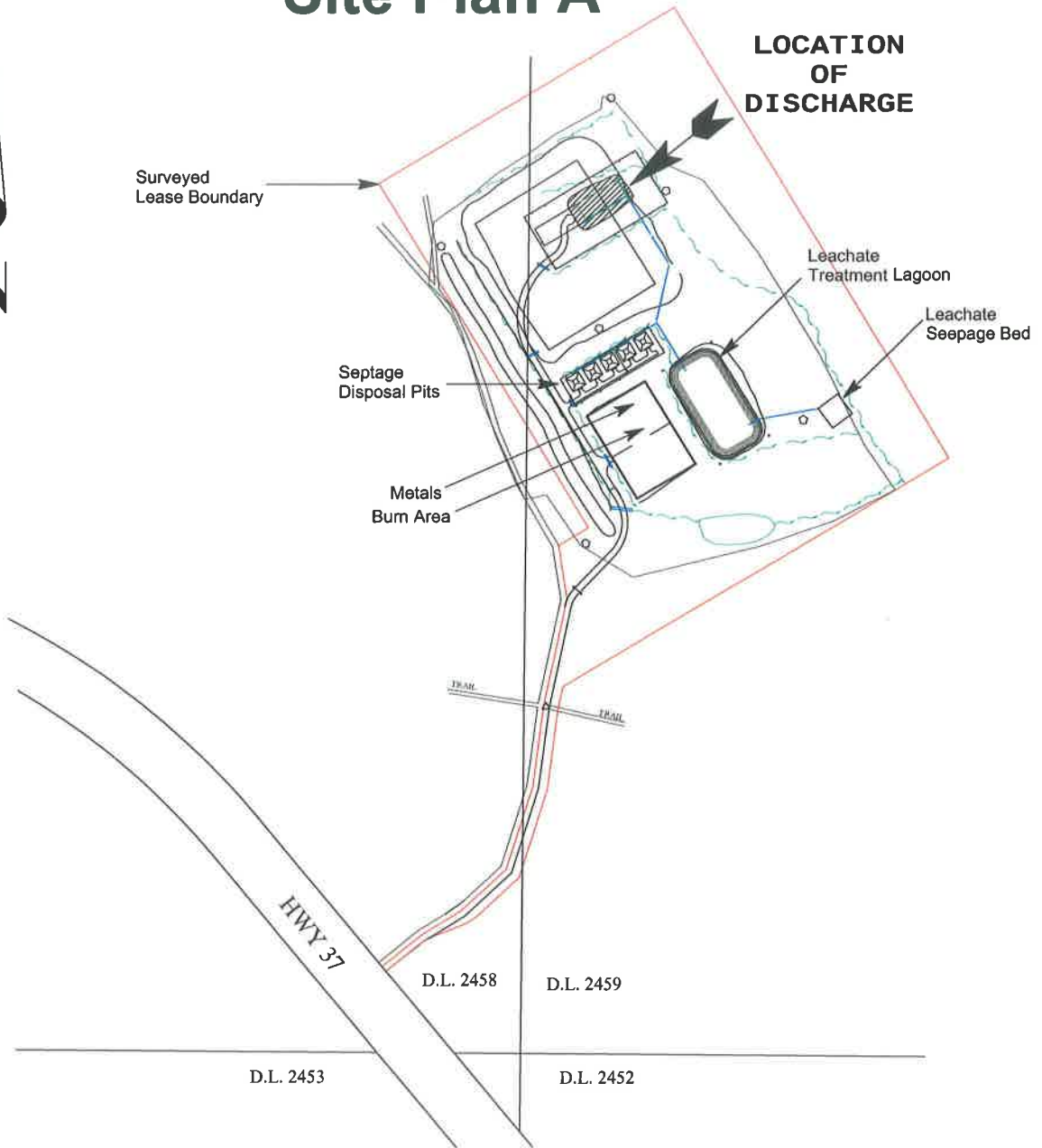
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J. Hofweber, P. Eng.  
Assistant Regional Waste Manager

OPERATIONAL CERTIFICATE: MR-15681



# Site Plan A



## Location Map



Permit No.: MR-15681

Date: **AUG 08 2002**

**Jim Hofweber, P.Eng.**  
**Assistant Regional Waste Manager**



November 28, 2013

File: MR-15681

Roger Tooms  
 Manager of Works and Services  
 Regional District of Kitimat-Stikine  
 300-4545 Lazelle Avenue  
 Terrace, BC  
 V8G 4E1

Dear Roger Tooms:

**Re: Meziadin Landfill Operational Certificate Amendment – Environmental Effects Monitoring Program**

Pursuant to Section 16 of the *Environmental Management Act*, Section 13 (Monitoring Requirements) of MR-15681 is hereby amended as follows:

**13. Environmental Effects Monitoring Program**

The Permittee shall undertake Environmental Effects Monitoring (EEM) to determine the effects of the landfill on the receiving environment. The Permittee shall submit the results of the monitoring program to the Director as soon as practicable, and no later than June 30 of the following year.

**13.1 Surface Water Monitoring**

<b>Locations</b>	<b>Parameters</b>	<b>Frequency</b>
Upstream Surface Water – Log Weir (E252829)	<u>Field Parameters</u> - pH, conductivity, temperature and dissolved oxygen	Two times per year (spring & fall)
Downstream Surface Water – Log Weir (E251541)	<u>Lab Parameters</u> - pH, conductivity, temperature, hardness, TSS, alkalinity, BOD, COD, ammonia, total Kjeldahl nitrogen (TKN), nitrate + nitrite, chloride, sulphate, fluoride and total + dissolved metals.	
Treatment Lagoon Outlet – Effluent (E245722)		



Should any contaminants be detected in the surface water samples, additional sampling locations may be added to the program.

### **13.2 Groundwater Monitoring**

A groundwater monitoring program shall be implemented and maintained with the following objectives:

- to help confirm groundwater flow direction and adequate numbers/placement of wells;
- to support future groundwater modeling if determined to be necessary;
- to detect, should they exist, any significant impacts on the environment of leachate in the groundwater.

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.

<b>Locations</b>	<b>Parameters</b>	<b>Frequency</b>
BH97-1A Deep (E251536) or BH97-1B Shallow (E251537)	<u>Field Parameters</u> - Well elevation (m), well depth (m), groundwater elevation (m), well water depth (m), pH, conductivity, temperature	Two times per year  (spring & fall)
BH97-2 (E251538)	<u>Lab Parameters</u> - pH, conductivity, temperature, hardness, total dissolved solids, alkalinity, COD, ammonia, total Kjeldahl nitrogen (TKN), nitrate + nitrite, chloride, sulphate, fluoride, and dissolved metals.	
BH97-3 (E251539)		
BH97-4 (E251540)		

### **13.3 Ground and Surface Water Monitoring Procedures**

#### **13.3.1 Sampling**

Sampling is to be carried out in accordance with the procedures described in the most recent edition of the "British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples", or by suitable alternative procedures as authorized by the Director.

A copy of the above manual may be purchased from the Queen's Printer Publications Centre, P.O. Box 9452, Stn. Prov. Gov't. Victoria, British Columbia, V8W 9V7 (1-

800-663-6105 or (250) 387-6409). A copy of the manual is also available for inspection at all Environmental Protection offices.

### **13.3.2 Analyses**

Analyses are to be carried out in accordance with procedures described in the most recent edition of the “British Columbia Environmental Laboratory Methods Manual for the Analysis of Water, Wastewater, Sediment, Biological Materials and Discrete Ambient Air Samples”, or by suitable alternative procedures as authorized by the Director.

A copy of the above manual may be purchased from the Queen’s Printer Publications Centre, P.O. Box 9452, Stn. Prov. Gov’t. Victoria, British Columbia, V8W 9V7 (1-800-663-6105 or (250) 387-6409). A copy of the manual is also available for inspection at all Environmental Protection offices.

### **13.3.3 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 permit and Section 2(d) of the Environmental Data Quality Assurance Regulation.

- a) Obtain and keep current, the laboratory precision, accuracy and blank quality control criteria for each laboratory analysed parameter from the analytical laboratory.
- b) Collect one duplicate sample during each sampling session from one of the sample locations.
- c) Each duplicate sample shall be submitted to the laboratory; one of the pair 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 shall 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 shall be made to determine and control the source of contamination.

If you have any questions or concerns please contact Eric Pierce at (250) 847-7252 or at [eric.pierce@gov.bc.ca](mailto:eric.pierce@gov.bc.ca)

Sincerely,

A handwritten signature in blue ink that reads "Eric Pierce". The signature is written in a cursive style with a long horizontal stroke at the end.

Eric Pierce  
*for Director, Environmental Management Act*

ME 2

Refuse ~~STATE~~

~~5860 09 05~~



June 3, 2009

Files: MR-15681

Mr. Roger Tooms  
Manager of Works and Services  
Regional District of Kitimat-Stikine  
300-4545 Lazelle Avenue  
Terrace, BC  
V8G 4E1



**Also By Fax: (250) 635-9222**

Dear Roger Tooms:

**Re: Amendment to Meziadin Landfill Operational Certificate MR-15681**

As communicated over the past month, the Ministry of Environment is amending all landfill and transfer station authorizations to reflect new policy prohibiting the burning of painted wood, treated wood, plywood and particle board.

Pursuant to Section 16 of the *Environmental Management Act*, operational certificate MR-15681 is hereby amended as follows:

Section 11.3 "Nature of Wastes"

**From:** "Generally, no waste shall be burned which is unacceptable to the Regional Waste Manager. Acceptable materials include demolition and construction wood wastes, stumps, branches, trees, cardboard, and similar items, but excluding nuisance causing combustibles such as sawdust, rubber, plastics, tars, insulation, etc".

**To:** "No waste shall be burned which is unacceptable to the Regional Environmental Protection Manager. Unacceptable materials for open burning include: nuisance-causing combustibles such as painted and treated wood, plywood, particle board, sawdust, yard wastes, mulch, wood chips, stumps, rubber, plastics, tars, insulation, paper, cardboard, etc. Acceptable materials for open burning are as follows: unpainted, untreated demolition and construction wood wastes, pallets, and brush"

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 authorization will be carried out by staff from the Skeena Region. Data and reports pertinent to this authorization are to be submitted to the Regional Manager, Environmental Protection, at Ministry of Environment, Regional Operations, Skeena Region, Box 5000, Smithers BC, V0J 2N0.

Should you have any concerns or questions regarding the above, please contact Eric Pierce at (250) 847-7252.

Yours truly,



Mark Love, P. Ag.

For Director, *Environmental Management Act*  
Skeena Region

EP/ep

ecc. Ben Van Nostrand, EPO, Omineca Region  
Ben Weinstein, Air Quality Meteorologist



Date: **AUG 08 2002**

File: MR-15681

**REGISTERED MAIL**

Harry Nyce, Chair of the Board of Directors  
Board of Directors  
Regional District of Kitimat-Stikine  
Suite 300 – 4545 Lazelle Avenue  
Terrace, BC V8J 4E1

Dear Operational Certificate Holder:

Enclosed is Operational Certificate MR-15681 issued under the provisions of the *Waste Management Act*. Your attention is respectfully directed to the terms and conditions outlined in the operational certificate.

This operational certificate does not authorise entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorised by the owner of such lands or works. The responsibility for obtaining such authority shall rest with the operational certificate holder. This operational certificate is issued pursuant to the provisions of the *Waste Management Act* to ensure compliance with Section 54(3) of that statute, which makes it an offence to discharge waste without authorisation. It is also the responsibility of the operational certificate holder to ensure that all activities conducted under this authorisation 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. Notice of the appeal must (1) be in writing, (2) include the grounds for appeal, (3) be directed by registered mail or personally delivered to the Chair, Environmental Appeal Board, 4th Floor 836 Yates Street, Victoria British Columbia V8V 1X4, (4) be delivered within 30 days from the date notice of the decision is given, and (5) be accompanied by a fee of \$25, payable to the Minister of Finance and Corporate Relations. 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 our Regional office located at 3726 Alfred Avenue, British Columbia, V0J 2N0 (telephone 250-847-7260). Plans, data and reports pertinent to the approval are to be submitted to the Regional Waste Manager, at this address.

Yours truly,

A handwritten signature in blue ink, appearing to read "J. Hofweber".

Jim Hofweber, P.Eng.  
Assistant Regional Waste Manager  
Skeena Region

Enclosure



## Appendix C      Non-Compliance Report







**To:** Ministry of Environment and Climate Change Strategy  
[EnvironmentalCompliance@gov.bc.ca](mailto:EnvironmentalCompliance@gov.bc.ca)

**From:** Regional District of Kitimat-Stikine (RDKS)  
300-4545 Lazelle Avenue, Terrace BC, V8G 4E1  
[Enviro.Dept@rdks.bc.ca](mailto:Enviro.Dept@rdks.bc.ca)

**Date:** December 14, 2022

**Re:** **Non-Compliance Report for MR-15681 – Surface Water Quality Exceedances**

**Location:** Meziadin Landfill, Block A of District Lots 2458 and 2459, Cassiar District

### Background:

Meziadin Landfill is authorised under Operational Certificate ME-15684 (OC), which includes an Environmental Effects Monitoring Program (EEMP) for surface water and groundwater that are sampled twice a year. The landfill (Figure 1) is sited on the topographic high between the Meziadin and Nass Rivers, with the watershed divide between the two rivers crossing through the landfill tenure. The groundwater monitoring program includes wells within both the Meziadin and Nass River watersheds, while the surface water monitoring program includes surface water sites limited to the Nass River. The Hanna-Tintina Conservation Area abuts the landfill tenure to the north and west. The Gitanyow Wilp Wii Litsxw declared the entire Meziadin River watershed an indigenous protected area (IPA) in 2021 and published a management plan for the IPA in June of 2022.

The exfiltration treatment lagoon is leaking, with seepage forming a channel that runs into a wetland which drains towards the Nass River. Constructed drainage ditches on site convey run-off from the area near the metal pile towards a lagoon that drains to the Nass River. Additional sampling locations were established in October 2022 to sample these two locations, including an additional surface water site downstream of the landfill tenure on a tributary to the Meziadin River.

### Nature of Non-compliance:

Water samples from the leaking lagoon (SW22-05), exceeded the Approved British Columbia Water Quality Guidelines for Aquatic Water (BCWQG-AW, the guideline) for dissolved and total iron, and total manganese. Down gradient site SW-DS exceeded the guideline for dissolved aluminum. Down gradient site SW22-01 exceeded the guideline for dissolved aluminum and dissolved iron. Down gradient site SW22-03 exceeded the guideline for total manganese. All exceedances were observed in the October 2022 sampling event.

### Surface Water

During 2022 surface and groundwater wells were sampled on the following dates:

- April 13 (Spring)
- October 26 (Fall)



The surface water monitoring program prescribed under the OC for Meziadin Landfill includes an upstream and downstream monitoring site which drain towards the Nass River (SW-US & SW-DS), and sampling of the exfiltration treatment lagoon effluent (SW-03). During the fall 2022 sampling program, the RDKS took the proactive approach to monitor additional sites, including a tributary to the Meziadin River (SW22-01), a constructed ditch which conveys run-off and stormwater into a small lagoon (SW22-03 and SW22-04), and the effluent leak from the exfiltration treatment lagoon (SW22-05).

Surface water analytical data was compared to the BCWQG-AW. BCWQG for Drinking Water were not applied due to the site being greater than 1 kilometre away from any surface drinking water sources. The RDKS proactively added dissolved metal analysis to the surface water program in 2022 to meet the conditions of the BCWQG-AW which require dissolved metals to assess compliance for aluminum, cadmium, copper, and iron concentrations.

The BCWQG-AW includes short-term maximum (acute) and long-term average (chronic) criteria. Results were compared to both the acute and chronic criteria. Sites where only the chronic criteria are exceeded may serve as an alert to increase the sampling frequency (BC Ministry of Environment, 2016).

Constructed ditches are defined under the Environmental Management Act as a “*regularly maintained human-made trench or furrow dug in the ground for the primary purpose of conveying or draining surface water, storm water or irrigation water that may or may not contain water at all times of the year*”. Constructed Ditches must meet the criteria of Schedule 3.2 Aquatic Wildlife (Schedule 3.2-AW) under the Contaminated Sites Regulation for compliance. The following surface water sites meet the definition of a constructed ditch:

- SW-US (April)<sup>1</sup>
- SW22-03

The effluent leak from the exfiltration treatment lagoon, SW22-05, was also compared to the CSR-AW. Exceedances to surface water quality were limited to the fall sampling event and are detailed in Table 1.

The upgradient site (SW-US) had numerous exceedances, with analytes often in greater concentration than those of the down gradient surface water sites. This site represents a narrow drainage that is fed from a small wetland and flows into the northern perimeter drainage ditch. Exceedances may be attributed to the sites low pH, which increases the dissolution of metals into soluble form. Due to the low pH of this site, analytical results may not represent true background conditions for the down gradient surface water sites.

Dissolved aluminum exceeds the guidelines at each site down gradient. The low pH of the background site makes it difficult to distinguish if elevated dissolved aluminum is due to background conditions, as indicated in the upstream site, or if it is from landfill influence. Historical trends for dissolved aluminum prior to 2022 are not available as dissolved metals had not been included in surface water analysis until this year.

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<sup>1</sup> April 2022 sampling of this watercourse was from the constructed ditch that runs from west to east along the north end of the landfill, and not from the small tributary that flows into the constructed ditch.



SW22-03 exceeded the BCWQG-AW for total manganese but did meet the criteria for Schedule 3.2-AW. SW22-04, directly downstream from SW22-03 met the criteria of the BCWQG-AW at the tenure boundary, with the exception of dissolved aluminum.

The seepage from the exfiltration treatment lagoon leak (SW22-05) exceeded the BCWQG-AW for dissolved and total iron, and total manganese.

There were no exceedances to the CSR-AW standards for surface water.

### Groundwater

The Schedule 3.2-AW standards apply to groundwater that is within 500 metres upland of aquatic receiving environment. Schedule 3.2 – Drinking Water standards do not apply to the site because the geological units below the site do not meet the definition of a drinking water aquifer (SHA 2022), and because there are no drinking water wells within 500 metres of the site.

All groundwater monitoring well results for the site were compared to Schedule 3.2-AW. There were no exceedances to the groundwater standards in April or October of 2023.

**Table 1 Surface Water Exceedances at Meziadin Landfill**

Site	Parameter	Acute or Chronic	Result mg/L	BCWQG-AW mg/L	CSR-AW	Dates of Exceedance
SW-US (April) (Up Gradient, Constructed Ditch)	Aluminum, Dissolved Copper, Dissolved Silver, Dissolved Alkalinity pH (lab)	Chronic Acute Acute Chronic Chronic	0.0495 <b>0.00555</b> <b>0.000105</b> 14.6 6.13	0.025 0.00029 0.0001 20 6.5-9	No Exceedances	April April April April April
SW-US (October) (Up Gradient)	Aluminum, Dissolved Cadmium, Dissolved Copper, Dissolved Alkalinity pH (lab)	Acute Chronic Chronic Chronic Chronic	<b>0.412</b> 0.00003500 0.00150 3.5 6.2	0.059 0.00003271 0.00031 20 6.5-9		October October October October October
SW-DS* (Down Gradient, Tributary to Nass River, Off Tenure)	Aluminum, Dissolved Alkalinity	Acute Chronic	<b>0.216</b> 14.6	0.100 20		October October
SW-03 (Exfiltration Treatment Lagoon, Constructed Pond, Permitted)	Standards and Guidelines Do Not Apply to Surface Water of Constructed Ponds					
SW22-01 (Down Gradient, Tributary to Meziadin River)	Aluminum, Dissolved Iron, Dissolved Alkalinity Zinc Total	Acute Acute Chronic Chronic	<b>0.126</b> <b>0.464</b> 5.6 0.0084	0.100 0.35 20 0.0075		October October October October
SW22-03 (Down Gradient, Tributary to Nass River, Constructed Ditch)	Aluminum, Dissolved Manganese, Total	Chronic Acute	0.0556 <b>1.540</b>	0.050 0.777	No Exceedances	October October
SW22-04 (Down Gradient, Tributary to Nass River, Tenure Boundary)	Aluminum, Dissolved	Chronic	0.0552	0.050		October
SW22-05 (Lagoon Leak)	Ammonia Iron, Dissolved Cobalt, Total Iron, Total Manganese, Total	Chronic Acute Chronic Acute Acute	3.94 <b>7.10</b> 0.00404 <b>9.26</b> <b>35.5</b>	1.73 0.35 0.00400 1 4.188	No Exceedances	October October October October October

\* Sample not obtained in April due to iced over conditions



### Corrective Action to be Taken

The RDKS has drafted a Request for Proposals (RFP) for design and engineering of leachate treatment works for the Meziadin landfill, including an environmental review of the site and repairs to the exfiltration treatment lagoon. The RDKS anticipates that the work will be awarded in early 2023, with construction taking place in the summer and fall of 2024, pending any environmental permits or authorisations that may be required.

The RDKS will continue to monitor the additional surface water monitoring sites that were established in 2022 and will continue to include the analysis of dissolved metals for surface water. During the next sampling event in 2023, an additional background site with neutral pH will be selected and added to the monitoring program to provide a better reflection of background conditions and to assist in determining if dissolved aluminum concentrations in the down gradient surface water sites are from landfill influence or natural conditions. Reporting from the Environmental Review included in the RFP will provide recommendations to improve and enhance the sampling and monitoring program and will include surface water sites from within both the Meziadin River and Nass River watersheds. The RDKS aims to request an amendment to the EEMP for the OC based on the recommendations of the Environmental Review.

#### Prepared by:

**Nicole Lavoie, B.Tech., A.Ag.**  
Environmental Services Coordinator  
Regional District of Kitimat-Stikine  
300 – 4545 Lazelle Avenue  
Terrace, BC V8G 4E1  
[nlavoie@rdks.bc.ca](mailto:nlavoie@rdks.bc.ca)

#### Reviewed by:

**Erin Blaney, B.Sc.**  
Solid Waste Manager  
Regional District of Kitimat-Stikine  
300 – 4545 Lazelle Avenue  
Terrace, BC V8G 4E1  
[eblaney@rdks.bc.ca](mailto:eblaney@rdks.bc.ca)



**References:**

BC Ministry of Environment. (2016). *Fact Sheet Water Quality Guidelines: Long-Term Average vs. ShortTerm Maximum Water Quality Guidelines*. BC Ministry of Environment.

British Columbia Ministry of Environment and Climate Change Strategy. (2017). *Technical Guidance on Contaminated Sites 15 Version 2*. British Columbia Ministry of Environment and Climate Change Strategy. Retrieved from <https://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-remediation/docs/technical-guidance/tg15.pdf>

British Columbia Ministry of Environment and Climate Change Strategy. (2021). *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary*. *Water Quality Series, WQG-20*. Victoria: Province of BC.

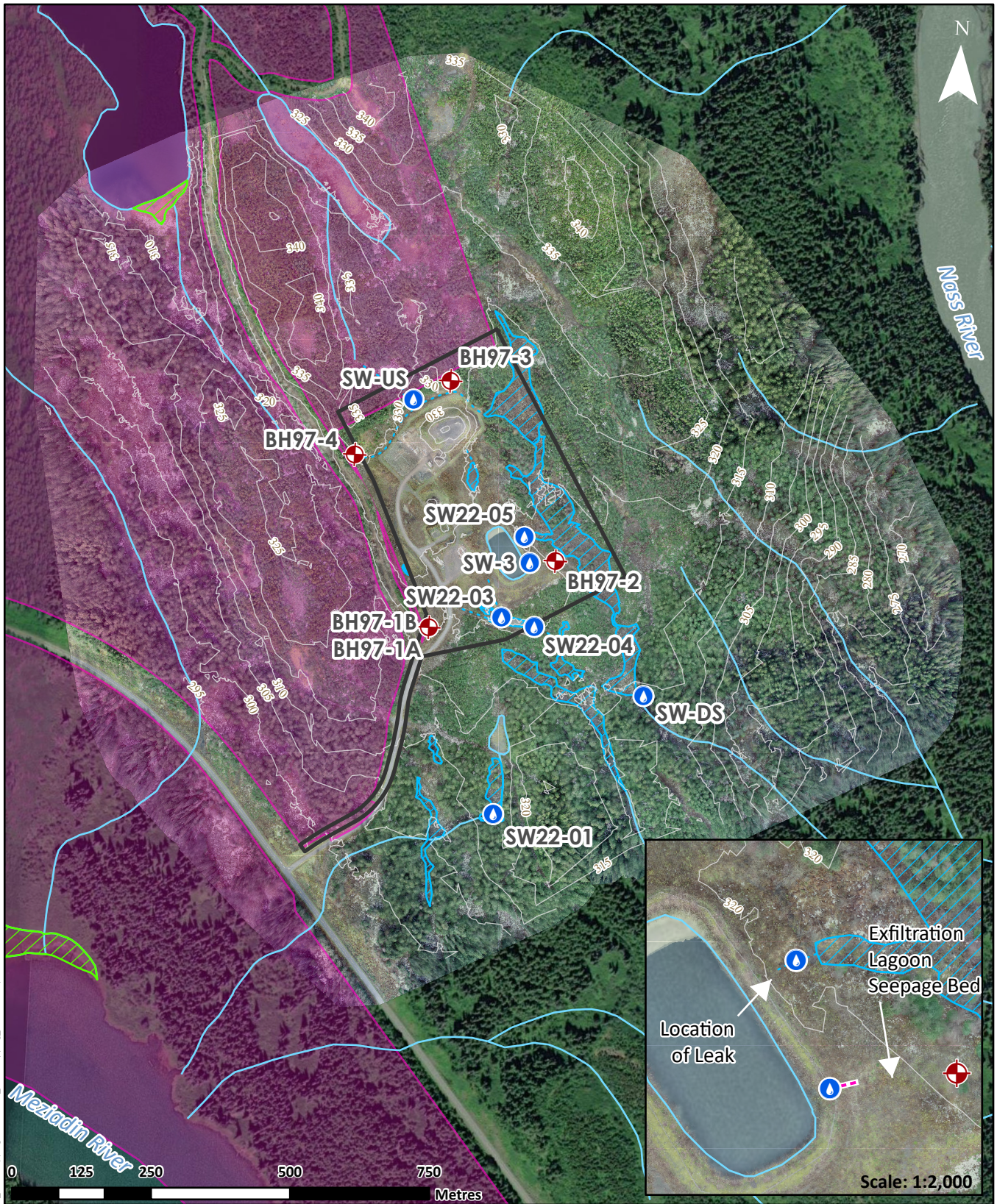
British Columbia Ministry of Environment and Climate Change Strategy. (2021). *Procedure 8: Definitions for Contaminated Sites Version 4*. British Columbia Ministry of Environment and Climate Change Strategy. Retrieved from <https://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-remediation/docs/procedures/procedure08.pdf>

Province of British Columbia. (2021). Contaminated Sites Regulation BC Reg 375/96.

Sperling Hansen Associates. (2022). *Meziadin Landfill 2021 Annual Monitoring Report*.

Wilp Wii Litsxw. (2022). *Wilp Wii Litsxw Meziadin Indigenous Protected Area Management Plan*. Wilp Wii Litsxw Gitanyow Chiefs. Retrieved from [https://www.indigenousguardianstoolkit.ca/sites/default/files/2022-07/meziadin\\_ipa\\_management\\_plan\\_june\\_2022.pdf](https://www.indigenousguardianstoolkit.ca/sites/default/files/2022-07/meziadin_ipa_management_plan_june_2022.pdf)





Esri, NASA, INGA, USGS, Esri, HERE, Garmin, FourSquare, METI/NASA, USGS, Maxar, Orthoimagery October 2022, Data BC 1:5000 TRIM Watercourse and Contour Lines, N:\Works & Services\Solid Waste\Waste Mapping\solidwaste\_basemapping\_20220518.aprx

Project:











## Meziadin Landfill

# DRAFT



**Regional District of Kitimat-Stikine**  
 Suite 300 - 4545 Lazelle Avenue  
 Terrace, B.C. V8G 4E1

Legend:

-  Monitoring Well
-  Surface Water Site
-  Contour (5m)
-  Exfiltration Pipe
-  Mapped Watercourse (2022 Orthoimagery)
-  Watercourse
-  Hanna-Tintina Conservancy Area
-  Mapped Surface Water (2022 Orthoimagery)
-  Tenure Lease
-  Wetland

Title:

## Environmental Monitoring Locations

Scale: 10,000	Projection: NAD 1983 UTM Zone 9N
File: 5360-03-05-05	Date: Dec 7, 2022
Drawn: N. Lavoie	Figure No: 1
Reviewed: E. Blaney	



## Appendix D      Historical Data Tables



Table D-1: Groundwater Analytical Results  
2018 Meziadin Landfill Annual Monitoring Program  
Regional District of Kitimat-Stikine

Location Monitoring Well	Sample ID	Sample Date Sample Time	Laboratory ID	Analyte QAQC	Units	Meziadin Landfill BH97-1A / E251536																		
						MW-1A	MW-1A	MW-1A	MW-1A	MW-1A	MW-1A	MW-1A	MW-1A	MW-1A	MW-1A	MW-1A	MW-1A	MW-1A	MW-1A	MW-1A	MW-1A	MW-1A	MW-1A	
						1-Apr-97	1-Jul-03	1-Jan-04	1-Jan-06	3-May-15	9-Sep-15	3-May-16	13-Sep-16	1-Apr-17	1-Aug-17	17-May-18	17-Oct-18	7-May-19	14-Nov-19	17-Jun-2020 15:05	15-Oct-20 10:45	19-Jul-21 15:02	27-Oct-2021 10:36	
						-	-	-	-	-	-	-	-	-	-	L2097663-1	L2183746-1	L2269973	L2383402-1	VA20A8675-001 Sub-Matrix: Water	VA20B8400-001 Sub-Matrix: Water	VA21B5004-001 Sub-Matrix: Water HS	VA21C4129-001 Sub-Matrix: Water HS	
<b>Field Observations</b>																								
Elevation	-	-	-	-	m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Depth to Water	-	-	-	-	m	-	-	-	-	-	-	-	-	-	-	6.77	8.63	8	7.79	7.36	317	8.45	-	
Depth to Bottom	-	-	-	-	m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.74	8.2	8.45	8.43	
pH	-	-	-	-		-	-	-	-	-	-	-	-	-	-	7.42	7.83	7.22	7.45	7.55	7.59	9.9	9.98	
Temperature	-	-	-	-	°C	-	-	-	-	-	-	-	-	-	-	7.9	8.7	6.5	6.9	6.2	6.5	6.4	7.1	
Conductivity	-	-	-	-	uS/cm	-	-	-	-	-	-	-	-	-	-	469.3	452.2	505	461.8	587	476.1	605	511	
SPC	-	-	-	-	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	655	727.3	764	777	
Dissolved Oxygen	-	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	3.1	8.5	4.9	8.4	7.2	3.7	9.3	9.6	
Oxidation Reduction Potential	-	-	-	-	mV	-	-	-	-	-	-	-	-	-	-	255.4	402.4	406.2	257.2	172.5	224.2	219.9	277.8	
<b>Physical Tests</b>																								
Conductivity	-	-	-	-	uS/cm	600	715	972	1020	743	602	743	737	716	721	670	690	766	739	747	776	779	820	
Alkalinity, Total (as CaCO3)	-	-	-	-	mg/L	198	239	251	260	290	260	250	250	250	241	239	246	244	260	240	229	229	238	
Hardness (Dissolved as CaCO3)	-	-	-	-	mg/L	159	164	332	290	-	197	-	-	-	-	-	-	-	175	180	205.00	202.00	202.00	
pH	-	-	-	-		7.9	8.1	8.2	8.1	8.1	7.5	8.1	7.9	7.9	7.9	-	8.39	8.23	8.49	8.20	8.29	8.14	8.34	
Total Dissolved Solids	-	-	-	-	mg/L	393	-	658	674	460	330	460	450	450	350	487	452	593	518	547	554	524	518	
<b>Anions and Nutrients</b>																								
Total Kjeldahl Nitrogen	-	-	-	-	mg/L	-	-	3.19	1.4	2.54	10.7	2.54	7.3	1.33	5.43	4.05	0.167	2.21	0.21	0.170	1.19	0.11	0.129	
Ammonia, Total (as N)	1.31 - 11.3	-	-	-	mg/L	-	-	0.032	1.52	1.26	6.92	1.26	1.3	0.08	0.2	0.0827	0.0532	0.965	0.103	0.0778	0.0481	0.0188	0.0364	
Bromide (Br)	-	-	-	-	mg/L	-	0.1	0.1	-	-	-	-	-	-	-	-	-	<0.25	<0.250	<0.250	-	-	-	
Chloride (Cl)	1500	-	-	-	mg/L	11.2	3.4	3.9	2.3	2.5	2.1	2.5	2.3	2.1	2.8	1.33	<2.5	<2.5	<2.5	<2.50	<2.50	<2.50	<2.50	
Fluoride (F)	2.0-3.0 (e)	-	-	-	mg/L	0.32	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	0.2	0.19	0.17	0.15	0.19	0.150	0.151	0.148	0.136	
Nitrate (as N)	400	-	-	-	mg/L	0.1	-	0.107	0.054	-	-	-	-	-	-	0.138	0.145	0.093	0.239	0.0682	0.0805	0.135	0.231	
Nitrite (as N)	0.2 - 2.0 (h)	-	-	-	mg/L	0.01	-	0.004	0.018	-	-	-	-	-	-	<0.0010	<0.0050	0.0083	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
Sulfate (SO4)	128 - 429 (d)	-	-	-	mg/L	99	135	288	285	144	27.5	144	135	135	127	135	130	163	160	164	150	188	188	
<b>Dissolved Metals</b>																								
Aluminum	-	-	-	-	mg/L	0.2	0.0015	0.0015	0.008	0.015	<0.005	0.015	0.007	<0.0050	0.0063	0.0101	0.0091	0.0039	0.0045	0.0063	0.0038	0.0027	0.0060	
Antimony	0.09	-	-	-	mg/L	0.2	0.000473	0.000473	0.000315	0.0004	<0.0001	0.0004	0.0008	0.00035	0.0005	0.00043	0.00031	0.00025	0.00018	0.00031	0.00029	0.00016	0.00020	
Arsenic	0.05	-	-	-	mg/L	0.2	0.001	0.001	0.0014	0.002	<0.0005	0.002	0.0021	0.00064	0.00074	0.00017	0.00089	0.00103	0.0008	0.00128	0.00110	0.00053	0.00051	
Barium	10	-	-	-	mg/L	0.26	0.176	0.176	0.124	0.068	0.113	0.068	0.295	0.129	0.0531	0.0625	0.0526	0.0738	0.0502	0.0601	0.0557	0.0440	0.0466	
Beryllium	0.0015	-	-	-	mg/L	0.005	0.00002	0.00002	0.00002	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000100	<0.000100	<0.000100	<0.000100	
Bismuth	-	-	-	-	mg/L	0.1	0.00002	0.00002	0.00002	-	-	-	-	<0.00010	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
Boron	12	-	-	-	mg/L	0.1	0.084	0.084	0.073	0.083	0.023	0.083	0.093	0.085	0.0734	0.067	0.071	0.071	0.079	0.072	0.071	0.074	0.077	
Cadmium	0.0005 - 0.004	-	-	-	mg/L	0.01	0.00011	0.00011	0.00007	0.00003	<0.00001	0.00003	0.00005	0.000072	<0.000010	0.000204	0.0000225	0.0000126	0.0000806	<0.0000200	<0.0000200	0.000191	0.0000267	
Calcium	-	-	-	-	mg/L	47.2	97.5	97.5	85.6	45.6	65.4	45.6	48.3	45.6	44.2	46.6	49.1	52.8	56.8	49.7	52.4	60.4	58.3	
Cesium	-	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010		
Chromium	0.01	-	-	-	mg/L	0.01	0.0002	0.0002	0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.00050	0.00015	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Cobalt	0.04	-	-	-	mg/L	0.01	0.000834	0.000834	0.00103	0.00067	0.00054	0.00067	0.00068	0.00062	0.00074	0.00064	0.00057	0.00057	0.00056	0.00044	0.00032	<0.00010	<0.00010	
Copper	0.02 - 0.09	-	-	-	mg/L	0.01	0.00069	0.00069	0.00189	0.0018	<0.0002	0.0018	0.0143	0.00801	<0.00040	0.00061	<0.00020	0.00105	0.00054	0.00026	<0.00020	0.00045	0.00304	
Iron	-	-	-	-	mg/L	0.06	0.005	0.005	0.007	<0.010	0.018	<0.010	<0.010	<0.010	<0.010	0.213	0.367	0.085	0.017	0.084	0.044	<0.010	0.013	
Lead	0.04 - 0.16	-	-	-	mg/L	0.05	0.00001	0.00001	0.00001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00020	<0.000050	<0.000050	0.000063	<0.000050	<0.000050	<0.000050	<0.000050	0.000062	
Lithium	-	-	-	-	mg/L	0.01	0.00392	0.00392	0.00488	0.0078	0.0013	0.0078	0.0031	0.00324	0.0042	0.0037	0.0039	0.0037	0.0041	0.0038	0.0042	0.0038	0.0046	
Magnesium	-	-	-	-	mg/L	9.94	21.5	21.5	19.2	10.7	8.11	10.7	11.6	10.7	10.8	11.1	11.7	11.8	12.4	12.4	11.9	13.2	13.6	
Manganese	-	-	-	-	mg/L	0.904	0.521	0.521	0.584	0.792	3.77	0.792	0.948	0.314	0.567	0.542	0.988	0.303	0.757	0.410	0.419	0.0421	0.00179	
Mercury	0.00025	-	-	-	mg/L	-	0.00005	0.00005	0.00005	<0.00002	<0.00002	<0.00002	-	<0.00002	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
Molybdenum	10	-	-	-	mg/L	0.3	0.0118	0.0118	0.0133	0.0254	0.001	0.0254	0.029	0.0253	0.0295	0.0194	0.0156	0.0125	0.0135	0.0137	0.0155	0.0108	0.0112	
Nickel	0.25 - 1.5	-	-	-	mg/L	0.02	0.0028	0.0028	0.0024	0.0045	0.0028	0.0045	0.0034	0.00316	0.00477	0.00194	0.00138	0.00079	0.00081	0.00115	0.00104	<0.00050	<0.00050	
Phosphorus	-	-	-	-	mg/L	0.3	0.1	0.1	0.1	-	-	-	-	<0.050	<0.050	<0.050	0.05	0.057	0.060	<0.050	<0.050	<0.050	<0.050	
Potassium	-	-	-	-	mg/L	3	3	3	4	2.52	2.23	2.52	2.55	2.37	2.24	2.43	2.31	2.46	2.83	2.49	2.54	2.49	2.64	
Rubidium	-	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	0.00037	0.00032	0.00027	0.00042	0.00029	0.00034	0.00028	0.00033		
Selenium	0.02	-	-	-	mg/L	0.2	0.0004	0.0004	0.0003	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.00050	0.000066	0.00008	0.000143	0.000116	0.00055	0.000156	0.000227	0.000428	
Silicon	-	-	-	-	mg/L	-	-	-	-	-	-	-	-	3.7	3.5	3.87	3.79							



Table D-1: Groundwater Analytical Results  
2018 Meziadin Landfill Annual Monitoring Program  
Regional District of Kitimat-Stikine

Location Monitoring Well		
Sample ID		
Sample Date	CSR Aquatic Life Standard	Units
Sample Time	Freshwater (AW-F)	
Laboratory ID		
Analyte		
QAQC		
<b>Field Observations</b>		
Elevation	-	m
Depth to Water	-	m
Depth to Bottom	-	m
pH	-	-
Temperature	-	°C
Conductivity	-	uS/cm
SPC	-	uS/cm
Dissolved Oxygen	-	mg/L
Oxidation Reduction Potential	-	mV
<b>Physical Tests</b>		
Conductivity	-	uS/cm
Alkalinity, Total (as CaCO3)	-	mg/L
Hardness (Dissolved as CaCO3)	-	mg/L
pH	-	pH
Total Dissolved Solids	-	mg/L
<b>Anions and Nutrients</b>		
Total Kjeldahl Nitrogen	-	mg/L
Ammonia, Total (as N)	1.31 - 11.3	mg/L
Bromide (Br)	-	mg/L
Chloride (Cl)	1500	mg/L
Fluoride (F)	2.0-3.0 (e)	mg/L
Nitrate (as N)	400	mg/L
Nitrite (as N)	0.2 - 2.0 (h)	mg/L
Sulfate (SO4)	128 - 429 (d)	mg/L
<b>Dissolved Metals</b>		
Aluminum	-	mg/L
Antimony	0.09	mg/L
Arsenic	0.05	mg/L
Barium	10	mg/L
Beryllium	0.0015	mg/L
Bismuth	-	mg/L
Boron	12	mg/L
Cadmium	0.0005 - 0.004	mg/L
Calcium	-	mg/L
Cesium	-	mg/L
Chromium	0.01	mg/L
Cobalt	0.04	mg/L
Copper	0.02 - 0.09	mg/L
Iron	-	mg/L
Lead	0.04 - 0.16	mg/L
Lithium	-	mg/L
Magnesium	-	mg/L
Manganese	-	mg/L
Mercury	0.00025	mg/L
Molybdenum	10	mg/L
Nickel	0.25 - 1.5	mg/L
Phosphorus	-	mg/L
Potassium	-	mg/L
Rubidium	-	mg/L
Selenium	0.02	mg/L
Silicon	-	mg/L
Silver	0.0005 - 0.015	mg/L
Sodium	-	mg/L
Strontium	-	mg/L
Sulfur	-	mg/L
Tellurium	-	mg/L
Thallium	0.003	mg/L
Thorium	-	mg/L
Tin	-	mg/L
Titanium	1	mg/L
Tungsten	-	mg/L
Uranium	0.085	mg/L
Vanadium	-	mg/L
Zinc	0.075 - 2.4	mg/L
Zirconium	-	mg/L
dissolved mercury filtration location		
dissolved metals filtration location		
<b>Aggregate Organics</b>		
Chemical Oxygen Demand (COD)	-	mg/L

**NOTES**  
 BC CSR AW-F for Quality Guidelines for Protection  
 BC CSR LW on Water Quality Guidelines for Pr  
 BC CSR DW ation Water Quality Guidelines for  
 Italics indicate that the laboratory detection limit exceeds the applicable standa  
 Standards shown are from the BC Contaminated Sites Regulation  
 (CSR; BC Reg. 375/96, O.C. 1480/96 and M40/2019, includes  
 amendments up to BC Regs. 11/2019 and 13/2019, updated to  
 24 Jan 2020)  
 QAQC = quality assurance/quality control; FD = field duplicate;





Table D-5: Groundwater Analytical Results  
 2018 Meziadin Landfill Annual Monitoring Program  
 Regional District of Kitimat-Stikine

Location Monitoring Well			
Sample ID		CSR Aquatic Life Standard	Units
Sample Date		Freshwater (AW-F)	
Sample Time			
Laboratory ID			
Analyte			
QA/QC			
<b>Field Observations</b>			
Elevation	-		m
Depth to Water	-		m
Depth to Bottom	-		m
pH	-		-
Temperature	-		°C
Conductivity	-		uS/cm
SPC	-		uS/cm
Dissolved Oxygen	-		mg/L
Oxidation Reduction Potential	-		mV
<b>Physical Tests</b>			
Conductivity	-		uS/cm
Alkalinity, Total (as CaCO3)	-		mg/L
Hardness (Dissolved as CaCO3)	-		mg/L
pH	-		pH
Total Dissolved Solids	-		mg/L
<b>Anions and Nutrients</b>			
Total Kjeldahl Nitrogen	-		mg/L
Ammonia, Total (as N)	1.31 - 11.3		mg/L
Bromide (Br)	-		mg/L
Chloride (Cl)	1500		mg/L
Fluoride (F)	2.0-3.0 (e)		mg/L
Nitrate (as N)	400		mg/L
Nitrite (as N)	0.2 - 2.0 (h)		mg/L
Sulfate (SO4)	128 - 429 (d)		mg/L
<b>Dissolved Metals</b>			
Aluminum	-		mg/L
Antimony	0.09		mg/L
Arsenic	0.05		mg/L
Barium	10		mg/L
Beryllium	0.0015		mg/L
Bismuth	-		mg/L
Boron	12		mg/L
Cadmium	0.0005 - 0.004		mg/L
Calcium	-		mg/L
Cesium	-		mg/L
Chromium	0.01		mg/L
Cobalt	0.04		mg/L
Copper	0.02 - 0.09		mg/L
Iron	-		mg/L
Lead	0.04 - 0.16		mg/L
Lithium	-		mg/L
Magnesium	-		mg/L
Manganese	-		mg/L
Mercury	0.00025		mg/L
Molybdenum	10		mg/L
Nickel	0.25 - 1.5		mg/L
Phosphorus	-		mg/L
Potassium	-		mg/L
Rubidium	-		mg/L
Selenium	0.02		mg/L
Silicon	-		mg/L
Silver	0.0005 - 0.015		mg/L
Sodium	-		mg/L
Strontium	-		mg/L
Sulfur	-		mg/L
Tellurium	-		mg/L
Thallium	0.003		mg/L
Thorium	-		mg/L
Tin	-		mg/L
Titanium	1		mg/L
Tungsten	-		mg/L
Uranium	0.085		mg/L
Vanadium	-		mg/L
Zinc	0.075 - 2.4		mg/L
Zirconium	-		mg/L
dissolved mercury filtration location			
dissolved metals filtration location			
<b>Aggregate Organics</b>			
Chemical Oxygen Demand (COD)	-		mg/L

**NOTES**  
 BC CSR AW-F Quality Guidelines for Protection of Aquatic Life  
 BC CSR LW British Columbia Water Quality Guidelines for Freshwater  
 BC CSR DW British Columbia Drinking Water Quality Guidelines for Protection of Human Health  
 Italics indicate that the laboratory detection limit exceeds the applicable standard.  
 Standards shown are from the BC Contaminated Sites Regulation (CSR; BC Reg. 375/96, O.C. 1480/96 and M40/2019, includes amendments up to BC Regs. 11/2019 and 13/2019, and 24/2021).  
 QA/QC = quality assurance/quality control; FD = field duplicate;

Table D-7: Groundwater Analytical Results  
2018 Meziadin Landfill Annual Monitoring Program  
Regional District of Kitimat-Stikine

Location Monitoring Well	Sample ID	Sample Date Sample Time	Laboratory ID	Analyte QAQC	Units	Meziadin Landfill										
						BH97-3 / E251539										
						MW-3	MW-3	MW-3	MW-3	MW-3	MW-3	MW-3	MW-3	MW-3	MW-3	MW-3
						1-Jul-03	1-Jan-04	1-Jan-06	3-May-15	9-Sep-15	3-May-16	13-Sep-16	1-Apr-17	1-Aug-17	17-May-18	
<b>Field Observations</b>																
Elevation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Depth to Water	-	-	-	-	m	-	-	-	-	-	-	-	-	-	6.1	
Depth to bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.19	
Temperature	-	-	-	-	°C	-	-	-	-	-	-	-	-	-	6.6	
Conductivity	-	-	-	-	uS/cm	-	-	-	-	-	-	-	-	-	421.7	
SPC	-	-	-	-	uS/cm	-	-	-	-	-	-	-	-	-	-	
Dissolved Oxygen	-	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	11.2	
Oxidation Reduction Potential	-	-	-	-	mV	-	-	-	-	-	-	-	-	-	433.8	
<b>Physical Tests</b>																
Conductivity	-	-	-	-	uS/cm	-	785	766	676	680	676	669	640	647	612	
Alkalinity, Total (as CaCO3)	-	-	-	-	mg/L	-	197	201	190	190	190	190	190	180	193	
Hardness (Dissolved as CaCO3)	-	-	-	-	mg/L	-	288	300	-	218	-	-	-	-	-	
pH	-	-	-	-	pH	-	8.20	7.90	8.00	8.00	8.00	7.90	7.80	7.70	-	
Total Dissolved Solids	-	-	-	-	mg/L	-	496	520	430	430	430	420	420	320	412	
<b>Anions and Nutrients</b>																
Total Kjeldahl Nitrogen	-	-	-	-	mg/L	-	0.14	0.04	0.27	0.12	0.27	0.2	0.224	0.213	0.173	
Ammonia, Total (as N)	1.31 - 11.3	-	-	-	mg/L	-	0.02	0.02	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.02	
Bromide (Br)	-	-	-	-	mg/L	-	0.1	0.1	-	-	-	-	-	-	-	
Chloride (Cl)	1500	-	-	-	mg/L	-	1.50	1.10	1.20	1.20	1.20	1.20	1.10	<1.0	0.76	
Fluoride (F)	2.0-3.0 (e)	-	-	-	mg/L	-	-	-	-	<0.10	-	-	0.1	0.1	0.095	
Nitrate (as N)	400	-	-	-	mg/L	-	0.137	0.163	-	-	-	-	-	-	0.121	
Nitrite (as N)	0.2 - 2.0 (h)	-	-	-	mg/L	-	0.027	0.012	-	-	-	-	-	-	<0.0010	
Sulfate (SO4)	128 - 429 (d)	-	-	-	mg/L	-	210	205	161	156	161	112	154	148	148	
<b>Dissolved Metals</b>																
Aluminum	-	-	-	-	mg/L	-	0.0024	0.0044	<0.005	0.012	<0.005	0.007	<0.0050	<0.0050	0.0043	
Antimony	0.09	-	-	-	mg/L	-	0.000122	0.000146	0.0001	<0.0001	0.0001	0.0003	<0.00010	<0.00020	<0.00010	
Arsenic	0.05	-	-	-	mg/L	-	0.0004	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.00050	0.00024	
Barium	10	-	-	-	mg/L	-	0.0377	0.0321	0.03	0.025	0.03	0.081	0.0805	0.0286	0.0296	
Beryllium	0.0015	-	-	-	mg/L	-	0.00002	0.00002	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	
Bismuth	-	-	-	-	mg/L	-	0.00002	0.00002	-	-	-	-	<0.00010	<0.00010	<0.000050	
Boron	12	-	-	-	mg/L	-	0.072	0.065	0.07	0.068	0.07	0.085	0.068	0.0711	0.061	
Cadmium	0.0005 - 0.004	-	-	-	mg/L	-	0.00013	0.00015	0.00025	0.00055	0.00025	0.00039	0.000275	0.000321	0.000106	
Calcium	-	-	-	-	mg/L	-	86.7	89.7	58.1	65.0	58.1	55.7	53.3	57.1	62.3	
Cesium	-	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	<0.000010	
Chromium	0.01	-	-	-	mg/L	-	0.0002	0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.00050	<0.00010	
Cobalt	0.04	-	-	-	mg/L	-	0.000118	0.000113	<0.00005	<0.00005	<0.00005	<0.00005	<0.00010	<0.00010	<0.00010	
Copper	0.02 - 0.09	-	-	-	mg/L	-	0.00098	0.00018	0.0008	0.0009	0.0008	0.028	0.0111	0.00046	0.00065	
Iron	-	-	-	-	mg/L	-	0.005	0.005	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Lead	0.04 - 0.16	-	-	-	mg/L	-	0.00001	0.00001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00020	<0.000050	
Lithium	-	-	-	-	mg/L	-	0.00428	0.00481	0.0054	0.0048	0.0054	0.0065	0.00433	0.005	0.0045	
Magnesium	-	-	-	-	mg/L	-	17.3	17.7	13.2	13.6	13.2	13.4	11.8	13.0	12.7	
Manganese	-	-	-	-	mg/L	-	0.218	0.114	0.0041	0.0027	0.0041	0.0424	0.00546	0.0175	0.00888	
Mercury	0.00025	-	-	-	mg/L	-	0.00005	0.00005	<0.00002	<0.00002	<0.00002	-	<0.00002	<0.000010	<0.0000050	
Molybdenum	10	-	-	-	mg/L	-	0.00579	0.0058	0.0063	0.0065	0.0063	0.0064	0.00607	0.00667	0.00603	
Nickel	0.25 - 1.5	-	-	-	mg/L	-	0.00058	0.00112	0.0002	0.0025	0.0002	0.0003	0.00023	0.00066	0.00052	
Phosphorus	-	-	-	-	mg/L	-	0.1	0.1	-	-	-	-	<0.050	<0.050	<0.050	
Potassium	-	-	-	-	mg/L	-	2.0	2.0	1.8	1.8	1.8	1.9	1.7	1.7	2.0	
Rubidium	-	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	0.0	
Selenium	0.02	-	-	-	mg/L	-	0.0004	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.00050	0.000298	
Silicon	-	-	-	-	mg/L	-	-	-	-	-	-	-	3.1	3.4	3.35	
Silver	0.0005 - 0.015	-	-	-	mg/L	-	0.00002	0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050	<0.000050	<0.000010	
Sodium	-	-	-	-	mg/L	-	64.9	69.2	63.3	65.3	63.3	65.0	60.5	66.0	63.5	
Strontium	-	-	-	-	mg/L	-	0.7	0.8	-	-	-	-	0.5	0.5	0.6	
Sulfur	-	-	-	-	mg/L	-	71.5	74.8	-	-	-	-	45.5	48.6	49.3	
Tellurium	-	-	-	-	mg/L	-	0.1	-	-	-	-	-	<0.00020	<0.00050	<0.00020	
Thallium	0.003	-	-	-	mg/L	-	0.000022	0.000032	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020	<0.000020	<0.000010	
Thorium	-	-	-	-	mg/L	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	
Tin	-	-	-	-	mg/L	-	0.00001	0.00002	0.0009	0.0004	0.0009	<0.0002	<0.00020	<0.00020	<0.00010	
Titanium	1	-	-	-	mg/L	-	0.003	0.003	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.00030	
Tungsten	-	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	<0.00010	
Uranium	0.085	-	-	-	mg/L	-	0.00251	0.00255	0.00175	0.00161	0.00175	0.00144	0.00134	0.00159	0.00148	
Vanadium	-	-	-	-	mg/L	-	0.00019	0.00027	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010	<0.00050	
Zinc	0.075 - 2.4	-	-	-	mg/L	-	0.0001	0.0001	<0.004	0.005	<0.004	0.013	0.0149	<0.0040	0.0015	
Zirconium	-	-	-	-	mg/L	-	0.005	0.005	-	-	-	-	<0.00010	<0.00010	<0.000060	
dissolved mercury filtration location																
dissolved metals filtration location																
<b>Aggregate Organics</b>																
Chemical Oxygen Demand (COD)	-	-	-	-	mg/L	-	10	10	<20	<20	<20	<20	<20	<20	<20	

**NOTES**  
 BC CSR AW-F Water Quality Guidelines for Protection of Freshwater Aquatic Life  
 BC CSR LW Water Quality Guidelines for Protection of Livestock  
 BC CSR DW Water Quality Guidelines for Drinking Water  
 Italics indicate that the laboratory detection limit exceeds the applicable standard.  
 Standards shown are from the BC Contaminated Sites Regulation (CSR; BC Reg. 375/96, O.C. 1480/96 and M40/2019, includes amendments up to BC Regs. 11/2019 and 13/2019, updated to 24 Jan 2019).  
 QAQC = quality assurance/quality control; FD = field duplicate;





Table D-11: Surface Water Analytical Results  
2018 Meziadin Landfill Annual Monitoring Program  
Regional District of Kitimat-Stikine

Location Site Name Sample ID Laboratory ID Sample Date QAQC	Meziadin - Treatment Lagoon Outlet Effluent							
	SW-3 / E245722							
	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3
	L2097662-3	L2183745-1	L2269974-3	L2383403-1	VA20A8676-001	VA20B8397-003	VA21B3002-001	VA21C4128-003
17-May-18	17-Oct-18	7-May-19	14-Nov-19	17-Jun-20	15-Oct-20	19-Jul-2021	27-Oct-2021	
<b>Conventional Parameters</b>								
Conductivity	456	429	445	510	458	564	616	1370
Hardness (Total as CaCO3)	207.0	157.0	172.0	169.0	179	190	232	356
Hardness (Dissolved as CaCO3)	-	-	-	-	194	191	223	359
pH	-	8.2	7.7	7.7	7.32	8.06	7.2	7.72
Total Suspended Solids	20.5	<3.0	7.5	16.8	11.4	6.8	13	86.9
Total Dissolved Solids	-	-	-	-	-	-	-	-
Alkalinity, Total (as CaCO3)	215	192	198	199	198	195	272	509
Ammonia, Total (as N)	1.65	2.84	1.74	3.09	1.15	2.13	6.46	25.7
Bromide (Br)	-	0.077	0.052	0.092	<0.050	0.086	-	<0.250
Chloride (Cl)	20.3	25.9	19.7	39.4	19.9	42.8	28.8	92.8
Fluoride (F)	0.069	0.113	0.075	0.065	0.069	0.037	0.112	<0.100
Nitrate (as N)	<0.0050	0.0956	0.0157	0.0053	<0.0050	<0.0050	<0.0050	<0.0250
Nitrite (as N)	<0.0010	0.0114	<0.0010	<0.0010	<0.0010	<0.0010	0.0071	<0.0050
Nitrate + Nitrite (as N)	<0.0051	0.107	0.0157	0.0053	-	-	-	-
Total Kjeldahl Nitrogen	3.5	3.3	2.71	3.83	1.73	3.06	7.36	30.3
Phosphorus (P)-Total	-	-	-	-	-	-	-	-
Sulfate (SO4)	-	8.7	18.6	19.2	15.7	21.8	15.5	57.9
Biological Oxygen Demand (BOD)	9.9	<2.0	6.6	7.6	6.8	5.6	9.9	79.3
Chemical Oxygen Demand (COD)	47	22	25	27	30	39	52	243
Phenols (4AAP)	-	-	-	-	-	-	-	-
<b>Total Metals</b>								
Aluminum	0.0595	0.0129	0.048	0.199	0.350	0.0392	0.232	0.377
Antimony	0.00017	0.00014	<0.00020	0.00017	<0.00010	0.0002	0.00017	0.00099
Arsenic	0.00141	0.00082	0.00127	0.00104	0.00104	0.0013	0.00086	0.00460
Barium	0.196	0.1	0.128	0.128	0.139	0.108	0.116	0.200
Beryllium	<0.00010	<0.00010	<0.00020	<0.00010	<0.000100	<0.000100	<0.000100	<0.000200
Bismuth	<0.00050	<0.00050	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.000100
Boron	0.155	0.2	0.124	0.226	0.150	0.296	0.232	0.939
Cadmium	0.0000127	<0.0000050	0.000019	0.0000707	0.0000097	0.0000222	0.0000419	0.0000240
Calcium	59.7	52.2	55.1	50.8	61.0	54	72.0	109
Cesium	0.0	0.0	<0.000020	0.0	<0.000010	0.000013	0.000031	0.000150
Chromium	0.001	0.00019	0.00055	0.00085	0.00060	0.00043	0.00090	0.00559
Cobalt	0.00122	0.00024	0.00099	0.00075	0.00062	0.00033	0.00081	0.00140
Copper	<0.00050	<0.00050	<0.00010	0.00108	0.00088	0.00126	0.00126	0.00393
Iron	4.21	0.49	2.46	2.22	2.03	3.64	1.48	5.13
Lead	0.000336	0.000063	<0.00010	0.000221	0.000104	<0.000050	0.000160	0.000228
Lithium	0.0015	<0.0010	<0.0020	0.002	<0.0010	0.0029	0.0035	0.0198
Magnesium	10.9	7.58	10.2	10.3	10.1	13.5	12.6	20.5
Manganese	7.91	3.58	5.86	5.02	7.94	3.68	8.56	7.17
Mercury	0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000076
Molybdenum	0.00083	0.00234	0.0007	0.00024	0.00083	0.000256	0.000185	0.000413
Nickel	0.00317	0.00278	0.0028	0.00328	0.00208	0.00293	0.00297	0.00840
Phosphorus	0.405	0.056	0.21	0.069	0.166	0.052	0.682	1.20
Potassium	3.85	4.04	3.51	6.22	1.96	9.57	7.45	32.8
Rubidium	0.00164	0.00192	0.0015	0.00303	0.00076	0.00419	0.00427	0.0183
Selenium	0.00009	0.00008	<0.00010	0.000095	0.000059	0.000058	0.000066	0.000119
Silicon	3.27	3.58	2.49	1.95	3.51	1.33	4.65	4.28
Silver	<0.000010	<0.000010	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010	0.000081
Sodium	18.2	20.2	16	27	16.8	32.8	26.4	82.6
Strontium	0.378	0.367	0.31	0.284	0.344	0.352	0.398	0.627
Sulfur	3.12	2.72	6.8	6.95	3.91	8.43	4.47	11.3
Tellurium	<0.00020	<0.00020	<0.00040	<0.00020	<0.00020	<0.00020	0.00022	<0.00040
Thallium	<0.000010	<0.000010	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010	<0.000020
Thorium	<0.00010	<0.00010	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020
Tin	0.00011	0.0004	<0.00020	<0.00010	0.00012	<0.00010	<0.00010	<0.00020
Titanium	0.00064	0.00032	<0.00090	<0.0027	0.00173	<0.00030	0.00271	0.00650
Tungsten	<0.00010	<0.00010	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020
Uranium	0.000034	0.000044	0.000029	0.000023	0.000017	<0.000010	0.000012	0.000022
Vanadium	<0.00050	<0.00050	<0.0010	0.00064	0.00052	<0.00050	0.00074	0.00130
Zinc	0.0049	0.0034	<0.0060	0.0055	0.0098	0.0035	0.0180	0.0105
Zirconium	<0.000060	<0.000060	<0.00012	<0.00020	<0.00020	<0.00020	<0.00020	<0.00040
<b>Dissolved Metals</b>								
Aluminum (Al)-Dissolved	0.0083	0.0097	0.0083	0.0115	0.0428	0.0071	0.0200	0.0708
Antimony (Sb)-Dissolved	0.00013	0.00013	<0.00020	0.00017	<0.00010	0.00015	<0.00020	0.00074
Arsenic (As)-Dissolved	0.00129	0.00081	0.00124	0.00114	0.00084	0.00096	0.00084	0.00442
Barium (Ba)-Dissolved	0.162	0.0968	0.112	0.115	0.146	0.108	0.109	0.177
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00020	<0.00010	<0.000100	<0.000100	<0.000200	<0.000100
Bismuth (Bi)-Dissolved	<0.000050	<0.000050	<0.00010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
Boron (B)-Dissolved	0.146	0.186	0.116	0.215	0.132	0.274	0.229	0.805
Cadmium (Cd)-Dissolved	0.0000066	0.0000602	0.000012	0.0000086	<0.0000050	<0.0000050	<0.0000100	<0.0000050
Calcium (Ca)-Dissolved	63.7	50.1	52.6	48.8	54.3	54.8	69.4	109
Cesium (Cs)-Dissolved	0.000011	0.000026	<0.000020	0.000013	<0.000010	0.00001	0.000024	0.000149
Chromium (Cr)-Dissolved	0.00088	0.00011	0.00032	0.00027	0.00028	0.00038	<0.00100	0.00408
Cobalt (Co)-Dissolved	0.00121	0.00022	0.0009	0.00061	0.00032	0.0003	0.00033	0.00065
Copper (Cu)-Dissolved	<0.00020	0.0014	<0.00040	0.00037	<0.00020	0.00026	<0.00040	0.00026
Iron (Fe)-Dissolved	4.04	0.029	1.65	1.87	0.525	0.248	0.324	0.155
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.00010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
Lithium (Li)-Dissolved	0.0014	<0.0010	<0.0020	0.0018	0.0011	0.0027	0.0034	0.0181
Magnesium (Mg)-Dissolved	11.6	7.83	9.9	11.4	10.5	13.2	12.0	21.2
Manganese (Mn)-Dissolved	8.2	3.38	5.5	5.15	7.60	3.89	8.56	7.50
Mercury (Hg)-Dissolved	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved	0.000766	0.0022	0.00063	0.00021	0.000252	0.000218	0.000106	0.000121
Nickel (Ni)-Dissolved	0.00307	0.00267	0.0027	0.0027	0.00132	0.00286	0.00211	0.00616
Phosphorus (P)-Dissolved	0.098	<0.050	<0.10	<0.050	0.100	<0.050	0.561	0.690
Potassium (K)-Dissolved	4.05	4.03	3.4	6.77	2.03	10	7.18	36.0
Rubidium (Rb)-Dissolved	0.00167	0.00197	0.00154	0.00318	0.00089	0.00434	0.00388	0.0201
Selenium (Se)-Dissolved	0.00121	0.000076	<0.00010	0.000698	0.00077	0.00171	0.00176	0.00665
Silicon (Si)-Dissolved	3.16	3.45	2.45	1.73	3.42	1.27	4.27	4.08
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000020	<0.000010	<0.000010	<0.000010	<0.000020	<0.000010
Sodium (Na)-Dissolved	18.8	20.3	16.5	27.7	16.6	33.8	24.3	81.6
Strontium (Sr)-Dissolved	0.362	0.35	0.263	0.316	0.318	0.349	0.420	0.646
Sulfur (S)-Dissolved	3.4	3.25	6.6	9.78	32.8	10	14.8	63.9
Tellurium (Te)-Dissolved	<0.00020	<0.00020	<0.00040	<0.00020	<0.00020	<0.00020	<0.00040	<0.00020
Thallium (Tl)-Dissolved	<0.000010	<0.000010	<0.000020	<0.000010	<0.000010	<0.000010	<0.000020	<0.000010
Thorium (Th)-Dissolved	<0.00010	<0.00010	<0.00020	<0.00010	<0.00010	<0.00010	<0.00020	<0.00010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00020	0.00011	<0.00010	<0.00010	<0.00020	<0.00010
Titanium (Ti)-Dissolved	<0.00030	<0.00030	<0.00060	0.00035	<0.00030	<0.00030	<0.00060	0.00151
Tungsten (W)-Dissolved	<0.00010	<0.00010	<0.00020	<0.00010	<0.00010	<0.00010	<0.00020	<0.00010
Uranium (U)-Dissolved	0.000031	0.000041	0.000027	0.000019	0.000013	<0.000010	<0.000020	0.000021
Vanadium (V)-Dissolved	<0.00050	<0.00050	<0.0010	0.00064	<0.00050	<0.00050	<0.00050	0.00066
Zinc (Zn)-Dissolved	0.0013	0.0031	0.0023	0.0011	0.0012	0.0013	0.0035	0.0014
Zirconium (Zr)-Dissolved	<0.000060	<0.000060	<0.00012	<0.00020	<0.00020	<0.00020	<0.00040	0.00026



Table D-11: Surface Water Analytical Results  
 2018 Meziadin Landfill Annual Monitoring Program  
 Regional District of Kitimat-Stikine

Location Site Name	Meziadin - Treatment Lagoon Outlet Effluent							
	SW-3 / E245722							
Sample ID	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3
Laboratory ID	L2097662-3	L2183745-1	L2269974-3	L2383403-1	VA20A8676-001	VA20B8397-003	VA21B5002-001	VA21C4126-003
Sample Date	17-May-18	17-Oct-18	7-May-19	14-Nov-19	17-Jun-20	15-Oct-20	19-Jul-2021	27-Oct-2021
QA/QC	-	-						

**NOTES**

BC CSR AWE

BC CSR LW

BC CSR DW

Italics indicate that the laboratory detection limit exceeds the applicable standard.  
 Standards shown are from the BC Contaminated Sites Regulation (CSR; BC Reg. 375/96, O.C. 1460/96 and M40/2019, include amendments in BC Reg. 375/96).  
 QA/QC = quality assurance/quality control;



Table D-15: Surface Water Analytical Results  
2018 Meziadin Landfill Annual Monitoring Program  
Regional District of Kitimat-Stikine

Location Site Name Sample ID Laboratory ID Sample Date QAQC	CSR Aquatic Life Standard Freshwater (AW-F)	Units	Upstream surface location							
			SW2017-2 / E252829							
			SW2017-2 1-May-17	SW2017-2 17-May-18	SW2017-02 L2269974 7-May-19	SW2017-02 14-Nov-19 No sample collected	SW2017-02 17-Jun-20 dry (MT)	SW2017-2 15-Oct-20	SW2017-2 19-Jul-21	SW2017-2 VA21C4128-002 27-Oct-2021
<b>Field Observations</b>										
pH	-	-	-	5.42	5.73	-	-	6.7	-	7.13
Temperature	-	°C	-	8	5.3	-	-	6	-	5.1
Conductivity	-	uS/cm	-	160	8.7	-	-	15.2	-	31.7
Water level	-	m	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	mg/L	-	13.4	8.1	-	-	2.4	-	6.4
Oxidation Reduction Potential	-	mV	-	444.6	449.9	-	-	230.5	-	255
<b>Conventional Parameters</b>										
Conductivity	-	uS/cm	15.8	12.7	12.9	-	-	19.1	-	17.1
Hardness (Total as CaCO3)	-	mg/L	8.93	5.9	5.4	-	-	8.18	-	6.96
Hardness (Dissolved as CaCO3)	-	mg/L	-	-	-	-	-	7.92	-	6.63
pH	-	pH	6	-	6.3	-	-	6.54	-	6.28
Total Suspended Solids	-	mg/L	61	38.3	3.7	-	-	12	-	<3.0
Total Dissolved Solids	-	mg/L	-	-	-	-	-	-	-	-
Alkalinity, Total (as CaCO3)	-	mg/L	6	4.8	4.2	-	-	5.9	-	3.6
Ammonia, Total (as N)	1.3	mg/L	<0.03	0.0	0.0	-	-	0.0080	-	<0.0050
Bromide (Br)	-	mg/L	-	-	<0.050	-	-	<0.050	-	<0.050
Chloride (Cl)	1500	mg/L	<1.0	<0.50	<0.50	-	-	<0.50	-	<0.50
Fluoride (F)	2.0-3.0 (e)	mg/L	-	0.0	0.0	-	-	<0.020	-	<0.020
Nitrate (as N)	400	mg/L	-	<0.0050	<0.0050	-	-	<0.0050	-	<0.0050
Nitrite (as N)	0.2 - 2.0 (h)	mg/L	-	<0.0010	<0.0010	-	-	<0.0010	-	<0.0010
Nitrate + Nitrite (as N)	-	mg/L	-	<0.0051	<0.0051	-	-	-	-	-
Total Kjeldahl Nitrogen	-	mg/L	0.353	0.3	0.2	-	-	0.402	-	0.328
Phosphorus (P)-Total	-	mg/L	-	-	-	-	-	-	-	-
Sulfate (SO4)	128 - 429 (d)	mg/L	<1.0	-	0.4	-	-	<0.30	-	0.91
Biological Oxygen Demand (BOD)	-	mg/L	<5.0	<2.0	<2.0	-	-	<2.0	-	<2.0
Chemical Oxygen Demand (COD)	-	mg/L	26	21.0	<20	-	-	46	-	37
Phenols (4AAP)	0.2	mg/L	-	-	-	-	-	-	-	-
<b>Total Metals</b>										
Aluminum	-	mg/L	1.13	0.679	0.331	-	-	0.348	-	0.399
Antimony	0.09	mg/L	<0.00010	<0.00010	<0.00010	-	-	<0.00010	-	<0.00010
Arsenic	0.05	mg/L	<0.00050	0.00021	0.00012	-	-	0.00016	-	0.00020
Barium	10	mg/L	0.0164	0.0158	0.00894	-	-	0.0108	-	0.0125
Beryllium	0.0015	mg/L	<0.00010	<0.00010	<0.00010	-	-	<0.000100	-	<0.000100
Bismuth	-	mg/L	<0.00010	<0.000050	<0.000050	-	-	<0.000050	-	<0.000050
Boron	12	mg/L	0.005	<0.010	<0.010	-	-	<0.010	-	<0.010
Cadmium	0.0005 - 0.004	mg/L	0.0000270	0.0000328	0.0000179	-	-	0.0000266	-	0.0000798
Calcium	-	mg/L	2.1	1.61	1.41	-	-	2.20	-	1.87
Cesium	-	mg/L	-	0.00002	<0.000010	-	-	<0.000010	-	<0.000010
Chromium	0.01	mg/L	0.003	0.00113	0.00063	-	-	0.00060	-	0.00060
Cobalt	0.04	mg/L	0.00042	0.00048	<0.00010	-	-	0.00019	-	0.00058
Copper	0.02 - 0.09	mg/L	0.00263	0.00188	0.00112	-	-	0.00104	-	0.00152
Iron	-	mg/L	1.13	0.411	0.127	-	-	0.133	-	0.236
Lead	0.04 - 0.16	mg/L	0.0002	0.000154	<0.000050	-	-	<0.000050	-	0.000064
Lithium	-	mg/L	0.00075	<0.0010	<0.0010	-	-	<0.0010	-	<0.0010
Magnesium	-	mg/L	0.919	0.618	0.485	-	-	0.652	-	0.556
Manganese	-	mg/L	0.0423	0.0634	0.00691	-	-	0.0578	-	0.206
Mercury	0.00025	mg/L	-	0.0000103	0.00001	-	-	<0.0000050	-	<0.0000050
Molybdenum	10	mg/L	<0.00010	<0.000050	<0.000050	-	-	<0.000050	-	<0.000050
Nickel	0.25 - 1.5	mg/L	0.00434	0.00218	0.00133	-	-	0.00194	-	0.00174
Phosphorus	-	mg/L	<0.050	0.056	<0.050	-	-	<0.050	-	<0.050
Potassium	-	mg/L	0.29	0.24	0.179	-	-	0.235	-	0.093
Rubidium	-	mg/L	-	0.00042	0.00022	-	-	0.00033	-	<0.00020
Selenium	0.02	mg/L	<0.00050	0.000084	0.000115	-	-	0.000102	-	0.000108
Silicon	-	mg/L	3.7	3.04	2.37	-	-	3.21	-	2.99
Silver	0.0005 - 0.015	mg/L	<0.000050	0.0000150	<0.000010	-	-	0.000011	-	0.000011
Sodium	-	mg/L	0.85	0.816	0.705	-	-	0.881	-	0.891
Strontium	-	mg/L	0.0125	0.013	0.00988	-	-	0.0154	-	0.0129
Sulfur	-	mg/L	<3.0	<0.50	<0.50	-	-	<0.50	-	<0.50
Tellurium	-	mg/L	<0.00020	<0.00020	<0.00020	-	-	<0.00020	-	<0.00020
Thallium	0.003	mg/L	<0.000020	<0.000010	<0.000010	-	-	<0.000010	-	<0.000010
Thorium	-	mg/L	<0.00010	<0.00010	<0.00010	-	-	<0.00010	-	<0.00010
Tin	-	mg/L	<0.00020	<0.00010	<0.00010	-	-	<0.00010	-	<0.00010
Titanium	1	mg/L	0.0192	0.0058	0.0026	-	-	0.00164	-	0.00217
Tungsten	-	mg/L	-	<0.00010	<0.00010	-	-	<0.00010	-	<0.00010
Uranium	0.085	mg/L	0.0000230	0.0000150	<0.000010	-	-	<0.000010	-	<0.000010
Vanadium	-	mg/L	0.0020	0.0008	<0.00050	-	-	<0.00050	-	<0.00050
Zinc	0.075 - 38.1	mg/L	<0.0040	<0.0030	<0.0030	-	-	<0.0030	-	0.0035
Zirconium	-	mg/L	0.0005	0.0003	0.0003	-	-	0.00034	-	0.00037
<b>Dissolved Metals</b>										
Aluminum	-	mg/L	-	0.263	0.267	-	-	0.330	-	0.334
Antimony	0.09	mg/L	-	<0.00010	<0.00010	-	-	<0.00010	-	<0.00010
Arsenic	0.05	mg/L	-	0.00011	0.00012	-	-	0.00019	-	0.00018
Barium	10	mg/L	-	0.0097	0.00844	-	-	0.0104	-	0.0100
Beryllium	0.0015	mg/L	-	<0.00010	<0.00010	-	-	<0.000100	-	<0.000100
Bismuth	-	mg/L	-	<0.000050	<0.000050	-	-	<0.000050	-	<0.000050
Boron	12	mg/L	-	<0.010	<0.010	-	-	<0.010	-	<0.010
Cadmium	0.0005 - 0.004	mg/L	-	0.000014	0.0000115	-	-	0.0000262	-	0.0000273
Calcium	-	mg/L	-	1.5	1.42	-	-	2.10	-	1.74
Cesium	-	mg/L	-	<0.000010	<0.000010	-	-	<0.000010	-	<0.000010
Chromium	0.01	mg/L	-	0.00047	0.00042	-	-	0.00063	-	0.00053
Cobalt	0.04	mg/L	-	<0.00010	<0.00010	-	-	0.00016	-	<0.00010
Copper	0.02 - 0.09	mg/L	-	0.00109	0.00102	-	-	0.00106	-	0.00118
Iron	-	mg/L	-	0.071	0.061	-	-	0.096	-	0.114
Lead	0.04 - 0.16	mg/L	-	<0.000050	<0.000050	-	-	<0.000050	-	<0.000050
Lithium	-	mg/L	-	<0.0010	<0.0010	-	-	<0.0010	-	<0.0010
Magnesium	-	mg/L	-	0.518	0.441	-	-	0.647	-	0.556
Manganese	-	mg/L	-	0.0115	0.00275	-	-	0.0560	-	0.0126
Mercury	0.00025	mg/L	-	0.0000054	0.0000076	-	-	<0.0000050	-	0.0000089
Molybdenum	10	mg/L	-	<0.000050	<0.000050	-	-	<0.000050	-	<0.000050
Nickel	0.25 - 1.5	mg/L	-	0.00116	0.00109	-	-	0.00186	-	0.00158
Phosphorus	-	mg/L	-	<0.050	<0.050	-	-	<0.050	-	<0.050
Potassium	-	mg/L	-	0.224	0.175	-	-	0.223	-	0.061
Rubidium	-	mg/L	-	<0.00020	<0.00020	-	-	0.00033	-	<0.00020
Selenium	0.02	mg/L	-	0.000063	0.000102	-	-	0.000128	-	0.000109
Silicon	-	mg/L	-	2.57	2.19	-	-	3.31	-	2.84
Silver	0.0005 - 0.015	mg/L	-	<0.000010	<0.000010	-	-	0.000012	-	<0.000010
Sodium	-	mg/L	-	0.788	0.754	-	-	0.942	-	0.888
Strontium	-	mg/L	-	0.011	0.00851	-	-	0.0143	-	0.0135
Sulfur	-	mg/L	-	<0.50	<0.50	-	-	<0.50	-	<0.50
Tellurium	-	mg/L	-	<0.00020	<0.00020	-	-	<0.00020	-	<0.00020
Thallium	0.003	mg/L	-	<0.000010	<0.000010	-	-	<0.000010	-	<0.000010
Thorium	-	mg/L	-	<0.00010	<0.00010	-	-	<0.00010	-	<0.00010
Tin	-	mg/L	-	<0.00010	<0.00010	-	-	<0.00010	-	<0.00010
Titanium	1	mg/L	-	0.00125	0.00114	-	-	0.00149	-	0.00139
Tungsten	-	mg/L	-	<0.00010	<0.00010	-	-	<0.00010	-	<0.00010
Uranium	0.085	mg/L	-	<0.000010	<0.000010	-	-	<0.000010	-	<0.000010
Vanadium	-	mg/L	-	<0.00050	<0.00050	-	-	<0.00050	-	<0.00050
Zinc	0.075 - 2.4	mg/L	-	0.001	<0.0010	-	-	0.0019	-	0.0020
Zirconium	-	mg/L	-	0.000261	0.000309	-	-	0.00043	-	0.00037

**NOTES**

BC CSR AW-F Water Quality Guidelines for Protection of Freshwater Aquatic Life  
BC CSR LW Water Quality Guidelines for Protection of Livestock  
BC CSR DW Municipal Water Quality Guidelines for Drinking Water

Italics indicate that the laboratory detection limit exceeds the applicable standard.

Standards shown are from the BC Contaminated Sites Regulation (CSR; BC Reg. 375/96, O.C. 1480/96 and M40/2019, includes amendments up to BC Regs. 11/2019 and 13/2019, updated to 24 Jan 2020).

QAQC = quality assurance/quality control; FD = field duplicate;

## Appendix E      Photographs





Photo 1: Meziadin Landfill SW17-01 DS, looking downstream, April 12, 2022



Photo 2: Meziadin Landfill SW17-01 DS, looking upstream, April 12, 2022





Photo 3: Meziadin Landfill SW17-01 DS, looking downstream October 26, 2022



Photo 4: Meziadin Landfill SW17-01 DS, looking upstream, October 26, 2022





Photo 5: Meziadin Landfill SW17-02 US, looking downstream, April 12, 2022



Photo 6: Meziadin Landfill SW17-02 US, looking upstream, April 12, 2022



Photo 7: Meziadin Landfill SW17-02 US, looking downstream, October 26, 2022



Photo 8: Meziadin Landfill SW17-02 US, looking upstream, October 26, 2022





**Photo 9: Meziadin Landfill SW-03, looking at manhole, April 12, 2022**



**Photo 10: Meziadin Landfill SW-03, looking at lagoon, April 12, 2022**



Photo 11: Meziadin Landfill SW-03, looking at lagoon, October 26, 2022



Photo 12: Meziadin Landfill SW-03, looking at lagoon facing NW, October 26, 2022



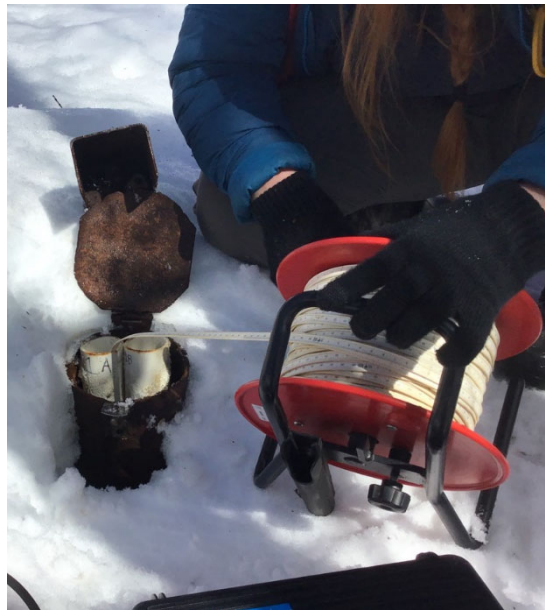


Photo 13: Meziadin Landfill MW-01AB, dual well head buried under snow, April 12, 2022



Photo 14: Meziadin Landfill MW-01AB, dual well head, October 26, 2022



Photo 15: Meziadin Landfill MW-02, well buried under snow, April 12, 2022



Photo 16: Meziadin Landfill MW-02, well monument, October 26, 2022





Photo 17: Meziadin Landfill MW-03, well monument, April 12, 2022



Photo 18: Meziadin Landfill MW-03, well monument, October 26, 2022



Photo 19: Meziadin Landfill MW-04, well monument, April 12, 2022



Photo 20: Meziadin Landfill MW-04, well monument, October 26, 2022

## Appendix F      Data Summary Tables





**Table 1**  
**Groundwater Field Observations**  
**2022 Annual Environmental Effects Monitoring Report**  
**Regional District of Kitimat-Stikine**

Monitor Well ID	Date	Depth to Water from T.O.P.* (m)	Depth to bottom from T.O.P.* (m)	Ground Elevation (masl)	Casing Height (mags)	Groundwater Elevation (masl)	Field Temperature (°C)	Conductivity (µs/cm)	DO (mg/L)	ORP (mV)	Field pH	Apparent NAPL Thickness (mm)
MW-01A	4/12/2022	7.6	10.0	317.0	0.7	306.3	6.6	505.0	5.2	219.9	7.8	nil
	10/26/2022	8.8	11.0			305.3	4.3	489.2	14.7	257.2	7.4	nil
MW-01B	4/12/2022	2.0	7.1	317.0	0.8	309.1	5.3	260.9	0.5	186.4	6.0	nil
	10/26/2022	2.3	7.1			309.2	7.2	222.5	3.8	249.3	6.2	nil
MW-02	4/12/2022	1.6	6.3	324.0	0.7	317.0	5.0	297.7	9.3	196.8	7.7	nil
	10/26/2022	2.3	7.1			316.2	7.3	251.6	9.3	232.4	7.5	nil
MW-03	4/12/2022	5.8	9.6	338.0	0.9	327.5	5.4	700.0	3.0	207.4	7.8	nil
	10/26/2022	5.8	9.5			327.7	5.5	437.9	7.0	241.1	7.5	nil
MW-04	4/12/2022	5.8	9.3	333.0	0.9	322.8	6.1	457.0	2.6	204.2	7.5	nil
	10/26/2022	5.1	9.3			322.8	6.2	434.1	5.0	243.6	7.4	nil

Notes:

- LTDL - Less than instrument detection limit
- NAPL - Non aqueous phase liquid
- m - Meters
- mm - Millimeters
- mbgs - Meters below grade
- ppmv - Parts per million by volume
- n.m. - Not measured
- T.O.P - Top of pipe
- MW - Monitoring Well sampling for groundwater
- nc - not collected
- ns - not surveyed
- nv - no value

**Table 2**  
**Surface Water Field Observations**  
**2022 Annual Environmental Effects Monitoring Report**  
**Regional District of Kitimat-Stikine**

Surface Water Location	Date	Field Temperature (°C)	Conductivity (µs/cm)	DO (mg/L)	ORP (mV)	Field pH	Apparent NAPL Thickness (mm)
SW-03 (Treatment Lagoon)	4/12/2022	4.9	1031	1.7	-11.2	6.69	nil
	10/26/2022	5.8	899	4	232.7	6.79	nil
SW2017-01 (Downstream)	4/12/2022	-	-	-	-	-	nil
	10/26/2022	3.2	40.5	14.1	250.8	7.21	nil
SW2017-02 (Upstream)	10/26/2022	2.8	14.5	7.5	239.2	6.21	nil
	4/12/2022	2.8	23.7	5.2	197.8	6.5	nil

Notes:

- LTDL - Less than instrument detection limit
- NAPL - Non aqueous phase liquid
- mm - Millimeters

**Table 3**  
**Summary of Groundwater Analysis**  
**2022 Annual Environmental Effects Monitoring Report**  
**Regional District of Kitimat-Stikine**

Sample Location		SW-03															
Sample Date	Sample ID	12-Apr-22 MW1A RDKS	26-Oct-22 MW-1A RDKS	12-Apr-22 MW1B RDKS	26-Oct-22 MW-1B RDKS	12-Apr-22 MW-02 RDKS	12-Apr-22 DUP RDKS	26-Oct-22 MW-02 RDKS	12-Apr-22 MW3 RDKS	26-Oct-22 MW-03 RDKS	12-Apr-22 MW4 RDKS	26-Oct-22 MW-04 RDKS	12-Apr-22 Field Blank RDKS	13-Apr-22 Lagoon Outlet RDKS	26-Oct-22 Treatment Lagoon RDKS		
Laboratory	Laboratory Work Order	VA22A7804	VA22C6348	VA22A7804	VA22C6348	VA22A7804	VA22A7804-003	VA22C6348-003	VA22A7804-004	VA22C6348-004	VA22A7804-005	VA22C6348-005	VA22A7804-007	VA22A7805-002	VA22C6296-008		
Laboratory Sample ID	Sample Type	CSR-Schedule 3.2															
Units																	
<b>General Parameters</b>																	
pH, lab	S.U.	n/v	8.28	8.13	6.73	6.89	8.32	8.36	0%	8.20	8.32	8.14	8.25	8.16	5.61	7.0	7.35
Ammonia (as N)	mg/L	1.3/18.4 <sup>51</sup> <sup>A</sup>	0.0258	0.0194	0.407	0.386	0.337	0.0194	0.325	4%	0.0123	< 0.0050	< 0.0050	< 0.0050	< 0.0050	31.2 <sup>A</sup>	32.8 <sup>A</sup>
Alkalinity, Total	mg/L	n/v	237	213	210	175	216	214	1%	197	205	183	199	184	< 1.0	760	393
Electrical Conductivity, Lab	µmhos/cm	n/v	795	782	398	342	487	491	1%	506	720	645	700	639	< 2.0	1660	1,390
Hardness (as CaCO3)	mg/L	n/v	182	221	181	148	141	145	nc	116	232	226	229	217	< 0.60	503	390
Total Dissolved Solids	mg/L	n/v	789	478	238	185	394	421	7%	244	472	428	440	370	-	832	852
Total Suspended Solids	mg/L	n/v	412	614	1890	150	422	388	8%	78.2	12.7	15.2	14.5	3.0	-	1170	320
Orthophosphate (as P)	mg/L	n/v	0.0244	0.0140	0.0021	0.0011	0.0593	0.0533	11%	0.0327	0.018	0.0314	0.0035	0.0037	-	1.92	0.379
Total Kjeldahl Nitrogen	mg/L	n/v	0.765	-	1.94	-	0.512	0.378	30%	-	0.086	-	< 0.050	-	-	104	-
Biochemical Oxygen Demand (BOD)	mg/L	n/v	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	nc	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	-	329	119
Chemical Oxygen Demand	mg/L	n/v	24	36	27	35	27	28	4%	12	< 10	< 10	< 10	< 10	-	1140	522
Dissolved Organic Carbon (DOC)	mg/L	n/v	1.37	-	4.42	-	1.56	1.47	6%	-	0.72	-	0.76	-	-	52.9	40.5
Chloride	mg/L	1,500 <sup>A</sup> 250 <sup>B</sup>	< 2.50	< 2.50	< 0.50	< 0.50	< 0.50	< 0.50	nc	< 0.50	< 2.50	< 0.50	< 2.50	< 2.50	-	103	85.2
Sulfate	mg/L	1,280/2,180/3,090/4,290 <sup>512</sup> <sup>A</sup> 500 <sup>B</sup>	188	204	5.48	5.33	53	53	0%	71.6	185	159	180	153	-	21.2	193
Bromide	mg/L	n/v	< 0.250	< 0.250	< 0.050	< 0.050	< 0.050	< 0.050	nc	< 0.050	< 0.050	< 0.050	< 0.050	< 0.250 DLDS	-	< 0.500	< 0.250
Fluoride	mg/L	2.0/3.0 <sup>55</sup> <sup>A</sup> 1.5 <sup>B</sup>	0.184	0.107	0.085	0.074	0.181	0.182	1%	0.145	< 0.100	0.070	< 0.100	< 0.100	-	< 0.200	< 0.180
Nitrate (as N)	mg/L	400 <sup>A</sup> 10 <sup>B</sup>	0.154	< 0.0250	0.0207	0.0554	0.017	0.0183	7%	0.0836	0.121	0.183	0.0495	0.0688	-	< 0.0500	< 0.0250
Nitrite (as N)	mg/L	0.20/0.40/0.60/0.80-2.0 <sup>58</sup> <sup>A</sup> 1.0 <sup>B</sup>	< 0.0050	< 0.0050	0.0054	0.0035	0.0048	0.0041	16%	< 0.0010	< 0.0050	< 0.0010	< 0.0050	< 0.0050	-	< 0.0100	< 0.0050
Nitrate + Nitrite (as N)	mg/L	n/v	-	< 0.0255	-	0.0589	-	-	nc	0.0836	-	0.183	-	0.0688	-	-	< 0.0255
<b>Dissolved Metals</b>																	
Aluminum	mg/L	9.5 <sup>B</sup>	0.0029	0.0115	0.0346	0.0139	0.0038	0.0036	5%	0.0075	0.0727	0.0015	0.0015	0.0024	-	0.1	0.0456
Antimony	mg/L	0.090 <sup>A</sup> 0.0060 <sup>B</sup>	0.00017	0.00017	0.00021	< 0.00020	< 0.00010	< 0.00010	nc	0.00019	< 0.00010	0.00010	0.00011	0.00011	-	0.00095	0.00054
Arsenic	mg/L	0.050 <sup>A</sup> 0.010 <sup>B</sup>	0.0004	0.00043	0.00123	0.00065	0.00055	0.00056	2%	0.00044	0.00018	0.00019	0.00023	0.00016	-	0.00385	0.00305
Barium	mg/L	10 <sup>A</sup> 1.0 <sup>B</sup>	0.0489	0.562	0.362	0.566	0.0579	0.0579	2%	0.0521	0.0282	0.0247	0.022	0.0216	-	0.24	0.150
Beryllium	mg/L	0.0015 <sup>A</sup> 0.0080 <sup>B</sup>	< 0.000100	< 0.000100	< 0.000100	< 0.000100	< 0.000100	< 0.000100	nc	< 0.000100	< 0.000100	< 0.000100	< 0.000100	< 0.000100	-	< 0.000100	< 0.000100
Bismuth	mg/L	n/v	< 0.000050	< 0.000100	< 0.000050	< 0.000050	< 0.000050	< 0.000050	nc	< 0.000050	< 0.000050	< 0.000050	< 0.000050	< 0.000050	< 0.000100	< 0.000100	< 0.000100
Boron	mg/L	12 <sup>A</sup> 5.0 <sup>B</sup>	0.08	0.068	< 0.020	< 0.020	0.054	0.053	2%	0.039	0.068	0.059	0.074	0.061	-	1.05	0.612
Cadmium	mg/L	0.00050/0.0015/0.0025/0.0035/0.0040 <sup>53</sup> <sup>A</sup> 0.0050 <sup>B</sup>	0.0000297	0.0000368	0.0000826	0.000163	< 0.0000100	< 0.0000050	nc	0.0000445	0.000141	0.0000363	0.0000636	0.0000801	-	0.0000149	< 0.0000100
Calcium	mg/L	n/v	53.1	64.6	54.8	43.9	38.7	39.2	1%	31.4	70	67.4	68.2	62.9	-	160	122
Cesium	mg/L	n/v	< 0.000010	< 0.000010	0.000021	0.000022	< 0.000010	< 0.000010	nc	< 0.000010	< 0.000010	< 0.000010	< 0.000010	< 0.000010	-	0.00014	0.000138
Chromium	mg/L	0.010 <sup>523</sup> <sup>A</sup> 0.050 <sup>523</sup> <sup>B</sup>	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	nc	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	-	0.00676	0.00402
Cobalt	mg/L	0.040 <sup>A</sup> 0.0010 <sup>B</sup>	< 0.00010	< 0.00010	0.0176 <sup>B</sup>	0.00934 <sup>B</sup>	0.00031	0.0003	3%	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	-	0.00143	0.00078
Copper	mg/L	0.020/0.030/0.040/0.050/0.060-0.090 <sup>54</sup> <sup>A</sup> 1.5 <sup>B</sup>	0.00263	0.00911	0.00048	< 0.00040	< 0.00020	< 0.00020	nc	0.00023	0.00036	0.00021	0.00165	0.00049	-	0.00055	< 0.00040
Iron	mg/L	6.5 <sup>B</sup>	< 0.010	0.022	2.29	1.06	0.022	0.022	0%	0.013	0.012	< 0.010	< 0.010	< 0.010	-	1.23	0.325
Lead	mg/L	0.040/0.050/0.060/0.11/0.16 <sup>56</sup> <sup>A</sup> 0.010 <sup>B</sup>	0.00008	0.000082	< 0.000100	< 0.000100	< 0.000050	< 0.000050	nc	< 0.000050	< 0.000050	< 0.000050	< 0.000050	< 0.000050	-	0.000201	< 0.000100
Lithium	mg/L	0.0080 <sup>B</sup>	0.0051	0.0038	0.0029	0.0030	0.0033	0.003	10%	0.0031	0.0054	0.0045	0.005	0.0042	-	0.022	0.0158
Magnesium	mg/L	n/v	12	14.4	10.8	9.23	10.8	11.4	5%	9.18	14	14.0	14.2	14.5	-	25.1	20.7
Manganese	mg/L	1.5 <sup>B</sup>	0.0665	0.0686	10.4 <sup>B</sup>	9.17 <sup>B</sup>	0.289	0.316	9%	0.0291	0.001	0.00090	0.00798	0.0115	-	8.57	7.56
Mercury	mg/L	0.00025 <sup>A</sup> 0.0010 <sup>B</sup>	< 0.000050	< 0.000050	< 0.000050	< 0.000050	< 0.000050	< 0.000050	nc	< 0.000050	< 0.000050	< 0.000050	< 0.000050	< 0.000050	-	< 0.000050	< 0.000050
Molybdenum	mg/L	10 <sup>A</sup> 0.25 <sup>B</sup>	0.0113	0.00769	0.00892	0.00292	0.0164	0.0158	4%	0.0102	0.00425	0.00467	0.00679	0.00689	-	0.000248	< 0.000100
Nickel	mg/L	0.25/0.65/1.1/1.5 <sup>57</sup> <sup>A</sup> 0.080 <sup>B</sup>	0.00066	0.00086	0.016	0.0226	0.00061	0.00066	8%	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	-	0.00857	0.00686
Phosphorus	mg/L	n/v	< 0.050	< 0.050	< 0.100	< 0.100	0.075	0.093	21%	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-	1.73	1.18
Potassium	mg/L	n/v	2.59	2.66	0.688	0.700	2.02	1.98	2%	1.68	2.01	1.88	2.46	2.40	-	41.9	34.3
Rubidium	mg/L	n/v	0.00026	0.00025	0.00064	0.00092	0.00027	0.00024	12%	< 0.00020	0.00029	0.00027	0.00038	0.00030	-	0.0237	0.0198
Selenium	mg/L	0.020 <sup>A</sup> 0.010 <sup>B</sup>	0.000225	0.000199	< 0.000100	< 0.000100	< 0.000050	0.000088	nc	0.000149	0.000851	0.000655	0.000326	0.000254	-	0.000325	0.000303
Silicon	mg/L	n/v	3.87	3.96	7	4.19	4.19	3.64	7%	4.17	3.64	4.02	3.87	3.87	-	7.21	4.33
Silver	mg/L	0.00050/0.015 <sup>511</sup> <sup>A</sup> 0.020 <sup>B</sup>	< 0.000010	< 0.000010	< 0.000020	< 0.000020	< 0.000010	< 0.000010	nc	< 0.000010	< 0.000010	< 0.000010	< 0.000010	< 0.000010	-	< 0.000020	< 0.000020
Sodium	mg/L	200 <sup>B</sup>	104	97.2	4.16	4.38	49.4	53.4	8%	56.0	64.3	58.9	60.4	60.4	-	97.5	77.1
Strontium	mg/L	2.5 <sup>B</sup>	0.642	0.823	0.385	0.304	0.486	0.501	3%	0.400	0.695	0.677	0.763	0.761	-	0.835	0.655
Sulfur	mg/L	n/v	63.6	74.6	17.3	19.2	17.2	19.2	11%	20.5	61.1	62.0	59.5	59.4	-	17.6	36.2
Tellurium	mg/L	n/v	< 0.00020	< 0.00020	< 0.00040	< 0.00040	< 0.00020	< 0.00020	nc	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	-	< 0.00040	< 0.00040
Thallium	mg/L	0.0030 <sup>A</sup>	< 0.00010	< 0.00010	0.0003	< 0.00020	< 0.00010	< 0.00010	nc	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	-	< 0.00020	< 0.00020
Thorium	mg/L	n/v	< 0.00010	< 0.00010	< 0.00020	< 0.00020	< 0.00010	< 0.00010	nc	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	-	< 0.00020	< 0.00020
Tin	mg/L	2.5 <sup>B</sup>	< 0.00010	< 0.00010	< 0.00020	< 0.00020	< 0.00010	< 0.0									

**Table 3**  
**Summary of Groundwater Analysis**  
**2022 Annual Environmental Effects Monitoring Report**  
**Regional District of Kitimat-Stikine**

Sample Location			12-Apr-22 MW1A RDKS ALS VA22A7804 VA22A7804-001	26-Oct-22 MW-1A RDKS ALS VA22C6348 VA22C6348-001	12-Apr-22 MW1B RDKS ALS VA22A7804 VA22A7804-002	26-Oct-22 MW-1B RDKS ALS VA22C6348 VA22C6348-002	12-Apr-22 MW-02 RDKS ALS VA22A7804 VA22A7804-003	12-Apr-22 DUP RDKS ALS VA22A7804 VA22A7804-006 Field Duplicate	RPD %	26-Oct-22 MW-02 RDKS ALS VA22C6348 VA22C6348-003	12-Apr-22 MW3 RDKS ALS VA22A7804 VA22A7804-004	26-Oct-22 MW-03 RDKS ALS VA22C6348 VA22C6348-004	12-Apr-22 MW4 RDKS ALS VA22A7804 VA22A7804-005	26-Oct-22 MW-04 RDKS ALS VA22C6348 VA22C6348-005	12-Apr-22 Field Blank RDKS ALS VA22A7804 VA22A7804-007 Field Blank	13-Apr-22 Lagoon Outlet RDKS ALS VA22A7805 VA22A7805-002	26-Oct-22 Treatment Lagoon RDKS ALS VA22C6296 VA22C6296-008
Sample Date	Units	CSR-Schedule 3.2														SW-03	
Sample ID																	
Sampling Company																	
Laboratory																	
Laboratory Work Order																	
Laboratory Sample ID																	
Sample Type																	
<b>Total Metals</b>																	
Aluminum	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	17.1	20.0
Antimony	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0194	0.0144
Arsenic	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0668	0.0435
Barium	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	0.775	0.724
Beryllium	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00041	0.000451
Bismuth	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00114	0.00631
Boron	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	1.19	0.921
Cadmium	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00259	0.00205
Calcium	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	221	228
Cesium	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00127	0.000789
Chromium	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0681	0.0728
Cobalt	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0734	0.0460
Copper	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	0.177	0.163
Iron	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	96	84.6
Lead	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0289	0.0226
Lithium	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0388	0.0271
Magnesium	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	35.8	29.4
Manganese	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	11.5	11.2
Mercury	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	<.DLM 0.000500	0.000245
Molybdenum	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0216	0.0104
Nickel	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	0.136	0.106
Phosphorus	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	11.3	10.3
Potassium	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	51.8	38.8
Rubidium	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0352	0.0235
Selenium	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00216	0.00181
Silicon	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	31.3	14.6
Silver	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	0.004	0.00278
Sodium	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	112	84.0
Strontium	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	1.14	1.02
Sulfur	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	47	36.7
Tellurium	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	<.DLA 0.00100	<0.00100 DLA
Thallium	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000233	0.000134
Thorium	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	<.DLA 0.00050	<0.00050 DLA
Tin	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00306	0.00214
Titanium	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	0.323	0.114
Tungsten	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00728	0.00488
Uranium	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000997	0.000811
Vanadium	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0481	0.0387
Zinc	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	3.8	2.99
Zirconium	mg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	<.DLM 0.00840	0.00156

**Table 3**  
**Summary of Groundwater Analysis**  
**2022 Annual Environmental Effects Monitoring Report**  
**Regional District of Kitimat-Stikine**

**Notes:**

CSR-Schedule 3.2	CSR Schedule 3.2 - Generic Numerical Water Standards (Contaminated Sites Regulation [B.C. Reg. 375/96, April 1, 1997: includes amendments up to July 7, 2021 by B.C. Reg. 179/2021])
A	Generic Standard - Aquatic Life (Freshwater)
B	Generic Standard - Drinking Water
<b>6.5<sup>A</sup></b>	Concentration exceeds the indicated standard.
15.2	Measured concentration did not exceed the indicated standard.
<b>&lt;0.50</b>	Laboratory reporting limit was greater than the applicable standard.
<0.03	Analyte was not detected at a concentration greater than the laboratory reporting limit.
n/v	No standard/guideline value.
-	Parameter not analyzed / not available.
S1	Ammonia, total (as N) varies with pH for freshwater aquatic life. 1310@pH≥8.5, 3700@pH8.0-<8.5, 11300@pH7.5-<8.0, 18500@pH7.0-<7.5, 18400@pH<7.0
S3	Cadmium varies with hardness for freshwater aquatic life. 0.5 ug/L@H<30 mg/L, 1.5 ug/L@H30-<90 mg/L, 2.5 ug/L@H90-<150 mg/L, 3.5 ug/L@H150-<210 mg/L, 4 ug/L@H≥210 mg/L.
S4	Copper varies with hardness for freshwater aquatic life. 20 ug/L@H<50 mg/L, 30 ug/L@H=50-<75 mg/L, 40 ug/L@H=75-<100 mg/L, 50 ug/L@H=100-<125 mg/L, 60 ug/L@H=125-<150 mg/L, 70 ug/L@H=150-<175 mg/L, 80 ug/L@H=175-<200 mg/L, 90 ug/L@H≥200 mg/L.
S5	Fluoride varies with hardness for freshwater aquatic life. 2000@H<50, 3000@H≥50.
S6	Lead varies with hardness for freshwater aquatic life. 40 ug/L@H<50 mg/L, 50 ug/L@H=50-<100 mg/L, 60 ug/L@H=100-<200 mg/L, 110 ug/L@H=200-<300 mg/L, 160 ug/L@H≥300 mg/L.
S7	Nickel varies with hardness for freshwater aquatic life. 250 ug/L@H<60 mg/L, 650 ug/L@H60-<120 mg/L, 1100 ug/L@H120-<180 mg/L, 1500 ug/L@H≥180 mg/L.
S8	Nitrite (as N) varies with Chloride concentration for aquatic life. 200(Cl<2mg/L), 400(Cl<4mg/L), 600(Cl4-<6mg/L), 800(Cl6-<8mg/L), 1000(Cl8<10mg/L), 2000(Cl>10mg/L).
S11	Silver varies with hardness for freshwater aquatic life. 0.5 ug/L@H≤100 mg/L, 15 ug/L@H>100 mg/L.
S12	Sulfate varies with hardness for aquatic life. 1280mg/L @ H≤30, 2180mg/L @ H31-75, 3090mg/L @ H76-180, 4290mg/L @ H>180.
S13	Zinc varies with hardness for freshwater aquatic life. 75 ug/L@H<90 mg/L, 150 ug/L@H=90-<100 mg/L, 900 ug/L@H=100-<200 mg/L, 1650 ug/L@H=200-<300 mg/L, 2400 ug/L@H=300-<400 mg/L.
S23 <sup>AB</sup>	The standard is for Chromium Hexavalent.
1	Only CSR Aquatic Life (Freshwater) standards are applicable at SW-03.

**Table 4**  
**Summary of Surface Water Analysis**  
**2022 Annual Environmental Effects Monitoring Report**  
**Regional District of Kitimat-Stikine**

Sample Location Sample Date Sample ID Sampling Company Laboratory Laboratory Work Order Laboratory Sample ID Sample Type	Units	SW2017-02-US			RPD %	SW2017-01 DS	SW22-01	SW22-03	SW22-04	SW22-05	13-Apr-22 Travel Blank RDKS ALS VA22A7805 VA22C6296-003 Trip Blank		
		13-Apr-22 SW2017-02-US RDKS ALS VA22A7805 VA22A7805-001	26-Oct-22 SW2017-02 US RDKS ALS VA22C6296 VA22C6296-006	26-Oct-22 SW22-09 RDKS ALS VA22C6296 VA22C6296-007 Field Duplicate		26-Oct-22 SW2017-01 DS RDKS ALS VA22C6296 VA22C6296-005	26-Oct-22 SW22-01 RDKS ALS VA22C6296 VA22C6296-001	26-Oct-22 SW22-03 RDKS ALS VA22C6296 VA22C6296-002	26-Oct-22 SW22-04 RDKS ALS VA22C6296 VA22C6296-003	26-Oct-22 SW22-05 RDKS ALS VA22C6296 VA22C6296-004			
General Parameters		A B C BC WQG-Approved	D BC WQG-Working										
pH, lab	S.U.	6.5-9 <sup>B</sup>	n/v	6.13 <sup>B</sup>	6.20 <sup>B</sup>	6.22 <sup>B</sup>	0%	7.14	6.52	7.18	7.33	7.77	-
Ammonia (as N)	mg/L	10.5-28.7 <sup>A</sup> 1.24-2.08 <sup>B</sup>	n/v	0.0057	0.0145	0.0208	36%	0.0209	0.0079	0.0062	<0.0050	3.94	< 0.0050
Alkalinity, Total	mg/L	n/v	n/v	14.6	3.5	3.4	3%	14.6	5.6	29.1	29.1	400	-
Electrical Conductivity, Lab	µmhos/cm	n/v	n/v	32.1	18.3	17.9	2%	69.1	20.0	61.0	72.3	867	-
Hardness (as CaCO3)	mg/L	n/v	n/v	14.8	7.92	7.61	4%	22.4	7.82	21.5	29.7	331	<0.60
Total Dissolved Solids	mg/L	n/v	n/v	26	40	43	7%	72	49	45	47	474	-
Total Suspended Solids	mg/L	n/v	n/v	< 3.0	<3.0	<3.0	nc	<3.0	8.2	<3.0	3.6	19.4	-
Orthophosphate (as P)	mg/L	n/v	n/v	0.0063	0.0224	0.0220	2%	0.0037	0.0139	0.0156	0.0080	0.0036	-
Total Kjeldahl Nitrogen	mg/L	n/v	n/v	0.111	-	-	nc	-	-	-	-	-	-
Biochemical Oxygen Demand (BOD)	mg/L	n/v	n/v	<2.0	<2.0	<2.0	nc	<2.0	<2.0	2.1	<2.0	6.4	-
Chemical Oxygen Demand	mg/L	n/v	n/v	16	51	48	6%	54	75	25	43	110	-
Dissolved Organic Carbon (DOC)	mg/L	n/v	n/v	2.91	16.5	16.0	3%	19.2	17.3	8.07	8.03	13.8	-
Chloride	mg/L	600 <sup>A</sup> 150 <sup>B</sup>	n/v	< 0.50	0.67	0.66	2%	5.35	<0.50	0.75	1.79	50.0	-
Sulfate	mg/L	128-429 <sup>B</sup>	n/v	0.95	0.81	0.81	0%	3.91	<0.30	4.03	3.03	8.40	-
Bromide	mg/L	n/v	n/v	< 0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050	<0.250	-
Fluoride	mg/L	0.56 <sup>A</sup>	n/v	0.033	<0.020	<0.020	nc	<0.020	<0.020	<0.020	0.032	<0.100	-
Nitrate (as N)	mg/L	32.8 <sup>A</sup> 3 <sup>B</sup>	n/v	< 0.0050	<0.0050	<0.0050	nc	0.460	<0.0050	0.0077	<0.0050	0.0288	-
Nitrite (as N)	mg/L	0.06-0.6 <sup>A</sup> 0.02-0.2 <sup>B</sup>	n/v	< 0.0010	<0.0010	<0.0010	nc	0.0015	<0.0010	<0.0010	<0.0010	<0.0050	-
Nitrate + Nitrite (as N)	mg/L	n/v	n/v	< 0.0051	<0.0051	<0.0051	nc	0.462	<0.0051	0.0077	<0.0051	0.0288	-
<b>Total Metals</b>													
Aluminum	mg/L	n/v	n/v	0.111	0.415	0.408	2%	0.230	0.244	0.104	0.0509	<0.0300 DLA	< 0.0030
Antimony	mg/L	n/v	n/v	< 0.00010	<0.00010	<0.00010	nc	<0.00010	<0.00010	<0.00010	<0.00010	<0.00100 DLA	< 0.00010
Arsenic	mg/L	0.0050 <sup>A</sup>	n/v	0.00018	0.00021	0.00019	10%	0.00018	0.00017	0.00026	0.00048	0.00178	< 0.00010
Barium	mg/L	n/v	n/v	0.0128	0.0125	0.0118	6%	0.0116	0.0114	0.00984	0.00786	0.211	< 0.00010
Beryllium	mg/L	n/v	0.00013 <sup>D</sup>	< 0.000100	<0.000100	<0.000100	nc	<0.000100	<0.000100	<0.000100	<0.000100	<0.000200 DLA	< 0.000100
Bismuth	mg/L	n/v	n/v	< 0.000050	<0.000050	<0.000050	nc	<0.000050	<0.000050	<0.000050	<0.000050	<0.000500 DLA	< 0.000050
Boron	mg/L	1.2 <sup>B</sup>	n/v	< 0.010	<0.010	<0.010	nc	0.042	<0.010	0.019	0.258	< 0.010	< 0.010
Cadmium	mg/L	n/v	n/v	0.0000099	0.0000459	0.0000292	44%	0.0000863	0.0000310	0.0000324	0.0000114	<0.000500 DLA	< 0.000050
Calcium	mg/L	n/v	n/v	4.14	2.15	2.17	1%	6.79	2.43	6.59	8.93	109	< 0.050
Cesium	mg/L	n/v	n/v	< 0.000010	<0.000010	<0.000010	nc	<0.000010	0.000012	<0.000010	<0.000010	<0.000100 DLA	< 0.000010
Chromium	mg/L	n/v	n/v	< 0.00050	0.00059	0.00072	20%	<0.00050	0.00053	<0.00050	<0.00050	<0.00100 DLA	< 0.00050
Cobalt	mg/L	0.11 <sup>A</sup> 0.0040 <sup>B</sup>	n/v	0.00053	0.00035	0.00012	98%	0.00012	0.00042	0.00041	0.00041	0.00404 <sup>B</sup>	< 0.00010
Copper	mg/L	BLM	n/v	0.00093	0.00164	0.00152	8%	0.00109	0.00089	0.00088	0.00085	<0.00500 DLA	< 0.00050
Iron	mg/L	1 <sup>A</sup>	n/v	0.439	0.374	0.422	95%	0.439	0.126	0.695	0.490	9.26 <sup>A</sup>	< 0.010
Lead	mg/L	0.0072 <sup>A</sup> 0.0036 <sup>B</sup>	n/v	< 0.000050	0.000059	<0.000050	nc	0.000060	0.000068	<0.000050	0.000053	<0.000500 DLA	< 0.000050
Lithium	mg/L	n/v	n/v	< 0.0010	<0.0010	<0.0010	nc	<0.0010	<0.0010	<0.0010	<0.0010	<0.0100 DLA	< 0.0010
Magnesium	mg/L	n/v	n/v	1	0.652	0.646	1%	1.60	0.755	1.65	2.15	22.0	< 0.0050
Manganese	mg/L	0.67-2.8 <sup>A</sup> 0.703-6.08 <sup>B</sup>	n/v	0.224	0.100	0.0240	123%	0.0977	0.271	1.54 <sup>AB</sup>	0.471	35.5 <sup>AB</sup>	< 0.00010
Mercury	mg/L	0.00001 <sup>B</sup>	n/v	< 0.0000050	0.0000099	0.0000123	22%	0.0000060	0.0000097	0.0000052	<0.0000050	<0.0000050	< 0.0000050
Molybdenum	mg/L	46 <sup>A</sup> 7.6 <sup>B</sup>	n/v	< 0.000050	<0.000050	<0.000050	nc	<0.000050	<0.000050	<0.000050	0.000243	0.000721	< 0.000050
Nickel	mg/L	n/v	n/v	0.00172	0.00180	0.00178	1%	0.00165	0.00146	0.00158	0.00196	<0.00500 DLA	< 0.00050
Phosphorus, Total	mg/L	15 <sup>B</sup>	n/v	< 0.050	0.053	0.056	6%	<0.050	<0.050	<0.050	<0.050	<0.500 DLA	< 0.050
Potassium	mg/L	n/v	n/v	0.248	0.411	0.401	2%	1.96	0.773	1.81	1.72	3.07	< 0.050
Rubidium	mg/L	n/v	n/v	< 0.00020	0.00029	0.00034	16%	0.00099	0.00078	0.00158	0.00123	0.00514	< 0.00020
Selenium	mg/L	0.0020 <sup>B</sup>	n/v	< 0.000050	0.000150	0.000138	8%	0.000055	<0.000050	0.000083	<0.000050	<0.000500 DLA	< 0.000050
Silicon	mg/L	n/v	n/v	2.98	3.01	3.02	0%	3.09	2.01	1.91	2.38	3.38	< 0.10
Silver	mg/L	0.0001/0.003 <sup>A</sup> 0.00005/0.0015 <sup>B</sup>	n/v	< 0.000010	0.000021	0.000020	5%	<0.000010	<0.000010	0.000013	<0.000010	<0.000100 DLA	< 0.000010
Sodium	mg/L	n/v	n/v	1.03	0.854	0.823	4%	5.34	1.13	1.86	2.63	41.2	< 0.050
Strontium	mg/L	n/v	n/v	0.0255	0.0151	0.0151	0%	0.0416	0.0168	0.0365	0.0597	0.641	< 0.00020
Sulfur	mg/L	n/v	n/v	< 0.50	<0.50	<0.50	nc	1.38	<0.50	1.38	1.25	<5.00 DLA	< 0.50
Tellurium	mg/L	n/v	n/v	< 0.00020	<0.00020	<0.00020	nc	<0.00020	<0.00020	<0.00020	<0.00020	<0.00200 DLA	< 0.00020
Thallium	mg/L	n/v	0.00080 <sup>D</sup>	< 0.000010	<0.000010	<0.000010	nc	<0.000010	<0.000010	<0.000010	<0.000010	<0.000100 DLA	< 0.000010
Thorium	mg/L	n/v	n/v	< 0.00010	<0.00010	<0.00010	nc	<0.00010	<0.00010	<0.00010	<0.00010	<0.00100 DLA	< 0.00010
Tin	mg/L	n/v	n/v	< 0.00010	<0.00010	<0.00010	nc	<0.00010	<0.00010	<0.00010	<0.00010	<0.00100 DLA	< 0.00010
Titanium	mg/L	n/v	n/v	0.00112	0.00207	0.00188	10%	0.00111	0.00197	0.00151	0.00094	<0.00300 DLA	< 0.00030
Tungsten	mg/L	n/v	n/v	< 0.00010	<0.00010	<0.00010	nc	<0.00010	<0.00010	<0.00010	<0.00010	<0.00100 DLA	< 0.00010
Uranium	mg/L	n/v	0.0085 <sup>nr</sup> <sup>D</sup>	< 0.000010	<0.000010	<0.000010	nc	<0.000010	<0.000010	<0.000010	<0.000010	<0.000100 DLA	< 0.000010
Vanadium	mg/L	n/v	n/v	< 0.00050	<0.00050	<0.00050	nc	<0.00050	<0.00050	<0.00050	<0.00050	<0.00500 DLA	< 0.00050
Zinc	mg/L	0.033 <sup>A</sup> 0.0075 <sup>B</sup>	n/v	< 0.0030	<0.0030	<0.0030	nc	0.0053	0.0084	0.0053	0.0039	<0.0300 DLA	< 0.0030
Zirconium	mg/L	n/v	n/v	< 0.00020	0.00025	0.00023	8%	0.00020	<0.00020	<0.00020	<0.00020	<0.00200 DLA	< 0.00020

See notes last page



**Table 4**  
**Summary of Surface Water Analysis**  
**2022 Annual Environmental Effects Monitoring Report**  
**Regional District of Kitimat-Stikine**

Sample Location Sample Date Sample ID Sampling Company Laboratory Laboratory Work Order Laboratory Sample ID Sample Type	Units	SW2017-02-US		SW2017-01 DS		RPD %	SW2017-01 DS	SW22-01	SW22-03	SW22-04	SW22-05	13-Apr-22 Travel Blank RDKS ALS VA22A7805 VA22C6296-003 Trip Blank	
		13-Apr-22 SW2017-02-US RDKS ALS VA22A7805 VA22A7805-001	26-Oct-22 SW2017-02 US RDKS ALS VA22C6296 VA22C6296-006	26-Oct-22 SW2017-01 DS RDKS ALS VA22C6296 VA22C6296-007 Field Duplicate	26-Oct-22 SW2017-01 DS RDKS ALS VA22C6296 VA22C6296-005		26-Oct-22 SW22-01 RDKS ALS VA22C6296 VA22C6296-001	26-Oct-22 SW22-03 RDKS ALS VA22C6296 VA22C6296-002	26-Oct-22 SW22-04 RDKS ALS VA22C6296 VA22C6296-003	26-Oct-22 SW22-05 RDKS ALS VA22C6296 VA22C6296-004			
		A B C BC WQG-Approved	D BC WQG-Working										
<b>Dissolved Metals</b>													
Aluminum	mg/L	0.05 <sup>0.1</sup> <sup>B</sup>	n/v	0.0495	0.412 <sup>AB</sup>	0.388 <sup>AB</sup>	6%	0.216 <sup>AB</sup>	0.126 <sup>AB</sup>	0.0556 <sup>A</sup>	0.0552 <sup>A</sup>	0.0122	-
Antimony	mg/L	n/v	n/v	< 0.00010	< 0.00010	< 0.00010	nc	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00100 DLA	-
Arsenic	mg/L	0.0050 <sup>A</sup>	n/v	0.0002	0.00018	0.00016	12%	0.00016	0.00012	0.00019	0.00036	0.00116	-
Barium	mg/L	n/v	1 <sup>D</sup>	0.0161	0.0123	0.0119	3%	0.0109	0.00869	0.00853	0.0128	0.171	-
Beryllium	mg/L	n/v	0.00013 <sup>D</sup>	< 0.000100	< 0.000100	< 0.000100	nc	< 0.000100	< 0.000100	< 0.000100	< 0.000100	< 0.000200 DLA	-
Bismuth	mg/L	n/v	n/v	< 0.000050	< 0.000050	< 0.000050	nc	< 0.000050	< 0.000050	< 0.000050	< 0.000050	< 0.000500 DLA	-
Boron	mg/L	1,2 <sup>B</sup>	n/v	< 0.010	< 0.010	< 0.010	nc	0.039	< 0.010	0.017	0.018	0.209	-
Cadmium	mg/L	0.000082-0.0031 <sup>A</sup> 0.000032-0.0007 <sup>B</sup>	n/v	0.0000112	0.0000350 <sup>B</sup>	0.0000195	57%	0.0000171	0.0000136	0.0000247	0.0000076	< 0.0000500 DLA	-
Calcium	mg/L	n/v	n/v	4.3	2.12	2.03	4%	6.49	2.08	6.03	8.50	98.0	-
Cesium	mg/L	n/v	n/v	< 0.000010	< 0.000010	< 0.000010	nc	< 0.000010	< 0.000010	< 0.000010	< 0.000010	< 0.000100 DLA	-
Chromium	mg/L	n/v	n/v	< 0.00050	0.00060	0.00051	16%	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.0100 DLA	-
Cobalt	mg/L	0.11 <sup>A</sup> 0.0040 <sup>B</sup>	n/v	0.0006	0.00010	< 0.00010	nc	0.00010	0.00028	0.00057	0.00022	0.00338	-
Copper	mg/L	BLM	n/v	0.00555	0.00150 <sup>B</sup>	0.00142 <sup>B</sup>	5%	0.00114	0.00050	0.00068	0.00069	< 0.00200 DLA	-
Iron	mg/L	0.35 <sup>A</sup>	n/v	0.304	0.125	0.112	11%	0.095	0.464 <sup>A</sup>	0.194	0.120	7.10 <sup>A</sup>	-
Lead	mg/L	n/v	n/v	0.000058	< 0.000050	< 0.000050	nc	0.000060	< 0.000050	< 0.000050	< 0.000050	< 0.000500 DLA	-
Lithium	mg/L	n/v	n/v	< 0.0010	< 0.0010	< 0.0010	nc	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0100 DLA	-
Magnesium	mg/L	n/v	n/v	0.998	0.639	0.617	4%	1.51	0.638	1.56	2.06	20.9	-
Manganese	mg/L	n/v	n/v	0.268	0.0220	0.00783	95%	0.0182	0.174	1.42	0.325	30.3	-
Mercury	mg/L	n/v	n/v	< 0.000050	0.0000090	0.0000092	2%	0.0000060	< 0.000050	< 0.000050	< 0.000050	< 0.000050	-
Molybdenum	mg/L	46 <sup>A</sup> 7.6 <sup>B</sup>	n/v	< 0.000050	< 0.000050	< 0.000050	nc	< 0.000050	< 0.000050	< 0.000050	< 0.000050	0.000771	-
Nickel	mg/L	n/v	n/v	0.00197	0.00169	0.00166	2%	0.00149	0.00099	0.00136	0.00176	< 0.00500 DLA	-
Phosphorus	mg/L	15 <sup>B</sup>	n/v	< 0.050	< 0.050	< 0.050	nc	< 0.050	< 0.050	< 0.050	< 0.050	< 0.500 DLA	-
Potassium	mg/L	n/v	n/v	0.236	0.416	0.398	4%	1.95	0.727	1.87	1.69	2.79	-
Rubidium	mg/L	n/v	n/v	< 0.00020	0.00033	0.00034	3%	0.00090	0.00067	0.00165	0.00109	0.00432	-
Selenium	mg/L	0.0020 <sup>B</sup>	n/v	< 0.000050	0.000132	0.000115	14%	0.000061	0.000062	< 0.000050	0.000065	< 0.000500 DLA	-
Silicon	mg/L	n/v	n/v	2.95	2.99	2.94	2%	3.06	1.90	1.76	2.31	3.39	-
Silver	mg/L	n/v	n/v	0.000105	< 0.000010	< 0.000010	nc	< 0.000010	< 0.000010	< 0.000010	< 0.000010	< 0.000100 DLA	-
Sodium	mg/L	n/v	n/v	0.971	0.849	0.819	4%	5.14	1.03	1.76	2.49	38.6	-
Strontium	mg/L	n/v	n/v	0.0297	0.0144	0.0147	2%	0.0409	0.0148	0.0305	0.0561	0.597	-
Sulfur	mg/L	n/v	n/v	< 0.50	< 0.50	< 0.50	nc	1.52	< 0.50	1.16	1.24	< 5.00 DLA	-
Tellurium	mg/L	n/v	n/v	< 0.00020	< 0.00020	< 0.00020	nc	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00200 DLA	-
Thallium	mg/L	n/v	0.00080 <sup>D</sup>	< 0.000010	< 0.000010	< 0.000010	nc	< 0.000010	< 0.000010	< 0.000010	< 0.000010	< 0.000100 DLA	-
Thorium	mg/L	n/v	n/v	< 0.00010	< 0.00010	< 0.00010	nc	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00100 DLA	-
Tin	mg/L	n/v	n/v	< 0.00010	< 0.00010	< 0.00010	nc	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00100 DLA	-
Titanium	mg/L	n/v	n/v	< 0.00010	0.00195	0.00157	22%	0.00095	0.00119	0.00061	< 0.00030	< 0.00300 DLA	-
Tungsten	mg/L	n/v	n/v	< 0.00010	< 0.00010	< 0.00010	nc	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00100 DLA	-
Uranium	mg/L	n/v	0.0085 <sup>nr</sup> <sup>D</sup>	< 0.000010	< 0.000010	< 0.000010	nc	< 0.000010	< 0.000010	< 0.000010	< 0.000010	< 0.000100 DLA	-
Vanadium	mg/L	n/v	n/v	< 0.00050	< 0.00050	< 0.00050	nc	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00500 DLA	-
Zinc	mg/L	n/v	n/v	0.0038	0.0027	0.0022	20%	0.0024	0.0059	0.0048	0.0053	< 0.0100 DLA	-
Zirconium	mg/L	n/v	n/v	< 0.00020	0.00029	0.00030	3%	0.00022	< 0.00020	< 0.00020	< 0.00020	< 0.00200 DLA	-

See notes last page

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**Regional District of Kitimat-Stikine**

Sample Location Sample Date Sample ID Sampling Company Laboratory Laboratory Work Order Laboratory Sample ID Sample Type	Units	A B C BC WQG-Approved	D BC WQG-Working	26-Oct-22 Field Blank RDKS ALS VA22C6296 VA22C6296-010 Field Blank	26-Oct-22 Travel Blank RDKS ALS VA22C6296 VA22C6296-009 Trip Blank
<b>General Parameters</b>					
pH, lab	S.U.	6.5-9 <sup>B</sup>	n/v	5.43 <sup>B</sup>	5.61 <sup>B</sup>
Ammonia (as N)	mg/L	10.5-28.7 <sup>A</sup> 1.24-2.08 <sup>B</sup>	n/v	<0.0050	0.0084
Alkalinity, Total	mg/L	n/v	n/v	<1.0	<1.0
Electrical Conductivity, Lab	µmhos/cm	n/v	n/v	<2.0	<2.0
Hardness (as CaCO3)	mg/L	n/v	n/v	<0.60	<0.60
Total Dissolved Solids	mg/L	n/v	n/v	<10	<10
Total Suspended Solids	mg/L	n/v	n/v	<3.0	<3.0
Orthophosphate (as P)	mg/L	n/v	n/v	-	-
Total Kjeldahl Nitrogen	mg/L	n/v	n/v	-	-
Biochemical Oxygen Demand (BOD)	mg/L	n/v	n/v	-	-
Chemical Oxygen Demand	mg/L	n/v	n/v	-	-
Dissolved Organic Carbon (DOC)	mg/L	n/v	n/v	<0.50	-
Chloride	mg/L	600 <sup>A</sup> 150 <sup>B</sup>	n/v	-	-
Sulfate	mg/L	128-429 <sup>B</sup>	n/v	-	-
Bromide	mg/L	n/v	n/v	-	-
Fluoride	mg/L	0.56 <sup>A</sup>	n/v	-	-
Nitrate (as N)	mg/L	32.8 <sup>A</sup> 3 <sup>B</sup>	n/v	-	-
Nitrite (as N)	mg/L	0.06-0.6 <sup>A</sup> 0.02-0.2 <sup>B</sup>	n/v	-	-
Nitrate + Nitrite (as N)	mg/L	n/v	n/v	-	-
<b>Total Metals</b>					
Aluminum	mg/L	n/v	n/v	0.0065	<0.0030
Antimony	mg/L	n/v	n/v	<0.00010	<0.00010
Arsenic	mg/L	0.0050 <sup>A</sup>	n/v	<0.00010	<0.00010
Barium	mg/L	n/v	1 <sup>D</sup>	0.00093	<0.00010
Beryllium	mg/L	n/v	0.00013 <sup>D</sup>	<0.000100	<0.000100
Bismuth	mg/L	n/v	n/v	<0.000050	<0.000050
Boron	mg/L	1.2 <sup>B</sup>	n/v	<0.010	<0.010
Cadmium	mg/L	n/v	n/v	<0.0000050	<0.0000050
Calcium	mg/L	n/v	n/v	<0.050	<0.050
Cesium	mg/L	n/v	n/v	<0.000010	<0.000010
Chromium	mg/L	n/v	n/v	<0.00050	<0.00050
Cobalt	mg/L	0.11 <sup>A</sup> 0.0040 <sup>B</sup>	n/v	<0.00010	<0.00010
Copper	mg/L	BLM	n/v	<0.00050	<0.00050
Iron	mg/L	1 <sup>A</sup>	n/v	<0.010	<0.010
Lead	mg/L	0.0072 <sup>A</sup> 0.0036 <sup>B</sup>	n/v	<0.000050	<0.000050
Lithium	mg/L	n/v	n/v	<0.0010	<0.0010
Magnesium	mg/L	n/v	n/v	<0.0050	<0.0050
Manganese	mg/L	0.67-2.8 <sup>A</sup> 0.703-6.08 <sup>B</sup>	n/v	<0.00010	<0.00010
Mercury	mg/L	0.00001 <sup>B</sup>	n/v	<0.0000050	<0.0000050
Molybdenum	mg/L	46 <sup>A</sup> 7.6 <sup>B</sup>	n/v	<0.000050	<0.000050
Nickel	mg/L	n/v	n <sup>D</sup>	<0.00050	<0.00050
Phosphorus, Total	mg/L	15 <sup>B</sup>	n/v	<0.050	<0.050
Potassium	mg/L	n/v	n/v	<0.050	<0.050
Rubidium	mg/L	n/v	n/v	<0.00020	<0.00020
Selenium	mg/L	0.0020 <sup>B</sup>	n/v	<0.000050	<0.000050
Silicon	mg/L	n/v	n/v	<0.10	<0.10
Silver	mg/L	0.0001/0.003 <sup>A</sup> 0.00005/0.0015 <sup>B</sup>	n/v	<0.000010	<0.000010
Sodium	mg/L	n/v	n/v	<0.050	<0.050
Strontium	mg/L	n/v	n/v	<0.00020	<0.00020
Sulfur	mg/L	n/v	n/v	<0.50	<0.50
Tellurium	mg/L	n/v	n/v	<0.00020	<0.00020
Thallium	mg/L	n/v	0.00080 <sup>D</sup>	<0.000010	<0.000010
Thorium	mg/L	n/v	n/v	<0.00010	<0.00010
Tin	mg/L	n/v	n/v	<0.00010	<0.00010
Titanium	mg/L	n/v	n/v	<0.00030	<0.00030
Tungsten	mg/L	n/v	n/v	<0.00010	<0.00010
Uranium	mg/L	n/v	0.0085 <sup>D</sup>	<0.000010	<0.000010
Vanadium	mg/L	n/v	n/v	<0.00050	<0.00050
Zinc	mg/L	0.033 <sup>A</sup> 0.0075 <sup>B</sup>	n/v	<0.0030	<0.0030
Zirconium	mg/L	n/v	n/v	<0.00020	<0.00020

See notes last page

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<b>Dissolved Metals</b>					
Aluminum	mg/L	0.05 <sup>A</sup> 0.1 <sup>B</sup>	n/v	0.0066	-
Antimony	mg/L	n/v	n/v	<0.00010	-
Arsenic	mg/L	0.0050 <sup>A</sup>	n/v	<0.00010	-
Barium	mg/L	n/v	1 <sup>D</sup>	0.00098	-
Beryllium	mg/L	n/v	0.00013 <sup>D</sup>	<0.000100	-
Bismuth	mg/L	n/v	n/v	<0.000050	-
Boron	mg/L	1,2 <sup>B</sup>	n/v	<0.010	-
Cadmium	mg/L	0.000082-0.0031 <sup>A</sup> 0.000032-0.0007 <sup>B</sup>	n/v	<0.0000050	-
Calcium	mg/L	n/v	n/v	<0.050	-
Cesium	mg/L	n/v	n/v	<0.000010	-
Chromium	mg/L	n/v	n/v	<0.00050	-
Cobalt	mg/L	0.11 <sup>A</sup> 0.0040 <sup>B</sup>	n/v	<0.00010	-
Copper	mg/L	BLM	n/v	<0.00020	-
Iron	mg/L	0.35 <sup>A</sup>	n/v	<0.010	-
Lead	mg/L	n/v	n/v	<0.000050	-
Lithium	mg/L	n/v	n/v	<0.0010	-
Magnesium	mg/L	n/v	n/v	<0.0050	-
Manganese	mg/L	n/v	n/v	0.00020	-
Mercury	mg/L	n/v	n/v	<0.0000050	-
Molybdenum	mg/L	46 <sup>A</sup> 7.6 <sup>B</sup>	n/v	<0.000050	-
Nickel	mg/L	n/v	n/v	<0.00050	-
Phosphorus	mg/L	15 <sup>B</sup>	n/v	<0.050	-
Potassium	mg/L	n/v	n/v	<0.050	-
Rubidium	mg/L	n/v	n/v	<0.00020	-
Selenium	mg/L	0.0020 <sup>B</sup>	n/v	<0.000050	-
Silicon	mg/L	n/v	n/v	<0.050	-
Silver	mg/L	n/v	n/v	<0.000010	-
Sodium	mg/L	n/v	n/v	<0.050	-
Strontium	mg/L	n/v	n/v	<0.00020	-
Sulfur	mg/L	n/v	n/v	<0.50	-
Tellurium	mg/L	n/v	n/v	<0.00020	-
Thallium	mg/L	n/v	0.00080 <sup>D</sup>	<0.000010	-
Thorium	mg/L	n/v	n/v	<0.00010	-
Tin	mg/L	n/v	n/v	<0.00010	-
Titanium	mg/L	n/v	n/v	<0.00030	-
Tungsten	mg/L	n/v	n/v	<0.00010	-
Uranium	mg/L	n/v	0.0085 <sub>nr</sub> <sup>D</sup>	<0.000010	-
Vanadium	mg/L	n/v	n/v	<0.00050	-
Zinc	mg/L	n/v	n/v	<0.0010	-
Zirconium	mg/L	n/v	n/v	<0.00020	-

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**Regional District of Kitimat-Stikine**

**Notes:**

BC WQG-Approved	British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture (Aug 2019)
A	Approved Water Quality Guidelines - Short-Term Acute (Freshwater Aquatic Life)
B	Approved Water Quality Guidelines - Long-Term Chronic (Freshwater Aquatic Life)
C	Approved Water Quality Guidelines - Long-Term Chronic (Freshwater Aquatic Life)-Phototoxic
BC WQG-Working	British Columbia Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture (June 2017)
D	Working Water Quality Guidelines - Freshwater aquatic life
<b>6.5<sup>A</sup></b>	Concentration exceeds the indicated standard.
15.2	Measured concentration did not exceed the indicated standard.
<b>&lt;0.50</b>	Laboratory reporting limit was greater than the applicable standard.
<0.03	Analyte was not detected at a concentration greater than the laboratory reporting limit.
n/v	No standard/guideline value.
-	Parameter not analyzed / not available.
CALC <sup>AB</sup>	Guideline to be calculated. For further information please reference [British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture, August 2019].
LOOKUP <sup>AB</sup>	Guideline is a lookup value. For further information please reference [British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture, August 2019].
LOOKUP/CALC <sup>AB</sup>	Guideline is a lookup and calculation. For further information please reference [British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture, August 2019].
n1	Long-term median within 20% of background median
n7	Guideline was developed by CCME using the species sensitivity distribution (SSD) method. This method has not been adopted by BC and therefore the lower fudicial limit of the SSD 5th percentile is adopted as the BC WWQG.
n9	To calculate the WWQG for nickel at hardness >60 to <180 mg/L use the equation: WWQG (µg/L)=e^{0.76[ln(hardness)]+1.06}; where hardness is in mg/L CaCO3.
BLM	Copper Guidelines depends on pH, Hardness and DOC

## Appendix G      Laboratory Analytical Certificates



## CERTIFICATE OF ANALYSIS

**Work Order** : **VA22A7804**  
**Client** : **Regional District of Kitimat-Stikine**  
**Contact** : Hannah Shinton  
**Address** : # 300 - 4545 Lazelle Avenue  
 Terrace BC Canada V8G 4E1  
**Telephone** : ----  
**Project** : Meziadin Landfill Groundwater  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : Hannah Shinton  
**Site** :  
**Quote number** : Q62338  
**No. of samples received** : 7  
**No. of samples analysed** : 7

**Page** : 1 of 8  
**Laboratory** : Vancouver - Environmental  
**Account Manager** : Amber Springer  
**Address** : 8081 Lougheed Highway  
 Burnaby BC Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 13-Apr-2022 21:00  
**Date Analysis Commenced** : 14-Apr-2022  
**Issue Date** : 28-Apr-2022 15:28

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
Dan Gebert	Laboratory Analyst	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	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Ruby Pham	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>
DLA	Detection Limit adjusted for required dilution.
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				
(Matrix: Water)					MW1A	MW1B	MW2	MW3	MW4
Client sampling date / time					12-Apr-2022 13:58	12-Apr-2022 14:38	12-Apr-2022 16:42	12-Apr-2022 10:35	12-Apr-2022 11:40
Analyte	CAS Number	Method	LOR	Unit	VA22A7804-001	VA22A7804-002	VA22A7804-003	VA22A7804-004	VA22A7804-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	237	210	216	205	199
conductivity	----	E100	2.0	µS/cm	795	398	487	720	700
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	182	181	141	232	229
pH	----	E108	0.10	pH units	8.28	6.73	8.32	8.32	8.25
solids, total dissolved [TDS]	----	E162	10	mg/L	789	238	394	472	440
solids, total suspended [TSS]	----	E160	3.0	mg/L	412	1890	422	12.7	14.5
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0258	0.407	0.337 <sup>RRV</sup>	<0.0050	<0.0050
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.250 <sup>DLDS</sup>	<0.050	<0.050	<0.250 <sup>DLDS</sup>	<0.250 <sup>DLDS</sup>
chloride	16887-00-6	E235.Cl	0.50	mg/L	<2.50 <sup>DLDS</sup>	<0.50	<0.50	<2.50 <sup>DLDS</sup>	<2.50 <sup>DLDS</sup>
fluoride	16984-48-8	E235.F	0.020	mg/L	0.184	0.085	0.181	<0.100 <sup>DLDS</sup>	<0.100 <sup>DLDS</sup>
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.765	1.94	0.512	0.086	<0.050
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.154	0.0207	0.0170	0.121	0.0495
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0050 <sup>DLDS</sup>	0.0054	0.0048	<0.0050 <sup>DLDS</sup>	<0.0050 <sup>DLDS</sup>
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0244	0.0021	0.0593	0.0180	0.0035
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	188	5.48	53.0	185	180
<b>Organic / Inorganic Carbon</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	1.37	4.42	1.56	0.72	0.76
<b>Dissolved Metals</b>									
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0029	0.0346	0.0038	0.0727	0.0015
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00022	0.00021	<0.00010	<0.00010	0.00011
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00040	0.00123	0.00055	0.00018	0.00023
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0448	0.562	0.0566	0.0282	0.0220
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	<0.000100 <sup>DIA</sup>	<0.000050	<0.000050	<0.000050
boron, dissolved	7440-42-8	E421	0.010	mg/L	0.080	<0.020 <sup>DIA</sup>	0.054	0.068	0.074
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000297	0.0000826	<0.0000100 <sup>DLM</sup>	0.000141	0.0000636
calcium, dissolved	7440-70-2	E421	0.050	mg/L	53.1	54.8	38.7	70.0	68.2
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	0.000021	<0.000010	<0.000010	<0.000010
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW1A	MW1B	MW2	MW3	MW4
Client sampling date / time					12-Apr-2022 13:58	12-Apr-2022 14:38	12-Apr-2022 16:42	12-Apr-2022 10:35	12-Apr-2022 11:40	
Analyte	CAS Number	Method	LOR	Unit	VA22A7804-001	VA22A7804-002	VA22A7804-003	VA22A7804-004	VA22A7804-005	
					Result	Result	Result	Result	Result	
<b>Dissolved Metals</b>										
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	0.0176	0.00031	<0.00010	<0.00010	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00263	0.00048	<0.00020	0.00036	0.00165	
iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	2.29	0.022	0.012	<0.010	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000080	<0.000100 <sup>DLA</sup>	<0.000050	<0.000050	<0.000050	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0051	0.0029	0.0033	0.0054	0.0050	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	12.0	10.8	10.8	14.0	14.2	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0665	10.4	0.289	0.00100	0.00798	
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	0.0113	0.000892	0.0164	0.00425	0.00679	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00066	0.0160	0.00061	<0.00050	<0.00050	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.100 <sup>DLA</sup>	0.075	<0.050	<0.050	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	2.59	0.688	2.02	2.01	2.46	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00026	0.00064	0.00027	0.00029	0.00038	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000225	<0.000100 <sup>DLA</sup>	<0.000050	0.000851	0.000326	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	3.87	7.00	4.19	3.64	4.02	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000020 <sup>DLA</sup>	<0.000010	<0.000010	<0.000010	
sodium, dissolved	7440-23-5	E421	0.050	mg/L	104	4.16	49.4	63.1	58.9	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.642	0.385	0.486	0.695	0.763	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	63.6	1.73	17.2	61.1	59.5	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00040 <sup>DLA</sup>	<0.00020	<0.00020	<0.00020	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	0.000030	<0.000010	<0.000010	<0.000010	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00020 <sup>DLA</sup>	<0.00010	<0.00010	<0.00010	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00020 <sup>DLA</sup>	<0.00010	<0.00010	<0.00010	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00060 <sup>DLA</sup>	<0.00030	<0.00030	<0.00030	
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00020 <sup>DLA</sup>	<0.00010	<0.00010	<0.00010	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.00279	0.000058	0.00194	0.00151	0.000930	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00100 <sup>DLA</sup>	<0.00050	<0.00050	<0.00050	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0030	0.0040	<0.0010	0.0014	0.0017	
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00040 <sup>DLA</sup>	<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	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW1A	MW1B	MW2	MW3	MW4
Client sampling date / time					12-Apr-2022 13:58	12-Apr-2022 14:38	12-Apr-2022 16:42	12-Apr-2022 10:35	12-Apr-2022 11:40	
Analyte	CAS Number	Method	LOR	Unit	VA22A7804-001	VA22A7804-002	VA22A7804-003	VA22A7804-004	VA22A7804-005	
					Result	Result	Result	Result	Result	Result
<b>Aggregate Organics</b>										
biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
chemical oxygen demand [COD]	----	E559-L	10	mg/L	24	36	27	<10	<10	<10

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



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	DUP	Field Blank	---	---	---
Client sampling date / time					12-Apr-2022 12:00	12-Apr-2022	---	---	---	
Analyte	CAS Number	Method	LOR	Unit	VA22A7804-006	VA22A7804-007	-----	-----	-----	
					Result	Result	---	---	---	
<b>Physical Tests</b>										
alkalinity, total (as CaCO3)	---	E290	1.0	mg/L	214	<1.0	---	---	---	
conductivity	---	E100	2.0	µS/cm	491	<2.0	---	---	---	
hardness (as CaCO3), dissolved	---	EC100	0.60	mg/L	145	---	---	---	---	
hardness (as CaCO3), from total Ca/Mg	---	EC100A	0.60	mg/L	---	<0.60	---	---	---	
pH	---	E108	0.10	pH units	8.36	5.61	---	---	---	
solids, total dissolved [TDS]	---	E162	10	mg/L	421	---	---	---	---	
solids, total suspended [TSS]	---	E160	3.0	mg/L	388	---	---	---	---	
<b>Anions and Nutrients</b>										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.325 <sup>RRV</sup>	<0.0050	---	---	---	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	---	---	---	---	
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	---	---	---	---	
fluoride	16984-48-8	E235.F	0.020	mg/L	0.182	---	---	---	---	
Kjeldahl nitrogen, total [TKN]	---	E318	0.050	mg/L	0.378	---	---	---	---	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0183	---	---	---	---	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0041	---	---	---	---	
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0533	---	---	---	---	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	53.0	---	---	---	---	
<b>Organic / Inorganic Carbon</b>										
carbon, dissolved organic [DOC]	---	E358-L	0.50	mg/L	1.47	---	---	---	---	
<b>Total Metals</b>										
calcium, total	7440-70-2	E420	0.050	mg/L	---	<0.050	---	---	---	
magnesium, total	7439-95-4	E420	0.0050	mg/L	---	<0.0050	---	---	---	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0036	---	---	---	---	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	---	---	---	---	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00056	---	---	---	---	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0579	---	---	---	---	
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	0.053	---	---	---	---	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	---	---	---	---	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	DUP	Field Blank	---	---	---
Client sampling date / time					12-Apr-2022 12:00	12-Apr-2022	---	---	---	
Analyte	CAS Number	Method	LOR	Unit	VA22A7804-006 Result	VA22A7804-007 Result	-----	-----	-----	
<b>Dissolved Metals</b>										
calcium, dissolved	7440-70-2	E421	0.050	mg/L	39.2	---	---	---	---	
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	0.00030	---	---	---	---	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	---	---	---	---	
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.022	---	---	---	---	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	---	---	---	---	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0030	---	---	---	---	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	11.4	---	---	---	---	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.316	---	---	---	---	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	---	---	---	---	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.0158	---	---	---	---	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00066	---	---	---	---	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.093	---	---	---	---	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	1.98	---	---	---	---	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00024	---	---	---	---	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000088	---	---	---	---	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.51	---	---	---	---	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	---	---	---	---	
sodium, dissolved	7440-23-5	E421	0.050	mg/L	53.4	---	---	---	---	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.501	---	---	---	---	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	19.2	---	---	---	---	
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	---	---	---	---	
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	---	---	---	---	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.00187	---	---	---	---	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	---	---	---	---	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	---	---	---	---	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	DUP	Field Blank	----	----	----
Client sampling date / time					12-Apr-2022 12:00	12-Apr-2022	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22A7804-006	VA22A7804-007	-----	-----	-----	
					Result	Result	---	---	---	
<b>Dissolved Metals</b>										
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	----	----	----	----	
dissolved mercury filtration location	----	EP509	-	-	Field	----	----	----	----	
dissolved metals filtration location	----	EP421	-	-	Field	----	----	----	----	
<b>Aggregate Organics</b>										
biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	----	----	----	----	
chemical oxygen demand [COD]	----	E559-L	10	mg/L	28	----	----	----	----	

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

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA22A7804</b>	Page	: 1 of 21
Client	: <b>Regional District of Kitimat-Stikine</b>	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	: Meziadin Landfill Groundwater	Date Samples Received	: 13-Apr-2022 21:00
PO	: ----	Issue Date	: 28-Apr-2022 15:28
C-O-C number	: ----		
Sampler	: Hannah Shinton		
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 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		
<b>Aggregate Organics : Biochemical Oxygen Demand - 5 day</b>											
HDPE [BOD HT 3d] DUP	E550	12-Apr-2022	----	----	----		14-Apr-2022	3 days	2 days	✓	
<b>Aggregate Organics : Biochemical Oxygen Demand - 5 day</b>											
HDPE [BOD HT 3d] MW1A	E550	12-Apr-2022	----	----	----		14-Apr-2022	3 days	2 days	✓	
<b>Aggregate Organics : Biochemical Oxygen Demand - 5 day</b>											
HDPE [BOD HT 3d] MW1B	E550	12-Apr-2022	----	----	----		14-Apr-2022	3 days	2 days	✓	
<b>Aggregate Organics : Biochemical Oxygen Demand - 5 day</b>											
HDPE [BOD HT 3d] MW2	E550	12-Apr-2022	----	----	----		14-Apr-2022	3 days	2 days	✓	
<b>Aggregate Organics : Biochemical Oxygen Demand - 5 day</b>											
HDPE [BOD HT 3d] MW3	E550	12-Apr-2022	----	----	----		14-Apr-2022	3 days	2 days	✓	
<b>Aggregate Organics : Biochemical Oxygen Demand - 5 day</b>											
HDPE [BOD HT 3d] MW4	E550	12-Apr-2022	----	----	----		14-Apr-2022	3 days	2 days	✓	
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)</b>											
Amber glass total (sulfuric acid) DUP	E559-L	12-Apr-2022	----	----	----		19-Apr-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		
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> MW1A	E559-L	12-Apr-2022	----	----	----		19-Apr-2022	28 days	7 days	✔	
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> MW1B	E559-L	12-Apr-2022	----	----	----		19-Apr-2022	28 days	7 days	✔	
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> MW2	E559-L	12-Apr-2022	----	----	----		19-Apr-2022	28 days	7 days	✔	
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> MW3	E559-L	12-Apr-2022	----	----	----		19-Apr-2022	28 days	7 days	✔	
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> MW4	E559-L	12-Apr-2022	----	----	----		19-Apr-2022	28 days	7 days	✔	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> DUP	E298	12-Apr-2022	22-Apr-2022	----	----		24-Apr-2022	28 days	12 days	✔	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> MW1A	E298	12-Apr-2022	22-Apr-2022	----	----		24-Apr-2022	28 days	12 days	✔	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> MW1B	E298	12-Apr-2022	22-Apr-2022	----	----		24-Apr-2022	28 days	12 days	✔	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> MW2	E298	12-Apr-2022	22-Apr-2022	----	----		24-Apr-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		
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> MW3	E298	12-Apr-2022	22-Apr-2022	----	----		24-Apr-2022	28 days	12 days	✔	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> MW4	E298	12-Apr-2022	22-Apr-2022	----	----		24-Apr-2022	28 days	12 days	✔	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> Field Blank	E298	12-Apr-2022	22-Apr-2022	----	----		24-Apr-2022	28 days	13 days	✔	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> DUP	E235.Br-L	12-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✔	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> MW1A	E235.Br-L	12-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✔	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> MW1B	E235.Br-L	12-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✔	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> MW2	E235.Br-L	12-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✔	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> MW3	E235.Br-L	12-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✔	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> MW4	E235.Br-L	12-Apr-2022	----	----	----		16-Apr-2022	28 days	4 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		
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE DUP	E235.Cl	12-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE MW1A	E235.Cl	12-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE MW1B	E235.Cl	12-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE MW2	E235.Cl	12-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE MW3	E235.Cl	12-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE MW4	E235.Cl	12-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✓	
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE DUP	E378-U	12-Apr-2022	----	----	----		16-Apr-2022	3 days	4 days	* EHT	
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE MW1A	E378-U	12-Apr-2022	----	----	----		16-Apr-2022	3 days	4 days	* EHT	
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE MW1B	E378-U	12-Apr-2022	----	----	----		16-Apr-2022	3 days	4 days	* EHT	



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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		
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE MW2	E378-U	12-Apr-2022	----	----	----		16-Apr-2022	3 days	4 days	*	EHT
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE MW3	E378-U	12-Apr-2022	----	----	----		16-Apr-2022	3 days	4 days	*	EHT
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE MW4	E378-U	12-Apr-2022	----	----	----		16-Apr-2022	3 days	4 days	*	EHT
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE DUP	E235.F	12-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE MW1A	E235.F	12-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE MW1B	E235.F	12-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE MW2	E235.F	12-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE MW3	E235.F	12-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE MW4	E235.F	12-Apr-2022	----	----	----		16-Apr-2022	28 days	4 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		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE DUP	E235.NO3-L	12-Apr-2022	----	----	----		16-Apr-2022	3 days	4 days	*	EHT
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW1A	E235.NO3-L	12-Apr-2022	----	----	----		16-Apr-2022	3 days	4 days	*	EHT
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW1B	E235.NO3-L	12-Apr-2022	----	----	----		16-Apr-2022	3 days	4 days	*	EHT
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW2	E235.NO3-L	12-Apr-2022	----	----	----		16-Apr-2022	3 days	4 days	*	EHT
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW3	E235.NO3-L	12-Apr-2022	----	----	----		16-Apr-2022	3 days	4 days	*	EHT
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW4	E235.NO3-L	12-Apr-2022	----	----	----		16-Apr-2022	3 days	4 days	*	EHT
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE DUP	E235.NO2-L	12-Apr-2022	----	----	----		16-Apr-2022	3 days	4 days	*	EHT
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW1A	E235.NO2-L	12-Apr-2022	----	----	----		16-Apr-2022	3 days	4 days	*	EHT
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW1B	E235.NO2-L	12-Apr-2022	----	----	----		16-Apr-2022	3 days	4 days	*	EHT





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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		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW2	E235.NO2-L	12-Apr-2022	----	----	----		16-Apr-2022	3 days	4 days	*	EHT
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW3	E235.NO2-L	12-Apr-2022	----	----	----		16-Apr-2022	3 days	4 days	*	EHT
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW4	E235.NO2-L	12-Apr-2022	----	----	----		16-Apr-2022	3 days	4 days	*	EHT
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE DUP	E235.SO4	12-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE MW1A	E235.SO4	12-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE MW1B	E235.SO4	12-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE MW2	E235.SO4	12-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE MW3	E235.SO4	12-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE MW4	E235.SO4	12-Apr-2022	----	----	----		16-Apr-2022	28 days	4 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		
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> DUP	E318	12-Apr-2022	22-Apr-2022	----	----		25-Apr-2022	28 days	13 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> MW1A	E318	12-Apr-2022	22-Apr-2022	----	----		25-Apr-2022	28 days	13 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> MW1B	E318	12-Apr-2022	22-Apr-2022	----	----		25-Apr-2022	28 days	13 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> MW2	E318	12-Apr-2022	22-Apr-2022	----	----		25-Apr-2022	28 days	13 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> MW3	E318	12-Apr-2022	22-Apr-2022	----	----		25-Apr-2022	28 days	13 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> MW4	E318	12-Apr-2022	22-Apr-2022	----	----		25-Apr-2022	28 days	13 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> DUP	E509	12-Apr-2022	16-Apr-2022	----	----		16-Apr-2022	28 days	4 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW1A	E509	12-Apr-2022	16-Apr-2022	----	----		16-Apr-2022	28 days	4 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW1B	E509	12-Apr-2022	16-Apr-2022	----	----		16-Apr-2022	28 days	4 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		
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW2	E509	12-Apr-2022	16-Apr-2022	----	----		16-Apr-2022	28 days	4 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW3	E509	12-Apr-2022	16-Apr-2022	----	----		16-Apr-2022	28 days	4 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW4	E509	12-Apr-2022	16-Apr-2022	----	----		16-Apr-2022	28 days	4 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> DUP	E421	12-Apr-2022	22-Apr-2022	----	----		24-Apr-2022	180 days	12 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW2	E421	12-Apr-2022	23-Apr-2022	----	----		25-Apr-2022	180 days	12 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW1A	E421	12-Apr-2022	23-Apr-2022	----	----		25-Apr-2022	180 days	13 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW1B	E421	12-Apr-2022	23-Apr-2022	----	----		25-Apr-2022	180 days	13 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW3	E421	12-Apr-2022	23-Apr-2022	----	----		25-Apr-2022	180 days	13 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW4	E421	12-Apr-2022	23-Apr-2022	----	----		25-Apr-2022	180 days	13 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		
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> DUP	E358-L	12-Apr-2022	22-Apr-2022	----	----		22-Apr-2022	28 days	10 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> MW1A	E358-L	12-Apr-2022	22-Apr-2022	----	----		22-Apr-2022	28 days	10 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> MW1B	E358-L	12-Apr-2022	22-Apr-2022	----	----		22-Apr-2022	28 days	10 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> MW2	E358-L	12-Apr-2022	22-Apr-2022	----	----		22-Apr-2022	28 days	10 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> MW3	E358-L	12-Apr-2022	22-Apr-2022	----	----		22-Apr-2022	28 days	10 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> MW4	E358-L	12-Apr-2022	22-Apr-2022	----	----		22-Apr-2022	28 days	10 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> DUP	E290	12-Apr-2022	----	----	----		15-Apr-2022	14 days	3 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> Field Blank	E290	12-Apr-2022	----	----	----		15-Apr-2022	14 days	3 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> MW1A	E290	12-Apr-2022	----	----	----		15-Apr-2022	14 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		
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE MW1B	E290	12-Apr-2022	----	----	----		15-Apr-2022	14 days	3 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE MW2	E290	12-Apr-2022	----	----	----		15-Apr-2022	14 days	3 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE MW3	E290	12-Apr-2022	----	----	----		15-Apr-2022	14 days	3 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE MW4	E290	12-Apr-2022	----	----	----		15-Apr-2022	14 days	3 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE DUP	E100	12-Apr-2022	----	----	----		15-Apr-2022	28 days	3 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE Field Blank	E100	12-Apr-2022	----	----	----		15-Apr-2022	28 days	3 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW1A	E100	12-Apr-2022	----	----	----		15-Apr-2022	28 days	3 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW1B	E100	12-Apr-2022	----	----	----		15-Apr-2022	28 days	3 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW2	E100	12-Apr-2022	----	----	----		15-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		
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW3	E100	12-Apr-2022	----	----	----		15-Apr-2022	28 days	3 days		✓
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW4	E100	12-Apr-2022	----	----	----		15-Apr-2022	28 days	3 days		✓
<b>Physical Tests : pH by Meter</b>											
HDPE MW2	E108	12-Apr-2022	----	----	----		15-Apr-2022	0.25 hrs	63 hrs		* EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE MW1A	E108	12-Apr-2022	----	----	----		15-Apr-2022	0.25 hrs	65 hrs		* EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE MW1B	E108	12-Apr-2022	----	----	----		15-Apr-2022	0.25 hrs	65 hrs		* EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE DUP	E108	12-Apr-2022	----	----	----		15-Apr-2022	0.25 hrs	67 hrs		* EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE MW4	E108	12-Apr-2022	----	----	----		15-Apr-2022	0.25 hrs	68 hrs		* EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE MW3	E108	12-Apr-2022	----	----	----		15-Apr-2022	0.25 hrs	69 hrs		* EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE Field Blank	E108	12-Apr-2022	----	----	----		15-Apr-2022	0.25 hrs	79 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		
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE DUP	E162	12-Apr-2022	----	----	----		19-Apr-2022	7 days	7 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE MW1A	E162	12-Apr-2022	----	----	----		19-Apr-2022	7 days	7 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE MW1B	E162	12-Apr-2022	----	----	----		19-Apr-2022	7 days	7 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE MW2	E162	12-Apr-2022	----	----	----		19-Apr-2022	7 days	7 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE MW3	E162	12-Apr-2022	----	----	----		19-Apr-2022	7 days	7 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE MW4	E162	12-Apr-2022	----	----	----		19-Apr-2022	7 days	7 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE DUP	E160	12-Apr-2022	----	----	----		19-Apr-2022	7 days	7 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE MW1A	E160	12-Apr-2022	----	----	----		19-Apr-2022	7 days	7 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE MW1B	E160	12-Apr-2022	----	----	----		19-Apr-2022	7 days	7 days	✔	





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE MW2	E160	12-Apr-2022	----	----	----		19-Apr-2022	7 days	7 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE MW3	E160	12-Apr-2022	----	----	----		19-Apr-2022	7 days	7 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE MW4	E160	12-Apr-2022	----	----	----		19-Apr-2022	7 days	7 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE - total (lab preserved) Field Blank	E420	12-Apr-2022	----	----	----		26-Apr-2022	180 days	15 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	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	459455	1	11	9.0	5.0	✓
Ammonia by Fluorescence	E298	465147	1	19	5.2	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	458987	1	10	10.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	459459	1	8	12.5	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	461937	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	459458	1	10	10.0	5.0	✓
Conductivity in Water	E100	459456	1	10	10.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	459788	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	465554	2	40	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	465146	1	15	6.6	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	459464	1	6	16.6	5.0	✓
Fluoride in Water by IC	E235.F	459457	1	10	10.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	459460	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	459461	1	11	9.0	5.0	✓
pH by Meter	E108	459454	1	12	8.3	5.0	✓
Sulfate in Water by IC	E235.SO4	459462	1	11	9.0	5.0	✓
TDS by Gravimetry	E162	461748	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	465153	1	10	10.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	467520	1	14	7.1	5.0	✓
TSS by Gravimetry	E160	461734	1	20	5.0	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	459455	1	11	9.0	5.0	✓
Ammonia by Fluorescence	E298	465147	1	19	5.2	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	458987	1	10	10.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	459459	1	8	12.5	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	461937	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	459458	1	10	10.0	5.0	✓
Conductivity in Water	E100	459456	1	10	10.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	459788	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	465554	2	40	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	465146	1	15	6.6	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	459464	1	6	16.6	5.0	✓
Fluoride in Water by IC	E235.F	459457	1	10	10.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	459460	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	459461	1	11	9.0	5.0	✓
pH by Meter	E108	459454	1	12	8.3	5.0	✓
Sulfate in Water by IC	E235.SO4	459462	1	11	9.0	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	
<i>Analytical Methods</i>							
<b>Laboratory Control Samples (LCS) - Continued</b>							
TDS by Gravimetry	E162	461748	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	465153	1	10	10.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	467520	1	14	7.1	5.0	✓
TSS by Gravimetry	E160	461734	1	20	5.0	5.0	✓
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	459455	1	11	9.0	5.0	✓
Ammonia by Fluorescence	E298	465147	1	19	5.2	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	458987	1	10	10.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	459459	1	8	12.5	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	461937	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	459458	1	10	10.0	5.0	✓
Conductivity in Water	E100	459456	1	10	10.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	459788	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	465554	2	40	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	465146	1	15	6.6	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	459464	1	6	16.6	5.0	✓
Fluoride in Water by IC	E235.F	459457	1	10	10.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	459460	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	459461	1	11	9.0	5.0	✓
Sulfate in Water by IC	E235.SO4	459462	1	11	9.0	5.0	✓
TDS by Gravimetry	E162	461748	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	465153	1	10	10.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	467520	1	14	7.1	5.0	✓
TSS by Gravimetry	E160	461734	1	20	5.0	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	465147	1	19	5.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	459459	1	8	12.5	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	461937	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	459458	1	10	10.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	459788	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	465554	2	40	5.0	5.0	✓
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Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	459464	1	6	16.6	5.0	✓
Fluoride in Water by IC	E235.F	459457	1	10	10.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	459460	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	459461	1	11	9.0	5.0	✓
Sulfate in Water by IC	E235.SO4	459462	1	11	9.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	465153	1	10	10.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	467520	1	14	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.
TSS by Gravimetry	E160 Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
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	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 <sub>2</sub> . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Dissolved 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.
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.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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 <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> 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 <sub>3</sub> ), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> 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 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
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
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 : VA22A7804

Page : 1 of 18

Client : Regional District of Kitimat-Stikine
Contact : Hannah Shinton
Address : # 300 - 4545 Lazelle Avenue
Terrace BC Canada V8G 4E1
Telephone : ----
Project : Meziadin Landfill Groundwater
PO : ----
C-O-C number : ----
Sampler : Hannah Shinton
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 : 13-Apr-2022 21:00
Date Analysis Commenced : 14-Apr-2022
Issue Date : 28-Apr-2022 15:28

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.

Table with 3 columns: Signatories, Position, Laboratory Department. Rows include Angela Ren, Angelo Salandanan, Dan Gebert, Dee Lee, Kevin Duarte, Kim Jensen, Lindsay Gung, and Ruby Pham.



Page : 2 of 18  
Work Order : VA22A7804  
Client : Regional District of Kitimat-Stikine  
Project : Meziadin Landfill Groundwater

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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 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**

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

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### 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: <b>Water</b>					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
<b>Physical Tests (QC Lot: 459454)</b>											
VA22A7804-003	MW2	pH	----	E108	0.10	pH units	8.32	8.35	0.360%	4%	----
<b>Physical Tests (QC Lot: 459455)</b>											
VA22A7804-003	MW2	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	216	215	0.650%	20%	----
<b>Physical Tests (QC Lot: 459456)</b>											
VA22A7804-003	MW2	conductivity	----	E100	2.0	µS/cm	487	487	0.00%	10%	----
<b>Physical Tests (QC Lot: 461734)</b>											
VA22A7694-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	8.9	8.1	0.8	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 461748)</b>											
FJ2200914-001	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	462	486	5.07%	20%	----
<b>Anions and Nutrients (QC Lot: 459457)</b>											
VA22A7804-001	MW1A	fluoride	16984-48-8	E235.F	0.100	mg/L	0.184	0.170	0.014	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 459458)</b>											
VA22A7804-001	MW1A	chloride	16887-00-6	E235.Cl	2.50	mg/L	<2.50	<2.50	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 459459)</b>											
VA22A7804-001	MW1A	bromide	24959-67-9	E235.Br-L	0.250	mg/L	<0.250	<0.250	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 459460)</b>											
VA22A7804-001	MW1A	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.154	0.152	0.0023	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 459461)</b>											
VA22A7804-001	MW1A	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 459462)</b>											
VA22A7804-001	MW1A	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	188	188	0.0150%	20%	----
<b>Anions and Nutrients (QC Lot: 459464)</b>											
VA22A7804-001	MW1A	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0244	0.0242	0.653%	20%	----
<b>Anions and Nutrients (QC Lot: 465147)</b>											
VA22A7208-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 465153)</b>											
VA22A7246-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.545	0.502	8.23%	20%	----
<b>Organic / Inorganic Carbon (QC Lot: 465146)</b>											
VA22A7208-002	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	0.90	0.94	0.04	Diff <2x LOR	----
<b>Total Metals (QC Lot: 467520)</b>											
VA22A7357-001	Anonymous	calcium, total	7440-70-2	E420	100	mg/L	323000 µg/L	347	7.25%	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
<b>Total Metals (QC Lot: 467520) - continued</b>											
VA22A7357-001	Anonymous	magnesium, total	7439-95-4	E420	10.0	mg/L	11500 µg/L	12.3	6.63%	20%	----
<b>Dissolved Metals (QC Lot: 459788)</b>											
VA22A7723-002	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 465554)</b>											
VA22A7804-006	DUP	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0036	0.0029	0.0008	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	0.00056	0.00059	0.00003	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0579	0.0620	6.72%	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	0.053	0.054	0.0006	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	39.2	40.7	3.77%	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	0.00030	0.00031	0.00001	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	0.022	0.023	0.0007	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	0.0030	0.0030	0.00006	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	11.4	11.7	2.29%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.316	0.327	3.28%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.0158	0.0158	0.136%	20%	----
		nickel, dissolved	7440-02-0	E421	0.000050	mg/L	0.00066	0.00067	0.00001	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.093	0.101	0.008	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.050	mg/L	1.98	2.10	5.55%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00024	0.00025	0.00001	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000088	0.000092	0.000005	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.51	4.50	0.301%	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	53.4	54.3	1.67%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.501	0.507	1.32%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	19.2	19.8	3.06%	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	----



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
<b>Dissolved Metals (QC Lot: 465554) - continued</b>											
VA22A7804-006	DUP	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	0.00187	0.00193	2.98%	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	----
<b>Dissolved Metals (QC Lot: 465874)</b>											
VA22A7715-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0047	0.0046	0.00005	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.166	0.164	1.02%	20%	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00866	0.00870	0.411%	20%	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0605	0.0621	2.64%	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	0.056	0.057	0.0003	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000175	0.0000142	0.0000033	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	52.4	54.9	4.50%	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	0.00035	0.00035	0.000004	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00320	0.00318	0.581%	20%	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	0.050	0.050	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	0.0030	0.0030	0.00002	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	76.8	79.6	3.54%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0814	0.0819	0.576%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00519	0.00518	0.246%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00609	0.00616	1.21%	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	3.31	3.37	1.82%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00029	0.00031	0.00002	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.00269	0.00270	0.607%	20%	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.80	4.77	0.633%	20%	----
		silver, dissolved	7440-22-4	E421	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
<b>Dissolved Metals (QC Lot: 465874) - continued</b>											
VA22A7715-001	Anonymous	sodium, dissolved	7440-23-5	E421	0.050	mg/L	10.8	11.0	1.60%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.265	0.266	0.314%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	62.5	60.2	3.79%	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	0.00010	mg/L	<0.00010	<0.00010	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	0.00040	0.00036	0.00004	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	0.00025	0.00025	0.000005	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.00010	mg/L	0.00365	0.00368	0.573%	20%	----
		vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00073	0.00073	0.000003	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0018	0.0010	0.0008	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 458987)</b>											
VA22A7802-001	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----
<b>Aggregate Organics (QC Lot: 461937)</b>											
VA22A7665-001	Anonymous	chemical oxygen demand [COD]	----	E559-L	10	mg/L	72	77	5	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
<b>Physical Tests (QCLot: 459455)</b>						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
<b>Physical Tests (QCLot: 459456)</b>						
conductivity	----	E100	1	µS/cm	<1.0	----
<b>Physical Tests (QCLot: 461734)</b>						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
<b>Physical Tests (QCLot: 461748)</b>						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
<b>Anions and Nutrients (QCLot: 459457)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 459458)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 459459)</b>						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 459460)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 459461)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 459462)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
<b>Anions and Nutrients (QCLot: 459464)</b>						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 465147)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 465153)</b>						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
<b>Organic / Inorganic Carbon (QCLot: 465146)</b>						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
<b>Total Metals (QCLot: 467520)</b>						
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
<b>Dissolved Metals (QCLot: 459788)</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
<b>Dissolved Metals (QCLot: 465554)</b>						



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 465554) - continued</b>						
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
<b>Dissolved Metals (QCLot: 465554) - continued</b>						
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	----
<b>Dissolved Metals (QCLot: 465874)</b>						
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>
<b>Dissolved Metals (QCLot: 465874) - continued</b>						
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	----
<b>Aggregate Organics (QCLot: 458987)</b>						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----
<b>Aggregate Organics (QCLot: 461937)</b>						
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: <b>Water</b>					Laboratory Control Sample (LCS) Report				
					Spike Concentration	Recovery (%) LCS	Recovery Limits (%)		Qualifier
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Physical Tests (QCLot: 459454)</b>									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
<b>Physical Tests (QCLot: 459455)</b>									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	101	85.0	115	----
<b>Physical Tests (QCLot: 459456)</b>									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	101	90.0	110	----
<b>Physical Tests (QCLot: 461734)</b>									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	112	85.0	115	----
<b>Physical Tests (QCLot: 461748)</b>									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	101	85.0	115	----
<b>Anions and Nutrients (QCLot: 459457)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	107	90.0	110	----
<b>Anions and Nutrients (QCLot: 459458)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	104	90.0	110	----
<b>Anions and Nutrients (QCLot: 459459)</b>									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	103	85.0	115	----
<b>Anions and Nutrients (QCLot: 459460)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	104	90.0	110	----
<b>Anions and Nutrients (QCLot: 459461)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	105	90.0	110	----
<b>Anions and Nutrients (QCLot: 459462)</b>									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	106	90.0	110	----
<b>Anions and Nutrients (QCLot: 459464)</b>									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	105	80.0	120	----
<b>Anions and Nutrients (QCLot: 465147)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	98.5	85.0	115	----
<b>Anions and Nutrients (QCLot: 465153)</b>									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	96.5	75.0	125	----
<b>Organic / Inorganic Carbon (QCLot: 465146)</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	104	80.0	120	----
<b>Total Metals (QCLot: 467520)</b>									
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	101	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	
<b>Total Metals (QCLot: 467520) - continued</b>									
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	100	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	85.9	80.0	120	----
<b>Dissolved Metals (QCLot: 465554)</b>									
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	101	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	102	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	98.7	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	95.1	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	94.1	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	97.4	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	99.9	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	96.8	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	101	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	99.8	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	99.0	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	99.1	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	100	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	99.1	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	99.9	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	101	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	105	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	106	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	104	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	91.8	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	101	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	104	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	102	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	90.6	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	99.2	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
<b>Dissolved Metals (QCLot: 465554) - continued</b>									
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	94.2	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	98.3	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	103	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	100.0	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	95.8	80.0	120	----
<b>Dissolved Metals (QCLot: 465874)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	100.0	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	99.5	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	99.7	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	99.9	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	95.2	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	90.1	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	95.6	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	98.0	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	97.6	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	96.2	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	95.9	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	96.8	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	103	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	98.4	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	95.5	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	92.6	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	99.6	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	99.4	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	95.4	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	100	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	101	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	97.6	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	98.0	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	91.3	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	95.4	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	99.6	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	82.9	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	104	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	98.3	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
<b>Dissolved Metals (QCLot: 465874) - continued</b>									
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	94.9	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	95.0	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	91.4	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	94.6	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	98.3	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	98.0	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	98.1	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	95.5	80.0	120	----
<b>Aggregate Organics (QCLot: 458987)</b>									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	99.4	85.0	115	----
<b>Aggregate Organics (QCLot: 461937)</b>									
chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	107	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  $\geq 1 \times$  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
<b>Anions and Nutrients (QCLot: 459457)</b>										
VA22A7804-002	MW1B	fluoride	16984-48-8	E235.F	1.11 mg/L	1 mg/L	111	75.0	125	----
<b>Anions and Nutrients (QCLot: 459458)</b>										
VA22A7804-002	MW1B	chloride	16887-00-6	E235.Cl	109 mg/L	100 mg/L	109	75.0	125	----
<b>Anions and Nutrients (QCLot: 459459)</b>										
VA22A7804-002	MW1B	bromide	24959-67-9	E235.Br-L	0.547 mg/L	0.5 mg/L	109	75.0	125	----
<b>Anions and Nutrients (QCLot: 459460)</b>										
VA22A7804-002	MW1B	nitrate (as N)	14797-55-8	E235.NO3-L	2.74 mg/L	2.5 mg/L	110	75.0	125	----
<b>Anions and Nutrients (QCLot: 459461)</b>										
VA22A7804-002	MW1B	nitrite (as N)	14797-65-0	E235.NO2-L	0.529 mg/L	0.5 mg/L	106	75.0	125	----
<b>Anions and Nutrients (QCLot: 459462)</b>										
VA22A7804-002	MW1B	sulfate (as SO4)	14808-79-8	E235.SO4	111 mg/L	100 mg/L	111	75.0	125	----
<b>Anions and Nutrients (QCLot: 459464)</b>										
VA22A7804-002	MW1B	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0336 mg/L	0.03 mg/L	112	70.0	130	----
<b>Anions and Nutrients (QCLot: 465147)</b>										
VA22A7246-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.104 mg/L	0.1 mg/L	104	75.0	125	----
<b>Anions and Nutrients (QCLot: 465153)</b>										
VA22A7306-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	1300 mg/L	2.5 mg/L	104	70.0	130	----
<b>Organic / Inorganic Carbon (QCLot: 465146)</b>										
VA22A7804-001	MW1A	carbon, dissolved organic [DOC]	----	E358-L	5.17 mg/L	5 mg/L	103	70.0	130	----
<b>Total Metals (QCLot: 467520)</b>										
VA22A7357-002	Anonymous	calcium, total	7440-70-2	E420	ND mg/L	8 mg/L	ND	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	2 mg/L	ND	70.0	130	----
<b>Dissolved Metals (QCLot: 459788)</b>										
VA22A7735-001	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000906 mg/L	0.0001 mg/L	90.6	70.0	130	----
<b>Dissolved Metals (QCLot: 465554)</b>										
VA22A7805-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.193 mg/L	0.2 mg/L	96.7	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0192 mg/L	0.02 mg/L	96.3	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0205 mg/L	0.02 mg/L	102	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
<b>Dissolved Metals (QCLot: 465554) - continued</b>										
VA22A7805-001	Anonymous	barium, dissolved	7440-39-3	E421	0.0190 mg/L	0.02 mg/L	94.9	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0391 mg/L	0.04 mg/L	97.8	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00852 mg/L	0.01 mg/L	85.2	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.094 mg/L	0.1 mg/L	94.0	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00396 mg/L	0.004 mg/L	99.0	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	0.00983 mg/L	0.01 mg/L	98.3	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0389 mg/L	0.04 mg/L	97.2	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0194 mg/L	0.02 mg/L	96.8	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.94 mg/L	2 mg/L	96.9	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0192 mg/L	0.02 mg/L	96.3	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.0951 mg/L	0.1 mg/L	95.1	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	0.916 mg/L	1 mg/L	91.6	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	0.0192 mg/L	0.02 mg/L	96.2	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0390 mg/L	0.04 mg/L	97.5	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	4.08 mg/L	4 mg/L	102	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0201 mg/L	0.02 mg/L	101	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0422 mg/L	0.04 mg/L	106	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.70 mg/L	10 mg/L	97.0	70.0	130	----
		sodium, dissolved	7440-23-5	E421	1.98 mg/L	2 mg/L	98.9	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	0.0412 mg/L	0.04 mg/L	103	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00367 mg/L	0.004 mg/L	91.8	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0192 mg/L	0.02 mg/L	96.3	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0188 mg/L	0.02 mg/L	93.8	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0381 mg/L	0.04 mg/L	95.2	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0182 mg/L	0.02 mg/L	91.0	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00381 mg/L	0.004 mg/L	95.2	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.0980 mg/L	0.1 mg/L	98.0	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.405 mg/L	0.4 mg/L	101	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0390 mg/L	0.04 mg/L	97.5	70.0	130	----
<b>Dissolved Metals (QCLot: 465874)</b>										
VA22A7715-002	Anonymous	aluminum, dissolved	7429-90-5	E421	0.202 mg/L	0.2 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
<b>Dissolved Metals (QCLot: 465874) - continued</b>										
VA22A7715-002	Anonymous	antimony, dissolved	7440-36-0	E421	0.0196 mg/L	0.02 mg/L	98.0	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0198 mg/L	0.02 mg/L	99.2	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	0.0410 mg/L	0.04 mg/L	103	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00938 mg/L	0.01 mg/L	93.8	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.094 mg/L	0.1 mg/L	93.7	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00390 mg/L	0.004 mg/L	97.6	70.0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, dissolved	7440-46-2	E421	0.0100 mg/L	0.01 mg/L	100	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0390 mg/L	0.04 mg/L	97.4	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0194 mg/L	0.02 mg/L	96.9	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0193 mg/L	0.02 mg/L	96.4	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.90 mg/L	2 mg/L	94.8	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	0.0949 mg/L	0.1 mg/L	94.9	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	0.0198 mg/L	0.02 mg/L	99.2	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0200 mg/L	0.02 mg/L	99.8	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0380 mg/L	0.04 mg/L	95.1	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	3.80 mg/L	4 mg/L	95.0	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0196 mg/L	0.02 mg/L	97.9	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0399 mg/L	0.04 mg/L	99.7	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.30 mg/L	10 mg/L	93.0	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00408 mg/L	0.004 mg/L	102	70.0	130	----
		sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	18.8 mg/L	20 mg/L	94.2	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0401 mg/L	0.04 mg/L	100	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00385 mg/L	0.004 mg/L	96.2	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0198 mg/L	0.02 mg/L	98.9	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0189 mg/L	0.02 mg/L	94.3	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0380 mg/L	0.04 mg/L	94.9	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0189 mg/L	0.02 mg/L	94.7	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00392 mg/L	0.004 mg/L	98.1	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.0972 mg/L	0.1 mg/L	97.2	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.397 mg/L	0.4 mg/L	99.3	70.0	130	----

Page : 18 of 18  
 Work Order : VA22A7804  
 Client : Regional District of Kitimat-Stikine  
 Project : Meziadin Landfill 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>
<b>Dissolved Metals (QCLot: 465874) - continued</b>										
VA22A7715-002	Anonymous	zirconium, dissolved	7440-67-7	E421	0.0399 mg/L	0.04 mg/L	99.8	70.0	130	----
<b>Aggregate Organics (QCLot: 461937)</b>										
VA22A7802-001	Anonymous	chemical oxygen demand [COD]	----	E559-L	108 mg/L	100 mg/L	108	75.0	125	----



## CERTIFICATE OF ANALYSIS

**Work Order** : **VA22A7805**  
**Client** : **Regional District of Kitimat-Stikine**  
**Contact** : Hannah Shinton  
**Address** : # 300 - 4545 Lazelle Avenue  
 Terrace BC Canada V8G 4E1  
**Telephone** : ----  
**Project** : Meziadin Landfill Surface Water  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : Hannah Shinton  
**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** : 13-Apr-2022 21:00  
**Date Analysis Commenced** : 16-Apr-2022  
**Issue Date** : 29-Apr-2022 14:16

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
Dan Gebert	Laboratory Analyst	Metals, Burnaby, British Columbia
Dee Lee	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
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>
DLA	Detection Limit adjusted for required dilution.
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).
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.



## Analytical Results

Sub-Matrix: Water					Client sample ID	SW2017-02-US	Lagoon Outlet	Travel Blank	----	----
(Matrix: Water)										
Client sampling date / time					13-Apr-2022	13-Apr-2022	13-Apr-2022	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22A7805-001	VA22A7805-002	VA22A7805-003	-----	-----	-----
					Result	Result	Result	----	----	----
<b>Physical Tests</b>										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	14.6	760	----	----	----	----
conductivity	----	E100	2.0	µS/cm	32.1	1660	----	----	----	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	14.8	503	----	----	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	14.4	699	<0.60	----	----	----
pH	----	E108	0.10	pH units	6.13	7.00	----	----	----	----
solids, total dissolved [TDS]	----	E162	10	mg/L	26	832	----	----	----	----
solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	1170	----	----	----	----
<b>Anions and Nutrients</b>										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0057	31.2	<0.0050	----	----	----
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.500 <sup>DLDS</sup>	----	----	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	103	----	----	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L	0.033	<0.200 <sup>DLDS</sup>	----	----	----	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.111	104	----	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0500 <sup>DLDS</sup>	----	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0100 <sup>DLDS</sup>	----	----	----	----
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0063	1.92	----	----	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	0.95	21.2	----	----	----	----
<b>Organic / Inorganic Carbon</b>										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.91	52.9	----	----	----	----
<b>Total Metals</b>										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.111	17.1	<0.0030	----	----	----
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	0.0194	<0.00010	----	----	----
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00018	0.0668	<0.00010	----	----	----
barium, total	7440-39-3	E420	0.00010	mg/L	0.0128	0.775	<0.00010	----	----	----
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	0.000410	<0.000100	----	----	----
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	0.00114	<0.000050	----	----	----
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	1.19	<0.010	----	----	----
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000099	0.00259	<0.0000050	----	----	----
calcium, total	7440-70-2	E420	0.050	mg/L	4.14	221	<0.050	----	----	----
cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	0.00127	<0.000010	----	----	----
chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	0.0681	<0.00050	----	----	----





## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	SW2017-02-US	Lagoon Outlet	Travel Blank	----	----
Client sampling date / time					13-Apr-2022	13-Apr-2022	13-Apr-2022	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22A7805-001	VA22A7805-002	VA22A7805-003	-----	-----	
					Result	Result	Result	---	---	
<b>Total Metals</b>										
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00053	0.0734	<0.00010	---	---	
copper, total	7440-50-8	E420	0.00050	mg/L	0.00093	0.177	<0.00050	---	---	
iron, total	7439-89-6	E420	0.010	mg/L	0.439	96.0	<0.010	---	---	
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	0.0289	<0.000050	---	---	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	0.0388	<0.0010	---	---	
magnesium, total	7439-95-4	E420	0.0050	mg/L	1.00	35.8	<0.0050	---	---	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.224	11.5	<0.00010	---	---	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.000500 <sup>DLM</sup>	<0.0000050	---	---	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	<0.000050	0.0216	<0.000050	---	---	
nickel, total	7440-02-0	E420	0.00050	mg/L	0.00172	0.136	<0.00050	---	---	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	11.3	<0.050	---	---	
potassium, total	7440-09-7	E420	0.050	mg/L	0.248	51.8	<0.050	---	---	
rubidium, total	7440-17-7	E420	0.00020	mg/L	<0.00020	0.0352	<0.00020	---	---	
selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	0.00216	<0.000050	---	---	
silicon, total	7440-21-3	E420	0.10	mg/L	2.98	31.3	<0.10	---	---	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	0.00400	<0.000010	---	---	
sodium, total	7440-23-5	E420	0.050	mg/L	1.03	112	<0.050	---	---	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.0255	1.14	<0.00020	---	---	
sulfur, total	7704-34-9	E420	0.50	mg/L	<0.50	47.0	<0.50	---	---	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00100 <sup>DLA</sup>	<0.00020	---	---	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	0.000233	<0.000010	---	---	
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00050 <sup>DLA</sup>	<0.00010	---	---	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	0.00306	<0.00010	---	---	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00112	0.323	<0.00030	---	---	
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	0.00728	<0.00010	---	---	
uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	0.000997	<0.000010	---	---	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	0.0481	<0.00050	---	---	
zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	3.80	<0.0030	---	---	
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00840 <sup>DLM</sup>	<0.00020	---	---	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0495	0.140	---	---	---	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	0.00095	---	---	---	



## Analytical Results

Sub-Matrix: Water					Client sample ID	SW2017-02-US	Lagoon Outlet	Travel Blank	----	----
(Matrix: Water)					Client sampling date / time	13-Apr-2022	13-Apr-2022	13-Apr-2022	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22A7805-001	VA22A7805-002	VA22A7805-003	-----	-----	
					Result	Result	Result	---	---	
<b>Dissolved Metals</b>										
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00020	0.00385	----	----	----	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0161	0.240	----	----	----	
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	<0.000100 <sup>DLA</sup>	----	----	----	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	1.05	----	----	----	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000112	0.0000149	----	----	----	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	4.30	160	----	----	----	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	0.000140	----	----	----	
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	0.00676	----	----	----	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00060	0.00143	----	----	----	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00555 <sup>DTC</sup>	0.00055	----	----	----	
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.304	1.23	----	----	----	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000058	0.000201	----	----	----	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	0.0220	----	----	----	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	0.998	25.1	----	----	----	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.268	8.57	----	----	----	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	----	----	----	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	<0.000050	0.000248	----	----	----	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00197	0.00857	----	----	----	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	1.73	----	----	----	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.236	41.9	----	----	----	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	<0.00020	0.0237	----	----	----	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	0.000325	----	----	----	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	2.95	7.21	----	----	----	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	0.000105 <sup>DTC</sup>	<0.000020 <sup>DLA</sup>	----	----	----	
sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.971	97.5	----	----	----	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0297	0.835	----	----	----	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	<0.50	17.6	----	----	----	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00040 <sup>DLA</sup>	----	----	----	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000020 <sup>DLA</sup>	----	----	----	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00020 <sup>DLA</sup>	----	----	----	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	0.00060	----	----	----	



## Analytical Results

Sub-Matrix: Water					Client sample ID	SW2017-02-US	Lagoon Outlet	Travel Blank	----	----
(Matrix: Water)					Client sampling date / time	13-Apr-2022	13-Apr-2022	13-Apr-2022	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22A7805-001	VA22A7805-002	VA22A7805-003	-----	-----	-----
					Result	Result	Result	---	---	---
<b>Dissolved Metals</b>										
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00060 <sup>DLM</sup>	0.00287	----	----	----	----
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	0.00029	----	----	----	----
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	0.000072	----	----	----	----
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	0.00124	----	----	----	----
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0038	0.0295	----	----	----	----
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00040 <sup>DLA</sup>	----	----	----	----
dissolved mercury filtration location	----	EP509	-	-	Field	Field	----	----	----	----
dissolved metals filtration location	----	EP421	-	-	Field	Field	----	----	----	----
<b>Aggregate Organics</b>										
biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	329	----	----	----	----
chemical oxygen demand [COD]	----	E559-L	10	mg/L	16	1140	----	----	----	----

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

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA22A7805</b>	Page	: 1 of 14
Client	: <b>Regional District of Kitimat-Stikine</b>	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	: Meziadin Landfill Surface Water	Date Samples Received	: 13-Apr-2022 21:00
PO	: ----	Issue Date	: 29-Apr-2022 14:11
C-O-C number	: ----		
Sampler	: Hannah Shinton		
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	
<b>Aggregate Organics : Biochemical Oxygen Demand - 5 day</b>										
<b>HDPE [BOD HT 3d]</b> Lagoon Outlet	E550	13-Apr-2022	----	----	----		16-Apr-2022	3 days	3 days	✓
<b>Aggregate Organics : Biochemical Oxygen Demand - 5 day</b>										
<b>HDPE [BOD HT 3d]</b> SW2017-02-US	E550	13-Apr-2022	----	----	----		16-Apr-2022	3 days	3 days	✓
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> Lagoon Outlet	E559-L	13-Apr-2022	----	----	----		19-Apr-2022	28 days	7 days	✓
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> SW2017-02-US	E559-L	13-Apr-2022	----	----	----		19-Apr-2022	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> Lagoon Outlet	E298	13-Apr-2022	23-Apr-2022	----	----		25-Apr-2022	28 days	12 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> SW2017-02-US	E298	13-Apr-2022	23-Apr-2022	----	----		25-Apr-2022	28 days	12 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> Travel Blank	E298	13-Apr-2022	23-Apr-2022	----	----		25-Apr-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 Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE Lagoon Outlet	E235.Br-L	13-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✔
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE SW2017-02-US	E235.Br-L	13-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE Lagoon Outlet	E235.Cl	13-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SW2017-02-US	E235.Cl	13-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✔
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>										
HDPE Lagoon Outlet	E378-U	13-Apr-2022	----	----	----		16-Apr-2022	3 days	3 days	✔
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>										
HDPE SW2017-02-US	E378-U	13-Apr-2022	----	----	----		16-Apr-2022	3 days	3 days	✔
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE Lagoon Outlet	E235.F	13-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✔
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SW2017-02-US	E235.F	13-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✔
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE Lagoon Outlet	E235.NO3-L	13-Apr-2022	----	----	----		16-Apr-2022	3 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		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
<b>HDPE</b> SW2017-02-US	E235.NO3-L	13-Apr-2022	----	----	----		16-Apr-2022	3 days	4 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
<b>HDPE</b> Lagoon Outlet	E235.NO2-L	13-Apr-2022	----	----	----		16-Apr-2022	3 days	4 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
<b>HDPE</b> SW2017-02-US	E235.NO2-L	13-Apr-2022	----	----	----		16-Apr-2022	3 days	4 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
<b>HDPE</b> Lagoon Outlet	E235.SO4	13-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
<b>HDPE</b> SW2017-02-US	E235.SO4	13-Apr-2022	----	----	----		16-Apr-2022	28 days	4 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> Lagoon Outlet	E318	13-Apr-2022	23-Apr-2022	----	----		25-Apr-2022	28 days	12 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SW2017-02-US	E318	13-Apr-2022	23-Apr-2022	----	----		25-Apr-2022	28 days	12 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> Lagoon Outlet	E509	13-Apr-2022	16-Apr-2022	----	----		16-Apr-2022	28 days	3 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> SW2017-02-US	E509	13-Apr-2022	16-Apr-2022	----	----		16-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		
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> Lagoon Outlet	E421	13-Apr-2022	22-Apr-2022	----	----		24-Apr-2022	180 days	12 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> SW2017-02-US	E421	13-Apr-2022	22-Apr-2022	----	----		24-Apr-2022	180 days	12 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> Lagoon Outlet	E358-L	13-Apr-2022	23-Apr-2022	----	----		23-Apr-2022	28 days	10 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> SW2017-02-US	E358-L	13-Apr-2022	23-Apr-2022	----	----		23-Apr-2022	28 days	10 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> Lagoon Outlet	E290	13-Apr-2022	----	----	----		16-Apr-2022	14 days	3 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> SW2017-02-US	E290	13-Apr-2022	----	----	----		16-Apr-2022	14 days	3 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
<b>HDPE</b> Lagoon Outlet	E100	13-Apr-2022	----	----	----		16-Apr-2022	28 days	3 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
<b>HDPE</b> SW2017-02-US	E100	13-Apr-2022	----	----	----		16-Apr-2022	28 days	3 days	✓	
<b>Physical Tests : pH by Meter</b>											
<b>HDPE</b> Lagoon Outlet	E108	13-Apr-2022	----	----	----		16-Apr-2022	0.25 hrs	83 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		
<b>Physical Tests : pH by Meter</b>											
HDPE SW2017-02-US	E108	13-Apr-2022	----	----	----		16-Apr-2022	0.25 hrs	83 hrs	*	EHTR-FM
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE Lagoon Outlet	E162	13-Apr-2022	----	----	----		19-Apr-2022	7 days	7 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE SW2017-02-US	E162	13-Apr-2022	----	----	----		19-Apr-2022	7 days	7 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE Lagoon Outlet	E160	13-Apr-2022	----	----	----		19-Apr-2022	7 days	7 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SW2017-02-US	E160	13-Apr-2022	----	----	----		19-Apr-2022	7 days	7 days	✓	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
Glass vial total (hydrochloric acid) Lagoon Outlet	E508	13-Apr-2022	----	----	----		17-Apr-2022	28 days	4 days	✓	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
Glass vial total (hydrochloric acid) SW2017-02-US	E508	13-Apr-2022	----	----	----		17-Apr-2022	28 days	4 days	✓	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
Glass vial total (hydrochloric acid) Travel Blank	E508	13-Apr-2022	----	----	----		17-Apr-2022	28 days	4 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
HDPE total (nitric acid) Lagoon Outlet	E420	13-Apr-2022	----	----	----		26-Apr-2022	180 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	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> SW2017-02-US	E420	13-Apr-2022	----	----	----		26-Apr-2022	180 days	14 days	✔
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> Travel Blank	E420	13-Apr-2022	----	----	----		26-Apr-2022	180 days	14 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	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	459648	1	8	12.5	5.0	✓
Ammonia by Fluorescence	E298	465965	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	459803	1	19	5.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	459644	1	2	50.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	461937	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	459639	1	12	8.3	5.0	✓
Conductivity in Water	E100	459647	1	12	8.3	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	459788	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	465554	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	465966	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	459651	1	7	14.2	5.0	✓
Fluoride in Water by IC	E235.F	459643	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	459645	1	8	12.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	459640	1	12	8.3	5.0	✓
pH by Meter	E108	459646	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	459642	1	11	9.0	5.0	✓
TDS by Gravimetry	E162	462468	1	19	5.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	465963	1	17	5.8	5.0	✓
Total Mercury in Water by CVAAS	E508	460224	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	467520	1	15	6.6	5.0	✓
TSS by Gravimetry	E160	462469	1	20	5.0	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	459648	1	8	12.5	5.0	✓
Ammonia by Fluorescence	E298	465965	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	459803	1	19	5.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	459644	1	2	50.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	461937	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	459639	1	12	8.3	5.0	✓
Conductivity in Water	E100	459647	1	12	8.3	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	459788	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	465554	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	465966	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	459651	1	7	14.2	5.0	✓
Fluoride in Water by IC	E235.F	459643	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	459645	1	8	12.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	459640	1	12	8.3	5.0	✓
pH by Meter	E108	459646	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 (%)		
			QC	Regular	Actual	Expected	Evaluation
<b>Analytical Methods</b>							
<b>Laboratory Control Samples (LCS) - Continued</b>							
Sulfate in Water by IC	E235.SO4	459642	1	11	9.0	5.0	✓
TDS by Gravimetry	E162	462468	1	19	5.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	465963	1	17	5.8	5.0	✓
Total Mercury in Water by CVAAS	E508	460224	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	467520	1	15	6.6	5.0	✓
TSS by Gravimetry	E160	462469	1	20	5.0	5.0	✓
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	459648	1	8	12.5	5.0	✓
Ammonia by Fluorescence	E298	465965	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	459803	1	19	5.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	459644	1	2	50.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	461937	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	459639	1	12	8.3	5.0	✓
Conductivity in Water	E100	459647	1	12	8.3	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	459788	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	465554	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	465966	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	459651	1	7	14.2	5.0	✓
Fluoride in Water by IC	E235.F	459643	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	459645	1	8	12.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	459640	1	12	8.3	5.0	✓
Sulfate in Water by IC	E235.SO4	459642	1	11	9.0	5.0	✓
TDS by Gravimetry	E162	462468	1	19	5.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	465963	1	17	5.8	5.0	✓
Total Mercury in Water by CVAAS	E508	460224	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	467520	1	15	6.6	5.0	✓
TSS by Gravimetry	E160	462469	1	20	5.0	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	465965	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	459644	1	2	50.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	461937	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	459639	1	12	8.3	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	459788	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	465554	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	465966	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	459651	1	7	14.2	5.0	✓
Fluoride in Water by IC	E235.F	459643	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	459645	1	8	12.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	459640	1	12	8.3	5.0	✓
Sulfate in Water by IC	E235.SO4	459642	1	11	9.0	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
<i>Analytical Methods</i>							
<b>Matrix Spikes (MS) - Continued</b>							
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	465963	1	17	5.8	5.0	✓
Total Mercury in Water by CVAAS	E508	460224	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	467520	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.
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.



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	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 <sub>2</sub> . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Dissolved 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.



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
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 <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> 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 <sub>3</sub> ), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> 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
Dissolved Metals Water Filtration	EP421  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
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 : VA22A7805

Page : 1 of 18

Client : Regional District of Kitimat-Stikine
Contact : Hannah Shinton
Address : # 300 - 4545 Lazelle Avenue
Terrace BC Canada V8G 4E1
Telephone : ----
Project : Meziadin Landfill Surface Water
PO : ----
C-O-C number : ----
Sampler : Hannah Shinton
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 : 13-Apr-2022 21:00
Date Analysis Commenced : 16-Apr-2022
Issue Date : 29-Apr-2022 14:12

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.

Table with 3 columns: Signatories, Position, Laboratory Department. Lists names like Angela Ren, Dan Gebert, Dee Lee, etc., along with their roles and departments.

Page : 2 of 18  
Work Order : VA22A7805  
Client : Regional District of Kitimat-Stikine  
Project : Meziadin Landfill Surface Water

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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 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**

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

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### 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
<b>Physical Tests (QC Lot: 459646)</b>											
VA22A7805-002	Lagoon Outlet	pH	----	E108	0.10	pH units	7.00	7.00	0.00%	4%	----
<b>Physical Tests (QC Lot: 459647)</b>											
VA22A7805-002	Lagoon Outlet	conductivity	----	E100	2.0	µS/cm	1660	1650	0.786%	10%	----
<b>Physical Tests (QC Lot: 459648)</b>											
VA22A7805-002	Lagoon Outlet	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	760	726	4.64%	20%	----
<b>Physical Tests (QC Lot: 462468)</b>											
KS2201237-001	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	639	677	5.78%	20%	----
<b>Physical Tests (QC Lot: 462469)</b>											
FJ2200912-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	4.8	5.0	0.2	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 459639)</b>											
KS2201245-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	8.82	8.81	0.146%	20%	----
<b>Anions and Nutrients (QC Lot: 459640)</b>											
KS2201245-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0027	0.0027	0.00003	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 459642)</b>											
KS2201245-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	14.0	14.0	0.0710%	20%	----
<b>Anions and Nutrients (QC Lot: 459643)</b>											
VA22A7805-001	SW2017-02-US	fluoride	16984-48-8	E235.F	0.020	mg/L	0.033	0.033	0.0001	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 459644)</b>											
VA22A7805-001	SW2017-02-US	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 459645)</b>											
VA22A7805-001	SW2017-02-US	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 459651)</b>											
KS2201245-001	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0464	0.0463	0.183%	20%	----
<b>Anions and Nutrients (QC Lot: 465963)</b>											
VA22A7805-001	SW2017-02-US	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.111	0.103	0.007	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 465965)</b>											
VA22A7805-001	SW2017-02-US	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0057	0.0059	0.0002	Diff <2x LOR	----
<b>Organic / Inorganic Carbon (QC Lot: 465966)</b>											
VA22A7805-001	SW2017-02-US	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.91	3.18	0.27	Diff <2x LOR	----
<b>Total Metals (QC Lot: 460224)</b>											
KS2201243-002	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	0.0000098	0.0000096	0.0000001	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
<b>Total Metals (QC Lot: 467520)</b>											
VA22A7357-001	Anonymous	aluminum, total	7429-90-5	E420	6.0	mg/L	1200 µg/L	1.28	6.40%	20%	----
		antimony, total	7440-36-0	E420	0.20	mg/L	3.59 µg/L	0.00386	7.21%	20%	----
		arsenic, total	7440-38-2	E420	0.20	mg/L	7.21 µg/L	0.00777	7.51%	20%	----
		barium, total	7440-39-3	E420	0.20	mg/L	72.4 µg/L	0.0764	5.35%	20%	----
		beryllium, total	7440-41-7	E420	0.100	mg/L	<0.100 µg/L	<0.000100	0	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.100	mg/L	<0.100 µg/L	<0.000100	0	Diff <2x LOR	----
		boron, total	7440-42-8	E420	20	mg/L	886 µg/L	0.941	5.93%	20%	----
		cadmium, total	7440-43-9	E420	0.170	mg/L	<0.170 µg/L	<0.000170	0	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	100	mg/L	323000 µg/L	347	7.25%	20%	----
		cesium, total	7440-46-2	E420	0.020	mg/L	0.038 µg/L	0.000042	0.000004	Diff <2x LOR	----
		chromium, total	7440-47-3	E420	0.00050	mg/L	0.00437	0.00463	0.00026	Diff <2x LOR	----
		cobalt, total	7440-48-4	E420	0.20	mg/L	5.35 µg/L	0.00572	6.58%	20%	----
		copper, total	7440-50-8	E420	1.00	mg/L	14.4 µg/L	0.0150	4.52%	20%	----
		iron, total	7439-89-6	E420	20	mg/L	3850 µg/L	4.09	6.04%	20%	----
		lead, total	7439-92-1	E420	0.100	mg/L	3.23 µg/L	0.00342	5.68%	20%	----
		lithium, total	7439-93-2	E420	2.0	mg/L	25.7 µg/L	0.0277	7.45%	20%	----
		magnesium, total	7439-95-4	E420	10.0	mg/L	11500 µg/L	12.3	6.63%	20%	----
		manganese, total	7439-96-5	E420	0.20	mg/L	928 µg/L	0.957	3.12%	20%	----
		molybdenum, total	7439-98-7	E420	0.100	mg/L	56.4 µg/L	0.0604	6.90%	20%	----
		nickel, total	7440-02-0	E420	1.00	mg/L	20.8 µg/L	0.0219	5.24%	20%	----
		phosphorus, total	7723-14-0	E420	100	mg/L	814 µg/L	0.870	0.056	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	100	mg/L	19400 µg/L	20.5	5.61%	20%	----
		rubidium, total	7440-17-7	E420	0.40	mg/L	8.75 µg/L	0.00904	3.25%	20%	----
		selenium, total	7782-49-2	E420	0.100	mg/L	0.514 µg/L	0.000623	0.000109	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	200	mg/L	4560 µg/L	4.69	2.74%	20%	----
		silver, total	7440-22-4	E420	0.020	mg/L	<0.020 µg/L	<0.000020	0	Diff <2x LOR	----
		sodium, total	7440-23-5	E420	100	mg/L	53200 µg/L	56.9	6.63%	20%	----
		strontium, total	7440-24-6	E420	0.40	mg/L	1100 µg/L	1.18	7.17%	20%	----
		sulfur, total	7704-34-9	E420	1000	mg/L	290000 µg/L	304	4.62%	20%	----
		tellurium, total	13494-80-9	E420	0.40	mg/L	<0.40 µg/L	<0.00040	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.020	mg/L	<0.020 µg/L	<0.000020	0	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.20	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.20	mg/L	2.11 µg/L	0.00223	5.61%	20%	----
		titanium, total	7440-32-6	E420	0.60	mg/L	19.4 µg/L	0.0208	6.89%	20%	----
		tungsten, total	7440-33-7	E420	0.20	mg/L	0.36 µg/L	0.00038	0.00002	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
<b>Total Metals (QC Lot: 467520) - continued</b>											
VA22A7357-001	Anonymous	uranium, total	7440-61-1	E420	0.020	mg/L	1.34 µg/L	0.00141	5.29%	20%	----
		vanadium, total	7440-62-2	E420	1.00	mg/L	2.75 µg/L	0.00292	0.00017	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	6.0	mg/L	235 µg/L	0.247	5.01%	20%	----
		zirconium, total	7440-67-7	E420	0.40	mg/L	<0.40 µg/L	<0.00040	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 459788)</b>											
VA22A7723-002	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 465554)</b>											
VA22A7804-006	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0036	0.0029	0.0008	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	0.00056	0.00059	0.00003	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0579	0.0620	6.72%	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	0.053	0.054	0.0006	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	39.2	40.7	3.77%	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	0.00030	0.00031	0.00001	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	0.022	0.023	0.0007	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	0.0030	0.0030	0.00006	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	11.4	11.7	2.29%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.316	0.327	3.28%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.0158	0.0158	0.136%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00066	0.00067	0.00001	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.093	0.101	0.008	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.050	mg/L	1.98	2.10	5.55%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00024	0.00025	0.00001	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000088	0.000092	0.000005	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.51	4.50	0.301%	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	53.4	54.3	1.67%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.501	0.507	1.32%	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
<b>Dissolved Metals (QC Lot: 465554) - continued</b>											
VA22A7804-006	Anonymous	sulfur, dissolved	7704-34-9	E421	0.50	mg/L	19.2	19.8	3.06%	20%	----
		tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.00187	0.00193	2.98%	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	----
<b>Aggregate Organics (QC Lot: 459803)</b>											
VA22A7805-001	SW2017-02-US	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----
<b>Aggregate Organics (QC Lot: 461937)</b>											
VA22A7665-001	Anonymous	chemical oxygen demand [COD]	----	E559-L	10	mg/L	72	77	5	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
<b>Physical Tests (QCLot: 459647)</b>						
conductivity	----	E100	1	µS/cm	<1.0	----
<b>Physical Tests (QCLot: 459648)</b>						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
<b>Physical Tests (QCLot: 462468)</b>						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
<b>Physical Tests (QCLot: 462469)</b>						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
<b>Anions and Nutrients (QCLot: 459639)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 459640)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 459642)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
<b>Anions and Nutrients (QCLot: 459643)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 459644)</b>						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 459645)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 459651)</b>						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 465963)</b>						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 465965)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Organic / Inorganic Carbon (QCLot: 465966)</b>						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
<b>Total Metals (QCLot: 460224)</b>						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
<b>Total Metals (QCLot: 467520)</b>						
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
<b>Total Metals (QCLot: 467520) - continued</b>						
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
<b>Dissolved Metals (QCLot: 459788)</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	---
<b>Dissolved Metals (QCLot: 465554)</b>						
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**

<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Result</i>	<i>Qualifier</i>
<b>Dissolved Metals (QCLot: 465554) - continued</b>						
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	----
<b>Aggregate Organics (QCLot: 459803)</b>						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----
<b>Aggregate Organics (QCLot: 461937)</b>						
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	
<b>Physical Tests (QCLot: 459646)</b>									
pH	----	E108	----	pH units	7 pH units	99.6	98.0	102	----
<b>Physical Tests (QCLot: 459647)</b>									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	100	90.0	110	----
<b>Physical Tests (QCLot: 459648)</b>									
alkalinity, total (as CaCO <sub>3</sub> )	----	E290	1	mg/L	500 mg/L	99.7	85.0	115	----
<b>Physical Tests (QCLot: 462468)</b>									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	106	85.0	115	----
<b>Physical Tests (QCLot: 462469)</b>									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	96.0	85.0	115	----
<b>Anions and Nutrients (QCLot: 459639)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	104	90.0	110	----
<b>Anions and Nutrients (QCLot: 459640)</b>									
nitrite (as N)	14797-65-0	E235.NO <sub>2</sub> -L	0.001	mg/L	0.5 mg/L	107	90.0	110	----
<b>Anions and Nutrients (QCLot: 459642)</b>									
sulfate (as SO <sub>4</sub> )	14808-79-8	E235.SO <sub>4</sub>	0.3	mg/L	100 mg/L	106	90.0	110	----
<b>Anions and Nutrients (QCLot: 459643)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	106	90.0	110	----
<b>Anions and Nutrients (QCLot: 459644)</b>									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	105	85.0	115	----
<b>Anions and Nutrients (QCLot: 459645)</b>									
nitrate (as N)	14797-55-8	E235.NO <sub>3</sub> -L	0.005	mg/L	2.5 mg/L	104	90.0	110	----
<b>Anions and Nutrients (QCLot: 459651)</b>									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	106	80.0	120	----
<b>Anions and Nutrients (QCLot: 465963)</b>									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 465965)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	100	85.0	115	----
<b>Organic / Inorganic Carbon (QCLot: 465966)</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	104	80.0	120	----
<b>Total Metals (QCLot: 460224)</b>									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	106	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	
<b>Total Metals (QCLot: 467520)</b>									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	104	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	102	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	102	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	99.8	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	94.3	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	101	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	100	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	100	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	100	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	102	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	98.7	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	101	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	101	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	98.7	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	111	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	105	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	100	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	103	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	95.7	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	106	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	104	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	92.1	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	97.0	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	104	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	98.1	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	99.0	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	98.9	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	101	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	104	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	96.9	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	
<b>Total Metals (QCLot: 467520) - continued</b>									
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	98.9	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	85.9	80.0	120	----
<b>Dissolved Metals (QCLot: 465554)</b>									
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	101	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	102	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	98.7	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	95.1	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	94.1	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	97.4	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	99.9	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	96.8	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	101	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	99.8	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	99.0	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	99.1	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	100	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	99.1	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	99.9	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	101	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	105	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	106	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	104	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	91.8	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	101	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	104	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	102	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	90.6	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	99.2	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
<b>Dissolved Metals (QCLot: 465554) - continued</b>									
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	94.2	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	98.3	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	103	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	100.0	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	95.8	80.0	120	----
<b>Aggregate Organics (QCLot: 459803)</b>									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	101	85.0	115	----
<b>Aggregate Organics (QCLot: 461937)</b>									
chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	107	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  $\geq 1 \times$  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
<b>Anions and Nutrients (QCLot: 459639)</b>										
KS2201245-002	Anonymous	chloride	16887-00-6	E235.Cl	95.4 mg/L	100 mg/L	95.4	75.0	125	----
<b>Anions and Nutrients (QCLot: 459640)</b>										
KS2201245-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.486 mg/L	0.5 mg/L	97.3	75.0	125	----
<b>Anions and Nutrients (QCLot: 459642)</b>										
KS2201245-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	94.9 mg/L	100 mg/L	94.9	75.0	125	----
<b>Anions and Nutrients (QCLot: 459643)</b>										
VA22A7805-002	Lagoon Outlet	fluoride	16984-48-8	E235.F	8.97 mg/L	10 mg/L	89.7	75.0	125	----
<b>Anions and Nutrients (QCLot: 459644)</b>										
VA22A7805-002	Lagoon Outlet	bromide	24959-67-9	E235.Br-L	5.18 mg/L	5 mg/L	104	75.0	125	----
<b>Anions and Nutrients (QCLot: 459645)</b>										
VA22A7805-002	Lagoon Outlet	nitrate (as N)	14797-55-8	E235.NO3-L	25.3 mg/L	25 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 459651)</b>										
KS2201245-002	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	ND mg/L	0.03 mg/L	ND	70.0	130	----
<b>Anions and Nutrients (QCLot: 465963)</b>										
VA22A7805-002	Lagoon Outlet	Kjeldahl nitrogen, total [TKN]	----	E318	204 mg/L	2.5 mg/L	81.5	70.0	130	----
<b>Anions and Nutrients (QCLot: 465965)</b>										
VA22A7805-002	Lagoon Outlet	ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	MS-B
<b>Organic / Inorganic Carbon (QCLot: 465966)</b>										
VA22A7805-002	Lagoon Outlet	carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
<b>Total Metals (QCLot: 460224)</b>										
KS2201243-003	Anonymous	mercury, total	7439-97-6	E508	0.000101 mg/L	0.0001 mg/L	101	70.0	130	----
<b>Total Metals (QCLot: 467520)</b>										
VA22A7357-002	Anonymous	aluminum, total	7429-90-5	E420	ND mg/L	0.4 mg/L	ND	70.0	130	----
		antimony, total	7440-36-0	E420	0.0396 mg/L	0.04 mg/L	99.1	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0400 mg/L	0.04 mg/L	100	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.04 mg/L	ND	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0769 mg/L	0.08 mg/L	96.1	70.0	130	----
		bismuth, total	7440-69-9	E420	0.0182 mg/L	0.02 mg/L	90.8	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
<b>Total Metals (QCLot: 467520) - continued</b>										
VA22A7357-002	Anonymous	boron, total	7440-42-8	E420	ND mg/L	0.2 mg/L	ND	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00778 mg/L	0.008 mg/L	97.3	70.0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	8 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E420	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		chromium, total	7440-47-3	E420	0.0769 mg/L	0.08 mg/L	96.1	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0377 mg/L	0.04 mg/L	94.3	70.0	130	----
		copper, total	7440-50-8	E420	0.0361 mg/L	0.04 mg/L	90.2	70.0	130	----
		iron, total	7439-89-6	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		lead, total	7439-92-1	E420	0.0373 mg/L	0.04 mg/L	93.3	70.0	130	----
		lithium, total	7439-93-2	E420	0.191 mg/L	0.2 mg/L	95.7	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.04 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	ND mg/L	0.04 mg/L	ND	70.0	130	----
		nickel, total	7440-02-0	E420	0.0729 mg/L	0.08 mg/L	91.2	70.0	130	----
		phosphorus, total	7723-14-0	E420	19.8 mg/L	20 mg/L	98.8	70.0	130	----
		potassium, total	7440-09-7	E420	ND mg/L	8 mg/L	ND	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0374 mg/L	0.04 mg/L	93.6	70.0	130	----
		selenium, total	7782-49-2	E420	0.0802 mg/L	0.08 mg/L	100	70.0	130	----
		silicon, total	7440-21-3	E420	17.4 mg/L	20 mg/L	87.3	70.0	130	----
		silver, total	7440-22-4	E420	0.00796 mg/L	0.008 mg/L	99.5	70.0	130	----
		sodium, total	7440-23-5	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.04 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E420	ND mg/L	40 mg/L	ND	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0788 mg/L	0.08 mg/L	98.4	70.0	130	----
		thallium, total	7440-28-0	E420	0.00745 mg/L	0.008 mg/L	93.1	70.0	130	----
		thorium, total	7440-29-1	E420	0.0391 mg/L	0.04 mg/L	97.8	70.0	130	----
		tin, total	7440-31-5	E420	0.0386 mg/L	0.04 mg/L	96.6	70.0	130	----
		titanium, total	7440-32-6	E420	0.410 mg/L	0.4 mg/L	102	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0383 mg/L	0.04 mg/L	95.7	70.0	130	----
		uranium, total	7440-61-1	E420	0.00784 mg/L	0.008 mg/L	98.0	70.0	130	----
		vanadium, total	7440-62-2	E420	0.196 mg/L	0.2 mg/L	98.0	70.0	130	----
		zinc, total	7440-66-6	E420	0.727 mg/L	0.8 mg/L	90.8	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0791 mg/L	0.08 mg/L	98.9	70.0	130	----
<b>Dissolved Metals (QCLot: 459788)</b>										
VA22A7735-001	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000906 mg/L	0.0001 mg/L	90.6	70.0	130	----
<b>Dissolved Metals (QCLot: 465554)</b>										



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
<b>Dissolved Metals (QCLot: 465554) - continued</b>										
VA22A7805-001	SW2017-02-US	aluminum, dissolved	7429-90-5	E421	0.193 mg/L	0.2 mg/L	96.7	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0192 mg/L	0.02 mg/L	96.3	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0205 mg/L	0.02 mg/L	102	70.0	130	----
		barium, dissolved	7440-39-3	E421	0.0190 mg/L	0.02 mg/L	94.9	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0391 mg/L	0.04 mg/L	97.8	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00852 mg/L	0.01 mg/L	85.2	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.094 mg/L	0.1 mg/L	94.0	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00396 mg/L	0.004 mg/L	99.0	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	0.00983 mg/L	0.01 mg/L	98.3	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0389 mg/L	0.04 mg/L	97.2	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0194 mg/L	0.02 mg/L	96.8	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0187 mg/L	0.02 mg/L	93.5	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.94 mg/L	2 mg/L	96.9	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0192 mg/L	0.02 mg/L	96.3	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.0951 mg/L	0.1 mg/L	95.1	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	0.916 mg/L	1 mg/L	91.6	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	0.0192 mg/L	0.02 mg/L	96.2	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0390 mg/L	0.04 mg/L	97.5	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	4.08 mg/L	4 mg/L	102	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0201 mg/L	0.02 mg/L	101	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0422 mg/L	0.04 mg/L	106	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.70 mg/L	10 mg/L	97.0	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00399 mg/L	0.004 mg/L	99.7	70.0	130	----
		sodium, dissolved	7440-23-5	E421	1.98 mg/L	2 mg/L	98.9	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	0.0412 mg/L	0.04 mg/L	103	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00367 mg/L	0.004 mg/L	91.8	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0192 mg/L	0.02 mg/L	96.3	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0188 mg/L	0.02 mg/L	93.8	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0381 mg/L	0.04 mg/L	95.2	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0182 mg/L	0.02 mg/L	91.0	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00381 mg/L	0.004 mg/L	95.2	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.0980 mg/L	0.1 mg/L	98.0	70.0	130	----

Page : 18 of 18  
 Work Order : VA22A7805  
 Client : Regional District of Kitimat-Stikine  
 Project : Meziadin Landfill Surface Water



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>
<b>Dissolved Metals (QCLot: 465554) - continued</b>										
VA22A7805-001	SW2017-02-US	zinc, dissolved	7440-66-6	E421	0.405 mg/L	0.4 mg/L	101	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0390 mg/L	0.04 mg/L	97.5	70.0	130	----
<b>Aggregate Organics (QCLot: 461937)</b>										
VA22A7802-001	Anonymous	chemical oxygen demand [COD]	----	E559-L	108 mg/L	100 mg/L	108	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

<p><b>Work Order</b> : <b>VA22C6348</b></p> <p><b>Client</b> : <b>Regional District of Kitimat-Stikine</b></p> <p><b>Contact</b> : Hannah Shinton</p> <p><b>Address</b> : # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1</p> <p><b>Telephone</b> : ----</p> <p><b>Project</b> : Meziadin Landfill Groundwater</p> <p><b>PO</b> : 66670</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : H. Shinton</p> <p><b>Site</b> :</p> <p><b>Quote number</b> : Default Water Testing (Q62338)</p> <p><b>No. of samples received</b> : 5</p> <p><b>No. of samples analysed</b> : 5</p>	<p><b>Page</b> : 1 of 5</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Amber Springer</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 29-Oct-2022 12:00</p> <p><b>Date Analysis Commenced</b> : 01-Nov-2022</p> <p><b>Issue Date</b> : 14-Nov-2022 10:48</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>
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Benjamin Oke	Lab Assistant	Metals, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Cindy Tang	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	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>
DLA	Detection Limit adjusted for required dilution.
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW-1A	MW-1B	MW-02	MW-03	MW-04
Client sampling date / time					26-Oct-2022 09:56	26-Oct-2022 10:16	26-Oct-2022 12:21	26-Oct-2022 08:35	26-Oct-2022 09:35
Analyte	CAS Number	Method	LOR	Unit	VA22C6348-001	VA22C6348-002	VA22C6348-003	VA22C6348-004	VA22C6348-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	213	175	197	183	184
conductivity	----	E100	2.0	µS/cm	782	342	506	645	639
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	221	148	116	226	217
pH	----	E108	0.10	pH units	8.13	6.89	8.20	8.14	8.16
solids, total dissolved [TDS]	----	E162	10	mg/L	478	185	244	428	370
solids, total suspended [TSS]	----	E160	3.0	mg/L	614	150	78.2	15.2	3.0
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0194	0.386	0.0123	0.0050	<0.0050
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.250 <sup>DLDS</sup>	<0.050	<0.050	<0.050	<0.250 <sup>DLDS</sup>
chloride	16887-00-6	E235.Cl	0.50	mg/L	<2.50 <sup>DLDS</sup>	<0.50	<0.50	<0.50	<2.50 <sup>DLDS</sup>
fluoride	16984-48-8	E235.F	0.020	mg/L	0.107	0.074	0.145	0.070	<0.100 <sup>DLDS</sup>
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0250 <sup>DLDS</sup>	0.0554	0.0836	0.183	0.0688
nitrate + nitrite (as N)	----	EC235.N+N	0.0050	mg/L	<0.0255	0.0589	0.0836	0.183	0.0688
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0050 <sup>DLDS</sup>	0.0035	<0.0010	<0.0010	<0.0050 <sup>DLDS</sup>
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0140	0.0011	0.0327	0.0314	0.0037
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	204	5.33	71.6	159	153
<b>Dissolved Metals</b>									
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0115	0.0139	0.0075	0.0015	0.0024
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00017	<0.00020 <sup>DLA</sup>	0.00019	0.00010	0.00011
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00043	0.00065	0.00044	0.00019	0.00016
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0489	0.362	0.0521	0.0247	0.0216
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	<0.000100 <sup>DLA</sup>	<0.000050	<0.000050	<0.000050
boron, dissolved	7440-42-8	E421	0.010	mg/L	0.068	<0.020 <sup>DLA</sup>	0.039	0.059	0.061
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000368	0.000163	0.0000445	0.0000363	0.0000801
calcium, dissolved	7440-70-2	E421	0.050	mg/L	64.6	43.9	31.4	67.4	62.9
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	0.000022	<0.000010	<0.000010	<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	0.00934	<0.00010	<0.00010	<0.00010



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW-1A	MW-1B	MW-02	MW-03	MW-04
Client sampling date / time					26-Oct-2022 09:56	26-Oct-2022 10:16	26-Oct-2022 12:21	26-Oct-2022 08:35	26-Oct-2022 09:35
Analyte	CAS Number	Method	LOR	Unit	VA22C6348-001	VA22C6348-002	VA22C6348-003	VA22C6348-004	VA22C6348-005
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00911	<0.00040 <sup>DLA</sup>	0.00023	0.00021	0.00049
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.022	1.06	0.013	<0.010	<0.010
lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000082	<0.000100 <sup>DLA</sup>	<0.000050	<0.000050	<0.000050
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0038	0.0030	0.0031	0.0045	0.0042
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	14.4	9.23	9.18	14.0	14.5
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0686	9.17	0.0291	0.00090	0.0115
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	0.00769	0.000292	0.0102	0.00467	0.00689
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00086	0.0226	<0.00050	<0.00050	<0.00050
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.100 <sup>DLA</sup>	<0.050	<0.050	<0.050
potassium, dissolved	7440-09-7	E421	0.050	mg/L	2.66	0.700	1.68	1.88	2.40
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00025	0.00092	<0.00020	0.00027	0.00030
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000199	<0.000100 <sup>DLA</sup>	0.000149	0.000655	0.000254
silicon, dissolved	7440-21-3	E421	0.050	mg/L	3.96	6.91	4.17	3.47	3.87
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000020 <sup>DLA</sup>	<0.000010	<0.000010	<0.000010
sodium, dissolved	7440-23-5	E421	0.050	mg/L	97.2	4.38	56.0	64.3	60.4
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.823	0.304	0.400	0.677	0.761
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	74.6	2.16	20.5	62.0	59.4
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00040 <sup>DLA</sup>	<0.00020	<0.00020	<0.00020
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000020 <sup>DLA</sup>	<0.000010	<0.000010	<0.000010
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00020 <sup>DLA</sup>	<0.00010	<0.00010	<0.00010
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00020 <sup>DLA</sup>	<0.00010	<0.00010	<0.00010
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00060 <sup>DLA</sup>	<0.00030	<0.00030	<0.00030
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00020 <sup>DLA</sup>	<0.00010	<0.00010	<0.00010
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.00248	0.000037	0.00191	0.00144	0.000900
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00100 <sup>DLA</sup>	<0.00050	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0034	0.0056	0.0019	<0.0010	<0.0010
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00040 <sup>DLA</sup>	<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



## Analytical Results

Sub-Matrix: Groundwater

(Matrix: Water)

					Client sample ID	MW-1A	MW-1B	MW-02	MW-03	MW-04
					Client sampling date / time	26-Oct-2022 09:56	26-Oct-2022 10:16	26-Oct-2022 12:21	26-Oct-2022 08:35	26-Oct-2022 09:35
Analyte	CAS Number	Method	LOR	Unit	VA22C6348-001	VA22C6348-002	VA22C6348-003	VA22C6348-004	VA22C6348-005	
					Result	Result	Result	Result	Result	
<b>Aggregate Organics</b>										
biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0	
chemical oxygen demand [COD]	----	E559-L	10	mg/L	36	35	12	<10	<10	

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




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## QUALITY CONTROL INTERPRETIVE REPORT

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<p><b>Work Order</b> : <b>VA22C6348</b></p> <p><b>Client</b> : <b>Regional District of Kitimat-Stikine</b></p> <p><b>Contact</b> : Hannah Shinton</p> <p><b>Address</b> : # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1</p> <p><b>Telephone</b> : ----</p> <p><b>Project</b> : Meziadin Landfill Groundwater</p> <p><b>PO</b> : 66670</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : H. Shinton</p> <p><b>Site</b> :</p> <p><b>Quote number</b> : Default Water Testing (Q62338)</p> <p><b>No. of samples received</b> : 5</p> <p><b>No. of samples analysed</b> : 5</p>	<p><b>Page</b> : 1 of 17</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Amber Springer</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 29-Oct-2022 12:00</p> <p><b>Issue Date</b> : 14-Nov-2022 10:48</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.

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### ***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	
<b>Aggregate Organics : Biochemical Oxygen Demand - 5 day</b>										
HDPE [BOD HT 3d] MW-02	E550	26-Oct-2022	----	----	----		01-Nov-2022	3 days	6 days	* EHTL
<b>Aggregate Organics : Biochemical Oxygen Demand - 5 day</b>										
HDPE [BOD HT 3d] MW-03	E550	26-Oct-2022	----	----	----		01-Nov-2022	3 days	6 days	* EHTL
<b>Aggregate Organics : Biochemical Oxygen Demand - 5 day</b>										
HDPE [BOD HT 3d] MW-04	E550	26-Oct-2022	----	----	----		01-Nov-2022	3 days	6 days	* EHTL
<b>Aggregate Organics : Biochemical Oxygen Demand - 5 day</b>										
HDPE [BOD HT 3d] MW-1A	E550	26-Oct-2022	----	----	----		01-Nov-2022	3 days	6 days	* EHTL
<b>Aggregate Organics : Biochemical Oxygen Demand - 5 day</b>										
HDPE [BOD HT 3d] MW-1B	E550	26-Oct-2022	----	----	----		01-Nov-2022	3 days	6 days	* EHTL
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)</b>										
Amber glass total (sulfuric acid) MW-02	E559-L	26-Oct-2022	----	----	----		06-Nov-2022	28 days	11 days	✓
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)</b>										
Amber glass total (sulfuric acid) MW-03	E559-L	26-Oct-2022	----	----	----		06-Nov-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	
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)</b>										
Amber glass total (sulfuric acid) MW-04	E559-L	26-Oct-2022	----	----	----		06-Nov-2022	28 days	11 days	✔
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)</b>										
Amber glass total (sulfuric acid) MW-1A	E559-L	26-Oct-2022	----	----	----		06-Nov-2022	28 days	11 days	✔
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)</b>										
Amber glass total (sulfuric acid) MW-1B	E559-L	26-Oct-2022	----	----	----		06-Nov-2022	28 days	11 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) MW-02	E298	26-Oct-2022	03-Nov-2022	----	----		04-Nov-2022	28 days	9 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) MW-03	E298	26-Oct-2022	03-Nov-2022	----	----		04-Nov-2022	28 days	9 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) MW-04	E298	26-Oct-2022	03-Nov-2022	----	----		04-Nov-2022	28 days	9 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) MW-1A	E298	26-Oct-2022	03-Nov-2022	----	----		04-Nov-2022	28 days	9 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) MW-1B	E298	26-Oct-2022	03-Nov-2022	----	----		04-Nov-2022	28 days	9 days	✔
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE MW-02	E235.Br-L	26-Oct-2022	02-Nov-2022	----	----		02-Nov-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		
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE MW-03	E235.Br-L	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	28 days	7 days	✔	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE MW-04	E235.Br-L	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	28 days	7 days	✔	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE MW-1A	E235.Br-L	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	28 days	7 days	✔	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE MW-1B	E235.Br-L	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	28 days	7 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE MW-02	E235.Cl	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	28 days	7 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE MW-03	E235.Cl	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	28 days	7 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE MW-04	E235.Cl	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	28 days	7 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE MW-1A	E235.Cl	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	28 days	7 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE MW-1B	E235.Cl	26-Oct-2022	02-Nov-2022	----	----		02-Nov-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	
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)</b>										
HDPE MW-02	E378-U	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	3 days	7 days	* EHTL
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)</b>										
HDPE MW-03	E378-U	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	3 days	7 days	* EHTL
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)</b>										
HDPE MW-04	E378-U	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	3 days	7 days	* EHTL
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)</b>										
HDPE MW-1A	E378-U	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	3 days	7 days	* EHTL
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)</b>										
HDPE MW-1B	E378-U	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	3 days	7 days	* EHTL
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE MW-02	E235.F	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	28 days	7 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE MW-03	E235.F	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	28 days	7 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE MW-04	E235.F	26-Oct-2022	02-Nov-2022	----	----		02-Nov-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		
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE MW-1A	E235.F	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	28 days	7 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE MW-1B	E235.F	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	28 days	7 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW-02	E235.NO3-L	26-Oct-2022	02-Nov-2022	3 days	7 days	* EHTL	02-Nov-2022	3 days	0 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW-03	E235.NO3-L	26-Oct-2022	02-Nov-2022	3 days	7 days	* EHTL	02-Nov-2022	3 days	0 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW-04	E235.NO3-L	26-Oct-2022	02-Nov-2022	3 days	7 days	* EHTL	02-Nov-2022	3 days	0 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW-1A	E235.NO3-L	26-Oct-2022	02-Nov-2022	3 days	7 days	* EHTL	02-Nov-2022	3 days	0 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW-1B	E235.NO3-L	26-Oct-2022	02-Nov-2022	3 days	7 days	* EHTL	02-Nov-2022	3 days	0 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW-02	E235.NO2-L	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	3 days	7 days	* EHTL	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW-03	E235.NO2-L	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	3 days	7 days	* EHTL	



Matrix: **Water** 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		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW-04	E235.NO2-L	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	3 days	7 days	*	EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW-1A	E235.NO2-L	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	3 days	7 days	*	EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW-1B	E235.NO2-L	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	3 days	7 days	*	EHTL
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE MW-02	E235.SO4	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	28 days	7 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE MW-03	E235.SO4	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	28 days	7 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE MW-04	E235.SO4	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	28 days	7 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE MW-1A	E235.SO4	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	28 days	7 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE MW-1B	E235.SO4	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	28 days	7 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial dissolved (hydrochloric acid) MW-02	E509	26-Oct-2022	03-Nov-2022	----	----		03-Nov-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		
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial dissolved (hydrochloric acid) MW-03	E509	26-Oct-2022	03-Nov-2022	----	----		03-Nov-2022	28 days	8 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial dissolved (hydrochloric acid) MW-04	E509	26-Oct-2022	03-Nov-2022	----	----		03-Nov-2022	28 days	8 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial dissolved (hydrochloric acid) MW-1A	E509	26-Oct-2022	03-Nov-2022	----	----		03-Nov-2022	28 days	8 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial dissolved (hydrochloric acid) MW-1B	E509	26-Oct-2022	03-Nov-2022	----	----		03-Nov-2022	28 days	8 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) MW-02	E421	26-Oct-2022	07-Nov-2022	----	----		07-Nov-2022	180 days	13 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) MW-03	E421	26-Oct-2022	07-Nov-2022	----	----		07-Nov-2022	180 days	13 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) MW-04	E421	26-Oct-2022	07-Nov-2022	----	----		07-Nov-2022	180 days	13 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) MW-1A	E421	26-Oct-2022	07-Nov-2022	----	----		07-Nov-2022	180 days	13 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) MW-1B	E421	26-Oct-2022	07-Nov-2022	----	----		07-Nov-2022	180 days	13 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		
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE MW-02	E290	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	14 days	7 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE MW-03	E290	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	14 days	7 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE MW-04	E290	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	14 days	7 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE MW-1A	E290	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	14 days	7 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE MW-1B	E290	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	14 days	7 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW-02	E100	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	28 days	7 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW-03	E100	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	28 days	7 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW-04	E100	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	28 days	7 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW-1A	E100	26-Oct-2022	02-Nov-2022	----	----		02-Nov-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		
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW-1B	E100	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	28 days	7 days	✓	
<b>Physical Tests : pH by Meter</b>											
HDPE MW-02	E108	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	0.25 hrs	3.25 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE MW-03	E108	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	0.25 hrs	3.25 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE MW-04	E108	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	0.25 hrs	3.25 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE MW-1A	E108	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	0.25 hrs	3.25 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE MW-1B	E108	26-Oct-2022	02-Nov-2022	----	----		02-Nov-2022	0.25 hrs	3.25 hrs	* EHTR-FM	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE MW-02	E162	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE MW-03	E162	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE MW-04	E162	26-Oct-2022	----	----	----		01-Nov-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	
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE MW-1A	E162	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE MW-1B	E162	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✔
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE MW-02	E160	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✔
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE MW-03	E160	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✔
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE MW-04	E160	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✔
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE MW-1A	E160	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✔
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE MW-1B	E160	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✔

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.  
 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
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	725903	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	728860	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	724304	1	13	7.6	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	725908	1	5	20.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	732630	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	725907	1	5	20.0	5.0	✓
Conductivity in Water	E100	725901	1	11	9.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	728612	1	18	5.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	729203	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	725910	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	725906	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	725904	1	10	10.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	725905	1	20	5.0	5.0	✓
pH by Meter	E108	725902	1	11	9.0	5.0	✓
Sulfate in Water by IC	E235.SO4	725909	1	15	6.6	5.0	✓
TDS by Gravimetry	E162	724458	1	7	14.2	5.0	✓
TSS by Gravimetry	E160	724464	1	7	14.2	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	725903	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	728860	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	724304	1	13	7.6	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	725908	1	5	20.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	732630	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	725907	1	5	20.0	5.0	✓
Conductivity in Water	E100	725901	1	11	9.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	728612	1	18	5.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	729203	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	725910	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	725906	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	725904	1	10	10.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	725905	1	20	5.0	5.0	✓
pH by Meter	E108	725902	1	11	9.0	5.0	✓
Sulfate in Water by IC	E235.SO4	725909	1	15	6.6	5.0	✓
TDS by Gravimetry	E162	724458	1	7	14.2	5.0	✓
TSS by Gravimetry	E160	724464	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
<b>Analytical Methods</b>							
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	725903	1	15	6.6	5.0	✔
Ammonia by Fluorescence	E298	728860	1	20	5.0	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	724304	1	13	7.6	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	725908	1	5	20.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	732630	1	18	5.5	5.0	✔
Chloride in Water by IC	E235.Cl	725907	1	5	20.0	5.0	✔
Conductivity in Water	E100	725901	1	11	9.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	728612	1	18	5.5	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	729203	1	16	6.2	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	725910	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	725906	1	15	6.6	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	725904	1	10	10.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	725905	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	725909	1	15	6.6	5.0	✔
TDS by Gravimetry	E162	724458	1	7	14.2	5.0	✔
TSS by Gravimetry	E160	724464	1	7	14.2	5.0	✔
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	728860	1	20	5.0	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	725908	1	5	20.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	732630	1	18	5.5	5.0	✔
Chloride in Water by IC	E235.Cl	725907	1	5	20.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	728612	1	18	5.5	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	729203	1	16	6.2	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	725910	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	725906	1	15	6.6	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	725904	1	10	10.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	725905	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	725909	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.
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.





Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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)
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.
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.
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 <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> 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.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  Vancouver - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).



<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.
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
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><b>Work Order</b> : <b>VA22C6348</b></p> <p><b>Client</b> : Regional District of Kitimat-Stikine</p> <p><b>Contact</b> : Hannah Shinton</p> <p><b>Address</b> : # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1</p> <p><b>Telephone</b> :</p> <p><b>Project</b> : Meziadin Landfill Groundwater</p> <p><b>PO</b> : 66670</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : H. Shinton ----</p> <p><b>Site</b> :</p> <p><b>Quote number</b> : Default Water Testing (Q62338)</p> <p><b>No. of samples received</b> : 5</p> <p><b>No. of samples analysed</b> : 5</p>	<p><b>Page</b> : 1 of 14</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Amber Springer</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 29-Oct-2022 12:00</p> <p><b>Date Analysis Commenced</b> : 01-Nov-2022</p> <p><b>Issue Date</b> : 14-Nov-2022 10:48</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>
Angela Ren	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia
Angelo Salandanan	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Benjamin Oke	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Cindy Tang	Team Leader - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
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Work Order : VA22C6348  
Client : Regional District of Kitimat-Stikine  
Project : Meziadin Landfill Groundwater

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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**

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

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### 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: <b>Water</b>					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
<b>Physical Tests (QC Lot: 724458)</b>											
VA22C6307-009	Anonymous	solids, total dissolved [TDS]	----	E162	13	mg/L	84	88	3	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 724464)</b>											
VA22C6307-009	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	6.6	6.4	0.2	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 725901)</b>											
VA22C6348-003	MW-02	conductivity	----	E100	2.0	µS/cm	506	510	0.787%	10%	----
<b>Physical Tests (QC Lot: 725902)</b>											
VA22C6348-003	MW-02	pH	----	E108	0.10	pH units	8.20	8.18	0.244%	4%	----
<b>Physical Tests (QC Lot: 725903)</b>											
VA22C6348-003	MW-02	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	197	198	0.402%	20%	----
<b>Anions and Nutrients (QC Lot: 725904)</b>											
VA22C6348-001	MW-1A	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	<0.0250	0.0278	0.0028	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 725905)</b>											
VA22C6348-001	MW-1A	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 725906)</b>											
VA22C6348-001	MW-1A	fluoride	16984-48-8	E235.F	0.100	mg/L	0.107	0.103	0.004	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 725907)</b>											
VA22C6348-001	MW-1A	chloride	16887-00-6	E235.Cl	2.50	mg/L	<2.50	<2.50	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 725908)</b>											
VA22C6348-001	MW-1A	bromide	24959-67-9	E235.Br-L	0.250	mg/L	<0.250	<0.250	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 725909)</b>											
VA22C6348-001	MW-1A	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	204	203	0.720%	20%	----
<b>Anions and Nutrients (QC Lot: 725910)</b>											
VA22C6261-008	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0010	<0.0010	0.00001	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 728860)</b>											
FJ2203086-005	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 728612)</b>											
VA22C6240-005	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0050 µg/L	<0.0000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 729203)</b>											
FJ2203114-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0050	0.0053	0.0003	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00040	0.00041	0.000009	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
<b>Dissolved Metals (QC Lot: 729203) - continued</b>											
FJ2203114-001	Anonymous	arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00046	0.00048	0.00002	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0647	0.0690	6.46%	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	0.014	0.013	0.0005	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	153	151	1.45%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00021	0.00020	0.00001	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00447	0.00444	0.598%	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	0.000316	0.000322	0.000006	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0389	0.0372	4.40%	20%	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	84.8	82.9	2.35%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00605	0.00604	0.0730%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00861	0.00850	1.31%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.0160	0.0160	0.0186%	20%	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.050	mg/L	2.82	2.81	0.390%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00149	0.00162	0.00013	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000250	mg/L	0.000395	0.000406	0.000011	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	0.655	0.629	4.02%	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	14.6	14.1	3.52%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.293	0.299	1.92%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	202	196	2.75%	20%	----
		tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.00446	0.00447	0.120%	20%	----



Sub-Matrix: <b>Water</b>					<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>
<b>Dissolved Metals (QC Lot: 729203) - continued</b>											
FJ2203114-001	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	0.0145	0.0152	4.29%	20%	----
		zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 724304)</b>											
VA22C6348-001	MW-1A	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----
<b>Aggregate Organics (QC Lot: 732630)</b>											
VA22C6348-001	MW-1A	chemical oxygen demand [COD]	----	E559-L	10	mg/L	36	39	4	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
<b>Physical Tests (QCLot: 724458)</b>						
solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Physical Tests (QCLot: 724464)</b>						
solids, total suspended [TSS]	---	E160	3	mg/L	<3.0	---
<b>Physical Tests (QCLot: 725901)</b>						
conductivity	---	E100	1	µS/cm	<1.0	---
<b>Physical Tests (QCLot: 725903)</b>						
alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
<b>Anions and Nutrients (QCLot: 725904)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 725905)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 725906)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 725907)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 725908)</b>						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	---
<b>Anions and Nutrients (QCLot: 725909)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 725910)</b>						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 728860)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Dissolved Metals (QCLot: 728612)</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	---
<b>Dissolved Metals (QCLot: 729203)</b>						
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
<b>Dissolved Metals (QCLot: 729203) - continued</b>						
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.000050	----
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	----
<b>Aggregate Organics (QCLot: 724304)</b>						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----

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Work Order : VA22C6348  
Client : Regional District of Kitimat-Stikine  
Project : Meziadin Landfill Groundwater



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>
<b>Aggregate Organics (QCLot: 732630)</b>						
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	
<b>Physical Tests (QCLot: 724458)</b>									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	88.9	85.0	115	----
<b>Physical Tests (QCLot: 724464)</b>									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	99.3	85.0	115	----
<b>Physical Tests (QCLot: 725901)</b>									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	95.8	90.0	110	----
<b>Physical Tests (QCLot: 725902)</b>									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
<b>Physical Tests (QCLot: 725903)</b>									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	101	85.0	115	----
<b>Anions and Nutrients (QCLot: 725904)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 725905)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 725906)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	97.1	90.0	110	----
<b>Anions and Nutrients (QCLot: 725907)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 725908)</b>									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	98.0	85.0	115	----
<b>Anions and Nutrients (QCLot: 725909)</b>									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	104	90.0	110	----
<b>Anions and Nutrients (QCLot: 725910)</b>									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	106	80.0	120	----
<b>Anions and Nutrients (QCLot: 728860)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	93.6	85.0	115	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	93.6	80.0	120	----
<b>Dissolved Metals (QCLot: 729203)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	102	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	107	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	101	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
<b>Dissolved Metals (QCLot: 729203) - continued</b>									
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	92.8	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	98.9	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	104	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	87.1	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	98.2	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	95.0	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	104	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	97.8	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	97.2	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	97.0	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	88.7	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	95.4	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	96.4	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	104	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	99.4	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	100	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	96.4	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	102	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	101	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	100	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	95.4	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	99.5	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	94.6	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	97.4	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	97.9	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	99.8	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	93.8	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	95.5	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
<b>Aggregate Organics (QCLot: 724304)</b>									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	94.7	85.0	115	----
<b>Aggregate Organics (QCLot: 732630)</b>									
chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	111	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
<b>Anions and Nutrients (QCLot: 725904)</b>										
VA22C6348-002	MW-1B	nitrate (as N)	14797-55-8	E235.NO3-L	2.52 mg/L	2.5 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 725905)</b>										
VA22C6348-002	MW-1B	nitrite (as N)	14797-65-0	E235.NO2-L	0.486 mg/L	0.5 mg/L	97.3	75.0	125	----
<b>Anions and Nutrients (QCLot: 725906)</b>										
VA22C6348-002	MW-1B	fluoride	16984-48-8	E235.F	0.915 mg/L	1 mg/L	91.5	75.0	125	----
<b>Anions and Nutrients (QCLot: 725907)</b>										
VA22C6348-002	MW-1B	chloride	16887-00-6	E235.Cl	100 mg/L	100 mg/L	100	75.0	125	----
<b>Anions and Nutrients (QCLot: 725908)</b>										
VA22C6348-002	MW-1B	bromide	24959-67-9	E235.Br-L	0.483 mg/L	0.5 mg/L	96.6	75.0	125	----
<b>Anions and Nutrients (QCLot: 725909)</b>										
VA22C6348-002	MW-1B	sulfate (as SO4)	14808-79-8	E235.SO4	99.2 mg/L	100 mg/L	99.2	75.0	125	----
<b>Anions and Nutrients (QCLot: 725910)</b>										
VA22C6261-009	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0304 mg/L	0.03 mg/L	101	70.0	130	----
<b>Anions and Nutrients (QCLot: 728860)</b>										
VA22C6291-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	MS-B
<b>Dissolved Metals (QCLot: 728612)</b>										
VA22C6348-001	MW-1A	mercury, dissolved	7439-97-6	E509	0.0000955 mg/L	0.0001 mg/L	95.5	70.0	130	----
<b>Dissolved Metals (QCLot: 729203)</b>										
FJ2203114-002	Anonymous	aluminum, dissolved	7429-90-5	E421	0.187 mg/L	0.2 mg/L	93.6	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0191 mg/L	0.02 mg/L	95.6	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0193 mg/L	0.02 mg/L	96.3	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	0.0358 mg/L	0.04 mg/L	89.4	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00828 mg/L	0.01 mg/L	82.8	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.086 mg/L	0.1 mg/L	86.1	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00376 mg/L	0.004 mg/L	93.9	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	0.00956 mg/L	0.01 mg/L	95.6	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0369 mg/L	0.04 mg/L	92.2	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
<b>Dissolved Metals (QCLot: 729203) - continued</b>										
FJ2203114-002	Anonymous	cobalt, dissolved	7440-48-4	E421	0.0179 mg/L	0.02 mg/L	89.7	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0178 mg/L	0.02 mg/L	89.1	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.76 mg/L	2 mg/L	88.0	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0178 mg/L	0.02 mg/L	88.8	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.0829 mg/L	0.1 mg/L	82.9	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	0.0174 mg/L	0.02 mg/L	87.0	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0195 mg/L	0.02 mg/L	97.5	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0368 mg/L	0.04 mg/L	92.1	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	9.56 mg/L	10 mg/L	95.6	70.0	130	----
		potassium, dissolved	7440-09-7	E421	3.96 mg/L	4 mg/L	99.1	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0194 mg/L	0.02 mg/L	96.8	70.0	130	----
		selenium, dissolved	7782-49-2	E421	ND mg/L	0.04 mg/L	ND	70.0	130	----
		silicon, dissolved	7440-21-3	E421	8.90 mg/L	10 mg/L	89.0	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00356 mg/L	0.004 mg/L	88.9	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	0.0368 mg/L	0.04 mg/L	92.1	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00356 mg/L	0.004 mg/L	89.1	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0199 mg/L	0.02 mg/L	99.7	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0188 mg/L	0.02 mg/L	93.9	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0366 mg/L	0.04 mg/L	91.6	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0184 mg/L	0.02 mg/L	91.8	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	0.0971 mg/L	0.1 mg/L	97.1	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.358 mg/L	0.4 mg/L	89.6	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0392 mg/L	0.04 mg/L	97.9	70.0	130	----
<b>Aggregate Organics (QCLot: 732630)</b>										
VA22C6348-002	MW-1B	chemical oxygen demand [COD]	----	E559-L	107 mg/L	100 mg/L	107	75.0	125	----

**Qualifiers**

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

Page : 14 of 14  
Work Order : VA22C6348  
Client : Regional District of Kitimat-Stikine  
Project : Meziadin Landfill Groundwater

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# Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

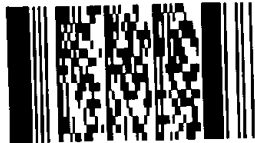
Affix ALS barcode label here  
(lab use only)

COC Number: 17 -

Page of

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>											
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			PRORITY (Business Day) 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 [E - 100%] <input type="checkbox"/> Same Day, Weekend or Statutory holiday [E2 -200%] (Laboratory opening fees may apply) <input type="checkbox"/>						
Phone: 250-641-4141		<input checked="" type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm											
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			For tests that can not be performed according to the service level selected, you will be contacted.											
Street: 4545 Lazelle Avenue		Email 1 or Fax: enviro.dept@rdks.bc.ca			<b>Analysis Request</b>											
City/Province: Terrace BC		Email 2: hshinton@rdks.bc.ca			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below											
Postal Code: V8G 4E1		Email 3:			<b>NUMBER OF CONTAINERS</b>											
Invoice To: Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		<b>Invoice Distribution</b>			P F/P P P P											
Copy of Invoice with Report <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			PH, Conductivity, Specific Conductivity, TSS, T											
Company: Regional District of Kitimat Stikine		Email 1 or Fax: anne-maries@rdks.bc.ca			Bromide, Chloride, Fluoride, Sulphate											
Contact: Hannah Shinton		Email 2: hshinton@rdks.bc.ca			Dissolved Metals											
<b>Project Information</b>		<b>Oil and Gas Regulated Fields (client use)</b>			Alkalinity Total (CaCO3), Hardness											
ALS Account # / Quote #: VA19-RDKS100-001		AFE/Cost Center: PO#			COD, BOD											
Job #: Meziadin Landfill Groundwater		Major/Minor Code: Routing Code:			Orthophosphate											
PO / AFE:		Requisitioner:			Nitrate, Nitrite, Nitrate+Nitrite, Nutrients											
LSD:		Location:			Ammonia											
ALS Lab Work Order # (lab use only): 6348		ALS Contact: Sampler: H. Shinton			<b>SAMPLES ON HOLD</b>											
ALS Sample # (lab use only):		Sample Identification and/or Coordinates (This description will appear on the report)			Date (dd-mmm-yy)			Time (hh:mm)			Sample Type			SUSPECTED HAZARD (see Special Instructions)		
MW-1A					26-Oct-22			9:56			Ground Water			6		
MW-1B					26-Oct-22			10:16			Ground Water			6		
MW-02					26-Oct-22			12:21			Ground Water			6		
MW-03					26-Oct-22			8:35			Ground Water			6		
MW-04					26-Oct-22			9:35			Ground Water			6		

Environmental Division  
Vancouver  
Work Order Reference  
**VA22C6348**



Telephone: +1 604 253 4166

**Terrace Shipping**  
# 1 Coolers Ground   
# Carbouys Air   
SFX

<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		Please add on report by clicking on the drop-down list below (electronic COC only)		<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>			
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		British Columbia Contaminated Sites Regulation Stage 10 Amendment (NOV, 2017)		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		Please apply (IL) DW and AW guidelines to groundwater		Ice Packs <input type="checkbox"/> Ice Cubes <input type="checkbox"/>		Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>	
<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>		<b>FINAL SHIPMENT RECEPTION (lab use only)</b>			
Released by: N. LAVOIE		Date: OCT 28 2022		Received by: DJS		Date: OCT 29 12 PM	



## CERTIFICATE OF ANALYSIS

<p><b>Work Order</b> : <b>VA22C6296</b></p> <p><b>Client</b> : <b>Regional District of Kitimat-Stikine</b></p> <p><b>Contact</b> : Hannah Shinton</p> <p><b>Address</b> : # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1</p> <p><b>Telephone</b> : ----</p> <p><b>Project</b> : Meziadin Landfill Surface Water</p> <p><b>PO</b> : ----</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : H Shinton</p> <p><b>Site</b> :</p> <p><b>Quote number</b> : Default Water Testing (Q62338)</p> <p><b>No. of samples received</b> : 10</p> <p><b>No. of samples analysed</b> : 10</p>	<p><b>Page</b> : 1 of 10</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Amber Springer</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 29-Oct-2022 12:00</p> <p><b>Date Analysis Commenced</b> : 31-Oct-2022</p> <p><b>Issue Date</b> : 10-Nov-2022 11:53</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
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Benjamin Oke	Lab Assistant	Metals, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Cindy Tang	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Dan Gebert	Laboratory Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Paul Cushing	Team Leader - Organics	Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Sukhman Khosa	Lab Assistant	Metals, Burnaby, British Columbia



## General Comments

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

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

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

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

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

Unit	Description
-	No 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

Qualifier	Description
DLA	Detection Limit adjusted for required dilution.
DLCI	Detection Limit Raised: Chromatographic interference due to co-elution.
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DTMF	Dissolved concentration exceeds total for field-filtered metals sample. Metallic contaminants may have been introduced to dissolved sample during field filtration.
RRV	Reported result verified by repeat analysis.



## Analytical Results

Sub-Matrix: Surface Water

Client sample ID

(Matrix: Water)

					SW22-01	SW22-03	SW22-04	SW22-05	SW2017-01 DS
Client sampling date / time					26-Oct-2022 15:14	26-Oct-2022 13:44	26-Oct-2022 14:06	26-Oct-2022 11:01	26-Oct-2022 10:00
Analyte	CAS Number	Method	LOR	Unit	VA22C6296-001	VA22C6296-002	VA22C6296-003	VA22C6296-004	VA22C6296-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	5.6	24.9	29.1	400	14.6
conductivity	----	E100	2.0	µS/cm	20.0	61.0	72.3	867	69.1
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	7.82	21.5	29.7	331	22.4
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	9.18	23.2	31.2	363	23.5
pH	----	E108	0.10	pH units	6.52	7.18	7.33	7.77	7.14
solids, total dissolved [TDS]	----	E162	10	mg/L	49	45	47	474	72
solids, total suspended [TSS]	----	E160	3.0	mg/L	8.2	<3.0	3.6	19.4	<3.0
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0079	0.0062	<0.0050	3.94	0.0209
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.250 <sup>DLDS</sup>	<0.050
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	0.75	1.79	50.0	5.35
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	0.032	<0.100 <sup>DLDS</sup>	<0.020
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	0.0077	<0.0050	0.0288	0.460
nitrate + nitrite (as N)	----	EC235.N+N	0.0050	mg/L	<0.0051	0.0077	<0.0051	0.0288	0.462
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0050 <sup>DLDS</sup>	0.0015
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0139	0.0156	0.0080	0.0036	0.0037
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	<0.30	4.03	3.03	8.40	3.91
<b>Organic / Inorganic Carbon</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	17.3	8.07	8.03	13.8	19.2
<b>Total Metals</b>									
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.244	0.104	0.0509	<0.0300 <sup>DLA</sup>	0.230
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00100 <sup>DLA</sup>	<0.00010
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00017	0.00026	0.00048	0.00178	0.00018
barium, total	7440-39-3	E420	0.00010	mg/L	0.0114	0.00984	0.00786	0.211	0.0116
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000200 <sup>DLA</sup>	<0.000100
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000500 <sup>DLA</sup>	<0.000050
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	0.019	0.020	0.258	0.042
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000310	0.0000324	0.0000114	<0.0000500 <sup>DLA</sup>	0.0000863
calcium, total	7440-70-2	E420	0.050	mg/L	2.43	6.59	8.93	109	6.79



## Analytical Results

Sub-Matrix: Surface Water

(Matrix: Water)

					Client sample ID	SW22-01	SW22-03	SW22-04	SW22-05	SW2017-01 DS
					Client sampling date / time	26-Oct-2022 15:14	26-Oct-2022 13:44	26-Oct-2022 14:06	26-Oct-2022 11:01	26-Oct-2022 10:00
Analyte	CAS Number	Method	LOR	Unit	VA22C6296-001	VA22C6296-002	VA22C6296-003	VA22C6296-004	VA22C6296-005	
					Result	Result	Result	Result	Result	
<b>Total Metals</b>										
cesium, total	7440-46-2	E420	0.000010	mg/L	0.000012	<0.000010	<0.000010	<0.000100 <sup>DLA</sup>	<0.000010	
chromium, total	7440-47-3	E420	0.000050	mg/L	0.000053	<0.000050	<0.000050	<0.00100 <sup>DLA</sup>	<0.000050	
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00042	0.00064	0.00041	0.00404	0.00012	
copper, total	7440-50-8	E420	0.000050	mg/L	0.00089	0.00088	0.00085	<0.00500 <sup>DLA</sup>	0.00109	
iron, total	7439-89-6	E420	0.010	mg/L	0.695	0.422	0.490	9.26	0.126	
lead, total	7439-92-1	E420	0.000050	mg/L	0.000068	<0.000050	0.000053	<0.000500 <sup>DLA</sup>	0.000060	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0100 <sup>DLA</sup>	<0.0010	
magnesium, total	7439-95-4	E420	0.0050	mg/L	0.755	1.65	2.15	22.0	1.60	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.271	1.54	0.471	35.5	0.0977	
mercury, total	7439-97-6	E508	0.0000050	mg/L	0.0000097	0.0000052	<0.0000050	<0.0000050	0.0000060	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	<0.000050	<0.000050	0.000243	0.000721	<0.000050	
nickel, total	7440-02-0	E420	0.000050	mg/L	0.00146	0.00158	0.00196	<0.00500 <sup>DLA</sup>	0.00165	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	0.052	<0.050	<0.500 <sup>DLA</sup>	<0.050	
potassium, total	7440-09-7	E420	0.050	mg/L	0.773	1.81	1.72	3.07	1.96	
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00078	0.00158	0.00123	0.00514	0.00099	
selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	0.000083	<0.000050	<0.000500 <sup>DLA</sup>	0.000055	
silicon, total	7440-21-3	E420	0.10	mg/L	2.01	1.91	2.38	3.38	3.09	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	0.000013	<0.000010	<0.000100 <sup>DLA</sup>	<0.000010	
sodium, total	7440-23-5	E420	0.050	mg/L	1.13	1.86	2.63	41.2	5.34	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.0168	0.0365	0.0597	0.641	0.0416	
sulfur, total	7704-34-9	E420	0.50	mg/L	<0.50	1.38	1.25	<5.00 <sup>DLA</sup>	1.38	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00200 <sup>DLA</sup>	<0.00020	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000100 <sup>DLA</sup>	<0.000010	
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00100 <sup>DLA</sup>	<0.00010	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00100 <sup>DLA</sup>	<0.00010	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00197	0.00151	0.00094	<0.00300 <sup>DLA</sup>	0.00111	
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00100 <sup>DLA</sup>	<0.00010	
uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000100 <sup>DLA</sup>	<0.000010	
vanadium, total	7440-62-2	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.00500 <sup>DLA</sup>	<0.000050	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0084	0.0053	0.0039	<0.0300 <sup>DLA</sup>	0.0053	





## Analytical Results

Sub-Matrix: Surface Water

(Matrix: Water)

					Client sample ID	SW22-01	SW22-03	SW22-04	SW22-05	SW2017-01 DS
					Client sampling date / time	26-Oct-2022 15:14	26-Oct-2022 13:44	26-Oct-2022 14:06	26-Oct-2022 11:01	26-Oct-2022 10:00
Analyte	CAS Number	Method	LOR	Unit	VA22C6296-001	VA22C6296-002	VA22C6296-003	VA22C6296-004	VA22C6296-005	
					Result	Result	Result	Result	Result	
<b>Total Metals</b>										
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00200 <sup>DLA</sup>	0.00020	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.126	0.0556	0.0552	0.0122	0.216	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00100 <sup>DLA</sup>	<0.00010	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00012	0.00019	0.00036	0.00116	0.00016	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00869	0.00853	0.0128 <sup>DTMF</sup>	0.171	0.0109	
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000200 <sup>DLA</sup>	<0.000100	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000500 <sup>DLA</sup>	<0.000050	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	0.017	0.018	0.209	0.039	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000136	0.0000247	0.0000076	<0.0000500 <sup>DLA</sup>	0.0000171	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	2.08	6.03	8.50	98.0	6.49	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000100 <sup>DLA</sup>	<0.000010	
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00100 <sup>DLA</sup>	<0.00050	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00028	0.00057	0.00022	0.00338	<0.00010	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00050	0.00068	0.00069	<0.00200 <sup>DLA</sup>	0.00114	
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.464	0.194	0.120	7.10	0.095	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000500 <sup>DLA</sup>	0.000060	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0100 <sup>DLA</sup>	<0.0010	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	0.638	1.56	2.06	20.9	1.51	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.174	1.42	0.325	30.3	0.0182	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000060	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	0.000771	<0.000050	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00099	0.00136	0.00176	<0.00500 <sup>DLA</sup>	0.00149	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.500 <sup>DLA</sup>	<0.050	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.727	1.87	1.69	2.79	1.95	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00067	0.00165	0.00109	0.00432	0.00090	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000062	<0.000050	0.000065	<0.000500 <sup>DLA</sup>	0.000061	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.90	1.76	2.31	3.39	3.06	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000100 <sup>DLA</sup>	<0.000010	
sodium, dissolved	7440-23-5	E421	0.050	mg/L	1.03	1.76	2.49	38.6	5.14	



## Analytical Results

Sub-Matrix: Surface Water

(Matrix: Water)

					Client sample ID	SW22-01	SW22-03	SW22-04	SW22-05	SW2017-01 DS
					Client sampling date / time	26-Oct-2022 15:14	26-Oct-2022 13:44	26-Oct-2022 14:06	26-Oct-2022 11:01	26-Oct-2022 10:00
Analyte	CAS Number	Method	LOR	Unit	VA22C6296-001	VA22C6296-002	VA22C6296-003	VA22C6296-004	VA22C6296-005	
					Result	Result	Result	Result	Result	
<b>Dissolved Metals</b>										
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0148	0.0305	0.0561	0.597	0.0409	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	<0.50	1.16	1.24	<5.00 <sup>DLA</sup>	1.52	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00200 <sup>DLA</sup>	<0.00020	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000100 <sup>DLA</sup>	<0.000010	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00100 <sup>DLA</sup>	<0.00010	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00100 <sup>DLA</sup>	<0.00010	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00119	0.00061	<0.00030	<0.00300 <sup>DLA</sup>	0.00095	
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00100 <sup>DLA</sup>	<0.00010	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000100 <sup>DLA</sup>	<0.000010	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00500 <sup>DLA</sup>	<0.00050	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0059	0.0048	0.0053	<0.0100 <sup>DLA</sup>	0.0024	
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00200 <sup>DLA</sup>	0.00022	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field	
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field	
<b>Aggregate Organics</b>										
biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	2.1	<2.0	6.4	<2.0	
chemical oxygen demand [COD]	----	E559-L	10	mg/L	75	25	43	110	54	

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



## Analytical Results

Sub-Matrix: Surface Water

Client sample ID

(Matrix: Water)

					SW2017-02 US	SW22-09	Treatment Lagoon	Travel Blank	Field Blank
Client sampling date / time					26-Oct-2022 08:40	26-Oct-2022 12:00	26-Oct-2022 11:40	26-Oct-2022	26-Oct-2022 14:25
Analyte	CAS Number	Method	LOR	Unit	VA22C6296-006	VA22C6296-007	VA22C6296-008	VA22C6296-009	VA22C6296-010
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	3.5	3.4	393	<1.0	<1.0
conductivity	----	E100	2.0	µS/cm	18.3	17.9	1390	<2.0	<2.0
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	7.92	7.61	390	----	<0.60
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	8.05	8.08	690	<0.60	<0.60
pH	----	E108	0.10	pH units	6.20	6.22	7.35	5.61	5.43
solids, total dissolved [TDS]	----	E162	10	mg/L	40	43	852	<10	<10
solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	320	<3.0	<3.0
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0145	0.0208	32.8	0.0084 <sup>RRV</sup>	<0.0050
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.250 <sup>DLDS</sup>	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	0.67	0.66	85.2	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	<0.180 <sup>DLCl</sup>	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	<0.0250 <sup>DLDS</sup>	----	----
nitrate + nitrite (as N)	----	EC235.N+N	0.0050	mg/L	<0.0051	<0.0051	<0.0255	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0050 <sup>DLDS</sup>	----	----
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0224	0.0220	0.379	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	0.81	0.81	193	----	----
<b>Organic / Inorganic Carbon</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	16.5	16.0	40.5	----	<0.50
<b>Total Metals</b>									
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.415	0.408	20.0	<0.0030	0.0065 <sup>RRV</sup>
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0.0144	<0.00010	<0.00010
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00021	0.00019	0.0435	<0.00010	<0.00010
barium, total	7440-39-3	E420	0.00010	mg/L	0.0125	0.0118	0.724	<0.00010	0.00093 <sup>RRV</sup>
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	0.000451	<0.000100	<0.000100
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0.00631	<0.000050	<0.000050
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0.921	<0.010	<0.010
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000459	0.0000292	0.00205	<0.0000050	<0.0000050
calcium, total	7440-70-2	E420	0.050	mg/L	2.15	2.17	228	<0.050	<0.050
cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	0.000789	<0.000010	<0.000010



## Analytical Results

Sub-Matrix: Surface Water

(Matrix: Water)

					Client sample ID	SW2017-02 US	SW22-09	Treatment Lagoon	Travel Blank	Field Blank
					Client sampling date / time	26-Oct-2022 08:40	26-Oct-2022 12:00	26-Oct-2022 11:40	26-Oct-2022	26-Oct-2022 14:25
Analyte	CAS Number	Method	LOR	Unit	VA22C6296-006	VA22C6296-007	VA22C6296-008	VA22C6296-009	VA22C6296-010	
					Result	Result	Result	Result	Result	
<b>Total Metals</b>										
chromium, total	7440-47-3	E420	0.00050	mg/L	0.00059	0.00072	0.0728	<0.00050	<0.00050	
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00035	0.00012	0.0460	<0.00010	<0.00010	
copper, total	7440-50-8	E420	0.00050	mg/L	0.00164	0.00152	0.163	<0.00050	<0.00050	
iron, total	7439-89-6	E420	0.010	mg/L	0.374	0.133	84.6	<0.010	<0.010	
lead, total	7439-92-1	E420	0.000050	mg/L	0.000059	<0.000050	0.0226	<0.000050	<0.000050	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	0.0271	<0.0010	<0.0010	
magnesium, total	7439-95-4	E420	0.0050	mg/L	0.652	0.646	29.4	<0.0050	<0.0050	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.100	0.0240	11.2	<0.00010	<0.00010	
mercury, total	7439-97-6	E508	0.0000050	mg/L	0.0000099	0.0000123	0.000245	<0.0000050	<0.0000050	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	<0.000050	<0.000050	0.0104	<0.000050	<0.000050	
nickel, total	7440-02-0	E420	0.00050	mg/L	0.00180	0.00178	0.106	<0.00050	<0.00050	
phosphorus, total	7723-14-0	E420	0.050	mg/L	0.053	0.056	10.3	<0.050	<0.050	
potassium, total	7440-09-7	E420	0.050	mg/L	0.411	0.401	38.8	<0.050	<0.050	
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00029	0.00034	0.0235	<0.00020	<0.00020	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000150	0.000138	0.00181	<0.000050	<0.000050	
silicon, total	7440-21-3	E420	0.10	mg/L	3.01	3.02	14.6	<0.10	<0.10	
silver, total	7440-22-4	E420	0.000010	mg/L	0.000021	0.000020	0.00278	<0.000010	<0.000010	
sodium, total	7440-23-5	E420	0.050	mg/L	0.854	0.823	84.0	<0.050	<0.050	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.0151	0.0151	1.02	<0.00020	<0.00020	
sulfur, total	7704-34-9	E420	0.50	mg/L	<0.50	<0.50	36.7	<0.50	<0.50	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00100 <sup>DLA</sup>	<0.00020	<0.00020	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0.000134	<0.000010	<0.000010	
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00050 <sup>DLA</sup>	<0.00010	<0.00010	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0.00214	<0.00010	<0.00010	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00207	0.00188	0.114	<0.00030	<0.00030	
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0.00488	<0.00010	<0.00010	
uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	<0.000010	0.000811	<0.000010	<0.000010	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0.0387	<0.00050	<0.00050	
zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	2.99	<0.0030	<0.0030	
zirconium, total	7440-67-7	E420	0.00020	mg/L	0.00025	0.00023	0.00156	<0.00020	<0.00020	



## Analytical Results

Sub-Matrix: Surface Water

(Matrix: Water)

					Client sample ID	SW2017-02 US	SW22-09	Treatment Lagoon	Travel Blank	Field Blank
					Client sampling date / time	26-Oct-2022 08:40	26-Oct-2022 12:00	26-Oct-2022 11:40	26-Oct-2022	26-Oct-2022 14:25
Analyte	CAS Number	Method	LOR	Unit	VA22C6296-006	VA22C6296-007	VA22C6296-008	VA22C6296-009	VA22C6296-010	
					Result	Result	Result	Result	Result	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.412	0.388	0.0456	----	0.0066 <sup>RRV</sup>	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0.00054	----	<0.00010	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00018	0.00016	0.00305	----	<0.00010	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0123	0.0119	0.150	----	0.00098 <sup>RRV</sup>	
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	<0.000100	----	<0.000100	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000100 <sup>DLA</sup>	----	<0.000050	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0.612	----	<0.010	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000350	0.0000195	<0.0000100 <sup>DLA</sup>	----	<0.0000050	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	2.12	2.03	122	----	<0.050	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0.000138	----	<0.000010	
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	0.00060	0.00051	0.00402	----	<0.00050	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00010	<0.00010	0.00078	----	<0.00010	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00150	0.00142	<0.00040 <sup>DLA</sup>	----	<0.00020	
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.125	0.112	0.325	----	<0.010	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000100 <sup>DLA</sup>	----	<0.000050	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0.0158	----	<0.0010	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	0.639	0.617	20.7	----	<0.0050	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0220	0.00783	7.56	----	0.00020 <sup>RRV</sup>	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	0.0000090	0.0000092	<0.0000050	----	<0.0000050	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000100 <sup>DLA</sup>	----	<0.000050	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00169	0.00166	0.00686	----	<0.00050	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	1.18	----	<0.050	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.416	0.398	34.3	----	<0.050	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00033	0.00034	0.0198	----	<0.00020	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000132	0.000115	0.000303	----	<0.000050	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	2.99	2.94	4.33	----	<0.050	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000020 <sup>DLA</sup>	----	<0.000010	
sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.849	0.819	77.1	----	<0.050	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0144	0.0147	0.655	----	<0.00020	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	<0.50	<0.50	36.2	----	<0.50	



## Analytical Results

Sub-Matrix: Surface Water

(Matrix: Water)

					Client sample ID	SW2017-02 US	SW22-09	Treatment Lagoon	Travel Blank	Field Blank
					Client sampling date / time	26-Oct-2022 08:40	26-Oct-2022 12:00	26-Oct-2022 11:40	26-Oct-2022	26-Oct-2022 14:25
Analyte	CAS Number	Method	LOR	Unit	VA22C6296-006	VA22C6296-007	VA22C6296-008	VA22C6296-009	VA22C6296-010	
					Result	Result	Result	Result	Result	
<b>Dissolved Metals</b>										
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00040 <sup>DLA</sup>	----	<0.00020	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000020 <sup>DLA</sup>	----	<0.000010	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00020 <sup>DLA</sup>	----	<0.00010	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00020 <sup>DLA</sup>	----	<0.00010	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00195	0.00157	0.00086	----	<0.00030	
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00020 <sup>DLA</sup>	----	<0.00010	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	<0.000010	0.000032	----	<0.000010	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00100 <sup>DLA</sup>	----	<0.00050	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0027	0.0022	<0.0020 <sup>DLA</sup>	----	<0.0010	
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	0.00029	0.00030	<0.00040 <sup>DLA</sup>	----	<0.00020	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	----	Field	
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	----	Field	
<b>Aggregate Organics</b>										
biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	119	----	----	
chemical oxygen demand [COD]	----	E559-L	10	mg/L	51	48	522	----	----	

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



## QUALITY CONTROL INTERPRETIVE REPORT

<p><b>Work Order</b> : <b>VA22C6296</b></p> <p><b>Client</b> : <b>Regional District of Kitimat-Stikine</b></p> <p><b>Contact</b> : Hannah Shinton</p> <p><b>Address</b> : # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1</p> <p><b>Telephone</b> : ----</p> <p><b>Project</b> : Meziadin Landfill Surface Water</p> <p><b>PO</b> : ----</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : H Shinton</p> <p><b>Site</b> :</p> <p><b>Quote number</b> : Default Water Testing (Q62338)</p> <p><b>No. of samples received</b> : 10</p> <p><b>No. of samples analysed</b> : 10</p>	<p><b>Page</b> : 1 of 29</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Amber Springer</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 29-Oct-2022 12:00</p> <p><b>Issue Date</b> : 10-Nov-2022 11:54</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	
<b>Aggregate Organics : Biochemical Oxygen Demand - 5 day</b>										
HDPE [BOD HT 3d] SW2017-01 DS	E550	26-Oct-2022	----	----	----		31-Oct-2022	3 days	5 days	* EHTL
<b>Aggregate Organics : Biochemical Oxygen Demand - 5 day</b>										
HDPE [BOD HT 3d] SW2017-02 US	E550	26-Oct-2022	----	----	----		31-Oct-2022	3 days	5 days	* EHTL
<b>Aggregate Organics : Biochemical Oxygen Demand - 5 day</b>										
HDPE [BOD HT 3d] SW22-01	E550	26-Oct-2022	----	----	----		31-Oct-2022	3 days	5 days	* EHTL
<b>Aggregate Organics : Biochemical Oxygen Demand - 5 day</b>										
HDPE [BOD HT 3d] SW22-03	E550	26-Oct-2022	----	----	----		31-Oct-2022	3 days	5 days	* EHTL
<b>Aggregate Organics : Biochemical Oxygen Demand - 5 day</b>										
HDPE [BOD HT 3d] SW22-04	E550	26-Oct-2022	----	----	----		31-Oct-2022	3 days	5 days	* EHTL
<b>Aggregate Organics : Biochemical Oxygen Demand - 5 day</b>										
HDPE [BOD HT 3d] SW22-05	E550	26-Oct-2022	----	----	----		31-Oct-2022	3 days	5 days	* EHTL
<b>Aggregate Organics : Biochemical Oxygen Demand - 5 day</b>										
HDPE [BOD HT 3d] SW22-09	E550	26-Oct-2022	----	----	----		31-Oct-2022	3 days	5 days	* EHTL



Matrix: **Water** 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	
<b>Aggregate Organics : Biochemical Oxygen Demand - 5 day</b>										
<b>HDPE [BOD HT 3d]</b> Treatment Lagoon	E550	26-Oct-2022	----	----	----		31-Oct-2022	3 days	5 days	✖ EHTL
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> SW2017-01 DS	E559-L	26-Oct-2022	----	----	----		08-Nov-2022	28 days	13 days	✔
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> SW2017-02 US	E559-L	26-Oct-2022	----	----	----		08-Nov-2022	28 days	13 days	✔
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> SW22-01	E559-L	26-Oct-2022	----	----	----		08-Nov-2022	28 days	13 days	✔
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> SW22-03	E559-L	26-Oct-2022	----	----	----		08-Nov-2022	28 days	13 days	✔
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> SW22-04	E559-L	26-Oct-2022	----	----	----		08-Nov-2022	28 days	13 days	✔
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> SW22-05	E559-L	26-Oct-2022	----	----	----		08-Nov-2022	28 days	13 days	✔
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> SW22-09	E559-L	26-Oct-2022	----	----	----		08-Nov-2022	28 days	13 days	✔
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> Treatment Lagoon	E559-L	26-Oct-2022	----	----	----		08-Nov-2022	28 days	13 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		
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
Amber glass total (sulfuric acid) Field Blank	E298	26-Oct-2022	03-Nov-2022	----	----		07-Nov-2022	28 days	13 days	✔	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
Amber glass total (sulfuric acid) SW2017-01 DS	E298	26-Oct-2022	03-Nov-2022	----	----		07-Nov-2022	28 days	13 days	✔	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
Amber glass total (sulfuric acid) SW2017-02 US	E298	26-Oct-2022	03-Nov-2022	----	----		07-Nov-2022	28 days	13 days	✔	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
Amber glass total (sulfuric acid) SW22-01	E298	26-Oct-2022	03-Nov-2022	----	----		07-Nov-2022	28 days	13 days	✔	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
Amber glass total (sulfuric acid) SW22-03	E298	26-Oct-2022	03-Nov-2022	----	----		07-Nov-2022	28 days	13 days	✔	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
Amber glass total (sulfuric acid) SW22-04	E298	26-Oct-2022	03-Nov-2022	----	----		07-Nov-2022	28 days	13 days	✔	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
Amber glass total (sulfuric acid) SW22-05	E298	26-Oct-2022	03-Nov-2022	----	----		07-Nov-2022	28 days	13 days	✔	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
Amber glass total (sulfuric acid) SW22-09	E298	26-Oct-2022	03-Nov-2022	----	----		07-Nov-2022	28 days	13 days	✔	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
Amber glass total (sulfuric acid) Travel Blank	E298	26-Oct-2022	03-Nov-2022	----	----		07-Nov-2022	28 days	13 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	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> Treatment Lagoon	E298	26-Oct-2022	03-Nov-2022	----	----		07-Nov-2022	28 days	13 days	✔
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
<b>HDPE</b> SW2017-01 DS	E235.Br-L	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✔
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
<b>HDPE</b> SW2017-02 US	E235.Br-L	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✔
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
<b>HDPE</b> SW22-01	E235.Br-L	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✔
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
<b>HDPE</b> SW22-03	E235.Br-L	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✔
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
<b>HDPE</b> SW22-04	E235.Br-L	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✔
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
<b>HDPE</b> SW22-05	E235.Br-L	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✔
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
<b>HDPE</b> SW22-09	E235.Br-L	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✔
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
<b>HDPE</b> Treatment Lagoon	E235.Br-L	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE SW2017-01 DS	E235.Cl	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE SW2017-02 US	E235.Cl	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE SW22-01	E235.Cl	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE SW22-03	E235.Cl	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE SW22-04	E235.Cl	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE SW22-05	E235.Cl	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE SW22-09	E235.Cl	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE Treatment Lagoon	E235.Cl	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓	
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)</b>											
HDPE SW2017-01 DS	E378-U	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	3 days	5 days	* EHTL	



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			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)</b>										
HDPE SW2017-02 US	E378-U	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	3 days	5 days	* EHTL
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)</b>										
HDPE SW22-01	E378-U	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	3 days	5 days	* EHTL
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)</b>										
HDPE SW22-03	E378-U	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	3 days	5 days	* EHTL
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)</b>										
HDPE SW22-04	E378-U	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	3 days	5 days	* EHTL
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)</b>										
HDPE SW22-05	E378-U	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	3 days	5 days	* EHTL
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)</b>										
HDPE SW22-09	E378-U	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	3 days	5 days	* EHTL
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)</b>										
HDPE Treatment Lagoon	E378-U	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	3 days	5 days	* EHTL
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SW2017-01 DS	E235.F	26-Oct-2022	31-Oct-2022	----	----		31-Oct-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	
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SW2017-02 US	E235.F	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SW22-01	E235.F	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SW22-03	E235.F	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SW22-04	E235.F	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SW22-05	E235.F	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SW22-09	E235.F	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE Treatment Lagoon	E235.F	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE SW2017-01 DS	E235.NO3-L	26-Oct-2022	31-Oct-2022	3 days	5 days	* EHTL	31-Oct-2022	3 days	0 days	✓
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE SW2017-02 US	E235.NO3-L	26-Oct-2022	31-Oct-2022	3 days	5 days	* EHTL	31-Oct-2022	3 days	0 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		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SW22-01	E235.NO3-L	26-Oct-2022	31-Oct-2022	3 days	5 days	* EHTL	31-Oct-2022	3 days	0 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SW22-03	E235.NO3-L	26-Oct-2022	31-Oct-2022	3 days	5 days	* EHTL	31-Oct-2022	3 days	0 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SW22-04	E235.NO3-L	26-Oct-2022	31-Oct-2022	3 days	5 days	* EHTL	31-Oct-2022	3 days	0 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SW22-05	E235.NO3-L	26-Oct-2022	31-Oct-2022	3 days	5 days	* EHTL	31-Oct-2022	3 days	0 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SW22-09	E235.NO3-L	26-Oct-2022	31-Oct-2022	3 days	5 days	* EHTL	31-Oct-2022	3 days	0 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE Treatment Lagoon	E235.NO3-L	26-Oct-2022	31-Oct-2022	3 days	5 days	* EHTL	31-Oct-2022	3 days	0 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SW2017-01 DS	E235.NO2-L	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	3 days	5 days	* EHTL	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SW2017-02 US	E235.NO2-L	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	3 days	5 days	* EHTL	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SW22-01	E235.NO2-L	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	3 days	5 days	* EHTL	





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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		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SW22-03	E235.NO2-L	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	3 days	5 days	*	EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SW22-04	E235.NO2-L	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	3 days	5 days	*	EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SW22-05	E235.NO2-L	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	3 days	5 days	*	EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SW22-09	E235.NO2-L	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	3 days	5 days	*	EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE Treatment Lagoon	E235.NO2-L	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	3 days	5 days	*	EHTL
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE SW2017-01 DS	E235.SO4	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE SW2017-02 US	E235.SO4	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE SW22-01	E235.SO4	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE SW22-03	E235.SO4	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓	



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			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE SW22-04	E235.SO4	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE SW22-05	E235.SO4	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE SW22-09	E235.SO4	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE Treatment Lagoon	E235.SO4	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial dissolved (hydrochloric acid) Field Blank	E509	26-Oct-2022	01-Nov-2022	----	----		01-Nov-2022	28 days	6 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial dissolved (hydrochloric acid) SW2017-01 DS	E509	26-Oct-2022	01-Nov-2022	----	----		01-Nov-2022	28 days	6 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial dissolved (hydrochloric acid) SW2017-02 US	E509	26-Oct-2022	01-Nov-2022	----	----		01-Nov-2022	28 days	6 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial dissolved (hydrochloric acid) SW22-01	E509	26-Oct-2022	01-Nov-2022	----	----		01-Nov-2022	28 days	6 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial dissolved (hydrochloric acid) SW22-03	E509	26-Oct-2022	01-Nov-2022	----	----		01-Nov-2022	28 days	6 days	✔	



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			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial dissolved (hydrochloric acid) SW22-04	E509	26-Oct-2022	01-Nov-2022	----	----		01-Nov-2022	28 days	6 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial dissolved (hydrochloric acid) SW22-05	E509	26-Oct-2022	01-Nov-2022	----	----		01-Nov-2022	28 days	6 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial dissolved (hydrochloric acid) SW22-09	E509	26-Oct-2022	01-Nov-2022	----	----		01-Nov-2022	28 days	6 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial dissolved (hydrochloric acid) Treatment Lagoon	E509	26-Oct-2022	01-Nov-2022	----	----		01-Nov-2022	28 days	6 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) Field Blank	E421	26-Oct-2022	07-Nov-2022	----	----		07-Nov-2022	180 days	13 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) SW2017-01 DS	E421	26-Oct-2022	07-Nov-2022	----	----		07-Nov-2022	180 days	13 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) SW2017-02 US	E421	26-Oct-2022	07-Nov-2022	----	----		07-Nov-2022	180 days	13 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) SW22-01	E421	26-Oct-2022	07-Nov-2022	----	----		07-Nov-2022	180 days	13 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) SW22-03	E421	26-Oct-2022	07-Nov-2022	----	----		07-Nov-2022	180 days	13 days	✔	



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			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE dissolved (nitric acid) SW22-04	E421	26-Oct-2022	07-Nov-2022	----	----		07-Nov-2022	180 days	13 days	✔
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE dissolved (nitric acid) SW22-05	E421	26-Oct-2022	07-Nov-2022	----	----		07-Nov-2022	180 days	13 days	✔
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE dissolved (nitric acid) SW22-09	E421	26-Oct-2022	07-Nov-2022	----	----		07-Nov-2022	180 days	13 days	✔
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE dissolved (nitric acid) Treatment Lagoon	E421	26-Oct-2022	07-Nov-2022	----	----		07-Nov-2022	180 days	13 days	✔
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>										
Amber glass dissolved (sulfuric acid) Field Blank	E358-L	26-Oct-2022	03-Nov-2022	----	----		03-Nov-2022	28 days	8 days	✔
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>										
Amber glass dissolved (sulfuric acid) SW2017-01 DS	E358-L	26-Oct-2022	03-Nov-2022	----	----		03-Nov-2022	28 days	8 days	✔
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>										
Amber glass dissolved (sulfuric acid) SW2017-02 US	E358-L	26-Oct-2022	03-Nov-2022	----	----		03-Nov-2022	28 days	8 days	✔
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>										
Amber glass dissolved (sulfuric acid) SW22-01	E358-L	26-Oct-2022	03-Nov-2022	----	----		03-Nov-2022	28 days	8 days	✔
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>										
Amber glass dissolved (sulfuric acid) SW22-03	E358-L	26-Oct-2022	03-Nov-2022	----	----		03-Nov-2022	28 days	8 days	✔



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			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
Amber glass dissolved (sulfuric acid) SW22-04	E358-L	26-Oct-2022	03-Nov-2022	----	----		03-Nov-2022	28 days	8 days	✔	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
Amber glass dissolved (sulfuric acid) SW22-05	E358-L	26-Oct-2022	03-Nov-2022	----	----		03-Nov-2022	28 days	8 days	✔	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
Amber glass dissolved (sulfuric acid) SW22-09	E358-L	26-Oct-2022	03-Nov-2022	----	----		03-Nov-2022	28 days	8 days	✔	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
Amber glass dissolved (sulfuric acid) Treatment Lagoon	E358-L	26-Oct-2022	03-Nov-2022	----	----		03-Nov-2022	28 days	8 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE Field Blank	E290	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	14 days	5 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE SW2017-01 DS	E290	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	14 days	5 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE SW2017-02 US	E290	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	14 days	5 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE SW22-01	E290	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	14 days	5 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE SW22-03	E290	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	14 days	5 days	✔	



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			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SW22-04	E290	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	14 days	5 days	✔
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SW22-05	E290	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	14 days	5 days	✔
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SW22-09	E290	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	14 days	5 days	✔
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE Travel Blank	E290	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	14 days	5 days	✔
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE Treatment Lagoon	E290	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	14 days	5 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE Field Blank	E100	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE SW2017-01 DS	E100	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE SW2017-02 US	E100	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE SW22-01	E100	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✔



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			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Conductivity in Water</b>											
HDPE SW22-03	E100	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE SW22-04	E100	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE SW22-05	E100	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE SW22-09	E100	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE Travel Blank	E100	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE Treatment Lagoon	E100	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	28 days	5 days	✓	
<b>Physical Tests : pH by Meter</b>											
HDPE Field Blank	E108	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	0.25 hrs	2.24 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE SW2017-01 DS	E108	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	0.25 hrs	2.24 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE SW2017-02 US	E108	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	0.25 hrs	2.24 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		
<b>Physical Tests : pH by Meter</b>											
HDPE SW22-01	E108	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	0.25 hrs	2.24 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE SW22-03	E108	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	0.25 hrs	2.24 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE SW22-04	E108	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	0.25 hrs	2.24 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE SW22-05	E108	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	0.25 hrs	2.24 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE SW22-09	E108	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	0.25 hrs	2.24 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE Travel Blank	E108	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	0.25 hrs	2.24 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE Treatment Lagoon	E108	26-Oct-2022	31-Oct-2022	----	----		31-Oct-2022	0.25 hrs	2.24 hrs	*	EHTR-FM
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE Field Blank	E162	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE SW2017-01 DS	E162	26-Oct-2022	----	----	----		01-Nov-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	
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE SW2017-02 US	E162	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE SW22-01	E162	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE SW22-03	E162	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE SW22-04	E162	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE SW22-05	E162	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE SW22-09	E162	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE Travel Blank	E162	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE Treatment Lagoon	E162	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✔
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE Field Blank	E160	26-Oct-2022	----	----	----		01-Nov-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		
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SW2017-01 DS	E160	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SW2017-02 US	E160	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SW22-01	E160	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SW22-03	E160	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SW22-04	E160	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SW22-05	E160	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SW22-09	E160	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE Travel Blank	E160	26-Oct-2022	----	----	----		01-Nov-2022	7 days	6 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE Treatment Lagoon	E160	26-Oct-2022	----	----	----		01-Nov-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		
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> Field Blank	E508	26-Oct-2022	01-Nov-2022	----	----		01-Nov-2022	28 days	6 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> SW2017-01 DS	E508	26-Oct-2022	01-Nov-2022	----	----		01-Nov-2022	28 days	6 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> SW2017-02 US	E508	26-Oct-2022	01-Nov-2022	----	----		01-Nov-2022	28 days	6 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> SW22-01	E508	26-Oct-2022	01-Nov-2022	----	----		01-Nov-2022	28 days	6 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> SW22-03	E508	26-Oct-2022	01-Nov-2022	----	----		01-Nov-2022	28 days	6 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> SW22-04	E508	26-Oct-2022	01-Nov-2022	----	----		01-Nov-2022	28 days	6 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> SW22-05	E508	26-Oct-2022	01-Nov-2022	----	----		01-Nov-2022	28 days	6 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> SW22-09	E508	26-Oct-2022	01-Nov-2022	----	----		01-Nov-2022	28 days	6 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> Treatment Lagoon	E508	26-Oct-2022	01-Nov-2022	----	----		01-Nov-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	
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial - total (lab preserved)</b> Travel Blank	E508	26-Oct-2022	04-Nov-2022	----	----		04-Nov-2022	28 days	9 days	✔
<b>Total Metals : Total metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> Field Blank	E420	26-Oct-2022	07-Nov-2022	----	----		08-Nov-2022	180 days	13 days	✔
<b>Total Metals : Total metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> SW2017-01 DS	E420	26-Oct-2022	07-Nov-2022	----	----		08-Nov-2022	180 days	13 days	✔
<b>Total Metals : Total metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> SW2017-02 US	E420	26-Oct-2022	07-Nov-2022	----	----		08-Nov-2022	180 days	13 days	✔
<b>Total Metals : Total metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> SW22-01	E420	26-Oct-2022	07-Nov-2022	----	----		08-Nov-2022	180 days	13 days	✔
<b>Total Metals : Total metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> SW22-03	E420	26-Oct-2022	07-Nov-2022	----	----		08-Nov-2022	180 days	13 days	✔
<b>Total Metals : Total metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> SW22-04	E420	26-Oct-2022	07-Nov-2022	----	----		08-Nov-2022	180 days	13 days	✔
<b>Total Metals : Total metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> SW22-05	E420	26-Oct-2022	07-Nov-2022	----	----		08-Nov-2022	180 days	13 days	✔
<b>Total Metals : Total metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> SW22-09	E420	26-Oct-2022	07-Nov-2022	----	----		08-Nov-2022	180 days	13 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	
<b>Total Metals : Total metals in Water by CRC ICPMS</b>										
<b>HDPE - total (lab preserved)</b> Travel Blank	E420	26-Oct-2022	07-Nov-2022	----	----		08-Nov-2022	180 days	13 days	✔
<b>Total Metals : Total metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> Treatment Lagoon	E420	26-Oct-2022	07-Nov-2022	----	----		08-Nov-2022	180 days	13 days	✔

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.  
 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
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	723035	1	17	5.8	5.0	✓
Ammonia by Fluorescence	E298	728308	1	13	7.6	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	723372	2	25	8.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	723042	1	8	12.5	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	735457	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	723041	1	13	7.6	5.0	✓
Conductivity in Water	E100	723038	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	724265	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	729203	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	728307	1	17	5.8	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	723046	1	10	10.0	5.0	✓
Fluoride in Water by IC	E235.F	723040	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	723043	1	12	8.3	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	723044	1	12	8.3	5.0	✓
pH by Meter	E108	723037	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	723039	1	13	7.6	5.0	✓
TDS by Gravimetry	E162	724457	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	724309	3	53	5.6	5.0	✓
Total metals in Water by CRC ICPMS	E420	731486	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	724463	1	20	5.0	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	723035	1	17	5.8	5.0	✓
Ammonia by Fluorescence	E298	728308	1	13	7.6	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	723372	2	25	8.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	723042	1	8	12.5	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	735457	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	723041	1	13	7.6	5.0	✓
Conductivity in Water	E100	723038	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	724265	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	729203	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	728307	1	17	5.8	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	723046	1	10	10.0	5.0	✓
Fluoride in Water by IC	E235.F	723040	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	723043	1	12	8.3	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	723044	1	12	8.3	5.0	✓
pH by Meter	E108	723037	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
<b>Analytical Methods</b>							
<b>Laboratory Control Samples (LCS) - Continued</b>							
Sulfate in Water by IC	E235.SO4	723039	1	13	7.6	5.0	✓
TDS by Gravimetry	E162	724457	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	724309	3	53	5.6	5.0	✓
Total metals in Water by CRC ICPMS	E420	731486	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	724463	1	20	5.0	5.0	✓
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	723035	1	17	5.8	5.0	✓
Ammonia by Fluorescence	E298	728308	1	13	7.6	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	723372	2	25	8.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	723042	1	8	12.5	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	735457	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	723041	1	13	7.6	5.0	✓
Conductivity in Water	E100	723038	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	724265	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	729203	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	728307	1	17	5.8	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	723046	1	10	10.0	5.0	✓
Fluoride in Water by IC	E235.F	723040	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	723043	1	12	8.3	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	723044	1	12	8.3	5.0	✓
Sulfate in Water by IC	E235.SO4	723039	1	13	7.6	5.0	✓
TDS by Gravimetry	E162	724457	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	724309	3	53	5.6	5.0	✓
Total metals in Water by CRC ICPMS	E420	731486	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	724463	1	20	5.0	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	728308	1	13	7.6	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	723042	1	8	12.5	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	735457	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	723041	1	13	7.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	724265	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	729203	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	728307	1	17	5.8	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	723046	1	10	10.0	5.0	✓
Fluoride in Water by IC	E235.F	723040	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	723043	1	12	8.3	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	723044	1	12	8.3	5.0	✓
Sulfate in Water by IC	E235.SO4	723039	1	13	7.6	5.0	✓
Total Mercury in Water by CVAAS	E508	724309	3	53	5.6	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>							
<b>Matrix Spikes (MS) - Continued</b>							
Total metals in Water by CRC ICPMS	E420	731486	1	20	5.0	5.0	✔





## Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
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.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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)
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 <sub>2</sub> . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Dissolved 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 <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> 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 <sub>3</sub> ), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> 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.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Vancouver - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Preparation for Dissolved Organic Carbon for Combustion	EP358 Vancouver - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
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><b>Work Order</b> : <b>VA22C6296</b></p> <p><b>Client</b> : Regional District of Kitimat-Stikine</p> <p><b>Contact</b> : Hannah Shinton</p> <p><b>Address</b> : # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1</p> <p><b>Telephone</b> :</p> <p><b>Project</b> : Meziadin Landfill Surface Water</p> <p><b>PO</b> : ----</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : H Shinton ----</p> <p><b>Site</b> :</p> <p><b>Quote number</b> : Default Water Testing (Q62338)</p> <p><b>No. of samples received</b> : 10</p> <p><b>No. of samples analysed</b> : 10</p>	<p><b>Page</b> : 1 of 18</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Amber Springer</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 29-Oct-2022 12:00</p> <p><b>Date Analysis Commenced</b> : 31-Oct-2022</p> <p><b>Issue Date</b> : 10-Nov-2022 11:53</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
Angelo Salandanan	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Benjamin Oke	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
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Cindy Tang	Team Leader - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
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Owen Cheng		Vancouver Metals, Burnaby, British Columbia
Paul Cushing	Team Leader - Organics	Vancouver Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Vancouver Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia
Sukhman Khosa	Lab Assistant	Vancouver Metals, Burnaby, British Columbia

Page : 2 of 18  
Work Order : VA22C6296  
Client : Regional District of Kitimat-Stikine  
Project : Meziadin Landfill Surface Water

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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**

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

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### 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: <b>Water</b>					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
<b>Physical Tests (QC Lot: 723035)</b>											
VA22C5469-004	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	50.8	51.1	0.589%	20%	----
<b>Physical Tests (QC Lot: 723037)</b>											
VA22C5469-004	Anonymous	pH	----	E108	0.10	pH units	8.50	8.50	0.00%	4%	----
<b>Physical Tests (QC Lot: 723038)</b>											
VA22C6296-001	SW22-01	conductivity	----	E100	2.0	µS/cm	20.0	19.2	0.8	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 724457)</b>											
VA22C6179-001	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	484	462	4.66%	20%	----
<b>Physical Tests (QC Lot: 724463)</b>											
VA22C6179-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 723039)</b>											
VA22C6296-001	SW22-01	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	<0.30	<0.30	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 723040)</b>											
VA22C6296-001	SW22-01	fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 723041)</b>											
VA22C6296-001	SW22-01	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 723042)</b>											
VA22C6296-001	SW22-01	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 723043)</b>											
VA22C6296-001	SW22-01	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 723044)</b>											
VA22C6296-001	SW22-01	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 723046)</b>											
VA22C5469-003	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0100	mg/L	<0.0100	<0.0100	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 728308)</b>											
VA22C6200-004	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0097	0.0092	0.0005	Diff <2x LOR	----
<b>Organic / Inorganic Carbon (QC Lot: 728307)</b>											
KS2204163-001	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	6.14	6.48	5.52%	20%	----
<b>Total Metals (QC Lot: 724309)</b>											
KS2204153-001	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 724310)</b>											



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
<b>Total Metals (QC Lot: 724310) - continued</b>											
VA22C6296-006	SW2017-02 US	mercury, total	7439-97-6	E508	0.0000050	mg/L	0.0000099	0.0000108	0.0000010	Diff <2x LOR	----
<b>Total Metals (QC Lot: 731261)</b>											
VA22C6296-009	Travel Blank	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 731486)</b>											
FJ2203115-007	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0122	0.0114	0.0007	Diff <2x LOR	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	0.00017	0.00017	0.00000003	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00015	0.00016	0.000004	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.246	0.250	1.82%	20%	----
		beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	0.013	0.012	0.002	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000317	0.0000303	0.0000014	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	0.050	mg/L	84.7	85.2	0.666%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		iron, total	7439-89-6	E420	0.010	mg/L	0.035	0.035	0.0004	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	0.0130	0.0130	0.551%	20%	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	48.0	47.7	0.588%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.00170	0.00159	7.13%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00117	0.00121	3.75%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00207	0.00215	0.00008	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	1.14	1.16	1.27%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00062	0.00064	0.00002	Diff <2x LOR	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.0183	0.0187	2.46%	20%	----
		silicon, total	7440-21-3	E420	0.10	mg/L	1.34	1.36	1.53%	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	8.38	8.54	1.90%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.154	0.154	0.0212%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	101	101	0.564%	20%	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	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
<b>Total Metals (QC Lot: 731486) - continued</b>											
FJ2203115-007	Anonymous	thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.000030	mg/L	<0.000030	<0.000030	0	Diff <2x LOR	----
		tungsten, total	7440-33-7	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.00258	0.00254	1.76%	20%	----
		vanadium, total	7440-62-2	E420	0.000050	mg/L	<0.000050	<0.000050	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	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 724265)</b>											
VA22C6289-001	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 729203)</b>											
FJ2203114-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0050	0.0053	0.0003	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.000010	mg/L	0.00040	0.00041	0.000009	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.000010	mg/L	0.00046	0.00048	0.00002	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.000010	mg/L	0.0647	0.0690	6.46%	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	0.014	0.013	0.0005	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	153	151	1.45%	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	0.000010	mg/L	0.00021	0.00020	0.00001	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.000020	mg/L	0.00447	0.00444	0.598%	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	0.000316	0.000322	0.000006	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0389	0.0372	4.40%	20%	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	84.8	82.9	2.35%	20%	----
		manganese, dissolved	7439-96-5	E421	0.000010	mg/L	0.00605	0.00604	0.0730%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00861	0.00850	1.31%	20%	----
		nickel, dissolved	7440-02-0	E421	0.000050	mg/L	0.0160	0.0160	0.0186%	20%	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.050	mg/L	2.82	2.81	0.390%	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
<b>Dissolved Metals (QC Lot: 729203) - continued</b>											
FJ2203114-001	Anonymous	rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00149	0.00162	0.00013	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000250	mg/L	0.000395	0.000406	0.000011	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	0.655	0.629	4.02%	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	14.6	14.1	3.52%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.293	0.299	1.92%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	202	196	2.75%	20%	----
		tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.00446	0.00447	0.120%	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	0.0145	0.0152	4.29%	20%	----
		zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 723372)</b>											
VA22C6181-001	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----
<b>Aggregate Organics (QC Lot: 723373)</b>											
VA22C6296-007	SW22-09	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----
<b>Aggregate Organics (QC Lot: 735457)</b>											
FJ2203114-001	Anonymous	chemical oxygen demand [COD]	----	E559-L	10	mg/L	31	29	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
<b>Physical Tests (QCLot: 723035)</b>						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
<b>Physical Tests (QCLot: 723038)</b>						
conductivity	----	E100	1	µS/cm	1.3	----
<b>Physical Tests (QCLot: 724457)</b>						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
<b>Physical Tests (QCLot: 724463)</b>						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
<b>Anions and Nutrients (QCLot: 723039)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
<b>Anions and Nutrients (QCLot: 723040)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 723041)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 723042)</b>						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 723043)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 723044)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 723046)</b>						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 728308)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Organic / Inorganic Carbon (QCLot: 728307)</b>						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
<b>Total Metals (QCLot: 724309)</b>						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
<b>Total Metals (QCLot: 724310)</b>						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
<b>Total Metals (QCLot: 731261)</b>						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
<b>Total Metals (QCLot: 731486)</b>						



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 731486) - continued</b>						
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	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 731486) - continued</b>						
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	----
<b>Dissolved Metals (QCLot: 724265)</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
<b>Dissolved Metals (QCLot: 729203)</b>						
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**

<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Result</i>	<i>Qualifier</i>
<b>Dissolved Metals (QCLot: 729203) - continued</b>						
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	----
<b>Aggregate Organics (QCLot: 723372)</b>						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----
<b>Aggregate Organics (QCLot: 723373)</b>						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----
<b>Aggregate Organics (QCLot: 735457)</b>						
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	
<b>Physical Tests (QCLot: 723035)</b>									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	98.9	85.0	115	----
<b>Physical Tests (QCLot: 723037)</b>									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
<b>Physical Tests (QCLot: 723038)</b>									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	97.5	90.0	110	----
<b>Physical Tests (QCLot: 724457)</b>									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	91.1	85.0	115	----
<b>Physical Tests (QCLot: 724463)</b>									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	89.3	85.0	115	----
<b>Anions and Nutrients (QCLot: 723039)</b>									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	104	90.0	110	----
<b>Anions and Nutrients (QCLot: 723040)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	98.9	90.0	110	----
<b>Anions and Nutrients (QCLot: 723041)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 723042)</b>									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	101	85.0	115	----
<b>Anions and Nutrients (QCLot: 723043)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	103	90.0	110	----
<b>Anions and Nutrients (QCLot: 723044)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	97.6	90.0	110	----
<b>Anions and Nutrients (QCLot: 723046)</b>									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	97.9	80.0	120	----
<b>Anions and Nutrients (QCLot: 728308)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	102	85.0	115	----
<b>Organic / Inorganic Carbon (QCLot: 728307)</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	108	80.0	120	----
<b>Total Metals (QCLot: 724309)</b>									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	99.0	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
<b>Total Metals (QCLot: 724310)</b>									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	95.7	80.0	120	----
<b>Total Metals (QCLot: 731261)</b>									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	100	80.0	120	----
<b>Total Metals (QCLot: 731486)</b>									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	100	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	114	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	99.8	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	110	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	96.9	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	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	100	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	99.9	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	97.7	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	95.4	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	94.8	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	99.2	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	99.3	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	104	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	104	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	103	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	108	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	94.5	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	107	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	91.0	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	98.4	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	101	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	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
<b>Total Metals (QCLot: 731486) - continued</b>									
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	96.6	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	97.0	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	99.1	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	101	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	91.4	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	98.5	80.0	120	----
<b>Dissolved Metals (QCLot: 729203)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	102	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	107	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	101	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	92.8	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	98.9	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	104	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	87.1	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	98.2	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	95.0	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	104	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	97.8	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	97.2	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	97.0	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	88.7	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	95.4	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	96.4	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	104	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	99.4	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	100	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	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
<b>Dissolved Metals (QCLot: 729203) - continued</b>									
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	102	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	101	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	100	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	95.4	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	99.5	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	94.6	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	97.4	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	97.9	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	99.8	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	93.8	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	95.5	80.0	120	----
<b>Aggregate Organics (QCLot: 723372)</b>									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	96.5	85.0	115	----
<b>Aggregate Organics (QCLot: 723373)</b>									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	93.6	85.0	115	----
<b>Aggregate Organics (QCLot: 735457)</b>									
chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	107	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
<b>Anions and Nutrients (QCLot: 723039)</b>										
VA22C6296-002	SW22-03	sulfate (as SO4)	14808-79-8	E235.SO4	104 mg/L	100 mg/L	104	75.0	125	----
<b>Anions and Nutrients (QCLot: 723040)</b>										
VA22C6296-002	SW22-03	fluoride	16984-48-8	E235.F	1.00 mg/L	1 mg/L	100	75.0	125	----
<b>Anions and Nutrients (QCLot: 723041)</b>										
VA22C6296-002	SW22-03	chloride	16887-00-6	E235.Cl	103 mg/L	100 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 723042)</b>										
VA22C6296-002	SW22-03	bromide	24959-67-9	E235.Br-L	0.515 mg/L	0.5 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 723043)</b>										
VA22C6296-002	SW22-03	nitrate (as N)	14797-55-8	E235.NO3-L	2.60 mg/L	2.5 mg/L	104	75.0	125	----
<b>Anions and Nutrients (QCLot: 723044)</b>										
VA22C6296-002	SW22-03	nitrite (as N)	14797-65-0	E235.NO2-L	0.498 mg/L	0.5 mg/L	99.6	75.0	125	----
<b>Anions and Nutrients (QCLot: 723046)</b>										
VA22C5469-004	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0354 mg/L	0.03 mg/L	118	70.0	130	----
<b>Anions and Nutrients (QCLot: 728308)</b>										
VA22C6200-006	Anonymous	ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	MS-B
<b>Organic / Inorganic Carbon (QCLot: 728307)</b>										
KS2204163-002	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
<b>Total Metals (QCLot: 724309)</b>										
KS2204153-002	Anonymous	mercury, total	7439-97-6	E508	0.000101 mg/L	0.0001 mg/L	101	70.0	130	----
<b>Total Metals (QCLot: 724310)</b>										
VA22C6296-007	SW22-09	mercury, total	7439-97-6	E508	0.0000969 mg/L	0.0001 mg/L	96.9	70.0	130	----
<b>Total Metals (QCLot: 731261)</b>										
VA22C6307-012	Anonymous	mercury, total	7439-97-6	E508	0.0000917 mg/L	0.0001 mg/L	91.7	70.0	130	----
<b>Total Metals (QCLot: 731486)</b>										
FJ2203115-013	Anonymous	aluminum, total	7429-90-5	E420	0.200 mg/L	0.2 mg/L	100	70.0	130	----
		antimony, total	7440-36-0	E420	0.0210 mg/L	0.02 mg/L	105	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0200 mg/L	0.02 mg/L	100	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
<b>Total Metals (QCLot: 731486) - continued</b>										
FJ2203115-013	Anonymous	beryllium, total	7440-41-7	E420	0.0380 mg/L	0.04 mg/L	94.9	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00970 mg/L	0.01 mg/L	97.0	70.0	130	----
		boron, total	7440-42-8	E420	0.093 mg/L	0.1 mg/L	92.8	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00398 mg/L	0.004 mg/L	99.5	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	0.0104 mg/L	0.01 mg/L	104	70.0	130	----
		chromium, total	7440-47-3	E420	0.0393 mg/L	0.04 mg/L	98.2	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0190 mg/L	0.02 mg/L	94.9	70.0	130	----
		copper, total	7440-50-8	E420	0.0188 mg/L	0.02 mg/L	93.9	70.0	130	----
		iron, total	7439-89-6	E420	1.88 mg/L	2 mg/L	94.2	70.0	130	----
		lead, total	7439-92-1	E420	0.0188 mg/L	0.02 mg/L	94.3	70.0	130	----
		lithium, total	7439-93-2	E420	0.0934 mg/L	0.1 mg/L	93.4	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	0.0188 mg/L	0.02 mg/L	94.0	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0207 mg/L	0.02 mg/L	104	70.0	130	----
		nickel, total	7440-02-0	E420	0.0385 mg/L	0.04 mg/L	96.3	70.0	130	----
		phosphorus, total	7723-14-0	E420	9.56 mg/L	10 mg/L	95.6	70.0	130	----
		potassium, total	7440-09-7	E420	4.46 mg/L	4 mg/L	111	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0196 mg/L	0.02 mg/L	98.2	70.0	130	----
		selenium, total	7782-49-2	E420	0.0426 mg/L	0.04 mg/L	107	70.0	130	----
		silicon, total	7440-21-3	E420	9.20 mg/L	10 mg/L	92.0	70.0	130	----
		silver, total	7440-22-4	E420	0.00395 mg/L	0.004 mg/L	98.8	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	ND mg/L	20 mg/L	ND	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0388 mg/L	0.04 mg/L	97.0	70.0	130	----
		thallium, total	7440-28-0	E420	0.00370 mg/L	0.004 mg/L	92.6	70.0	130	----
		thorium, total	7440-29-1	E420	0.0210 mg/L	0.02 mg/L	105	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	0.0376 mg/L	0.04 mg/L	94.0	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0188 mg/L	0.02 mg/L	94.3	70.0	130	----
		uranium, total	7440-61-1	E420	0.00388 mg/L	0.004 mg/L	97.1	70.0	130	----
		vanadium, total	7440-62-2	E420	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		zinc, total	7440-66-6	E420	0.382 mg/L	0.4 mg/L	95.4	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0423 mg/L	0.04 mg/L	106	70.0	130	----



Sub-Matrix: Water

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 724265)</b>										
VA22C6289-002	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000973 mg/L	0.0001 mg/L	97.3	70.0	130	----
<b>Dissolved Metals (QCLot: 729203)</b>										
FJ2203114-002	Anonymous	aluminum, dissolved	7429-90-5	E421	0.187 mg/L	0.2 mg/L	93.6	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0191 mg/L	0.02 mg/L	95.6	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0193 mg/L	0.02 mg/L	96.3	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	0.0358 mg/L	0.04 mg/L	89.4	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00828 mg/L	0.01 mg/L	82.8	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.086 mg/L	0.1 mg/L	86.1	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00376 mg/L	0.004 mg/L	93.9	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	0.00956 mg/L	0.01 mg/L	95.6	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0369 mg/L	0.04 mg/L	92.2	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0179 mg/L	0.02 mg/L	89.7	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0178 mg/L	0.02 mg/L	89.1	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.76 mg/L	2 mg/L	88.0	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0178 mg/L	0.02 mg/L	88.8	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.0829 mg/L	0.1 mg/L	82.9	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	0.0174 mg/L	0.02 mg/L	87.0	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0195 mg/L	0.02 mg/L	97.5	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0368 mg/L	0.04 mg/L	92.1	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	9.56 mg/L	10 mg/L	95.6	70.0	130	----
		potassium, dissolved	7440-09-7	E421	3.96 mg/L	4 mg/L	99.1	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0194 mg/L	0.02 mg/L	96.8	70.0	130	----
		selenium, dissolved	7782-49-2	E421	ND mg/L	0.04 mg/L	ND	70.0	130	----
		silicon, dissolved	7440-21-3	E421	8.90 mg/L	10 mg/L	89.0	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00356 mg/L	0.004 mg/L	88.9	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	0.0368 mg/L	0.04 mg/L	92.1	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00356 mg/L	0.004 mg/L	89.1	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0199 mg/L	0.02 mg/L	99.7	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0188 mg/L	0.02 mg/L	93.9	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
<b>Dissolved Metals (QCLot: 729203) - continued</b>										
FJ2203114-002	Anonymous	titanium, dissolved	7440-32-6	E421	0.0366 mg/L	0.04 mg/L	91.6	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0184 mg/L	0.02 mg/L	91.8	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	0.0971 mg/L	0.1 mg/L	97.1	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.358 mg/L	0.4 mg/L	89.6	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0392 mg/L	0.04 mg/L	97.9	70.0	130	----
<b>Aggregate Organics (QCLot: 735457)</b>										
FJ2203114-002	Anonymous	chemical oxygen demand [COD]	----	E559-L	102 mg/L	100 mg/L	102	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**

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COC-Number 17

Page

Environmental Division  
Vancouver  
Work Order Reference  
**VA22C6296**



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<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to...</b>																																																																																																																																																																																		
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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"/>				1 Business d																																																																																																																																																																														
Phone: 250-641-4141		<input checked="" type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			3 day [P3-26%] <input type="checkbox"/>				Same Day, W (Laboratory)																																																																																																																																																																														
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: enviro.dept@rdks.bc.ca			Date and Time Required for all E&P TATs: >																																																																																																																																																																																		
City/Province: Terrace BC		Email 2: hshinton@rdks.bc.ca			For tests that can not be performed according to the service level see																																																																																																																																																																																		
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<b>Invoice To</b>		<b>Invoice Distribution</b>			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P)																																																																																																																																																																																		
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			<table border="1"> <tr> <th></th> <th>P</th> <th>F/P</th> <th>P</th> <th></th> <th>P</th> <th>P</th> <th>F/P</th> <th>P</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> </tr> <tr> <td rowspan="12"><b>NUMBER OF CONTAINERS</b></td> <td>pH, Conductivity, Specific Conductivity, TSS, TP</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>Bromide, Chloride, Fluoride, Sulphate</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>Dissolved Metals</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>Total Metals</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>Alkalinity Total (CaCO3), Hardness</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>COD, BOD</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>Orthophosphate</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>Nitrate, Nitrite, Nitrate+Nitrite</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>DOC</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>Ammonia</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>													P	F/P	P		P	P	F/P	P								<b>NUMBER OF CONTAINERS</b>	pH, Conductivity, Specific Conductivity, TSS, TP															Bromide, Chloride, Fluoride, Sulphate															Dissolved Metals															Total Metals															Alkalinity Total (CaCO3), Hardness															COD, BOD															Orthophosphate															Nitrate, Nitrite, Nitrate+Nitrite															DOC															Ammonia														
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	Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Email 1 or Fax: anne-maries@rdks.bc.ca																																																																																																																																																																																				
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Contact: Hannah Shinton																																																																																																																																																																																							
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>																																																																																																																																																																																					
ALS Account # / Quote #: VA19-RDKS100-001		AFE/Cost Center: PO#																																																																																																																																																																																					
Job #: Meziadin Landfill Surface Water		Major/Minor Code: Routing Code:																																																																																																																																																																																					
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LSD:		Location:																																																																																																																																																																																					
ALS Lab Work Order # (lab use only):		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	pH	Conductivity	Specific Conductivity	TSS	TP	Bromide	Chloride	Fluoride	Sulphate	Dissolved Metals	Total Metals	Alkalinity Total (CaCO3)	Hardness	COD	BOD	Orthophosphate	Nitrate	Nitrite	Nitrate+Nitrite	DOC	Ammonia																																																																																																																																																												
	SW22-01		26-Oct-22	15:14	Surface Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R																																																																																																																																																												
	SW22-03		26-Oct-22	13:44	Surface Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R																																																																																																																																																												
	SW22-04		26-Oct-22	14:06	Surface Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R																																																																																																																																																												
	SW22-05		26-Oct-22	11:01	Surface Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R																																																																																																																																																												
	SW2017-01 DS		26-Oct-22	10:00	Surface Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R																																																																																																																																																												
	SW2017-02 US		26-Oct-22	8:40	Surface Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R																																																																																																																																																												
	SW22-09		26-Oct-22	12:00	Surface Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R																																																																																																																																																												
	Treatment Lagoon		26-Oct-22	11:40	Effluent	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R																																																																																																																																																												
	Travel Blank		26-Oct-22	nr	Water	R																																																																																																																																																																																	
	Field Blank		26-Oct-22	14:25	Water	R																																																																																																																																																																																	

Terrace Shipping  
# 3 Coolers Ground     
# Carbouys Air SFX

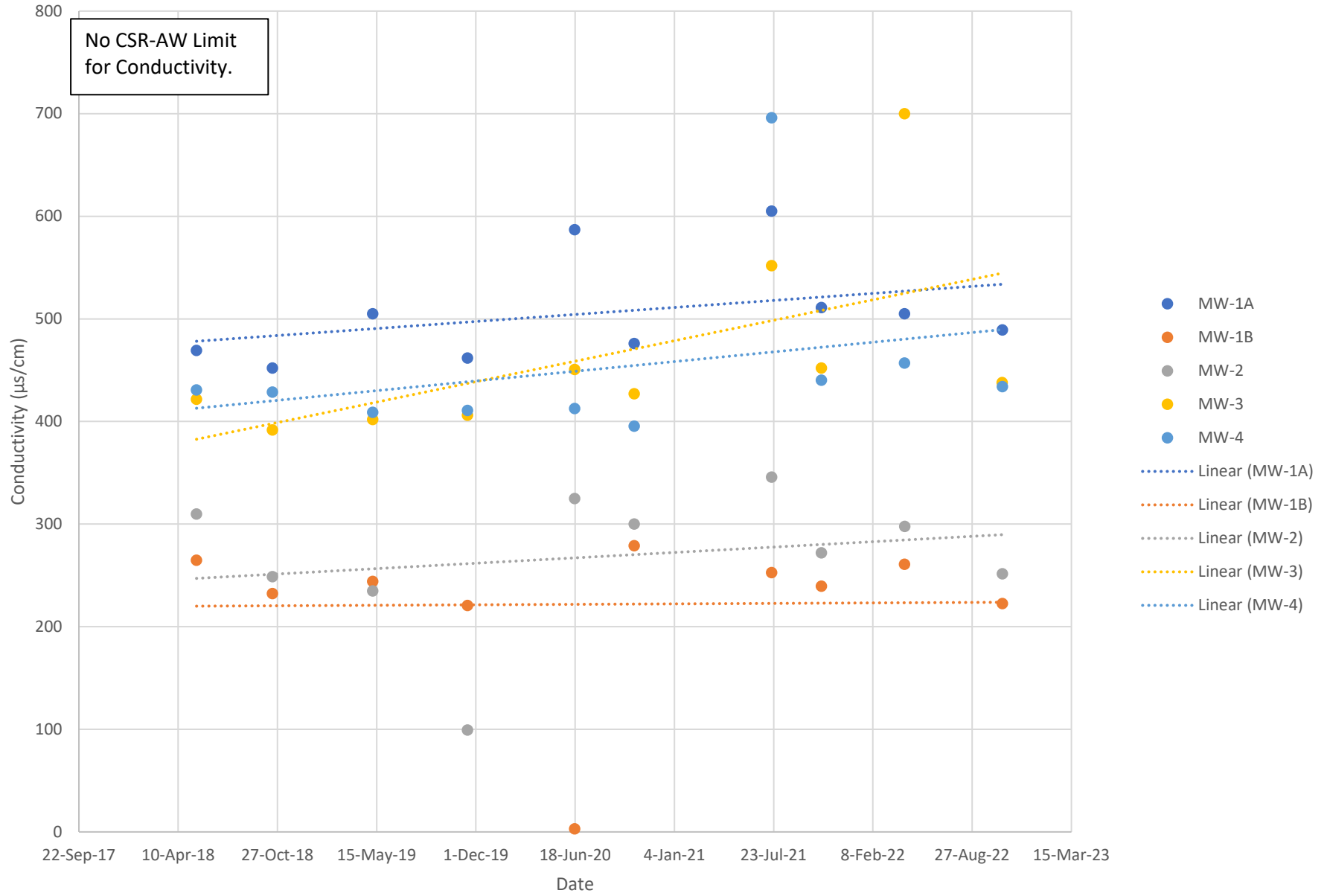
**SAMPLES ON HOLD**

<b>Drinking Water (DW) Samples (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>				<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>											
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		SW22-02, SW22-03, SW22-05 renamed from SW17 prefix Please use -AW, -DW and Wildlife guidelines for surface water				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					
						7.6 7.8						7.5 5					
<b>SHIPMENT RELEASE (client use)</b>				<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>				<b>FINAL SHIPMENT RECEPTION (lab use only)</b>									
Released by: N LAVOIE		Date: Oct 28 2022		Time:		Received by: Chris		Date: 28 Oct 22		Time: 12:30		Received by: Jc		Date: 29/10/22		Time: 12 pm	

## Appendix H      Trend Analysis

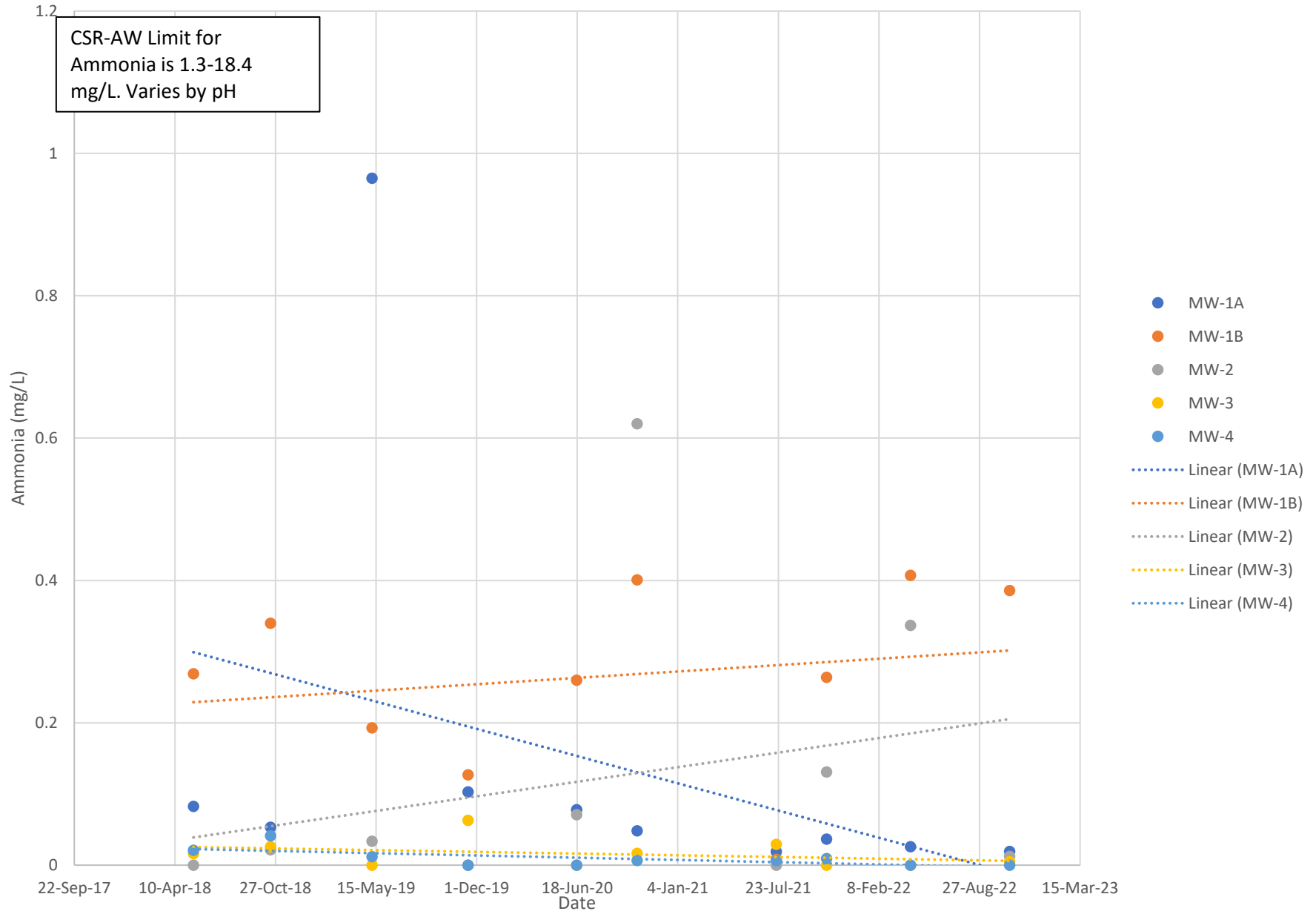


# Conductivity

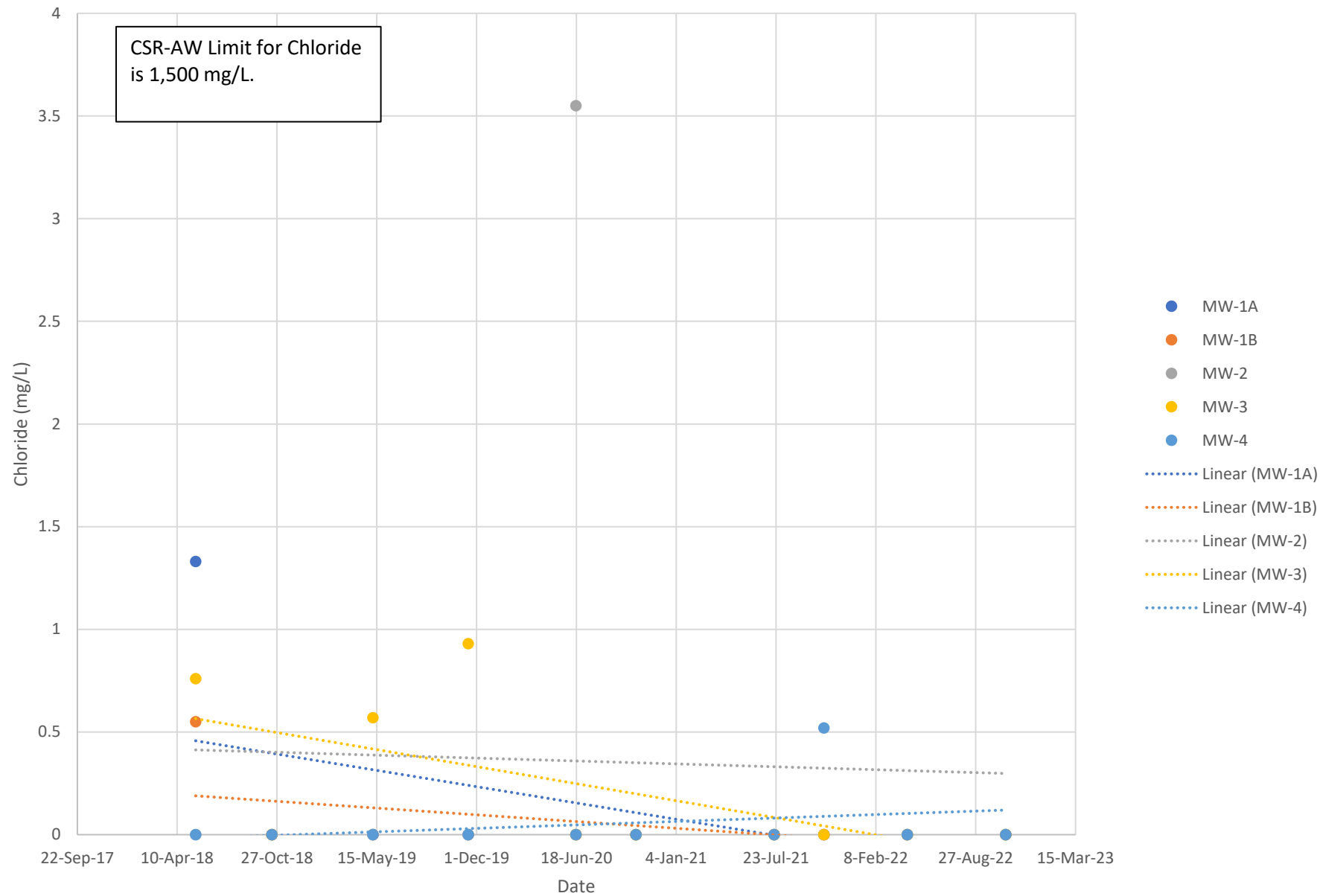




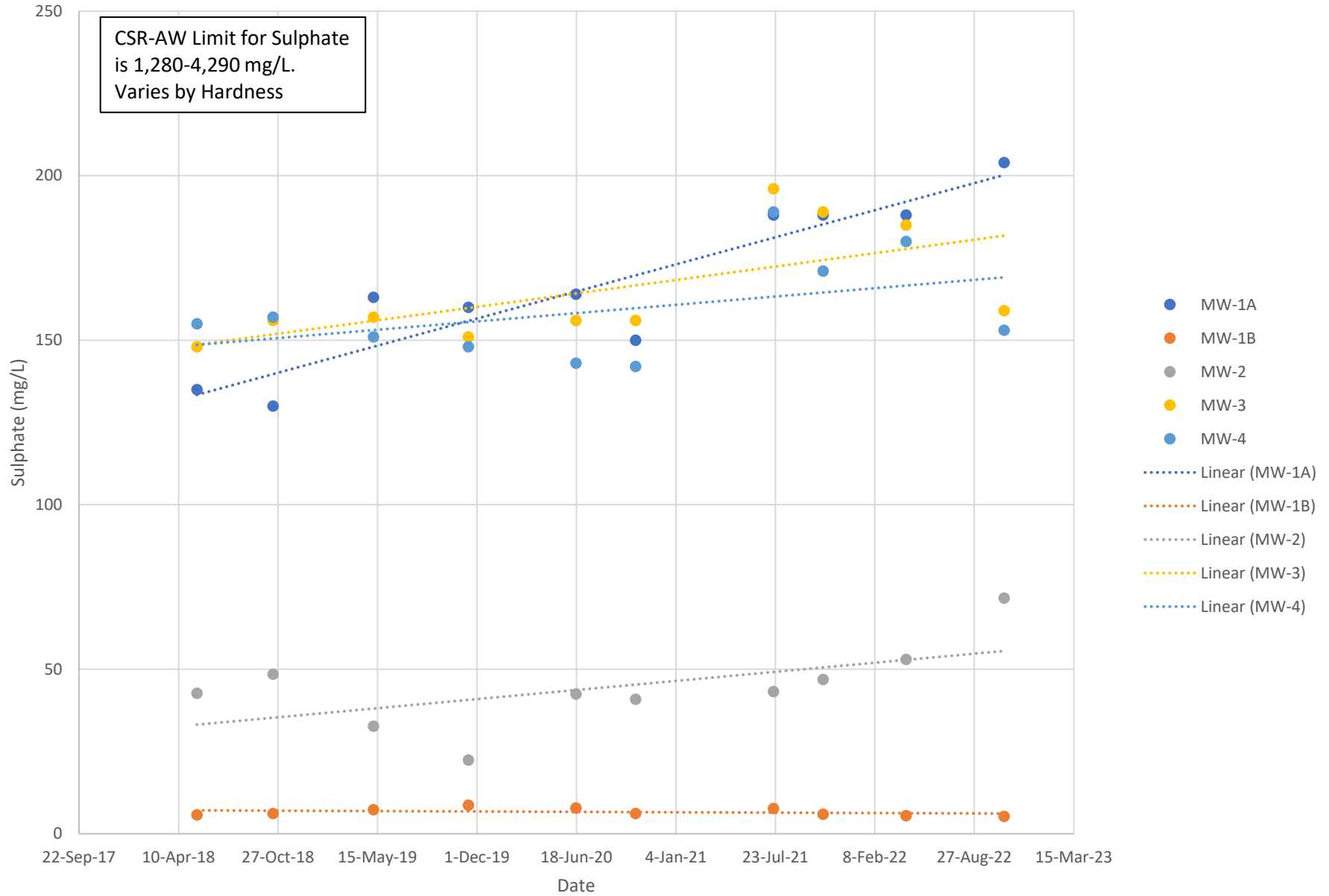
# Ammonia



# Chloride

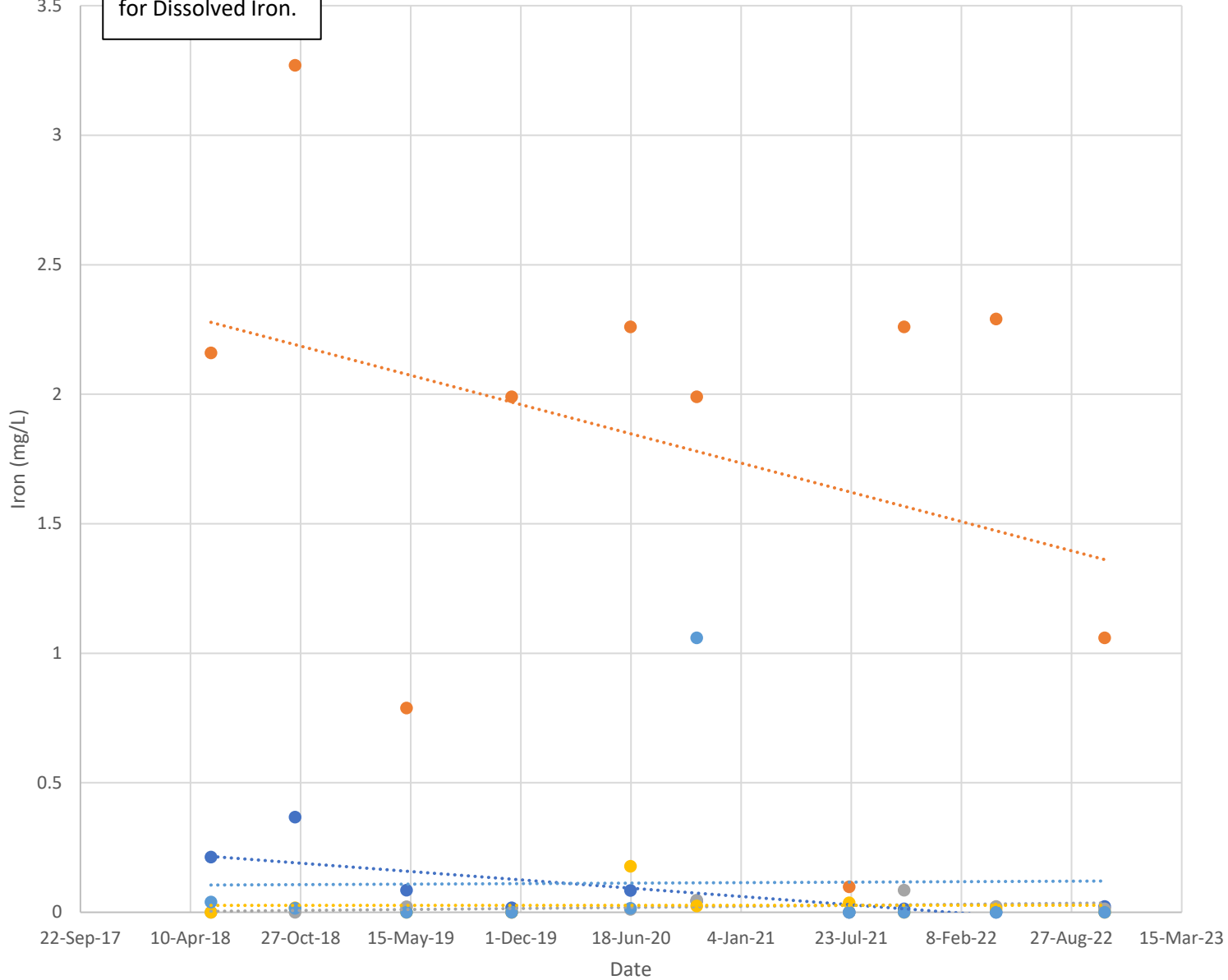


# Sulphate

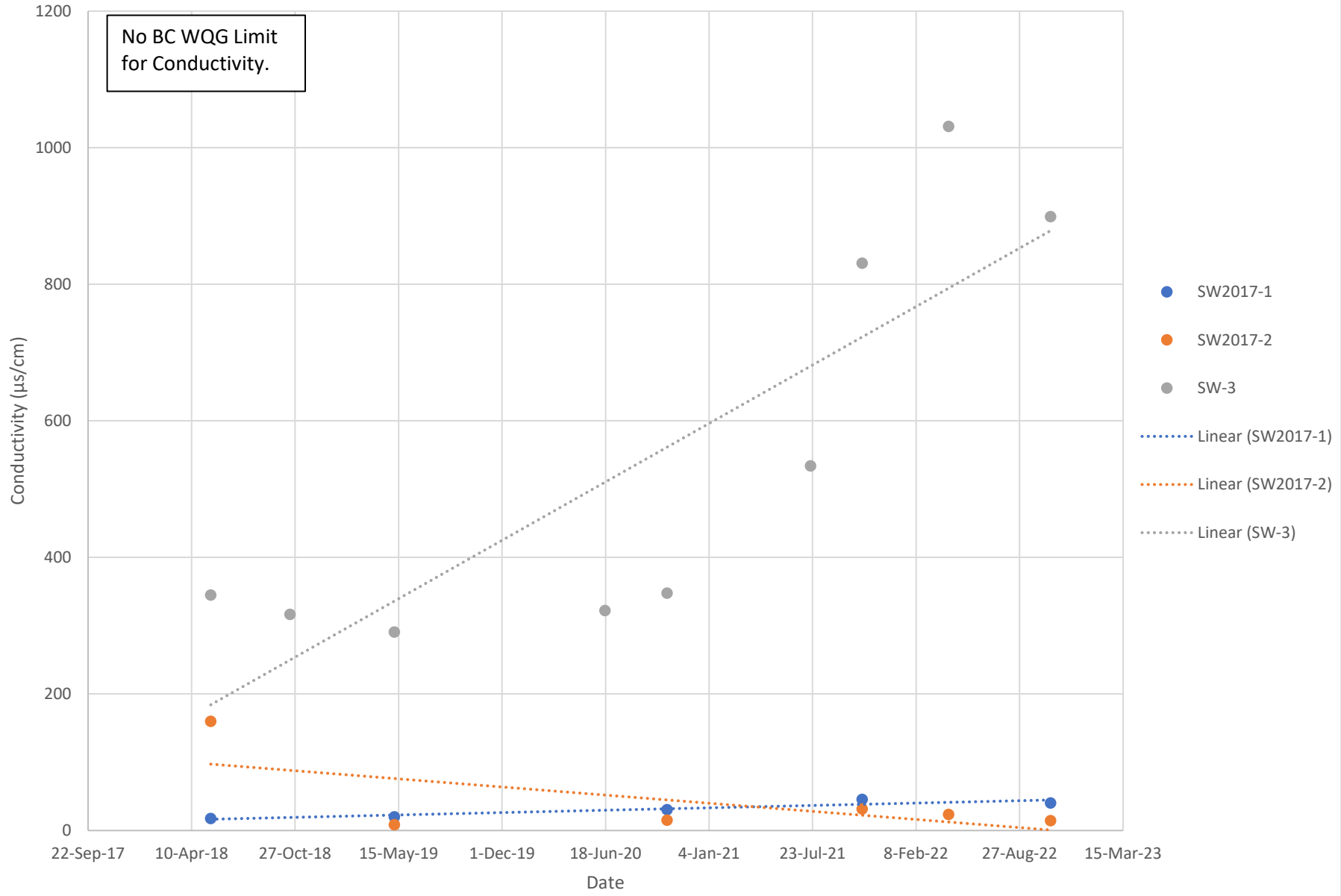


### Dissolved Iron

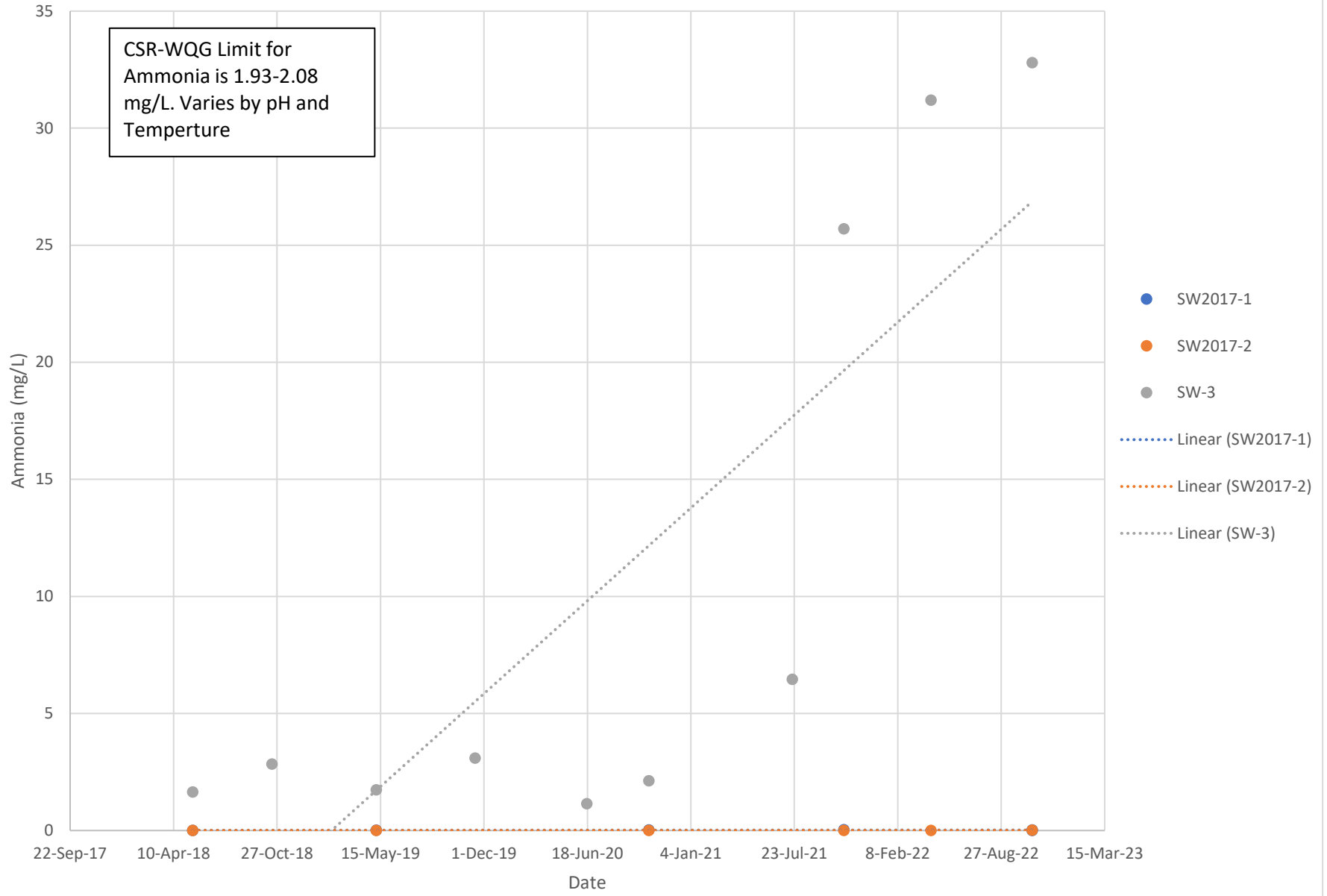
No CSR-AW Limit  
for Dissolved Iron.



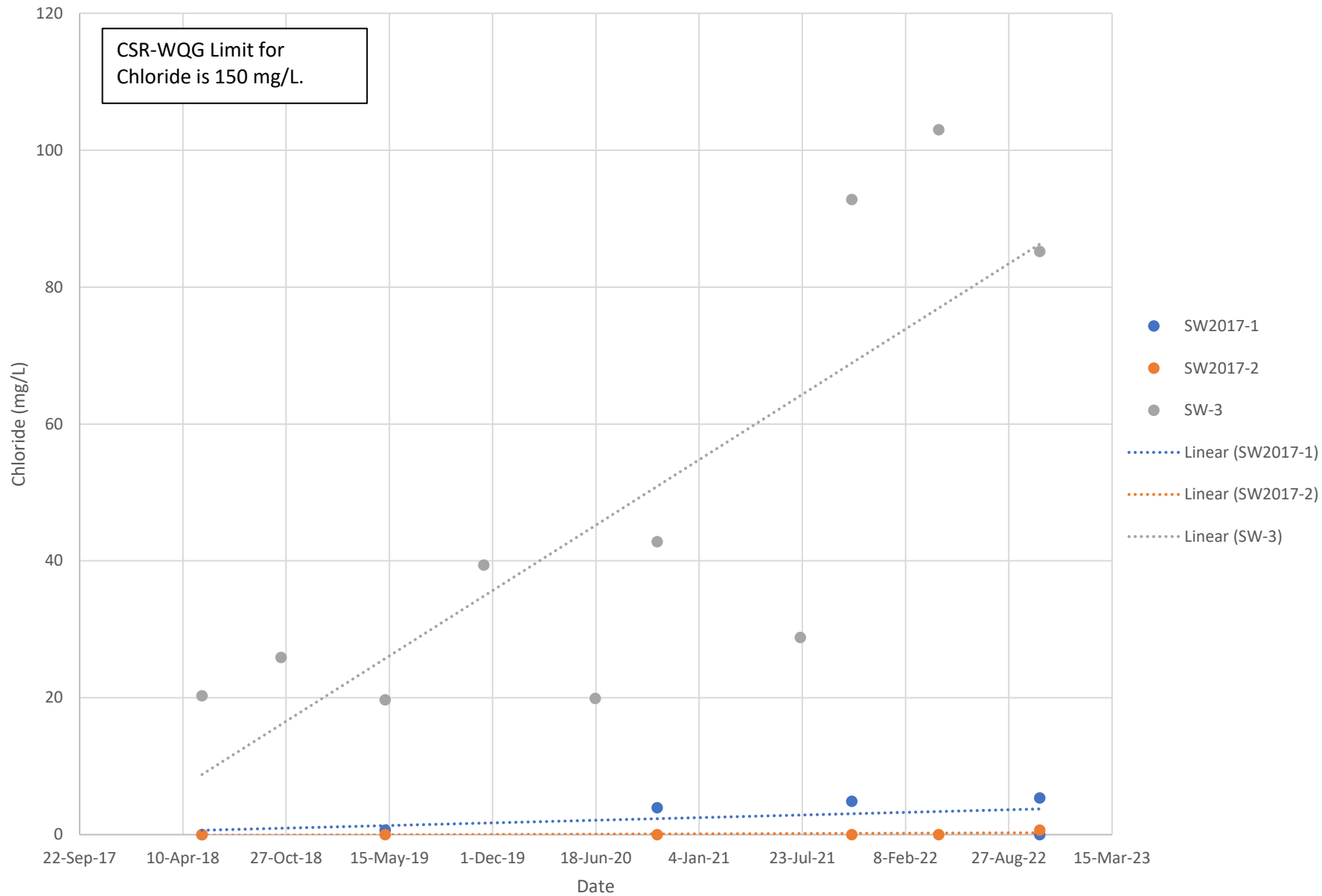
# Conductivity



# Ammonia



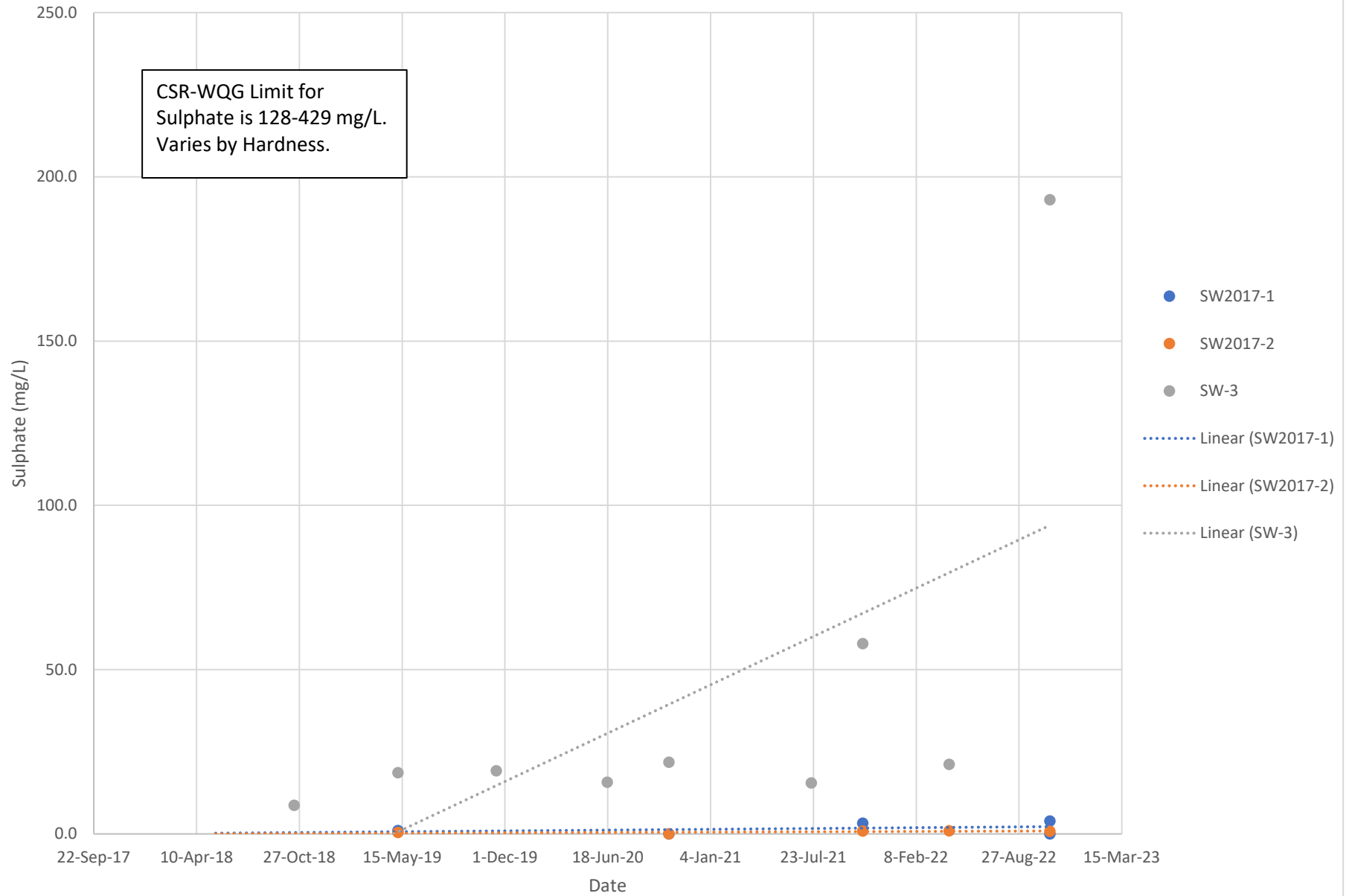
# Chloride



CSR-WQG Limit for Chloride is 150 mg/L.

- SW2017-1
- SW2017-2
- SW-3
- ..... Linear (SW2017-1)
- ..... Linear (SW2017-2)
- ..... Linear (SW-3)

# Sulphate





# Total Iron

